COPING WITH RESOURCE CONSTRAINTS: TWO CASE STUDIES OF VILLAGES IN CAMEROON

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Executive Summary and Purpose

Cameroon is an incredibly diverse country and is home to heavily forested tropical, savannah, and sahelian ecosystems. The extraordinary range of the cultural and ecological diversity in the country leads to a corresponding plethora of development issues. While the country has a large portion of its population living at a subsistence level, the constraints on these villages vary

vastly based on the geographic and environmental locations of the villages. This paper highlights two villages in an attempt to shed light on applicible development interventions and how geography affects development interventions.

The two case studies presented in this paper outline how varied natural and economic resource constraints can be in Cameroon. The purpose of this paper is to explore and identify resource constraints in very different communities in Cameroon, to determine how the communities are constrained by resources, and provide some recommendations and insights for development organizations.

Using an exploratory case study method, I identified secondary research objectives that were site specific. Each site had very different resource constraints, Bechati was much more market driven while Piwa experienced severe natural resource constraints. Therefore, the theoretical framework and literature review for each site is dependent on the identified resource constraints which in turn informs differently the main research objective.

The first case, Bechati, is located in the lush rainforests of southwestern Cameroon and poverty in generally driven by geogrpahic isolation and limited market access, rather than natural resources. The deplorable road conditions and lack of cell service keep the community in a bare minimum subsistence level, and keep per capita incomes low. Strategies and recommendations for this community included utilizing existing social and economic structures, such as community groups and co-operatives, to create marketing plans in order to get their products out of Bechati and to the larger market, rather than relying on local traders to travel to the village to purchase their goods.

The second case study, Piwa, is located in the dry Sahelian climate of northwestern Cameroon and is most limited by natural resource constraints, such as limited water availability and poor soil fertility, than by any other factor. The very short growing season coupled with a long, dry, hot season encourage the community members of Piwa to diversify their income generating actvities and subsistence farming, as well as to rely on the bush as a source of supplemental food and fuel wood. Recommendations and strategies to help cope better with natural resource constraints in Piwa included entering new agricultural markets, like soy, and to increase food transformation as a source of secondary income.

For both sites, the study indicated that increasing women's business skills and economic opportunities would help strengthen coping mechanisms to resource constraints. Secondly, it was clear that in general, capacity building and basic business skills and knowledge would also benefit the communities, both individuals and group co-operatives. Overall, the main management recommendations derived from this project indicate that it is very important to be site specific when implementing development interventions. While located in the same political country, these two communities are examples of just how diverse Cameroon, as well as many other countries in West Africa, is and how development issues can vary based on geographic, economic, and social aspects of the area. There is no one single strategy that will alleviate poverty in Cameroon and its important to take into account the local environments when developing interventions.

Chapter 1: Research Objectives and Theoretical Framework

This chapter lays out the research objectives and questions for the study, and outlines the theoretical framework that structures each study site. The literature is rich with studies regarding how isolation affects poverty, and how communities and households have to build resilience to natural resource constraints. The two frameworks are specific to two different ecological areas: isolation is more important in rural, tropical, forested areas while resilience is more important in the dry Sahel region. Bechati is located in a tropical rainforest, and fits within an isolation framework; Piwa is situated in the Sahel, and conforms to the framework and theory of resilience and adaption. Each theory is described in this chapter in order to provide a framework for each case study.

1.1 Research Objectives and Questions

Purpose: The purpose of this paper was to explore and identify resource needs in two communities in Cameroon, to determine how the communities are constrained by resources, and how communities cope with those constraints in order to provide insight and recommendations for development.

Research Questions:

1. How do communities cope in light of resource constraints in different geographic rural areas in Cameroon?
2. Site specific, what are the mechanisms that communities utilize to cope with resource constraints?
3. What are strategies to improve coping mechanisms?

1.2 Theorectical Framework: Isolation and Resilience

1.2.1 Isolation and Market Access

The main development constraint that was identified in Bechati was isolation and the lack of market access. The literature is robust with theoretical and empirical studies on isolation and market access and is rich with frameworks that explain how those two concepts affect development of a community. The overall economic environment of rural populations can be described by the intertwining of different components: agricultural produce and agri-inputs; production support or financial services; information; assets including land and water; labor; and other consumer goods. A community's access to these markets depend on their degree of isolation, and greatly affects the livelihoods of rural communities.

1.2.1 Isolation

There are many ways to define isolation; historically, the distance to urban centers or markets was used as the measure of choice. Other definitions also include the travel time to the nearest urban center, the cost of transporting sacks of grain to the nearest urban center, and a remoteness index that includes factors such as distance to health facilities, banks, post offices, agricultural extension services, and various measures of access to transportation (Stifel and Minten, 2003). These studies indicate that as a community is farther from urban areas, in actual distance and also in hours traveled, agricultural productivity decreases, as well as other development indicators decrease (see Gollin, 2014; Khandker, 2006; Stifel and Minten, 2003; etc). Researchers include in the definition of isolation is the assumption that infrastructure can ameliorate the degree of isolation (McCabe, 1977; Ahmed and Hossain, 1990; Jacoby 2000; etc).

The consensus is that in general, there is a strong positive correlation between poverty levels and isolation (Stifel and Minten, 2003). Isolation not only reduces access to vital services, like markets, health care, and social and political networks but also to educational and information services that are critical for improving livelihoods. For example, in Madagascar, crop yields for staple crops (i.e., rice, maize and cassava) are lower in isolated areas relative to non-isolated areas, the use of fertilizer was much lower in isolated areas, and the overall incidence of poverty was found to increase with remoteness (Stifel and Minten 2003).

For the purpose of this study, isolation also includes telecommunication isolation. Muto (2009) found that cell coverage enhanced market participation of rural farmers, which was found to also reduce poverty. Lack of cell coverage contributes to isolation because of the effects it has on market relations and access to market information (Muto, 2009). Information on market prices allow farmers to maximize incomes and also reduces the need for farmers to travel long distances to markets.

Avenues through which isolation influences poverty levels and agricultural productivity are outlined in Figure 1.1. First, and the factor most focused on by policy makers and researchers, is transportation induced transaction costs. Second is increased price variability and intensification onto less fertile land. Third is insecurity; including both household insecurity (e.g., health and labor productivity) as well as environmental insecurity (e.g., rainfall). Insecurity also includes surprise events such as theft and unexpected crop failure. Bargaining power of a community is the last avenue through which isolation affects agriculture production.

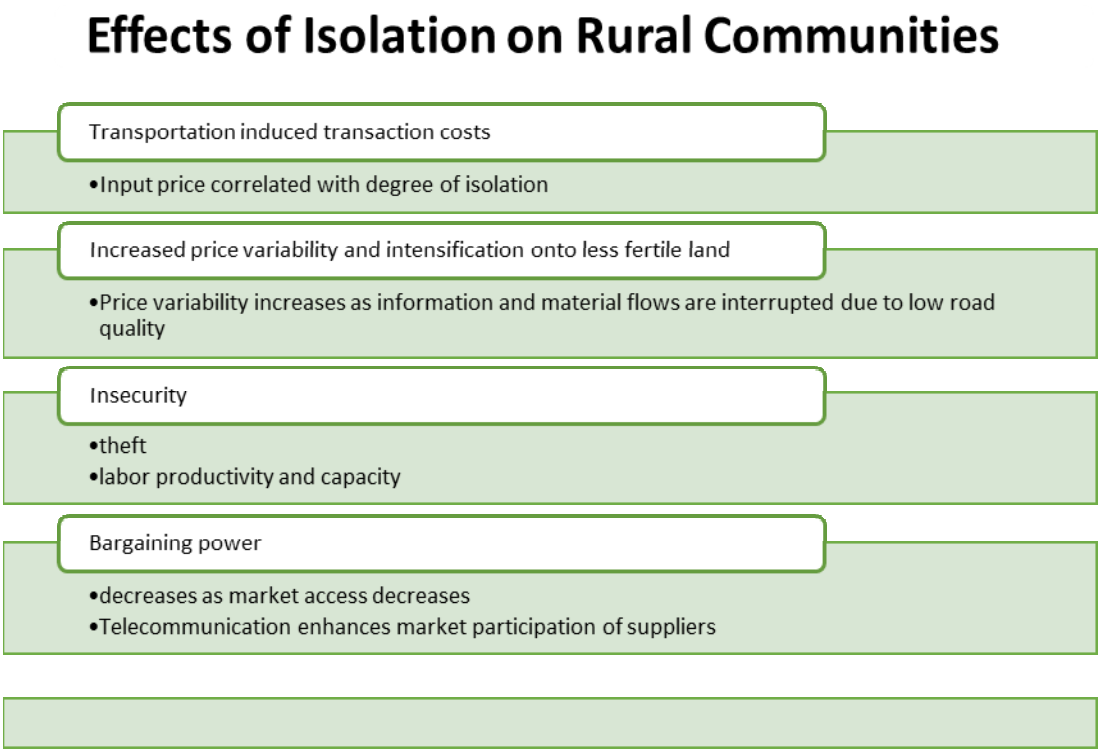

Figure 1.1: *The avenues which isolation can influence agricultural productivity and poverty. (Adapted from Stifel, 2008.)*

For remote loctations, bargaining power tends to shift towards the buyer, which decreases incomes for the producer.

