BUEM AGRICULTURAL STRATEGIES AND CROP CHOICES AS ADAPTABILITY PRACTICES: SOCIAL RESPONSES TO ENVIRONMENTAL CHANGE IN A RURAL GHANAIAN FARMING COMMUNITY

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Buem Agricultural Strategies and Crop Choices as Adaptability Practices: Social Responses to Environmental Change in a Rural Ghanaian Farming Community

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DEDICATION

To my son Dylan, who has crafted the world anew for me.

Do not call the forest that shelters you a jungle.

- Ashanti Proverb from Ghana

ABSTRACT OF THE THESIS

Buem Agricultural Strategies and Crop Choices as Adaptability Practices: Social Responses to Environmental Change in a Rural Ghanaian Farming Community

by
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This research examines local perceptions of environmental change and their related adaptability practices through an analysis of agricultural strategies and crop choices in Guaman-Buem, a rural farming community in Ghana, West Africa that is experiencing significant weather and other environmental changes. The research addresses how farmers in Guaman-Buem have come to re-evaluate their agricultural strategies in relation to climate change and local experiences of environmental change. Buem history, society, and culture and the narratives that embody Buem understandings of the environment and environmental change are analyzed in relation to agricultural strategies and crop choices. Dominant global definitions and understandings of adaptation in local contexts, particularly in Africa, assume that local subsistence strategies are incapable of dealing with climate change. However, the details of local African adaptation strategies and the relationship between local understandings of environmental change and adaptation have not been thoroughly documented. This research employed household surveys, ethnographic interviews, focus groups, and participant observation to examine rural farmers' agricultural strategies and illustrate how communities are observing and responding to environmental change. This research demonstrates that Buem farmers are experiencing environmental change through bush fires, droughts, extreme weather, weaker agricultural yields, and a steady decline in natural resources. They are responding to these challenges by experimenting with various imported agricultural strategies, creating safety nets through the extended cultivation of crops resistant to various environmental perturbations, and diversifying their crop choices. Such social responses, largely ignored by the literature on climate change and adaptability, are of crucial importance for understanding local adaptive capacity and indentifying the community and household level social institutions and strategies that are most likely to be effective in adapting to future environmental change.

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CHAPTER 1

INTRODUCTION

ENVIRONMENTAL CHANGE AND HUMAN-ENVIRONMENT RELATIONSHIPS IN GUAMAN-BUEM

"We are not waiting for something big to happen. That is not how this problem has come to us, like a bush fire or a famine. It has been slow but sure, like a tortoise. We are not continuing on as we were 70, 60, or even 50 years ago. Things are different now, and we are farming in a way that I think is suitable to these new conditions" (Akan[1], Personal interview, December 15, 2009). Kojo Akan, a 65 year old farmer and president of a community-based farmer organization in Guaman-Buem, was speaking slowly and confidently at a small restaurant and drinking spot that was nestled underneath a coconut grove just off the main dusty dirt road that runs through Guaman. The restaurant, "Marry Me Chop Bar and Drinking Spot," is a place where Buems get together to talk, relax, and enjoy cold drinks. It is an open space with an overhang and no windows to block the much-needed breeze, but enclosed enough to keep out the torrents of rain that sometimes assault the village. We were seated at a large white table with six flimsy plastic chairs circled around it, my digital recorder in the middle and a plate of cookies next to it. We were both sweating profusely, as a thunderhead was climbing over the mountains to the east of the village and had sent a sauna-like wave of heat to clear the way for a downpour. "All of these questions about what we are going to do, who we want to help us, and where we are going to go are, excuse me to say, rubbish questions. We have already changed our diet, started farming new crops, and learned to react to the weather in new ways" (Akan, Personal interview, December 15, 2009). He was responding to a small section of the Intergovernmental Panel on Climate Change's (IPCC) 2007 report on Africa that described the potential of climate change in equatorial Africa as very precarious. In particular, he was reacting to the IPCC's claim that, with "high confidence," they can declare that Africans have very low adaptive capacity, have an

[1] To protect anonymity, all names are pseudonyms unless otherwise stated.

agricultural system that will be insufficient in the face of climate change, and that agricultural food production will be severely impacted by climate change (Boko et al. 2007:435). I had just read the executive summary to him, and he was disturbed and surprised that an organization like the IPCC would make such claims. “I have been living and working in Guaman-Buem my whole life, and I have never seen anyone come here and ask us what we would do if the environment changed. So how can they know? Besides, why should I care? These are the people who just failed to make an agreement in Copenhagen” (Akan, Personal interview, December 15, 2009). Just a week earlier, the United Nations Climate Change Conference in Copenhagen had failed to produce an agreement that would compel industrialized countries to reduce carbon emissions and support global efforts to deal with climate change. “Even if they do have a good point to make, no one is going to move to do anything about it,” he shrugged (Akan, Personal interview, December 15, 2009).

What Kojo was saying on this hot, humid afternoon was a concise reflection of contemporary, evolving adaptability strategies and environmental perspectives in Guaman-Buem. Intricately linked through narratives to other facets of Buem society, these perspectives and strategies reflect a desire to maintain a society undergoing change from all directions, but which seeks to maintain its independence and cultural character. This is not to say that Buems have a static identity that is being upheld through intransigence; Buem culture and society have always been shifting and changing (Nugent 2002). It also shouldn’t be interpreted as meaning that Buems feel that they will be able to adapt to any and all environmental changes – poor farmers with infertile soil cannot produce an adequate amount of food . Also, it does not suggest that Buem farmers don’t need help to strengthen their agricultural strategies – they certainly do. This is precisely why Kojo, quoted above, has applied for several Peace Corps volunteers. But what his comments *do* reflect is the ability to adjust to gradual environmental changes, and to move forward despite the outside world’s seemingly careless attitude to climate change and its effects on subsistence farmers. Kojo was not upset that organizations like the IPCC were discussing the problem of climate change and trying to find common ground to formulate solutions, he was upset that he couldn’t locate his voice anywhere in the IPCC’s executive summary. What made him irate, however, was that the IPCC identified him as the individual with low adaptive capacity,

despite the fact that he nor anyone he had ever met had been asked how they were adapting to environmental change.

I first rambled into Guaman-Buem on a humid November night in 2005. After traveling by *tro-tro*[2] for 19 hours from Techiman in the Brong-Ahafo region, I descended from the vehicle, stretched my knotted-up limbs, unloaded my bags, and stood on the side of the road absorbed in a very sudden darkness. I was a young Peace Corps volunteer at the time, fresh out of college, and ready to help with whatever endeavors the NGO I was assigned to work with had on their agenda. I was also the first Peace Corps volunteer to work in Guaman, or anywhere in the ancient Buem state that stood in the heart of the Volta Region on the northern fringes of the semi-deciduous rain-forest. I was prepared to empower local women to speak up and take the proverbial wheel; I was ambitious about planting trees and establishing a village nursery; I wanted to help prevent the spread of HIV/AIDS through advocacy in schools and market squares; I was full of energy, vision, and charisma. The following two years would produce a mixed harvest of successes, failures, and incredible experiences. What I didn't know at the time was that I would soon become an Nkusuohene (sub-chief of development) in the village and go through the necessary rituals to become a citizen of the community, owing my allegiance to the village chief Nana Sampson Ofori IV and prepared to take on responsibilities within the clan that adopted me. I also didn't know that five years later I'd be sitting at a drinking spot some 100 yards away from where I stood on that sticky November night, still asking the same questions about environmental change and what Buem farmers were doing to cope with it.

This study focuses on the dynamic ways in which this particular rural Ghanaian farming community is understanding and interacting with a changing environment. By "changing environment," I am not implying an environment solely undergoing transformations that are the consequences of climate change. In fact, "global climate change" as it is understood by biological and physical scientists from the developed world is not a concept that many individuals in this particular community invoke to explain perturbations in their surrounding environment. Perturbations in weather patterns and weaknesses in the integrity of the ecosystem are mostly understood in terms of practices that are occurring

[2] A *tro-tro* is a van or mini-bus in Ghana that has been converted into a vehicle for public transportation.

locally – land mismanagement, excessive logging, corruption, and generational gaps in the transmission of local agricultural knowledge. Aside from perceived patterns of savannization and climate desiccation, political and economic forces driven by international variables are alluded to as a means of explaining transformations in the landscape surrounding the community of Guaman-Buem. Negligence towards traditional practices, including ancestral worship and the abandonment of certain "taboo areas," is also alluded to as a cause of deleterious environmental perturbations. Over the past thirty years intensive logging, cocoa production for global markets, demands for staple crops from urban centers, continuous cultivation due to a mixture of population pressure and patrilineal land inheritance rights, the introduction of agrichemicals, and proposed mineral extraction projects have inspired a discourse of massive environmental change among Buems. Setting aside controversies surrounding the strength or even validity of global climate change, subsistence farmers in Guaman-Buem are observing and reacting to environmental change at unprecedented, multifaceted levels.

One of the unintended consequences of shifting the focus of environmental change research solely to global climate change has been to ignore other drivers of environmental degradation[3]. Many of the day-to-day realities that Buems are learning to cope with are the direct consequences of *other* clearly identifiable causes: logging by timber companies, the use of agrichemicals by "wealthier" farmers, a land tenure system that is groaning under the weight of a rising population, and the use of fire by pastoralists from northern Ghana to encourage the germination of saplings for their livestock. This is not to argue that some of these drivers are not also the consequence of global climate change – it has been argued by Brown et al. (2007) that pastoralists are moving with the southward shift of the savanna into the Guinean rainforests. One of the concerns that many Buem farmers brought up during the course of my research was that, according to what they were hearing from the media and other sources, too much focus was being placed on what *may* happen and not what *is* happening. Emilia Darko, a peasant farmer in her 60s, commented that "Things are already

[3] This is not to argue that the environmental change discussed here and global climate change are mutually exclusive. I simply want to point out that *other* kinds of large-scale environmental changes are, and have been, occurring as a result of diverse forces.

very bad. If it is to get worse, should we not at least see to the mess there is now?" (Darko, Interview, June 1, 2010).

How rural Buem farmers are understanding and "adapting" to these perceived changes in the environment defines the contours of my core research question. Subsumed within this core research question is a concern with how rural African farmers are *expected* to adapt to global climate change. Are the propositions for adaptation made by international institutions, such as the Intergovernmental Panel on Climate Change (IPCC), appropriate for how farmers are envisioning their future environment and their own set of adaptive strategies? This research suggests that Buem farmers have an understanding of adaptability that acts as a negotiation with a changing environment. In other words, even though Buem farmers don't articulate a term or explicit concept synonomous with the word "adaptability," their suite of crop choices and agricultural strategies represents a flexible engagement with an uncertain environment that has, at its core, an adaptability strategy.

Mohammed Antwi, a well-to-do farmer in his mid-40s, argues that "if the weather dries out and the forests retreat, we are prepared to adapt because migrants from the north are already teaching us how to use the hoe, how to graze cattle and other such things." Other farmers are trying to regenerate forest cover using agro-forestry techniques, creating a canopy under which they can revitalize cocoa cultivation. Some are initiating alternative livelihood projects, trying to rear grasscutters (large rodents that are considered a delicacy in Ghana), cultivate oyster mushrooms in small structures, harvest honey through beekeeping, or establish palm liquor distilleries. All of these subsistence strategies act as on-going negotations and experimentations with an uncertain environment. Other farmers – though a vast minority - argue that the environment is, in fact, not changing at all and that there is no reason for concern. In the end, Buem farmers will engage in diverse agricultural practices and income-generating activities, and will learn from each other what methods and strategies work best. They will also continue to participate in international environmental development programs funded by developed and even developing countries. There is no singular "Buem response" to environmental change, but rather a suite of responses that borrow, experiment, and evolve depending on their variable successes, benefits, or failures. Nevertheless, on the most intimate scale of farmer-environment interactions through crops, technologies, and imaginings of farm ecosystems, some striking adaptability practices are taking precedence.

These practices, among others, include the incorporation of imported agricultural strategies and the redundant cultivation of less risky crops. This research describes some of these practices in the context of Buem.

CLIMATE CHANGE, ADAPTATION, AND THE SOCIAL SCIENCES

Concerns about environmental change have become widespread during the early twenty-first century, with global campaigns and research agendas focusing on issues of climate change (Adger et al. 2009; Crate and Nutall 2009; Houghton et al. 2001), deforestation (Fairhead and Leach 1998; Laurance 1999; Vajpeyi 2001), species loss (Malcolm et al. 2006; Schwartz et al. 2008; Wake and Vredenburg 2008), and degradation of the world's oceans and fisheries (Coulthard 2008; Lotze 2006; Worm et al. 2006). There is increasing evidence that underdeveloped countries will bear much of the brunt of global climate change, with the African continent in particular anticipating severe savannization and desertification (Adger et al. 2007; Haile 2005; Huq et al. 2003; Kurukulasuriya et al. 2006; Mertz, Halsnaes et al. 2009).

These global discourses on environmental change, however, have been dominated by Western conservation organizations, universities, international organizations such as the United Nations, and non-governmental organizations such as the World Wildlife Fund and Greenpeace (Brosius 1999; Fairhead and Leach 2003; Forsyth 2003). These discourses frame the problem from a Western perspective emphasizing complex global models and proposed solutions in the forms of external "expert-based" interventions, thus marginalizing local experiences and reactions to climate change (Glantz and Feingold 1992; Magistro and Roncoli 2001; Proctor 1998; Smithers and Smit 1997; Stern et al. 1992). At times, these discourses have been shown to be disingenuous, locating problems and areas for intervention where crises don't necessarily exist (Fairhead and Leach 2003). More importantly, these discourses are more concerned with modeling future scenarios of climate change than examining more immediate and imminent human vulnerabilities (Crate and Nuttall 2009).

The concept of "adaptability" has been defined in many ways in the literature on climate change. According to Crate and Nuttall (2009), adaptability has become a research and policy priority in the global discourse on climate change. The meaning of the concept, however, has not been agreed upon in academic and development circles. According to Ben

Orlove (2009), the term "serves the international and intermediary organizations far better than the local communities who feel the impacts most directly; rather than transforming the great fear of a hotter planet into sustained action to address the consequences of climate change, the term can create a sense of complacency" (132). The context in which adaptability has traditionally been discussed has been biased towards a "global" perspective, focusing more on large-scale climatic issues with modeling exercises that serve to obscure local level impacts (Magistro and Roncoli 2001). This has prompted many social scientists to look at issues of scale – from the global to the local - and examine how adaptability works at local levels (Glantz and Feingold 1992; Ingold 1993; Magistro and Roncoli 2001; Orlove 2009; Proctor 1998; Smithers and Smit 1997; Stern et al. 1992). In other words, adaptability as it is described by international organizations has assumed that local-level responses to environmental change are inadequate and that global-scale interventions are necessary to ensure adaptation to climate change. Social scientists, on the other hand, have attempted to approach the concept of adaptability from more local, small-scale levels and have proposed that certain communities have the capacity to deal with certain levels of environmental change through their own strategies (Gyampoh et al. 2009).

Another key concept in the literature on adaptation is "adaptive capacity." This concept, according to Smit and Wandel (2006) is "similar or closely related to a host of other commonly used concepts incuding adaptability, coping ability, management capacity, stability, robustness, flexibility, and resilience" (Smit and Wandel 2006: 287). Though the term is obviously vague, it requires some basic explanation in the context of this anthropological research. Smit and Wandel (2006) go on to argue that adaptive capacity can be partially determined by its social and economic context, political factors, and infrastructural context. Adaptive capacity varies "from country to country, from community to community" and "over time" (287). They stress that adaptive capacity occurs at many scales that are "not independent or separate" (287). For example, a household that engages in a particular activity that increases their adaptive capacity is likely to be part of an "enabling community" (287) that holds a kind of knowledge or principle which makes the overall adaptive capacity of that community stronger. On the other hand, a community that experiences interference from external political, social, or economic forces may see their adaptive capacity decline. Some of these issues are discussed in Chapter 7 of this thesis.

The Intergovernmental Panel on Climate Change (IPCC) defines "the emerging range of livelihood adaptation practices" in Africa as surrounding themes such as "diversification of livelihood activities, institutional architecture (including rules and norms of governance), adjustments in farming operations, income-generation projects and selling of labour (e.g, migrating to earn an income) and the move towards off or non-farm livelihood incomes" (Boko et al. 2007:452). In their discussions on agriculture, the IPCC examines adaptation to climate change in terms of regional and domestic institutions and infrastructural capabilities of agricultural systems. One of the key assumptions, in other words, is that *relevant* agricultural systems are large-scale and not subsistence oriented. In this sense, the IPCC defines African adaptive capacity as being very low, thus making rural Africans seem more vulnerable to climate change because they lack the technical and institutional complexity to deal with such crises. Ways of addressing such crises are proposed that involve state-led, technical interventions into the agricultural sectors of African economies. Though indigenous knowledge is referred to in the IPCC's analysis of adaptation, it is framed in a way that makes it appear conducive for external interventions yet not powerful enough on its own to deal with environmental crises (Boko et al. 2007). For example, the IPCC states that indigenous environmental knowledge "has value not only for the culture in which it evolves, but also for scientists and planners striving to improve condition in rural localities. Incorporating indigenous knowledge into climate-change policies can lead to the development of effective adaptation strategies that are cost-effective, participatory, and sustainable" (Boko et al. 2007:456).

Nelson et al. (2009) identified four central themes in the social-scientific literature on adaptation to climate change, including its emphasis on the multi-scalar nature of climate change and adaptation (Magistro and Roncoli 2001), inequalities in exposure to climate change risks on regional and international scales (Kelly and Adger 2000), the interrelated nature of stresses on environmental and economic levels, and the inclusion and participation of local communities (Adger 2003; Folke et al 2005). Adger (2003) identifies social networks and states, social institutions with high levels of social capital, as being primary sources of decision-making and collective action in possible climate change adaptation. In a case study in Ghana, however, Gyampoh et al. (2009) identify fragmented social bonds and alienation from state services as being sources of weakness in adaptation to crises, and instead focus on

household responses to changes in precipitation by looking at water harvesting and agriculture. Such research successfully identifies a crisis brought on by environmental change, contextualizes it within a community with limited resources, and demonstrates how a specific community enacted social networks and environmental knowledge to successfully address a criss. How communities define and employ the concept of "adaptation" in their own social contexts is a topic sorely lacking in the social-scientific literature. This research project, along with other social-scientific projects concerning adaptation to environmental change, intends to begin filling such a crucial empirical gap.

Agricultural strategies and crop choices can be useful and empirically measurable activities for understanding how households and individuals are acknowledging and responding to environmental crises such as climate change (Gyampoh et al. 2009; Mendelsohn and Dinar 1999; Mortimore and Adams 2001; Smithers and Smit 1997). Individual decision-makers make choices about what will be planted and how land will be managed based on observations about weather and altered soil climate regimes, and the sum of these decisions characterize a societal adaptation to climate change (Smithers and Smit 1997). Documenting these narratives of environmental change as well as the strategies employed to address them provides useful information on how people are identifying and reacting to perceived changes in the environment, such as drought, desertification, savannization, perturbations in weather systems, deforestation, and wildfires. Local knowledge, materialized in agricultural strategies and crop choices, is used by farmers to form understandings of the environment and develop coping strategies to deal with environmental change (Vedwan 2006). Thus, by looking at agricultural strategies and crop choices the link between perceptions of environmental change and actual adaptation practices can be documented and analyzed.

In this sense, this research project will act as a both challenge and contribution to global environmental discourse. One of the aims of this research is to highlight the localized qualities of environmental change and how what Western scientists see as an abstract, global phenomenon – global environmental change – has real and urgent dimensions in the lives of subsistence farmers. Ingold identifies a dichotomy in Western thinking between the "global" and the "local," with global perspectives viewing humans acting *upon* the earth and local perspectives viewing the earth from *within*, from an "active, perceptual engagement with

components of the dwelt-in world" (Ingold 1993:468). This research thus contributes an alternative voice to discourse(s) on global environmental change, yet an alternative voice that is viewing similar processes as articulating similar concerns at the *local* level. Ironically, that these phenomena are being experienced so immediately by subsistence farmers who have immediate interactions with the environment and have developed local knowledge surrounding it does more to buttress claims about important global processes than abstract, all-encompassing pontifications on the global climate.

STUDY SITE: GUAMAN-BUEM

Guaman-Buem is a small village of approximately 800 individuals. It is part of the larger Buem state that expands from Nsuta-Buem in the north to Kute-Buem in the south. The larger Buem state has a paramount chief who resides in Bodada, in the hills above Jasikan-Buem which figure dominantly in Buem history and creation stories. Village affairs in Guaman-Buem are presided over by chiefs and elders who trace their lineage through five indigenous Buem clans. These clans include Onayoa, Bekblukpo, Benkyiomana (the royal clan), Kafeta, and Badomia. Of these five clans, only Onayoa, Bekblukpo, and Benkyiomana have "sacred stools," which are connected to sacred shrines and other sacrosanct parts of the landscape. The Benkyiomana clan is believed to be the first clan to have settled Guaman-Buem and thus contributed the first chief to the "stool" of Guaman. Thus, every new chief in Guaman-Buem is chosen from the Benkyiomana clan. The village is ethnically diverse with Ewes from southern Ghana and Togo, Hausas from northern Nigeria, Akans from areas immediately surrounding Buem, and diverse migrants from northern Ghana. Though these individuals make up a significant portion of the population, they are not permitted to participate in the traditional affairs of the village. The village is predominantly Christian with a Muslim population made up mostly of Hausas from northern Nigeria, their Buem spouses, and their offspring. Cross-cutting both of these religious groups is a belief in traditional African religions from both local and distant parts of West Africa. As a general rule, most participants in local Buem ancestral worship and worship of ancient shrines are Buems who have also been raised as Christians. In recent years, there has been some tension in the village between evangelical Christian churches and traditional authorities who continue to perform certain rituals believed to be sacrilegious by Christians.

The Buems follow a patrilineal kinship system that traces inheritance through the father's line to his sons. When women marry, they become part of their husband's kinship network, even though their husband must continue to provide assistance to the wife's father's side of the family if requested. A father's lands are divided amongst his sons when he dies, and this has led to the fragmentation of agricultural areas into increasingly smaller plots. In fact, one of the biggest complaints of Buem farmers is that lands are becomingly increasingly small and that the traditional councils are becoming overloaded with disputes over land boundaries. Wives are permitted to work on their husbands' lands or their fathers' lands if they are unmarried. The lands surrounding Buem are broken up into large areas that belong to the five different clans, with the three "stool clans" having access to the best quality and highest quantity of lands. Landless peasants, migrants, or unmarried women typically farm on their father's land, if permitted, or sharecrop on someone else's land. Polygamous marriages are common in Buem, and are typically practiced by wealthier men who desire large families. In most polygamous marriages, a man's wives will not live together in one house but rather in separate houses and typically in separate villages. Christianity has encouraged monogamy in most Buem areas, including Guaman-Buem, and most polygamous marriages are not openly discussed or sanctioned.

The indigenous language of the Buem area is Lelemi-Buem, a Guan language that is part of a broader family of languages that includes many contemporary languages in Coite-D'Ivoire, Ghana, and Togo (Asihene 1987). Though Lelemi-Buem is the principal language of Buem, most people also speak Akuapem-Twi and English, the *langua franca* of Ghana. The Buem, Kadjebi-Akan, and Obotuase areas are quite unusual in the Volta Region in that the majority of eastern Ghana speaks Ewe, the language of the Anlo-Ewes and most people in southern Togo. The Ashantis and Akans had a powerful presence in Buem in pre-colonial Ghana and expanded slave markets into Buem during the African and European slave trades. Though there is no evidence that the Buem were ever exploited by the Ashantis in the slave trade, the influence of the Ashantis is present in both the place names of the towns and villages (all of which are Akuapem-Twi words) and the chieftancy structure and political regalia. A deeper discussion of Buem history, including the impacts of Ashanti hegemony on Buem, is discussed in Chapter 2.

THESIS STRUCTURE

This thesis explores Buem crop choices and agricultural strategies as adaptability practices by identifying key narratives in Guaman-Buem and examining their associated livelihood strategies. The thesis begins by describing the historical and environmental context for this research. It then moves through three chapters of Buem narratives on social-environmental change and ethno-ecological understandings of the surrounding environment. These narratives and ethno-ecological perspectives are then examined in light of quantitative data on crop chocies and environmental perspectives. In the conclusion, a synthesis of the research is presented along with recommendations for development projects in the future and suggestions for future research.

Chapter 2 presents a historical, social, and cultural context for this research by examining the origins and rise of the Buem state. Emphasis is placed on important historical transformations that have occurred within Buem society including the influence of Ashanti hegemony, the African and European slave trades, European colonialism, Ghanaian independence, and the rise of the international cocoa trade. These historical transformations are described in order to demonstrate the crucial relationship between Buem history and human-environment relationships in Guaman-Buem. The cocoa boom in the early twentieth century and associated influx of migrant workers not only transformed the landscape into a series of vast cocoa plantations, but it also absorbed a population with agricultural strategies appropriate for the drier and more savanna-like landscapes that have emerged since the decline of cocoa.

The environmental context of this research is presented in Chapter 3, which examines current environmental issues in Ghana in general, and Guaman-Buem in particular. Rainfall data collected in Ghana during the end of the twentieth century is presented which demonstrates an overall decline in average rainfall. The rates of deforestation in Ghana are summarized along with a short discussion on the consequences of deforestation on subsistence practices. One of the most profound forces of environmental change, bush fires, are discussed with particular emphasis on their transformative impacts on the landscape. These transformations include areas that were previously covered with dense forest but have given way to “derived savanna” as a result of bush fires and deforestation. A short summary of the cumulative impacts of these processes is then presented.

Chapter 4 explores the life histories of three individuals that represent different social and economic groups in Guaman-Buem. The first life history explores the day-to-day life of a peasant farmer who mostly sharecrops on other families' lands and subsists off her share of produce. Her story represents not only the life of a peasant Buem farmer, but the deep, interactive knowledge that women farmers have concerning specific crops and specific agricultural strategies. The second life history concerns an innovative farmer who was raised in Buem but spent much of his young adult life traveling abroad, returning home several years ago to experiment with new farming methods and become something of a "lead" farmer whom people consult with for farming advice. The third life history looks at the life of one of the village's most important chiefs and the vital role of farming in Buem culture. This royal chief not only takes on the responsibilities of traditional leadership in Guaman-Buem and representation at regional and national levels, but also maintains several plots of mixed crops. These stories are representations of life in Guaman-Buem and the options which farmers are presented with. They represent the diverse human-environment relationships that have contributed to Buem agricultural knowledge.

Chapter 5 explores local environmental histories and ethno-ecology in Guaman-Buem. Narratives by elders in Guaman-Buem explore some of the major environmental transformations that have occurred over the past century. The subsistence farming economy present before the cocoa boom and then again after the collapse of cocoa plantations in the 1970s is invoked to explain the severity of environmental degradation over the past four decades. Buem ethno-ecological understandings of the connection between rainfall patterns and deforestation are explored along with their impacts on soil fertility and agricultural production. Finally, a discussion of the Buem "agricultural calendar" and how crop choices in Guaman-Buem are typically made is undertaken. These environmental histories and ethno-ecological understandings of environmental processes illustrate the rationale behind emerging adaptability strategies.

Chapter 6 deals with Buem spirituality and religious understandings of human-environment relationships. These spiritual understandings extend to interpretations of environmental degradation as a consequence of unfulfilled ritual obligations and the neglect of the ancestors. The introduction of evangelical Christianity and other world views are often cited as transformational points within Buem environmental histories. Specific sacred areas

within the Buem landscape hold deep connections to Buem ethno-history and the regeneration and protection of vital natural resources. All of these sacred sites are spaces where ritual obligations are performed and offerings given to the ancestors. Certain spiritual forces within the landscape, including “dwarves,” are seen as embodying the more dense and “wild” landscape of the Buem bush. In addition to practices such as deforestation and the accidental or intentional setting of bush fires, the neglect of ancestral worship and what is viewed as a disregard for traditional authority is offered as an explanation for environmental degradation in Guaman-Buem. With the onset of large-scale environmental degradation, the landscape is viewed as having been depleted of some of its spiritual power – both benign and dangerous.

Chapter 7 addresses cultural narratives concerning cosmopolitanism, modernity, and generational gaps in environmental knowledge. Since the influx of migrants during the cocoa boom, Guaman-Buem has become a diverse village with residents from various tribes who speak diverse languages. Even though Buem is a village of approximately 800 individuals, a person can hear Twi, Lelemi-Buem, Ewe, Hausa, Kotokoli, English, and French in the course of an afternoon. This is the result of both regional instability (refugees from Togo, for instance) and economic attractiveness for agrarian migrant workers. The influx of migrants from northern areas in particular has brought both an appetite for northern cuisine as well as agricultural strategies more reminiscent of savanna or Sahel environments. Additionally, the religious tradition of Islam has been introduced through Hausas from northern Nigeria. Urbanization and globalization has created alternative options for Buem youth, who more often than not choose to leave Buem as young adults to find work in urban centers. As a consequence, much of the Buem youth don’t take a keen interest in agriculture or environmental issues in Buem. This is complicated by the fact that many of these youth return to Buem to take up farming after failing to find employment in urban centers such as Hohoe, Ho, Accra, or Kumasi. These processes of increased cosmopolitanism, globalization, and migration to urban centers present certain challenges and opportunities in Buem that call for a much more nuanced understanding of vulnerabilities and adaptability practices.

Quantitative data from household surveys is presented in Chapter 8 that provides an etic perspective on livelihood strategies in terms of crop choices and environmental perspectives. This data links narratives of environmental change and their associated

adaptability practices with crop choices, agricultural strategies, and environmental perspectives. In other words, the data presented in this quantitative analysis provides a link between narrative, perspective, and action. Crop choices in terms of their relative abundance in farmers' repertoires, and the social history of individual crops in Guaman-Buem are presented to add depth to the discussion. In this chapter, I present my case for cassava (*Manihot esculenta)* as a crop choice fine-tuned for a marginal or even transitional environment. I then explore farmers' perspectives on environmental change by presenting data concerning experiences with natural disasters and impacts on food production. These environmental perspectives include perceptions of soil fertility, frequency of fallow periods, and the availability of riverine and forest natural resources. The data suggests that farmers are struggling with environmental change from diverse sources and invoking it during decision-making processes such as deciding what crops to plant and how to plant them.

In the conclusion, I provide a summary of this research and offer suggestions for both future research and action plans within the development community. In particular, I emphasize that action plans to protect vulnerable communities from the negative impacts of climate change or any other kind of environmental change must incorporate local adaptability practices and recognize efforts that are already being made within subsistence-oriented communities. This research suggests that Buem farmers are both experimenting with new agricultural strategies as well as intensifying the cultivation of particular crops in response to perceived changes in the local environment, and that these practices constitute an adaptability strategy. Such adaptability strategies, constituted in this case in the rationale behind crop choices and more specific farming strategies, should be perceived within the development community as viable resources for adaptation to environmental crises throughout the world. In other words, organizations such as the IPCC should consider such engagements with environmental change as presented in this research more carefully than they do at present. If communities engaging in such adaptability strategies are strengthened through support from international organizations, adaptation to environmental change will not only be more economical, but it will also be more successful. This argument is contextualized within global debates about climate change, adaptability, and action plans for affected communities.

CHAPTER 2

BUEM CULTURE, SOCIETY, AND HISTORY

The Buem state[4] is a linguistically homogenous assemblage of villages squeezed between Ewe-dominant southeastern Ghana and a collection of Akan-dominant districts to the north. To the west, it is hemmed in by a concentration of Akan villages that sit along the shores of Lake Volta. Unlike the Akans and Ewes, the Buems are a small, isolated group that don't have a "homeland" outside of their immediate surroundings. Several other ethnic groups in the Volta Region are scattered outside of Buem and speak Guan languages that, while related to Lelemi-Buem, are mutually unintelligible (Asihene 1987). The Buems thus represent a unique pre-colonial state that have interacted on their own terms with several West African and European state powers. One of the goals of this research project is to demonstrate that the Buem state has undergone several profound transformations throughout its history, including its interaction with an expanding Ashanti state and the tendrils of the slave trade, as well as its cooperation with colonial powers to increase cocoa production and absorb migrant workers into its agricultural production system. All of these variables have combined to add layers of complexity to Buem society that are embedded within different kinds of environmental knowledge. From frontier-like subscriptions to cash crop farming in the form of cocoa (Amanor 1994) to the utilization of small-scale Sahelian agricultural techniques imported with migrant northerners, the history of the Buem area is relevant to current and past agricultural strategies and crop choices. Before exploring Buem narratives of environmental change and adaptive strategies, it is thus vital to have a basic understanding of Buem culture, society, and history.

[4] The Buem area is refered to as a "state" by its inhabitants when discussing traditional boundaries and traditional jurisdiction. In addition to the Ghanaian legal system, there is a parallel system of traditional laws legislated and enforced by a council of traditional Buem elders. The term "state" also refers historically to the pre-colonial Buem state, which was a sovereign nation.

BUEM HISTORY AND BIOGEOGRAPHY

The Buem area consists of a complex landscape of undulating hills, large steep mountains along the Ghana-Togo Mountain Range, table top mountains, and river valleys that lend rich texture to the northern-most semi-deciduous rainforests of the Volta Region. The size of the Buem state (Figure 1) has fluctuated throughout history, with certain settlements being ceded to Akans and Ewes during the periodic expansions and contractions of the Buem state. Currently, the Lelemi-speaking Buem Traditional Area under customary rule by the Apakanhene (or "paramount chief") spans from Teteman in the south to Nsuta in the north. Formerly, the area expanded from the northern border of the Ewe state to Kete-Krachi, a large trading post and slave market on the eastern border of the Ashanti empire. With the creation of the Kadjebi District in 1989, dominated by Twi-speaking Akans, the Buem state contracted to its present size.

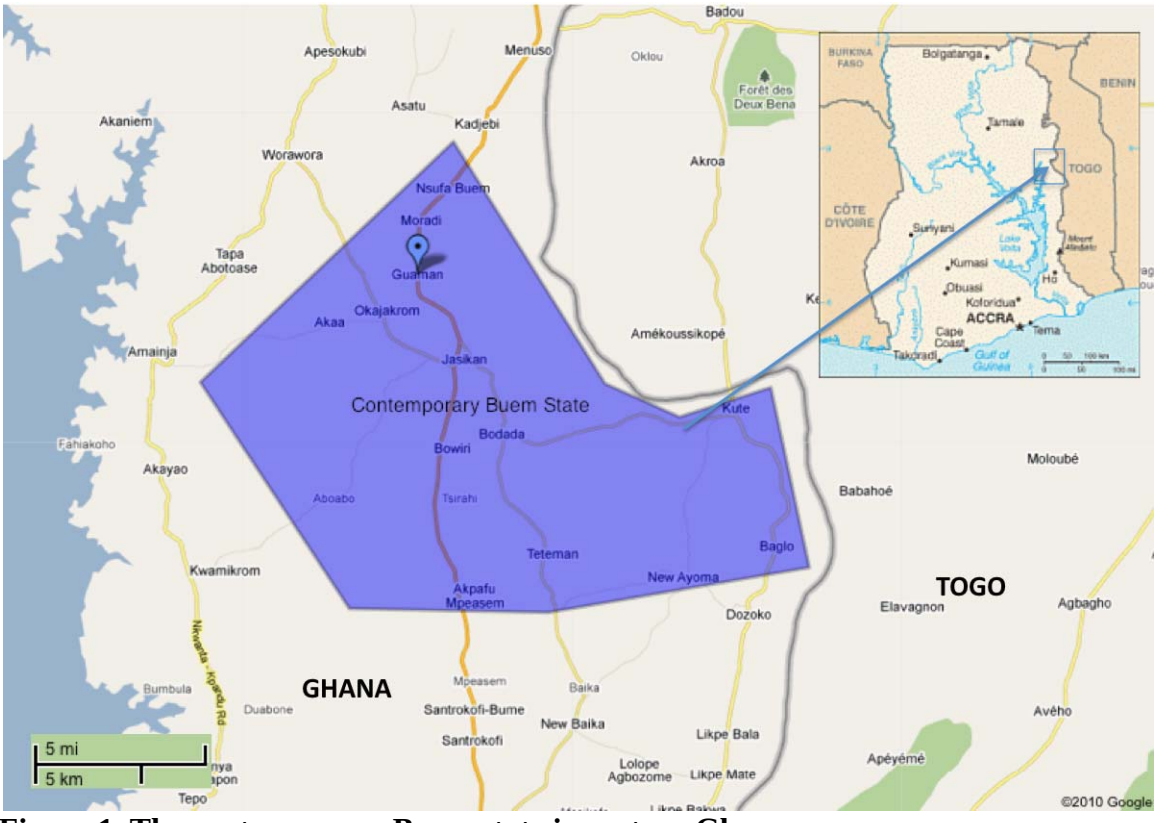

Figure 1. The contemporary Buem state in eastern Ghana.

The current livelihood strategies of the Buem area are characterized by subsistence agriculture, cash cropping of several species, river fishing, hunting, animal rearing, and small commercial businesses based in larger Buem towns such as Jasikan and Kute. The western-

most portion of the Buem area sits adjacent to the eastern shores of Lake Volta, with the most economically important town being Obotuase. The area along the lakeside, although not part of Buem, supplies Buem's major protein source of freshwater fish. This particular relationship, among a suite of other socio-economic relationships, represents a strong bond between the Buem state and the Ewe-land of southeastern Ghana and southern Togo.

