Pastoral Resiliency and Development: Lessons from Senegal

By

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Abstract

In this thesis I describe traditional herding strategies of Fulani transhumants in Senegal, and their adaptations to repeated droughts thought to be brought on by anthropogenic climate change. I also describe unique and novel risks associated with pastoralism in the face of these droughts. Furthermore, I attempt to reconcile these practices with broader arguments about development practices. Specifically, this research addresses these questions:

1. In what ways, if any have pastoralists been affected by climate change-induced drought?

2. What are some of their adaptation strategies and are these strategies effective?

3. What are pastoralists' views on development? And what do they believe is the way forward?

4. How can this population and their unique experiences with climate change-induced drought inform us of the merits of planned versus unplanned development?

Furthermore, I discuss the adaptations of these Fulani in the context of broader development, and I provide information on development history in the Sahel, Sahelian pastoralists, as well as competing theories of Western-led development programs seeking to eliminate poverty.

Through my interviews in this study, I found that the pastoralists in question are struggling with a cycle of herd destruction from drought, and they have had relatively little experience with long range migration, unlike other pastoral groups. This is central to

arguments about pastoral resiliency as a resource, as long range migration poses a considerable risk to their livelihood. Furthermore, I have found that communal resiliency strategies based around reciprocity, tend to fail in the face of a community wide disaster.

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Contents

Development and Climate in the Sahel

The Sahel is one of the poorest regions on earth and has faced unique challenges in development due to a variety of reasons. Some of these reasons are cultural and ethnic divides, voletile cycles of drought, as well as arbitrary borders which serve to create derision between groups (Keenan, 2009). Other issues stem from Western-led development efforts that serve to keep The Sahel zone in a state of dependency in a form of neocolonialism (Moyo, 2009).

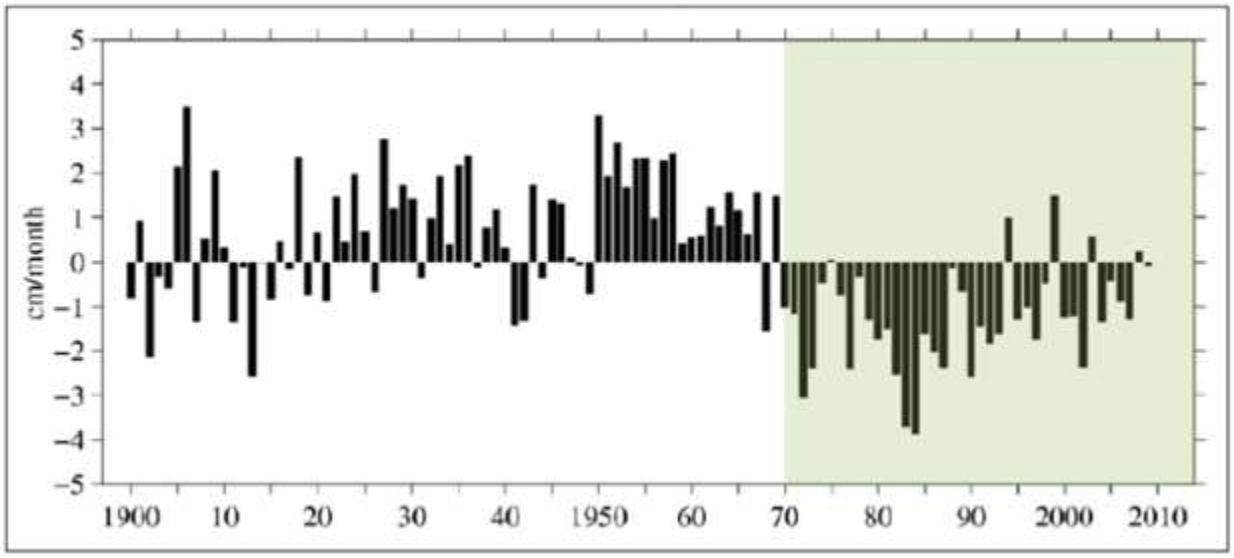
The Sahel has become a major market for foreign imports, largely as a result of trade liberalization policies thrust upon West Africa by the International Monetary Fund (IMF) and the World Bank making local industries unable to compete globally, fostering dependency (Moyo, 2009). In terms of development policy in relation to herders, there has been a long history of prescriptive sendentizing of pastoral people and an increased emphasis on cash crop agriculture, neither of which lend themselves to a pastoral lifestyle (Davis, 2016).

Pastoralist populations in the Sahel face growing concern from governmental and non-governmental aid organizations as a population that is highly at risk from drought. This concern was sparked in the 1970's after one of the worst-recorded famines in history devastated the region and gained the attention of climate scientists (Pots & Graves, 2013). Pastoralists seemingly became less and less able to sustain themselves simply through herding and the idea spread that the Sahara desert was rapidly creeping into the grazing lands (Davis, 2016). Initially desertification was thought to be caused by poor land-management techniques, namely overgrazing and deforestation, and was blamed on the pastoralists (Turner et al., 2014). The prescription for this was to attempt to sedentize nomadic populations, lower herd numbers,

intensify yield, and practice land-management techniques thought to stave off desertification. This desertification however, was proven to be overstated as evidenced by studies in the 1990's. These studies responded to the 1970's desertification scare and critique, used Graphic Information's Systems (GIS) to determine that in their test cases, one of which was Senegal, the boarders of the Sahara were not actually advancing (Hallden, 1991). While desertification has perhaps been overstated, anthropogenic climate change arguably has led to lower overall rainfall, severe and cyclical droughts, and other weather irregularities (Hein, 2009). There has also been a described re-greening of the Sahel in some areas, which points to the high regional variability of rain fall (Zhang, 2017).

Rainfall data from the 1950's-1990's clearly show a drastic decrease in rainfall, as can be seen on figure 1 below. However, rain gauge data from recent years has been harder to collect and interpret, although It does seem that there has been an increase from the previous decades. Overall rain data does not preclude regional droughts, which my research participants claim are increasing (Nicholson, 2012). Regional variability and irregularities in the timing of rains may be a better indicator of climate change then overall rainfall. A late rainy season, or an early rainy season can both have disastrous effects on herders and agriculturalists, regardless of how much rain is subsequently dumped (Nicholson, 2012). Pastoralists in this study cited repeated droughts as a new occurrence and different from historical cycles of droughts, often repeating how

Figure 1. Centimeters of rain in the Sahel since 1900



Note: this figure represents average percipitation in the Sahel, as part of a study from the Joint Institute for the Study of Atmoshpere and Ocean, and is used with permission. JISAO DATA, copywite 2018 by Universty of Washington.

“Our grandfathers never dealt with this.” This concurs with other research that cites the Sahel as a hotspot for negative impacts of climate change. Some of the impacts affecting this particular group are seasonal herd loss that affects their livelihood, their nutrition and even their identity. One respondent said **“**If the climate continues like this, herding will be dead.”

Recently the paradigm has shifted with development professionals from sedentization and herd reduction to pastoral mobility (Adriansen, 2008). Results from this study suggest that, for some populations, the answer lies somewhere in the middle assuming that sedentary and nomadic life lie on two ends of pastoral spectrum. While mobility can be a huge asset for some herders, it can also be the greatest source of risk. With limited forages decimating entire herds over the course of a few weeks, staying closer to town would at least give herders the option to buy fodder. Although staying close poses its own issues such as in Guede, where I conducted

my research, herders are forced to migrate to larger-population hubs to purchase animal fodder when they previously were able to find forage in the rangelands. Purchasing fodder leads them into a cycle of poverty, in which animals are sold in order to pay for feed, until no animals are left. Furthermore, the feed available for purchase are low quality rice husks, which lack the required nutrients for cattle to produce milk. Lack of milk production poses a grave threat to the pastoralists' diets and income.

The purpose of my research is to gain a better understanding of herder's traditional forms of resiliency so that they can be used to create projects that can help herders overcome cycles of poverty and achieve climate resiliency in the face of seasonal herd loss from droughts. Widespread and systematic drought has crippled their ability to rely on traditional reciprocal relationships as a means of mitigating herd loss. This is compounded by state imposed land management techniques and ideas of development that favor sedentism (Davis, 2016). My research also suggests that long-distance migration amongst this group of transhumants is a relatively recent phenomena directly linked to the changing climate, and therefore holds little insights in the way of traditional mitigating strategies for this group. Simply put this means: they never traveled thousands of kilometers for grass and perhaps they aren't the best at doing it. Literature on the subject will describe long-range migration as a major resiliency strategy, and this is true for pastoral groups such as the Tuaregs who were engaged in a different type of nomadism, which is outside the scope of this paper (Shapeland, Peter C, Personal interview, 2019). Long-range migration is not a resiliency strategy for this group, who may have migrated to cities for work, but didn't traditionally wander very far with their cows in search of grass. Evidence of this can be seen in quotes from respondents who said "In our grandfathers day he

never had to wander more than 30 Kilometers for grass. Back then, herders only wandered for the joy of wandering" among a myriad of similar sentiments.

This research focuses on an ethnic group known as the Fulani. The Fulani are a diverse group that spans many countries in the Sahel. They go by various names such as Pular and Peul, and they are made up of various lineages and tribes. Fulani society was traditionally organized in a feudal fashion with a hierarchy of lords, commoners and slaves. In modern times, they are seen as a lowly tribe, even though they are one of the largest and most powerful groups in the region (Basset, 1986). They are perhaps most famous for their spread of Islam across West Africa by the great Jihad of Ousman Dan Fadio. Although this history is somewhat disputed, Fadio established the Sokoto caliphate in what is now Nigeria and through this, exerted influence over much of the African continent (Forstner & Lovejoy, 1994).

The Fulani are generally considered a pastoral group. Although many of the Fulani are ethnically mixed and sedentary, they are considered one of the greatest herding tribes in West Africa (White, 1997). Cows are particularly sacred to the Fulani ethos, and many cite a deep spiritual connection to their animals (Basset, 1986). A particular Fulani group known as the Woodabe, for example, link their creation to a giant bull lured out of the river by a pair of hero twins. This and other stories actually earned Woodabe their name. Woodabe roughly translates to people of the taboo, named because of their strong connection to their indigenous religious traditions, which is a complex rendition of Islam that includes aspects of other world religions, and indigenous traditions.