The first factor is the method which comes up in the literature the most often: transportation induced transaction costs. Much of the literature focuses on road development and road density as the answer to access issues; Sapoka (2014) recently found that road density was highly significant in increasing the income index of a community; note also that electricity and access to clean drinking water was found to increase also health and education indices. Yamano (2010) found in a cross-country study in East Africa that the proportion of loose surface roads in an area had a "clear negative association with crop income, livestock income, and per capita income".

Inputs of agricultural activities are shown to be more expensive in rural areas (Dorosh 2012; Sapoka 2014; Stifel and Minten 2008). Furthermore, as the price of inputs increases, the agricultural productivity of a community decreases, leading to decreased income and increased poverty levels. And, for a community more isolated from markets, the price of outputs decreases, further decreasing crop income for the community (Stifel 2003).

It's worth pointing out that roads don't per se affect poverty, but roads provide integral services or facilities to a community. The impact is usually found to be significant between road access and poverty levels (Deininger and Okidi, 2002; Fan et al 2004; Jalan, 2002). However, there has been some evidence that there is a threshold effect for roads in low economic density regions, related to the endowments of a household (land, skills, labor) and the household's ability to increase production and surplus (Raballand et al. 2010). Road access has been shown to reduce poverty in three main ways: (1) Access to inputs and output markets (2) Access to education and health services (3) Access to labor opportunities.

The second factor is increased price variability and intensification onto less fertile land. As road quality decreases, studies have found that the likelihood of information and material interruptions causes greater price variability (Stifel and Minten 2008). Price variability can be attributed to fluctuations in price during times of year when roads are poorer, or from lack of communication due to poor cell coverage. Information sharing is incredibly important in the marketing of goods and exchange of agricultural innovations. Muto (2009) found that the

market participation of rural farmers increased as cell coverage increased, thereby reducing poverty levels in Uganda.With higher prices, and lack of market pricing information, the rural poor can be expected to "self-insure" through agricultural extensification (Barrett, 1999); in other words, because the cost of inputs increases with the degree of isolation, households tend to extend their cultivation onto less fertile land rather than increase production on current fields. This ultimately leads to decreased production and incomes as the land is not utilized efficiently.

The third factor, insecurity, has been shown to negatively influence agricultural productivity, and is related to isolation by the distance to health facilities, and access to information. The health of a household affects the labor productivity and capacity of a household. The farther a community is from a health center or adequate health care, the more likely that labor productivity will be affected by health related issues (Khandker, 2006). Physical insecurity also increases wages in remote areas as laborers have to be compensated for riskier living conditions; in rural areas, this often manifests in the relatively lower use of hired labor which contributes to lower production (Stifel and Minten 2008).

The fourth factor that isolation affects is bargaining power. In Cameroon, grain prices are generally lower between the months of September and December, which corresponds to the harvest period when most farmers sell their crops. Farmers are often forced to sell their products in order to pay off debt accrued to buy inputs, and lack of market information and access creates a environment where the buyers can force the seller to accept a lower price.

1.2.2 Market Access

Edmonds (1998) defines access as the "ability to reach, visit or use". Physical access can be improved or achieved through an effective transport system, which includes adequate infrastructure and transport services; however, it is argued that transportation alone mitigates the travel and transport constraints of poor people. Poor road conditions are not the only factors in transport constraints but also "inadequate infrastructure, lack of appropriate and affordable means of transport, remoteness and physical isolation from basic services" (Njenga and Davis 2003).

The framework for how rural farmers are limited and constrained in regards to access to markets is outlined in Table 1.1. The physical barriers have already been mostly described in the previous isolation section; physical barriers most often include transportation costs and access to transport as well as communications and information. Structural barriers are often manifested in the imbalance of bargaining power between buyers and sellers. And lastly, information, knowledge and skills constrict access to markets through basic ignorance.

Table 1.1: *How markets can be constrained in rural communities.*

Market Access Constraints: Physical, structural, information and organization		
Constraint	Disadvantaged areas	Disadvantaged groups
Physical	Poor roads, high transport costs	Those located far from markets or with poor access to transport; rural women
Structural	Inequality in market relations and bargaining power: reliance on monopsonistic traders whose market power controls prices	Those with poor access to land and credit to allow diversification and/or better marketing
Skills, information, and organization	Lack of understanding of basic business and markets, lack of technology information, lack of skills	Those who lack education

The balance of bargaining power between buyer and producer becomes more unevenly distributed as communities are more isolated and access to markets decreases. Because of the lack of information on markets due to price variability and gaps in telecommunication, lack of business and negotiating experience, and lack of collective organization in rural communities, the rural producers are often at a disadvantage when interacting with other, generally larger and stronger, market intermediaries. The main problem of market access is laid out in three main ways: physical distance from markets, political barriers (including the producer's inability

to influence the terms upon which they participate in the market), and structural barriers (including the lack of market intermediaries).

Because of some community's inability to transport their products to the nearest market themselves, studies have found that farmer's in that situation tend to have high uncertainty in terms of knowledge of the market prices for goods. Traders are then in the position to take advantage of farmers' ignorance of the market price and offer farmers a very low price for their goods. (Cortois, 2013)

In more extreme cases, such as in the village of Bechati, traders have almost all of the bargaining power. The low population density, almost impassible roads (over 12 hours one way travel time during the rainy season from the closest market center), and low demand for production inputs makes it almost not worth it for traders to visit Bechati.

1.3 Theoretical Framework: Resiliency

In the past, rural development policies and programs focused more on emergency response to crises and political constraints (Macrae, 2001; White, 2000). Drought, flooding, or other crises would occur and in response, development agencies would engage in large-scale distribution of food aid. At best, these types of responses allieviate immediate needs but only pay passing attention to long term consequences. At its worst, emergency aid can exacerbate inequality and weaken rural people's capacity to help themselves. Furthermore, studies indicate that dry land populations are often the most ecologically, socially, and politically marginalized, and are far behind on most economic and health indices (Mertz 2009; Reynolds et al.,2007).

The idea of increasing the resiliency of communities and households is based on the theory that development can be more sustainable if organizations are more sensitive to, and supportive of, what communities and households do themselves to minimize risk and cope with crisis (Adams, 1998; Folk, 2002). There is a growing body of case studies attributing the connection between resilience, diversity, and sustainability of social-ecological systems (Adger 2003). While the majority of the literature focuses on the savannah and sahel ecoregions of sub-saharan Africa, Cameroon is such an ecologically diverse country that it is important to also analyze the context

of the tropical forest social-ecological system in order to create more effective development policies and programs.

1.3.1 Resiliency and Adaptation

Resiliency was first defined by ecologists (Holling 1973) before being applied to social-ecological systems and linked with environmental sustainability (Folke et al. 2002; Gallopin 1991). There are two dominating definitions of resiliency in the literature, the first is the speed of recovery from a disturbance (Pimm 1984, Tilman and Downing 1994); the second is the magnitude of a shock, stress, or disturbance that a system can absorb before it changes the interior organization by adapting the processes that regulate the systems behavior (Holling 1995, Gunderson and Holling 2002). The literature describes two different types of forces that cause the mobilization of coping mechanisms. Exogenous factors, or generalized catalysts, include drought, flood, civil unrest, inflation, and epidemics. Endogenous factors, or household-specific catalysts, include illness/death of key workers, family strife, and indetbtedness (Adams 1998;

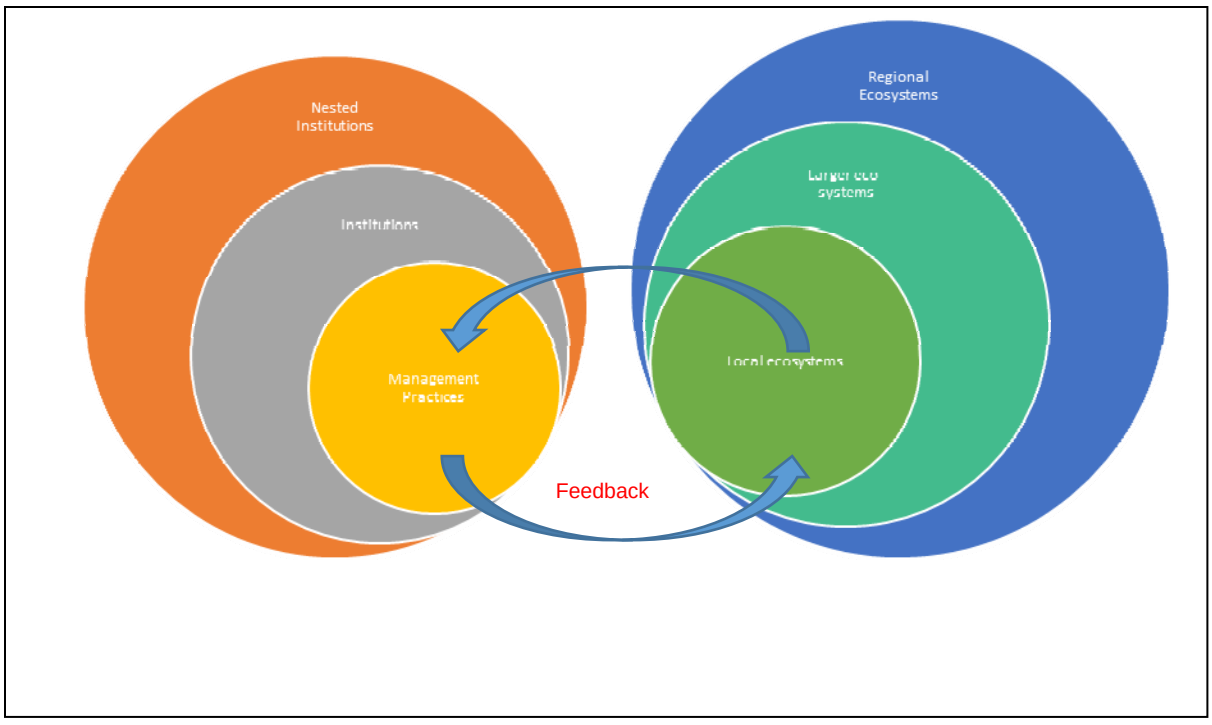

Figure 1.2: *A conceptual framework for the analysis of social-ecological systems. The resilience framework focuses on how ecosytem knowledge is translated into management practices, and feedback dynamics can faciliate the adaptive capacity of the system. Institutions are defined as codes of conduct that regulate access and use rights to resources. Institutions define practices, assign roles, and guide interactions between people. (Source: Berkes, 2003)*

Kelly and Adger 2000; Leurs 2005). The terms “shock”, “stress”, and “disturbance” are used in reference to outside forces that have the ability to create an adverse impact (Luers, 2005). These forces are determined to be “exogenous” if their manifestation is beyond the control of the individual or household (Kelly and Adger, 2000).