Conducting research on Buem history is a daunting task. Scant historical research has been conducted in the area, with only several modest documents that mostly emphasize the history of particular missions and churches in the area. One of the best sources of information, Elias Kwaku Asiama's (2003) fifty-page "Oral History and Cultural Practices of the Buem People", also relies on oral histories narrated by many of the same Buem elders I interviewed in the course of my research. Sammy B. Yeboah's (2002) "The History and Survival of Presbyterian Church of Ghana (Basel Mission) in Buem/Karchi/Adele – 1891-2001" provides interesting insights into Buem, and particularly Guaman-Buem, as it existed during the arrival of some of the first missionaries to the area. His narration, however, is biased towards the events as described by Christian missionaries. As it is not intended as an unbiased history of Buem, but rather as a document for religious inspiration, many of the details presented within it must be taken as such. The primary sources referred to in the text, however, are invaluable for their ability to provide glimpses into late 19th-century and early 20th-century Buem. Paul Nugent's (2002) "Smugglers, Secessionists, and Loyal Citizens on the Ghana-Togo Frontier" contains a chapter on the contractions and expansions of the Buem state vis-à-vis colonial interactions and the rise of the cocoa economy. According to Nugent, the current boundaries of the Buem state were largely defined by migrant cocoa plantation laborers who, owing their allegiance to Akan chiefs, finally overtook entire areas of the Buem state. Ben K. Fred-Mensah (1999, 2003) also conducted research on land tenure disputes resulting from migrant labor during the cocoa boom of the 20th century. This research, presented in several articles in academic journals, is helpful for its historical synthesis, but often delves in and out of unfair characterizations of the Buem as an ethnic group. Many of the characterizations of Buems – particularly Buem men – are not only degrading, but are also completely out of synch with the people I have grown to know so well over the last five years. As these authors are the only available written sources of

immediate relevance to Buem history they were instrumental in constructing the narrative given below.

As a result of the scarce literature on Buem, it was necessary for me to collect oral histories of Buem from several village elders in Guaman-Buem, consult with the few written histories that are available, gather historical information from anthropological and geographical research that has been conducted in the area, and consult colonial maps and documents. Understanding the culture and history of the Buem people has been both crucial for undertaking the research agenda presented in this thesis as well as attempting to compile an updated version of Buem history that can be provided to the Buem people for future reference. To the best of my knowledge, as it is buttressed by the conflation of all the available sources as well as my own in-depth research into oral history, the following narration of Buem history represents the most current synthesis of the various primary and secondary sources available. I have taken great care to present alternative viewpoints on contentious issues and be critical of analyses that have cast certain ethnic groups in what can, at best, be considered a bad caricature.

THE PEOPLING OF BUEM

The history of the human occupation of the Buem area is poorly understood, characterized by various claims that Buems came from either the north or the west (Asiami 2003). Claims have been made that the Buem migrated across the Volta River after the collapse of the Bono Dynasty in the Brong-Ahafo Region during the rise to prominence of the Ashantis (Asiami 2003). Linguistically, evidence for this is substantiated by the presence of a group living in Dormaa Ahenkro on the Ghana/Coite-D'Ivoire border which speaks an ancestral form of Buem known as Bafana. Others have argued that the Buems descended from Ewes moving west from Togoland and Benin, antagonized by the rise of the Dahomey kingdom during the 18th century (Asiami 2003). This theory of the peopling of Buem, known as the "Ngotsie" theory, is not entertained by most Buems. Some versions of Buem oral tradition also describe the *sui generis* creation of the Buem in the Kolomgbangye hills above the contemporary Buem state. According to this creation myth, the creator *Atibluku* lowered the Buems into the mouth of a cave to protect them from the elements. The Buems used large boulders, characteristic of the present landscape, to roll over and defeat intruders who were

antagonizing their shelter. When the waves of attacks ceased, the Buems then descended from the hills and caves to hunt and gather in the productive river valley below (Asiami 2003). This oral tradition, however, is strikingly similar to Ashanti creation myths and is explained away by most Buems as a relic of Ashanti hegemony during of the 17th-19th centuries.

Perhaps the most important line of evidence one can follow in trying to reconstruct the peopling of Buem is supported by modest linguistic research. Lelemi-Buem, the language contemporarily spoken by Buems, is part of a larger family of Guan languages that is present throughout Ghana, the Ivory Coast, and Togo (Asihene 1987). Notably, the Guan family of languages has no obvious relationship with either Akan or Ewe, which suggests that Akan and Ewe speakers immigrated into Ghana and that Guan was one of the ancestral tongues of Ghana (Asihene 1987). Further evidence for this is provided by the vast diversity of languages owing their roots to the most ancient forms of Guan. In Ghana, there are presently more than twenty-eight distinct Guan dialects being spoken by hundreds of communities throughout the country. The area which demonstrates the most diversity of Guan dialects, the Volta Region, hosts what are known as the "Volta Region Guan Groups" (Asihene 1987). This group of languages includes Lelemi-Buem as well as Sele, Sekpele, Ikposo, Siwu, Tutrugbu, Tegbo, and Nkonya Guan.

As a result of the powerful influence of the Ashantis in the Buem area, almost all of the names of towns and landmarks in the area owe their heritage to the Twi language of the Ashantis. The name "Buem" itself means "open" in Twi. The district capital of Buem, "Jasikan," is derived from the Twi "gye-sikan" which literally means "take the sword." This name owes itself to the failed attempt by the Ashantis to invade and rule Buem in the late 19th century. It was said that the river Konsu took the sword of the leading commander of the expedition and, combined with the defense of Buem by its own warriors, forced the Ashantis to retreat from their intended sacking of Jasikan. These Ashanti names, though confusing to scholars of Buem history, exist alongside "local" names for the same towns.

Oral tradition and historical records demonstrate that in earlier centuries the hills and valleys of Buem were brimming with wildlife, including forest elephants, leopards, myriad species of non-human primates, hogs, and other mammals. According to Sammy B. Yeboah's (2002) "The History and Survival of Presbyterian Church of Ghana (Basel

Mission) in Buem/Karchi/Adele – 1891-2001", one of the main reasons the massive church bell at Guaman's Presbyterian Church was carried across the Afram Plains into Buem was because the missionaries needed something to ward off wild animals lurking around the village. These wild animals, though a threat to the missionaries, are also one of the main reasons given in oral tradition for the Buems' initial attraction to the Konsu river area.

PRE-COLONIAL BUEM (UNKNOWN - 1884)

As described above, the origins of the Buem state are nebulous and contentious. As no archaeological investigations have been conducted in the area and colonial documents are sparse, it is necessary to arrive at some kind of understanding of pre-colonial Buem through the consultation of oral histories. In addition to these oral histories, some missionary accounts are available that describe features of Buem culture and society as it was first encountered by them during the mid-to-late nineteenth century. At this time, Ashanti influences were already prominent in the Buem vocabulary as well as pronounced in Buem political organization.

Prior to the influence of the Ashantis on the Buem state, it represented a far different political organization than contemporary Buem. While the Ashantis had a centralized chieftancy system with a unique set of symbolic rituals and icons, the Buems had a far different political organization based on ancestral worship and animistic "fetishes."[5] These "fetishes" were associated with traditional authority figures, with the most sacred of these "fetishes" being at Bodada, the village of the contemporary paramount chief. The contemporary political structure of Buem, however, is far closer to the Ashanti system than its "traditional" incarnation. The Buems observe patrilineal inheritance of traditional political roles, while the Ashantis follow their blood line and associated inheritances matrilineally (Akwabi-Ameyaw 1982). The characteristic sword of the Ashanti empire, used to swear oaths to chiefs and symbolize military strength, is now prominent in Buem symbolic culture. This sword, however, wasn't introduced into Buem society until at least the early 18th century, when the Ashantis invaded and occupied Kete-Krachi, just north of Buem (Maier

[5] Buems use the word "fetish" to describe areas of spiritual significance such as the sacred grove described later in this thesis. While many of these sacred areas may be associated with ancestral worship, not all ancestral worship or ancestral offerings are considered "fetishes."

1981). The pre-Ashanti fetishes, however, persist in contemporary Buem in the spiritual geography of Buem as well as in rituals and customs such as funerals and marriages. Most poignantly, these pre-Ashanti "fetishes" are represented by sacred groves and springs in Guaman-Buem. These areas are highly taboo and can only be visited or worshipped by members of certain clans, fetish priests, and chiefs and elders. These "fetish areas," described in more detail below, are also the focal point of contemporary tensions between evangelical Christians and "traditionalists."

Ashanti influence in the 18th century in relation to what is now the Volta Region of Ghana has been invoked to explain the Twi-Akan names of villages and towns throughout the Buem area (Asiami 2003). Even "Guaman" is one of several words for "market" in the Twi-Akan language. This trend continued to as late as the 1940s, when the major contemporary towns of Worawora and Kadjebi were "Akanized" and divorced from Buem authority.

ASHANTI EXPANSIONISM, THE TRANS-SAHARAN SLAVE TRADE, AND THE TRANS-ATLANTIC SLAVE TRADE (15TH CENTURY – 1884)

Surprisingly, the relationship between Ashanti expansionism and its effects on Buem is one of the least understood yet most influential processes that the Buems have undergone over the past 300 years. The contemporary political organization of the Buem state relies heavily on the imported Ashanti chieftancy structure, including the powerful symbols of the stool, sword, and linguists' staffs. The Akuapem-Twi language is spoken as a second language by all Buems except those in Kuje, who have taken on the Ewe language of their majority immigrant population. This is partially because the Presbyterian missionaries introduced Akuapem-Twi as the language of worship and it later became a common dialect spoken throughout the Buem state (Skinner 2007). However, the British also encouraged "Akanization" of areas in former Togoland in the 1920s, which amounted to the deepening of resemblances to Ashanti political and social organization (Lawrance 2005). It is quite possible that the British chose to opportunistically put Buem at the helm of this process, since the Buem state had taken on a distinctively "Akan" flavor through acculturation during previous centuries.

The Ashantis benefited more than any other contemporary Ghanaian group from the African slave trade, using slavery to fuel the development of the Ashanti nation-state (Wilkes 1993). During the Trans-Saharan slave trade, the Ashantis were motivated by Muslim traders from the north to secure access to gold, which was being traded as far north as Europe from West Africa (Wilkes 1993). Moving into the central rainforests of present-day Ghana in the 15th and 16th centuries, the Ashantis lacked the necessary labor to construct gold mines and harvest the agricultural produce necessary to maintain a state. Massive amounts of labor were needed to complete this endeavor, which required clearing incredibly dense forest cover (Wilkes 1993). Ashanti sources of labor were not sufficient for this project, so the Ashanti were endeavored to trade gold for slaves from the trans-Saharan slave routes in earlier years and the trans-Atlantic slave trade in later years (Perbi 2004). Later, the Ashanti absorbed the Fante state and began selling slaves directly to European traders (Mendonsa 2002). In exchanging slaves with European traders at Elmina and Cape Coast, the Ashantis received guns and ammunition, items used to further expand, consolidate, and strengthen the Ashanti empire (Arhin 1967). Ironically, these weapons would later be turned against the British in the Ashanti war of resistance in 1900-1901 (Boahen and Akyeampong 2003).

Buem, Nkami, and Kete-Krachi all had slave markets that sold slaves east-to-west for the Ashantis and southward for Krobo markets in German Togoland (Sutton 1983). Much of this labor was probably used domestically on palm oil plantations and other areas with high labor demands. Just north of Buem, the slave market at Kete-Krachi (Maier 1980; Johnson 1986) was located in that cosmopolitan city controlled mostly by northern Islamic migrant traders and located on the Asante borderland frontier (Maier 1980). The market at Kete-Krachi was directly linked to Salaga, the biggest slave market in northern Ghana (Perbi 2004). Very few direct references are available for the involvement of the slave trade in Buem itself, but a few primary source documents from Presbyterian missionaries are available. In 1896 Clerk, a Basel missionary, reported that “many slaves have fled in the course of the year, and a few been recaptured. No German official has raised the subject of slavery in Buem, and buying and selling continues unabated” (Clerk quoted in Akurang-Parry 2002). No figures for the quantities of slaves removed from the Buem area are available, but oral history emphasizes that Buems were more involved in the transportation and selling of slaves than in becoming victims of the trade themselves. According to Kwaku

Attah, an elder in Guaman-Buem, oral history claims that in the 16th and 17th centuries the Ashanti spearheaded "hegemonic drives" into the Buem area, but were resisted by the Buem military allied with other ethnic states from the pre-colonial Volta Region area. It is likely that the influences of Ashanti expansionism were thus relatively tolerated by the late 19th century, though 200 years earlier they would have been less benign.

In addition to the influence of Ashanti political organization on Buem, the Akuapem-Twi (Akan) language has also had an instrumental roll in shaping the cultural landscape. The original Lelemi-Buem names are no longer used to identify the various villages within the Buem state. Table 1 shows the names of contemporary Buem villages and towns in the Akan and Buem languages, with the English translation from Akan in the far right column. Contemporarily, the villages and towns are identified on maps, signs, and common usage by their Akan names. In Elias Kwaku Asiama's (2003) book on Buem history and culture, he provides a table identifying the original Buem names of prominent villages and their English translations.

Table 1. Names of Buem Villages and Towns in Twi and Lelemi

Akan (Akuapem-Twi)	**Buem (Lelemi-Buem)**	**English Translation (from Buem)**
Bodada/Borada	K'Buem/Obetiase	"Settlement under the tall palm tree," "the ancient rock"
Gyesikan/Jasikan	Odome ovi	"Beyond/across the odome stream" "take the sword"
Atonkor Kugye/Kudje Akaa	Kunsu ovi	"Inhabitants beyond the river Konsu"
Guaman	Ugbema	"Market town (center)"
Teteman	Lisemi	"The old/ancient place/town"

Source: Asiama, E. K. 2003 *Oral History and Cultural Practices of the Buem People*. Jasikan-Buem, Ghana: Buem Rural Press.

GERMAN, FRENCH, AND BRITISH COLONIALISM (1884-1961)

During Europe's "Scramble for Africa," the Volta Region of contemporary Ghana and the Republic of Togo became a German protectorate known simply as "Togoland"

(Pakenham 1992). Gustav Nachtigal first raised Germany's imperial flag over Lomé in July of 1884. It was the first time that Germany would claim part of the African continent, but not the last. In the years to follow, Germany built three railroad lines penetrating the interior of the country as well as connecting urban centers on the coast. Thus, the capital at Lomé became connected with the present-day Togolese urban centers of Kpalime, Aneho, and Atakpame (Pakenham 1992). The German presence in Togoland would have had the biggest affect on 19th century Buem, as the Germans were immensely interested in cocoa, coffee, and palm oil. In fact, according to Skinner (2007) the Buem area was where the majority of Togoland's cocoa lands were concentrated. In doing archival research on Buem, I came across large, detailed maps of the Buem's forest area along the early road describing in some detail the environmental conditions of the area as they were surveyed in 1910 by the Germans and 1926 by the British. Although the original 1910 German survey was unavailable, the British included data from the survey in their own representation. The fact that the Germans performed an environmental survey of the area – focusing on forest-savannah ratios – reveals some of their economic intentions in the area.

During World War I, a British and French alliance bloodlessly invaded Togoland and removed its German administration. The two new colonial powers split the colony into two parts, one half being ceded to the British as part of the Gold Coast, and the other half becoming French Togoland. The core ethnic group disturbed by this schism were the Ewes, who until the present have had an international border cutting through the middle of their ancestral homeland. The British became concerned that the southeastern Gold Coast, formerly south Togoland, would fracture and be annexed by the French as a result of the border bisecting the pre-colonial Ewe state (Lawrance 2005). Though the Buem area was not divided over the fracture in Ewe-land, it became the recipient of refugees as well as resultant political drama in the Volta Region in general. The British thus attempted to "Akanize" the Buem state as well as fruitfully tap its cocoa potential by promoting Ashanti models of allegiance and confirming a "non-Ewe" identity (Lawrance 2005). Many of the ethnic conflicts and land tenure disputes in Buem, discussed below, that erupted in the 1990s can be traced back to the original, arbitrary partioning of German Togoland into the British Gold Coast and French Togo. Guaman-Buem itself contains a "zongo" (a community of refugees on the outskirts of a town, typically Ewes or Hausa Muslims) which is comprised of migrant

laborers from multiple generations. These individuals rent, lease, sharecrop, or simply provide labor for Buem landholders who have inherited lands through their clans.

Ghana achieved independence from Great Britain in 1957 under the leadership of Kwame Nkrumah and the Convention People's Party (CPP). Under Nkrumah's leadership through the Ghana Cocoa Board, farmers were encouraged to initiate and maintain vast cocoa plantations in the interests of fueling Ghana's economic growth. Although cocoa production defined Ghana's success from the post-World War II period through independence (Fred-Mensah 2003) it became an important part of developing and strengthening Ghanaian national identity following independence (Allman 1993). The Buem area was considered to be an important part of the consolidation of the Ghanaian cocoa economy, as can be evidenced by the amount of massive cocoa warehouses that pepper the landscape. Partially, this is due to the promotion of cocoa cultivation by the British (Lawrance 2005), but would have likely taken hold after independence because of the prominence of cocoa in the Ashanti and Brong-Ahafo regions (Allman 1993). Thus, the initial interactions between Buems and their new national government in Accra were mostly through the Ghana Cocoa Board.

THE COCOA FRONTIER AND BUEM COSMOPOLITANISM (1920-PRESENT)

The unique physical geography of the Buem area in comparison to the northern and southern Volta Region, with undulating high mountains and semi-deciduous tropical forests, introduced regionally distinct economic successes during the national cocoa boom of the early-to-mid twentieth century. In the 1930s, the Buem area became a very attractive spot for migrant laborers looking for work on cocoa plantations. This added to the already rich ethnic diversity that resulted from the fracturing of German Togoland (Lawrance 2005). As a result of the promotion of cocoa production in Buem, workers from Nigeria, Benin, and neighboring Togo poured into the Buem area bringing different languages and cultural traditions. Walking through Guaman-Buem today, one can hear Lelemi-Buem, Akuapem-Twi, Ewe, Hausa, Kotokoli, English, and French. In addition to introducing new languages and traditions, the introduction of migrant workers also brought about sharecropping and renting agro-economic arrangements that led to conflicts between Buems and migrant workers.

Buem cosmopolitanism [6]- Ewe, Akan, Hausa, Buem - was generated through the advent of the cocoa boom of the early 20th century as well as the disintegration of German Togoland (Lawrance 2005). The economic opportunities and conditions presented by world-wide demands for cocoa on the one hand, as well as the prime environmental conditions for the cultivation of cocoa present in Buem on the other hand, brought about a demand for labor and subsequent migrations of laborers. While the cocoa boom was still reeling in generous profits, the compromise between Buems and migrant laborers seemed agreeable, but once the cocoa boom started yielding lower profits and cocoa plantations aged and became less productive, conflict between migrant laborers or sharecropping landed peasants and Buem landholders began to surface due to ambiguous national legislation and conflicting traditional land inheritance rights.

ETHNIC CONFLICT AND LAND TENURE DISPUTES (1990S)

The economically enriching rise and subsequent collapse of the cocoa boom in Buem marks one of the most important and decisive social and economic crises in the history of the Buem area. Certainly, contemporary Buem's struggling economy and desperation for new economic alternatives is rooted in the collapse of the cocoa economy. Ghana Cocoa Board (GCB) warehouses still dot the Buem landscape, emerging from thickets of bush or disguised under the assumption of more recent manifestations. The GCB warehouse in Guaman, for example, is now a one-size-fits-all community center used for funerals, weddings, celebrations, and other organized social events. Just outside of downtown Jasikan-Buem, on the main road to Guaman, lie five large GCB warehouses that now bear no sign of formal GCB use but host a trade school for tailors, shoemakers, and craftsmen. Some of the expansive estates and ornate, two-storey homes found in various parts of Buem were built with the wealth of cocoa, and the unlikely and quite posh rural banks found in Guaman, Kute, and other Buem towns all got their start storing and loaning money to cocoa farmers. A

[6] By "cosmopolitan" I mean the bringing together of ethnic groups from different states within the West African region. This move towards a more cosmopolitan Buem state occurred prior to the colonial era, with the expansion of the Ashanti state and increased interactions with the Ewe state. During and after the colonial era, however, the Buem state witnessed the immigration of even more non-Buem populations mostly due to the rise of cocoa as a valuable cash crop.

"cocoa research center" near Acca, between Buem and Obotuase, is bordered with expensive rest houses but is essentially a gutted, abandoned project that was shelved a decade ago.

Fred-Mensah describes in some detail the ethnic conflict and land tenure disputes that occurred in the Buem area during the 1990s. Unfortunately, his writings on the subject are stained with derogatory comments about the Buems that describe them at different times as being "lazy," "drunkards," and "loafers" (Fred-Mensah 2003). It is difficult to know where these characterizations come from. While taking much of his research with the proverbial "grain of salt," it is still useful to understand his interpretation of a conflict that has received little attention elsewhere.

Cocoa is, however, making a slow and steady comeback as the revitalized heart of Buem's economy. New hybridized cocoa seedlings are being sold to interested Buem farmers by the GCB through a revitalized Cocoa Marketing Board (CMB) in Jasikan-Buem. "We are now selling hybridized cocoa seedlings at five pesawas per seedling," explained an agricultural extension worker, "in just three years these trees will be producing cocoa and bringing in about five thousand cedis (approximately $3355.00 USD) per acre twice a year." Such an income from an acre of land for a common Buem farmer would bring about a revolutionary change in household income. While Buem farmers now clear land for the cultivation of cocoa and begin the imagine new possibilities for their families and communities, one question remains unanswered: what will be the unintended consequences of another cocoa boom on Buem, and where will the labor come from to plant, maintain, and harvest these cocoa plantations?

CONTEMPORARY GUAMAN-BUEM

Contemporary Guaman-Buem is shaped by several ongoing social, political, economic, and environmental forces. All of these forces came into play at some level during the household surveys and personal interviews conducted in this research. Socially, Buem has become a cosmopolitan area that presents some of the most impressive cultural diversity in Ghana. It has also become a very "old" area, demographically speaking, with much of the youth migrating to urban centers and either sending money to their kin in Buem or evading their responsibilities to their families. Politically, traditional authority has been brought into limbo by national politics as well as globalization. Economically, the Buem area has been

hard hit by the collapse of the "cocoa boom" and a reliance on its quickly disappearing timber resources. Ecologically, Buem is now under serious pressure from bush fires, deforestation, savannization, and unpredictable rainfall patterns. These forces are explored throughout this research and their influences are simultaneous and profound. Other profound changes that have recently come to the community are in the form of migrant settlements at Bethel or "The Lord's Healing Church," the "Zongo" area where Muslim migrant workers and Togolese refugees reside, and the village of Atokrom which was settled by Togolese Ewes but is under the traditional leadership of the chief of Guaman-Buem.

Just south of Guaman-Buem, along the old road that once connected the northern Volta Region to Accra, a community of Seventh-Day Adventists was founded in the 1980s that calls their church "The Lord's Healing Church of Ghana." The community is comprised of some 200 people and lies just about 1 kilometer outside of Guaman-Buem proper. Most residents in Guaman-Buem identify the community as "Bethel" when discussing it. The community, while under the traditional jurisdiction of the chief of Guaman-Buem, is essentially considered to be a separate community of immigrants. For example, no ethnic Buems from Guaman attend services at "The Lord's Healing Church." The community follows a zealous form of Christianity that combines Pentecostalism, Seventh-Day Adventism, and evangelical Christianity with traditional African medicine and rituals.

Members of the "Lord's Healing Church" community are also subsistence farmers who cultivate their crops on land that belongs to Buems. This usually follows some kind of leasing, renting, or sharecropping arrangement. Unlike other immigrant communities in the Buem area, members of the "Lord's Healing Church" never demanded ownership rights for land that they cultivated or helped harvest before the collapse of the cocoa boom (Fred-Mensah 2003). The relationship between ethnic Buems in Guaman-Buem and immigrants in the "Lord's Healing Church" community is very good and rarely do any disputes erupt between traditional authorities in Guaman and those in the healing community. As the community is not technically part of the Guaman-Buem community, no households in the "Lord's Healing Church" community were surveyed or individuals interviewed during the course of this research.

The "Zongo" area of Guaman-Buem lies about a quarter of a kilometer outside of central Guaman. This area was settled by Ewes from southern Ghana, Hausas from northern

Nigeria, and Kotokolis from northern Ghana. “Zongo” is a Hausa term that literally means “strangers’ settlement” and is used to describe any community of migrants that live outside a village or town in Ghana (Schildkrout 1974). Many of these households were initiated by non-Buems who married Buems and either created a sharecropping agreement with Buem landholders or started farming on their spouse’s land. In addition to being a community of inter-ethnic families, it is also a majority Muslim community as a result of the strong Hausa and Kotokoli ties. This is highly noticeable on Fridays when everyone in the “Zongo” walks the 10 or more kilometers to the mosque in Jasikan-Buem and during Ramadan when the community celebrates what other Buems call “the Muslim X-mas.”

The community of “Atokrom” was founded in the 1940s between Guaman-Buem and Nsuta. These immigrant farmers sought permission from the chief and elders of Guaman to settle “Dzoghekofe,” which was later renamed “Atokrom” by Nana Appew IV and his elders of Guaman. Like the “Lord’s Healing Church,” Atokrom is under the jurisdiction of Nana Appew V of Guaman-Buem, but recently caused tension in the area by attempting to create its own traditional council. In 2010, the matter was mostly settled when the “elders” in Atokrom accepted their position under Nana Appew IV. The community consists of migrant farmers from Tesviefe Ando, Badza, and Sei – all towns in the present Republic of Togo. The main language spoken in Atakrom is thus Ewe, though most of the individuals living there also speak French and the youth are being taught English and Akuapem-Twi in school.

CONCLUSION

Understanding Buem culture, society, and history is a vital pre-requisite to embarking on inquiries into human-environment relationships and adaptations to environmental change in contemporary Buem. Historical currents, from the migration of laborers who employ different farming methods to the ubiquitous cultivation of cocoa throughout Buem, have shaped both the physical environment and the narratives employed to describe it. Without an understanding of these forces, it is impossible to ascertain the rationale behind ethno-ecological knowledge, crop choices, and agricultural strategies. Buem ethno-history describes an environment that was originally settled because of its wealth in natural resources, with high protective mountains and fertile, verdant valleys. Wild animals and rough terrain made the area difficult for Ashanti expansionary projects and for Presbyterian

missionaries in the 19th century. Only through persistence did the slave trade make inroads to Buem and did missionaries finally erect their mission bells within Buem forest-lands. When Buem land was identified as an ideal place for cocoa cultivation in the early 20th century, the dense forests were packed with shade-grown cocoa plantations and migrants from northern Ghana, Togo, Benin, and Nigeria came to the area to cash in on the cocoa economy. After the collapse of Buem cocoa plantations due to aging plantations and a "swollen shoot" disease outbreak amongst the cocoa trees, those migrants were left with no work and hosts that demanded their land back. This led to inter-ethnic conflicts placing traditional land tenure systems and domestic land ownership policies at loggerheads (Fred-Mensah 2003). A complex combination of the collapse of the cocoa economy, deforestation by timber interests, mono-cropping of staple crops, intense bush fires, the introduction of agrichemicals and perceived changes in the local climate came to define an environment undergoing severe pressures. A once densely forested area began to give way to a forest-savanna mosaic, inspiring savannah-dwelling northern migrants to dig deep into their agricultural knowledge and introduce new cropping methods to Buem farmers. Contemporary Buem is thus a product of multiple historical currents that have shaped and defined, amongst a suite of other social and cultural features, current Buem human-environment relationships.

CHAPTER 3

A CHANGING ENVIRONMENT

The aim of this research is not to prove or disprove the phenomenon of climate change nor climate change's effects on Buem agriculture. Such debates and inquiries are inappropriate for a research project of this scale and nature. Rather, this research is concerned with the way Buem farmers are themselves perceiving environmental change, including climate change, through their own cultural and societal lens. It is a presumption of this research that Buem farmers have just as valid a perspective on the environment as any climate scientist, and that their perspectives on environmental change are just as important as those of a sitting member of the Intergovernmental Panel on Climate Change (IPCC). It comes as some surprise, then, that the voices of these everyday farmers – who are expected to be the ones to bear the "brunt" of climate change (Adger et al. 2005; Dixon et al. 2003)– are so drowned or even silenced in debates on climate change. In the spirit of giving the stage to rural farmers, I will not spend too much time delving in to what is known or unknown about global climate change and the dynamic, abstract models through which it is understood. Although I believe such research to be invaluable, I also believe it has the ability to obscure a tangible life-and-death problem by overwhelming its audience through doomsday scenarios and webs of integers that often overshadow the voices of those it is proclaiming to be concerned with.

That being said, it is necessary to discuss at different levels, or at least snapshots of different levels, the changes that are happening to the environment in Guaman-Buem. This endeavor is not intended to provide some kind of justification or compulsory legitimization to the perspectives of Buem farmers. Rather, it is to show that many of the processes that Buem farmers are grasping through their own interactions with the environment are being observed simultaneously by domestic and international organizations working in Ghana and West Africa. These parallel observations of similar processes put Buem farmers into the same environmental context discussed in reports elsewhere. These individuals and organizations – ranging from academicians in Accra to the Intergovernmental Panel on

Climate Change – have been collecting data on rainfall records, forest cover, and the crisis of bush fires for many years. These studies, selectively compiled here into an appropriately brief synthesis, provide a type of environmental context for the anthropological research presented in this thesis. It will be noted that some issues are discussed at more length than others. This is because some processes are better understood or less hazy. Bush fires, for example, are a phenomenon that is well documented and understood. Rainfall patterns and deforestation, however, are more nebulous and complex issues that are difficult to present in such a specific context.

First, I will look at the evidence for changing rainfall perturbations and overall declines in rainfall in Ghana and the Buem area. Secondly, I will discuss deforestation as a general crisis in West Africa and Ghana in particular. I will bring in some primary source material from the early colonial period in Buem, which paints a picture of a vastly different landscape from what is found there today. Thirdly, I will cover bush fires in Ghana and their effects on the Volta Region. Finally, I will discuss the process of "savannization" that is leading to fingers of "derived savanna" in the rainforests surrounding Guaman-Buem. This process is turning once heavily-forested areas into savanna grasslands that are reminiscent of northern Ghana and the Sahel.

WEATHER PERTURBATIONS: HAVE RAINFALL PATTERNS REALLY CHANGED?

Along with bush fires, perturbations in rainfall patterns in Guaman-Buem were the most common environmental disturbance discussed in interviews. Participants claimed that inconsistencies in weather patterns were both the most imminent effect of environmental change as well as the most devastating to their livelihoods. 76 percent of respondents complained that periodic droughts had impacted their farms negatively. Of these 76 percent, 78 percent claimed that they had suffered major damage to their farms and livelihoods as a result of drought. Drought though, wasn't defined as the kind of dry spell popularly understood in Western meteorology. To a Buem farmer, "drought" means a lack of rainfall during a period when rainfall is anticipated *or* a long dry spell during an agricultural season. Even if rainfall comes in copious amounts months after the expected rainy season, a Buem farmer will still complain that they have undergone a drought. In other words, the *amount* of contemporary rainfall wasn't considered as disheartening to Buem farmers as the

chronological and geographical *distribution* of contemporary rainfall throughout the environment as well as the year. In this sense, standard ways of measuring rainfall don't contribute to an accurate understanding of the difficulty that farmers face.

In rural Ghanaian agriculture, timing is of the utmost importance for a successful harvest. If a farmer plants a maize crop before a dry spell, the kernels won't germinate or will struggle to find their way out of the ground with what little rainfall they do receive. If a farmer plants a maize crop before a wetter-than-expected season, the kernels will drown or be swept away through erosion or flooding. Furthermore, Buem farmers are experts in reading weather patterns, and will not plant until they are certain that their efforts will bear fruit. In the next chapter, I will explain in more detail Buem ethno-meteorology and narratives surrounding weather perturbations and their associated responses. This section of the chapter on environmental context deals solely with what is quantitatively *known* about climatic changes in Buem in particular and Ghana in general.

RAINFALL DATA FROM DIFFERENT ENVIRONMENTAL ZONES IN GHANA

The second phase of my inquiry into climatic patterns looked first at data sets of rainfall patterns in other parts of the Volta Region, and secondly at data sets of rainfall patterns from different environmental zones within Ghana. Rainfall records for the Volta Region turned out to be even more difficult to obtain than those at the district level in Jasikan-Buem. It was not as easy for me to access rainfall data from the Cocoa Marketing Board in Ho, a six hour bush taxi ride from Guaman-Buem, so rainfall data from other parts of the Volta Region are unfortunately absent in this research. Similarly, most of the other data on rainfall patterns were from northern Ghana and Burkina Faso, which seemed to be of questionable relevance for the research at hand.

Ghana's "State of Environment Report 2004" uses data collected by the Environmental Protection Agency (EPA) of Ghana from 1960 to 2000 (EPA 2005) to produce line graphs (Figure 2) tracing rainfall and temperature records in the different environmental zones in Ghana. The forest, coastal savanna, and rain-forest zones all show clear dips in annual precipitation levels over the forty-year time span. The forest zone, including the Volta Region's forests, drops from an average of 1500 mm/yr to about 1300 mm/yr. The rainforests zones show a dramatic decrease in average rainfall from about 2500

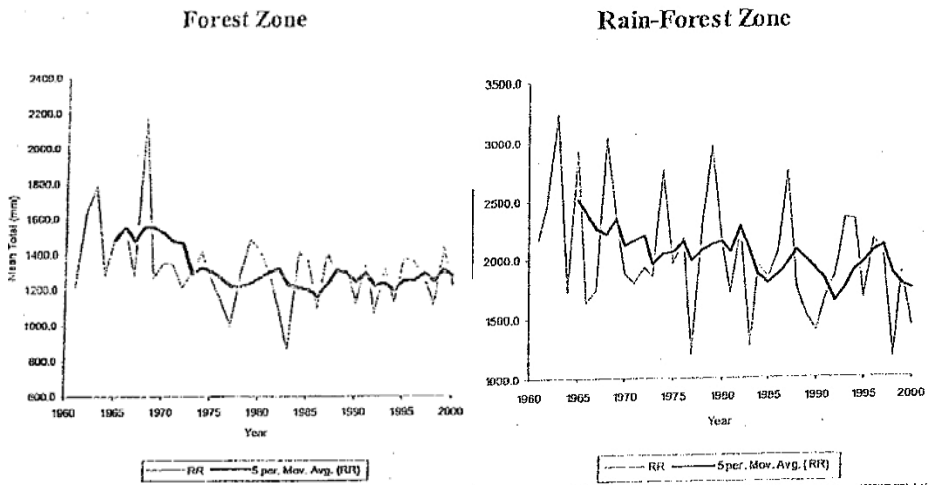

Figure 2. Annual rainfall (1961-2000) in the forest and rain-forest zones of Ghana. Source: EPA 2005 Ghana State of Environment Report, 2004. Accra, Ghana: EPA.

mm/yr in 1960 to 1700 mm/yr in 2000. This data, however, does not address changes in rain *cycles* as it focuses on annual data. As stated above, most farmers are typically more concerned with *when* it rains rather than *how much* it rains. In the same 2005 EPA report, it was observed that Rainfall patterns show great fluctuations over the years and across vegetation zones. However there is a gradual decrease in rainfall distribution in all parts of the country and this affects agricultural production. Factors that account for climate variability include general oscillation of the atmospheric wind system and prevailing sea surface temperatures, the fast rate of deforestation, warm weather conditions in urban areas created by massive concrete pavements in housing estates (EPA 2005:19). Clearly, the data shows that rainfall has decreased and become more erratic over the past 60 years. Even over the past twenty years, there appears to be more inconsistency in rainfall patterns in Jasikan-Buem from year to year.

DEFORESTATION TRENDS IN GUAMAN-BUEM AND WEST AFRICA

Deforestation has had dramatic social, economic, and ecological impacts on Guaman-Buem in particular, and Ghana in general. Unfortunately, it is difficult to find good data on rates of deforestation due to differing definitions of “forest” as well as differing methodologies for collecting data. Fairhead and Leach (1998) have extensively discussed problems with identifying “original” forest area vis-à-vis current forest cover. Even in cases

where current forest cover is adequately measured, it is difficult to know if it is any different than it was before the measurement. Remote sensing data on forest cover only goes as far back as the earliest aerial photographs in the 1950s (though I'm not aware of any that exist for this area), and the earliest primary source documents on Buem forests are surveys conducted by German and British surveyors.

One of the most helpful of these early colonial-era documents is located at the chief's palace in Guaman-Buem and contains a linear illustration of the environmental zones along the main Nkwanta-Accra road in 1911 and 1929. However, it is difficult to know what is meant by terms featured on this document such as "natural deciduous forest," "secondary 're-growth' forest," "transition rainforest" and "savanna," and if the meaning of those terms was similar at the time to their meaning today. Many international development organizations and environmental scientists claim that West Africa in general is undergoing a "deforestation crisis" but fail to agree on terms such as "forest," "secondary forest," or what exactly West African forests looked like before this "crisis" began. This is not to argue that deforestation in West Africa *is not* a problem, but its extent and severity have possibly been exaggerated by international development organizations (Fairhead and Leach 1993:2003). These early documents are a testament to the fact that these terms are difficult to interpret and even more difficult to use as indicators of forest cover in the past.

Barnes' (1990) "Deforestation Trends in Africa" discusses deforestation rates and impacts based on surveys conducted by the FAO/UNEP in 1981. The data used in these graphs (Figure 3) included surveys done in the 1970s and 1980s. The forests of Ghana are part of the Guinea-Congolian rainforests of central and West Africa and are, according to Barnes, vital for the normal distribution of rainfall throughout the continent. During the monsoon season, storms move across the forests both distributing rainfall and acquiring additional precipitation for areas further north and east.The forests of Ghana affect rainfall patterns in the Sahel and the rainforests of central Africa affect the rainfall patterns in Ghana (Barnes 1990). According to Barnes, the forests of Ghana will have been reduced to 3598 square kilometers by 2040 (Barnes 1990).