The Fulani group I worked with in Senegal are *transhumant*, a term which refers to semi-sedentary peoples. This means that this group would spend part of their year wandering with

their animals and part of it in one place. As opposed to purely nomadic groups, transhumant have permanent dwellings, and hail from specific villages. Most pastoralists in the Sahel today fall under the transhumant label (Alidou, 2016).

Research Area

Research for this project took place in Futa, an area in Northern Senegal in an area known as the Futa. Futa is known as a herding area, and the ethnic majority are Fulani. My research was centered around a village called Guede, which lies on the Senegal River, a contentious border with neighboring Mauritania. The proximity of the river was important in this research because the availability of water means Guede serves as a gathering point for herders during times of drought. Guede also serves as a way station for people and goods coming from Mauritania, whose southern borders are also populated by a large amount of Fulani people. Areas such as Guede, which are located next to the river, are known as the wallow.

More rural areas less suitable for farming are known as the Jerri. The Jerri is the rangeland where herders will spend a majority of their year. There are permanent villages and settlements in the Jerri.

Senegal is in the Western most part of the African continent, and the Northern area's fall into the geographical territory known as the Sahel (Cooke, Flowers, 2021). The Sahel is a swath of grass land that borders the Sahara Desert. It starts on the coasts of Mauritania and stretches to Ethiopia. It is an area known for low rainfall and receives around 800 ml in the south to as low as 200 ml in the north annually (Biasutti, 2019). Droughts are nothing new to this area, but there is evidence and testimony to suggest that it has been getting increasingly

worse since the 1970's (Giannini et. all, 2008). In spite of this, its grasslands have still been the historic area for pastoralists (Swift, 1977).

Climate and Pastoralists

For thirty years, scientists have discussed climate chance as an existential threat to planet. For pastoralists in the Sahel, the impacts of climate change are being sharply felt. Droughts and famines have directly and indirectly killed thousands of vulnerable peoples, and displaced thousands more (Sissoko, 2011). Entire generations of cattle have been lost in a matter of weeks, and traditional resiliency strategies and ways of life have proven ineffective in the face of this growing problem probem of drought, especially when coupled with counterproductive development measures such as forced sedentism and aid programs that do not include pastoral groups (Nyong, 2007). Further, the widespread uncertainty of resource availability caused by weather unpredictability, and failed or mismanaged development initiatives have contributed to the unrest and violence in the Sahel, largely experienced by pastoral people (Kisangani, 2012). Although this, too, is somewhat controversial and conforms to the narrative that all violence is based on resource scarcity, rather than other political and cultural factors such as historic tribal grudges, corruption, or a fundamental lack of understanding of West African philosophies of money, wealth and power on behalf of outsiders (Turner, 2004).

A deeper understanding of pastoral peoples and their experiences is essential to development in the Sahel and understanding the true effects of climate change induced drought. Pastoralism, as opposed to agriculture, has proven to be a more effective livelihood strategy than farming in many areas of the Sahel, and it has even been suggested that

pastoralism can aid in the restoration of grasslands (Davis, 2016; Pedersen & Benjaminson, 2008) .

As previously mentioned, climatic strife is nothing new to the Sahel or to arid lands in general; long periods of shifting rains and droughts can be traced back to intense dryness followed by markedly wetter periods during the last glacial periods around 10,000 years ago. This period saw higher precipitation and many lake formations in the Sahara and Sahel (Groves, 1974). In more recent history, respondents spoke of droughts in the 30's and 50's, which rivaled the 1973 drought or anything seen recently (Gianni et.al, 2008). Some might even argue that the Sahel is not experiencing climate change in any particularly drastic way and is just caught in a regular cycle of drought (Nyong et al., 2007). Testimonials from this study cite the frequency and severity of droughts as being unparalleled in the last 5 years as compared to the last 60. This is contradictory to a recent model that suggests the Sahel may be getting wetter in the coming years. In either case, droughts in the Sahel are consistent with the effects of anthropogenic climate change, although the causal connection is hard to prove (Brooks, 2004).

In her book *Arid Lands*, Dianna Davis argues that arid lands can often be more productive economically than agricultural ones which require higher inputs. I would go a step further and argue that part of the shock that pastoralists are feeling from recent droughts are the result of Eropean post World War II development solutions that do not value pastoral lands. (Davis, 2016). Dating back to the colonial period, pastoralists were actually blamed for the desertification of rangelands. As mentioned, this desertification turned out to be overstated with little unnatural desert encroachment actually happening. This isn't to say, however, that this area isn't subject to droughts as previously mentioned. However, this idea of the Saharan

desert slowly creeping over the continent, is overstated and has led to a negative perception of pastoralists (Davis, 2016).

Deforestation and overgrazing wrought by pastoralists were cited as the cause of drought and aridness, and sendentism, agriculture and reforestation were prescribed as the cure (Dresch, 1977). In reality, these tactics arguably lead to actual soil degradation as well as a loss of the traditional and restorative tactics used by pastoralists to deal with drought. These tactics ultimately contributed to cultural shifts and tensions which can be felt today (Shetima & Tar, 2008). But if desertification is a myth, and the spiral of the Sahel into repeated droughts is manmade, are climate change macro-effects for pastoralists in the Sahel real? This is actually up for debate (Benjeminson, 2008). This paper operates under the assumption that drought in the Sahel is connected to anthropogenic climate change caused by global industrialization (Brooks, 2004). Furthermore, one of the central questions to answer is has this particular group of pastoralists been affected by said drought? using qualitative methods, responses from participants have overwhelmingly been yes. This research speaks to that qualitative data.

In the next section I will describe who these people are in both a broad cultural sense and in terms of this research. I will also identify the original goals of the study, and how it fits in with broader research. This will help contextualize both the findings and the discussion.

Who are Pastoralists?

Pastoralists refer to nomadic or semi-nomadic peoples who are primarily dependent on rangeland as opposed to agricultural land for their livelihood (Turner, 1999). In the context of this study as well as with most pastoral groups in Africa, the main economic unit of pastoralists are cattle, whose primary role is milk production. Milk makes up roughly 90 percent of protein

intake for many pastoral groups in the Sahel such as the Woodabe, Tamacheque and people who are the subjects of this study, although they now have other sources of protein (Dahl, 1977).

Historically, smaller animals such as goats are less important economically but still serve vitally important functions. Sheeps and goats are the main units driving a reciprocal economy as a major piece of the pastoral resiliency strategy **(**Dahl, 1977). Sheep and goats can be slaughtered for meat and given away during festivals or parties as gifts. A herd of cattle can be considered the pastoral equivalent to money in the bank, while sheep and goats can be considered petty cash. Typically, having a large herd of cows in particular, is thought of as a form of insurance for protection against drought or other catastrophes (Turner, 2009). Herders are allowed to engage more heavily in the reciprocal economy, as it makes the sacrifice of smaller animals easier to bear. Many pastoralists herd in groups or in family units, though there is some suggestion from this study that competition over grass is making that harder and harder to do (Dahl, 1977).

Goals and gaps

This study looks at resiliency among transhumants in Senegal. In particular, I seek to understand:

1. How traditional resiliency strategies work among transhumants in Senegal and if these strategies are known or new to researchers and the pastoralists,
2. Whether these strategies can remain effective in the face of climate change, and
3. Whether these strategies can be incorporated into pastoralist-sensitive development.

In a broader sense, this paper attempts to address the age-old question of whether or not Western-led development, as it has been practiced in the last 50 years, is warranted at all, and what duties the West has from a humanist perspective to aid people in poorer countries. There is a gap in knowledge about the transhumants who are largely sedentized, but also retain a herding lifestyle. These people do not necessarily fit into the model which completely rejects prescriptions towards sedentism. They also don't broadly fit into a structuralist model that paints development as a success, and by extension this sedenterization ideology as a success. This leaves semi-nomadic groups such as this in a unique position. This research is based in a framework of post development theory, post-colonial theory and humanism and seeks to reform development work.

Theoretical Framework

Post Development Theory

The framework for this study, and any resulting projects, is based on post-development theory meaning this research was undertaken with a critical mindset towards the current paradigm of development. The current paradigm overall supports large, top-down interventions, in which local knowledge has traditionally been considered as secondary. This research aims to understand local knowledge, insight, community structures, and discuss theory potential as the primary vehicle for development projects (McMichael, 2012). This understanding means taking an approach in which local voices are truly heard and gives them control of the narrative. It also means that any on-going project is designed in such a way that allows for continued effective communication amongst stakeholders and an equitable distribution of project benefits. This second element poses a problem to the original theoretical

principle of a community led project, which stipulates limited involvement in the actual running of the project on my part. This means that while it may be my intention to create this type of project, the decision is ultimately up to the community in an attempt to avoid what economist William Easterly might call “a tyranny of experts” (Easterly, 2013). Thirdly, It will be made available to the community, which could potentially mean translating the material into local language, in order to aid in the decolonization of Western university learning.

Also, I approach this research from a humanist standpoint. In this work I am aiming to improve the living experiences of the people I am researching - by their own standards. In practical terms this means I am working towards creating a tangible outcome that helps the people I am trying to understand, perhaps in the form of a project (Sen, 2000).

My thoughts towards post-development theory are largely shaped by the Zambian economist Dambisa Moyo. Moyo argues for a drastic reduction of foreign aid to Africa, which she believes has crippled the continent by creating corruption and dependency. Furthermore, she would argue that this crippling has been systematically engineered by the West to exert control over the South (Moyo, 2009). Moyo assigns much of this blame to the World Bank, the International Monetary Fund and their structural adjustment programs, which were meant to open up markets and usher in market-based development (Dossa, 2007). Instead, the Internationl Monetary Fund and the World bank have brought recipient countries economic stagnation and an endless cycle of debt which gives way to to what Moyo would argue as a handout from Western governments. She refers to these as handouts because, while conditionalities exist on these loans and gifts, they are often toothless (Moyo, 2009). These handouts fuel corruption in recipient governments which leads to the easy exploitation of

resources on behalf of the of West. Moyo further argues that this corruption is responsible for much of the violence which has become emblematic of Africa (Moyo, 2009).

Moyo goes on, in her book, to discuss the dangers of the single story. The single story is a phrase coined by author Chimamanda Adichie. In her TED talk, she discusses the problems that can arise when only one side of a story is told (Adichie, 2009). In this case she is referring to the story of Africa's poverty being controlled by the West. In the talk, Adichie discusses how the representation of Africa is often skewed to only show images of poverty and unrest and how this representation negatively affects Africa's standing in the World (Adichie, 2009).