The resilience approach is fundamentally anchored in the idea that the natural state of a system is not static; rather, a system is in a constant state of change, often unpredictable (Nelson 2007). Because of fluctuation, systems need to be managed for flexibility rather than simple stability. The resilience approach also places social and ecological systems intwined together, and should not be considered in the absence of one another (Figure 1.2). The resilience and adaptive capacity framework emphasizes the dynamics of links among the ecosystem, knowledge, and institutions.

Social-ecological systems within the resilience framework form a series of feedbacks that have been described in the ecological literature; more specifically, Holling (1986) has argued that ecosystems go through regular cycles of organization, collapse, and renewal, and that linear change on a short time scale may in fact be a part of a cycle. Resilient systems are able to engage in a series of feedback loops, which are not unidirectional (leading to a climax ideal system) but are able to change and adapt (Berkes, 2003).

Ecological disturbances are the basis for variation in natural systems and are key in the maintenance of ecosystem renewal. In a purely ecological system, there is no state that is more desirable than other; the cycle of organzation, collapse, and renewal continues as natural disturbances occur. Disturbances are defined as ‘any relatively discrete event in time that disrupts ecosystem community or population structure and changes resources, substrate availability, or the physical environment’ (Picket et al., 1997).

Because resliency is dependent on both social and ecological systems, one must evaluate not only a societies ability to cope well with change from a social perspective but also include the sustainability of adaptation from an ecological perspective. The resilience framework allows one “to analyze adaptation processes and to identify appropriate policy responses” (Nelson, 2007). The literature emphasizes the relationships between the system components, not just the functioning of isolated components (Nelson, 2007; Berkes 1998; Berkes 2003).

Social-ecological systems exist in a number of possible states based on the goals and desires of a given institution. Because, without human intervention, a theoretical ecological state would be no more desirable than another. But humans have the unique ability to change the ecological and social factors within a given system, and the negotation between the two is never complete or at some "ideal" configuration (Nelson, 2007). For example, a grazing community might prefer an ecosystem with few shrubs, plenty of grass, and many animals. On the other hand, another community that becomes less dependend on livestock production might prefer more shrubs for wood, less grass, and have less animals. Those communities have the ability to negotate the ecosystem of the surrounding area to a certain extent.

1.3.2 Adaptation within a Resilience Framework

Adaptability of households has been a focus of many studies in developing countries (Adger 2003; Mertz 2007; Foncoli 2001). Adapation is defined in the literature as being "a process of deliberate chance in anticipation of, or in reaction to, external stimuli and stress" (Nelson 2007). Adaptive capacity then refers to the conditions that are required to enable adaptation and encompasses both physical and ecomonic elements as well as social characteristics (Mertz 2007; Gallopin 2006).

In traditional adaptation literature, adaptation approaches cause changes in a system that lead to a state in which the social-ecological system that can deal effectively with percieved risks (Smithers 1997). On the other hand, within the resilience framework, the adapation approach is the ability of a system to cope with future change. The central theory is that if a system has the capacity to deal with uncertain future events, it is more resilient (Nelson, 2007).

The resilience framework was developed to integrate the components of complex systems, and in doing so, emphasize the function of the social-ecological system as a whole. In general, the better a system is able to adapt, the stronger the sources of resilience become (Nelson, 2007). For example, during a drought in Kenya, communities were observed adapting to the crisis by changing occupations, selling assets, and benefiting from drought relief. Sources of resilience in this case were based on adaptive capacity characteristics, such as learning and memory, as well as strengthened social networks and remittances (Erikson, 2005).

More resilient social-ecological systems are able to absorb larger shocks and disturbances to the system without changing in a fundamental way; however, when transformation is inevitable, resilient systems, in theory, have integrated within them the mechanisms for renewal and reorganization. Resilience is most often associated with diversity – ecologically, economically, and socially – that maintains and encourages adaptation and learning (Folkes 2002). Coping mechanisms faciliate the diversification and adaptation of households to crises.

1.3.4 Coping Mechanisms

Coping is defined in the literature as adaptions that are "an array of short-term strategies adopted in response to crises" (Adams, 1998; Davies, 1993). Households cope in order to maintain collective well-being, including livelihood security, consumption, health, and community status. Food consumption and health are short-term objectives and are immediate day-to-day needs that every household deals with. Livelihood security and community status are longer-term objectives which involve strengthening of assets, incomes, and social position to strengthen future claims on resources (Adams, 1998).

Studies have explored how rural West African households engage in the continuous process of balancing competing needs and limited resources with the goal of preserving their livelihoods, subsistence, health, and social status (Adams, 1998; Erikson 2005). Households engage in trade-offs between the different goals during times of crisis, like drought, civil unrest, or the illness/death of a productive worker. Ultimately during a crisis, the response of the household must be "to minimize the intensity or duration of crisis, to maximize limited resources, and to preserve long-term livelihood security" (Adams, 1998).

Successful coping then, must be flexible in order to negotiate a households' diverse needs and demands; field data in the Sahel, however, does indicate that considerable variation occurs between households and their ability to balance between competing demands and objectives. Studies suggest that a household's ability to successfully cope is related to the household's resilience in the face of exogenous ecological or climactic conditions, and is also related to endogenous attributes such as socio-economic status or demographic compostion. There is a spectrum within a household in terms of the needs and priorties of members, access to resources, and the individual coping ability of household members, and more resilient

households must balance those factors. Effective coping can be accredited to not only the type, timing, and intensity of the crisis faced but also is a reflection of the household's baseline resilience (Adams, 1998). It is rare to find cases however where the catalyst causing an individual-level coping mechanism to be used can be traced to one specific exogenous or endogenous attribute (Adams 1998; Mertz 2009)

Individual-level coping mechanisms are mechanisms which farmers used to adapt to challenges or crises that arise at the local level. In general, farmers have been described as adapted by changing the distribution of "household labor in three sequential steps: livestock ownership, business (trade, manufacture, services) and outside activities (for social, political, or religious reasons, and for income)" (Sendzimir, 2011). These responses are only a part of how a farmer will perceive, prepare, and adapt for crises in their village (Table 1.2).

Table 1.2 *Crises and farmers' strategic adaptations (Mortimer and Adams 2001; Sendzimir, 2011)*

Perception of 'crisis'	**Strategic adaptations by farmers**
Drought	Negotiating the rain Adapting timing and quantity of labor to rainfall pattern
Stocking	Integrating animals Mobilize labor to work with livestock to intensify production
Environmental degradation	Work land harder

While coping mechanisms are integral to short-term responses to crises, adaptive strategies are defined by the ways that both individuals and communities change their activities and modify local rules and policies to secure livelihoods (Berkes and Jolly, 2001). The two strategies can and do overlap over time, in the case where coping mechanisms develop into adaptations.

Summary

Overall, the ecology of each study site was incredibly important for the framework of the studies. Bechati is a case of isolation and market access constraints; poverty tends to increase as isolation increases. Isolation is defined to be the distance to an urban center or market. Isolation affects four main factors in rural communities. First, is transportation induced

transaction costs. Second is increased price variability and intensification onto less fertile land. Third is insecurity; including both household insecurity as well as environmental insecurity. Bargaining power of a community is the last avenue through which isolation affects agriculture production.For remote loctations, bargaining power tends to shift towards the buyer, which decreases incomes for the producer.

In Piwa, resilience and adaptation to natural resource constraints were the most important factor. Resilience is defined as the amount of change or shock a system can withstand before change occurs; in general, the flexibility and fluidity of a system shows how resistant to crises. Social, ecological, and institutional factors are all connected in this framework, and through a system of feedbacks, can allow households and communities to remain resilient and adapt to natural resource constraints. The idea of increasing the resiliency of communities and households is based on the theory that development can be more sustainable if organizations are more sensitive to, and supportive of, what communities and households do themselves to minimize risk and cope with crisis.

Chapter 2: Background and Setting: Cameroon

This chapter highlights a brief history and provides a setting on the national scale for Cameroon. The country was under colonial control until independence and unification into what is known today as the Republic of Cameroon in 1961. Various economic and social problems have plagued the country; from widespread corruption to a serious depression in the 1980's and 1990's, Cameroon's history sets the stage for development problems and resource management issues seen today.