One of the most common problems in identifying and measuring deforestation trends, however, concerns the ways in which forests are labeled. Though Barnes (1990) discusses such problems, his analysis still relies on models that make assumptions based on earlier

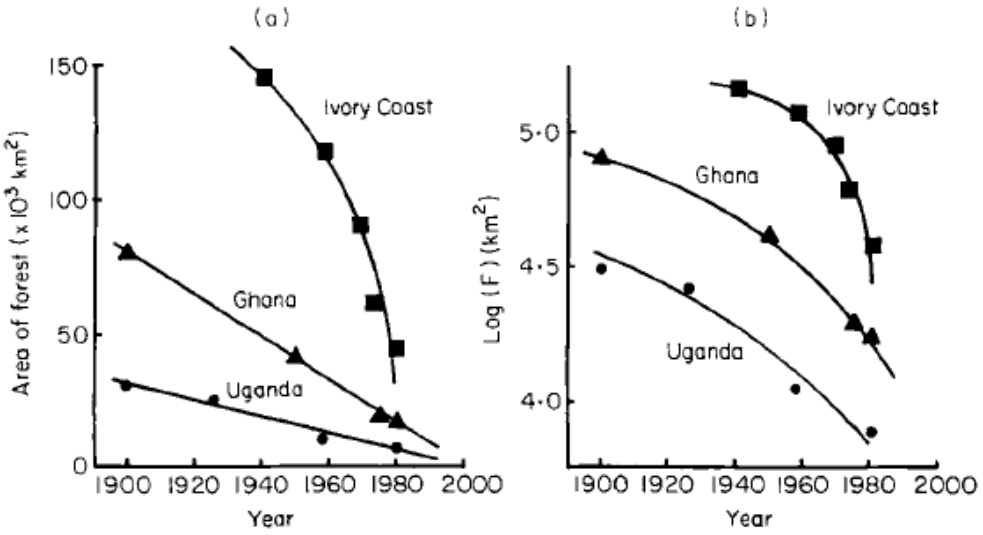

Figure 3. Long-term deforestation trends in Ghana, Ivory Coast, and Uganda on (a) linear scales and on (b) a log-linear plot 1900-2000. Source: Barnes, R. F. W. 1990 Deforestation Trends in Tropical Africa. African Journal of Ecology 28:161–173.

reports about deforestation in West Africa. Current definitions of different qualities and states of forests include "primary," "secondary," or "agro-forests" (Fairhead and Leach 1993). Is a farm that has been left to fallow for eight years considered a forest? Is a woodlot of Teak considered a forest? Can an oil palm plantation mixed with large *Ceiba pentandra* trees be considered a forest area? In my research, Buems didn't make such distinctions between primary forests and secondary forests, and considered nearly everything they did to be "forest agriculture." In fact, "farm" and "bush" are synonymous with "forest" in the Lelemi-Buem language. When a family is leaving for their farm in the morning they will simply announce that they are "going to the bush." When I discussed this dilemma of "defining forests" with them, they would respond that the forests aren't disappearing, but rather becoming weaker and less resourceful for fertile soils, wild animals, medicines, and other natural and cultural resources.

Sammy B. Yeboah's (2002) "The History and Survival of Presbyterian Church of Ghana (Basel Mission) in Buem/Karchi/Adele – 1891-2001" describes Guaman-Buem when it was first visited by missionaries in 1891 as a lush forest environment brimming with various species of large and small mammals. "The area allocated to them is where Christians occupy today. The area given to the Christians was an area vested with wild animals. Mr. Ruben therefore decided that there was the need to get a bell to summon members to both

school and church and also to drive away the wild animals" (Yeboah 2002:4). In Yeboah's work he uses primary source material to reconstruct missionary history in Guaman-Buem, particularly where the part of the village known as the "Mission" currently sits. In addition to its reference to the environmental conditions in Guaman at the time, the work is also invaluable for understanding how the missionary process was undertaken and what interactions between Christian missionaries and "traditionalists" looked like.

Together, these data do demonstrate a decrease in what is defined as "forest" by Western scientists. These rates of deforestation parallel the loss of a vital source of soil nutrition in the form of leaf litter, commonly cited by rural Buems as a marker in increased environmental degradation on their farmland. Early documents written by Presbyterian missionaries, surveys conducted by German and British colonial surveyors, and later surveys undertaken by K. Twum-Barima and FAO/UNEP all show a steady decrease in forest cover. This decrease in the diversity and bio-mass of forest trees surrounding Guaman-Buem echoes the narrative of Buem elders and farmers today. Deforestation processes are increasingly targeting the remaining isolated trees such as *Ceiba pentandra* that are left over from the previous bonanza for hardwood trees. Though deforestation is a documented crisis, it should be remembered that how dramatic deforestation has actually been in Buem will remain unknown until further sources of data are identified and incorporated into such studies.

BUSH FIRES AND EMERGING ENVIRONMENTAL ZONES

Bush fires are large, sprawling fires that opportunistically burn dried forests during the dry season and can rapidly build into massive forest fires that consume agricultural lands and undisturbed forests. They have become regular major environmental disturbances throughout Ghana and are related to other environmental changes such as rainfall perturbations, deforestation, and "derived savanna." Bush fires also have immediate social causes, such as the use of fire in hunting and broadcast fires to encourage the growth of saplings for livestock owned by pastoral groups. Most commonly, bush fires are ignited when farmers clear land and burn dried weeds to begin a new cropping cycle at an inappropriate time (Ampadu-Agyei 1988). These bush fires affect nearly every environmental zone in Ghana, including the Western Region which was until recently home to expansive moist evergreen rainforests.

Table 2 shows the incidences of bush fires in different regions of Ghana from 1984to 1985. It demonstrates that bush fires have had a detrimental impact on agricultural output in the affected regions of Ghana, particularly the Northern, Upper East, and Upper West regions. In 1982 and 1983 bush fires swept through all the regions of Ghana, causing a six percent decline in agricultural output for each respective year. Not too surprisingly, Ghana's GDP also declined six percent in each of those years (Seini 2002). The Volta Region made up 10.6 percent of bush fires in the years 1984-85, and the "at risk" zone in the Volta Region begins around Hohoe and the Jasikan Districts. Of the regions south of the main "Sahel" zone, the Volta Region represents the second-most affected area.

Table 2. Incidence of Bush Fires by Region in 1984-85

Region	Main vegetation	Main crops	No. of fires 1984-85	Percentage of total in 1984-85	Rank
1. Western	Semi deciduous forest	Timber, cocoa	46	4.6	10
2. Central	Coastal savanna	Maize, cassava	92	9.1	8
3. G. Accra	Coastal savanna	Maize, cassava	68	6.8	9
4. Eastern	Semi deciduous forest	Cocoa, oil palm	96	9.6	7
5. Volta	Semi deciduous forest	Cocoa, rootcrops	107	10.6	5
6. Ashanti	Semi deciduous forest	Cocoa, timber	104	10.3	6
7. Brong-Ahafo	Transitional zone	Cocoa, timber	110	10.9	4
8. Northern	Savanna	Rice, millet	145	14.4	1
9. Upper E.	Savanna	Sorghum, millet	125	12.4	2
10. Upper W.	Savanna	Sorghum, millet	112	11.1	3
Total			1005	100.0	

Source: Ampadu-Agyei, O. 1988 Bushfires and Management Policies in Ghana. *The Environmentalist* 8:221-228.

Bush fires often create and then reinforce new boundaries of savanna grasslands and woodlands, particularly in areas classified as "forest-savanna mosaic" (Ampadu-Agyei 1988). "In some of the areas affected by the bushfires, especially in the northern sector of Ghana, grass has failed to grow again because the regenerative power of the land has been destroyed. There is an emergence of pockets of desert even in the forest zones" (Ampadu-

Agyei 1988:222). The area that Ampadu-Agyei is likely referring to is the type of forest-savanna mosaic that exists in the northernmost parts of both the Volta Region and the Ashanti Region. These new environmental areas in previously-forested zones are referred to as "derived savanna."

"DERIVED SAVANNA"

As Buem is situated at the northernmost margins of the rainforest area of the Volta Region, one can easily pay a five *cedi* taxi fair and head north for about one hour before finding themselves surrounded by an entirely different environmental zone: the savanna. The savanna, a combination of woodland and grassy savanna, is one of Africa's major environmental zones and is also home to West Africa's earliest state societies, such as ancient Mali, ancient Ghana, Songhay, and ancient Niger (Davidson 1998). Sahelian Ghanaians are largely Muslim and belong to different language groups than Ghanaians in the south, including transnational pastoral groups such as the Fulanis and Tuaregs as well as migrants from northern Nigeria, Niger, and Burkina Faso. In neighboring countries such as Cote D'Ivoire, Togo, Benin, and Nigeria, the north-south cultural divide has been so pronounced that it has led to civil wars and ethnic conflicts in all four countries (Meredith 2005). Mostly due to Ghanaian nationalism, such ethnic tensions have largely been avoided in Ghana (Birmingham 1998). Buem is one of the rare areas where these two groups rather amicably overlap, due largely to the cocoa boom of the mid-to-late 20th century,which brought in migrant labor from the poorer, drier north. As a result of the migration and subsequent settlement of communities of northerners, Islam and northern cultural practices came to define "Zongo" areas of Buem, described earlier.

Although much of the northernmost margins of the rainforest in the Volta Region give way to forest-savanna mosaic, Buem farmers and oral historians argue that Buem used to be a densely forested environment. The fact that cocoa was planted *en masse* in Guaman-Buem and formed the cornerstone of the Buem economy some thirty years ago is a testament to the likelihood of these Buem environmental histories. Early German and British surveys of the area, as well as historical documents and journals penned by missionaries and colonial officers, indicate that the area was indeed densely forested. Buem, however, is also a large mountainous region of considerable variability, with areas east of Jasikan, on the way to

Worawora, being covered by natural savanna areas that were never exploited for cocoa production. The “derived savanna” discussed here involves environments that have been deforested, exposed to erosive conditions, depleted of nutrients as a result of the lack of leaf-derived hummus, and left to bake in the equatorial sun until they give way to savanna. Savannization of previously forested environments can result from many processes, including local land-use practices (Ampadu-Agyei 1988) and climate change (Le Houérou 1996).

Derived savanna that is used for agricultural purposes is typically used to grow crops that are not characteristic of shifting forest cultivation. Such crops include yams, cowpeas, millet, tomatoes, okra, and other vegetable crops. When agrichemicals are provided, farmers can also choose to grow maize. On derived savanna that floods into marshland during rainy seasons, many farmers choose to plant vast acres of local and exotic rice. One characteristic of derived savanna is patches of forested areas with relic forest trees towering over derived savanna areas. In Guaman, a diagnostic tree species for this type of environment would be *Ceiba pentandra*.

Typically, derived savanna is identified as clear-cut land with a clayey soil that appears to intrude into the margins of heavily forested areas. In the case of Buem, it represents fingers of savanna that are reaching into forested areas that, even if left to fallow, will not revert to secondary growth forest but will rather transform into woodland or grassy savannas. This involves a complex ecological process that is explained elsewhere in great detail (Salako et al. 2006), but has been explained by local land-use patterns (Ampadu-Agyei 1988), bush fires (Saha 2002), and climate change (Le Houérou 1996). Ultimately, it seems that derived savanna is a consequence of removing the dense biomass of rain forest that provides leaf litter and other organic materials that are transformed into the five or six inches of hummus that typically make up the top soil of rain forest environments (Wilkes 1993). When large enough areas of forest are removed, this source of healthy, hummus-rich tropical soil is cut off.

CONCLUSION

Guaman-Buem is experiencing environmental change from multiple directions including changing rainfall rates, deforestation, bush fires, and the transition of forest into

woodland savannah. These changes represent challenges and opportunities for Buem farmers, from losses in sources of leaf litter for soils as a result of deforestation to emerging savannahs conducive to yam, cowpea, and even millet farming. While many of these environmental changes can be attributed to broader economic networks (deforestation) and local practices (the use of fire by pastoralists encouraging bush fires), unpredictable rainfall and broader patterns of savannization are more likely a result of large-scale environmental change. These environmental changes have been summarized to provide a context for this anthropological research and to describe the environment that Buem farmers are interacting with in their crop choices and agricultural strategies.

CHAPTER 4

LIFE HISTORIES OF THREE BUEM FARMERS: THE PEASANT FARMER, THE INNOVATIVE FARMER, AND THE ROYAL FARMER

In order to come to some kind of understanding of how the world looks through the eyes of a Buem farmer, it is important to have some kind of understanding of what the life of a common Buem farmer looks like. Here, I want to focus on three different kinds of people who have found themselves farming in a changing environment at different stages in their lives. These three individuals represent different segments of Buem society and their narratives describe understandings of environmental change from the perspective of a peasant farmer, an economically well-off innovative farmer, and a royal farmer. Emilia Darko, an elderly woman of about 75 years, still wakes up five days a week at four o'clock in the morning to work on one of the three plots she currently cultivates. She is too poor to hire laborers and relies on children she has agreed to watch over to provide her with help on her plots. Mohammed Antwi is a middle-aged man of 40 years who has traveled to various countries and worked on various high-paying international projects, only to come back home because he missed the Buem farming lifestyle. Though his story may sound romantic, it is very sincere. His role as a "lead farmer" in Guaman-Buem is inspiring other Buem farmers to experiment with new methods of cultivation, most notably methods associated with northern Ghanaian savannah farming. Nana Sampson Ofori IV is a prominent chief in Guaman-Buem and one of the most highly-respected elders in the town. He is in his 60s and continues to work on his farms five days a week, despite his high status and his obligations as a chief and prominent member of the Benkyiomana clan. One of his assertions is that farming is, in itself, essentially a way to reproduce Buem culture and to maintain the identity of the town. The fact that he toils on his farm while acting as a chief of the village isn't indicative of a "leading by example" narrative, but rather a testament to the fact that "to farm is to be Buem." Historically, this is not only significant in relation to the land tenure disputes of the 1990s, but also in that the Buem state prides itself on its self-sufficiency.

THE PEASANT FARMER

Emilia Darko is a Buem woman of 75 years. She is a peasant farmer[7] who mostly sharecrops. She is a short, stout, strong woman with a round face and tough, leathery hands. At 75 years of age, she has maintained an impressive posture from carrying loads to and from her croplands as well as head pans of water to and from the Konsu River, the Kabue sacred pond, or from one of the three bore holes in the village. She is remarkably tough and perseverant, and doesn't appear fatigued or exhausted. Over her lifetime, she has given birth to 15 children, 10 of whom died in their infancy. "That is life in Guaman," she shrugs as if to dismiss the tragedy. On a normal day, she wears a traditional Ghanaian cloth wrapped around her waist and a shirt or blouse acquired second-hand from traveling Sahelian merchants who resell used clothes donated from Goodwill or any other of the numerous international donors. On Sundays she takes out one of her few immaculate dresses that are folded neatly and packed into an old green-brown suitcase, decorated with Ghanaian symbols or West African-style prints, and presses it with a coal-powered steel iron. "My daughters buy this cloth for me and bring it when there is a funeral or other custom being performed in the town, I put these away under the bed and only take them out on Sundays or for special occasions." In the same suitcase, she has a small envelope with black-and-white pictures of her when she was a young woman. "All of the boys in the town used to chase after me," she comments with a big smile, "some of the same ones that chased me then still chase me now." Along with the photographs of her in the late 1940s and 1950s, she also has pictures of her long-deceased parents. "They are great ancestors in this town," she adds, "they are great people in the Beklukpo clan." She lives in the spare room of a house that belongs to the Minister of Parliament for Buem, who invited her to stay in the room when her mud-brick house collapsed after a heavy rain storm in 2008. "It is only by the grace of God that I was outside preparing palm nut soup. Suddenly the roof fell into the walls and the building came down with a loud noise" (Darko, Personal interview, June 1, 2010).

[7] By "peasant farmer" I mean someone who is a smallholder, sharecropper, or leaser of small plots of land to farm. I use the term in the traditional sense, to refer to someone who either owns, shares, or rents a small piece of land.

Emilia was born in Guaman- Buem in 1935 into the Bekblukpo clan and has lived in Guaman her whole life. She never went to school and does not speak English. Her primary language is Lelemi-Buem but she also speaks Twi, Ewe, Hausa, and Kotokoli. Her husband, a 74 year old Ewe farmer, struggles from health problems and hasn't always had the means to support the family. "When we were first married, he was a playboy of sorts," she laughingly comments, "but in more recent years he has stopped fooling around and now we work together on the farm" (Darko, Personal interview, June 1, 2010). Because her husband is an Ewe and land is patrilineally inherited in Buem society, she is forced to rent or lease land or to arrange a sharecropping agreement with other Buem farmers. According to Emilia "It is hard to farm the way you prefer to farm when it isn't your land. Someone might ask you 'let's plant some rice' or 'let's plant some maize,' and you might be thinking 'this land needs to lie fallow, the soil is beginning to spoil.' But really, you are powerless in the situation and you have to shrug your shoulders and say 'okay'" (Darko, Personal interview, June 1, 2010). While interviewing her, she swirls around freshly harvested rice in a big, brightly silver metal bowl where the chaff unhinges from the rice and floats to the surface in a useless, thick layer. Lying in the sun behind us is a large mat pieced together from old produce sacks covered with drying rice.

"When I was young, the forest used to be a frightening place. As I grew older, the forest also grew older and pulled back from the town. As our families grew, plots became smaller and smaller, so now almost all the available land is being cultivated. Those who have too much land to cultivate hire people like me to cultivate it for them, and then take a big chunk of what we grow" (Darko, Personal interview, June 1, 2010). Emilia doesn't sell her produce. She eats what she needs and stores the rest in an old mud-brick kitchen that used to be adjoined to her now-collapsed home. When she needs to buy condiments like salt or spices or meat like fish, fowl, bush rat, goat, sheep, or grasscutter she normally either barters with incrementally-sized bags of staples with shop-owners or hunters. While conducting a household survey with her I asked what her income was every month, and she responded that "In one month I only touch one Ghana cedi; if someone doesn't have something to give me for the rice I'll accept cash, but I prefer not to" (Darko, Personal interview, June 1, 2010). Though this is likely an exaggeration, the point that Emilia is trying to make is that she doesn't have access to a consistent income and that most of the goods or services she requires

are paid in kind. “When I was younger and my sons and daughters went to school, then I would sell some of my produce at the market to pay their school fees and buy clothes, but now I don’t need money and only have to feed myself” (Darko, Personal interview, June 1, 2010). This isn’t entirely true, despite her humility. She takes care of a young girl, Pearl, who is a distant part of her kin network, as well as two granddaughters and a grandson who help her on the farm. “I get more from them than they get from me” (Darko, Personal interview, June 1, 2010). During the school year, they attend school from eight in the morning until three in the afternoon while she toils on the farm by herself. Clearly, she buries the often stark reality of her life in humble and dismissive understatements. This humility is typical of many poor Buem farmers.

When Emilia was born, Ghana was still known as the “Gold Coast” and was one of Great Britain’s flagship colonies. The British had erected posts around the forests, then “natural” reserves, and made a liaison with traditional authorities to punish trespassers and those who would take from the forests. The chief of Guaman-Buem at the time held a native court at the chief’s palace and also carried out punishments such as imprisonment, fines, and other relatively stiff penalties. “At that time, the forests surrounding Guaman were so thick that if you went inside it felt like it was nighttime. There were snakes that used to fly through the air above you. All of those animals and spirits ran away to other forest areas when the trees started coming down and the fires came” (Darko, Personal interview, June 1, 2010). Like most elders in Guaman-Buem, Emilia remembers the Buem forests being towering, dark, powerful repositories of dangerous creatures and lurking spirits - endless spaces of natural and spiritual energy. The fringes of the these forests, forming the boundaries of Guaman-Buem and only disrupted by bush paths – and later lorry roads – comprised the agricultural lands and natural resource areas for the Buems. “We would clear the forest – one or two hectares – plant our plantains, cassava, groundnuts, and cocoa yam, and then we would move on to another area” (Darko, Personal interview, June 1, 2010). The “another area,” however, was not a new part of the forest but rather “someplace that we had farmed before.” That more areas of the forest are now being farmed is not due to locally instigated agricultural expansions into the “bush,” but because in the 1950s and 1960s the Ghanaian government encouraged landowners to tap fallow or uncultivated forest lands for cocoa plantations. Following the demise of the cocoa boom in the 1970s and 1980s, due to among

other things swollen shoot disease and aging plantations, these lands were either converted to growing staple crops or became consumed by bush fires. The pre-cocoa boom plots of land that Emilia talks about represent traditional, intercropped farms that followed a swidden agricultural system of shifting cultivation. Each clan had an area that was distributed among its members and then passed down patrilineally. Only sons could inherit their fathers' lands, so Emilia now finds herself sharecropping on another clan's land, which isn't at all unusual. "Most people in Guaman are sharecroppers at one time or another, especially women. In fact, being a sharecropper is sometimes easier, because sharecroppers don't have to worry too much about how their farming methods are going to impact next year's harvest" (Darko, Personal interview, June 1, 2010).

Emilia's narrative of environmental change is almost identical to any other narrative from a person of this age and from this generation. "But because I am a woman, I think more about how the soil is now and how it was then, what kinds of plants we had, and how we knew what to plant and when to plant it" (Darko, Personal interview, June 1, 2010). Buem women have complex, detailed understandings of different varieties of different crops for both agricultural reasons as well as culinary reasons. Typically, a Buem man will discuss the history of the forest reserves, the demise of wild animals and hunting grounds, and retreat of positive and negative spiritual forces from the forested periphery of the village. A Buem woman, however, usually narrates the perturbations that visited her farming strategies, the amount of food that was available for her family, or the varieties of crops that did or didn't exist at the time. "We had more kinds of yams and rice back then, but they didn't produce big fruits like they do now. But now, the ones that MOFA (Ministry of Food and Agriculture) promotes and sells to us need all kinds of chemicals and extra work to maintain. At first we had a lot of trees, but now we don't have a lot of them. The soil has changed. The way it has changed is that if we plant in the ground the crops will not grow well unless we apply some kind of fertilizer, especially these chemical fertilizers" (Darko, Personal interview, June 1, 2010).

THE INNOVATIVE FARMER

It would be easy to compose the longest and most detailed narrative for Mohammed Antwi, because he is a highly educated, well-read, and well-traveled Buem who spent more

than five years in the Middle East working as a safety supervisor in some of the world's busiest ports. As a result, he is very skilled in discourse and rhetoric and often trails off into tales about missing Africa while in Dubai or trucking across the Canadian tundra listening to Fela Kuti tapes. While these ventures might seem like they could have detached him from the everyday realties of a Buem farmer, he is quick to dismiss such a question.

> I have lived most of my life here as a hunter and a farmer, but because of my brother I had those opportunities you know, so I couldn't say 'no.' But living in Dubai I used to sit at my desk and dose off when work was slow during the night. I would think about this place so much, about my wife and kids especially, and one day I said 'no, I have to go home.' So I came back here to Guaman, got some land to farm and began loving my life again. You know, people talk so much about abroad but when you go abroad it is not like people say it is going to be. You get treated poorly like you are some kind of fool. I love being able to eat my own food and be with my family. I am a Buem, so I understand what it means to live like a Buem, that is why I came back. (Antwi, Personal interview, July 6, 2010)

Mohammed often discusses the way he was treated when working in Dubai. Because of the high demands for labor at port cities throughout the rapidly developing oil-rich states in the Middle East, construction labor is often sourced from other poor developing countries such as Ghana. Typically large groups of semi-educated laborers are hired and flown to their worksite and housed in camps with compatriots. At the specific harbor where Mohammed was working, there were large groups of Indians, Ghanaians, Nigerians, Sudanese, and Ivorians. "We all stayed together, you know. Some of the people, like especially the Indians, they had nicer accommodations than us, and that used to make us so angry." Mohammed and other Africans working at the ports in Dubai were often insulted and ridiculed. "One time I was sitting down dozing off and someone asked me 'Mohammed, are you dreaming of sleeping in the trees? Do you miss your mosquito-infested backwater?' I became so angry that I jumped up and grabbed the guy by his neck and began shouting at him. That day I was missing my family so much and said 'no, this guy is not going to talk to me like this'" (Antwi, Personal interview, July 6, 2010). Even though the amount of money that Mohammed made was two or three times more than what he would make in Ghana, he still decided that it was time for him to come home.

Coming from abroad back to Ghana, however, was not easy for Mohammed. Because of assumptions about the world outside of Ghana being a land of limitless wealth, Mohammed was greeted with impossible demands and ridicule upon returning home.

> M: But I came home with nothing. Just my suitcase. I came home as if I had just left. I had forgotten that I had to support – in cash and kind – so many people…. When I was coming home, the feeling of everybody looking at me, laughing behind my back, coming home with nothing. It was painful. People expected me to be spending a lot of money and showing off. I wasn't prepared for that, it is not my nature. That is not my kind of life. When I came here and stayed here for some time and observed, I slowly started working my way out… Look, the first day I came to this house my place was like a magnet. It was full of people who wanted hand-outs. Just to see what I had brought, and some realizing that I came home empty handed. Hahaha! And then, people stopped visiting me and I started hearing how they were laughing at me. I was built for that, I was prepared for that. I had to tell myself "Mohammed, forget about what you are doing and just concentrate on your farming.
>
> D: That is a very powerful story.
>
> M: Uh huh. Look, even my wife had these big expectations of me. It is customary that once you come home you just have to start giving things out (laughter). Various beers and Guinness have to be flowing like water, that is what people want. Everyday there should be fowls to eat. But I came home different from what was expected. I had that pain and feeling that people were laughing at me. But now, I tell you, people are beginning to get closer to me. So I am saying that if all my brothers in Guaman have that feeling that they can't fulfill their promises and are ashamed: "Come back home!" Forget about them, forget about the gossip. Work hard for one or two years and then you will see. Look, if you are only living to please other people you will never be happy. (Antwi, Personal interview, July 6, 2010)

Mohammed compares his narrative with that of a much more common occurrence in Buem – young people moving to major urban centers such as Accra to look for work and then coming home ashamed at their failure to acquire riches.

Unlike the peasant farmer or the royal farmer Mohammed Antwi is a large-scale farmer, relatively speaking, with access to hybridized crop varietals and expensive inputs. His farm is a massive, twenty-hectare piece of land on the other side of the mountains that tower over Guaman-Buem. His farm is composed of sprawling fields of mono-culturally cropped cowpeas and other fields of cowpeas intercropped with different varieties of yams. "This yam is called a Marshall yam and is now being pushed by the Ministry of Food and Agriculture," he tells me as he traces his finger along the contours of a heart-shaped leaf, "it is probably the most valuable yam these days and is delicious if you fry it in oil and eat it as chips." From as far as the eye can see, his farm sprawls through a savanna environment that is dotted with towering *Ceiba pentandra* trees. "I know you won't like to hear me say that I am going to have to bring those trees down next year," he comments while giggling "I can

use the wood to build a bigger cottage, and then sell some for some *small small* money. I also need that land to plant more crops and the shadow from the tree disturbs my farm" (Antwi, Personal interview, July 6, 2010). Taking me to his present-day cottage, he introduces me to a middle-aged Ewe couple and their young son who have been taking care of the farm while he is at home. They sleep in a stout longhouse built from hard wood and roofed with corrugated iron. In the house there are two large "Ashfoam" mattresses where the parents sleep next to their child. Between the beds and the entrance is a small cooking area with a mud-brick stove and a large bag of locally produced charcoal.

While visiting his farm, he takes me to an area that is at a lower elevation than the rest of his farm and introduces me to three young Ewe men who he has hired to clear a large area of elephant grass for a rice project. "This is Ben, Kojo, and Kwase," Mohammed says as he introduces me, "they are from Acca and usually help me with laborious tasks that my older farm hands can't handle." They are carrying finely-sharpened machetes and whacking away at eight-foot tall swaying elephant grass that is dense and tangible enough to require significant exertions of strength to bring down. "Clearing these five hectares of grass will take them all week," he explains, "and they have to be very careful to watch out for green mambas, puff adders and black cobras" (Antwi, Personal interview, July 6, 2010). He doesn't laugh after mentioning those dreaded, poisonous creatures of local lore. Snakes are greatly feared by Ghanaians, and take a significant amount of life in rural communities. When I was a Peace Corps volunteer in Guaman, there were at least three deaths that resulted from snake bites. Looking at the young men who are farming in only tattered pairs of shorts while barefoot, I cringe at the idea of them stepping into the pathway of a black cobra.

"As for the environment, well yes it has changed," explained Mohammed in my interview with him, "but to be honest, we are also changing with it. We have to learn how to farm like our brothers in the north" (Antwi, Personal interview, July 6, 2010). This is a comment that came up innumerable times during my interviews with Buem farmers. Mohammed articulated it quite well from his perspective as someone on the cusp of the "new environment":

> You know, during the cocoa boom a lot of Hausas from Nigeria and Gonjas from northern Ghana came to Buem to help take care of our cocoa plantations. The way the land is up there, they use hoes and ploughs on their farms. They make furrows and gently mold the soil so that rain can pass through their farm when they pour it

> from head pans. They don't grow the same food that we grow here in Buem, because the environment is dry and there are no big trees around. So, you see, they brought a lot of those tools and the plants too. Like cowpeas and millet. People here don't know cowpeas and millet, but they have to learn. And they will learn, just like I did. When I grew up here I had a plantain farm and had some *small small* yams too, but I couldn't rely on that anymore, and I don't want to plant any *basa basa*[8] cassava. That is the way the land is becoming here, just like my farm. This place too, it used to be rainforest like near the Konsu River. But look, now there are just some big tropical trees here reminding us of those days. But my farm is the most productive in Buem! So look, we can still farm. We don't have to panic like some people are doing. If we are eating yams and cowpeas is it not better than plantains and *kitikiti*[9] cassava? Look, now we know what we have to do, so I am trying to tell people "listen to the Hausa and Gonja people if you want to keep farming." You see, that is what is happening now. (Antwi, Personal interview, July 6, 2010)

In other words, migrant farm laborers from northern Nigeria and Gonja have experience with just the kind of environment that Mohammed Antwi is *expecting* to develop in Guaman-Buem. His farm acts as a kind of leading example for Buem farmers to visit when they have any questions about how to start farming in a savanna-type environment. "It is already happening *pa!* People have been asking to come here and see what I am doing, because the way they are farming with old methods in the forests is failing them with how the rains have been" (Antwi, Personal interview, July 6, 2010). While not *all* Buem farmers who rely on traditional rain-fed tropical agriculture are "failing," in the words of Mohammed, many of them are beginning to take on off-season projects like vegetable gardens or yam projects as a means of familiarizing themselves with savanna agriculture.

Mohammed does offer one bit of advice when it comes to transitioning from rain-fed tropical agriculture to the "northern" style of agriculture he is practicing on his own farm: beware of agri-chemicals. "To be honest, these chemicals do bother me." During the interview, Mohammed scanned the area around his cottage and pointed to all the areas that were littered with weedicide, pesticide, and fertilizers containers. "I do use these chemicals on my own farm, because to go through and weed all of this with a cutlass [machete] would just require too much work and then you would have to mulch too." Looking over his

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[8] The Twi word *basa basa* is difficult to translate, but roughly means "messy," "sloppy," or "not well thought out."

[9] The Twi word *kitikiti* roughly translates to "small" in English.

expansive, high-yielding farm he nods in acknowledgement to his belief that the benefits have far outweighed the costs. “But I do know that there are some dangers with these chemicals. Even if you look at the package it says right there ‘Use with caution and don’t breath these chemicals in’. Well, most people don’t know how to read and can just spray, spray, spray all day without knowing the stuff can be deadly. Sometimes I say ‘hey man, be careful with that stuff’ but people just kind of laugh” (Antwi, Personal interview, July 6, 2010).

THE ROYAL FARMER

Nana Sampson Ofori IV is the chief of Guaman as well as the head of the royal Benkyiomana clan. Being the head of the royal clan makes an individual the chief of a Buem village by default. He is a soft-spoken, short and thin man of 70 years who presides in the royal palace in the center of Guaman. The royal palace is an old four-room concrete block building that has been modified over the years from its earlier mud-brick manifestation. It has a U-shape with a large courtyard and an open meeting room where village affairs are discussed and disagreements are settled. Nana Sampson Ofori IV presides over “cases” every Wednesday and Sunday, weighs the arguments of different sides, and pronounces a judgment. He is widely believed to be the most impartial, fair, and judicious person in the village despite his identification with a particular clan. In cases where one of his own clan members has violated a local law or taboo, he is known to judge against their favor despite their extended kinship. In the Lelemi-Buem language, it is said that a chief holds the prized qualities of “*kanye ndu bowi”* which literally translates as “ingredients of social harmony.” Sitting down with Nana Ofori Sampson IV for just a few minutes will put any “stranger” to the village at ease and permit them to feel comfortable telling the chief their mission and purpose for visiting Guaman.

Every Wednesday, the village of Guaman-Buem lays down their machetes and other farming tools and devotes their day to fulfilling “communal labor” obligations. These obligations include sweeping the streets, cleaning the gutters, weeding around the chief’s palace and other prominent structures, and fixing any other problems that need attention in the town. For example, the ritual center and fresh water resource of Kabue requires an annual cleaning, where inhabitants in the town carry their head-pans to the pool and empty out the

water one load at a time. The purpose is to remove any debris that may be lying at the bottom of the pond and to perform rituals for the "lady" of Kabue. The chief of the town brings his stool along with an entourage of elders to watch over the process. The process takes all day, but the combined strength of all the people in the community gets the job done. The reason that this "communal labor" takes place on Wednesday is because the first chief of Guaman was born on *wukuada*[10] and was thus named *Kwaku*[11]. These "taboo days" are in honor of the chief's namesake and must be respected by every person in the town. Anyone who goes to their farm on a Wednesday or performs non-communal labor of any sort (other than cleaning their house or yard) is said to be violating one of the most sacred taboos in Buem culture and society. Contemporarily, this is in honor of Nana Ofori Sampson IV, and any decree he makes is required to be fulfilled on this day.

Sitting down with Nana Ofori Sampson IV is a great privilege, because he is a very busy chief who is often summoned to Jasikan-Buem for meetings of the traditional council or to Accra to testify or present himself to discuss affairs in the Buem area. He is the "left-hand chief" of the paramount chief in Bodada, discussed in a previous chapter, and thus is referred to as "*Benkumhene"* which is a Twi word which in English translates as "chief on the left hand." The *Benkumhene* in Buem culture is the leader of the warriors of Buem who are called upon to defend the Buem state if it is attacked. Not surprisingly, *Benkumhenes* are known for being patient, judicious, and observant. In interviews, Nana Ofori Sampson IV is exactly that, and at times even comes across as being surprisingly humble for a person with such great responsibilities and power. He often deferred questions to other elders that he didn't feel comfortable answering and referred to himself as "just a Buem farmer" who was no better or more entitled than any other person living in the village.

> Normally, I go to farm everyday except Sunday and Wednesdays. Of course, if I have some business in Jasikan or Accra I do go there. But just now I came from farm and look, I haven't even changed out of my work clothes! [laughter] So yes, it is my responsibility to grow my food and sell some of it, but even more important is the pleasure that I get from farming. Working in the forest and watching things grow is something that makes me so happy. I just wish that the

[10] The Twi word for Wednesday

[11] The name for a male born on Wednesday.

> youth in this town understood the importance of farming the way the elders do. (Sampson, Personal interview, July 15, 2010)

Nana Ofori Sampson IV has six plots of land under cultivation, which is among the most of any other household discussed in this research. He mostly cultivates the same crops as other people in the village, but focuses on cassava, plantains, and his cocoa plantation. “Just like my father, I like growing cocoa so much. Not just because of the money, but because it is very interesting to farm it. As for the cassava and plantains, I like to grow them because one is a tree and one is a plant. If you go to farm and you are growing only maize, cassava, and yams you will spend too much time in the dirt. It is nice to have variety and be able to work with trees too” (Sampson, Personal interview, July 15, 2010).

Nana Ofori Sampson IV was trained as a teacher when he was a young adult, and spent much of his life teaching Senior Secondary School in a city just outside of Accra. He was enstooled as a chief when he was just a teenager, but handed over much of his local authority to other elders in the town when he was away from Guaman-Buem. After he retired from teaching in his late 50s, he returned to Guaman-Buem to sit as the full-time chief and dedicate his time to issues concerning the town. Though he is a self-proclaimed Presbyterian Christian, he still holds Buem tradition and ancestral beliefs to be of central importance to the welfare of the village as a whole as well as to his own life. Part of his spiritual worldview is tightly connected to the belief that environmental degradation is closely related to neglecting the welfare of the ancestors and not respecting other spiritual forces in the natural environment. “Because sometimes we are not performing our customs or are insulting the ancestors things can get bad in the town, and rains can delay or crops spoil” (Sampson, Personal interview, July 15, 2010). One of the features of this worldview is a belief in what are called “dwarves,” spiritual and physical inhabitants of the forest who used to come into the village and “steal” people for months at a time, only to return them to Guaman-Buem with strange markings on their bodies and spiritual powers. This belief, discussed below, is common among Buems and is tightly interwoven with their beliefs about environmental degradation, deforestation, and the impacts of modern religious systems on traditional life.