Moyo's critiques of development follow the same line of thinking as those of William Easterly, another post development economist who argues against what he refers to as planned development (although his ideas are more focused globally). In his book, *The Tyranny of Experts*, Easterly outlines how Western powers have prescribed development to poor nations often to their detriment, drawing a lot from Hayek who was, perhaps, the earliest critic of the post -World War II-development paradigm in the late 1940's (Easterly, 2014).

It may be tempting when looking at scholars like Moyo and Easterly to lump them in with neoliberal capitalists. While both of them do advocate for a free market, it is actually in response to neoliberal development tactics which are actually designed to favor Western markets (Graham, 2005). This is contradictory to what capitalism would have you believe about the invisible hand of the market creating the best possible outcomes. Post-development scholars would argue that the power of the invisible hand may actually be true to an extent, but that the game has been rigged (Easterly, 2006). Furthermore, neither Hayek nor Easterly or Moyo advocates for an end to humanitarianism, but simply point out the flaws and advocate

for a reduction or restructuring of the post-World War II-development paradigm. Small-scale regional development is actually advocated for by Moyo, if done properly, outside of the massive international political machine that is development today (Moyo, 2009). Easterly and Hayek separate their policies more in terms of the state and the individual, arguing for spontaneous development or poor people's ability to think and act for themselves (Easterly, 2014). Of course, the counter argument to that is whether or not these people have to tools to do this (Banerjee & Duflo, 2011).

Having worked briefly in the field of International development during my Peace Corps service, as well as having studied its effects academically, I am inclined to agree with the post - development sentiment. While Moyo does not give specific mention to herders in her work, her work does influence the type of research and development outcomes I am committed to. Furthermore, I agree that the single story can be dangerous to sustainable development. This is why there needs to be a greater influence in local knowledge which would highlight a different side of Africa. I also agree whole heartedly with Easterly that development, as carried out specifically by the West, and has been negatively prescriptive in that it has ignored both poor peoples' abilities, as well as their interests. This has been particularly reflected time and time again with developments responses to worsening climate in the Sahel, which has forced a state-focused approach to make pastoral people fit in better with the boundaries and agricultural lifestyles. My research is geared towards better understanding of herders and their own issues, tactics and solutions.

As a development student and practitioner, Moyo's critique of aid comes as a rude awakening as most of us are complicit or engaged in this system. As previously mentioned

however, she does not condemn all aid. Her critique mostly lies with bilateral and multilateral aid or aid which is government-to-government or through large state agencies such as the US Agency for International Development (USAID). She does believe that small, grassroots development can be effective, sustainable, and appropriate. She gives an example of faith-based development as being appropriate, partially because of the time investment and understanding of local customs and languages on behalf of faith based non-governmental organizations (NGOs). These allow them to undertake effective and sustainable projects (Moyo, 2009). Though not faith based, this is the type of development I am working towards, though admittedly I am working towards that within the system of the post-World War II-development paradigm, which some scholars might reject on principal. I however believe that they can, and need to be reconciled.

Reconciliation

One of the main critiques on Moyo's work, and post-development theorists in general, is that while critiquing development, they don't offer solutions (Rankin, 2011). While advocating for smaller scale development is a good start, even small projects are somewhat complicit in the exploitive paradigm. In this instance, I fall back onto the dialectics proposed by Hegel. This is the idea that paradigms are created in three steps. The first step is creating a hypothesis. The second step is the reaction to the hypothesis or an antithesis (Prendergast, 2005) (Hegel, 1812). The third step is the creation of something new from the struggle. This new idea would comprise elements for both the antitheses and the original hypothesis. This idea can be applied to development. While post-development theory is correct in its critiques, it would be naive to think that the new system could exist without incorporating some elements of the old one. In

terms of this work, this means operating within a capitalist system that has resulted from Western domination. This mentality is being widely adopted in the field of development geography, and is rooted in a postcolonial framework, as opposed to a development one. Although these two share many critiques, development geographers might argue that post-colonialism is more rooted in praxis and reality (Radcliff, 2005). This divide is perhaps most sharply outlined in the tired debate between Easterly and Sachs. William Easterly argues that the "somewhere in the middle" approach to development serves to break the debate, and is therefore not useful. Although he still offers little reason as to why, feeding into critiques by the likes of Sachs that post development scholars are not rooted in praxis (Sachs, 2005). I am highly critical of Sachs based on his environmental determinisms, which basically states that people and society are the mercy of their environments. This ideology has led to racism and Eurocentric ideology in its worst forms. I do, however agree that we have landed where we have landed in terms of global power structures, and that we have to balance the idea of post-development theory with the very real lived experiences of people who are in daily poverty. In other words, we have to reconcile theory with experience, while at the same time not completely sacrifice idealistic critiques to the system that created inequality in the first place. This isn't to say these power structures can't be changed, but it will happen slowly, and in the meantime we still have an obligation to fight poverty. Easterly might be correct from a strictly ideological standpoint, in assuming the truth might not lie somewhere in the middle. Indeed, we can surmise that development as it has risen from colonialism is inherently bad. But, I would argue that the *solution* from a realist perspective, does actually lie somewhere in the middle. In

terms of this research this basically means having an open mind, and not adhering to any ideological camp.

One of the problems in the debate, which is highlighted between Easterly and Sachs, is that both sides, to some degree, paint the other as an ideologue. And to some degree they are both right, in that they are often perceived as rejecting the opposing side in its entirety. This leads to misrepresentation. For example, the whole notion of post-development not offering solutions simply because it rejects old ones, is false to begin with. It does offer solutions: scale back government aid and implement regionally specific projects that are locally built (Moyo, 2009).

We need the critiques and solutions from post-development. We also need the post-colonial framework, which focuses on actually getting these things done in the neoliberal landscape. And finally, for all of his widely critiqued environmental determinism: we need Jeffery Sachs and the ilk of larger development. It may be easy to completely condemn larger development for the bad it has done; but for a herder receiving food aid in Niger during the 2004 famine, or mothers receiving birth control after their 5th child in Benin, or any multitude of vaccination or medical drives, school repairs, etc., it probably has made a difference (Sachs, 2008). Arguably, development may have aided in causing these problems to begin with, but from a humanist perspective that is irrelevant in times of crises. The lesson here is that when we attempt "development" or attempt to "dismantle development" we ought to be doing it in order to have a positive impact on people's lives. This means we need to listen to poor people even when they disagree with our overarching framework. If herder wants to become farmer,

or vice versa, then so be it. If poor people are relying on food aid to survive, think twice before arguing about dependency theory. This plays into my ideas towards humanism.

Humanism

Underlying all of my thoughts towards development is humanism, which places human wellbeing and experience at the forefront. In terms of development, this also means questioning what the notion of progress actually means. What do my ideas about development actually mean to the folks I'm studying? To what extent do my preconceived notions of development and progress govern my interactions?

My ideas towards humanism are influenced by Amartya Sen. In his work, *Development as Freedom*, Sen Shifts the measurement of development success away from Gross Domestic Product (GDP) and towards improving the lived experience of vulnerable peoples (Sen, 2000). Furthermore, he believes it is the responsibility of governments to do this. This mirrors my ideas towards development as being place-based and situational, although I do not necessarily believe national government is the best medium to accomplish this as opposed to smaller communities who have a much better understanding of their needs than a state. However, at their core, Sen's arguments align with post-development in that there is no one-size-fits-all solution to development and that each community has unique standards and needs that should be addressed (Sen, 2000). In many ways these ideas are similar to those of Paulo Freire. In his work *Pedagogy of the Oppressed,* Freire discusses similar themes with an emphasis on dialogue. Freire would argue that to have a true dialogue, which is the true essence of praxis, one side of the conversation cannot come from a place of power that holds an ulterior motive and agenda. To have a true conversation and to truly be a humanist, both sides have to acknowledge one

another and the oppressed have to be given a voice to shape their own communities and outcomes (Freire, 1970). Like Sen and Freire, I am a humanist who believes in reshaping development as a humanist practice.

In undertaking this research, it was necessary to engage with this deep analysis of development theory in order to reconcile it with the negative history of exploitation that has characterized it. Going forward, my methodologies, findings and discussion should be looked at in the context of this framework, and indeed the framework should be considered part of my methodology.

Methodology

Data for this study were gathered over six weeks between August and September 2019. One hundred people were interviewed in five different villages using a snowball sampling method. Interviewing was determined to be the best method for answering my research questions for a variety of reasons. The first of these is that the object was to illicit story responses in which the tone as well as sentiment could be captured. This is easier to do with interviews, than a more quantitative method such as surveys. The second is that interviewing fits in well with a tradition of social storytelling which I have found in my 16 years of experience to be prominent in the region. Finally, I am trained primarily in qualitative methods, and wanted to use the methods I am the most skilled in. I have done similar research and found interviews to be more effective at gathering the sort of data I was looking for over surveys. Ideally I would have done both, but I had time restraints on behalf of my participants.

Interviews were semi-structured and featured questions pertaining to experiences and practices related to herding. Herding specific questions included questions pertaining to animal

acquisition strategies, price mitigating strategies, modern versus traditional herding strategies, issues of resiliency, gender roles, and barriers to herding, project desires, and nongovernmental organization (NGO) interactions. These questions were decided upon following a literature review, and a consultation with my research staff and local project implementer, who are themselves engaged in herding and are of the Fulani ethnic group. They agreed that questions relating to these issues would be best for garnering the information I was seeking. The initial survey was then piloted with a few pastoralists, and was continually revised as the study continued. General questions were also asked about family size, marital status, and family lineage. These questions were asked to provide disaggregation that might later be used in data analysis. Interview questions were also designed to encourage open conversation and storytelling, in order to make respondents feel comfortable and give more accurate data. This is partially because storytelling is a more culturally appropriate means of disseminating information (Grandia, 2015). This type of interview falls in line with ethnographic methodology, which requires a certain amount of observation and reading between the lines, but has arguably been used to garner more accurate and truthful responses then asking direct questions (Hay, 2005).

As mentioned, Interview questions focused on a variety of topics separated roughly into primary and secondary questions. Using primary questions to initiate conversation on a topic, then secondary questions to probe deeper until saturation occurs, is a recommended and effective interviewing strategy (Hays, 2005). Primary questions were meant to initiate conversations, and secondary questions were meant to probe or continue conversation on a

given topic. Topics were included until research participants consistently reaffirmed each other, at which point these topics were left out, and new topics were introduced.