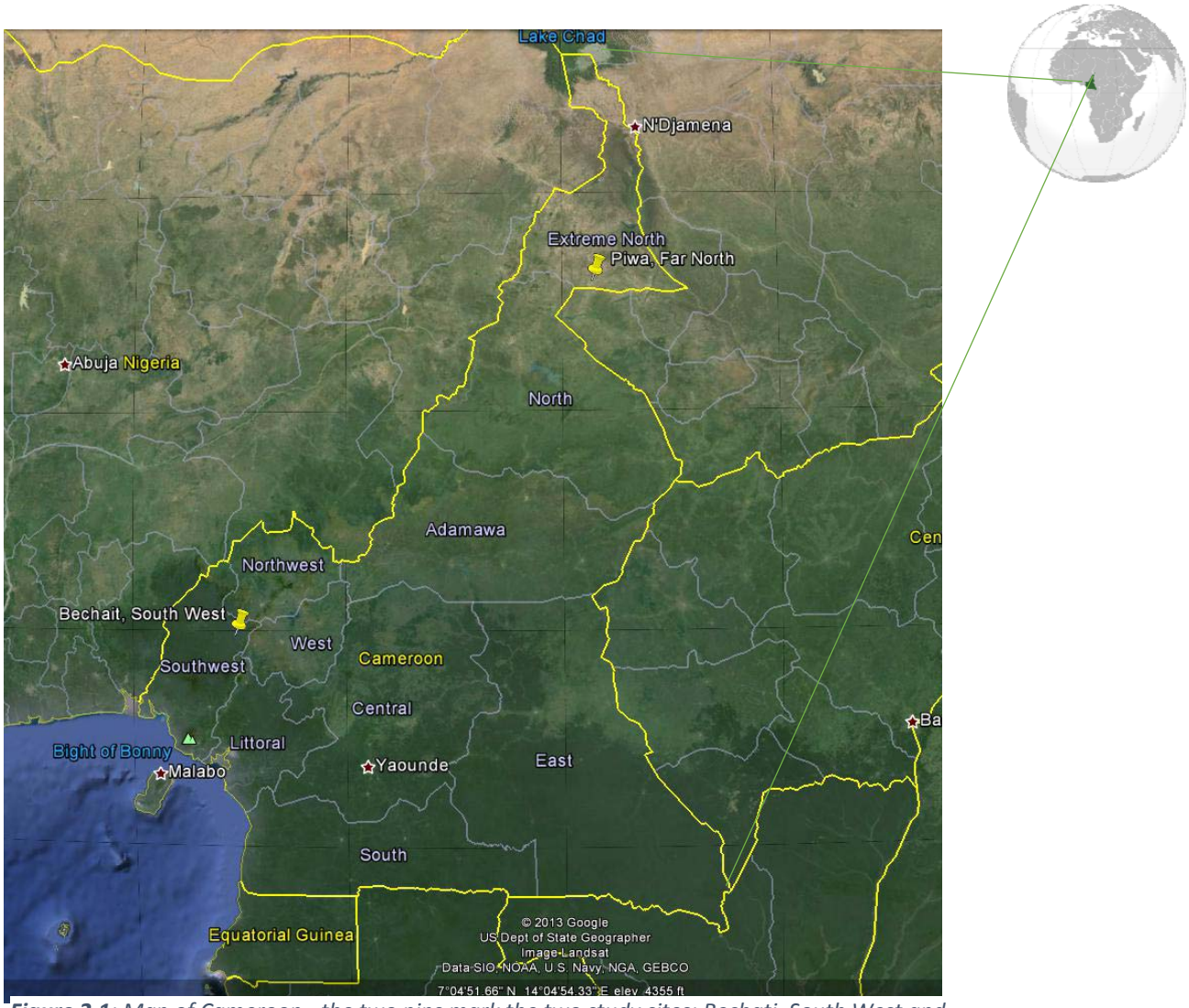

***Figure 2.1**: Map of Cameroon - the two pins mark the two study sites: Bechati, South West and Piwa, Far North (source: Google Maps)*

2.1 Geography and Climate

The Republic of Cameroon is a West African country situated just north of the Equator, located at 6 degrees N and 12 degrees East. Nigeria is it's neighbor to the west; Chad to the northeast, the Central Africa Republic to the east; and Equatorial Guinea, Gabon, and the Republic of Congo to the south.

At 475,442 square kilometers, Cameroon is roughly the size of the U.S. state of California. The country is often referred to as "Africa in Miniature" because of its geological and cultural diversity. The country boasts an amazing diveristy of landscapes, ranging from the Congo River Basin rainforests, to the Savannah highlands of the Adamaoua Plateau, and the sandy northernmost Sahel zone. The climates range from coastal to semiarid to arid in the north. (CIA Factbook, 2014)

Cameroon has over 22 million hectares of forest, making it one of the most forested among African countries, second only to the Democratic Republic of Congo (Nkemyi et al. 2013).

2.2 Demographics

Cameroon, in West Africa, is a diverse country with an estimated 250 ethnic groups that come from five large regional-cultural groups. The dominant ethnic group is the "Cameroon Highlanders", constituting about 38% of the population and include the Bamileke and the Bamoun people. The Equatorial Bantu, Kirdi, Fulani, Northwest Bantu, and Eastern Nigritic peoples comprise the other major ethnic groups. (CIA Factbook, 2014) Because of the diversity of peoples in the country, there is a plethora of tribal languages spoken throughout the country. While most groups have their own traditional language, the official languages in the country are French and English. Fufulde is widely spoken in the Adamaoua and Sahel regions, while Pidgin English is common within the Anglophone areas.

2.3 Economy

The economy of Cameroon is driven primarily by agriculture; an estimated 70% of the labor force works in the agricultural sector, 13% in industry and commerce, and all other activities account for the remaining 17% (World Bank, 2014). The Food and Agriculture Organization of the United Nations estimates that as much as 96 percent of the population is dependent on agriculture (FAO 2014).

Agriculture for export, which comprises about 20% of the gross domestic product for the country, is comprised of timber, coffee, tea, bananas, cocoa, rubber, palm oil, pineapples, and cotton. Furthermore, the country is endowed with an abundance of natural resources including minerals, timber, and oil and natural gas. (CIA Factbook, 2014)

Because of the dominating forested landscape, the forests of Cameroon provide an important source of cultural identity, livelihoods, economic development, while helping to mitigate global warming. The World Bank estimates that the forest provides about 8 million Cameroonians with traditional medicines, nutrition, fuelwood, and construction materials (Topa et al, 2009). Furthermore, other studies estimate that the forest sector provides up to 13,000 formal, and perhaps even as many as 150,000 informal jobs, making it Cameroon's second largest job sector after the public sector (Topa et al, 2009). In 2011, timber, both logs and lumber, accounted for 20% of total Cameroonian exports (UN Comtrade, 2012).

2.4 Brief History of the Natural Resource Management Context in Cameroon

2.4.1 Pre Colonial Period

The territory of present day Cameroon was first settled during the Neolithic period. The geographic place we consider Cameroon, however, was not a political entity in the way westerners think of countries. Because of the geographic diversity of the landscape, there were many different tribes who colonized this region over time. The original people to populate Cameroon in the south are thought to have been the Baka tribes, known colloquially as the pygmies. About 2,000 years ago the Bantu speaking tribes migrated through from the North East; around AD 500 the Sao culture arose around Lake Chad in the Far North. (DeLancey, 2000) During this period, natural resources were managed according to tribal laws and administrated by the village chief. For example, when a hunting party returned from a trip, the meat was taken to the chief, who was charged with distributing the meat to all villagers. When hunters went to hunt in another chiefs territory, the hunters were required to ask permission from that chief before entering the forest. The rationale behind this was that the totem of the village was thought to protect the forest from intruders, which kept non-local hunters from being able to kill any animals. (Nkemnyi et al., 2013)

2.4.2 Colonization

The Portuguese were the first Europeans to arrive in Cameroon, naming the country Rio Dos Camaroes (River of Shrimp, in Portuguese) upon seeing the Wouri River in Douala. The Portuguese were integral in setting up the slave trade, which culminated in the conquest and colonization of Cameroon. While the Porutuguese, Dutch, and British traders dominated the coast of Cameroon, it was the Germans who ultimately colonized and established the territory known now as Cameroon as a result of the Berlin Conference in 1884-1885. (DeLancey, 2000) After the end of World War I, Cameroon was transferred by the League of Nations to the French and British governments. Britain received West Cameroon, which is today the Northwest and Southwest regions while France received East Cameroon which is comprised of the 8 remaining regions in the country.

Like many countries under colonial rule, the national natural resource policies were primarily exploitative in nature and the development goals of the country were cast aside (see e.g. Silva 2004; Steinberg 2003; Fairhead and Leach 2002; Hurrell 1991). The administration of the newly founded colony established a formal administrative structure for resource management. The concept of personal property rights was created, and a system of permits was introduced for resource exploitation.

All land during this period belonged to the state, and forest products became a major export sector. Commercial logging was initiated during the colonial period in the 1880s and had greatly expanded by the 1920s; in the 1930s, the colonial government of British Southern Cameroons created a forest conservator position in the Bamenda Division. These policies allowed the state to be the primary beneficiary of the forests and its resources, and allowed the government to introduce exotic plants, like neem trees and eucalyptus (Mengang 1998; Njoh 2007). The establishment of protected areas also occurred during this period; in fact, all of the existing protected areas, with the exception of one, were established during the colonial period (Mengang, 1998).