The chief describes the environment of his youth as being both animated by spiritual beings and rich with natural resources. He described the Buem area as being thickly forested with a lot of wild animals and wild fruits:

> What I have noticed about the environment since I was a child is that the changes have been immense. In the olden days, we had very thick forests. Forests around our surrounding areas and in nearby towns. You will not walk more than one hundred meters before being stuck in the forest. You would just move a stone's throw and you would meet so many animals. You might see grass cutters, tortoises, and antelopes. Even there was a time that there were dwarves around and they could come down from the hills just here [points to large hill above Guaman-Buem] and easily take people away even in the daytime. (Sampson, Personal interview, July 15, 2010)

One of the biggest changes that has occurred in the environment, according to the chief, is the drop in soil fertility that followed the collapse of the cocoa boom in Guaman-Buem. After the swollen shoot disease hit the cocoa plantations in the 1970s and choked out their major source of economic income, fires swept through the area burning what few native trees were left in and around the cocoa plantations. This process hit its peak during the country-wide fire crisis of 1983-84, when Nana Ofori Sampson IV was teaching near Accra. "Because of the fires, you couldn't find food anywhere. It was better here than in Accra, where we had to wait in line for hours just to get some cold *kenke*[12] dough." (Sampson, Personal interview, July 15, 2010). In Guaman-Buem, land that had previously been used for cocoa plantations was destined to become land for growing cassava. "Those trees would pull down the rain and also give nutrients to the soil when the leaves fell. Without those good leaves we are just left with grasses and bad weeds to bring nutrients to the soil. This type of land started to be everywhere. No trees, weak soil, and only tall grasses and weeds. Most people said 'no, I will have to plant cassava now'" (Sampson, Personal interview, July 15, 2010).

CONCLUSION

These three life histories represent the day-to-day experiences of typical Buem farmers at varying social and economic levels. It is within these various engagements with the environment that environmental knowledge is created, reproduced, and even constrained. Whether it is reproduced, borrowed, or innovated, environmental knowledge enacted within these engagements produces the kind of adaptability strategies that are often overlooked by international organizations such as the IPCC. It must be remembered, however, that such

[12] *Kenke* is a heavy food that is made from fermented corn dough. It is sold in a cold, mild-tasting form and a hot, sour-tasting form.

engagements do not constitute a uniform response, but a suite of responses being carried out in different circumstances. The freedom with which the innovative farmer experiments with different agricultural methods, for example, is not available to a peasant farmer. Though she understands that crucial processes are being avoided, such as the optimal employment of fallow periods, her circumstances don't permit her to make decisions about when fallow periods are employed. "It is hard to farm the way you prefer to farm when it isn't your land. Someone might ask you 'let's plant some rice' or 'let's plant some maize,' and you might be thinking 'this land needs to lie fallow, the soil is beginning to spoil.' But really, you are powerless in the situation and you have to shrug your shoulders and say 'okay'" (Darko, Personal interview, June 15, 2010). Someone like the innovative farmer or the royal farmer would likely never been in a situation such as the peasant farmer's.

It can be argued that these three life histories represent different attitudes towards the environment, all stemming from similar ethno-ecological understandings. These attitudes and their subsequent adaptability strategies are the result of "local" understandings of a "local" environment, which are often overlooked in literature on adaptation. It is because they originate within an engagement with an environment, understood through ethno-ecological understandings and life histories, that they fall out of the more "global" approach of the IPCC. In that sense, these life histories and narratives constitute what Ingold identifies as "viewing the earth from *within*," from an "active, perceptual engagement with components of the dwelt-in world" (Ingold 1993:468). The peasant farmer realizes that environmental degradation is being encouraged through the continuous cultivation of maize in particular areas but she copes with such anxiety by realizing it is the landowner's responsibility and not her's. The innovative farmer realizes that environmental change is generating a more savanna-like landscape, but sees it is a potential opportunity instead of an impending challenge. The royal farmer views environmental degradation as a product of land mismanagement, the collapse of the cocoa economy, and the community's failure to fulfill ritual obligations. Though these life histories deal with the same basic suite of ideas, each of these farmers approaches their own agricultural strategy from a unique standpoint defined by their constraints and opportunities. These life histories and narratives highlight the localized qualities of environmental change in Guaman-Buem and demonstrate how what Western scientists see as a global phenomenon – climate change – has real and urgent dimensions in

the lives of subsistence farmers. These real and urgent dimensions, in other words, are the "local" theater within which Buem farmers employ specific crops and agricultural practices to establish viable adaptability practices. These adaptability practices should be considered an invaluable resource for any international institution concerned with adaptation to environmental change in the developing world.

CHAPTER 5

BUEM ENVIRONMENTAL HISTORIES, ETHNO-ECOLOGY, AND THE AGRICULTURAL CALENDAR

Environmental histories in Guaman-Buem describe a steady decline in the health and productivity of agricultural lands, with pivotal points following the decline of the cocoa economy and the arrival of severe bush fires in 1983. These narratives use specific reference points such as the Konsu river and the surrounding forest as indicators of this decline. The decline of traditional power and ability to sanction social behaviors that harm the environment is also referenced as a turning point in environmental degradation. They also measure the health of the environment by looking at the predictability or unpredictability of rainfall patterns, which are seen as having become more erratic in recent years. These perspectives are buttressed and rationalized by ethno-ecological understandings of the role of trees, rainfall, and soils in the environment. Additionally, these narratives and ethno-ecological understandings are directly connected to agricultural decisions based on an "ideal" calendar of when certain crops should be planted. These narratives and ethno-ecological perceptions of environmental processes were assembled through interviews with Buem farmers from different social and economic backgrounds, with a particular focus on elder farmers who have interacted with the Buem environment for a longer period of time. Local understandings of global climate change and how it relates to perceptions of environmental change in Buem are explored, with emphasis given to the tendency for Buem farmers to think of global climate change as a "local" process. Buem farmers often describe trends similar to what climate change is expected to look like in the West African region, including unpredictable rainfall, increased bush fires, and savannization in forest environments. In Buem ethno-ecological understandings, these trends are not attributed to climate change but rather to local and regional practices. Buem approaches to combating or adapting to such trends often seek to either reverse the trends or mold agricultural strategies appropriate to emerging environments. For example, some Buem farmers seek to reverse trends of

deforestation – believed to exhaust soil nutrition and discourage rainfall – by ceasing to remove trees from their farmland or even planting trees. Other farmers take advantage of areas that have been disturbed by fire or otherwise changed to savanna by planting cassava and other low-demand crops. These environmental narratives and ethno-ecological understandings are vital for understanding the rationale with which crop choices and agricultural strategies are formulated. It is in the context of these narratives and understandings that adaptability practices are, and have been, emerging.

THE ENVIRONMENT OF THE ANCESTORS AND THE COLLAPSE OF THE COCOA ECONOMY

Descriptions of Guaman-Buem's past, even as early as 70 years ago, illustrate a landscape covered in dense, rich forest that towered around Guaman and provided both a substantial obstacle and a seemingly limitless suite of natural resources. In interviews with elders, these illustrations quickly gave way to romantic descriptions of a massive forest landscape filled with ancestral spirits, wild animals, and lurking "dwarves" – spiritual beings who are said to have inhabited the forests surrounding Guaman until recently. The forest, according to Buem elders, was one of the chief attractions for them to the area during their migration. At the time, the area is described as having been an expansive forested river valley hemmed in on all sides by mountains with rising peaks and protective rock shelters. The area not only provided the Buem people with dense concentrations of natural resources such as wild game and fertile soils, but it also provided them with protection against hostile groups. The area was also conceived of as having important sacred areas where ancestors and gods could reciprocate rituals and sacrifices. Here, I will explore this "environment of the ancestors" so widely celebrated among Buem elders.

The myths of the early ancestors migrating into and settling Guaman-Buem form, in essence, the basis of the Buem ancestral story. The early settlers, fleeing persecution from an unnamed enemy, happened upon the area after years of traveling through lands that had already been occupied. When they came upon the Buem area, they were pleased with the mountainous terrain that ran north-south on either side of a densely forested valley that was bisected in the middle by the large Konsu river, a rich food and water resource. Finding a satisfactory mass of land, they next sought a high place that would keep them safe from surrounding enemies. This idea of "high places" for Buems to make their shelters atop and

within mountainous zones is a general feature of these narratives, and precludes their later migration into the valley of the Konsu river, where many of the contemporary large settlements, including Guaman, now reside.

The hills of Kolombangye rise above present day Bodada, where the paramount chief of Buem resides, and are pocketed with rock shelters and high vistas. These hills provided the Buems protection from probable enemies, from where they could roll down boulders to crush intruders and keep watch over the various resources of the valley. After living amongst the hills of Kolombangye for a few decades, some of the Buems then migrated into the valley and founded Guaman and Kute, leaving the paramount chief Akpanja I to rule from Bodada. The establishment of these new Buem villages involved establishing new sets of chiefs for the villages, based on clans. The most powerful of these clans was the royal Benkyiomana clan, which the current chief of Guaman traces his blood line through.

Papa Kwankwa, a Guaman-Buem elder of 84 years, describes the village of his youth as being a small subsistence agricultural community that could count on generous, consistent rains for the small plots of land they tilled in the forest directly surrounding Guaman. “The land was very healthy. Yes. The land was so fertile, rich, and healthy for us. But now, because of the felling of trees, things are not right.” (Kwankwa, Personal interview, June 15, 2010). The Konsu river that runs adjacent to Guaman would flood during the rainy season, swelling to the point where the Nkwanta-Accra road now stands dry year-round. During the rainy season older men would take their sons to the river to learn how to swim and fish. “Only the former times, the rain can fall very heavy *pa!*[13]. So even if the river Konsu filled up, you know… When we were small if the rainy season came, sometimes our elder men took us to the river to teach us how to swim” (Kwankwa, Personal interview, June 15, 2010). Sometime around 1962 the cocoa harvest began to dwindle as a result of swollen shoot disease, and economic hardship fell on Guaman, causing farmers to clear previous cocoa plantations for subsistence crops.

The end of the cocoa boom created major generational differences between the current older group of Buem farmers and their fathers and mothers. Partially, this had to do

[13] In Twi, the word *pa* puts emphasis on a statement. It can be roughly translated as “a lot” as in “I like it a lot.”

with the fact that the current generations' parents hired migrant labor to care for the cocoa plantations and reaped huge economic benefits from their lands. While this economic success vis-à-vis migrant labor reverberated throughout the community and still persists in the form of rural banks, cocoa warehouses, and large homes today, it also produced a generation that knew little about planting and caring for cocoa. These children went to school to learn various trades until the cocoa plantations collapsed and economic decline returned Buem families to subsistence agriculture. Though many went on to become teachers, accountants, or government employees, the majority returned to farming. Coupled with battles over land tenure, underemployment in non-agricultural jobs, and the presence of a large migrant population (Fred-Mensah 1999, 2003) most of the Buem youth were forced back on to family lands to practice subsistence agriculture. This generational difference is thus epitomized economically and ecologically by the reverting of farmers from wealth-producing cocoa plantations to subsistence agriculture. This process turned once-forested areas, necessary for shade-grown cocoa trees, into lands used primarily for cassava, maize, plantain, and yam production. "We didn't know how to fix the cocoa problem because there was disease on our plantations but also the government wasn't giving us enough money for our cocoa," explained Kojo Akan, a 65 year old male farmer, "so as the trees were dying and we weren't getting much out of them, we started growing more food crops again" (Akan, Personal interview, December 1, 2009). This moment in Buem history marks an important anthropogenic shift in the character of the environment. Memories of the environment prior to the collapse of the cocoa boom are still fresh in the minds of many elders.

One of these elders, a farmer and local expert on Buem history and culture named Kwaku Atta, describes the environment around Guaman as being very lush during his youth:

> As for the forest. Sincerely, in those days the canopy of the forest was very impressive. If you were to enter the forest at midday you would think you are deep in the night. The forest reserve was so heavy. Forest was everywhere. But now, population explosion and bad farming methods have ruined the forest. These incessant fire outbreaks during the *harmattan*[14] too cause a lot of problems. And to confess, the rainfall pattern has really changed. Because of the canopy of forest it used to rain so heavily. This river down here [the Konsu river] can flood all the

[14] The *harmattan* is a season in West Africa where Sahelian winds blow large amounts of sand and dry air from the Sahara desert southward. It is the season when bush fires most commonly occur, rainfall ends, and hot, dry temperatures increase.

> way up to where Assemblies of God church is [near the Nkwanta-Accra road]. But today, well it is so different. The stream was winding in those days and it would always overflow its boundaries. But now, it never comes. Even not long ago the river would rise and flood the bridge and you couldn't go anywhere. The German Administration had to construct the new bridge to help us during those times. Those bridges are very strong. But even still these days, at times it does swell and touch the bridge. So yeah, there have been substantial and observable changes in the weather pattern in favor of reduced rainfall. It has changed, reduced, and is now not as heavy as it used to be. It used to ran continuously for one week, and it is no longer like that. The volume has changed. This time from October 20th, the rains will cease. In the past it can rain until the beginning of December, but now from October 20th the rains have stopped. (Ata, Personal interview, June 4, 2010)

These observations of a lush environment with predicable rainfall and bountiful resources are echoed in the few available primary sources.

In fact, missionary journals describe an environment that was indeed carpeted with forests and teeming with wildlife. Sammy B. Yeboah's account (2002) of the opening of Guaman-Buem to Presbyterian missionaries gives an eye-opening account of the bringing of the first mission bell to Guaman. According to primary source missionary documents from the late 19th century, the bell was used to call youth in Guaman to fight off wild animals when they approached the Presbyterian church and mission. If townspeople weren't attending church, or getting ready to attend church, the bell would signify that a dangerous snake, leopard, or bush pig was lurking around the premises and needed to be forcefully moved. Unfortunately, this is one of the only primary source documents available on the environment in Guaman-Buem prior to the 20th century,

Papa Kwankwa, an elder of 84 years, also remembers a time when, under colonial rule, traditional leaders in Guaman-Buem acted on behalf of colonial administrators to explicitly protect the forest and other natural resources. The chief and the royal Benkyiomana clan held a "native court" at the chief's palace where, among other things, they punished Buems who trespassed against concrete pillars erected by the British to mark the boundaries of a now far reduced forest reserve.

> PK: Ah yes. In the olden days, the forest… You can't go to the forest. There was a law.
>
> D: A law?
>
> PK: Yes, the old chief who died. He made a law. You can't go to the forest and fell anything. Even a stump. You can't use it. In the former time, they had a

> strong law. They even used to judge cases here, in the native courts (Points towards chief's palace). Any small boy will fear to do something against a big man. So you can't go to the forest and take anything. If they caught you, they will put you in a cell at the native courts or they will punish you. So there was a fear in the olden times. (Kwankwa, Personal interview, June 20, 2010)

Once independence from the British was obtained, many of these laws were repealed and the government of Ghana, seeking to expand agricultural production as well as increase revenue by way of timber concessions, permitted its citizens as well as foreign ventures to return to once-protected forests. Some Buems, including Reynolds Kateye, a disabled former farmer in his 60s, even contend that British rule was better for Guaman-Buem and its surrounding natural resources than the post-colonial government. "That time, things were right! Things were properly protected from abuse and destruction. I know, I know that population has gone up. But just look at the British laws and how they respected the chiefs to enforce them. But I tell you, if we still had the British to help us and not governments who wanted to stuff their pockets, things would be different *pa!*" (Kateye, Personal interview, December 25, 2009).

THE LINK BETWEEN UNPREDICTABLE RAINFALL, SOIL INFERTILITY, AND TREE FELLING IN BUEM ETHNO-ECOLOGY

Buem narratives concerning environmental change all conflate around a similar ecological perspective that focuses on a delicate balance between forest cover, levels of soil fertility, and rainfall patterns. From the poorest farmer living on a cottage just outside of Guaman, to the innovative farmer described in Chapter 4 and his expansive cowpea and yam farm, every Buem farmer agrees that the bareness of the land has encouraged rain clouds to "skip over" the town and find more deeply forested lands to shower their blessings upon. Buem farmers view this "skipping over" as one of the main causes of their ecological dilemma – no forest, no rain, less fertile soils, more fires, more savannah. Unfortunately, they also see little hope in restoring the forests that used to surround Guaman-Buem. "As for these trees, even if we plant them *koraa*[15] they will not be how they were. Those trees were three, four, or five hundred years old. They were tall and pulled the rain down. You can't just make those trees come back. We have to learn how to farm on the land how it is now, today"

[15] The Twi word *koraa* roughly translates to "at all" in English. As in "I don't like this food at all."

(Seiwa, Personal interview, August 20, 2010) commented Comfort Seiwa, a female farmer in her 40s.

In order for "normal" weather patterns to come back into play, certain features of the landscape and their associated functions must be preserved. "The fire and the forest felling, this is why the rain has stopped. Eventually if the rainfall is coming, the wind will blow and the trees cannot stand against the wind. They will fall down and go away. And the wind will blow heavy and the rain won't fall, it will just scatter into the sky" (Kwankwa, Personal interview, June 15, 2010). This is the response Papa Kwanwkwa, the 84-year old elder farmer, gave me when I asked him why he had made the confident statement that "this time the rain is not good, it has become difficult and has failed us." He went on to explain that when the mountains were thickly carpeted with trees the rain clouds would be pulled down into the canopy before bringing heavy, rich rainfall to the farms surrounding Guaman. The forested hillsides acted as a force that essentially "grabbed" the rain, slowed it down, and then dispersed it evenly over the landscape. It was with the advent of deforestation and the bareness of the hillsides that the town's fortunes turned for the worse, and now farmers are forced to plant marginal crops on marginal land.

Georgy Osei, a younger farmer in his late 20s, described this relationship between trees, rainfall, and farming invoking what he calls "gravitational rainfall":

> G: Okay, yes. The weather has changed… But what I can see is that once we don't have the mountains covered with forests, then we can't have rain. When I was young in Guaman it used to rain so plenty. This is why I am saying that the way things go by, where my father lives they are having a land that is different from this place. They still have forests, big big trees. But here, we don't have enough trees to pull down the atmosphere.
>
> D: So you believe that the trees bring the rain?
>
> G: Yes, because they cover the mountain. The drier the mountain, the poorer the rainfall.
>
> D: So you feel that because of the trees coming down, the bush fires too, that the rainfall is less?
>
> G: Yes.
>
> D: So what are you doing on your farm to respond to these changes?
>
> G: What I can say is that when you clear bush you don't have to cut all the trees on your farm. You have to leave some of the trees. Those big big trees will bring the rain – this is gravitational rainfall – they have to pull the rain down. I myself, I don't have money to clear forest. So I don't clear forest.

> D: So if someone was to come to you and offer you money for your trees, you won't allow them to be felled?
>
> G: Okay, anyway. For me, because poverty is on my side I may. I might give some but then say "this one, no no, I need it." I may say "this one will protect my farm from windstorm and bring rain down." You see? Uh huh.
>
> D: So that's why you keep trees on your farm? Because you believe if you have trees on your farm you will get more rain for your crops?
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> G: Everything, everything will grow better because of the rain and the leaves making the soil strong. Look at all these things. The trees on the mountains, the trees on the farm, the way they rain is coming. Rain too, it is not always the best thing. If a big rain comes it will always fall and disturb the soil and blow down the crops. But if it is a light mist or light rain *koraa*, no, then you can't get the rain that those with trees will get.
>
> D: So if you have two farms near each other, and one has trees but one doesn't there will be some difference?
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> G: Oh yes, the one with the trees will get some rain and keep it in, the other the rain will pass over until it comes to meet some trees. (Osei, Personal interview, July 10, 2010)

Another interviewee, Joseph Owusu, a Buem farmer also in his late 20s, explained the relationship between forest cover, rains, environmental degradation, and soil infertility in a similar manner:

> D: Why do you think the rains have failed and that the environment is changing?
>
> J: I will say that it is because we don't maintain these forest reserves so we cannot get much good rain. But these forests, you know, are not only good for rain but also for soil. You know forest also gives us these rot leaves. You know anytime a forest is growing you get some leaves. The wind will blow these leaves on to a land and they will rot and we will get manure from it. Then like we here don't apply chemicals because we don't have the money to buy them. We don't have money to buy fertilizer. Like this maize that we grow If we want to go and plant it and don't have a money to buy fertilizer, it can be very difficult. How can I get a good yield? I will never get a good yield. Until there is something there to provide that manure. Now the land we are working on is very poor and you cannot get the yield you want. So yeah, not just the rain that trees are good for, but also for leaves that can bring manure to the soil. (Owusu, Personal interview, July 10, 2010)

The relationship between deforestation, soil infertility, and inconsistent rainfall patterns in Buem ethno-ecology is quite complicated, and takes different forms in different narratives. This was one of the topics I focused on in my interviews, though most interviewees would usually bring up the subject before I asked them about it.

The basic understanding of this complex ecological relationship in Buem ethno-ecology, which was typically volunteered in descriptions, has four core features: storms rising over the mountains of the east and then careening over the village without bringing needed rain, trees not "pulling the rain down," trees not blocking the wind which subsequently "blows all the clouds away," and the soil becoming infertile as a result of a lack leaf litter provided by forest trees.

The first of these processes, involving the bareness of the mountains and related affects on rainfall, was invoked in every personal interview that I conducted concerning environmental change in Guaman-Buem. As described in the above interview with Georgy Osei, a drier and less forested mountain is associated with lower rainfall levels. The second of these processes involves what Buems call "gravitational rainfall," or the power of trees to literally pull rain clouds down from the sky and bring rain to their plots. It is thought that at least *some* trees must remain on plots, with the exception of muddy plots of rice, to pull rain down and nourish the soil. The third of these processes involves trees not creating a strong enough windbreak during thunderstorms. Wind that careens down from the hills that define the Buem valley area has the potential to level fields of maize or entire cocoa plantations. The fourth process involves the degradation of the tropical soils and is understood to have deforestation and the corollary lack of leaf litter as its cause. These four processes thus involve four main variables that orbit around deforestation: a disturbed hydrological system, infertile soil due to a lack of leaf litter, landscapes susceptible to powerful winds that would normally be absorbed by forest cover, and increased susceptibility to bush fires from surrounding savanna or derived savanna areas.

Drivers of Deforestation

Deforestation is a complex issue in Guaman-Buem. Modernization in Ghana has brought with it demands for consumer goods as well as increased state bureaucracy in the form of schools, clinics, and other institutions. All of these goods and services require expendable incomes, which are still quite uncommon among rural farmers. While purchasing mobile phones and Western-style clothes can be brushed off by most families as unnecessary, most will not argue that school fees or medication costs can be avoided without embarrassment and poor prospects for the household's future. In such situations, families will

exploit any resource or opportunity available to meet the needs of their kin. As a result, Buem farmers typically have to decide between marketing their produce for money or selling off other resources. The most convenient and most readily available resources that farmers have access to are trees. As Georgy Osei, a farmer in his late 20s, mentioned above, because poverty is "on his side" he feels compelled to give into demands for the remaining timber resources on his land because he has other responsibilities to attend to. Once a Buem farmer has made the decision to sell a timber resource on their farmer, it is not difficult to find a buyer who is willing and ready to pay out money for the resource. "Even if a farmer knows that tree is going to be good for his soil," explained an older farmer named Kojo Akan, "he will still sell it so that his son or daughter are able to get their uniform and go to J.S.S (Junior Secondary School). So this is why the forest is going and then the fire is burning too. If there are no trees the fire can easily pass through and burn everything" (Akan, Personal interview, December 1, 2009). To make the matter even more upsetting, Mohammed Antwi (the innovative famer) told me that timber companies will pay a farmer only the equivalent of five U.S dollars for a tree that can be sold on the international market for $20,000.

Though tree cutting is a major cause of deforestation on farmlands, it is certainly not viewed as the main cause of deforestation. Bush fires are seen as the biggest threat to the forests that surround Guaman. Though timber companies are seen as exploitive and unhelpful to the environment, they are not regarded with nearly as much fear as the bush fires that periodically burn through Guaman. Buem farmers have identified one of the main targets of their grievance as the pastoralists that migrate from the north to graze their animals on saplings in surrounding forest-savannah mosaics. According to the Brown et al. (2007), there may be some truth to this claim. As the Sahel dips south, due to savannization, pastoralists are feeling compelled to incorporate more southerly lands into their migration patterns. Because Ghana west of Lake Volta is more densely populated than the Volta Region, many of these pastoralists are attracted to the forest-savanna mosaic area that surrounds Buem. Part of the process of "preparing" land for grazing involves burning weeds and bushes that cover the landscape. This encourages the growth of nutrient-rich saplings for animals to graze on. Unfortunately, in the process of burning weeds and bushes many of these fires spread into the forest area and, especially during the dry season, create massive uncontrollable wildfires in the forests leaving fresh savannas in their wake. The other culprits of bush fires are hunters

who use fire as a scare tactic in sending animals into a convenient panic, wherein they are easily seen and shot (Ampadu-Agyei 1988). This source of bush fires has been mostly eliminated though, as hunters who are caught engaging in such practices are sanctioned through "traditional courts," a "street justice" type of approach that usually involves public ridicule or beatings.

Local Understandings of "Global Climate Change"

Farmers in Guaman-Buem are avid radio listeners, tuning in the popular, Ewe-speaking Volta Star radio station that broadcasts daily out of Ho, the regional capital of the Volta Region. When Volta Star radio is not playing popular Ghanaian and Togolese music, it hosts discussions on various social, political, economic, and environmental concerns. As most of southern Ghana and Togo is engaged in some form of agricultural production, the radio station often holds forums on agricultural methods, new hybridized crops, fertilizers and pesticides, and changes and challenges in the environment. When I was serving as a Peace Corps Volunteer in Ghana, I was asked to attend an interview with a radio host at Volta Star to help promote the Peace Corps and inspire NGOs to apply for Peace Corps Volunteers. Invariably, the host of the show began asking me what my advice to farmers was and what knowledge I could impart to his listeners. "Well, sir, I don't have any *real* technical background in tropical agriculture, I am more of uh, what is it, facilitator?" The host responded with a follow-up question "And what about this global warming? Is it real? Should we be frightened?" It was a difficult question for me to answer, because I had no firm grounding in climate science either. "It seems so, yes. That is what the evidence suggests, anyways. I don't know that being frightened would be the best advice. But surely, keeping some trees around seems to be a good idea." The host pushed some levers, turned some dials, and then started singing some kind of jingle while asking me to say loudly, "This is Douglas La Rose, and when I'm in the Volta Region, I listen to Volta Star radio!"

Though rural farmers in Ghana are concerned with the murmurings they hear on the radio about climate change, they are far from well informed about what climate change is, why it is occurring, or how it can be stopped. They typically understand climate change as either a process that is occurring because of local practices, or some kind of sinister force that has erupted out of war and scientific tests. When I asked farmers in Guaman-Buem how they

understood climate change, they would invariably provide a description with conflicting characteristics. These characteristics all, as they understood them, had to do with the origins of the problem and the dynamics of how it was caused. The first understanding, involving local practices and causes, is linked inextricably with the Buem ethno-ecology described above. This involves deforestation, problems with the hydrological system related to "gravitational rainfall," bush fire, and the bareness of the hills surrounding Guaman. The second understanding can be best understood as a local interpretation of "global" climate change. These narratives take on strange, even mythical, tones. While individuals were relaying their understandings of global climate change to me, some of their perspectives made me quite uneasy. For instance, a younger farmer in his late 20s by the name of Georgy Osei understood global climate change to be a result of missile testing and sinister scientific experiments.

> G: What I can tell you is that scientists are also causing problems.
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> D: Scientists?
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> G: Yes, like astrology causes problems in the atmosphere. All of this, it reduces the vegetation. Because when there is a missile that is put into the atmosphere the ozone will get deteriorated. The missile pushes through the ozone layer. It is just this light thing covering the world that is protecting us from poisonous materials from the sun. It is the ozone that is protecting us from those things. So when the scientists just want to test missiles, they should go to the sea, but even then it can disturb vegetation.
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> D: So you think this is causing the weather to change here?
>
> G: Yes! Because when I was in school my teacher told me "there will be a time." They say, "third world, third world," that "God is going to end the world one day." But we ourselves we will cause the end of the world because of scientific developments.
>
> D: Before God ends the world?
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> G: Once the ozone layer gets spoiled, where will you go? You can't go out that time. You will die under the sun. Your skin will just melt and you will become bright like a fire. There is nothing like any nuclear bomb or something, but the sun itself is worse than a bomb. I think we should minimize some things.
>
> D: So what do you think farmers should be doing in Guaman to be helping the environment?
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> G: What I can tell you is that we have to minimize chemical fertilizers and pesticides to help the soil. These things seem to be very good but actually they are very bad for the land – for the soil. Also we have to stop felling the trees. We have trees that can be pulling down the rain. You know one thing: the taller the

> trees the more they pull down the rain. Also another thing: we should not be farming on mountains anymore. But this thing with missiles and holes in the sky is really outside of our power. (Osei, Personal interview, July 20, 2010)

In some ways, these perspectives were in synch with what Kojo Akan, the 65-year-old farmer and NGO president, had told me earlier. Buem farmers see themselves as capable of adapting to gradual changes in their environment through crop choices and agricultural strategies. Even the crisis of deforestation can be addressed, to some extent, through traditional authorities and negative sanctions. But abstract specters like "global climate change" - which are not even well understood amongst the Western societies that have controlled their discourse – loomed like mythical threats in distant universes that seemed heartless and uninterested. Scientists, warlords, and demonic politicians sat in congress trying to reap what little reward they could before the collapse of the atmosphere. Missiles tearing through the ozone layer, sunlight pouring into the green tropics and cooking entire communities alive – this was the image they held of "global climate change." And who was there to protect them? What international organization could step in on behalf of these marginalized subsistence farmers? That the IPCC was the one organization out there speaking on behalf of Buem – but not giving them the stage to speak for themselves – was not a very reassuring realization. After all, who were these people that made up the IPCC and who had determined with "very high confidence" that "Africans" had "low adaptive capacity" (Boko et al. 2007)? As far as Buems can tell, the IPCC is just as distant, mythical, and abstract as "global climate change" itself. This disconnect in just the understanding of climate change, between international institutions and subsistence farming communities, is symptomatic of the wide gap between "global" and "local" environmental knowledge and adaptability strategies.

BUEM ETHNO-METEOROLOGY AND AGRICULTURAL RESPONSES AS KEY ADAPTABILITY STRATEGIES

Buem farmers are obsessed with the topic of weather. Though it is fairly obvious why a subsistence agricultural society would be constantly concerned with meteorological phenomena, Buem farmers' concern with the weather is impressive in both their knowledge of meteorological processes and their accuracy in predicting changes in the weather. Walking through Guaman-Buem at any time of the year is likely to involve at least one conversation

surrounding the weather. Whenever I return from a neighboring village or town I am interrogated with particular questions about the weather. “Was it raining in Jasikan? Which direction were the clouds coming from? How heavy was the rain, did it last long or was it a short rain?” Answering these questions as accurately as possible is important – Buem farmers rely on such reports to determine their imminent farming plans and cropping strategies. To understate or overstate the duration of the rain might partially inspire a cropping strategy that could fail. Most, or hopefully all, farmers in Guaman would only take *my* descriptions of rainfall in neighboring villages as unreliable snapshots of what the rainfall was *really* like. I am not fluent enough in Lelemi-Buem, nor in the many types and qualities of rain that fall, to describe the consistency or time span of any given rainfall event. But the point remains that Buem farmers are constantly discussing the topic and noting whatever updates may be available vis-à-vis the weather. I remember one June night in 2008 when I went to buy some corned beef at a small shop in Guaman and the shopkeeper, an elder woman of about 70 years known as Peace Appew looked at me with a serious gaze and explained “Kojo, I hope you are prepared for the rain. It will not be a small thing, this rain!” I looked around at the sky, clear as a bell, with a look of confusion on my face. “Rain? What rain?” I laughed and returned to my house. And then, at two o’clock in the morning, I was awoken by what sounded like a million nails thrusting themselves into the corrugated iron rooftop. Outside, the clothes I had lazily forgotten to fold and put away were getting scattered around like leaves. This business with being able to predict the weather seemed to me, at least for that moment, to be useful after all.

The Agricultural Year

One of my intentions while conducting qualitative interviews was to achieve an accurate picture of how farmers visualize the agricultural year. The topic would often come up as a question directed at me during quantitative surveys – was I asking them what they were currently planting or what they planted throughout the year? Should they be assuming that the year is going to bring forth normal rainfall patterns or should they assume that things are going to continue to be as inconsistent as they have been? Naturally, I started to see the use in constructing some kind of calendar that would act as a useful illustration of how farmers visualized the seasons and their corresponding crops. Fortunately, too, the confusion

surrounding the question of “which crops do you grow” was cleared up within the first interview and thus doesn’t represent a source of inconsistency to the quantitative data. To clarify, then, farmers were being asked what kinds of crops they grew throughout the year.

To form some kind of “consensus calendar” concerning when certain crops should be planted and what normal rainfall patterns looked like, I began incorporating an additional section to my surveys concerned with such an agricultural calendar. I would ask farmers when the light rainy season started and ended, and likewise when the heavy rainy and dry seasons started and ended. I asked farmers what they planted during each of these seasons and transitional seasons and would draw a timeline to represent the year. I also asked farmers when they would perform basic tasks on their farms, such as clearing the land, burning dried weeds and bushes, applying fertilizer or pesticides, and planting or harvesting specific crops. The consequent calendar, presented in Table 3, demonstrates which activities are associated with which months.

Table 3. The Agricultural Cycle during an Ideal Year in Guaman-Buem

Month	**Seasons and Associated Crops and Agricultural Activities**
J	Harvesting cassava, cocoa yams, plantains, yams, maize. Clear land while harvesting. Planting new yams and groundnuts. Dry Season ending.
F	Transition into light rainy season. Weeding of farms.
M	First maize of year planted. New cassava and cocoa yam planted. Vegetables such as okra and pepper also planted. Light rainy season.
A	Light rainy season.
M	Light rainy season.
J	First maize harvested. Groundnuts, okra, and pepper also harvested. Light rainy season ends.
J	Yam harvested. Heavy rainy season begins. Second maize planted.
A	Rice planted. Heavy rainy season.
S	Heavy rainy season.
O	Cassava, plantains, and yams planted. Heavy rainy season.
N	Transition from heavy rainy season to dry season.
D	Harvest rice and second maize. Dry season begins.

Many of the crops, such as maize, have two seasons. According to many respondents, this was not always the case. According to Jones Kessie, a young farmer and school teacher in his early 30s, “In the past, we didn’t plant maize too much. But this time, we plant it plenty because of the way the rain is. You have to learn how to take advantage of the rains that you get, to plant at the time when there is some small small rainy season.” In other words, farmers have learned how to maximize the benefits of the rains they get from March to June by planting crops that “ *ko ntemntem*,” or “grow fast.” Although cassava and cocoa yam don’t grow fast, they also don’t require massive amounts of consistent rainfall. Maize can survive on minimal amounts of water, and okra, peppers, tomatoes, and onions can be watered by hand if rains don’t come as expected. Maize, okra, peppers, tomatoes, and onions can all be harvested within three months. Thus, before the heavy rainy season kicks in, Buems have reaped their first harvest of the year.

Predicting the Weather

As mentioned before, Buem farmers are constantly trying to ascertain information about how the weather is going to behave tomorrow, next week, next month, or even next year. It is part of the painstaking process of planning when and where a farmer is going to plant any given crop. Above, I described what the “ideal agricultural year” would present to a Buem farmer, but of even greater importance is how a farmer actually *knows* what is going to happen. For example, even though Buem farmers typically plant their rice in August, it is not as clockwork as someone might expect who is examining the calendar that illustrates the “ideal agricultural year.” A farmer will only plant their rice once they have prepared the land for planting and become optimistic enough about the weather that it seems reasonable to do so. To throw out grains of rice for germination a farmer needs to be assured that they will grow. Fortunately, they can base these assurances on cues from their surrounding environment. For example, when the *Ceiba pentandra* tree broadcasts its cotton-like seed from its vividly green crown, farmers know that the temperature has crept slightly higher and that the first of heavy rains are on their way. Likewise, when the seeds fail to flutter through the air and the mango trees continue to push out ripe, sweet fruits they leave their seed stock untouched. This ability to read cues in the surrounding environment is the primary way that

farmers predict rainfall patterns. Though I was unable to collect the necessary types of data, researching the efficacy of this strategy would make for a very interesting project.

There are numerous other ways in which Buem farmers attempt to predict how the weather is going to behave. They range from traditional methods of "reading the weather" to using wireless radios or even mobile phone updates. This can be exemplified by the example of when, one day, I was interviewing Jones Kessie and he fumbled around in his jacket pocket and pulled out a Nokia mobile phone with a bright, touch-screen interface. "You see, Kojo, I can just press the button here and know what the weather is going to be like in Hohoe, or Ho, or Accra. This phone does not tell me what the weather is going to be like in Jasikan, but it is only a matter of time!" (Kessie, Personal interview, August 15, 2010). Though Jones is a young school teacher who lives on an ample, yet still relatively meager, government salary he is nonetheless finding new ways to be able to predict weather patterns for his family farm. More common, however, is the use of wireless radios to hear weather updates on the local news. These forecasts, made by meteorologists in Ho and Hohoe, typically warn farmers of upcoming storms or scattered thunderstorms. Newspapers, announcements by the Ministry of Food and Agriculture, and of course word-of-mouth also act as means and ways of learning about upcoming weather events or changes in the weather.

CONCLUSION

Buem narratives of environmental change describe a steady decline in the health of the environment. These narratives focus on the thinning of the forests, the decline of the Konsu river, and the gradual erosion of certain "traditional" social controls over environmental exploitation. These narratives also discuss unpredictable rainfall patterns and ethno-ecological understandings of the hydraulic cycle, soil fertility, and the impacts of deforestation. One of the major causes of environmental change and climate desiccation, according to Buem farmers, is deforestation perpetuated by local practices. These ethno-ecological understandings of environmental processes are vital for understanding crop choices and agricultural strategies and how they comprise an adaptability strategy. Other narratives of environmental change, discussed in the next chapter, are more spiritual in nature and focus on a failure to fulfill ritual obligations and properly respect the ancestors.