A total of 8 topics were covered. Ultimately the focus of interviews shifted towards questions pertaining to projects that could mitigate the issues participants were experiencing. In particular alfalfa forage perma-culture became a main focus as it was a potential project identified by the community.

The questionnaire was initially tested with three people, then revised to be more culturally appropriate. However, the question categories remained the same. The semi-structured nature of these interviews, as well as the fact that they were taken in a snowball sample, was appropriate given the cultural context. Many interview respondents were difficult to locate given their semi sedentary nature. Furthermore, varying levels of participation and willingness to respond to certain questions made the adaptability of semi structured interviews the best choice, upon review of the literature (Hay, 2005; Creswell, 2016).

The research team, which consisted of myself, a translator, and a guide, would meet in the morning in the village of Guede Chantier five or six times each week and discuss research goals for that day. Typically a horse-cart would be hired to transport the team to one of the nearby satellite villages to conduct interviews. Interview respondents were contacted through a local research assistant who was in charge of the snowball sampling. Some interviewees were found at random by simply walking into an area where potential respondents were known to frequent. Interviews were typically conducted between the hours of 10 am and 2 pm. This daily work period was due mostly to time constraints on the part of the research subjects, as well as local customs related to when and how work is done on a daily basis. One to five interviews

were conducted per day, with the length depending on the data provided. Interviews tended to run longer when respondents had very particular insights, or deeper knowledge of the questions being asked. These respondents are considered to be key informant interviews, and were interviewed for longer. Other peripheral research participants would be interviewed for a minimum of 15 minutes. The average time for an interview was 25-35 minutes.

Field notes were directly translated onto a laptop in the field. This allowed me to take more accurate and faster notes than would have been possible handwriting, which was necessary given the time constraints of many of my participants. There were instances, however, in which a laptop was unavailable, and notebooks were used. These handwritten notes were later transcribed to the laptop. All data on the laptop isare now backed up on Box, as a security measure in case the laptop were to break or otherwise become unusable.

The data was were coded into NVIVO, a qualitative analysis software. Codes were divided into sections dealing with traditional adaptation strategies, which I defined as strategies which have gone back a long time in history and are at the core of a community, modern adaptation, which I defined as relatively recent strategies, hopelessness towards herding, and optimism. Hopeless versus optimism were some of the most important codes because these sentiments, and their subcategories, are what justify the entire study: is climate actually affecting these people? Is development actually the answer? The coding process was inductive, and also involved simultaneous note taking that served as the bulk of my analysis.

Recruitment and Trust

The research team was recruited through the help of my host organization REDES. REDES is an NGO that operates out of Guede Chantier and is focused on small development

projects. This particular NGO was selected because of the high level of trust they enjoy in the town. It was also selected out of convenience as they agreed to host me and provide a platform for this work. The director of this NGO, Aly Pame, is the host country sponsor of my research, as well as my direct supervisor. He enlisted the help of my translator, as well as my guide. Both of these individuals are from the local community, and enjoy high levels of credibility and trust.
I conducted some training with the research team on interviewing strategies and question design. Mostly this content dealt with asking questions in a way that elicited a story response from participants, as well as asking questions in a way that highlighted respondent's knowledge, and minimized our position as researchers. This attempt to minimize the power dynamic was done in order to gain as unbiased a response as possible. The interviews were conducted in the Fula language, a language which I do not speak well. My translator however, was an academic, who was already well trained in qualitative methods. He was able to understand how to interpret my English questions into culturally appropriate translations, which elicited the types of responses we were looking for. While the interviews were conducted in Fula, the translations were done in English, which is my first language. Since my translator was fluent in English, this provided the most accurate description of the data. When things were not adequately translatable to English, French was used, a language which I also speak well. The questionnaire was also revised with the research team and my supervisor before testing.

Gaining trust was done mostly through my association with REDES. The director of REDES was well known and well respected in the town. He made it well known that my research was associated with him through informal conversations as well as announcements at town

gatherings. Trust was also gained through an explanation of the research itself; letting research participants know that their information would be used to create development projects that could potentially help them. However, there were no direct promises made of any immediate benefits from participation, mostly because of a lack of funds. Trust was further gained through my guide, who is an employee of REDES, and also enjoys high standing in the community. Before approaching potential research participants, it was him who would explain the project, and get their informed consent. My own ability to speak the language in a limited context, as well as my understanding of Fula custom gained through prior research and experience, also helped in gaining trust.

Respondent Demographics

Out of the 100 respondents, 90 were men, ages 18-93, and 10 were women ages 25-65. The male respondents were split between those old enough to remember the 1973 drought, those who do not, and those who were even older and remembered long before the 1973 drought. Thirty percent were in the first category, 65% in the second category, and 15% in the final category. It should be mentioned that while there were 100 interviews conducted, 75 were coded into NVIVO. Upon review, the remaining interviews only served to saturate the coded data, and ceased to become insightful.

The 1973 drought is an important time marker for this study because it is generally regarded as the beginning of climate degradation in this region. The women respondents were harder to find and to interview, due to cultural norms and paradigms related to gender. Time on the part of the respondents was also a consideration when selecting women interviewees. West African women are typically busy at all hours of the day.

Around ten percent of respondents were key informant interviews. Key informant interviews were conducted with individuals who had unique insights, or were considered by the town to be experts in herding. These research participants were able to provide more detailed information on herding in general, as well as into other specific topics. The interview pool for key informants was largely composed of people who have a long history of working with projects, scientists, and community leaders. The respondents were all part of the Pular ethnic group, though they came from a variety of different lineages.

Respondent Criteria

All respondents were of the Pular ethnic group, partially by availability and partially by design. While most people in the geographic research area are Pular, they also happen to be the ethic group in Senegal who comprise the largest group of herders. When searching for interview respondents, we specifically targeted herders. All respondents were above the age of 18 because few herders below the age of 18 would have enough relevant experience for this study. All respondents in the study had, at one point in their lives, been completely dependent on herding as their main source of income. This was done to best reflect the goals of the study, which were based around herder's climate change adaptation as well as potential projects that could increase resiliency.

Locations

Research took place primarily in the Futa region of northern Senegal. Senegal was selected mostly for practical reasons: it is relatively politically stable, which allowed me to carry out my research safely, and it allowed me to be funded. The Futa region is emblematic of herding in Senegal. It is also an important region for agriculture as it lies along the Senegal

River. The byproduct of this agriculture provides animal feed, which is one of the main sources of resiliency to herders during the dry season. This meant that during the time of this study, the dry season, there were many herders from the surrounding areas in Guede and the surrounding villages. Guede was the center of my research. This was done for a variety of reasons, including available housing for me, it was the location of my host organization REDES, it lies along the Senegal River, and it is in an agricultural zone. This meant that there were many willing participants who had come to the area from the bush in order to buy animal fodder, as it was a drought year.

Culturally, the Futa area is also considered the center of Pular culture in Senegal which, as mentioned, is synonymous with herding. Besides these reasons, Guede is an eco-village that has long been experimenting with various development projects, some of which are related to permaculture, which furthered my reasoning for selecting it as my research site. This, combined with my affiliation with a well-respected community leader, meant that my research would have more credibility amongst the population.

Some research was also done in Mauritania. This was done because the Mauritanian village in which the research was done had extensive experience with permaculture, and was in the same region as Guede. Furthermore there was a cultural connection between the two villages, and it was advised by Dr. Aly Pame that I conduct interviews there to gain their insight as far as potential alfalfa permaculture was concerned.

Ethical Considerations

Ethical concerns were related to participant's time as well benefits from the study. I attempted to not abuse the respondent's time which could potentially impact them negatively

in terms of work or rest. This was done by gaining informed consent and giving the participants a time frame before the interviews start. Informed consent was gained by means of our translator explaining the study and asking explicitly if they consented to be a part of it and featured in any related work. It was also made known that their identities would be coded for anonymity. Further ethical issues with this study have to do with the benefits received by the respondents. Since my research is partially dependent on their poverty, I believe it unethical that I should receive a degree based on their responses. To mitigate this, my research will ultimately be tied in with building and implementing a project based on the respondent's voiced desires and knowledge, as mentioned earlier.

Findings

I will begin this section by reiterating my core research questions, and below them my main findings, which will be elaborated on in the following sections.

1. How have pastoralists been affected by drought induced by Anthropogenic climate change?
    a. Many pastoralists are stuck in a cycle of herd destruction and are unwilling or unable to use mobility as a resource.
    b. There are negative sentiments about the future of herding.
2. What are some of their mitigating strategies, and are these strategies effective?
    a. Many pastoralist are able to diversify in order to survive.
    b. In the face of community wide disaster, traditional reciprocal strategies are less effective.
3. What has been their experience with development projects?

a. These patriots have had limited success with collectives and savings groups, and seemingly limited interaction with outewardly funded projects.
b. They have expressed hope in the future of herding, and have expressed interest in alfalfa forage permaculture to help combat herd lose.

1. How Have Herders Been Affected Climate Change Induced Drought?

1.1 Sentiment

Many of the interviews revealed a hopeless sentiment in regards to the future of herding. The phrase "herding is dead" was echoed by many research participants, and many more expressed a desire to switch from herding to farming as their primary source of livelihood. Those who expressed these sentiments had oftentimes been the subjects of total herd destruction at some point in their lives, and had been unable to rebuild them because of repeated drought or other factors. Furthermore, 80% percent of respondents cited the last 5 years as being the hardest that they had ever witnessed. In some cases, generational wealth of hundreds of cows had been lost in a matter of a few months. Here are they ways in which respondents most frequently spoke about herding:

"Herding is dead"

"There is no future in herding"

"If the climate continues to change, we will not be able to herd"

"It is safer to stay here and buy feed then go into the bush."

All of these sentiments and more, portray a sense of not only hopelessness in the face of these repeated droughts but also a sense of failure on the part of governments and collectives. When asked about herding collectives, many said that they are useless, and herders were not

protected from devastation, because the groups were often formed by politicians, and used as money making scheme: they would have people pay for membership cards, but not provide any resources. Furthermore, when asked about traditional resiliency techniques, it seemed that their traditional community-based approaches to risk adaptation, the most important of these being reciprocal relationships, were also ineffective in the face of community wide disaster. In spite of all this, many expressed a desire to diversify their sources of income to save herding. In spite of the hopelessness, there was also a sense of admiration and pride in the herding tradition. One pastoralist who had lost everything said he would continue to try and rebuild his herds, even though it seemed like a losing battle. Many also stated that herding was all they knew.