2.4.3 Independence and Unification

East Cameroon, governed by France, achieved independence on January 1, 1960 and became known as the Republic of Cameroon. The following year, on October 1, 1961, Southern

Cameroons received its independence from Britain and voted to join with the Republic of Cameroon to form the Federal Republic of Cameroon. Ahmadou Ahijo, a French-speaking Fulani, was chosen as president of the federation, and in 1972 he facilitated the enactment of a new constitution, replacing the federation with a unitary state called the United Republic of Cameroon. He would continue as president until 1982, when he was succeeded by his Prime Minister, Paul Biya, who remains the president to this day. In 1984, the name of the country was changed to the Republic of Cameroon.

For a quarter century following independence, Cameroon was one of the most prosperous countries in Africa (Burnham and Sharpe, 1997). The country enjoyed strong economic growth from 1960 until the late 1970's, supported by the agriculture and agro-industrial sectors (FAO, 2008). In 1972, forest activities were placed under the jurisdiction of the Ministry of Agriculture, while the nine operational forest reserves were placed under the Department of Tourism. These institutions make it possible for politicians and senior public officials posted in other branches of government to access financial benefits from the forestry sector. (Njoh 2007) Even more important was the 1974 Land Law, which established land tenure and property rights, thereby creating a framework for personal ownership of property. The state and those in power were the major beneficiaries of this law as it endowed the state with limitless power over land and related resources since the majority of the population had not registered their property rights. Thus, all land that was not registered as private or public (i.e. managed by the state on behalf of the public) was deemed "national" land (USAID 2011). The government could then convert national land into state land and allocate rights to it, such as forest concessions, or convert it to private ownership; by 1975, Cameroon's Fourth Five-Year Development Plan (1976-1981) converted all designated forests within the country into the private property of the state.

2.4.3 1981 Forestry Law

The 1981 Forestry Law created a framework for establishing preferences in the allocation of forest concession rights, which essentially became a means of acquiring bribes for the political and bureaucratic elites who benefited from timber harvesting (Njoh 2007). A major weakness in this law was the failure to create a legal framework to require land use planning and the

integration of forest protection with production activities. Because there were no management requirements and concessions were given for a period of five years, timber companies had no incentive to manage forests sustainably because they did not have long term concession rights (O'Halloran and Ferrer, 1997; Brunner et al 2000).

2.4.4 Economic Recession

Because the economy is highly dependent on commodity exports, the 65% dip in prices for its principal exports, oil, timber, cocoa, coffee and cotton, during the 1980's caused a decade-long recession. During this period, the external terms of trade declined by 60% (Topa et al, 2009). Compounding the recession were economic mismanagement and pervasive corruption, which all contributed to a challenging business environment for investors. There was a major expansion of public sector employment in the early 1980's, which caused a balance of payments crisis later in the decade. All of these factors contributed to a 50-percent devaluation of the currency in 1994 (Brunner et al, 2000).

Accompanying the recession was a rise in poverty; with farmers being the most directly affected by the fall in commodity prices. In addition, the government was forced to cut basic health and education services. Public debt increased from US$5.9 billion in 1989 to US$9.1 billion in 1999. The debt, most of which was owed to external entities like the World Bank, was 108% of the gross domestic product (GDP) of Cameroon, meaning that the country owed more than the GDP (World Bank, 1996). The recession officially ended in 1994, but the country has yet to totally recover. Annual GDP growth was 4.8% in 2013 (World Bank, 2013).

Throughout the 1990s Cameroon was plagued with terrible corruption; and in 1997 the country had the dubious "honor" of being ranked 85th out of 85 countries that were ranked in the Corruption Perceptions Index of Transparency International; making Cameroon the most corrupt country in the world (Transparency International, 1998).

2.4.5 Decentralization and Community Based Natural Resource Management

The 1981 Forestry Law facilitated the use of forest resources as a way to increase influence and political capital within the countries patronage system. The economic benefits of forests were used as bribes to garner political support as well as to mobilize backing from communities for political appointments. Cameroon was also under increasing pressure from its citizens and the

World Bank to decentralize power and devolve resource rights to the local level. In fact, there had been some decentralization of government stemming from colonial times. Along with the central government, there have always been local governments that were headed by a mayor who worked with an elected municipal council (Oyono, "Paradoxes of Natural Resources" 2004).

There were violent protests against the government by citizens throughout the 1990's (Oyono, 2004). The central government was not only facing social unrest, but the past two decades had also been riddled with environmental and social crises throughout West Africa. The forestry sector experienced several violent conflicts between logging companies, who were backed by the state, and local communities; the main source of conflict centered on the monopoly of state and European interest groups over the forests. The local communities demanded access to commercial logging and this was fueled by the overarching movement for "local communities … to claim their rights" (Oyono, 2004).

2.4.6. The 1994 Forest Law

Under pressure from The World Bank to decentralize authority over the forests, the Cameroonian government passed the 1994 Forest Law, which made concession allocation by auctions, changed the pricing and taxation process to facilitate the use of market-based initiatives, promoted sustainable forest management, and granted local communities the right to manage and exploit 5,000 ha of their customary forests. The law defined the National Forest Estate, which in 2011 was 175.5 million hectares, or 37% of Cameroon's total land area (WRI 2012). Forests that were deemed National Forest Estates were designated either Permanent Forest Estate, which is land that is to remain as either forest or wildlife habitat, or non-Permanent Forest Estate, which is zoned land that could be converted from forest into other uses (Cameroon Law No. 94/01). Because the state holds dominion over all forests that are not held by private entities, all forest not explicitly classified as either Permanent or non-Permanent are by default non-Permanent, and are often used for swidden agriculture or agroforestry purposes (Brunner et al., 2000; WRI, 2012).

The 1994 forestry law was the first attempt by the government to decentralize forest management practices, to address the problem of inequality, and to create a more sustainable forest management system (Oyono, 2004; Alemagi, 2011) (see Table 2.1).

***Table 2.1**: Summary of the 1994 Forest Law (Source: Brunner et al 2000)*

Draft Reform	Effect
Concessions allocated via auctions	Auctions are less susceptible to political pressure and more economically efficient
Change Pricing and taxation	The price before reform had not changed since independence, this reform forced a significantly higher area tax that was indexed to inflation. The World Bank argued that higher taxes encouraged companies to improve efficiency
Promote Forest Management	Mitigates the potential negative effects of more intensive logging and responded to domestic and international support and policies requiring sustainable forest management
Local Management of forests	Local communities had rights to 5000 ha of forest; could log the forests themselves or contract out; communities also received 10-percent of area tax for local administration

2.5 Current Situation and Study Sites

Despite the reforms within the forestry sector in the 1990's, the majority of the forest communities live below the poverty line (Alemagi, 2011). This is predominately because a lareg portion of Cameroon's licensed forests are foreign-owned, and very little of the financial benefits of forests stay within the communities where they are operating. Many observers have noted that the main beneficiaries of the forest revenues are the government and the forest concessionaires (Alemagi, 2011; Njoh, 2007). As a result, poverty persists in most forest communities that accommodate logging concessions; some even claim that many concessionaires are not meeting their obligations with respect to corporate social responsibility

due to a lack of enforcement of the existing rules and regulations (Alemagi, 2011). Futhermore, while the current law mandates that 10% of forest royalties must be apportioned to the communities located within the forest concessions, the communities claim that "the proportion is inadequate and cannot provide the infrastructure required for sustainable societal development" (Alemagi, 2011).

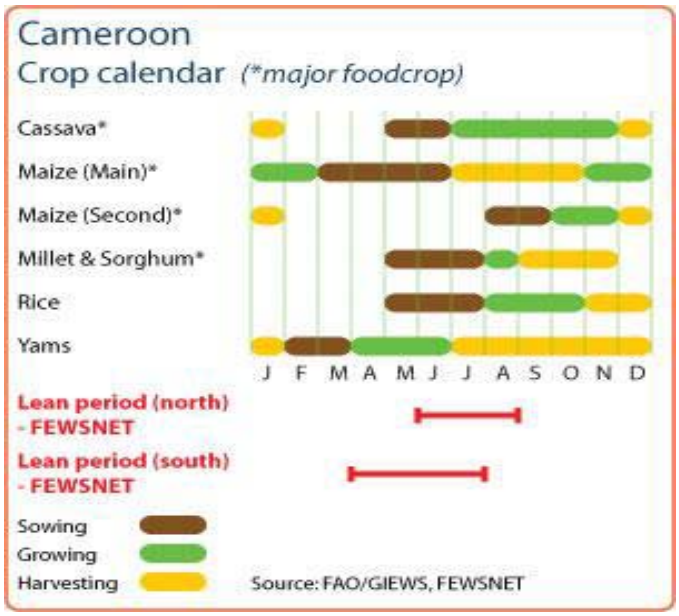

***Figure 2.2**: Seasonal crop calendar for Cameroon.*

2.5.1 Geographic and Ecological Setting

It is important to take into account the diverse nature of Cameroon when creating development policy; as stated earlier, the country boasts an incredible range of cultures, languages, and geography. I had the opportunity to live and work in two vastly different areas of the country, the Far North Region and the South-West region. In sub-saharan Africa, and particularily West Africa, most resilience and adaptive capacity research has focused on the dryland savannah and sahel area, as has most development work and aid (Eriksen 2009; Mertz, 2009; Roncoli, 2001). While both of these areas are located in the same country and experience similar levels of poverty, the way that they adapt to their environment and develop resiliency strategies are very different.