CHAPTER 6

THESE THINGS MUST BE ATTENDED TO FIRST: BUEM SPIRITUALITY, ANCESTRAL WORSHIP, AND SACRED GROVES

Buem environmental perspectives are intimately linked to spiritual relationships between the living and the dead. Most ceremonies or events within the community are marked by offerings to the Buem ancestors who both founded and brought life to the town. It is believed that the ancestors are the caretakers of the living and that the respect demonstrated to them will be reciprocated with optimal livelihood conditions. As a result, the town is home to many "sacred" spaces that are especially revered for their direct link to ancestral powers and supernatural beings. Three areas in particular – Kabue, Omengyina, Adoli – are thought of as "taboo" areas that act as sacred shrines to ancestral and spiritual beings. Buems also believe that as recently as 60 years ago, "dwarves" lived close to Guaman and often traveled into the town to capture unsuspecting citizens who would be taken to "dwarf villages," fed bananas, and trained in various supernatural abilities.

Here I will shed light on the narratives that surround the relationships between supernatural forces and environmental degradation. The narratives and worldviews given here are derived from qualitative interviews that dealt with explanations for environmental degradation. After mentioning deforestation and the related phenomena of bush fires and weather perturbations, most interviewees discussed a general malaise and ill feeling that had descended on the village due to a lack of respect for the ancestors and other supernatural forces. While many people blamed Christianity for "derailing" the village from its spiritual obligations, others blamed modernization and the contemporary political system for undermining traditional law and the authority of the elders. Either way, most Buems argue that unfulfilled ritual obligations and spiritualities are at least partially to blame for failures on farms, in the forest, or in the Konsu river. This section will explain the three main taboo areas in Guaman-Buem, the belief in the recently vanished "dwarves," ancestral worship, and illuminate how these entities and spiritual forces are central to Buem narratives of

environmental change. An important theme in these descriptions of spiritual forces vis-à-vis environmental change that underwrote many of these interviews was the belief that "these things must be attended to first."

KABUE: "THE COOL PLACE"

Kabue, which is Lelemi-Buem for "cool place," is what is commonly referred to as a "Sacred Grove" in anthropological literature. Sacred groves are cultural landscapes that are believed to house spiritual forces such as ancestral spirits or gods and goddesses, and are often associated with burial grounds or mythical sites (Decher 1997; Mgumia and Oba 2003). Typically, a Sacred Grove is an area that is protected from resource extraction such as hunting or harvesting of fuelwood (Colding and Folke 2001). Sacred Groves have been celebrated in the conservation literature as areas that can house floral biodiversity or become a refuge for endangered species (Gordon 1992), even though most environmental anthropologists believe such outcomes are unintended (Mgumia and Oba 2003). Kabue falls into the category of "habitat taboo" (Colding and Folke 2001), which refers to a no-take area that is set aside from the community as an area that shouldn't be exploited for resources. At Kabue, one exception exists in free access to the water of the sacred pond, which is also the "place" that is essentially being protected. Buems believe that the ecosystem surrounding the pond should be kept taboo so as to keep the goddess of the pond thriving and healthy.

It is believed that when Guaman-Buem was first settled, the elders were concerned that a viable year-round water resource wasn't present. The Konsu river, which flows heavily through the rainy season but can become sluggish and dirty during the *harmattan* (or dry season) wasn't sufficient to meet the needs of the settlers. Thus, they called upon a juju-man (fetish priest) to summon such a resource into the newly founded village. The juju-man went to the site of present day Kabue and performed an elaborate ritual involving bird eggs and sweet, non-alcoholic drinks. He communicated to the elders that the spirit he was invoking was a female and that she should never be offered alcoholic or "hot" drinks and that any kind of offering must be in the form of bird eggs and non-alcoholic drinks. After performing the ritual, it is said that the sacred pond at Kabue gurgled to the surface and took its present form. Year-round, Kabue was to be full to the brim with fresh spring water and teeming with fish, provided that Buems honor the goddess of Kabue and obey the taboos.

Kabue is located just outside of the center of Guaman-Buem, and sits adjacent to the "old Accra road" which is a dirt road that used to be plied by bush taxis and caravans traveling down the length of the Volta Region between the savannas of the north and the grasslands of the south. It is quite far from any households in the town and isn't immediately surrounded by any farms. It could be argued that Kabue has a "core" taboo area and then a type of surrounding "buffer zone" where most people continue to obey the taboos but are not technically required to do so. It is commonly said that the area surrounding Kabue should be kept "as forest" so as to prevent bush fires or other ecological disturbances such as heavy winds from disturbing the area.

Buems believe that Kabue is home to a female goddess (whose name was asked not to be written or repeated) who presides over the pond. They believe she was called upon to protect the pond after it was created by the settlers of Guaman-Buem. About 15 meters from the pond there is a small area, essentially unmarked, where Buem elders go to perform rituals to appease her anger or to ask for her aid in times of crisis. On several occasions, I have participated in this ritual. For example, when I asked the elders if I could photograph Kabue they told me that I should perform the necessary rites before doing so. These rituals involved pouring a full bottle of soda over the ritual area while summoning and pleading to the goddess to permit the photographs to be taken. This offering was in the form of an ancestral "libation" which is typically in the form of palm wine or "akpeteshie" (palm liquor). Three "native eggs" were then laid at the trunk of the tree and a full, closed bottle of soda was left next to the eggs. The ritual took about 20 minutes and at its close the elders informed me that I could take 15 photographs of the area.

It is believed that if the necessary rituals associated with Kabue are not performed on a regular basis then the sacred pond will dry and with it the foundations of the village will be disturbed. As will be seen below, this is common with many "sacred" features of the Buem landscape. Because of this, Kabue is a highly taboo area that is feared and respected among Buems. The chief and elders who founded Guaman-Buem outlined the taboos and their relevant punishments if broken. It is taboo to take any kind of living thing from the area, including fish, snails, grasscutters, or rats. No one is allowed to go into the Kabue area to retrieve fuelwood for cooking or building. No one is permitted to travel to Kabue after dark, for that is when the goddess of Kabue is said to "come out" and wander around the area.

Certain myths and stories surround the pond that are told in an atmosphere of suspense and fear and are a way of reminding people of the taboos associated with Kabue. It will be useful to discuss a couple of these stories as told during interviews.

One story involves a "stranger" who visited Guaman-Buem and was known to be a great healer among Ewe-peoples. The Ewe are a large group who share common language and beliefs who live in southern Ghana and Togo. They once hosted the Anlo-Ewe state which was located around the Keta Lagoon in southern Ghana (Akyeampong 2001). The healer arrived in Guaman-Buem to attend the funeral of an in-law. While visiting Guaman he was informed, just as anyone else would be, about the taboos surrounding Kabue and specifically that no fish or snails were to be harvested from the area. One night, he walked to Kabue after the village went to sleep and caught two or three fish to cook for his family. The following day, he grilled the fish and fed his family. He told everyone in the house that he had bought the fish from market before he arrived in Guaman-Buem. By nightfall, everyone in the family had died after complaining of stomach pains and the chief and elders decided to launch an investigation into the matter. The man's night journey to Kabue was exposed by several witnesses who spied him traveling there the previous night.

Another person is said to have gone mad after traveling to Kabue at night (another taboo) and coming face-to-face with the goddess of the pond, who is said to be visible as a bright light during the night. It is said that upon arriving at Kabue, he saw a tall woman of about 10 meters who was lanky and thin with a white dress and piercing eyes. She talked to him in a language that he couldn't understand and he stood transfixed before her as the landscape around him "closed in" and suffocated his spirit. For ten years after, he slipped in and out of madness and finally revealed that he had broken the night visit taboo. After performing the required rituals, he was freed of his psychological ailment and went on to live a healthy normal life before passing away in the 1990s. He was known to tell the story of the goddess until the year he passed away.

Like Omengyina, discussed below, Kabue is thought of as a kind of "barometer" for the well-being of the town. If Kabue ever becomes dry, or the taboos that surround it ever break down, it is believed that Guaman-Buem will enter a perilous time. Places like Kabue are believed to be the living vestiges of an ancestral time, and thus act as links to the past for contemporary Buems. "If we don't respect the lady of Kabue, then we will be thirsty and

sick. If we treat Kabue the way we have treated our own farms, we will die" commented Kwaku Attah, one of the elders in the town who is known for his knowledge of Buem customs and traditions. "Kabue *is* Guaman-Buem, it is where the life of the town comes from. If not for Kabue and Omengyina, we can not be here" (Attah, Persoal interview, July 15, 2010).

OMENGYINA: THE TREE "OF COMMUNITY"

In the center of Guaman there is a small cluster of trees along the road that used to be the only route from the area north of Buem to Accra. It conspicuously stands out from the red, dusty path and the concrete-brick structures on either side. The main tree is about 12 feet tall and is hemmed in by saplings, wild grasses, weeds, and leaf litter. The crown of the tree is colonized by dozens of nests that are home to small yellow and green birds that loudly frolic around the tree and fly off into the forest in droves. The birds are considered to be a delicacy in Buem and are often captured, cooked, and eaten in stews. The ground surface that the taboo area covers is only about 15 ft long and 10 feet wide. The cluster of trees is surrounded by a locally constructed bamboo fence that is put in place to keep out "all circumcised men" and women. It is believed that a man who has been circumcised should not enter the taboo area because it will anger the ancestors and bring ill fortune upon the town. Similarly, women are not permitted to enter the area because they are considered "impure" in such contexts. Around the base of the "main tree," described below, there is a long white piece of cloth wrapped around the tree like a large bow. A new cloth is tied around the base of the tree during each ritual cycle.

The taboo area and the tree cluster are known as "Omengyina" and can literally be translated to English as "community alive" or "the community is alive." In Akuapem-Twi, "oman" means "state" as in a political state, so it can be inferred that the "community" that Omengyina represents is not just Guaman-Buem, but the Buem state as a whole. To complicate the matter, each community in Buem has an Omengyina in one form or the other. The Omengyina in Jasikan, for example, consists of a large white box that has a taboo object inside, and was never described to me. In terms of what the Omengyina in Guaman protects, when I asked elders about this, they argued that the local Omengyina was primarly important for Guaman, but that its well-being did have some significance for the Buem area as a whole.

"You see, if Guaman is not doing well then Buem also is not good" explained Nana Sampson Ofori IV, "so in that way you can more easily understand it" (Sampson, Personal interview, July 6, 2010).

The story behind Omengyina relies on a narrative similar to many of the sacred areas of Buem – it was one of the first places to be nourished by the ancestral founder of the community and thus represents an active link between the living and the dead. It is said that when the Buems first settled Guaman, they planted the tree in the middle of the town to mark the beginning of the life of the people and the "soul of the town." In fact, most people in Guaman-Buem simply refer to Omengyina as "the soul of the town" when asked to identify the tree. A tree is considered to be a metaphor for strength, firmness, and intransigence in Buem symbolism. The firmness and permanence of the tree is said to be similar to those associated traits in the town as well. As long as the tree stands firmly so will the community be strong and permanent.

Omengyina was thus a protected area of the town and the tree planted on its premises was considered to be taboo. The elders in the town decreed that no one could take firewood from Omengyina unless the tree was being trimmed (which does happen about once every ten years in an elaborate, week-long ritual). Similarly, they enforced the aforementioned rules about circumcision and not allowing females to enter the surrounding boundary. According to the story of Omengyina, every year since the planting of the tree the elders of the town have gathered to sacrifice a full-grown ram and play cycles of drumming and dancing as a sacrifice for the founding ancestors of the town. Additionally, whenever something is "off" in the town, the elders are required to perform a ram sacrifice and the associated drumming and dancing. It is said that as long as the main tree in Omengyina lives, so does the soul of the town. "When that tree dies, we will have to leave this place. That tree cannot die," explained Kwaku Attah, one of the prominent elders of the town. "But to be honest, there are several trees there growing around each other, and we call all of those trees the main tree" (Attah, Personal interview, July 25, 2010). Technically, then, the soul of the town is not survived by a single tree *per se*, but rather by several trees growing amongst each other in the appearance of a single tree.

Omengyina can not be classified as a "sacred grove" in the same way that Kabue is a sacred grove. There is no "no take policy" taboo in place at Omengyina, and it is often

surprising how readily resources are taken from the tiny space occupied by Omengyina. Young boys use small wooden catapults, resembling sling-shots, to fire rocks into the crown of the main tree and catch birds to eat or play with. Women also send their children to Omengyina to gather herbs that crowd the soil underneath the trees. Sheep, goats, and chickens freely enter the area and eat grasses and weeds growing wildly under the tree.

ADOLI: "THE PLACE OF THUNDER"

Despite my persistence in attempting to grasp the meaning behind the three main taboo areas in Guaman-Buem, this area remains the most elusive and difficult to understand. Few elders are willing to discuss the area known as "Adoli," which is a Lelemi-Buem word and in English means "thunder." Adoli is also variously described as the "controller of thunder" or the "god of thunder" and is considered to be a spiritual force. Adoli is not an ancestral fetish, though it was brought to Guaman and installed by Buem ancestors. It is not because Adoli is considered to be a secret or a topic that isn't supposed to be openly discussed that elders hesitate to discuss it. Adoli is avoided in conversation simply because not many people have knowledge of its origins or meanings, and because it is feared as a powerful fetish. Adoli quite literally symbolizes the connection between contemporary Guaman-Buem and spiritual forces in the world.

In discussing Adoli, there is also an opportunity to explain the meaning behind what Buems call "fetishes." Fetishes are objects, portable or permanent, that have spiritual powers that can be summoned. In most instances, fetishes are portable objects, and places like Omengyina or Kabue are considered to be "taboo areas" that should be discriminated from the label of "fetish." However, certain rocks in rivers, or even rivers themselves, can also be considered fetishes. Fetishes can either be connected to ancestral powers or to gods. These fetishes are not reserved for the power of Buem ancestors or gods, but can be brought in from other cultures or even other countries. For example, Buems believe that India, Benin, and Nigeria have some of the most powerful fetishes in the world. These fetishes are prayed to, summoned, or sacrificed to in order to fulfill spells or to invoke supernatural forces to achieve specific goals. There are "white fetishes" and "black fetishes" and these are respectively associated with "good" and "bad" spells. Some fetishes are neutral and can be

used for “good” or “bad” reasons. Most fetishes are patronized in order to cure a disease or to bring blessings in the form of a pregnancy, wealth, or to provide good fortune on a journey.

Adoli is a portable fetish that was brought to Guaman-Buem by its founding ancestors from the hills of Kolambangyere near Bodada. Its form, material, and representation are all unknown to me. Some have described Adoli as an object buried underneath a stone, protected inside of a box, or manifested in other elements of the environment. “Adoli” refers to both the area where the fetish is located as well as the fetish itself, yet elders insist that they are most definitely *not* the same thing. The most important, reverent, and sacred rituals that Buems perform are performed at Adoli.

THE VANISHING “DWARVES”

Being a trained archaeologist who regularly conducts fieldwork in southern California, I notice when I have stumbled upon an archaeological site regardless of the state or country I am working in. Once the eye is trained to discern material culture from scattered stones and plants, it is difficult to walk over an archaeological site without taking notice. In fact, it has sometimes been my job as a cultural resource management archaeologist to survey broad expanses of land locating and recording archaeological sites. Thus I was quite surprised and delighted when I started noticing ceramic and lithic artifacts scattered on a pathway while visiting a farm near Guaman-Buem. Looking around, I also noticed large rock outcrops with ground stone mortars on the surface. Though exciting, I was not too surprised as the river Konsu flowed about 300 yards away and in the past would have been – and still is – considered a valuable source for fresh water. I asked the farmer, Dennis Osei, if he knew who had utilized these bedrock mortars and the associated ceramics and lithics. “We can wait to talk about that when we get back to the village,” he replied. I was a bit confused, but shrugged my shoulders, took some pictures of the site, and continued walking around his farm. Later that night, over some beers in Guaman, he told me in a very low voice that what I had seen earlier was an abandoned village where dwarves used to live. “That place, and all those places, they have all disappeared with the forest. It is only the things that they used that are now left behind.” He went on to explain that it wasn’t a great idea to discuss those matters because the dwarves probably still returned to those sites on a regular basis to conduct their own rituals. I had always known of the myths of the dwarves and the taboos

associated with them, but I had no idea that they were perceived as an active society that mysteriously wandered throughout the forests and savannas.

Later, in a personal interview with "the royal farmer" Nana Sampson Ofori IV, he brought up the matter of dwarves while we were discussing environmental degradation:

> N: Uh huh. What I have noticed about the environment since I was a child is that the changes have been immense. In previous times, we had very thick forests. Forests around our surrounding areas and in nearby towns. You will not walk more than one hundred meters before being stuck in the forest. You would just move a stones throw and you would meet so many animals. You might see grass cutters, tortoises, and antelopes. Even there was a time that there were many dwarves around.
>
> D: Dwarves?
>
> N: Uh huh. Dwarves.
>
> D: What is a dwarf?
>
> N: Well, they are still around. But because we do not patronize them we have forgotten how they are. But dwarves, I happen to know that they are some spiritual creatures whereby they come around in the night and make noise. You may here them whispering or coming to your house to take bananas. In the old days, if you went to the farm and harvested bananas, you could hang them in your house and when they would ripen the next day you will notice that the dwarves have come to steal your ripe bananas. They have spiritual powers and people believe in them. And as certain people believe in them they do come around and do certain things whereby even if you don't believe in them you will wake up one morning to find out that certain things have happened in your house. You will ask "where have all of these changes in my house come from?" They say if you put bananas up they will come to your house. Now these dwarves too, they are no more than two feet tall. Also, their legs are backwards so that if you see their footsteps you will think they have gone one way when in fact they have gone another way. (Sampson, Personal interview, July 6, 2010)

A difficult concept to grasp in Buem mythology is the presence of these infamous "dwarves" that lurk in the forests outside of Guaman-Buem. These human-like beings are both revered and feared in Buem mythology as teachers of magic as well as cruel abductors. They are wholly different from the "ancestors," who are revered as links to the Buems' origins, culture, and history. Rather then being viewed as benefactors of Buem society or characters in traditional Buem religious belief, dwarves are seen as a kind of "other" group of hominids whom Buem have learned to live amongst and who have acted as powerful pranksters who sometimes emerge from the forest and play dangerous tricks. There is a suite of taboos in the community that are closely followed in order to avoid visits by dwarves

during the night. Discussing dwarves in areas where they used to live is among these taboos. Most interestingly for the purposes of this research, these dwarves are intimately connected with narratives of environmental degradation and the loss of suitable habitat for dwarf communities in the surrounding rainforests.

As explained above, dwarves are described by Buems as short human-like beings with backwards legs who have the ability to take both physical as well as spiritual forms. Those few Buems who have seen dwarves describe them as small people who move very fast and are gleeful in their disposition. They are described as tantalizing jesters who use hypnosis and trickery to lure humans into the forest, where they entertain them for months at a time before finally returning them to the village tattooed and insane. “There used to be one man in this next house,” explained Nana Sampson pointing at his next door neighbor’s house, “he had marks all over his body and was a bit off because he had been captured by the dwarves” (Sampson, Personal interview, July 6, 2010). Dwarves love to have all-night parties where bananas are consumed in large quantities. These mischievous hominids, however, are not considered to be benign, harmless spirits but rather anxiety-producing creatures that create insanity and “booze” their victims.

Several taboos in Guaman exist with the explicit goal of keeping dwarves away from the village. For example, it is forbidden to whistle in Guaman once the sun has gone down. It is said that dwarves communicate and sing with whistles, and that if they hear human beings whistling in the night they will come and abduct them. If you whistle at night and are caught by an elder, you are forced to pay a fine and leave bananas outside your house for several nights thereafter to appease the dwarves. Residents of Guaman-Buem are not allowed to keep dogs, because the chief decreed in 2006 that dogs’ barking and howling at night was upsetting the dwarves and causing them to create problems in the village. Following the chief’s decree, there was a massive killing of all the dogs and an immediate cessation in the acquiring of new dogs. The third major taboo that concerns dwarves concerns pounding *fufu* after dark. Once the sun has set, citizens of the community are not permitted to prepare their favorite meal consisting of pounded yams, cassava, and plantains. It is said that the noise will attract dwarves into the town.

The dwarves, however, are believed to be a disappearing “species” in the forests surrounding Guaman. When asked about dwarves in personal interviews, most respondents

immediately invoked the relationship between environmental degradation and the vanishing dwarves. “This time, no, you can’t hear of the dwarves again. Just like the monkeys, leopards, and forest elephants they have all scattered off into the bush. They are now in places far away because the forest is too busy and the trees are gone” (Sampson, Personal interview, July 6, 2010) explained Nana Ofori Sampson IV. Kojo Akan, the president of a local environmental NGO, also noted the dwarves’ absence as a sign of deteriorating environmental conditions:

> When I was a young boy we would never leave the house at night. That time, the forest around the town was dark and very hard. But it wasn’t only snakes and wild animals that you had to mind. No, the dwarves too. At that time they were taking people *basa basa* [a Twi saying that means “without care”] and people were then coming back with these stories and marks on their bodies. Some people, too, they learned how to do these magical things like medicine magic or even wicked magic. But once the forest is gone, and the trees are being felled for firewood or to be sold, then the dwarves they can’t stay here again. They have ran off into other bushy places. (Akan, Personal interview, December 1, 2009)

The relationship between environmental degradation and the disappearance of dwarves is not a trivial matter to Buems. The vanishing dwarves act as a metaphor for the movement from traditional, subsistence farming in an ancestral landscape to the unsettled, out-of-balance, and barren aridity of the modern Buem environment. Nana Kojo from Nsuta-Buem, eight kilometers north of Guaman, organizes expeditions into the mountains and caves surrounding Buem with the goal of pacifying and “bringing out” the dwarves. He is the chief of Nsuta, where dwarves are also feared and respected, and believes that the dwarves have taken to the hills because they are now scared of humans. “It is something like we have grown to be bad for them. This time they are rather scared of us. Yes, we have taboos so they will not come and disturb, but that we don’t hear of them at all is not a good thing. Rather, it is bad” (Sampson, Personal interview, July 6, 2010).

THE ANCESTORS AND ENVIRONMENTAL DEGRADATION

One cool July day I was invited to visit a palm oil grove just off the Nkwanta-Accra road about one mile south of Guaman. Some youth in the town had been asked to help another young man by the name of Kojo Elias to tap some old palm oil trees for palm wine to be sold “as is” or distilled into *akpeteshie.* The grove was sheltered in relatively dense forest with towering tropical hardwoods overhead. Because of the copious amounts of sugar

involved in wine tapping and fermenting, clouds of flies and bees swarmed around large barrels of palm sap that was foaming and bubbling into wine that would later be transferred into smaller containers and then sold in the area. At the entrance of the palm grove, on either side of the path, were two half calabash shells filled to the brim with fresh palm wine. I asked Kojo why he had placed the shells of wine there. “Oh, not just here but at every entrance to this grove,” he answered, pointing in an ostensibly random assortment of locations, “these are for the ancestors to drink so that they will continue to protect this place from wicked spirits and from damage by winds, animals, and insects.” Looking at the numerous stocky palm oil trees that had been felled and were being tapped, and the three or more acres of younger oil palms bathed in shafts of golden sunlight and protected by a healthy canopy, I did indeed get the feeling that this particular piece of land was being protected by forces beyond the physical.

Ancestral belief is central to almost every dimension of Buem society and culture, including perspectives on the environment. Indeed, it could be argued that in Buem the dead are not really dead. Though most outside observers view the pouring of libations or negotiating with the deceased as a form of abstract spirituality, to many Buems (or, indeed, Ghanaians) these practices are very real and relevant actions. Before community events or meetings among elders, extensive rituals are performed that consist of the pouring of libations and reciting of prayers to the ancestors. Specific figures in the cultural history of Guaman-Buem may be invoked – previous chiefs, queen mothers, or founders of the town. Similarly, compulsory rituals are performed to mark different stages in an individual’s life and these must be met with dedication and sincerity. When a child is born, he or she must be blessed with herbal concoctions that are thought to bring ancestral blessings to the baby’s life. When a marriage is performed, Buem elders will perform a libation for the couple and the youth will perambulate through the town at night announcing the marriage to other residents in the town. When an important person arrives in Guaman or sets out from Guaman on a journey, the village elders will pour libations to bless their journey and keep them safe from harm.

Ancestors have the power to both bless and punish Buems for their obedience or lack of obedience. When darkness or “bad luck” descends upon the town, it is often blamed on the fact that Buems are not fulfilling their ritual obligations and that they are “straying” from

their traditions. During these times of crisis, the Amankrado (a sub-chief responsible for such affairs) typically calls upon the elders to perform rituals at Kabue, Omengyina, or Adoli in order to restore peace in the town. These rituals typically involve pouring libations and slaughtering a ram. Privately, farmers can also appease the ancestors through ritual sacrifices. Kwaku Atta provided some descriptions of these ritual obligations during my interview with him:

> K: Yes, yes. It is true. It is bringing adverse effects. Some years you came and saw that the place was gloomy and dark. The town was strange. But after the rituals were performed the atmosphere opened up and people had opportunities and chances. Like he is saying (Charles, quoted below), there was a year at the farm when I said "no." So I bought a goat and went to the farm and performed the rituals. That year, oh! People were even asking me "what kind of fertilizer are you using on your farm" and I said "oh, no, it is because I have given an offering to the ancestors." So those of us who are faithful to our culture, we do benefit. (Atta, Personal interview, July 20, 2010)

Many individuals in Guaman-Buem believe that environmental change is at least partially a result of the town neglecting ancestral obligations. Even the youth in Buem, who typically consider themselves to be "modern" and distrustful of "traditionalism" (the word used to identify "local" African beliefs) tend to view environmental degradation as part of a larger spiritual problem. Charles Owusu, a 32 year-old man who left when he was in his teens to work at a factory in Tema, discussed with me at length the problems that are engulfing the town as a result of the neglect of ancestral obligations. These problems, according to Charles, range from tragically high infant mortality rates, "madness" infecting the minds of certain individuals, car accidents occurring on the Nkwanta-Accra road, to light bulbs failing just after being installed. These same negative sanctions affect the environment that Buem farmers depend on:

> D: So what is the relationship between ancestral punishment and problems in the environment?
>
> C: These driver ants can sometimes enter the farm and destroy everything. But you come to realize that it is not the ants. It is the fault from the town that is making our ancestors do these things so that we will know that we have forgotten about them. They want us to know that every year we have to go and perform our obligations to them so that they can protect us. Every year we have to pray and kill a goat or fowl. So when someone from another town or some wicked spirit wants to destroy this town they will not protect us if we haven't performed our rituals….. So that is what is happening too on the land, it will appear that some things are coming and causing destruction but it is really the ancestors who are

> reminding us that “no, you can’t ignore us, so here is some small small thing to remember us.” Then we will know that we have to pray to them and that they will come protect us again. (La Rose and Owusu, Personal interview, August 15, 2010)

The ancestors can both cause problems within the environment and also refuse to defend Buems from other forces, curses, or spells that are being used against them. In other words, they are mostly viewed as “protectors” of the village, its people, and the environment that sustains them. If, however, they are not pleased with the way they are being supplicated and treated in the town, they may inflict damage on peoples’ crops or within their households. It is believed that small damages inflicted on people in the town are simply reminders that they are not fulfilling their obligations and that they are going to lose some of their protections is they continue to neglect their ancestral duties.

CONCLUSION

In addition to deforestation, bush fires, extreme weather, and other encounters with environmental degradation, Buem farmers also describe an “ill feeling” that has descended upon Guaman-Buem in recent decades. This ill feeling is discussed as another element in the suite of problems that Buem farmers face when considering agricultural strategies. Importantly, it is also considered to be an essential obstacle to be overcome before other aspects of the environment can improve. In other words, it is only when spiritual and ancestral obligations have been fulfilled that the environment can begin to return to an optimal state. Ancestors, gods, and other spiritual powers are believed to hold power over the forces of nature, and can either bless or punish Buem farmers based on the amount of attention they are given. Certain rituals on farmlands and other production areas are thought to enhance and protect the productivity of lands and projects. Anecdotally, the example of the shells of palm wine left as an offering to the ancestors on the path to Kojo Elias’ palm tapping project works as a great example of Buem farmers’ understandings of the role of ancestors and spiritual forces within their subsistence system. Environmental degradation, particularly deforestation, is thought to have disturbed important balances in the natural environment and disturbed spirits and “dwarves” who once maintained a presence there. Like the wild animals that are said to have been abundant in Buem forests in the past, the dwarves have also “run away” into deeper parts of the bush. Certain “sacred areas” of Guaman-Buem act as shrines to the ancestors or spirits, and have rich mythological stories behind them that

connect them intimately to the present. These sacred areas – Kabue, Adoli, and Omengyina – have certain taboos surrounding them, with Kabue ("the cool place") in particular encapsulating themes associated with "sacred groves" but also representing a divinely sanctioned "eternal" source of water (Decher 1997). Omengyina ("the tree of the community") is believed to have been planted by the ancestors who first settled Guaman-Buem and thus represents a material link to the founding Benkyiomana clan and symbolizes the well-being of the town.

These narratives shed light not only on Buem spirituality and understandings of the links between the physical and spiritual world, but they also have important implications for crop choices, agricultural strategies, and adaptability practices. That Buem farmers believe that the success with which their ritual and ancestral obligations are performed have profound impacts on the health of their environment (and their agricultural lands in particular) raises interesting questions about the impacts of modernity, cosmopolitanism, and the erosion of traditional beliefs on environmental practices. Even though many of the youths in Guaman-Buem still hold beliefs in the impacts of spiritual powers on their environment, what will become of sacred areas and sacred groves if the next generation does not continue to hold these beliefs? Recently, evangelical Christian churches have targeted traditional beliefs as satanic and pagan, and many communities in Ghana have gone so far as to demonize the pouring of libations to the ancestors – a ritual that is part of Ghana's national identity (Akyeampong 1993). According to informants such as Georgy Osei, the connection between trees and rainfall is also dependent on the maintenance of the spiritual health of the community, and without the blessings of the ancestors the health of the environment has the potential to be compromised. Though adaptability practices may be in place at technical levels (the primary discussion of this thesis), it is clear that traditional beliefs also play a role in farmers' decisions as to what should be cut down and what shouldn't, and also how land in general should be viewed and treated. Buem spirituality is another context, in addition to history and the environment, within which crop choices and agricultural strategies are formulated.

CHAPTER 7

MODERNITY, COSMOPOLITANISM, AND VULNERABILITIES IN CONTEMPORARY BUEM

This chapter explores themes of modernity, cosmopolitanism, and social vulnerabilities to environmental change in Guaman-Buem. These narratives are concerned with the ways that ideas formulated for savanna or Sahelian environments are being incorporated into Buem agricultural strategies as a result of migrant labor, particularly during the "cocoa boom." These ideas are being invoked to deal with environmental changes occuring in the agricultural landscape of Guaman-Buem. These themes are also concerned with the broader impacts of modernity and globalization in Buem, including urban emigration among the youth and a desire to seek a non-rural, non-farming lifestyle. For obvious reasons, elders and middle-aged farmers are concerned about the youths' disinterest in farming and environmental knowledge that is not being communicated between generations. These processes call for a more nuanced understanding of Buem crop choices and agricultural strategies and how globalization and immigraton are presenting new opportunities and new constraints for Buem farmers. That all of these concerns and processes are richly present in farmers' narratives is a sign that such impacts are being taken into consideration at the levels of crop choices and agricultural strategies.

BUEM COSMOPOLITANISM AND THE EMPLOYMENT OF AGRICULTURAL STRATEGIES FROM SAHELIAN SOCIETIES

Farmers in northern Ghana don't enjoy the same abundant rains that typically soak the forests that cloak the country from the Brong-Ahafo and northern Volta regions south. In fact, the country is seemingly defined by this boundary of absurdly wet and painfully dry – the arid north resting uncomfortably atop the green, steaming tropics. Many visitors to Ghana who traverse the entire country comment that the north of Ghana *feels* like a different country. And indeed, it does. The north of Ghana is characterized by open, tree-dotted savannah that is infrequently broken up by small, dusty villages. This part of the country not

only looks harsher and non-conducive to settlement, but truly *is* not as conducive to settlement as the lush south. There are frequent droughts that generate throngs of environmental refugees who pack their bags and head south into Kumasi, Techiman, Accra, Hohoe, Ho, or even the jungles of Western Ghana. Farmers living in Nangodi in north-eastern Ghana, for example, demonstrate radical fluctuations in weight throughout the year that mirror changes in rainfall patterns, harvests, and regular peaks and dips in food reserves (Hunter 1967; Destombes 2006). Such delicate adaptations to rainfall patterns disintegrate during famine periods, pushing such farmers south into more generous environments. Many of the load-carriers and hawkers in major Ghanaian cities come from these dry, northern environments (Kwankye et al 2007). Likewise, many of the migrant cocoa workers who toiled among the cocoa plantations of Buem came from arid climates in northern Ghana and northern Nigeria (Fred-Mensah 2003).

Ironically, it is also the agricultural knowledge, crops, and strategies of such northern migrants that are shaping emerging adaptability strategies in Guaman-Buem. Hoes are now seen amongst cutlasses (machetes), and farmers are beginning to cast a curious eye onto the fingers of savannah-like environments that they had never imagined would bear fruit in the past. Furrows are being formed in loamy soils to capture, move, and distribute water among vegetable crops such as onions, ginger, tomatoes, and peppers. One day I heard beans, cowpeas, and millet being discussed over calabashes of pito (millet beer) at a home where a Gonjan woman from the north of Ghana had married a Buem man. In other words, it is not just the environment that is beginning to look more like the north – it is the people, too. Islam, for example, is now widely practiced in Guaman. Where the air was once still and cold during Ramadan, it is now filled with morning prayers. Black-, beige-, and white-gowned worshippers travel to the mosque in Jasikan-Buem every Friday over three miles of sizzling asphalt. “Muslims did not live in Guaman until the cocoa boom,” 65-year-old Kojo Akan told me, “it is only then that they moved to Buem and built mosques in Jasikan” (Akan, Personal interview, December 1, 2009). In Buem, such migrants are not universally appreciated. One practice that Kotokoli-speaking northerners brought that has attracted a lot of negative attention is the practice of female circumcision. Though the practice of female genital mutilation has been mostly eradicated, memories of the practice in Jasikan’s “Zongo” still haunt the collective history of the town.

Though most Buems don't like to acknowledge the possibilities of northern agricultural practices, they are beginning to implement them anyhow. "Many farmers in this town are very stubborn," explained a young farmer named Dennis Okum "they want to continue with plantains and cassava but they know that these things are going to have to change. We will have to begin planting yams, peppers, tomatoes, and other such crops" (Okum, Personal interview, August 10, 2010). Farmlands around Guaman-Buem are indeed beginning to take new forms, and new tools now lean against the mud-brick walls of farmers' homes in Guaman-Buem. The fact that hoes now sit among the farm implements in Buem farmers' homes may seem trivial, but they symbolize the broadening of an adaptive strategy. There is now one more way to exploit the earth because there is a new kind of earth to exploit.

In terms of agricultural knowledge, this may be one area where young adults have older generations beat. When asking younger farmers how they were responding to environmental change – changing rainfall patterns and savannization in particular – many of them responded that they were experimenting with "northern" cropping strategies. Some of them had transcended experimentation and were actively employing agricultural methods that are, at least theoretically, more appropriate for the savanna than the semi-deciduous rainforest. These types of agricultural strategies were being actively carried out on farmland that had become typical of the "fingers" of derived savanna that are penetrating the forests around Guaman-Buem. Two farmers in particular – Dennis Okum and Mohammed Antwi – felt passionately about these methods of farming vis-à-vis the changes that are occurring in the surrounding environment.

Dennis Okum is a young 35-year old Buem farmer of modest means. Although sometimes he finds wage work in Guaman or Jasikan - carrying loads, clearing land, or helping someone harvest their crops – he mostly subsists off of his own farmland for his livelihood. His wife is a hairdresser and they have one child together. Dennis, however, is an oddity in Guaman in that he finished Senior Secondary School before returning to the village to farm. His English is honed and garnished with humor and subtlety, and he is able to discuss his approaches to agriculture in great nuance. "It is when I noticed that the soil was becoming something like sand, that is when I started to try yams, tomatoes, okra, and vegetables." Dennis has now dedicated an entire plot of land to yam farming, "something I

would not have thought I would do just five or ten years ago" (Okum, Personal interview, August 10, 2010). Visiting his yam farm in Bakpa, I was surprised at how much it stood out among the weedy maize, plantain, and cassava plots that surrounded it. Narrow yam tendrils with heart-shaped leaves crawled out of a low, brown mound and curled up a pole jammed at a 90-degree angle into the earth. According to Dennis, this tactic is used in the north and it is believed that the higher the vine reaches into the air, the longer and more succulent the corresponding tuber in the ground will become. The yam farm, in fact, looked startlingly healthy among the other plots of land surrounding it. "It is because those crops are not doing well, so people are tending to lands in other areas. They will still come here and weed and check on their maize, but they know it will not be the season they had hoped for" (Okum, Personal interview, August 10, 2010). Looking out over his own farm, he has a humble grin that seems to have an "I told you so" message buried within.