In the broader context of development, these sentiments fall in line with literature on climate change in the context of development, which has been corroborated by scientist since the 70's. It also highlights development's failure that falls in line with post-development critics. Other issues with grass, gender and authority point to further complexity.

1.2 Issues of Grass

Most of the herders spoken to in this study were reliant on buying fodder to feed their animals because of the drought. This might be the case in any given year, as there is often little grass anyway towards the end of the dry season. When a drought occurs, these resources become even thinner, forcing herders who might have been accustomed to buying a few weeks' worth of fodder, to be dependent for upwards of a month. This puts the herder in a difficult position where they are forced to sell some of their animals in order to pay for the fodder. Small animals such as sheep and goats are sold first. This further creates strain, because

without their small livestock, people are also unable to engage in the reciprocal giving of feast animals, and may be unable to host weddings for their own family members. Eventually cows, the most prized possession, are also sold, or die from hunger. One woman herder we interviewed was willing to sell her cows for as little as 5000 CFA (10USD) a head, rather than see them starve. A healthy cow will often go for 100,000 CFA or more. It was also mentioned that there is an emotional toll that comes with watching their animals die, or be sold for a pittance. One woman herder even said that during the 1973 drought "herders were killing themselves rather then coming home having lost all of their animals. Fulani have a deep connection to their herds, and will often go hungry themselves rather than see their animals die." For example, when asked if herding had been harder in the last 5 years, one woman said "we were not even eating. We were hungry but we refused to eat our animals even when we had them". The purchasing of fodder is a major expense to these people who are considered to be in the bottom bracket of poverty by income (Sachs, 2008). Many herders reported spending 15,000-50,000 CFA weekly on grass. This money is mostly borrowed or gifted from friends or family members as well, and is most likely going to sustain animals from multiple families. For example, one herder said "My son often gives me money weekly to buy grass." This is important to mention. While giving animals to rebuild herds is not practiced, it is commonly practiced to give cash, and this is a communal strategy. This extra expenditure also contributes to the cycle of poverty that many herders find themselves trapped in. For example one woman herder said that "Now we have to give money, we didn't do that before." Other people mentioned similar things about the money, saying they would not give names but would give some money if they had it. One herder stated that "I used to give animals when he had them

but now I don't, I just give money." Again this points to how drought has negatively affected reciprocal relationships. If you have no animals, people may expect you to give money, but it is hard to get money without animals.

These problems are compounded by the grass itself. The fodder commonly bought is rice husk. This is a byproduct from the rice farmers, whose operations have dramatically increased over the last ten years. Rice husk holds very little nutritional value. It will keep cattle alive, but it doesn't help very much in the production of milk, which is a dietary staple and source of revenue for the Fulani. So, people are paying to keep their cows alive, at a disadvantage of having to buy milk, and losing revenue at the same time from milk products they would have sold. Herders will oftentimes buy and haul rice husk to their animals, which may come as an added expenditure. Sometimes they will outright buy a field, typically 1-5 hectares, and move their animals on it to graze. It was difficult to determine how many hectares it would take to feed any given number of cows. This was on account of cultural issues related to herd numbers. Fulani people are often unwilling to divulge their actual animal numbers for fear that they will die, or be stolen. This is also true in regards to children. One herder also said it was difficult to assess because it depends on the cows. This herder went on to say that, for him, one hectare would only feed 3 cows. Another herder said 5 cows. From varied interviews we were able to get some rough estimates of one hectare feeding anywhere between 3-10 cows. After consulting with one of our key Informants we determined that one hectare of grass could feed up to eight cows for a week at most**.** This is a pathetic amount compared to other plants such as alfalfa, which according to one key informant involved with

an alfalfa forage project close to Guede said that he “could feed 50 cows per hectare for an entire month.” The system of buying rice husk is inefficient.

The supply of animal fodder is also limited, which creates another issue. With herders unable to sustain themselves in the Jerri, there are simply too many seeking fodder in Guede. The population and number of animals swells, driving up the price of fodder, and leading to shortage. This can create social issues between farmers and herders. For example, one person had their animals impounded for grazing his animals on a field that was not his, a move that came out of desperation.

These issues with grass point to the complex relationships that herders have with the cash economy as a result of colonialism and stat models of development focused on Agriculture. While these expanded agricultural programs seem to have provided an out for herders to buy fodder to sustain their animals, it has also created an economy which, according to elders, didn’t used to exist. Futher evidence from older herders who claim they never had to walk far, suggests that these expanded agricultural programs might have encroached on land that was traditionally open for grazing as evidenced by this sentiment: “when I was young I never had to wander far to find grass.” It also points to how this economy serves as a barrier to people who used to mostly be able to sustain themselves from the land. For example, one elder referenced how in his time there “were very few needs and a small amount of money went a long way.” He and other elders also referenced how often milk and animals used to be exchanged as opposed to cash. At the same time however, it does not necessarily indicated that increased mobility or the elimination of the cash economy are solutions either, as the cash economy is long standing.

1.3 Disenfranchisement of the Woman Herder.

Research for this project was primarily focused on men, as they are the primarily responsible for traveling and acquiring animals, medicine, and fodder. Women were harder to interview because of the amount of work they are doing during the day, relative to men. This isn't to say that women are not involved in the care of the animals. On the contrary, they are most often involved in the milking, the processing of the milk into cheese or yogurt, and general care of animals when they are in the villages, as is common in most herder societies in West Africa (Dahl, 1977). These roles are essential to, not only the financial wellbeing, but also the dietary wellbeing of the family. With the lack of milk being produced by the herd's consumption of subpar rice husk, these roles have somewhat been diminished. This could be putting additional strain on women who would now be responsible for finding other avenues of protein and income.

While men are typically considered to be the "herders", there are many women who also bear the title. According to some participants, woman herders are quite common, though not as common as they used to be due to the climatic strife. Herding as a woman poses a slew of added challenges, one of which is childcare. A woman herder we interviewed spoke about the difficulties of traveling in the bush while pregnant and taking care of children while on the move. These women would often travel with groups of men herders who had had no such constraints. One recalls having to prove herself to the men by climbing high into the trees with her machete to cut additional branches for animal feed. Stories were also told about mothers and grandmothers who had earned a great deal of respect and fame for being particularly adept herders. Aside from the burdens of childcare, we know from other studies that women

are oftentimes responsible for the diet of the family as well as portion of the income, meaning they will often engage in petty trade on top of their other responsibilities (Walker, 1993). These would also make it difficult for a woman to dedicate herself to herding, yet many women still do. Women would often herd for their families or for groups, like many young herders, but they also had their own animals. This has diminished in recent years by a changing of customs which came as a result of the shifting climate and the shifting of societal roles. For women, a primary means of obtaining animals was through dowry. These would be negotiated through the fathers of the families, and the cows would be given to the women. It was also common for them to receive additional animals as bridal presents. These animals, while they contributed to the new family's herd, were distinctly for the women, and could be sold at her wish, giving her private wealth as protection against divorce or death. Traditionally these bride prices had no limit and were up to the discretion of the family, meaning a woman could get five cows or even 100.

However, when the climate began to change, animals died off, and scarcity of resources made it difficult to marry. At this point local religious leaders known as Imams began posing restrictions on how many cows could be offered for a dowry. One woman herder we talked described the following: A divorced woman who remarried would get 30 cows. A virgin would get 15 cows. A widow who remarried received 10 cows. This system made it easier and cheaper to negotiate marriages, but it also put limits on the amount of cattle wealth women could amass at the onset of their marriages, and thus the amount of power they had. These customs vary region by region, but what we learned from this study is that the amount of cattle payable to women continued to decrease. It went from 15- to 10, to 7, to 3. In modern times it is more common to simply pay cash for a dowry. While this may be more versatile, it has less symbolic

power associated with it, and less equity. Cows produce offspring and milk, allowing the wealth to grow (Dahl, 1970). Cash is typically used to pay for immediate needs, and frequently given out as an obligation. Furthermore, it diminishes the role of women as herders, in society where herding can be highly prestigious.

It is not surprising that women would be the collateral damage caused by the system's reaction to climate change. This follows historical precedent which colonialism and capitalism which often sees women's roles diminished first. This is as true in farming where large male-focused projects were favored in spite of the majority of farm labor being done by women, as it is in herding (Antrobus, 1993). In the broader context of development, this matches post-development critique, however it is also uniquely tied to local values and customs. In either case in the words of a woman respondent "the situation for women herders in Guede is not good"

1.4 Issues around herding groups and collectives and microfinance

Issues around formal community-based strategies such as herding collectives were also present in my interviews, as indicated by the lack of enthusiasm for collectives. It was difficult for me to get respondents to elaborate on why, but my research assistant, a herder himself explained to me those in charge of the collectives - often rich individuals and politicians - use the collectives to collect membership fees or charge for member Identification cards, without ever actually doing anything to help the herders. One herder said that "they mislead people," and a vast majority of the others said they collected money from them but that "they never saw any benefit." This can also be said for some of the collective herder insurance groups in which everybody puts in an amount, which is theoretically doled out periodically when herders are in

financial trouble. One herder simply remarked that they were “useless” another went on to explain how microfinance lending scares herders because if there is a drought, which for many of the interviewees seemed to be a certainty, they would be unable to pay the debt. These strategies of community saving groups, collectives, and microfinance are quite common in development, in particular with the formation of women’s groups, for gardening, health information dissemination, microcredit, and saving (Baden, 2013; Dasi, 2013). Arguably this has been a successful tactic, and theoretically it fits well with the communalism which is foundational to much of rural West African society (Izuagie & Sado, 2015). Theoretically this might be a good solution for herders as well, but in these regions the notion of yet another herding collective is met with resignation.

2. Adaptation Strategies and their Effectiveness

Initially, I investigated climate adaptation strategies to separate traditional strategies from modern ones. This however proved hard to do upon finding that the reality of climate change was rather recent and therefore specific long-standing practices didn’t really exist, at least in relation to long range migration and repeated severe drought. Almost every herder interviewed said that the previous five years had been substantially harder for them, and many of them attributed the droughts directly to the changing climate. However, long-standing general attitudes towards herd economics and communalism did exist, and most strategies could be associated with them. Findings in this section are related to building and managing herds, as well as societal roles that serve these ends.