The two sites for the case study are typical of Cameroon because the community members are deeply rooted agriculturalists. Their livelihoods revolve around one of the most important

agricultural resources: water. Water availablity in these two cases are quite different: Piwa recieves only two months of rain a year, about half a meter or less, while Bechati enjoys about seven months of rain a year, about 3 meters of rain.

Piwa is located in the Far North Region, and is a flat semi-arid village located about 5 Kilometers from the border with Chad. It hosts about 1,000 residents who are ruled by a Lawan, or village chief, who is in turn under the Lamido of the greater Kaele area. The ecology of the area is sudano-sahelian; the climate is dry and tropical with two seasons, a long dry season and a short rainy season. With very little rainfall each year, the community members engage in a wide variety of subsistence and income generating activities. The Far North Region is also plagued with cyclical droughts and floods, causing yearly grain shortages in various parts of the Region. Extreme drought conditions were experienced in 2009 and 2011, with floods in both 2010 and 2012 resulting in severe damage to crop and forage land. The most recent flooding in 2012 left an estimated 6,000 residents of the Far North Region homeless and their crops ruined (IFRC 2012). Because of the wild fluctuations in weather patterns from year to year, the region experiences an estimated 20% of all households with food insecurity and another 60 percent of households at risk of food insecurity (FAO/GIEWS 2012). Furthermore, the floods during the 2012 rainy season in the region caused localized damage to crops, assets and people. An estimated 150 people were affected by the flooding of the river Mayo-Kani flowing through Kaele town (MINADER 2012).

Bechati, on the other hand, is located in the South-West Region of Cameroon. The South-West is a lush montane region that is home some of the most diverse rainforests in the world. The community of Bechati is relatively isolated; the road leaving Bechati to the nearest large town, Dschang, is almost impassible during rainy season, which is a grueling 7 month season where it rains almost every day. The community members primarly engage in cash crop cultivation, while the women engage in some subsistance farming. The market in Bechati is driven by outside buyers, who are able to travel in and out of Bechati using four wheel drive pick-up trucks almost year round. One of the main ecological concerns in the area is the threat of landslides, the most recent being in 2003 when 21 people were killed and a whole village was washed away.

Chapter 3: The Case Study Method

Chapter 3 outlines the methods used during the field research. The research plan for both sites were based on the case study method described by Yin (2003). Because of regional instability, I was moved from my first site, Piwa, before all the data could be collected and relocated to Bechati. I used surveys, interviews, focus groups, and personal observation to gather data to inform the research objectives. While in the field, I began analysis of my own personal observations and finished the analysis once returned to the United States.

3.1 Situation in Cameroon

Piwa was originally chosen as a study site because it was the village where I had the opportunity to live and work during the majority of my Peace Corps service. Piwa is located in the Far North Region of Cameroon, just 5 kilometers from the border with Chad. The area is semi-arid, and receives on average less than one meter of rainfall per year. The primary cash crop is cotton, and grains (such as maize, millet, and sorghum) are the most common agricultural crops.

The surveys that were developed were based on the case study method described by Yin (2003) to determine the coping strategies of households in Piwa, and administered the survey over the course of one month after the 2012 rainy and dry season crops had been harvested. While administering my survey, a French family was kidnapped from a tourist site just north of Piwa by Boko Haram. Immediately following the kidnapping, the US embassy moved all of the Peace Corps Volunteers to the capital of the Region, Maroua. After two weeks in the regional capital, we were allowed to return to our villages, but I was promptly evacuated from the region again due to increased military action in Northern Nigeria. After being evacuated for a second time from PIwa, I was re-posted in the village of Bechati in the South-West Region of Cameroon.

Bechati is a village located near the border with southern Nigeria and is in the middle of an area of sub-montane forest. The area receives about 8 months of rain a year, and the economy is based on cocoa and palm oil production. Once arriving there, I found that the survey I had begun administering in Piwa was no longer applicable. Because of the lush rainforest that

surrounds it, Bechati doesn't have the resource constraints that households in Piwa faced with. Households in Piwa can grow food crops almost year round,and they can "stock" food by deciding when to harvest; for example, cassava is a tuber that a household can harvest whenever they are ready to consume or sell it. In light of those unforeseen changes to the study, and the fact that resiliency in Bechati takes on a completely different context compared to Piwa, I developed and administered a different survey in Bechati.

3.2 Case study method – General

Yin (2009) defines a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the phenomenon and context are not clearly evident … [and] benefits from the prior development of theoretical propositions to guide data collection and analysis". The case study methodology is appropriate in this case due to the real life phenomenon of the topic, which is structured by a variety of historical, political, economic, psychological, technical, and ecological factors that cannot be separated from each other or their "context". I used a multiple-case exploratory case study, based on Yin's Case Study Research: Designs and Methods (Yin, 2009).

3.3 Data Collection

I relied on a mixed methods approach to data collection, following the technique of community needs assessment described by Neuber (1995), which uses data obtained from "demographic/statistical profiles, designated key informants, and individual interviews with randomly selected consumers" (pg 16). The model is primarily used to collect data from three discrete and interrelated sources for purposes of comparison and utilization in program planning and evaluation. This method is appropriate because it helps collect data which reflects individual problems and needs; perceived community problems and needs; and the individual's perceptions of problems of subsistence and the services intended to assist people in dealing with such problems (Neuber, 1995). Triangulating data in the scope of a needs assessment method allowed me to make inferences about: coping mechanisms (research objective 1),

sources of resiliency (research objective 2) and potential areas that could be improved or strengthened (research objective 3).

3.3.1. Interviews

Key informants are a person who "is a knowledgeable insider willing to serve as an informant on informants" (Weiss, 1994). For the purpose of this study, key informants were identified as either ministry officials or farmer leaders. Ministry officials were the delegates for the local area with the Ministry of Agriculture and Rural Development. Farmer leaders were identified based on their status in the community, and were generally the presidents of local farmer's co-ops. The key informant interviews were semi-structured (Weiss, 1994). I posed open-ended questions and then let participants answer with minimal interruption. When necessary, I asked follow-up questions for clarification. I used two different guides, one for farmer leaders and a different one for Ministry informants (see appendix 3). The interviews with farmer leaders began with general demographic questions as well as general questions about the study site. I then asked resource specific questions about land usage, water availability, crops and sources of income. With Ministry informants, where just one was available per site, I asked about site specific development issues, demographic information for the village, and resource management issues at the site.

Bechati

The delegate for MINADER in the Bechati area, Mark Lekunzi, was interviewed in a semi-structured style in order to gather information about the resource management situation in the village. He was identified as an "elite" informant because of his leadership role within the village and his access to agricultural information. He has access to many different stakeholders in the community, and also his work includes development of farmer's agricultural capacity, which relates to both of the research objectives of this study. I interviewed the village chief as well, using a semi-structured interview. He was identified as an "elite" informant because he controls much of the land use in the village, as well as being charged with maintaining the general well-being of community members based on the traditional roles of chiefs. These interviews were used as anecdotal evidence in conjunction with the survey and archival information.

Piwa

I performed semi-structured interviews with a few key informants in Piwa. I first interviewed the delegate for Piwa in MINADER because he has special insights into the development situation in the villageand because he has been working in the area for over 5 years. His interview was an important source of information to address the second and third research objectives.

Then, I interviewed three farmer leaders in the community to get further qualitative information on the resource and agriculture situation in the village. These interviews have been transcribed and used as anecdotal evidence in conjunction with the survey results, informing the first research objective.

3.3.2 Community Focus Groups

In Piwa, I also facilitated two community meetings, where I used one of the community assessment tools to gather information about perceptions of community problems and needs. The community meetings involved breaking up into focus groups and creating a list of what were the greatest environmental/agricultural problems in the community (see Appendix 3). Each focus group presented their results and as a whole, we developed a master list of problems in the community. This information was an important sourc of information for the overall situation in the community and how community members view themselves and their village, which helps inform the research objectives because they are the perceived environmental issues that households must cope against.

3.3.3. Surveys

Survey respondents were sampled using a convenience method, based on Weiss' (1994) theory that sampling to maximize the range of types of people interviewed can be an effective way to represent a large variety of views and opinions even when sampling size is small. I used the data gathered from the surveys to create an overview of sources of resilience in households; whether it was social, economic, or ecological sources, and how diverse their coping mechanisms might be. The surveys were used in lieu of individual interviews since the survey was given in the form of an interview and because the majority of respondents were illiterate

and I then had the opportunity to clarify answers and ask questions during the administration of the survey.

Bechati Survey

The survey focused on identifying region-specific resource management constraints and coping mechanisms to those constraints (Appendix 1). Based on the fact that the two sites were so very different, the survey used in Piwa was simply not relevant in Bechati. The Bechati survey consisted of demographic, economic, and agricultural questions, and was aimed at gathering quantitative information about the agricultural and economic situation of households in Bechati to inform the first research question.

Piwa Survey

A second survey was developed (Appendix 2) to determine sources of resiliency and coping mechanisms based on the theory developed in Chapter 1. I used quantitative information, such as diversification of agricultural products, to make inferences on a households' sources of resilience, triangulated with archival information, semi-structure interviews, and participant observation. The surveys primarily informed the first research question.