During my interviews with Mohammed Antwi ("the innovative farmer"), we discussed the differences between "northern" and "southern" styles of agriculture and how farmers in Guaman-Buem would have to adjust if the savannization trends continued:

> D: So do you think if that happens – that the savannah continues moving south into Guaman – people will begin to practice a different kind of farming?
>
> M: Of course, of course. If this continues it will bring a whole complete change. Methods of farming will have to change. Farmers will have to adapt to a whole new method.
>
> D: So do you think farmers here have the capacity to adapt? The way they are farming now, do you think if they continue to see changes in the environment they will be able to adapt to them?
>
> M: Yes, I see what you are asking. They can, but it will be so difficult. You see, we have two methods of farming in Ghana. First, you have those who are adapted to cutlass [machete] farming. Second, you have those who use hoes. Now, the hoe is commonly used in northern Ghana, and the cutlass is in southern Ghana, like here in the Volta. If this weather pattern change comes here, and we have to get adapted to those northern methods of farming, then farmers here will have to get adapted to the hoe method. This type of farming, it will be really difficult. This hoe type of farming involves more whole body physique, it requires a different type of strength. Because of the rows and the style of farming, it will require a whole new set of methods. And also, it is going to involve a whole new set of crops. We will have to start planting crops from the northern parts of Ghana. Cowpeas, yams, soy, those kinds of crops. (Antwi, Personal interview, July 5, 2010)

Mohammed Antwi is the epitome of the forward-thinking young farmer. He is in his early 40s and has had the most desired agricultural success in all of Buem. Mohammed, however, did not start with the meager means that most farmers in Guaman-Buem do. He has found success at many different occupations throughout his life, and collected a healthy savings to reinvest into farming. He has had the ability to lease additional land and to purchase farming equipment and inputs (chemical fertilizers and pesticides). Wealthier farmers like Mohammed have a distinct advantage over peasant farmers in that they can more easily absorb shocks to production and subsidize the risks associated with experimentation. His current farm, however, has had a powerful impact on Guaman-Buem because it demonstrates how successfully northern farming strategies can be employed in Buem. Mohammed once lived in northern Ghana and was well known for his bizarre and innovative farming strategies. One of these innovations involved taking human waste and revitalizing farmland that was thought of as dead, sterile, and incapable of ever being cultivated again. He had bought some cheap, undesirable land just outside of Tamale and people in town were chuckling at him and teasing him for buying land "incapable of producing food." He notified the local sewage and waste treatment facility that he would like for them to bring dried waste to his farm. "Within one year, people were apologizing to me 'Hey, Mohammed, wow, we are so sorry, you really do know what you are doing.' Hahaha. Nobody knew I could take some human shit and make a great farm out of it" (Antwi, Personal interview, July 5, 2010). In Guaman, he has done the same thing, sans the human waste, with a stretch of land just over a hill in a dry expanse of derived savanna. "This place was once used for cocoa but look, it doesn't resemble a forest area at all anymore." His farm is massive and, though he admittedly uses chemical fertilizers and pesticides, has encouraged many farmers to follow suit and plant yams and vegetables on parcels of land that were once thought of as all but dead. "You don't really need to use agrichemicals, but if you have a lot of land like I do here, it would be very difficult to do all these things by hand." Looking out over acre upon acre of cowpeas and yams, Buem farmers who visit Mohammed's farm often leave with the impression that they are going to have to follow his example if they are going to continue farming in the future. "Right now, people are planting a lot of cassava because they are seeing that things aren't going to continue as they have. But very soon, their farms will look a lot like this one here" (Antwi, Personal interview, July 5, 2010).

In the meantime, older generations of landholding farmers are beginning to sharecrop or lease their farms to younger farmers to cultivate the land for them. It is becoming more commonplace for these lands to be converted into vast acres of yams, millet and cowpeas, or rice in marshlands. It isn't even so much that older farmers no longer believe plantains, cocoa, coco yams, and maize can be successful in farm lands around Guaman-Buem – they are simply becoming too old to physically carry out the work of farming. If a younger farmer comes to them with a sharecropping proposal that involves imported, northern styles of farming, they are more willing to take such a venture into consideration. A farmer like Emilia Darko, who is both very old as well as still physically invested in her farm, combines the new approach with the old approach. "I have a farm with cassava, plantains, and cocoa yam but I also have a rice farm that I am sharecropping with the landowner." This strategy, according to Emilia, is fail safe. Both farms are very likely to succeed, but the rice and cassava are almost guaranteed to succeed. "Oh," adds Emilia Darko, pointing to a path behind a plot of cassava that leads to a large plot of cleared reddish-brown land, "over there I am also getting the land prepared for some vegetable gardens and am also learning how to do irrigation for the next year."

VULNERABILITIES IN BUEM SOCIETY: YOUTH EMIGRATION, GENERATIONAL DIFFERENCES IN AGRICULTURAL KNOWLEDGE, AND THE POSSIBILITY OF FAILURE

During the course of my research, one of the most common themes to emerge was a gap in generational knowledge due to the emigration of youth. Interviewees would invariably lead the discussion in this direction, warning that one of their biggest concerns was that their children and grandchildren had no interest in pursuing farming. This is ultimately a controversy that stands at the core of modernization in Ghana and the dichotomy between the rural farmer and the urban elite. The youth of Ghana have learned to idolize their urbanized counterparts raised in the swanky suburbs of Accra or Kumasi. Likewise, urbanized Ghanaian elites - and aspiring urbanized elites - have learned to disassociate themselves from their rural counterparts. A telling example of this dichotomy is epitomized in contemporary Ghanaian pidgin English, where someone who is considered unfashionable and out-of-touch in an urban context is called a "farmer." I was once even called a "farmer" when I showed up

to a meeting in Accra with my sandals on. Everyone else, of course, was wearing only the finest suits, shoes, and silver-rimmed glasses available on the market. Ironically, it was a meeting about natural resource management and the ways in which rural farmers could be empowered to prevent the spread of HIV/AIDS.

When visiting Guaman-Buem, one is almost immediately struck by the lack of young adults in the town. There is an abundance of young children and teenagers, but one is pressed to find more than 10 young adults in their 20s, with the exception of teachers at Guaman Junior Secondary School. This becomes even more shocking when you go to "the bush" where adults and even their elderly parents are working side-by-side, harvesting cassava with rusty machetes. According to most Buems, this a relatively recent phenomenon and brings considerable amounts of doubt to the future of the community. There are basically two ways that Buems view this phenomenon. First, they despair that the youth are fleeing the village to work in Accra or Kumasi and, as a result of embarrassment, will never come back, leaving the farms to become overgrown and their elderly parents to fend for themselves. Second, they laugh off the phenomenon, joking that the youth will return to Guaman-Buem once they have realized that life in Accra is more difficult and that the village is a preferable place to live.

In both cases, embarrassment plays a crucial role. In the first scenario, the youth have run away to Accra to look for a good job but haven't found it. Too embarrassed to return to the village in defeat, they find petty work in urban Accra and perhaps return to the village for funerals, enstoolment ceremonies for chiefs or queen mothers, engagements, baptisms, and other important social events. But they must remain in Accra because they are "waiting" to hit it big, become a "big man," and return to Guaman-Buem in a Mercedes-Benz and enough money to build a house for their family. Returning to the village to become a "farmer" is akin to admitting failure and being reborn into the "rural" life. Mohammed Antwi, a 40 year old well-to-do farmer, explained it this way:

> M: You see, the only problem in Guaman is that - it is a community where you don't have rampant charcoal burning, which is part of the causes of climate change. It is a community that lives a very simple life. A small farm, some food, enough money just to pay school fees, provide maybe some Christmas celebration. A person is content with himself, you know? You have lots of grasscutters, snails, plantains, pineapples – fine. It is a very simple life, with the exception that now the youth are deserting Guaman for better jobs that are really non-existent. The youth though, are now finding it harder to come home because

> they are embarrassed. So they have this almost perfect home with plenty of food, but they want more and they go looking for it. But a man does not fail, and to come back empty-handed would be to fail. So no, those youth will never come back to live in Guaman unless they become crippled or are called upon to do some kind of social obligation like be a chief or queen mother. So the youth are now abandoning Guaman to fend for itself and it is only some few young men who are staying here and saying 'yes, I am a farmer and I am proud to be a farmer'. (Antwi, Personal interview, July 5, 2010)

Although most interviewees agreed with Mohammed's sentiment, a few individuals dismissed this argument on the grounds that while some young people do indeed leave Guaman-Buem for urban centers, most invariably return because of a lack of employment. While the second reaction, that the youth will invariably return, doesn't account for the vast quantities of missing youth, it also remains true that many farmers in their 30s left Guaman-Buem in their 20s and indeed came back when they found life in Accra to be too difficult. Jones Kessie, a young school teacher and part-time farmer, explained it this way:

> D: What about those youths who are moving to Accra?
>
> J: Oh, they are looking for greener pastures. They think they will go there and begin to wear big big clothes. I might try and go to Accra to get some kind of *kayapo* job (carrying loads), I don't have any skill or work in particular that I am going there to do. But then, when I reach Accra because of necessity I will do some *kayapo* job in order to acquire the white man's shirt. Are you getting me? So without any employment or motive I move to Accra without any employment just to see my friends and lean against them. Then I can get some clothes to wear. *Kayapo* will bring some small small coins and then the person will run off to the village to show off. Is that best?
>
> D: Well, I don't know.
>
> J: Hahaha.
>
> D: Do those people come back to the village feeling embarrassed?
>
> J: Their hands become soft and they become useless. They must be embarrassed. Their mother is there working *da biara* [every day] and they have been doing some unnecessary thing whereby they are coming back to say "Mama, what do you want me to do?" They come back to the village finally, yes. They must. If they don't come back to the village where will they go? They have to come back and start farming again. That *kayapo* job didn't work, so they will come back, embarrassed but then pick up the cutlass again and clear their land. Hahaha! (Kessie, Personal interview, August 15, 2010).

A common concern expressed in interviews and during focus group was the ever-widening gap in generational knowledge of agricultural strategies and crop varieties. In particular, Buem women have a vast knowledge of the different varieties of crops. This was

exemplified in interviews when I asked young men and women questions concerning particular varieties of crops and their suitability for different soils. Almost immediately, they would turn to their mothers, fathers, grandmothers and grandfathers and ask them to help answer the question.

One interview in particular brought this dilemma to surface. I had accompanied a young woman of about 26 years, Florence Agybia, to her maize and rice farm in the Bakpa area. We were weeding around her maize farm and I asked her where she had acquired her maize kernels (seeds). “I got these kernels from the Ministry of Food and Agriculture, they are all *jakpa* maize seeds. These are the new ones they are promoting, but if you go to my grandmother’s farm you will see so many different kinds of maize” (Agybia, Personal interview, December 20, 2009). Later that evening, I went to Florence Agybia’s house to complete my interview and conduct a sort of mini-experiment. I wanted to see how many different varieties of maize, yams, and rice she could mention and then ask the same of her grandmother. The results were striking. Where Florence could name only about four varieties of maize, her grandmother listed off more than 20. While Florence could name about 10 varieties of yam, her grandmother knew of over 40. When I queried Florence about this, she shrugged her shoulders and explained “normally I just take the seeds that MOFA (Ministry of Food and Agriculture) gives me and plant them. They should know what is best.” (Agybia, Personal interview, December 20, 2009). Many elders are frightened by the prospects of their children and grandchildren not having the same knowledge of crop varieties and their appropriate soils. An elder farmer with six children, only two of whom farm (one as a supplement to income and one as a primary farmer) commented that, “When we are dead and our children only have *jakpa,* what will happen when they meet a new soil? Will they know to get *abura* seeds to plant in stony soils? No” (Darko, Personal interview, June 15, 2010).

Similarly, it is difficult for many young people to grasp the extent to which the environment has changed and how many of the agricultural strategies they are employing now would not have been considered “optimal” just twenty years ago. While discussing the boom and subsequent collapse of cocoa, elder farmer and NGO president Kojo Akan explained to me that much of the land now being used to cultivate maize and cassava was once teeming with swollen orange cocoa pods that were of impressive value. “If in those days you would tell someone that ‘hey, this land you are getting cocoa from is going to be

planted with maize in twenty years time' they would have just laughed at you. Now, you tell that to a young person and they are so surprised but then just forget about it. They think it is normal to just plant maize, maize, maize and get some small small money from it twice in a year. They don't know anything different" (Agybia, Personal interview, December 20, 2009). Many young farmers strictly follow their mental agricultural calendar and try to get the most they possibly can out of the land, without taking into consideration how long-term plans might benefit them. Even though there are now more viable and resilient varieties of cocoa trees, young people are afraid to plant them because of their unfamiliarity. This unfamiliarity, combined with a general detachment between the youth and farming, is a core concern of Buem farmers when thinking about the prospects of Buem agriculture in the future.

CONCLUSION

Contemporary trends in Buem society, from the environmental knowledge introduced through the immigration of agricultural laborers during the cocoa boom to the impacts of globalization on the youth, are firmly integrated into narratives on environmental change and their associated agricultural practices. On the one hand, new crop choices and agricultural strategies are being introduced from neighboring societies that are slowly becoming prominent features in Buem adaptability practices. On the other hand, young people are being dissuaded from careers in agriculture as a result on national discourses on the "backwardness" of rural farmers. That some of the forests surrounding Guaman-Buem gave way to savanna grasslands at the exact moment when migrant workers from savanna and Sahelian areas in the north ran out of work on cocoa plantations might be a coincidence – but it appears to be a fortuitous one. Some indigenous Buem farmers have taken up, or at least experimented with, some of the agricultural strategies of northern Ghana or the homeland of the Hausas. The transmission of traditional agricultural knowledge from elder farmers to the youth appears to be in some jeopardy as a result of powerful national narratives biased against "rural" identities. However, many of the youth who leave for Accra or Kumasi during their late teenage years return home when their urban dreams aren't realized. Though many of these young farmers seek to catch up with their siblings who have stayed in Guaman-Buem or make up for lost time by working with their elders, a lot of agricultural knowledge that would have otherwise been transmitted between generations is lost. Issues of modernity,

cosmopolitanism, and youth emigration present opportunities and vulnerabilites to dealing with environmental change. Utilizing working strategies as well as incorporating introduced agricultural strategies demonstrates that Buem farmers actively engage with a changing environment. That these issues are recognized in Buem narratives and that Buem crop choices and agricultural strategies appear to be flexible enough to integrate alternative strategies may, in itself, be an important adaptability practice.

CHAPTER 8

LIVELIHOOD STRATEGIES AND ENVIRONMENTAL PERSPECTIVES IN CONTEMPORARY GUAMAN-BUEM

Agricultural strategies and crop choices act as material representations and manifestations of ethno-ecological understandings and anticipations of the environment (Gyampoh et al. 2009; Mendelsohn and Dinar 1999; Mortimore and Adams 2001; Smithers and Smit 1997). As stated above, individual decision-makers make choices about what will be planted and how land will be managed based on observations about weather and altered soil climate regimes, and the sum of these decisions characterize a societal adaptation to climate change (Smithers and Smit 1997). The rich, textured narratives of Buem farmers illustrate the rationales behind cropping strategies, but the material manifestations of these environmental perspectives are located in livelihood strategies. It is thus important to quantify the basic environmental perspectives of a group as they relate to agriculture and food production. The methodology I employed to gather data on environmental perspectives and crop choices, discussed in the introduction, used household surveys as a means of gathering such data.

The majority of the data discussed here was gathered through 42 household surveys concerning crop choices, pest and pest control issues, perceptions of the environment, roles of farming in particular households, and labor issues. First, I will discuss data concerned with crop choices. Second, I will discuss Buem farmers' perceptions of environmental change as they relate to non-optimal farming conditions, including the recent advent of bush fires, extreme weather, and pest problems, as well as drought conditions.

RELIABILITY AND ADJUSTMENT: CROP CHOICES AND ADAPTABILITY IN BUEM FARMING

Buem ethno-ecology and narratives of environmental change describe an environment that has become increasingly degraded and unreliable. In other words, Buems

have consciously argued that their only option is to work in the environment that they have inherited and to plant crops that they know will be successful in it. This argument, articulated in narratives and materialized in agricultural practices, constitutes what can be called an "adaptability strategy." Furthermore, as discussed above, they are experimenting with new methods of farming that are just beginning to enter their agricultural repertoire. The data presented here convincingly suggests that Buem farmers are indeed employing an adaptability strategy combining reliability and adjustment. Though this strategy has no particular label or name in Lelemi, Twi, or English, it is a core part of Buem narratives on environmental change, crop choices, and agricultural strategies. They are both solidifying as well as diversifying their crop choices. In many ways, it is at its core a conservative strategy that also contains an experimental element. For example, it was only through experimentation that farmers in Guaman came to be one of the country's biggest cocoa producers and it is only through experimentation that they will learn to adapt to an environment more characteristic of northern savannahs than southern rain-forests. On the other hand, Buem farmers are building redundancies into their agricultural strategy that represent a conservative approach towards balancing risk with food security.

This section deals with quantitative data from 42 household surveys undertaken during the course of this research. The 42 households in this survey represent approximately 66 % of the entire community of Guaman-Buem. The section is based on farmers' responses to questions about what they were planting. Participants in this research were asked how many plots of land they had and what they were planting on those plots. The data was recorded on survey forms, entered into Microsoft Excel, and statistically analyzed. This data, compared with Buem narratives of environmental change and proposed solutions, demonstrates that farmers in Guaman-Buem are indeed responding through their farming strategies to social-environmental change. Here, I will present the results of the quantitative surveys and discuss the distribution of crops throughout Guaman-Buem. I will also describe the various crops, their history in Ghanaian agriculture, how they are used in Buem culture and cuisine, and how Buem farmers cultivate them.

Buem Agricultural Strategies

Buem farmers mostly cultivate typical rain-fed West African forest staple crops: cassava, plantains, maize, yams, cocoa yams, and peanuts. Some crops that aren't typically cultivated by forest farmers, but are valuable cash crops include cocoa, coffee, and oil palm. Rice farming in the Volta Region, including Guaman-Buem, involves a locally-domesticated African variety of rice that isn't commonly cultivated in other parts of Ghana (Akan, Personal interview, December 1, 2009). Because of the presence of cheap imported rice, local rice varieties are grown mostly for subsistence. According to many Buem farmers, local rice has become a more commonly cultivated staple crop over the last five years. Similarly, intensified cultivation of cassava is often mentioned as a reaction to degraded soils and unpredictable rainfall. Buem farmers also claim that the introduction of okra, tomatoes, pepper, onions, and cowpeas is a more recent phenomenon associated with the savannization of previously forested areas. However, in some interviews farmers used tomatoes as an example of a crop that grew better prior to deforestation in Guaman-Buem. The cultivation of these vegetable crops on large scales involves the use of different tools, such as hoes and hand plows as well as irrigation methods, such as the establishment of simple furrows or canals, all skills and strategies imported from northern Ghana.

Current Buem agricultural strategies reflect a human-environment relationship characterized by adaptation, maintenance and manipulation of environments suitable for specific crops. As Ivor Wilkes (1993) pointed out in his seminal study on the Kingdom of Asante in the central rainforests of Ghana, "The model of the Asante rural economy … would thus exemplify a general feature of successful ecosystems, that communities adapt not to usual but to unusual conditions" (65). Farmers' crop choices materialize an ever-evolving adaptation to observed changes in the weather and soils in the agricultural environment in Guaman-Buem. The crops described here are materializations of choices that farmers have made and are artifacts of human behavior. Here, I will describe the various crops cultivated by Buem farmers after giving a brief introduction to the distribution of crops over the Buem landscape. Following the descriptions of crops and farmers' attitudes towards them, I will discuss how this set of crop choices and its distribution among farmers represents an adaptability strategy that focuses on crop reliability and experimentation with new crops in a changing environment.

What are Buem Farmers Cultivating?

The data presented here (Figure 4) is a graphical representation of the percentage of farmers who are growing each specific crop harvested in Guaman-Buem. The data and the graphs act as simple representations for which crops farmers cultivate most regularly. The data was collected through household surveys that asked farmers how many plots of land they had under cultivation and what was planted on each plot throughout the year. The data does not, however, provide any inclination of *how much* of each crop is planted per plot. Although having that data would be extraordinarily valuable, collecting such data would have required a more intensive methodology that quantified yields (amount of seeds planted and weight of crops harvested) throughout the year. Many farmers explained that they prefer to spread risk among different plots by planting staple crops on two or more plots of land, particularly cassava, maize, and plantains. Participant observation on my part as well as interviews with farmers revealed that those farmers who planted maize planted it on a relatively large scale, while farmers opportunistically planted cassava on marginal pieces of land as well as intercropped it within larger plots. Cassava's dominance on the graph should not lead to the assumption that more cassava is harvested than maize. Similarly, rice's relatively low ranking on the graph should not be misinterpreted as meaning that it does not represent a substantial crop in Guaman-Buem. Of those farmers who cultivate on marshy lands, most of them extensively cultivate rice.

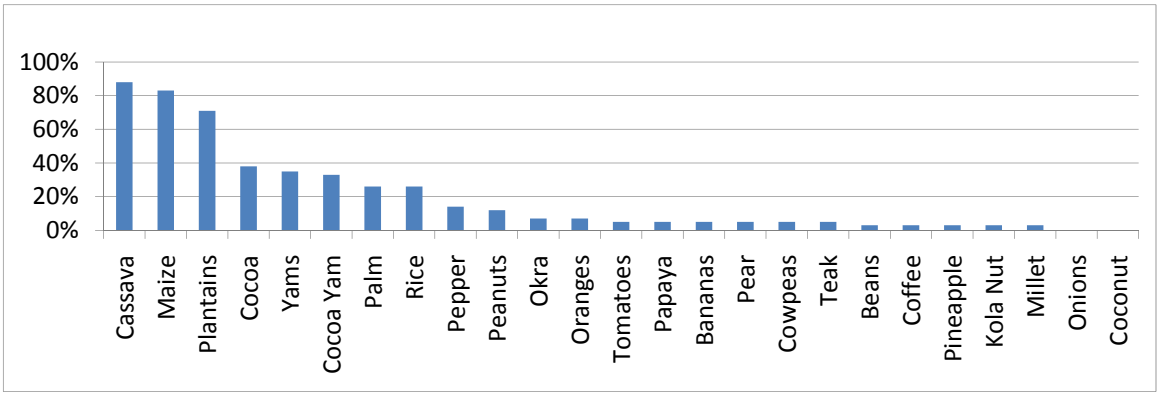

Figure 4. Percentage of crops most commonly cultivated in Guaman-Buem, according to data from 42 household surveys.

The presence of okra, tomatoes, cowpeas, and particularly pepper in the agricultural repertoire in Guaman-Buem, though relatively low, is something which would not have been present if this research was undertaken twenty years ago. Again, some interviews included

comments by farmers stating that tomatoes grew well in the past but do not grow as well now. It is possible that farmers were referring to small, household gardens on plots adjacent to their homes. According to Dennis Okum, a Buem farmer, "these days people are starting to try okra, tomatoes, and other crops that northern people farm because they wait and wait and sometimes the rain does not come. At least these vegetables you can fetch water and grow" (Okum, Personal interview, August 16, 2010).

Cassava

The most common crop cultivated in Guaman-Buem is cassava (*Manihot esculenta).* Cassava is a woody shrub of the Euphorbiaceae family native to South America and is a valuable source of carbohydrates. Of all the farmers surveyed in my fieldwork, 88 %[16] of them harvested cassava. Of those 88 %, nearly half cultivated cassava on all of their plots. Although cassava is a staple crop throughout West Africa, and has been cultivated in Ghana for at least 500 years, it has more recently become a heavily cultivated crop in the Buem area due to weaker and more inconsistent rainfall patterns and its reliability as a fall-back crop. Below, survey responses concerning farmers' experiences with droughts demonstrate that there have been recent concerns with unpredictable or untimely rainfall, and that maize, yam, and rice harvests have suffered as a result. Cassava has become a way for farmers to deal with this evolving crisis. *Manihot esculenta* conserves energy during droughts by shedding its leaves and maintaining the strength of its tuber. In even extreme drought conditions, cassava can survive for up to 18 months, but will grow at a radically slower pace (Onwueme 1978). According to one Buem farmer "You can plant cassava on any kind of land that is not like a marsh, and just forget about it; you don't have to water it or take care of it at all, and then if something happens like a drought, you will see that it is still there alive and waiting to be harvested" (Sewa, Personal interview, August 20, 2010). Another farmer reflected on the drought and bush fires of 1983 and commented that "when the rains failed and fires came through our farms, some of us went to the bush and used our cutlasses to bring up cassava that we had put down but forgotten about." Cassava can be harvested on marginal lands,

[16] Unless otherwise stated, all percentages discussed in this chapter are based on household surveys utilized during this research.

including poor, sandy soils and even in major Ghanaian cities on urban sidewalks. Although poor environmental conditions will result in cassava growing at a slower pace, they will not kill or damage the plant unless extreme circumstances, such as exposure to bush fires, ensue.

Cassava, however, is not a preferred food among Buems in particular or West Africans in general. This strengthens the argument that it is being cultivated as a less-preferred staple crop that is prized for its ability to thrive in marginal conditions. Most participants in the survey complained that cassava is a tedious crop to process into food. "You have to boil it and boil it and mash it so many times before you can make fufu from it, or you can dry it and mill it into flour, but just to cook up something quick is impossible, and it doesn't nourish you or make you strong," (Darko, Personal interview, June 5, 2010) commented Emilia Darko, a Buem farmer and community elder, over a searing fire in her courtyard. Cassava that hasn't been thoroughly cooked can be detrimental to a malnourished person's health, due to the presence of free and bound cyanogenic glucosides (Onwueme 1978). Different varieties of cassava have greater or lesser quantities of cyanogenic glucosides, and farmers can differentiate between varieties based on smell and taste. (Onwueme 1978) There are more cyanogenic glucosides found in the leaves of *Manihot esculenta* than in the tubers, but in the tubers the skin contains more cyanogenic glucosides than the flesh (Onwueme 1978). Cassava cultivation is complicated by the fact that tubers higher in cyanogenic glucosides tend to function as organic pesticides – farmers thus have to choose between two kinds of risk when selecting their cuttings. Either they can harvest a cassava variety high in cyanogenic glucosides and insure that their crops will not be attacked by pests while mildly endangering their health, or they can chose a riskier crop for cultivation while lowering anxieties about possible effects on their health. Either way, this was not a concern typically raised by Buem farmers, though they did emphasize that cassava requires attentive preparedness.

Cassava is consumed on a daily basis by Buems. It can be peeled and boiled and eaten alone. It can be peeled and boiled and pounded with yams or plantains in fufu. It can be sun-dried, ground, and turned into a flour. It can similarly be dried and turned into a type of hard-and-loose cereal known as *gari*, which is eaten with beans or sprinkled over stews. It can also be peeled and boiled into chips that are eaten with hot pepper sauce. Ghanaians often joke that cassava is the "poor man's yam," because yams are a highly-valued food

celebrated for their delicious sweet flesh and nourishing properties. African yams, furthermore, are a core part of a West African's identity because they were domesticated in West Africa. Cassava, however, was domesticated in South America and brought to West Africa around five hundred years ago by Portugese traders. The yam thus features prominently in myths and symbols in West African traditions, while cassava does not. Whether cassava is considered a "poor man's yam" or not, it is still a very crucial staple in the Buem diet and acts as a buffer against environmental uncertainties. The fact that cassava is quickly replacing yams as a more viable and dependable crop demonstrates that farmers are carefully choosing crops to fit a changing environment. Extensive cassava cultivation in Guaman-Buem is an adaptability strategy forged by Buems to mold their crop choices to an increasingly fickle environment.

Maize

Maize (*Zea mays*) is now cultivated by 83 % of the village's farmers, yet probably accounts for a much higher percentage of the amount of actual food harvested. Maize was domesticated in Central America and spread widely throughout the Americas prior to colonization (Weatherford 1989). Maize was distributed throughout Africa more than 500 years ago, and is also one of many introduced crops in Guaman-Buem. It is not known whether maize was already being cultivated by Buem farmers by the time they settled contemporary Buem. Whereas cassava is cultivated in a semi-impromptu fashion, maize is planted in neat delineated rows and is often cultivated monoculturally. Maize has been fueling a gradual, yet profound agricultural revolution in Africa over the past five hundred years and Buem has not hesitated to take part in its rapid expansion. McCann (2001) describes maize as a vegetable that has come to be treated like a grain, and thus planted in vast monocultural settings throughout the world. Maize has questionable nutritional and ecological status, well summarized by McCann (2001):

> As a grain, maize yields more food per unit of land and labor than any other. Yet, to those in Africa and in the non-industrial world, seduced by maize's obvious virtues, corn has also revealed a darker side. It is highly sensitive to deprivation of water, sunlight, and nitrogen; it rots easily in tropical storage. Even a few days of drought at the time of tasseling can ruin a crop. Thus, maize monocultures are extremely vulnerable to environmental shocks, especially drought. It may also impoverish the bodies of those who depend too heavily on it for food, resulting in disease such as pellagra and kwashiorkor. The end result is that when they plant

> maize, commercial farmers and peasant families (especially women—African maize is largely a woman's crop) walk a slender tightrope of risk. Still, its cultivation continues to spread from rain forest plots to cocoa farms, and from remote villages to urban vacant lots. Moreover, Africa is distinctive among world regions in that 95% of its maize is consumed by humans, rather than used as livestock feed.

This argument is not confined to McCann, or nutritional and academic circles alone. Buem farmers also understand these shortcomings of maize.

Like cassava, maize is consumed on a daily basis in Guaman-Buem. It is cheap, easy to store, and easy to process into a variety of different foods. More importantly, it is one of the easiest, fastest, and most opportunistic crops that farmers have to work with. The main reason, it seems, for the rise of maize as Guaman-Buem's core crop is that it can be harvested in at least two seasons throughout the year. After the main "rainy season," where the first maize harvest is cultivated, Buem's also take advantage of a "light rainy season" where a few, somewhat unpredictable, rains arrive in Buem to nourish a smaller opportunistic harvest. Given maize's relatively fast growth record, farmers enjoy these two maize harvests and double their longevity by processing maize into flour or finding other means of preserving it for lean seasons or possible droughts.. Like cassava, maize can act as a fall-back food though through preservation and storage.

Just as maize is processed into an impressive variety of seemingly distinct foods in the United States (Pollan 2006), it is also processed into various different dishes in West Africa. Although different regions of Ghana prefer different manifestations of maize, the most popular dish nation-wide, and certainly in Buem, is *banku*. *Banku* is a dough-like food that is prepared through a quite complicated process of soaking maize kernels in water, fermenting them, drying them, and then cooking them with water to knead into a thick, sour ball that is eaten with spicy stews. Similarly, *kenke* is made from fermented maize into a smaller and more hearty corn meal that is either packaged in maize husks or in banana leaves and can eaten either warm or cold. Other less popular varieties of fermented maize dough include *abudo, tee-zet,* and *kokonte*. Of course, maize can also be eaten off the cob and is typically cooked either directly over coals and dipped in salt water or boiled with salt. Maize is also processed into beer in Ghana's breweries. Because it is cheaper and easier to grow than yams, plantains, and cassava, it is simultaneously the most popular food in Ghana and also the least economically rewarding for rural farmers. It provides a quick economic return

to farmers but also exacts a high cost on the fragile tropical soils and the overall net worth of a farmers' investment. According to Georgy Osei, a Buem farmer in Guaman, "I hate farming maize but I have no choice. It is so easy to grow and gives you this fast fast money. If you are not planting your maize other farmers will look at you and say 'oh, Georgy, what is wrong with you?' Even though we know it is bad for our land, it is like free money for us. You will never grow maize and wait for someone to come and buy it, immediately you have plucked it and someone is offering you *cedis* for it. Not a lot of *cedis*, but enough, you know" (Osei, Personal interview, July 20, 2010).

Plantains

Plantains (*Musa paradisiacal)* are cultivated by 71 % of farmers in Guaman-Buem. Those farmers who actively cultivate plantains ubiquitously plant them on their farms. In other words, those farmers who cultivate plantains typically grow them on all of their farms *except* their rice farms. Plantains were domesticated in southeast Asia and Oceania and, though biologically identical to bananas, are not considered at all similar by those who regularly partake of them in their diets. They are nutritionally important and are celebrated as a cheap source of energy (Ketiku 1973). Unlike maize and cassava, plantains likely spread into sub-Saharan Africa much earlier. Roger Blench argues that plantains were likely being cultivated in central Africa about 3000 B.P and would have arrived in a "package" with taro and water-yam (Blench 2009). Without these crops, it would have been nearly impossible for African farmers to move into and exploit dense equatorial rain-forests. Unlike bananas, plantains are typically lower in sugar content (Ketiku 1973) and are not normally eaten raw. It is very likely that plantains were cultivated by the first Buems who arrived in Guaman-Buem, as other farmers in the rain-forest area of Ghana were growing plantains at least 1,400 years ago.

Plantains are farmed rather opportunistically in Guaman-Buem and don't typically constitute an entire farm area. They are rarely mono-cropped and are typically planted in cassava, maize, ground nut, or cocoa fields. One may also notice plantain trees planted around people's homes and on village paths. Buem farmers describe plantains as a highly drought-tolerant crop that can be relied upon in times of scarce rainfall. While visiting Emilia Darko's farm, she commented that "I plant these *kwadu* (the Akuapem-Twi word for

"plantain") trees everywhere, even along the path, because if the rain fails and the maize or yams don't grow, I know I will be able to get some plantains and cassava" (Darko, Personal interview, June 15, 2010). The peels of plantains are also a valuable source of fodder for herding ungulates such as sheep and goats (Ketiku 1973).

Unripe plantains are processed into a plethora of different Ghanaian dishes. They can be sliced length-wise, grilled over an open fire, and sold to be eaten in that form. They can also be boiled with salt and then eaten with various stews known as *ampese.* They can be sliced into small circular shapes, fried in palm nut oil, and eaten as plantain chips. Most commonly, though, plantains are boiled and mashed with yam or cassava into *fufu*. As a snack or mid-day small meal, ripened plantains are commonly fried with palm oil, ginger, and peanuts into a popular, energy-rich dish known as *keli weli.* The sugar content of plantains varies according to how ripe the fruit is when it is eaten. The sugar content of an unripe plantain is three percent while the sugar content of a fully ripened plantain is 37% (Ketiku 1973). Plantains are very rich in carbohydrates and are rapidly digested into usable energy (Sharrock and Lusty 2000). They are also valuable sources of Vitamin A, Vitamin B6, and Vitamin C (Sharrock and Lusty 2000).

Cocoa

According to the household surveys, around 40% of farmers in Guaman-Buem cultivate cocoa. Those who farm cocoa do so on a committed basis, as cocoa plantations are very difficult to maintain and are long-term agricultural investments. As a result, cocoa is not intercropped with other foodstuffs but is rather cultivated on individual plantations. Though the cocoa-producing tree (*Theobroma cacao*) is indigenous to the American tropics, it was brought to Africa via Sao Tome by the Portugese in the early 19th century (Howes 1946). It is used to make chocolate and has seen consistent demand for nearly a century. Cocoa has become a major export of West Africa, far outdoing the production levels in the crop's land of domestication. The beans produced by the tree fueled the growth of the newly independent Ghanaian state in the 1950s and 1960s, and continue to fuel economic growth in Ghana today (Mikell 1992). This process opened up "new frontiers" in the dense rainforests of Ghana and ultimately led to substantial deforestation and environmental degradation throughout southern Ghana (Amanor 1994). Cocoa also, ironically, partially led to the overthrow of the

regime of Kwame Nkrumah when he tried, through the Cocoa Marketing Board, to hold prices steady despite inflation (Allman 1993). Though Ghana was once the leading grower and exporter of cocoa in the world, it was surpassed by the Ivory Coast in the late 1970s (Ridler 1993).

In Guaman, cocoa has been a mixed blessing. On one hand, it fueled rapid economic growth in the Buem state during the mid-20th century and brought impressive quantities of wealth into a previously poor region. On the other hand, it both contributed to environmental degradation by encouraging farmers to rapidly expand their croplands and brought about waves of migration that would later lead to ethnic conflicts between Buems and migrant workers (Fred-Mensah 2003). Many of the roads and government-funded structures that now stand prominently in the Buem area were constructed mainly to process, store, and convey cocoa to Accra for export. Buem farmers who continue to grow cocoa contribute all of their yield to export markets. Cocoa is not processed into secondary products or sold locally but is rather dried, packed in large rice bags, and sold to cocoa-buyers in Jasikan. The amount of income generated from selling cocoa can be very significant. During my surveys, respondents stated that their cocoa plantations yielded from 500 to 600 Ghana Cedis (USD $266-$333) per harvest per two acres. With two harvests of cocoa each year, that is a pretty substantial income in Guaman-Buem.

Unlike the other crops mentioned here, cocoa is not consumed at all with the minor exception of the "fruit" of the pod, which is the white-colored, sticky, sweet and essentially unmarketable portion of the pod that surrounds the beans. Even this "fruit" of the cocoa pod is typically only eaten when cocoa is being harvested and the beans are being extracted to be dried in the sun. It is thus more of an occasional snack than it is a staple or prominent foodstuff. Ironically, Ghanaians do drink a lot of beverages made from cocoa, but they are imported by Nestle in the form of hot chocolate or "power" drinks.

Yams

African yams (*Dioscorea rotundata)* are only grown by 38 % of farmers in Guaman-Buem, but remain one of the most sought-after foods in the village. Yams were domesticated in the Guinean rainforest spanning from the Ivory Coast west into Cameroon and are still a primary source of nutrition in the West African region (Rašper and Coursey 1967). They are

known as the quintessential West African crop and have just as much symbolic value as they do nutritional value (Ayensu and Coursey 1972). Because yams are grown in such abundance in northern Ghana and don't do well in areas with excessive rainfall and tropical soils, they are only cultivated by a few farmers who have access to suitable lands for yam production in Guaman. These lands are located closer to Acca-Buem and consist of derived savanna on the other side of a prominent hill that overlooks Guaman. As yams are grown on a creeping vine that produces the fruit as its root system, they require special attention and ample amounts of sunlight. They are also an impressively valuable crop, selling at upwards of 10 Ghana cedis (or about USD $6.50) per tuber. Many farmers choose to grow yams, despite the risk of failing, because of the demand for the tuber in major Ghanaian cities. Yams are considered a delicacy of the highest quality in West African cuisine because of their cultural value, delicious flesh, and nutritional properties (Ayensu and Coursey 1972).