2.1 Building Herds

Building a large herd was synonymous with some interviewees as being a source of resiliency. This is also described in the literature (Dahl, 1976). It stands to reason that by having a large number of animals, one is better able to protect oneself from drought and illness, meaning that if some animals die, a herder will have a large stock to fall back on. Some interviews, however, suggested that this strategy is flawed with respect to widespread drought and competition for scarce resources This goes back to the herder who said he "used to give animals when he had them but he can't any more." Another herder described something similar saying he "always helps if he can." This is African reciprocity, as one respondant said, "What is your problem today will be mine tomorrow". But he went on to say that it's hard when he has nothing to give. We can see a comparison between several older herders as well who mention communities coming together to support people who have lost herds. Most of the young people say they do not ask specifically for help rebuilding herds because during a drought year no one has anything. When herders become dependent on buying animal fodder, as many have in the Guede community, they are forced to spend enormous amounts of money trying to feed their entire herd or selectively feed animals while watching other animals die, which can be traumatizing. Furthermore, during times of widespread drought, there is less of a market for cattle as everybody is worried about feeding the animals that remain. In times of drought, milk production falls. In spite of the dry season being an ample time to buy because of price, some herders said they preferred to buy in the wet season, but only if they had secure grass, as evidenced by this quote "I prefer to buy in the wet season because you can know the animals are stronger. If I have money I will buy some." Many of the herders said that in recent years they have been unable to buy animals during the dry times even with the prices being

low. For example, one respondent said “I prefer to buy in the dry season because it is cheaper, but I was unable to buy any animals this year.” One interviewee, who was successful at stockpiling, grass said that by keeping his animal numbers low, he was able to better feed the cows that he had. He went on to say that he was the only one in his immediate village whose cows were still producing milk, making his smaller herd more profitable than a larger one.

This strategy resonated with one of the older herders who said that they used to have far more manageable herds when he was younger and that this made them easier to care for, “Our grandfathers had everything, grass and smaller herds” He said. He also said that, since people followed their societal roles, there were fewer animals and more grazing to go around: “You could not just become a herder it was something you were born into.” Another interviewee spoke similarly on the subject saying “If you see a changing of roles today, it is because nobody has anything. The farmers have bad yields, the rivers are drying up and the cows are dying. So everybody want to become everything else.” People diversified in response to worsening conditions.

The ideas of the older generation seems to contradict others who described the pre-1973 “golden age of herding.” These people described not only massive herds, but also a greater emphasis on community. People had their roles to fill: Fishers, herders and farmers, and they helped each other within those roles. Furthermore, while few people said they would give animals today to someone who lost theirs, one older respondents said in his day “ the community would come together and each one would give him an animal” In order to rebuild his herd. Respondents also cited that during this golden age of herding they would herd in groups, as they do today, or that one herder would often herd the animals for a number of

people at one time. With this in mind it becomes difficult to ascertain whether or not the herds were actually bigger for individuals, or whether these larger herds were due to collectivity.

In either case, descriptions of the golden age not only included animals, but also a flamboyant culture in which herders enjoyed special rank, traditions, and fame. One older interviewee described “a herding competition in which massive herds were actually raced, and famous herders would adorn themselves in garments made from 10-100 meters of cloth to show status.” This grandeur seems to be far away from the hopelessness which seems to permeate many of the respondents spoken to in the present context. The old ways of herding and community were more than just the accumulation of animals for profit and for survival, it was part of a joyous tradition. Some of these traditions still exist. When herders are particularly happy, say for instance on the first good rain of the season, they will often race their smaller animals such as sheep or goats.

Herds are mostly spoken of primarily in terms of cattle, and to a lesser extent in terms of sheep and goats. In the modern context it would seem that sheep and goats would be of greater importance, especially at a time when cows are not producing as much milk, but they are still the secondary economic units of pastoral society. This may have to do with the fact that sheep and goat’s milk is not commonly consumed amongst the Fulani in this area. Sheep and goats however remain monumentally important. Not only are they bought and sold for the cash needed to acquire medicine and fodder for cattle, they are also an important part of accumulating cultural capital. Sheep and goats are donated to weddings and other ceremonies. They are also the greatest expense for Tabaski, the most important religious holiday of the year (Brisabrre, 2017). These gifts and displays are important not only to stature but to the

economy. Having animals donated to feasts limits the financial burden of families who are obligated to feast and celebrate (Davis, 2016). Sheep and goats keeps the herding world turning: they are used essentially as a type of social currency, and are transformed into actual currency in terms of selling them off to buy necessities. They are also far easier to keep alive, to feed, and to trade, and much easier to build larger herds (Dahl, 1976). In the historic context, the equity of cows as well as their ability to produce milk made them the most obvious economic unit. In the current context of this study, it seems a little less clear. While some people talked about how well they were doing in terms of sheep and goats, most of these herders were still concerned with cows, and most still wanted to have large numbers of cows, despite the seeming economic infeasibility of this. This was evident in conversation around rebuilding herds that mostly focused on cows as the main economic unit. The theoretical framework of this work however, would dictate that people typically know what is in their best interest in term of money (Sachs, 2008) and while they might not always act on that on a day to day basis, the theoretical economic underpinnings of cultural practice are typically sound (Abhijit & Duflo, 2011).

The importance of gift-giving and reciprocity has not been overlooked by the development field. Herd regeneration projects have cited gift giving as an important part of pastoral economy and one of the desired outcomes of these projects is for this to continue, which in turn strengthens this particular traditional resiliency pathway (Aktipis, 2011). Another important strategy I came across is a traditional form of animal lending called *sartou*. *Sartou* has a few variations, but generally speaking, this is the practice of loaning out animals to someone in order for them to build their herds. When the animals give birth, the herder is

eventually able to pay back the lender. Another variation is when the herder looks after someone's animals and is given some of the offspring in return for his labor. This particular strategy has been mimicked with some success in development in the goal of herd regeneration, which would make sense given that it is built upon a traditional resiliency strategy. An example of this comes from Niger, where a project began an animal lending bank and were reportedly able to aid many Tuareg pastoralists rebuild herds after a multiple drought years, and maintain animals to be loaned (Woodke, 2012).

Interestingly enough, while almost every herder we spoke to knew what *sartou* was and knew of someone who had practiced it, almost no one had practiced it themselves. In spite of this, respondents cited it as being one of the more important traditional means of herd acquisition for young people, " No I have never done sartou, but I know people who have done sartou" and "herders will do this starting out" were the most common responses to questions related to this (Perosnal Inerviews, 2019). One possible explanation is that this particular practice, like asking for help when herds have been decimated, is either shameful or not something that is readily discussed with outsiders, meaning I wasn't asking the question correctly. Another reason is that the cash economy has replaced this practice, with people preferring to either be paid cash for herding other's animals, or be paid the customary one sheep per month. These are then sold or bred into a herd with which the person in question can acquire cattle. In either case, animal lending has proven to be an effective development tool for re-building herds and seems to be at least loosely based on this old strategy. This strategy also plays into the sedentism of these groups and others like it. By paying young men to go out and herd, the owners of the cattle can stay home. Often, they can engage in part time

agriculture or other income generating strategies in order to diversify their income (Adrianson, 2008).

Inheritance is arguably the primary means by which herds are acquired. Children will often grow up herding their father's, uncles' or even brothers' animals, and then these are eventually passed down to them as a form of generational wealth. This makes the whole issue of herd decimation even more critical because it creates and entrenches intergenerational poverty

We can see that historically cultural practices of herd management and growth are somewhat contradictory citing both herd reduction as well as herd increases. These types of responses highlight the importance of listening to herders when attempting to craft solutions, as opposed to simply relying on whatever the popular narrative is at the time. For example, the narrative that argued for sedentism for most of colonial history and into the 80's versus the one now arguing for mobility. It is also important to remember that citing destruction of herding traditions by a paradigm that doesn't value pastoral lands, does not invalidate herders who say that the future of herding may require diversification and herd reduction. It is tempting to hear stories of the golden age of herding and to romanticize them. The real challenge though isn't recreating the old system, but rather listening to people and helping them create a system that works today.

2.2 Herding Practice

Some of the notable herding practices uncovered were related to scouting, distance and labor. Scouting plays a key role in herding. Traditionally herders would go on horseback or on foot ahead of their cattle to find areas of grass. While this is still common, a cell phone is

sometimes used to inform other parties about where grass is. However, one respondent said that now when he finds grass he is less likely to call other members of the community in response to increasing scarcity. Furthermore, herders restated that, in recent years, they have to travel farther and farther in search of grass, some reporting upwards of a 1000 kilometers. This carries other risks such as border crossings, particularly into Mali, where there is ongoing conflict (Barkindo, 2020). In the broader framework of this study, these practices serve to inform us about the changing landscape of borders and the impact it has on herders.

3. Coping Strategies

Originally in this research I had divided coping techniques into traditional versus modern methods. However this might be a misnomer due to the recent nature of long-distance transhumanism amongst this group. Below, I describe the coping techniques I encountered.

Stockpiling grass was one of the more effective coping techniques respondents reported using but only if the pastoralists in question has enough inputs to do it sustainably. This technique is one where a herder will harvest and/or buy grass when it is cheap and abundant, and stock it for the dry season when it is harder to come by. Some herders were even able to turn this into income generating activities, where they were able to sell the fodder to other herders. While this strategy seems like an easy solution, the logistics of it were actually fairly difficult for the average herder in this region to pull off. Stockpiling grass requires a large amount of dry storage space that not everybody has access to. Aside from this, it also requires either a lot of labor or a lot of money to stockpile. During the rainy season most herders are following the grass and taking care of animals. This makes it difficult to stockpile a large amount

at the same time. For people who often rely on buying fodder out of necessity, spending money on it when free grass is available is not something everybody is willing to do. While a few herders are able to gather and store adequate grass, many are able to only store enough to feed some of their animals for a few days or weeks, and only for their large animals at that.

There was one herder, however, who believed that this stockpiling is the future of herding. He was able to stockpile enough grass during the rainy season to feed his entire herd for several months at a time and commit himself to other income generating activities such as farming or petty commerce. With his animals being some of the only ones who remain well fed during the dry times, he was also one of the only herders whose cows were producing milk during the time of the interview, which further generated wealth. His ability to stockpile enough grass for the dry season was due mostly to his smaller herd size, which he outlined as part of his strategy.