3.3.4 Archival Information

I gathered archival information from MINADER. The Ministry provided me with access to their annual reports. These reports were used as quantitative sources of information for basic agriculture information for each site, as well as giving the annual report for agriculture and development difficulties in the villages. This information is important to the research objectives because it provides an overview of how the community as a whole diversifies incomes and gives insight into community wide natural resource constraints.

3.3.5 Participant Observation

This study is also informed by participant observation during my stay in the area using the iterative continuum method of participant observation described by CIFOR (1999). This method was used in order to document the process of increasing understanding that comes with each day of fieldwork. This method is used to record one's observations on a topic, in this case I focused on access to forest resources, at the end of every day in the field. I ended up with 15 pages of observations during my stay in Bechati. I utilized this method for the two weeks I was

administering the surveys; otherwise, I kept a less rigorous journal documenting my observations. I spoke at length informally with the Peace Corps Volunteer who had been living in Bechati for over a year when I arrived in order to get her impressions of the village. During my stay in Bechati I also spent time in the market and in *jangi* meetings, using those opportunities as informal settings to discuss research topics of interest to this study.

During my year and a half of Peace Corps service in Piwa, I engaged in both informal and formal participant observation. The majority of my formal observation was taken during my work as an agroforestry extension agent, where I worked with village farmer's co-operatives to improve soil fertility and promote the use of trees in the community. This work allowed me the unique opportunity to work and talk to community members about resource constraints in the area and coping mechanisms to those problems. I primarily worked with women's groups, who hold a large amount of responsibility in households for negotiating food security and coping mechanisms during the long dry season. Informally, I talked and lived with women and men who showed me how they gather bush leaves to eat during the dry season, and who showed me food storage techniques that were necessary to sustain the household during lean times. I often spent time chatting with my neighbors at the *bil-bil* markets, the local very weakly brewed millet beer, about issues dealing with rainfall and soil fertility, and had the opportunity to learn how community members negotiate various resource constraints throughout the year and informally discuss questions of interest for the study.

3.4 Sampling

Bechati

Survey participants using the convenience sampling method which drew from the population that was readily available because of time constraints and weather issues. While not planned, this process often became a "snowballing" technique, where existing study subjects are used to recruit more subjects into the sample.

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Because I was working with a local development organization, we used the data as a baseline for future work, and I wanted to represent both genders and a range of ages. It was more difficult to find women to survey than men because women spend more of their time cultivating in the field than do men, and therefore they do not spend as much time in the market as men. To increase female participation in the study, we decided to go door to door in order to recruit more women. Using this technique, we managed to get a varied age range, from 18 years old to 67 years old (see table 3.1). I also wanted to represent the varying educational level of the community, and was able to sample a range of education levels, from no education, to primary school level, to secondary school and beyond.

Table 3.1: *Gender and Mean Ages for Subjects in Becahti with standard deviations for the Bechati study site.*

Gender	N	Mean age	Standard Deviation
Female	8	34.75	12.27
Male	43	40.88	11.84

I used surveys to gather information on the village, going door to door with a fellow Cameroonian to survey the population. I was required to work with a translator in many cases, because many older men, and almost all women, did not speak English. We also visited Jangi meetings, which met every eight days, to find people to survey. It was difficult to find people on other days of the week because most farmers would go out and camp at their cocoa or palm plantations and only came back into town for the Jangis.

Piwa

In Piwa, I administered a survey on market days, using a convenience sampling method (Weiss, 1994). I decided to go out on market days because it was the most convenient time to find people as they were not out laboring in the fields. I attempted to get a sampling of the area based on gender and age, but I ended up surveying more women than men (N=5 for men, N=12 for women). The average age of a respondent was 45 ± 13.5; the life expectancy of a Cameroonian is 71 (UNICEF, 2013). I would like to note, however, I am probably over-representing the older women's population in the village (x=45.27 ± 13.52 years, N=12), see Table 3.2. The average number of children that respondents had was 3.4 ± 2.1, which is representative of the average fertility rate of Cameroon at 2.9 children (UNICEF, 2013).

Table 3.2: *Age of respondents by gender at the Piwa study site.*

		Age of Respondent				
		>35	35-45	46-55	56-65	<65
Gender	Male	2	1	1	1	0
	Female	3	1	4	1	1

I also wanted to represent a variety of educational backgrounds. The majority of the community members in Piwa attended at the highest primary school. Over half (58%) of respondents finished primary school, and 35% of respondents attended at least some secondary school.

Polygamy is very common in Cameroon, but because Piwa is a predominantly a Christian village, the overwhelmingly common marital status is monogamy, and I only surveyed one single person and one polygamous respondent. I also surveyed three widows. Marital status is important to the study because the input from more than one adult in a household has an influence on the resiliency and stability of the household. While polygamous families generally have more children, which means more mouths to feed, it also means multiple women working and cultivating to feed their children, and also more manual labor for the family to utilize. Furthermore, because of political instability in the region, I was not able to collect large amounts of survey data, only 16 community members responded to the survey. I am relying, therefore, on personal observation as a source of data, because I lived in the village for over a year by the time I was evacuated.

The informants for the semi-structured interviews were chosen based on the knowledge base I developed during my first few months living and working in Piwa. I was informed that the three farmer-leaders based on personal observation, as well as from informal interviews I had with community members. The fourth informant, the delegate for MINADER, was chosen because he has a unique position within the community and he works with farmers to improve their agricultural capacity.

The community meetings were held (1) when I first arrived at my village and (2) after living for one year in Piwa. The individuals who were at the meeting were whoever showed up to the

meeting, so the sample was a convenience sample. The first meeting had a wide sample of the village, though predominantly men. The second meeting was predominantly women.

3.4 Analysis

3.4.1 In the field

Data analysis began while I was in the field, with the recording of participant observation in the form of notes and a journal. I made notes during each interview, in addition to recording the interviews; I kept a journal during the whole two years of my Peace Corps service. During my journal recordings, I focused on resource management issues in the village, primarily land use and water availability, but I also recorded data on what I observed to be sources of resiliency and personal difficulties working in development in the village in order to inform the third research objective.

3.4.2 Translation and transcription

The interviews, after being transcribed and translated from French to English, are primarily used as anecdotal sources of information to further inform the survey results and participant observations. The act of translation and transcription was the first stage of analysis for the study, and further coding was used to identify key information obtained from the interviews. The archival information was first translated to English, and was then used to inform both the background section of the case study and the results section. The surveys were translated, coded, and input into SPSS in order to analyze the results.

3.4.3 Coding of Observations

By re-reading my observations and notes for each site, I began analysis in the field; upon returning to the United States and continuing the analysis, I started coding my observations so that I could methodically begin analyzing the data. I marked sections in my notes and journal regarding the community meetings, and then went through my journal marking specific observations that were related to coping mechanisms and sources of resilience in the community. Finally, I marked my comments while in the field for my own suggestions and observations on potential areas of improvement for development agencies for strengthening coping mechanisms (objective 3).

3.4.4 Triangulating Data

All three types of data were used to inform the results to the research objectives. If what was said during interviews was supported by participant interviews, the claim that a certain perception or idea was important could be strengthened. Furthermore, archival information and survey results were in general reflective of each other, showing that even though the sample size was small, it was still representative of the community.

It is worth noting that using local people as informants does not, on its own, provide a holistic understanding of resiliency and coping mechanisms of a community. Many of the important coping mechanisms of the community are deeply rooted in traditional farming practices and social structures.

Summary

The two research sites were chosen by convenience based on my Peace Corps assignments. Unfortunately, due to political instability, I was forced to leave my first site, Piwa, mid-way through the data collection phase, and was re-posted in Bechati. The vast differences between the two sites led me to develop a different survey for Bechati. The interview guides were the same for both villages. Throughout the process, I kept notes and journal entries which were used as a qualitative source of information for each site. The surveys, interviews, participant observations and archival information gathered for each site were used to triangulate information on coping mechanisms and sources of resiliency, and helped to inform the last research objective – how sources of resiliency can be better strengthened.

Chapter 4: Case Study 1 – Betchati, South West Cameroon

***Picture 4.1**: The landscape of Bechati is dense montane forests. The heavy rains turn roads and trails into deep muddy paths. These children are on their way to primary school.*

Bechati is a community located in the deep rainforests of the Cameroon-Nigerian Cross border forest. The community primarily focuses on cocoa and oil palm production, and suffers from lack of markets. The literature is rich with studies explaining how isolation and market access affect poverty and subsistence across sub-Saharan Africa, and Bechati is a clear case of isolation framework. I surveyed the village in an attempt to identify what the main resource constraint was in the community , and the clear answer was market access. The village is accessible only by a dirt road, and small footpaths, which are almost inaccessible in raniy season. The buyers for their commodities arrive from the large city nearby and can demand whatever price they desire. Because of isolation, lack of market access, and decreased bargaining power, the community of Bechati remains locked in poverty. My main recommendation for development

and management strategies is to improve roads and increase information sharing in the community.

4.1 Bechati: Overview

4.1.1 Geography

Bechati is one of the villages of the Wabane Sub-division, Lebialem division, South-west Region, Cameroon (5^{o} 37'- 5^{o}42' N and 9^{o}53' – 9^{o}58' E). Bechati is the largest village of Wabane with a population of about 1,200 people and is located along the main road that passes from Wabane to Menji, the divisional headquarters of Lebialem. The village is only 230m above sea level, as it is located in a deep valley.