While I was doing participant observation on Mohammed Antwi's (a well-to-do farmer in his 40s) yam and cowpea farm on derived savanna near Guaman, he trained me in the methods of planting yams. To grow a successful yam crop one must carefully train the vine up a system of sticks or poles that are erected next to the plant. As the vines grow higher, according to yam farmers, the size and quality of the roots under the ground also reciprocate. Mounds are first erected and then the end portion of a yam of the variety that the farmer desires to cultivate is carefully placed into the top of the mound. As the plant grows, the farmer carefully guides the vine towards the stick or pole structure and checks the soil to make sure that no infestations have occurred. The mounds provide aeration and proper drainage for the yams. They also prevent the yam from rotting in the ground in the event of a heavy rainy period (Antwi, Personal interview, June 25, 2010).

Yams are used in a variety of dishes in West African cuisine and are celebrated for their sweetness and nutritional value. They can be boiled with salt and eaten as yam *ampese* with a variety of stews. They can also be fried in palm oil and eaten with ground peppers, onions, and ginger. By far, the most popular dish in Ghanaian cuisine consists of yam-based *fufu* with *nkrakra nkwan* (light soup) cooked with fish, chicken, or beef. Yams are also symbolic in West African culture and a variety of important festivals surround the yam harvest (Opuku 1970). Although Guaman-Buem does not actively participate in yam harvest

festivals, the village just north of it, Nsuta-Buem, holds one of the biggest yam festivals in Ghana.

Cocoa Yams

Cocoa yam (*Colocasa esculenta*) is currently grown by 33% of farmers in Guaman. It is opportunistically planted in moist, deep, or sometimes even swampy soils that catch and hold rainfall for long periods of time. Wherever a farmer has access to such soil qualities in Guaman-Buem, they are likely to have a small cocoa yam project underway. It is thought of merely as a "peripheral" crop that is planted to supplement staple crops such as maize, rice, cassava, and yams. Cocoa yam is known as "taro" in most of the world. It was domesticated in the south Pacific, likely in Papua New Guinea, where it thrived throughout Oceania before diffusing through Asia to Africa (Spriggs 1982). It likely came to Africa as part of a "package" with plantains and water-yams about 3000 years ago (Blench 2009). Cocoa yam is high in fiber and has impressive amounts of Vitamic C, Vitamin E, and Vitamic B6. However, taro presents some of the same problems as cassava in that it contains toxins that can adversely affect the consumer's health if not prepared properly (Miyasaka et al. 2002).

Cocoa yam is cooked in a similar way to plantains or yams. It can be boiled and eaten with any variety of spicy stews as cocoa yam *ampese*. It can be sliced and fried in palm nut oil into cocoa yam chips. It can also be boiled with salt and pounded with plantains or cassava into *fufu,* or be pounded by itself into cocoa yam *fufu*. It has a slightly nutty taste and is typically only eaten on special occasions or when cassava, yams, or plantains are unavailable.

Palm (Palm Oil, Palm Nuts and Palm Liquor)

The African oil palm (*Elaeis guineensis*) is grown by 26% of farmers in Guaman. Like cocoa, most farmers dedicate entire farm areas to oil palm and carefully maintain them. It is, however, sometimes intercropped with cassava, peanuts, yams, or other low-to-the-ground crops. The African oil palm was domesticated in West Africa between modern-day Gambia and Angola, with Nigeria having the most genetic diversity amongst oil palms and thus likely the origin of the crop (Rajanaidu et al. 2006). *Elaeis guineensis* has become an important source of bio-fuel and has experienced a boom in production in countries as diverse as Indonesia, Ecuador, and Colombia (Santosa 2008). In Guaman, farmers grow oil

palms and market and consume the palm nuts, but also maintain large groves of palm oil trees for the production of palm wine and *akpeteshie* (palm liquor). The local palm liquor industry in Guaman-Buem provides palm wine and *akpeteshie* to Jasikan-Buem, the district capital. The African oil palm is thus a vital economic asset and source of employment for the community.

One popular means of securing an alternative source of income in Guaman-Buem is through the extraction of palm liquor from oil palms that have ceased to produce palm nut kernels. Typically, these are palm oil trees that are fifteen years or older and are no longer economically viable as sources of palm nuts that can be used in local dishes or sold for the production of palm oil. In Krobo communities in the Eastern Region of Ghana, palm liquor production has also become a popular alternative livelihood strategy as a result of poor prices for other agricultural commodities (Amanor 1994). Palm wine is a traditional drink in West Africa and in Ghana is used during social functions (Akyeampong 1993) and as a casual beverage at "palm wine bars." Palm wine also has spiritual properties and is used during marriages, funerals, and community gatherings. Akpeteshie distilled from palm wine is also a very popular "hard" drink that is consumed before meals and at village "spots." In urban centers, Akpeteshie is difficult to locate and is often very expensive. The extraction of palm sap (processed through distillation into palm liquor) requires the destruction of the palm oil tree.

When a suitable older oil palm is located the tree is first uprooted from the ground using human labor. Simple tools such as cutlasses are used to dig around the base of the tree and the tree is then uprooted by being pushed by a group of men. Once the tree is uprooted, it is laid on its side and the branches are cut away using cutlasses. A hole is then drilled through the trunk of the palm and a empty gallon jug is placed underneath. A square perforation is carved into the trunk surrounding the hole which is expanded day-by-day. The jug is used to collect the sap of the oil palm, which has a watery consistency and is milky in color. In the early evening, palm wine tappers will expand the size of the perforation while using dried palm branches to set fire to the flesh of the tree. The fire prevents the tree from rotting and literally "keeps the tree alive." A single oil palm tapped for palm wine production can produce variable galloons of palm wine, depending on its age and size.

Rice

African rice (*Oryza glaberrima*) was domesticated along the Niger River during the first century B.C.E (Linares 2002). It is one of only two domesticated species of rice in the world, the other being Asian rice (*Orzya sativa*). Its range of cultivation spreads southeast from Senegal into the northern Congo basin. In Guaman-Buem, both African and Asian rice are currently under cultivation. 26% of farmers in Guaman-Buem grow rice, though the exact species that is cultivated was not specified during household surveys. Even though Asian rice is often preferred over African rice in meals and at restaurants, Buem farmers still prefer African rice for its hardier characteristics and its resiliency. According to Linares (2002), African rice is more "sustainable" and resilient than its Asian counterpart. For example, it has broader leaves that prevent the growth of weeds within paddies and also has adapted to local pests and diseases (Linares 2002).

Rice farming in Guaman is one of the most labor-intensive forms of agricultural cultivation. The soil is first tilled and then they dike and bund the contours of the paddy. Seeds can be planted prior to or after the field is flooded with water. The farmers then must weed and maintain the paddies so that they can cultivate an optimal amount of rice per rainy season. Rice farming can only be done in particular areas, mostly on the east side of the Konsu river at the lowest points before the range that marks the Ghana-Togo border. This land belongs primarily to members of the royal Benkyiomana clan, so they have almost exclusive control over rice production in Guaman-Buem. Many farmers, such as Emilia Darko (discussed above), sharecrop on these vast rice paddies, which are far too large to be cultivated exclusively by their landholders.

Like yams, rice is considered to be something of a delicacy in West African cuisine. It is one of the more expensive foods to buy at market and is not typically grown strictly for subsistence purposes. Some farmers sharecrop local varieties of rice and then store them for home consumption, while the other half is sold by landholders at market. Rice can be served accompanying spicy stews or topped with grilled or fried chicken. It can also be rolled into "*emo tuo*" (rice balls) and eaten in spicy peanut soup or with palm nut soup. One of West Africa's most famous dishes, "jollof rice," consists of rice boiled with spices and tomatoes and is typically served with meat fried in palm oil.

Vegetable Crops

Buem farmers also cultivate red peppers, okra, tomatoes, onions and cowpeas during the minor rainy season and dry season. These are mostly viewed as opportunistic crops that can be planted and harvested quickly during dry periods or light rain periods. During interviews many farmers claimed that they were experimenting with vegetable crops in and around their houses and sometimes planting them on their farms between seasons. But many also feared that cultivating vegetable crops would disturb the agricultural cycle and consume energy in the soil that was needed for staple crops. Pepper was the most common vegetable crop grown on a regular seasonal basis, with 14% of farmers regularly engaging in its cultivation. Okra was the second most common vegetable crop, with seven percent of the population farming it. Only five percent of the population claimed to plant tomatoes and cow peas. Finally, a mere three percent of respondents said they planted onions. No one claimed to grow onions on farmland, though they are sometimes grown in household gardens.

Storms, Fires, Droughts, and Lower Yields: Buem Farmers' Recent Experiences with Environmental Change

One of the most commonly observed environmental perturbations discussed by contemporary subsistence-based societies concerns fluctuations in weather cycles and the increasing unpredictability of the environment. Oral histories, life histories, and agricultural responses can act as indicators of a groups' response to environmental change (Crate and Nuttall 2009). Susan Crate, for example, draws upon the narratives and oral histories of Sakha horse and cattle breeders in northeastern Siberia to craft a glimpse of a society witnessing massive changes in their environment (Crate 2008). Through the collection of data concerned with indigenous peoples' experiences within their environment, several anthropologists have written accounts of environmental change at local levels that have both negatively and positively affected their subjects (Crate and Nuttall 2009). The data presented here demonstrates a confident, societal acknowledgement of the negative effects of environmental change on forest and river natural resources as well as the quality of soils for agricultural production. The data also documents a clear recognition of weakening agricultural yields and the inability to let land lie fallow long enough to regenerate. While these two observations may be interrelated (less fallow would logically lead to lower yields),

most interviews revealed that land scarcity was not the cause, but rather infertile soils resulting from deforestation and a lack of nutrient-producing leaf litter. All three kinds of catastrophic environmental events – bush fires, extreme storms, and droughts – have been dealt with on a majority of farmers' lands, most often on a "major" basis. Buem perceptions of the environment thus comprise a trend of unpredictable and extreme weather, less-fertile agricultural soils, declining natural resources, and increased risks of bush fires, extreme storms, and droughts. These observations, summarized below, contribute to the growing body of anthropological literature demonstrating massive environmental change observed by subsistence-based societies.

In this section, I will use quantitative data collected through 42 household surveys to provide an illustration of how contemporary Buem farmers are experiencing and understanding environmental change. Though 42 household surveys were completed, some of the questions were either unanswered or left blank because of ambiguities in explanation. The question about river resources, for example, only contains 28 responses because many younger farmers felt unable to adequately respond to questions about the health of the river over time. Grafted to the qualitative interviews and focus groups undertaken in this research project, this data provides a very convincing line of evidence for how farmers feel about current environmental conditions in Guaman. As one farmer, Emilia Darko, noted in an interview,

> Because of the forest burning, the environment has changed. The weather now is too hot. When there was a lot of forest, you could just plant. There are wicked leaves now in our environment that if you plant [around them] your crops will not grow. At first, because there was more forest those wicked leaves were not here worrying our crops. But this time because of the bush burning, fire, and other things, our crops have been spoiling because of those leaves. The weather also has not helped us, sometimes the rain comes and washes all our hard work away, other times it doesn't come at all and the crops die (Darko, Personal interview, June 1, 2010)

I will begin by discussing bush fires, which most Buem farmers – though not all - contend did not begin until 1983. These bush fires have wreaked havoc among almost all of the farms in the mountains above Guaman-Buem, forcing many of the farmers to abandon lands in that area and cultivate plots east of the Konsu river. I will then discuss the effects of extreme, windy storms upon farmers' plots, which most farmers also contend did not begin disturbing their agricultural systems until about twenty or thirty years ago. I will then discuss more

recent “drought” conditions, which are defined by Buem farmers as expected wet periods where rain doesn’t fall. Though annual rainfall rates have apparently stayed relatively consistent, according to Buem farmers the rains have been unequally distributed and when they are not falling at all, they are often falling by way of extreme rainstorms. As discussed earlier, it is difficult to find good data on the distribution of rainfall in particular areas. Finally, I will discuss Buem farmers’ experiences of lower yields from their cultivated crops, which they insist are due to disturbances in the ecosystem mostly as a result of deforestation and soil erosion. As a result, Buem farmers argue that they must cultivate more land to maintain steady sources of food and decrease fallow periods.

Bush Fires

Bush fires occur during minor dry seasons or the longer *harmattan* season when the forests and derived savannas lose their moisture and become susceptible to crawling, rapacious forest and grassland fires. According to most Buems, the causes of bush fires range from using fire to scare wild game into hunting traps to irresponsible farmers extinguishing cigarettes while working on their farms. Bush fires can also be ignited when farmers clear land and use fire to both dispose of dried organic material as well as return lost nutrients to the soil. If the season is unusually dry, these fires can spread into neighboring fields and forests, causing large-scale bush fires. Another explanation for the recent rise in bush fires involves pastoral groups from the north moving south as the savanna dips into previously-forested zones. These pastoralists use fire to clear fields and then return to graze when nutrition-rich saplings emerge from the ground (Zida et al 2007). Ampadu-Agyei (1988) lists the main causes of bush fires as: fire as a tool for cultivation; flushing out game and protecting farmlands and villages from wild game; rejuvenating grassland for forage; cooking fires; carrying coals to ignite to be used in igniting new fires; settling disputes (grudge fires); disposal of cigarettes and; religious and ceremonial burning. During the 1981-1982 and 1982-1983 dry seasons, Ghana experienced unprecedented bush fires that destroyed 35 percent (around 150,000 tons) of standing crops (Ampadu-Agyei 1988). This epic environmental catastrophe was the most commonly referenced event in nearly every life history I conducted during my field work. Additionally, many farmers cited it as the initiation of the “era of bush fires” that ensued and continues to this day. The data presented here

concerning bush fires are particularly striking because the majority of Buem farmers have moved their farms from fire-prone areas to areas that have traditionally avoided the scourge of bush fires. In other words, bush fires seem to be following farmers into previously fire-free areas.

Of the 42 households involved in the surveys (Figures 5 and 6), 18 (42 %) had experienced major impacts from bush fires and 5 (12 %) had experienced minor impacts from bush fires. Nineteen (45 %) of the households had experienced no effects from bush fires on their crops. The data, presented in Figure 5, demonstrates that the vast majority of those who are affected by bush fires are greatly affected by them. Only 5 of the respondents claimed that they had experienced "minor" effects from bush fires. Nineteen farmers don't have any experience with bush fires while 23 farmers have been affected. Of the farmers not affected by bush fires, most of these farmers cultivated lands in the *Bakpa* area that is intersected by the Konsu river and interspersed with secondary forest.

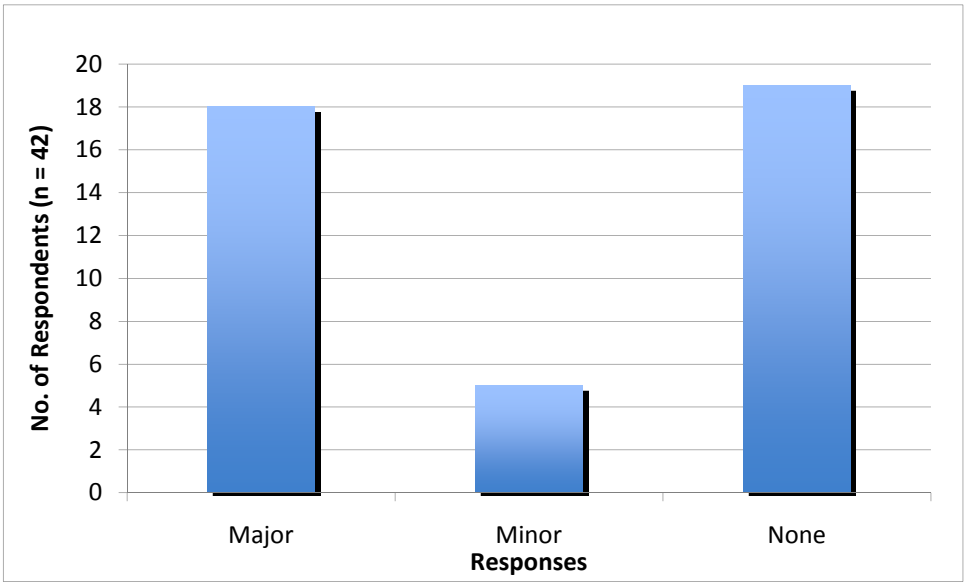

Figure 5. Buem farmers who reported bush fires on their farmlands, and the reported degree to which those bush fires impacted their land (in terms of total area) (n = 42).

When asked specifically how bush fires affected agricultural systems, respondents were very clear that bush fires typically have a severe impact on their farms when affected. For example, Georgy Osei commented that "If the fire comes down from up top and gets into your cassava or maize farm, you will be so hungry that year and will have to go to your in-

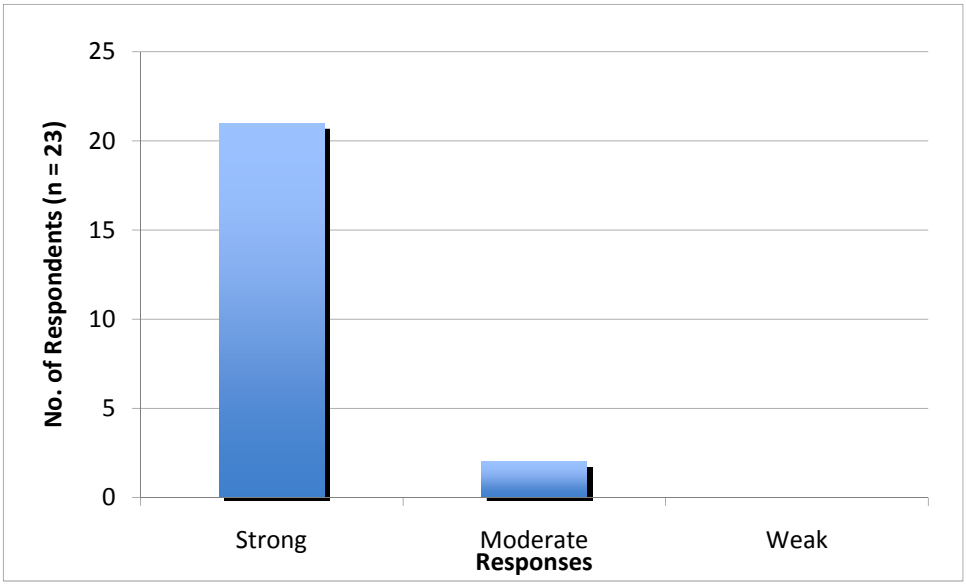

Figure 6. Reported effects of bush fires on food production for those farmers who reported that bush fires had had an impact on their farmlands. Farmers were asked "Did the bush fire that impacted your farmland have a strong, moderate, or weak effect on yields from your farm?" (n = 23).

laws or brothers for food. You will feel so bad and your wife and children will suffer because of it" (Osei, Personal interview, July 15, 2010). Of the 23 farmers who responded that they had experiences with bush fires, 21 of them responded that the effects of those bush fires on food production was "strong." Two respondents said that bush fires had affected a portion of their farm, but not destroyed their entire crop. One farmer commented that "the fire came from down the hill and burned some of my maize, but it didn't destroy all." Figure 6 provides a graphic representation of the effects of bush fires on food production, according to Buem farmers.

Buem farmers consider bush fires to be a strong indicator of an increasingly degraded environment. In one-on-one interviews, most farmers stressed that bush fires were the culprits in a destructive struggle between forestland and derived savanna. As more dry grasslands burned into the margins of the forests, the potential for bush fires in the following years was seen to exponentially increase. During windy *harmattan* seasons, the chiefs of Buem villages call up the youth to monitor the surrounding hills to locate areas or situations where bush fires might possibly be generated. Additionally, several advocacy campaigns

carried out by community-based non-governmental organizations focus on educating Buem communities about the dangers of bush fires and how they can be prevented.

Storms

Unanticipated storms often careen over the mountains that define the Ghana-Togo border, bringing with them either welcome or unwelcome quantities of rain that drench the landscape for indeterminate periods of time. These storms carry with them the potential to wreak havoc on Guaman-Buem farmlands. In addition to causing detrimental damage to crops and roads, tropical mega-storms can become deadly forces with the potential to topple structures and bury sleeping families in red clay. These storms sometimes only last 15 to 20 minutes but deliver two months' worth of rain. In doing research on rainfall patterns at the Cocoa Marketing Board in Jasikan, I was shocked to find entire months where weeks would pass without a millimeter of rain, only to be drenched by 170 millimeters in a single day. That is almost two thirds of all the rain that San Diego, California gets in a whole year condensed into as little as thirty minutes. One month in 2009, it rained for three days straight, dropping 292 mm of water on Jasikan, almost an entire foot of rain. Emilia Darko was outside cooking under a corrugated-iron overhang one evening when she saw her home collapse inwardly, burying all of her possessions and savings. Luckily, her entire family and herself were busy carrying pots of boiling soups and fish back and forth between sheltered cooking pits and no one was harmed.

As a result of deforestation, much of the farmland around Guaman is now open to the thrusts of these deluges and lies like an empty shore waiting for a rising tide. The tall *Ceiba pentandra* trees and the dense surrounding underbrush that once absorbed these avalanches of water have either burned or been sold to timber companies hungry for profits. As all of this rain has to go somewhere, and there are no insulating layers of woodland to accept the offer, these sheets of water blow over farmlands razing maize, plantains, and other crops in their paths. Notably, tuber crops, such as the ubiquitous cassava bush, typically survive these ordeals, remaining subversively strong in the aftermath of storms. Nevertheless, the damage wreaked by these storms is one of the major environmental changes vocalized and feared by rural Buems.

Only five of the 42 respondents (Figures 7 and 8) in this research claimed that they had not had some kind of encounter with an unwelcome storm. An overwhelming majority, 25, stated that storms had inflicted major damage upon their farms. 10 respondents claimed that storms had presented minor damage on their farms. The least likely response to the question was when a farmer would say that they had "no" experience with storms on their farms. Notably, of the five respondents who said they had no experiences with storms on their lands, four farmed at Bakpa and one had his main farm at Odumase, a small cottage quite deep in the forest and a full day's walk from Guaman-Buem. These two areas are celebrated as the "finest" places to farm in all of Guaman. They are also in less fire-prone areas and are covered with rich, dense forest that absorbs the blow of rainstorms.

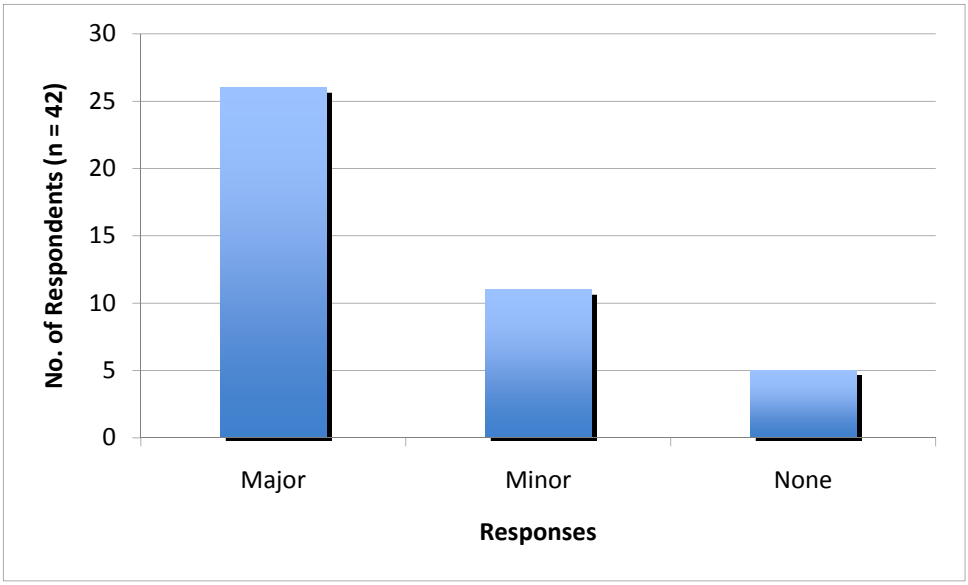

Figure 7. Buem farmers' reported experiences with storms on their farmlands, and the reported degree to which those storms damaged their farmlands (n = 42).

When asked how storms had affected crops and farmland, Buem farmers overwhelmingly responded that storms had inflicted a "strong" effect on food production. 10 farmers responded that storms only inflicted "moderate" damage on their lands. Notably, these are the same 10 farmers who responded that they could only recall minor skirmishes with storms on their farmland. According to Benjamin Abani, a farmer who cultivates his crops at Kubeku and Kobi (two open areas prone to bush fires and flooding), "extreme weather is now plaguing Guaman. You will think the rains have calmed and then plant your

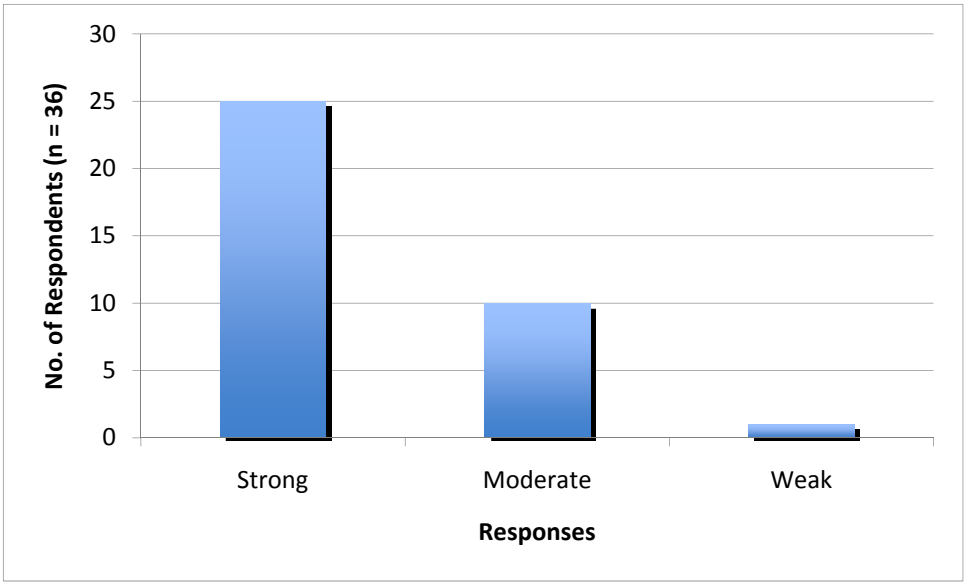

Figure 8. Reported effects of storms on food production (yields) for those farmers who reported that storms had had an impact on their farmlands. Farmers were asked "Did the storms that impacted your farmland have a strong, moderate, or weak effect on yields from your farm?" (n = 36).

yams, only to see a big storm come and make them rot in the ground" (Abani, Personal interview, July 6, 2010). Other farmers also discussed the impact of storms on standing plantain trees and maize fields, and how the strong winds that precede a major storm can destroy months of hard work and leave the farmer with nothing but a field of dead plants and trees.

Droughts

In terms of farming, droughts in Guaman-Buem don't exactly mirror the long-term debacles that are commonly associated with temperate climates. During the dry seasons of 1982-1983 and 1983-1984, however, there was a major drought of the more traditional type that not only caused harvests to fail, but also created the appropriate conditions for the worst bush fire crisis in Ghanaian history (Ampadu-Agyei 1988). So although such droughts do exist in the tropics of Ghana during the dry "harmattan" season and often lead to shortages of potable water (Gyampoh et al. 2009), droughts that affect farmland are typically thought of in terms of failed rains and phenomena that are inconsistent with "normal" rainfall pattern.. For example, if it is the middle of July and the first rains have not arrived in Guaman, farmers will abstain from planting their crops for fear of them not being able to germinate and grow.

If this pattern persists until the beginning or middle of August, farmers will begin to complain that they are enduring a drought. In other words, the data from the household surveys must be interpreted as such. When a farmer in Guaman-Buem responds that they have experienced major impacts from droughts and that they have had a strong impact on food production, they are basically saying that not enough rain fell at the appropriate time and that their entire maize or yam harvest suffered as a consequence. This helps to explain why farmers have started planting more drought-resistant crops like cassava and plantains.

Figures 9 and 10 illustrate Buem farmers' perceptions of droughts on their farmlands and their reported impacts on food production. Twenty-four respondents claimed that they had experienced major impacts from droughts in living memory. Most of the respondents made a point of emphasizing that these droughts are a more recent development and that, excluding the unusual seasons of 1982-1984, a general trend toward unpredictable rainfall and failed harvests has been developing for at least two decades. Nine respondents claimed that they had only felt minor impacts from periodic droughts. Interestingly, seven of these nine respondents were teachers who farm only as a supplemental activity. One of the other two was a student who helps on the family farm when he is not schooling, and the other was primarily a farmer though he also operated a lottery kiosk and a small palm liquor bar in Guaman-Buem. Nine more respondents answered that they had had no negative experiences with droughts on their farms. Two of these respondents were shopkeepers and one was the most successful cocoa farmer in Guaman-Buem. One more of the respondents who answered "no" was also a cocoa farmer and the other five were farmers and part-time hunters. In terms of cocoa farming, farmers explained that crops are less time sensitive to rainfall and that crops like maize, rice, and yams are more dependent on specific onsets of rainfall. Those who were hunters also explained that the dry season was "good for hunting" and that, though farming activities might be delayed by disappointing rains, their other occupation would rather flourish. According to some of the hunters, the resources acquired during a good hunting season could potentially offset a weaker agricultural yield.

Those individuals who responded that they had indeed felt the impacts of droughts responded that the effects of these droughts on food production were either strong or moderate. None of the farmers who had experienced the impacts of droughts claimed that they had only had a "weak" effect on food production. Twenty-four respondents claimed that

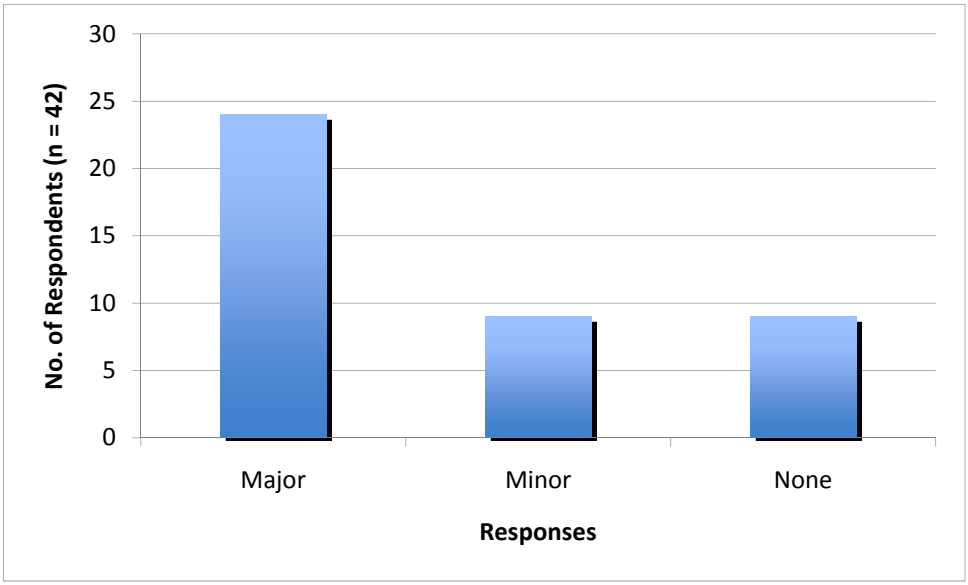

Figure 9. Buem farmers who reported droughts on their farmlands, and the reported degree to which those droughts impacted the quality of their land (in terms of total area) (n = 42).

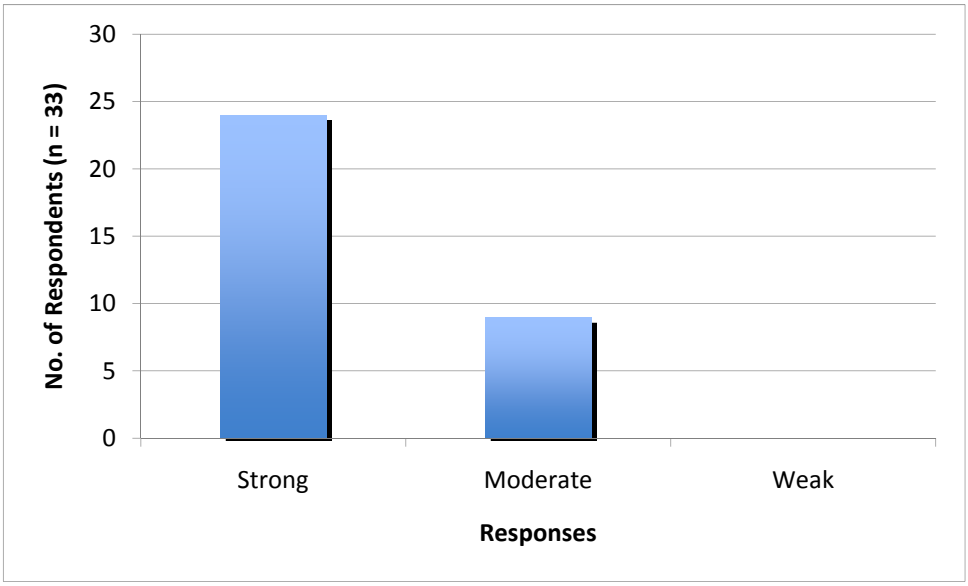

Figure 10. Reported effects of droughts on food production (yields) for those farmers who reported that droughts had had an impact on their farmlands. Farmers were asked "Did the droughts that impacted your farmland have a strong, moderate, or weak effect on yields from your farm?" (n = 33).

the effects of droughts on food production were “strong.” Nine respondents answered that droughts had inflicted a “moderate” amount of damage to food production. Again, these responses are perfectly in line with respondents’ answer to the initial question of whether they had experienced the impacts of droughts on their households.

Disappearing Natural Resources

The most overwhelmingly consistent responses to any of the questions in the household surveys concerned declining forest and river resources. Figures 11 and 12 illustrate responses to questions concerning forest resources and river resources respectively. Responding to the question - “From the time you were a child up to this point in your life, do you feel like there are more, less, or the same amounts of forest resources?” – 39 farmers responded that there were less forest resources, one responded that there were more, and one responded that the amount had not changed. “Forest resources” include wild animals such as grasscutters and partridges, other wild foods such as forest snails and grubs, firewood, herbs (for medicine or food), and fruits. Many farmers would elaborate that the most noticeable decline in forest resources concerned wild game such as grass cutters, bush pigs, bush cats, bush dogs, leopards, antelope, bush hens, porcupines, and other wild animals. They would continue to explain that wild resources of firewood and building resources were no longer easy to locate. Medicinal herbs, herbs needed for “taboo” ceremonies, and certain sacred shrines or ancestral areas had disappeared. Similarly, cultural landscapes such as “cool forests,” springs, and places to rest in the shade had become scarce.

Responding to questions concerning the amount of river resources available at present compared to the respondents’ childhood, the response was very similar to forest resources. In this case, however, many respondents refrained from answering the question. A total of 28 respondents answered the question, with 25 responding that there were less river resources now than in the past, two saying there were more, and one responding that the amount of river resources had remained the same. Fishing in the Konsu river is an activity undertaken by only very few skilled fisherwomen and fishermen. Presently, it is mostly women who engage in fishing in the Konsu river. This is done is a quite peculiar way. During the dry season, Buem women dig a large depression in the ground and build up a wall around it. After the rains have ceased, the women return to the hole and bail out the water until they

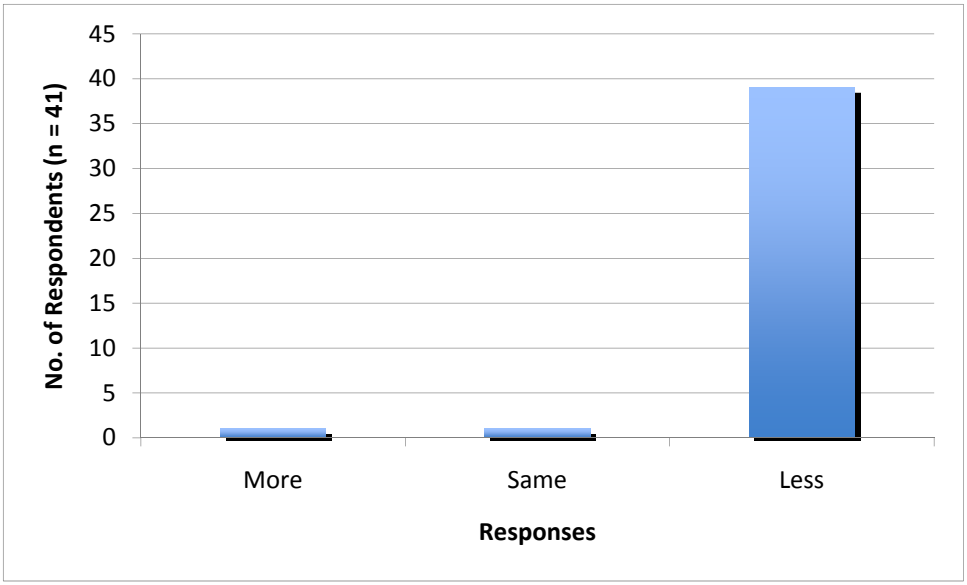

Figure 11. Buem farmers' perspectives on the availability of forest resources such as wild animals, herbs, firewood, and fruits over their lifetimes. Interviewees were asked "Since the time you were a child, have forest resources such as firewood and wild foods increased, decreased, or stayed the same?" (n = 41).