The idea of having smaller animal numbers is an old technique which was also outlined by some of the elders we interviewed. This particular herder said that “larger animal numbers are meaningless if they are unable to produce milk, and bankrupting families in order to keep them alive.” Building a large herd is synonymous with some as being a source of resiliency. This is also touted in the literature (Dahl, 1976). It stands to reason that by having a large number of animals you are better able to protect yourself from drought and illness, meaning that if some die, a herder will have large stock to fall back on. Some of my interviews however would suggest that this strategy is flawed in times of widespread drought and competition for scarce resources. This argument is reminiscent of arguments made by colonialists and early

development projects that argued for herd reduction in the name of land management to stave off desertification, but they are not without merit (Swift, 1977).

When herders become dependent on buying animal fodder as many have in the Guede community, they are forced to spend enormous amounts of money trying to feed their entire herd or selectively feed animals and watch the others die, which can be traumatizing for herders. Furthermore, during times of widespread drought, there is less of a market for cattle as everybody is worried about feeding the animals they have left, and there is little milk production. This is in spite of the dry season being an ample time to buy because of price. In fact most herders said they preferred to buy in the dry time, but only if they had secure grass (as noted in the findings). Most of the herders said that in recent years they have been unable to buy animals during the dry times. Furthermore, one interviewee believed the future of herding is sedentary, and will be a combination of herding and farming. This also is nothing new (Adrianson, 2008).

From our interviews, it seems that the greatest adaptation strategy has always been diversification. Even if a herder's primary source of income are animals, most of the people have at some time or another engaged in farm work, construction, or migrated to engage in petty commerce. The latter one being particularly important. Many people we spoke to had migrated at one point to the city in order to sell milk and yogurt. This was particularly noted to have happened directly following the drought of 1973, although it was also important before that. Some people migrated to find work in Mauritania, Mali and other areas. In terms of farming: many interviewees stated they would like to engage in it, still many others had little interest in it as a primary source of income, because it wasn't at their cultural core

Furthermore, the notion of having lower animal numbers is a seemingly contradictory cultural practice. Large animal numbers are seen as a source of security, and convincing people to have fewer animals and embrace a higher level of sedentism may have negative cultural implications for people.

Other adaptation strategies include taking advantage of seasonal pricing structures. Many herders will try to buy animals in the dry season when they are cheaper, if they are able, though many or not. Some respondents said that these animals are really very good, and they opt instead to buy during the wet season, when the animals are more expensive but stronger. As mentioned earlier, this is becoming less common due to poverty and debt incurred in the dry season. Seasonal price also comes with seasonal risk. One of the herders interviewed reported that almost his entire herd had been stolen several weeks before the interview. A semi-truck had pulled off the road and simply loaded up his animals from their corral in the dead of night, a tactic which several others have mentioned as being somewhat common. This type of animal theft is especially prevalent in the months leading to Tabaski (Eid). This is the biggest festival of the year and there is an immense societal pressure to procure sheep to slaughter and share meat (Brisbarre, 2017). It is also a time of gift giving, and can generate a large amount of strain on families. This was evident during my time there which began roughly a month before Tabaski and ended several weeks after the festival.

Animal theft as was just described is linked to what some of the elders had said about societal roles, the increasing importance of the cash economy, and the increase of mobility. Roads allow for easier migration around the country and between borders. This means that an area like Guede can have an influx of people from, say Mauritania, which puts an increased

strain on grass and water resources. This actually happened in the 1980's when Mauritania kicked out all non-Berbers in an act that almost started a war with Senegal (Parker, 1991). It has caused tension in Guede that extends to this day. It also means that opportunistic thieves can pull up in semi-trucks and steal a great deal of animals and sell them for a quick profit, far away from the community they were taken in. They are not from there area and have no social accountability.

Fear of theft also plays a role on herd acquisition and buying strategies. Some of the people we spoke to expressed fear about accidentally buying stolen animals. This determines whether or not animals are bought from family members or from the markets. Some herders said they would rather buy from markets because there was actually less of a risk involved in terms of buying a stolen animal which could result in social backlash or even legal issues. The market acts as a mediator, removing them from any blame on the purchaser, if the animal was in fact stolen. If they purchase the animals from their family however, they could be considered complacent in the theft.

There were some who had the opposite thing to say, but by and large most people said they prefer to purchase their animals from the market. This can be seen somewhat as separation of business from family. Money is considered somewhat dirty and transactional relationships are not welcomed in a family dynamic. Most of our respondents said that they typically get better prices at the market, and that buying from family came with the obligation of paying a higher price, and that buying from family members was almost done as a favor. This seemingly plays into this custom of not asking for help. At the same time, help is expected to be given. There is an old adage in the United States which goes "don't ask for what should be

offered freely," and that seems to ring true for the community in this study when it comes to cattle or other animals. It is however perfectly acceptable to ask for cash. When a community member gets paid, they can expect a line at his door of people asking for a piece of it for this or that, and more often than not, the money will be doled out.

This strategy works because the person can expect the favor returned. Chinua Achebe explores this type of communalism in his lesser-known book *No Longer at Ease* (1960). The book discusses how the communal aspects of giving in West Africa clash with the cash economy and make for an unsustainable lifestyle (Achebe, 1960). There is evidence to suggest that this is true for herders in the Sahel: petty cash is used for immediate needs, and rarely builds equity. This is an example of the double-edged sword of communal living in a cash economy; it becomes hard to save money, and when it is hard to save money it is hard to build equity in the form of cows or grass, or buy medicine, or engage in other coping mechanisms when there is no grass in the bush.

Weddings and festivals, as previously mentioned, are also important resiliency strategies. The obligation of families to buy sheep and goats, for slaughter, as well as to give presents of both cash and animals to raise, is as symbolic as it is practical. Much like the cash, it will be repaid. Weddings and festivals however have a higher chance of animal acquisitions than petty cash, which increases in value.

In these strategies we can see conflict between development ideologies, and a success on both ends. For example, post-development theory might critique tactics such as stockpiling grass and herd reduction, as these fall in line with the critiques laid out by traditional development. But some local herders advocate for it, and have used it effectively. On the other

side, communal relationships and traditional roles are what keep herding society afloat, but they are not always possible to practice in the face of widespread disaster.

I also think it is important here to note that people are interested in diversification and even farming, but they do not want to be considered farmers. This goes to show that people do not have to fit into any one mold. It does not have to be sedentism versus nomadism.

4. Interactions With Development and a Way Forward

In terms of the history of development projects in the area, most of the herders seemed to be ambivalent. The signs of development in this area are most visible in the massive water infrastructure used to increased rice production. During my interviews, several herders have complained about these projects, which were implemented by the Chinese, for poisoning water. Furthermore, the increase of cultivated land has led to a reduction in nearby grazing lands. On the other side, however, it has caused an increase in rice, and emergency fodder. It has also increased the opportunity for diversifications. Still, my supervisor has criticized the project because the water infrastructure has caused chemical and malaria issues in the community as well as negative issue with sanitation: there is now a large canal running through the town which is used for washing as well as dumbing garbage and in some cases, drinking. Once again, we see the trade off of development.

As mentioned, many respondents expressed ambivalence for the herding collectives often established by local politicians or leaders. One informant stated that he was a member of several and none had fulfilled their promises. When asked for the way forward, as mentioned, many people stated that “herding is dead” or hinted at diversification. When asked what sort of

project they wanted short of just being given cows many failed to respond without prompting. This is a problem that will be revisited in the discussion.

Many respondents liked the idea of grass stockpiling but the aforementioned barriers also made them skeptical. The idea of sticking in collectives was also seized upon but there is a distrust for collectives. An animal lending program based on *Sartou* for herd regeneration was also suggested by me. Animal lending like this has been implemented within other parts of the Sahel such as Niger (Gormly, 1980). The framework would be a mix of local custom and a microfinance system that excludes interest. This was met with similar enthusiasm to the other suggestions, but there seemed to be limited used of *sartou* in the community. One key informant suggested permaculture forage as a way forward. Upon investigation, it appeared as though this was being practiced amateurly by a few scientists in the area with success, and that there was actually growing local interest in having alfalfa access points to be used in case of drought. This initiative has local science and precedence, and I am currently researching a potential test project that might help further the imitative and help herders. Ultimately this is the goal of my research. I intend to have some sort of positive tangible outcome within the next three years to justify this research to the people being studied.

Findings Summary

Many of the findings confirmed what had previously been written about herders by authors such as Dahl (1976) and Davis (2016) in regards to traditional resiliency strategies. Some of the most important findings were how ineffective these traditional strategies are in the face of large-scale drought, where the whole community is affected. The second most important findings were related to participant's sentiments in regard to the future of herding.

The hopelessness of many respondents is countered with desires to have effective projects that can actually help them. The finding that there is actually a relatively short history amongst this particular group of pastoralists is also very important. This is at odds with some of the literature, which has homogenized pastoral groups and put them in the same category of long-distance pastoralists such as the Tuaregs or other Fulani groups (Adrianson, 2005).

The issue of a lack of grass leading to a cycle of herd decimation is also pertinent. This cycle is one which many people are unable to recover from. They sell animals to buy grass, to support their larger animals, and then sell to buy food for their families. Eventually all the animals are sold, and they are unable to feed their larger animals, who are no longer producing revenue from milk due to poor diet and wind up dying. At this point the herder will be forced to look for other work, usually in an attempt to regrow their herds in which case the cycle often starts all over again. Many of the herders we spoke to had been through this cycle several times in recent years, and were currently in the process of trying to build their herds back up. Still many more expressed hopelessness.

Many of the ways in which herders were adapting to the impacts of drought were related to their familial and communal bonds. However, what I found is that these are rendered ineffective when everybody is in the same situation; no one can give you animals if they are also out of animals. Furthermore, from interviewing older members of the community as well as younger ones about their parent's oral history, we found that long-range migration is somewhat unprecedented, and really started after the drought in 1973. People told us not only of their parents, but of their grandparents, whose primary source of stress came from lions and non-hunger related disease more than from drought. Before the 1970s, there were a number of

large droughts that were discussed in both the 30s and the 40s but none of them marked the beginning of a pattern of annual rain shortages. In that time, grass was abundant, and herders reported never had to move far in order to find sufficient forage. If there was a shortage, it was easily remedied by cutting down branches from the trees, which were also in greater abundance. The only reason a herder would have to go more than 30 kilometers at any given time of the year, was for the pleasure of wandering. This indicates that while there was a cultural and perhaps spiritual connection to nomadism, more than it being a wholesale requirement. This agrees with what Adrianson (2008) has said about similar groups in Senegal.