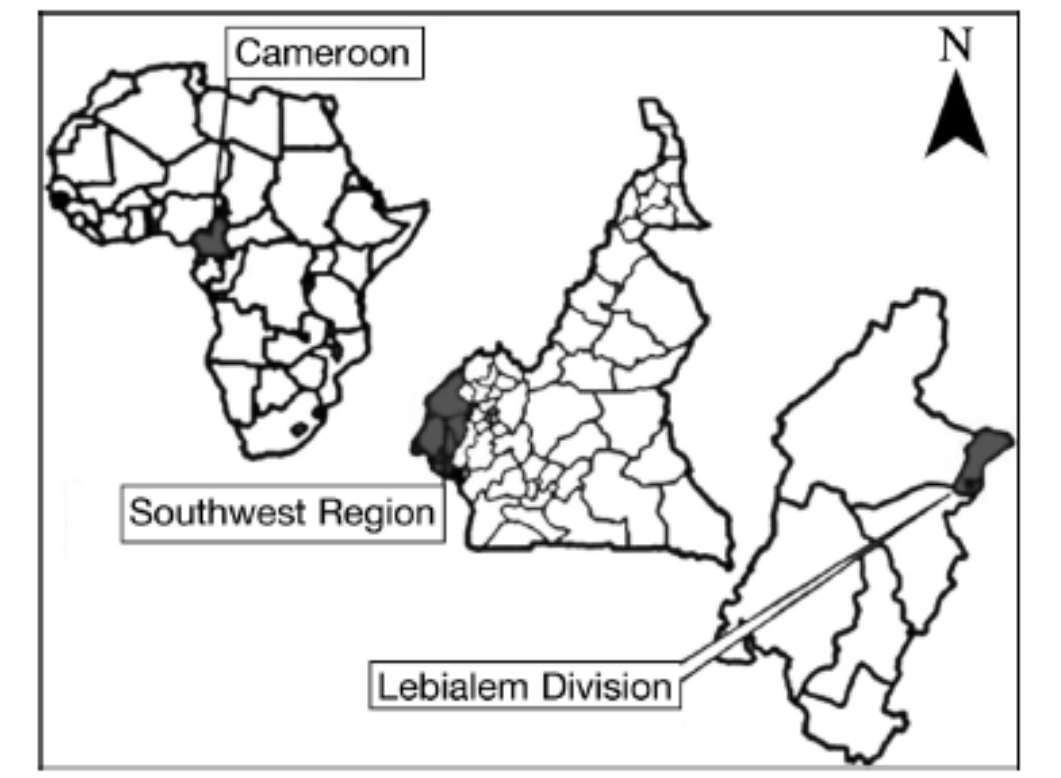

***Figure 4.1**: Polical map of the South-West region of Cameroon. Bechati is located in the Lebialem sub-division. Source: Public Domain*

***Picture 4.2**: Typical portion of the road leaving Bechati during rainy season. Passengers were often required to trek parts of the road.*

The village is situated in the Lebialem highlands, which forms part of the Cameroon-Nigerian Cross border forest, an internatinonally recognized diverse rainforest with a high degree of endemism (Nkemnyi 2013). The forest is home to some of Africa's most threatened primate species including the critically endangered Cross River gorilla (*Gorilla gorilla diehli*), Nigeria-Cameroon chimpanzee (*Pan troglodytes vellerosus*), drill (*Mandrillus leucophaeu*) and Preuss' guenon (*Cercopithecus preussi*). The area also harbors many endemic birds including the Bannerman's turaco, Banded-wattled eye, and Bangaw forest warbler as well as many endemic plants. (Nkemnyi et al., 2013) Iroko, mahogany, and boma trees dominate the forests. The

forest surrounding the village is a “communal forest” under the Cameroonian Forest Code Law no. 94 of 20 January 1994.

The area is a hot and humid forest. The temperature of the zone averages between 21^{o}C and 35^{o}C. The area experiences two seasons, a short dry season and a long rainy season. Rainy season extends from April to November-December with the maximum rainfalls occurring in September and October. The dry season, December to April, is never completely without rain. Average rainfall for the area is approximately 3 meters per year (Nkemnyi et al., 2013). The area is an important watershed with many fast flowing streams that drain into the Manyu River, which in turn joins the major Cross River at the Nigerian-Cameroonian border.

The village is accessable by a road year-round; however during rainy season, the road is nearly impassible for the average citizen. Trekking, one could arrive in the divisional capital, Menji, in about 12 hours. On a motorcycle, the ride is closer to six hours. Getting to the closest economic center and largest market 40 kilometers away in Dschang, can take between 4 to 6 hours via motorcycle or car during the dry season.

During the rainy season, it is even more difficult to get goods in and out of Bechati. Motorcycles arrive every other day from Dschang; the drivers deliver fish and other goods requested by community members, including medical perscriptions and mail. There are pick-up trucks that make the trip from Bechati to Dschang twice a week as well, picking up palm-oil from farmers on the way year round; in the rainy season the trip by car or motorcycle often takes over 12 hours. The recent installation of a cellphone tower has made it easier for community members to stay in touch with family elsewhere, as well as receive current Cameroonian and global news and information. But the conditions of the roads greatly affects the accessibility of rural communities.

4.1.2 Demographics

The Wabane sub-district area is dominated by the Mundani people, a group of people sub-divided into the lower Mundanis, who live in the lowlands of Bangang, Besali, Bechati, and Folepi, and the upper Mundani, who live in the highlands around the Mt. Bambutus caldera. The lower Mundanis claim to originate from the Widikum people from the North West Region, while the upper Mundani’s claim to have migrated to the area from the west, which explains

the minority Bamileke enclaves and the fact that both Mundani and Bamileke languages are spoken in the area. The difference between the upper and lower Mundani's is subtle: being visible intraditional garb, dances, and dialect.

The rest of the Lebialem district is dominated by the Bangwa tribe, and while the two groups now share a council and a treasury, theylack a basic common interest and there is a good deal of mutual suspicion. When the Germans penetrated the Lebialem highlands near Bangwa villages of Fozimongndi and Fozimombin, the Bangwas were at war with their Mundani neighbors over the ownership of palm groves. These tribal wars are a source of deep-rooted distrust between the two ethnic groups. The Mundani's distrust has caused problems with development and conservation efforts that are being directed out of Menji by a predominantly Bangwa development organization.

The villages in the area have well established traditional councils which resolve disputes concerning inhabitants. Each village is governed by a Fon, or the chief of the village, and each Fon works in partnership with the 7 other Fons in the Wabane sub-district. The villages are administered seperately by their chiefs. Bechati is currently having land disputes with Folepi, causing minor conflicts among inhabitants of those villages.

The area is predominantly Christian, with a large array of denominations for the small size of the villages. The area hosts Presbyterian, Catholic, Full Gospel, Baptist, Apostolic, and Jehova's Witness.

The Mundani people revere the forest as a spiritual and mysterious place. In Bechati, the people practice the worship of totems. These totems are animals, gorillas for example, who protect the person from harm. The belief is that if a hunter kills your totem animal then you would also die as a result. However, a traditional medicinal healer in Bechati has stated that the totem owner will only die if he or she does not seek immediate traditional medical attention. Besides totems, wildlife is very important to the village; for example, the chief owns several large python skins and animal pelts that hang in his palace.

The stapel food in this region is plantains, usually served with fish or cow peas. There is a central market every 8 days, following the traditional calendar of 8 day weeks and most of the merchandise comes from Dschang about 40 km away.

4.1.3 Economics

Both genders in the area practice agriculture, which is the primary economic activity in the village. More than 98% of the local population depends on agriculture for their main source of income and subsistence; the average annual income of the community is estimated to be about 330,000 FCFA (687 USD) (N=30). Most people practice small trading, fishing, and hunting. The main crops in the village are species that are adapted to hot climates; cocoa, oil palm, coconut, maize, plantain, cocoyam, cassava, and bananas (MINADER 2012). The cash crops are generally cultivated bythe men in the village; they enjoy a history of property rights within the village, therefore the large land areas needed for cocoa and oil palm culitivation is often the responsibilty of the men. Women are more likely to practice subsistance farming, primarily for

***Picture 4.3**: Harvest Palm nuts for oil palm is a dangerous occupation, and is a learned skill handed down father to son.*

feeding their families. Some women buy cocoa to resell in the market as well.

> *"Yes, not up to ten years [have women been cultivating cash crops]. They're just harvesting now, they've just entered into it. Now women are permitted to buy land and formerly it was men that had land. The women have money now and they can buy a piece of land." – Bechati*

The zone has a Credit Union which is affiliated with Menji and recently a village bank was constructed by Runnpi Area Participating Development Project. Private savings groups also are very common and operate alongside the institutionalized banks.

4.1.4 Land Use and Resource Conflicts

The main source of resource conflicts in the area involve land conflicts. In July 2003, there was a landslide in the highlands of Wabane that killed 21 people and displaced many other village members who had to be resettled in areas near Bechati and in neighboring Folepi. With increasing population pressure, the border between Folepi and Bechati has become a zone of contention for both villages, and tensions are starting to build. Furthermore, a portion of the nearby forest has been designated a protected area for sub-poplations of endangered gorilla and chimpanzee species. The organization responsible for the development of the reserve was created with a framework of a community wildlife sanctuary that reinforces bio-monitoring and law enforcement in the Bechati-Mone Forest Corridor, that would also strengthen the capacity of community conservation governance structures to enhance sustainable biodiversity management. (Nkembi et al., 2012).