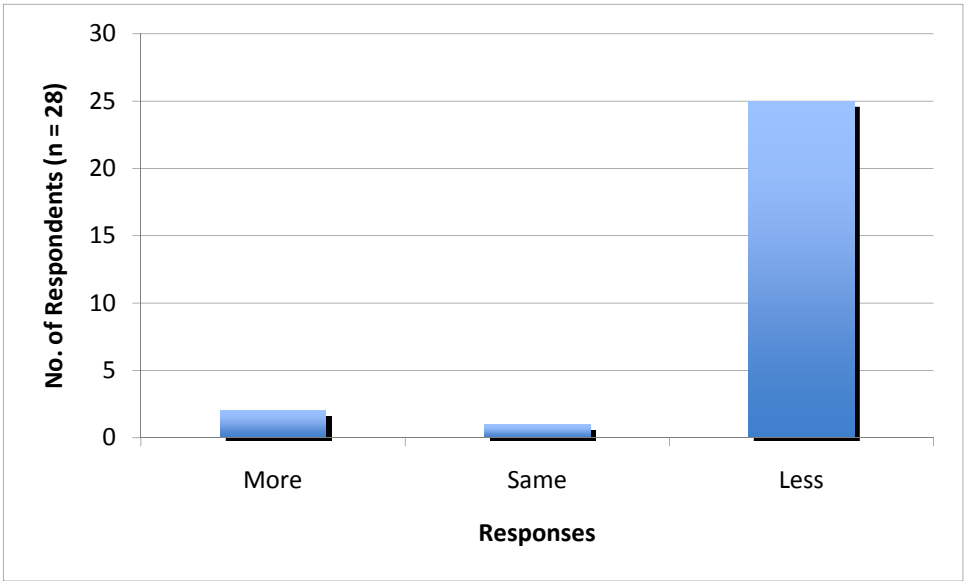

Figure 12. Buem farmer's perspectives on the availability of river resources such as fresh fish over their lifetimes (n = 28). Interviewees were asked "Since the time you were a child, have river resources such as fresh fish increased, decreased, or stayed the same?"

have become close to the bottom of it. At this point, they use head pans and machetes to catch large freshwater catfish by either hacking them with machetes or scooping them up and placing them in the head pans. If the fish enters the head pan, the women will use the blunt end of the machete to kill the fish. They are also careful to make sure that no green mambas, black cobras, puff adders, or other snakes are lurking beneath the surface. According to elders, in the past the Konsu river would swell to the point where it had to be crossed with a dugout canoe. During those times, men would fish from the riverside and from canoes and women were mostly uninvolved in the fishing process. Even those women who now collect fish using the method described above claimed that river resources had declined in recent years.

Weakening Agricultural Yields

Respondents overwhelming stated (n= 28) that they had perceived a decrease in farm yields over their lifetimes. Figure 13 demonstrates the response rates according to the three different categories. Nine respondents answered that farm yields had stayed the same, and five respondents claimed that farm yields had increased over their lifetime. Looking back over the surveys, it appears that the five farmers who had perceived an increase in their farm yields also would have likely used chemical fertilizers and pesticides based on their economic status (I did not ask whether farmers used chemical fertilizers or pesticides). In fact, the five individuals were one government pensions officer, one school teacher (a relatively high paying job), one civil servant, one prominent cocoa farmer, and one subsistence farmer. Likewise, the nine who responded that farm yields had stayed the same appear to be people in areas that are either not prone to bush fires or have similarly desirable jobs. One is a tailor, one is a photographer, one brews and sells millet beer, three are cocoa farmers, and one is a subsistence farmer. The remaining 28 respondents who stated that farm yields had decreased consisted of one NGO president, three teachers, two store keepers, and 22 subsistence farmers.

Declining Fallow Periods

In asking whether the use of fallow periods had increased, decreased, or stayed the same over farmers' lifetimes, the responses were varied. Figure 14 demonstrates the relationship between the various responses. 20 respondents said that fallow periods had

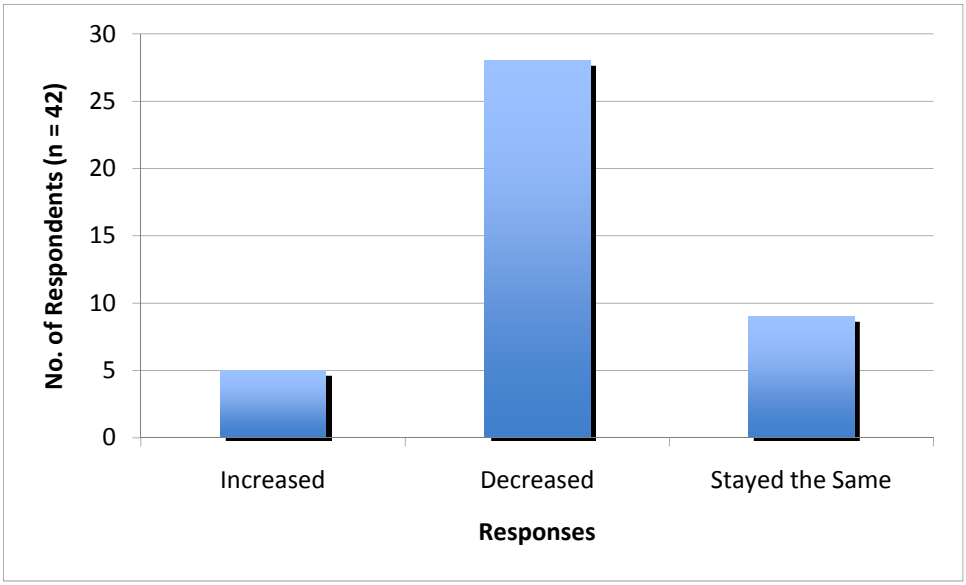

Figure 13. Buem farmers' perceptions of farm yields over their lifetimes (n = 42).

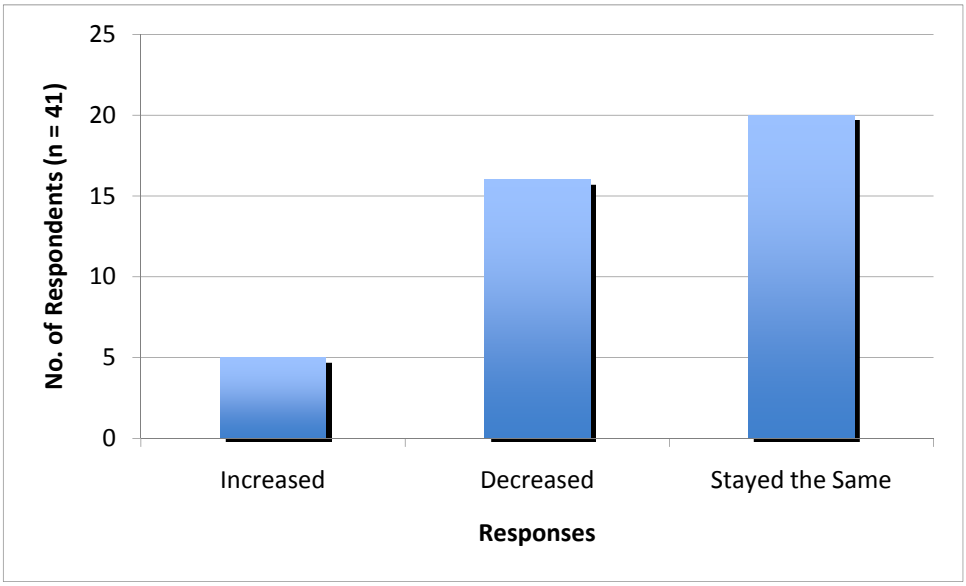

Figure 14. Farmers' reported use of fallow periods over their lifetimes (n = 41).

basically stayed the same since their youth. 16 responded that they had decreased their fallow periods, if they still used them at all. Only five respondents answered that they had increased fallow periods on their farms. What is not reflected in this quantitative data but was mentioned during interviews is that many farmers no longer practice fallow periods at all. In other words, someone who has decreased their use of fallow periods may have ceased in using them altogether. Emilia Darko, a sharecropper, has been planting rice on the same plot

of land for ten years straight and has a plantain and cassava farm that hasn't been left to fallow for more than three decades. In fact, 12 of the 20 respondents who claimed that their fallow periods had decreased no longer practiced fallow periods at all on their primary farms. On secondary farms, the typical explanation was that they simply couldn't afford to. It would make sense for a cocoa farmer or oil palm farmer to not practice fallow on their plantations, but none of these respondents fit either of those categories.

CONCLUSION

The data presented here provide an illustration of the crop choices of Buem farmers as well as their perceptions of environmental changes, the impacts of environmental perturbations on food production, and the health of agricultural lands. Each crop is described in terms of its prevalence within farmers' crop choices. Buem farmer's recent experiences with fires, droughts, extreme weather and their relative impacts on food production are then described according to survey responses. Finally, an assessment of perceptions on the health of agricultural lands and other natural resources is given.

According to household surveys, the most commonly cultivated crop in Guaman-Buem is cassava, with over 88 percent of farmers cultivating it. Maize and plantains are the second and third most common crops, respectively being grown by 83 percent and 71 percent of farmers. All of these most common crops are mainstays in the local diet, and cassava and plantains are notable for their drought-resistant properties. Cash crops such as cocoa (38 percent) and, to some degree, oil palm (26 percent), also figure relatively high on the list of most common crops. Other West African staples such as yams (35 percent), cocoa yams (33 percent), and African rice (26 percent) are also commonly grown in Buem. Notably, this range of crop choices represents crops grown in a diversity of environments, including southern rainforests and northern Sahelian grasslands. This intensive cultivation of rice in flooded lowland areas along-side textbook Ghanaian bush fallow farming (Benneh 1973) and savannah-oriented yam and cowpea farming is particularly interesting. Buem farmers are engaging in both redundancy (growing cassava ubiquitously) and diversification (exploiting different ecosystems and experimenting with new agricultural strategies).

Buem farmers' recent experiences with environmental perturbations such as bush fires, droughts, and extreme weather are particularly striking. The impacts of bush fires on

respondents were evenly divided between either having a major impact (42 %) or no impact at all (45 %). Most of those who were not affected by bush fires cultivated lands in areas surrounded by forest or other farms. Of those who experienced major impacts from bush fires, 91 % claimed that bush fires had a major impact on food production and eight percent replied that bush fires only moderately affected food production. Extreme weather and droughts, however, were experienced by Buem farmers across the board. 62 % of respondents claimed that they had experienced major impacts from extreme storms and 26 % claimed they had felt minor impacts. 69 % of respondents who had experienced extreme weather vis-à-vis their farms had experienced “major impacts” on food production. 57 % of respondents had major skirmishes with droughts and 21 % had minor experiences with droughts. Of those who responded that droughts had affected them, 72 % claimed that droughts had inflicted major impacts on food production. 66 % of farmers have noticed a decrease in agricultural yields over their lifetime, and 48 % of households have reduced their fallow periods. Most striking of all, Buem households overwhelming stated that both forest and river resources had declined dramatically since they were children. 95 % of Buem households have noticed a steep decline in the quantity and quality of forest resources and 89 % have noticed a steep decline in river resources.

CHAPTER 9

CONCLUSION: BUEM AGRICULTURAL STRATEGIES AND CROP CHOICES AS ADAPTABILITY TO ENVIRONMENTAL CHANGE

Buem agricultural strategies and crop choices are material manifestations of environmental perspectives concerning past, present, and future environments and the ways in which they have changed or are expected to change. Concerns with an increasingly unpredictable environment are encouraging farmers to incorporate new agricultural strategies and crops into their repertoire, as well as to experiment with livelihood strategies they had not previously engaged in. This research project explored ethno-ecological understandings of environmental change and the narratives that surround these observations and revealed the link between these narratives and contemporary agricultural strategies and crop choices. Though the Buem may not describe it as such, this link uncovers what can essentially be understood as a suite of subsistence behaviors that comprise an adaptability strategy. Though this adaptability strategy is present, it is not something that exists as an explicit response to what Western scientists have identified as "global climate change." In other words, Buem farmers are acting upon environmental stimuli in a way that is adaptive to environmental change. These changes that are being acted upon are similar to those alterations that climate experts expect to impact tropical Africa as a consequence of global climate change - savannization, unpredictable rainfall, and increased aridity (Boko et al. 2007). Buem farmers are responding to changes in the environment in a fashion that testifies to the adaptability of their subsistence strategies and puts into question the "extreme vulnerability" that many international organizations diagnose such communities with.

Benjamin Gyampoh (2009) identified similar behaviors in the Offin River Basin in Ghana, where a subsistence farming community began to notice changes in the weather, including unpredictable rainfall. The wells and boreholes that had previously provided them with ample water supplies had dried up due to an overall decrease in rainfall. As a response, they began altering attitudes towards water use and initiated an informal water harvesting

system where runoff from roofs was caught in barrels – a system that was previously used but abandoned when the wells and boreholes were installed. Noticing such a detrimental change in their livelihood system, the community thus explored its collective memory and tapped into a narrative that offered a solution. In other words, water-harvesting strategies that existed prior to the installation of the modern wells and boreholes were employed to address the wells and boreholes' ineffectiveness. According to Gyampoh, the community was expressing a *de facto* adaptability strategy to climate change. Similarly, I am arguing that Buem farmers are expressing not only adaptive capacity, but are directly responding to changes in the environment consistent with the consequences of climate change. By expressing "adaptive capacity," I mean that Buem farmers are demonstrating their agricultural system's ability to adapt to changing environmental conditions through specific interactions – such as described in this research – and thus maintain the production of necessary resources. Buem farmers are tapping into their collective environmental knowledge, including agricultural strategies and crop choices from other parts of West Africa, to address emerging challenges in their environment. This shared knowledge is not only passed from one generation to the next within communities, but it is also shared *between* communities across different environmental zones. The transition of the forest environment into a forest-savannah mosaic, the onslaught of powerful wind and rain storms, and the smoldering wake of bush fires is providing a stress test to Buem farmers. In their own words, they are dealing with this crisis in a way that will prepare them for a long-term engagement with an environment that, in their eyes, seems to be permanently altered. Though they continue to express concern over disturbing alterations to their landscape, they also continue to experiment with and adapt to that same altering landscape. They are not passively accepting defeat to a brutal and unpredictable environment – they are agents of their own future and are successfully adapting to what may possibly be the first pangs of climate change.

NARRATIVE AND PRACTICE: BUEM ADAPTABILITY PRACTICES AND ENVIRONMENTAL UNDERSTANDINGS IN ACTION

Here I want to follow a set of narratives and adaptability practices that illustrate the perseverance demonstrated by farmers in the Guaman-Buem community. Looking back on

the narratives outlined in Chapter Four and the livelihood strategies and environmental perspectives collected in household surveys and presented in Chapter Five, I will here draw a connection between idea and action, challenge and response, narrative and strategy. The first of these narratives and strategies concerns rising levels of soil infertility and the increase in low-demand crops such as cassava *(Manihot esculenta).* The second looks at the first signs of a northern-style agricultural strategy that involves the incorporation of northern tools, farming methods, and crops. I then want to explore these adaptability practices in light of the theoretical orientation given in Chapter One, focusing on the importance of local perspectives on environmental change and adaptability practices vis-à-vis global models of environmental change. It will be argued that institutions such as the IPCC would be strengthened by local perspectives such as those provided in this research. The goal of this conclusion is to tie all the lines of inquiry together and demonstrate how the history of Buem, the environmental data, the interviews and narratives, and the household surveys all suggest that Buem farmers are actively evaluating and responding to a changing environment and demonstrating a human-environment relationship that illustrates dynamism and an ability to adapt to certain levels of change in the environment. Finally, I will make suggestions for future research based on the results of this project.

The Reliable Tuber: The Rising Role of Cassava in Buem Farming as a Response to Environmental Change

It is not because cassava *(Manihot esculenta)* is considered a prized, delicious delicacy that 88% of farmers in Guaman-Buem grow it. They also don't grow it in such abundance because it brings in a good profit at the nearest market in Odumase. As Vivian Kesee, a peasant farmer in her late 40s, peeled, sliced, and threw big white slices of cassava into a pot of boiling water she considered my question thoroughly and then responded "I plant a lot of cassava because it will not fail me, it will not deceive me" (Kesee, Personal interview, August 15, 2010). She held eye contact with me for a few pregnant moments and then nodded her head, "What is your next question?" It was a telling moment for me, because it brought to surface a narrative that had until then been very subtle in my interviews. Her way of responding was blunt and precise – she knew exactly how to respond. At this point, I had not processed the household surveys and had no idea that cassava was the most common

crop in Guaman. But I had realized that a narrative of redundancy and reliability had emerged during the course of my interviews. When I finally did sit down and enter the surveys into Microsoft Excel back in San Diego, I was not surprised when cassava emerged as the most commonly cultivated crop in Guaman-Buem.

Since cassava was first introduced to West African farming communities, it has likely been viewed favorably primarily in light of its agreeableness as a crop. Ben Okigbo, an agricultural scientist at the University of Ibadan in Nigeria, explained the rise and spread of cassava in West Africa according through five primary reasons. The first is that cassava adapts to poor soils on which most other crops fail. The second is that cassava is drought resistant (aside from initial germination periods) and resistant to most pests. The third is that cassava is easily propagated by stem cuttings that, unlike African yams, are not desirable as a food. The fourth reason is that cassava is a high yielding crop and can produce more carbohydrates per acre than other staples. The fifth reason is that cassava does not demand terrible amounts of planning and labor because it is requires little weeding, does not require a specific season for planting, and can be harvested as needed (Okigbo 1978). The fact that cassava can grow in poor soils, is drought resistant, and can be planted throughout the year are all consistent with reasons given by Buem farmers for its primary role in their subsistence strategy. Similarly, their survey responses concerning environmental perturbations such as erratic weather, drought, and fire demonstrate that the very problems cassava is known to address are present in Guaman-Buem.

Though cassava is illustrative of the role that drought-resistant and “easy” crops have in subsistence systems in uncertain environments, it is by no means unique in its reliability. Plantains and bananas are also known for their reliability, and during interviews that dealt with the famine surrounding the bush fires of 1983 many farmers claimed that bananas and plantains played an important role in their diet. Plantains and bananas are often found in uncultivated parts of the “bush” and are classified as “wild” in such contexts. Cassava, however, is uniquely prominent among these crops in that it is actively and ubiquitously planted on farms throughout Buem. It forms a direct link between its narrative of reliability and the material evidence of its prominence on farms, thus encapsulating quite neatly an adaptability practice concerned with environmental change and uncertainty.

I am not arguing that Buem farmers are growing more cassava because they are anticipating climate change. I am not even arguing that they are farming it more intensively because they are worried about any kind of massive environmental perturbations. It is quite simply a part of their subsistence strategy and, as Vivian Kesee explained, Buem farmers know that cassava will not fail or deceive them. Buem farmers have incorporated cassava centrally into their subsistence strategy because they have been adapting to changing environments since West Africans began cultivating domesticated yams several thousand years ago. When cassava first arrived in Africa by way of the Portuguese, farmers in what is today Ghana likely viewed the crop as dependable, easy-to-grow, and an agreeable addition to their diet. Over time, this observation likely grew into an adaptability strategy that has become even more central to subsistence strategies as the environment has begun to make more dramatic shifts. According to interviews and household surveys, the role of cassava has become more important as soils have become less fertile, forests less dense, and weather more unpredictable.

Making the Most of the Savanna: Northern Agricultural Methods as a Solution to the Crisis of Deforestation and Savannization

Most Buem farmers quite explicitly express their desire to learn and incorporate agricultural practices consistent with northern savannah landscapes. Mohammed Antwi, a well-to-do farmer quoted and discussed extensively in this thesis, is one of the "lead farmers" that many people look to for advice on how to transition "degraded" forest lands into savannah-mimicking croplands. His life history, described earlier, details the story of someone who has lived extensively in northern Ghana, traveled overseas to take various high-paying jobs, and finally returned to his Buem homeland to pursue his passion of farming. An experienced farmer, Antwi has a vast store of agricultural knowledge to work with – he has farmed in rainforests and savannas and learned how to identify different cues in the landscape from which to formulate choices. While this process is currently underway, very few farmers have actually taken the next step and started to cultivate their lands in a way consistent with the narrative presented in Chapter Five. Though this may seem like a gap in the expectations presented in this research, it is more likely a reflection of the amount of commitment farmers have given to such practices so far. As they are currently learning how

to “farm like a northerner,” they are yet to commit such crops to prominent roles on their agricultural schedule (see Chapter Five).

Antwi represents only a small portion of farmers in Guaman-Buem, and thus far many individuals are reluctant to make the leap to yam, cowpea, or millet farming. One reason may simply be that they don’t yet see the need to take such a drastic step and give up their machetes in exchange for hoes and plows. Another reason, discussed above, is that they are still in an experimental stage and feel that they are not experienced enough to risk giving up their current agricultural regime for an imported one. Another reason still may be that the tools they have been using and crops they have been cultivating are firmly embedded in their Buem identities, and that gaining the knowledge of how to “farm like a northerner” doesn’t mean they should jump to such a practice right away. This speaks more to their adaptability than anything – they are eagerly learning a practice that they don’t yet see the need to engage in.

This narrative is inexorably linked to their environmental perspectives on drought, bush fires, and unreliable weather patterns. If the trends, outlined in Chapter Six, they are observing continue to dry out, burn, and barrage the landscape they depend on, they want to be prepared to implement an appropriate agricultural response that they are already familiar with. This in part explains farmers’ frequent visits to Mohammed Antwi’s farm on derived savannah to learn about his methods of farming yams, cowpeas, and millet. 57% of farmers in household surveys responded that they had experienced major droughts on their farms in recent memory, and 21% responded that they had undergone minor skirmishes with droughts. Of those impacted by droughts on their farmland, 73% claimed that droughts had inflicted a severe blow to food production. In addition, narratives on environmental change and ethno-ecological understandings of the local hydrologic system describe an environment that has recently become much more dry, deforested, and similar to forest-savannah mosaics in northern Ghana. The trend, as many Buem farmers see it, is towards an environment devoid of forest and mostly transitioned to savannah. Though only 35% of farmers currently cultivate yams, narratives and local discourses on environmental change suggest that that number is likely to grow in the near future.

FROM THE GLOBAL TO THE LOCAL: SITUATING HUMAN RESPONSES TO CLIMATE CHANGE AND ENVIRONMENTAL DEGRADATION

Timothy Ingold argues that Western conceptions of the world as a globe, separated from human experience and objectified as a sphere over which we suspend ourselves and probe and control its every move, have leached into global environmental discourse and threatened the multiple *lifeworlds* which are experienced from *within* the world (Ingold 1993). These *lifeworlds* consist of non-global, typically localized ways of understanding "nature" and the "mechanics" or inner-workings of the environment. Such local perspectives that contain detailed knowledge of local processes and interactions within ecosystems are valuable contributions to understanding the processes and impacts of environmental degradation (Crate and Nuttall 2009). These local perspectives offer alternative ways of understanding dynamics within ecosystems and often demonstrate unique subsistence strategies that are both productive and sustainable. For example, indigenous agroforestry systems in Honduras (Hellin et al 1999) have been identified as maintaining soil nutrition, sources of timber and fodder, and high agricultural yields over extended periods of time. Gyampoh et al.'s (2009) research from the Offin Basin of Ghana, described above, demonstrates how narratives and environmental histories helped a subsistence farming community adapt to several years of drought. Risbey et al. (1999) demonstrated that farmers in Australia who made agricultural decisions based on their observations of the weather fared better than those farmers who made decisions based solely on mediated forecasts. The ethno-ecological understandings underpinning these decisions, in other words, get lost in climate models and meteorological forecasts. While it is important to study global environmental processes and the rates and impacts of global climate change, it is equally important to understand how some of the most vulnerable societies, such as those in West Africa (Adger et al. 2007; Haile 2005; Huq et al. 2003; Kurukulasuriya et al. 2006; Mertz, Halsnaes et al. 2009), are conceptualizing and already responding to such perturbations. In a geo-political world defined by globalization, it is vital to garner understandings of environmental change and adaptation from local perspectives before they are "leached" away. This research acts as a challenge and a contribution to the literature on global environmental change, placing one of those "most vulnerable societies" front and center.

Communities that grapple with the everyday consequences of environmental degradation often employ local environmental knowledge to identify local solutions and adaptability practices useful for combating negative impacts (Vedwan 2006; Gyampoh 2009). Buem farmers' agricultural strategies and crop choices embody the process of formulating solutions to local environmental problems as well as the end result of that process – growing dependable harvests that are well-adapted to environmental perturbations. In the introduction to this thesis, I quoted Kofi Asare Baffour during his reaction to the IPCC's annual report on climate change and the societies most vulnerable to its impacts. It had only been a week since climate talks fell apart in Copenhagen, and Kofi was angered by the lack of communication between international organizations and small communities such as Guaman. According to Kofi, Buem farmers were already finding ways to exploit changed environments and adapt to unpredictable weather patterns – why was the IPCC claiming that Buems were the ones most vulnerable to climate change? The research presented here aspired to break Kofi's narrative down into its constituent parts and analyze them piece by piece – agricultural practices, crop choices, perspectives on environmental degradation, ethno-historical narratives, spirituality and environment, and ethno-ecological understandings – identifying and illuminating their various roles in the overarching Buem adaptability strategy.

There is evidence for increased environmental degradation in Buem, as well as overall decreasing levels of rainfall and reliability in weather patterns. Not only is this evidence located in Buem narratives, but it is captured in physical data concerning rainfall levels, deforestation, bush fires, and derived savannah. This data, presented in Chapter 3, illustrates an environment undergoing gradual yet severe change on all fronts. Furthermore, it is captured in the environmental perspectives of Buem farmers, who according to household surveys have overwhelmingly observed detrimental droughts, extreme storms, bush fires, decreasing forest resources, and decreasing river resources. Farmers have also overwhelmingly observed these variables' impacts on food production. Whether or not these changes are attributable to climate change or environmental change fueled by more local processes is not the important question. The important question, dealt with in this research, is how Buem farmers have understood such processes and employed their adopted crops and agricultural knowledge – and expanded upon them – to deal with environmental change.

Most importantly, perhaps, is the sense by communities dealing with profound environmental changes that their expertise isn't being properly considered or respected. While the IPCC does give a one page and a half discussion of "indigenous knowledge systems" in their annual report (Boko et al. 2007:456-457), the majority of their report deals with the prospects of biotechnology, improvements in infrastructure, and other standard development suggestions. Their overall position, that Africa is a continent with "high vulnerability" to climate change and highly limited adaptability options, is highlighted throughout their 36-page discussion of Africa and climate change. This research highlights not only the adaptability practices being undertaken by Buems currently, but also the frustration shared among farmers and community-based NGOs with the global communities lack of communication with local farmers.

Because of their specific historical, social, and environmental contexts, none of these processes or attitudes can be captured, of course, within a "global" perspective on environmental degradation and climate change. Buem agricultural strategies and crop choices are material manifestations of adaptability practices that have developed over centuries. Historical processes such as the cocoa boom during the colonial period and the early post-colonial period have brought a more cosmopolitan population to the Buem area and have expanded the possibilities for agricultural strategies in the area. The local assortment of crops has expanded considerably from the West African staples – yams, African rice, guinea corn, and other locally domesticated crops – to the giants of the near East and Mesoamerica. Local understandings of environmental change are all anchored within an ongoing dialogue between Buems, immigrant farmers and laborers, the global economy, and the environment of the forest-savanna transition zone in the Volta Region. Such perspectives and strategies coalesce into adaptability practices that provide a local solution to a problem that emerging on a global scale. Considered together, such local solutions could combine to make a more viable action plan to deal with global environmental change.

RECOMMENDATIONS FOR INTERNATIONAL AID ORGANIZATIONS

The recommendations given here stem from two main sources: a) the research undertaken and represented in this thesis and b) my former position as a Peace Corps Volunteer in Guaman-Buem. One needs to remember that even though there are debates

about the extent and severity of climate change, environmental changes of other kinds are continuing to worsen and create new problems for subsistence farming communities. Though there are myriad recommendations presented here, the overarching theme is the need to incorporate local knowledge, local adaptability practices, and local environmental perspectives into global action plans that deal with environmental change. If "solutions" are prescribed from the halls of conference rooms and government offices and are based only on meteorological predictions and assumptions about how other societies operate, many steps towards mitigating the impacts of environmental change and degradation are bound to fail. We must remember that Kojo Akan's "voice" is just as valid, if not more valid, than the voice of the IPCC member prescribing a solution to Kojo's problems. That Buem farmers are optimistic about the future and the viability of their adaptability practices should be seen as a positive sign that many solutions are available within the very societies that international aid organizations are aiming to assist.

- Create opportunities for interaction between international aid organizations and the communities they intend to work with, particularly prior to defining needs and prescribed solutions to environmental problems.
- Train communities in alternative livelihood strategies (such as mushroom farming, rabbit rearing, beekeeping, etc.) that can serve to generate income and thus allow farmers to offset some of the risks associated with experimenting with new agricultural strategies.
- Look for solutions to problems within communities' current adaptability strategies. This involves doing quantitative and qualitative ethnographic fieldwork and examining narratives, crop choices, and agricultural strategies.
- Be aware of the historical, cultural, and economic opportunities and constraints that exist within a community. What are the circumstances that have brought a community to the point where you believe they need assistance?
- Identify who the beneficiaries of aid are going to be. Who will benefit? Who will not benefit? What might be the inadvertent consequences of helping one part of a community and not helping another part? Are all parts of the community benefiting equally? If not, is there a justification for it?
- Identify individuals who have an extensive knowledge of crop varieties, the locations of natural resources, and skills in reading and understanding environmental cues.
- Understand local beliefs and traditional practices before embarking on development initiatives. Are there "taboo" areas or "sacred groves" that communities have spiritual connections to? How can these areas aid or hinder the progress of a project? Are there practices or days of the week that the communities define as taboo?

SUGGESTIONS FOR FUTURE RESEARCH

The following collection of research suggestions recommends inquiries that would produce further contributions to the topic of adaptability strategies in Guaman-Buem, as well as other subsistence-based communities:

Long-Term Research on Weather Patterns and Adaptability Practices

Although this research explores environmental perspectives and agricultural practices as they exist today, it would be useful to acquire an understanding of agricultural practices over an extended time period. Such an understanding would enrich the data and subsequent analysis presented in this research. For instance, spot-checking various farmers during different seasons over a period of several years and measuring weather patterns and other environmental perturbations would demonstrate clearer relationships between agricultural practices and environmental perspectives. This research, for example, inquired into the seasonal variances of crops throughout the year, but during the height of the rainy season. Although farmers did their best to construct an agricultural calendar, it was still the "idea" of what a normal year looks like. To ascertain the actual planting cycles that farmers used, especially vis-à-vis changing weather patterns, would be instrumental in understanding how agricultural choices and adaptability practices actually play out.

Such research would also test the accuracy of the narratives farmers gave during in-depth interviews on environmental change and agricultural strategies. In the introduction to this thesis, I explained that I wasn't interested in exploring the relationship between memory and fact. I do, however, feel that such research would be helpful when considering local understandings of environmental change and their impacts on agricultural choices.

Finally, it would be useful to explore the limits of Buem adaptability strategies. Are there certain situations where adaptability-oriented decisions aren't optimal and lead to crop failure? For instance, certain imported crops or crop varietals may lead to soil exhaustion or require too many inputs to be sustainable. What are the limits of these practices and what will farmers do if these limits are reached or breached? If the environment continues to change in ways that are detrimental to food production, what will be the limits of Buem agricultural adaptive capacity? These questions could be addressed during major environmental catastrophes such as droughts, extreme storms, or bush fires. They could also be addressed

by examining individual agricultural responses to heavily degraded soils on marginal lands. Such scenarios would provide perspective on the potential for long-term adaptations to environmental change.

Animal Husbandry

One subsistence practice not discussed or surveyed in this research is animal husbandry. Most, if not all, households in Buem raise chickens, sheep, goats, ducks, guinea fowls, and/or rabbits. These animals play an important economic, nutritional, and social role in Buem households. During major social gatherings, including funerals and weddings, animals are purchased and used for feasts. Likewise, animals are sold for feasts during major holidays including Christmas and Ramadan. If an offense is committed in the town and the chief and elders rule against the accused, the typical fine for the culprit is the slaughtering of two full-grown rams at the chief's palace. Likewise, nutrition from animals plays an important role in the Buem diet, although most protein comes from fish – consumed almost daily – bought at markets and usually originating at the market at Obotuase (a large lakeside Akan-speaking town bordering Buem). The most important role of animals is likely economical, since the average household only consumes chicken, for example, just three times a year. Most animals are sold to wealthier families in Guaman-Buem or are sold to "chop bars" (restaurants) in Jasikan-Buem. While walking through the village may indicate that livestock are a cornerstone of the village diet, it is actually quite rare to see a household cooking chicken, goat, sheep, or other animals.

Nonetheless, it would be helpful to incorporate this aspect of subsistence into research on environmental change and adaptability practices in Guaman-Buem. Seo and Mendelsohn (2007) argue that climate change, particularly warming, may have a beneficial impact on small farmers who practice animal husbandry. According to Seo and Mendelsohn (2007), heavier rains and warmer conditions will encourage the growth of plant resources for free-range animals. Many households devote a considerable amount of time and energy to maintaining chicken coups, fences for sheep and goats, and screened boxes for rabbits. These animals, particularly sheep and goats, also graze freely throughout the village during the day before being returned to their pens in the evening. There are strict community regulations surrounding the times the animals can be released and when they need to come in for the

night. Some farmers complain that sheep and goats enter their farms and destroy their crops. The costs and benefits of animal husbandry are important variables in understanding Buem adaptability practices and must be further considered.

Fisheries in Lake Volta

One of the primary sources of protein in Guaman-Buem are freshwater fish caught in Lake Volta, purchased or traded for at Obutuase, and re-sold and eaten in Guaman-Buem. The river Konsu, which according to many elders once teemed with fish, is now a negligible source of freshwater fish. According to household surveys, most people in Guaman-Buem eat fish at least once a *day*. The fact that fish make up the majority of Buems' protein intake makes them particularly vulnerable to any disturbance to the fisheries of Lake Volta. In terms of adaptability practices, the role of fish in the Buem diet and other possible sources of protein intake – including from crops – is another topic worth exploring .

It must be considered that Lake Volta didn't exist until the hydroelectric dam at Akosombo was established in 1961 (completed in 1965). In other words, the fact that freshwater fish are a primary source of protein is a direct result of the construction of the Akosombo dam being built, as the river Volta would not have provided communities with sufficient supplies of fish prior to the construction of the dam. Buem is far enough from the coasts of Ghana and Togo that ocean-caught fish are not part of the local diet.

Comparisons of Crop Choices by Weight

This research examined food production through a quantitative survey that asked farmers to describe which crops they grew and where they grew them. It did not, however, explore the quantities of each crop grown and compare the outputs of farms under different agricultural regimes. Cassava is grown by 88% of farmers in Guaman, but it is not known whether it provides the biggest net yield of calories and other nutrients. Similarly, a crop like rice is grown by 26% of farmers but one could assume it yields in higher quantities than cocoa yam, grown by 33% of farmers. Rice farms are, on the whole, much larger operations that require more land and more labor. Furthermore, rice is more commonly consumed than cocoa yam, though much of the rice consumed in Guaman is bought in sacks purchased from stores. Looking at these crops merely in terms of how many farmers, percentage-wise, cultivate them tells only half the story.

Ethno-Meteorological Studies

Though this research discusses ethno-meteorology to a considerable extent, it would prove worthwhile to conduct a more systematic, long-term study of the relationship between certain environmental cues, agricultural practices, and associated weather patterns. Research by Mertz and Mbow et al. (2009) suggests that Sahelian farmers predict rainfall patterns and environmental conditions by observing the strength and temperature of winds. Similarly, Ajibade and Shokemi (2009) demonstrate that Nigerian farmers are able to prepare for future weather by examining current weather systems. Such predictions are consistent with the crop choices made by the same farmers on their land. Such research in Buem would necessitate documenting farmers' perceptions of weather patterns and their subsequent responses on their farms.

GIS and Crop Distribution Analysis

How do farmers in Guaman-Buem utilize different environmental areas and what is the relationship between crops and certain soil regimes or environmental features? For example, there are two major rice-growing areas in Guaman-Buem – one in Bakpa and one between Guaman-Buem and Atokrom. Both of these rice-growing areas are flat areas that easily flood. This presents an obvious relationship between landscape and crop, but what about other crops and other environmental areas? Using Geographic Information Systems (GIS) to examine the presence of crops in different areas would be instrumental in understanding the relationships between different environments and their associated crops.

Youth Emigration and its Demographic and Environmental Implications

Further exploring the relationship between youth emigration and the transference of environmental knowledge between generations would provide invaluable insights into the resilience of Buem agricultural strategies and crop choices in the future. Quite simply, if such environmental knowledge is not being taught and learned by proceeding generations, the inherit advantages and disadvantages of contemporary practices could be lost. It would be advantageous to conduct research among the youth of Guaman-Buem to further understand the extent of their agricultural knowledge. Compared to a baseline of agricultural knowledge among elder farmers, how does the youth of Guaman-Buem envision responses to

environmental perturbations and what is the extent of their knowledge concerning crop diversity and the comparative advantages of crop varietals?

Sacred Groves and Indigenous Conservation Practices

Much anthropological research has been conducted concerning “sacred groves” in the context of environmental conservation. Sacred groves are cultural landscapes that are believed to contain ancestral or spiritual power and are often related to burial grounds or mythical sites (Decher 1997; Mgumia and Oba 2003). Indigenous peoples who maintain “sacred groves” have often been credited with practicing a form of environmental conservation (Gordon 1992). Although this claim is disputed, and such effects are often disregarded as “unintentional”, there is little doubt that such “no take” areas are valuable refuges for endangered flora and fauna (Decher 1997). During personal interviews, several respondents who discussed Kabue, the primary “sacred grove” in Guaman-Buem, commented that the area represented an optimal natural environment and was held in high regard for its fresh water and cool, unspoiled ecological health. This attitude is quite similar to that expressed by farmers who celebrated the “cooling” role of trees on their own farmland. There is thus a connection between the optimal ecological qualities represented in the “taboo area” that is Kabue and areas that mimic that environment on farms or in the forest. Looking deeper into this association could reveal further links between Buem spirituality, ethno-ecology, and adaptability practices.

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