There seems to be an ambivalence of local development solutions such as herding groups and micro finance and perhaps development in general, expressed in the sentiment " nobody has helped the herders." However, there may be a solution in creating alfalfa permaculture access points that has local precedence, and could help to alleviate some of the strains caused by repeated droughts. This is being researched. I should also routine here that this project was described by research participants as being "permaculture" although really it doesn't completely fit that criteria which requires and intermingling of plants. Permaculture in this context refers to a watered alfalfa forage that can produce year long.

In the context of larger development, these findings make the water murkier rather than clearer. We see a culture and a society that is at odds with what has traditionally been prescribed to their groups, while at the same time engaging with it successfully to some degree. This raises a fundamental question in regard to what is and isn't an appropriate framework in development, or whether there should be one at all.

Discussion

Many respondents attested that the climate in the last 40 years has worsened and has had detrimental effects on their livelihoods. In terms of rainfall data, there is evidence of massive decline over the previous 50 years. Even with potential increases in overall rainfall, interregional variations, and seasonal irregularities have still caused problems for both pastoralists and agriculturalists (Zhang, 2012). The pastoralists in this study are at a loss for what to do. While mobility is touted by some as the greatest strengths of herders, for these people, it seems to be a liability. Many people will travel thousands of kilometers, risking fines to cross borders, and even their lives as they cross into unstable territories in neighboring Mali. Many will go out with no promise of grass or water and have their generational wealth completely wiped out in a single season. This was actually expressed by many interviewees who say they would rather be stuck in the cycle of poverty, paying for animal fodder in town, than risk destruction of their herds, which begs the question of their survival of can really be thought of as adaptation at all. This runs contrary to what Banerjee and Duflo say about poor people being more willing to take risks because they live in a constant state of it (Banerjee & Dulfo, 2008). They might not be taking into account the psychological effects of witnessing hundreds of your animals dying. However, staying close to town does not seem to be a solution either because of the poverty trap set up by high fodder costs, and the additional needs and wants associated with living in town. These needs and wants are the result of the neoliberal aid paradigm and planned development (Easterly, 2006), and post-development scholars would argue that they are bad. It is not our place, however, to refuse technology and comforts either, as this too is paternalistic. Post-development scholars might also cite sedentism as a solution

that was wrong (Davis, 2016). It would appear that they were right, but they also can't reconcile their advocating for mobility in the face of the people who genuinely find there to be less risk in sedentism; even if they don't like it. Sachs in his optimism, would prescribe global changes in behavior that would reverse or at least ameliorate climate change, thus making nomadism viable again (Sachs, 2008). There are questions as to the feasibility of this, however, and how it helps people today. It also ignores the reality that this particular group seemingly never engaged in long range herding to begin with! And that the loss of available grassland nearby, can be attributed to the large-scale agricultural development Sachs advocates for.

In this work, it is important to think of the problems facing these herders holistically. The reasons for the strife of modern herding goes beyond just that of climate change. One important mitigating strategies of the older herding communities was the maintenance of societal roles. Elders discussed how everybody in the community had a place, and a function, and even their own magic. A quote by one elder respondent illustrates this well: "The fishermen were fishermen, farmers were farmers, and herders were herders**.** If a herder or a farmer wanted to cross the river, he would consult a fisherman who would in turn give him protection spells against crocodiles." This kept a friendly relationship going where they would trade and sell each other their goods, milk for fish, millet, rice, etc. When these societal relationships were kept, there were enough resources to go around, and there was a general sense of communal interconnectedness that interviewees described does not exist in the same way today.

With increasing importance of the cash economy, as well as diversification as a means of resiliency, everybody began to purchase animals, putting a strain on not only grass resources,

but also on the community relationships. While some herders spoke about the glory days when it was common to have herds of several hundred cows, others spoke about having smaller more manageable herds, and also herding the animals of several people at one time, not just family members but other members of the community. Today, most members of the community have some livestock. Furthermore, with the ease of travel, and the new importance of migration, people were able to come from outside of the area and exploit resources**.** The question is whether or not these people would be willing to trade any of these things in order to return to that golden age of herding. Post-development might critique planned development which has seemingly led to negative changes in the pastoralists cultures, but few pastoralists would argue against having a road. This makes the critique somewhat moot. This also follows in the discussion of the additional needs of the modern era.

Herders discussed these modern needs as being a burden. In the golden age, millet and fish were easily traded for and milk contributed a significant portion of their diet. In the modern era, there are more things available, and they spend money on them. There are motorcycles, bikes, school bills, radios, and other things. There are now more food items for sale such as candy, Coca Cola, tobacco and alcohol. A lot of this has to do with structural adjustment policies which allowed the West to flood the markets with foreign goods, while at the same time devaluing the local currency. While in the 1950s, 5000 CFA could easily feed a family for three to four months, today it will not even last the afternoon (McMichael, 2000). Furthermore, there was a population boom, which not only put additional stress on dwindling resources, but also created more obligation to contribute to feasts, which takes the communal resiliency strategy, and turns it into a double-edged sword. From a neocolonial lens, development has worked

perfectly: it has shifted the reins from military domination to economic domination, fostering dependency, and destroying traditional community based resiliency (Easterly, 2014). Easterly argues that this is actually the point of development. However, he questions if we can, at this point, morally suggest to people that they shouldn't be engaging with these products. Who are we to do that?

As discussed at length in this paper, many of the problems herders are facing have been compounded by development itself. One prominent example is the expansion of agriculture programs, oftentimes at the expense of traditional grazing land (Davis, 2016). As mentioned, this is true in the case of Guede: most of the surrounding lands have been turned over to rice cultivations, contributing to the need for long range migration. Other examples include the focus of development efforts on re-greening and anti-desertification projects, which consume time labor and funds (Davis, 2016). So what is the Solution?

How to Move Foward

Prescriptive development pertaining to herd reduction and sedentism has been condemned as Eurocentric solutions, and this is correct (Davis, 2016). Mobility has been eschewed as the saving grace of pastoralists, and its erasure has largely been due to European prejudice and ideas towards progress, which are largely sedentary, and considered non arable land as unproductive (Davis 2016). This is also correct in many cases but not all of them. What about pastoralists in this study who, for better or for worse, are already sedentary? And, because of droughts are even more so on account of mobility now being so great a risk that many stay close to water anyway?

In this particular case I would argue that herd reduction and agriculture, albeit agriculture of a pastoral nature, might be effective remedies to the situation of herd loss, in spite of the immediate condemnation this would bring from scholars cited within this paper. Testimony about the relatively short history of long-range herding in this area coupled with stories of herd decimation on the bush has led me to believe this. Most importantly: This study is built around the core tenet of believing in the respondents. Many of the respondents stated in no uncertain terms that the risk of long-range migration was big, and that it was better to hang around where there was fodder, and several key informants talked about the potential benefits to herd reduction. Phrases such **"**If the climate continues to change, herding will end" and "I used to travel but now I buy grass" were repeated often and coupled with expressed desires for appropriate projects. One older respondent even talked about how in the glory days, herd loss was not a huge deal because "you only needed three cows. The grass was good and they would produce enough milk." In terms of climate adaptation strategy, this is important to know as it could point in the right direction in terms of projects.

There is some precedence for this line of thinking which comes from another study in Senegal with a similar population that explores the role of mobility for pastoralists who are not in effect pastoral any more, that is to say their cultural connection to mobility at this point is very limited (Adrianson, 2008). I believe from a humanist perspective Sen and Friere would argue that the goal of preserving a way of life should be secondary to improving the overall quality of life. This is a sentiment also voiced by Duflo and Banerjee. After all, the primary arguments against these types of interventions for pastoralists in arid regions has not been their prescriptive nature rooted in Eurocentric racism, but overall ineffectiveness. However,

Adrianson (2008) raises the point, as I do in this study, that not all pastoralists are the same and applying sedentary techniques to semi-sedentary people could actually be part of the solution. Furthermore, these techniques do not have to be based in Eurocentric racism. They could be designed by local actors who know the community and know how to distribute resources and labor, to an extent an outsider could not. All this is to say when it comes to pastoralism, the solutions should be place-based and peoples-specific, and focused on indigenous voices.

To the questions of whether or not their traditional strategies could be incorporated into a development project, I think the answer is complicated. To reiterate: strategies uncovered towards herd building and resiliency primarily revolved around reciprocity and communal relationships, and their effectiveness seemed hard pressed in the face of widespread drought, something that was talked about by Dahl as far back as 1976, when the first mega droughts were actually occurring. Furthermore, the fact that long range pastoralism is actually fairly new to these people calls into question of whether or not some of these "traditional resiliency" techniques are really traditional at all. I would argue that the underlying communalism of these techniques is one that should be incorporated into development projects, if not specific strategies themselves. Although from this study, communalism could be viewed as a double-edged sword. While the traditional reciprocal economy of *sartou* and gift giving, and the unabashed nature of asking for resources is important, there is evidence that it may be compromised by the cash economy similar to the culture clash outlined by Achebe. The increased wants, needs, and shifting roles of society, may have created an undue increase on these types of obligations potentially limiting their actual benefit. This topic and idea is nothing new to development and is discussed to some degree in the book Poor Economics (Banerjee &

Duflo, 2011). However, these authors argue that overall, community relationships still prove to be an effective mitigation strategy to poverty traps. I am inclined to agree, though only if there are resources, cash, and other inputs available. In this sense, I will get into some contentious territory in agreeing with Jeffery Sachs, to a certain degree: that money can solve poverty (Sachs, 2008). In Sub-Saharan Africa it has been argued that these communal relationships are incredibly difficult to maintain within ordered development. For example, communities might come together to undermine government, but not participate in them. In other words: the communal relationship works when the community is able to control its own labor, but when outside forces come in, it has a hard time working (Roe, 1988). Principally this can be argued as one of development's main failures.

This does not mean I agree with the wholesale concept of throwing money at development problems, but rather that aid in the form of direct cash can serve to reinvigorate traditional communal strategies that have become cumbersome or ineffective in the face of widespread catastrophe like climate change and colonialism (which was the precursor of climate change, and the thorn in the side of ameliorating efforts). This is especially true if the projects and inputs given to disenfranchised peoples like pastoralists are designed by those people. This goes back to the body of knowledge that audaciously suggests that people actually know what's best for them. Furthermore, this idea holds true to post-development theory scholars' basic tenets of non-prescriptive development. So, the solution may lie somewhere in the middle. For example, it may lie in permaculture forage projects. While a permaculture forage project seems to have local precedence it still has to be mentioned that getting people

to talk and give you their take on development is not always easy, and that poses its own problems.

In the findings I discussed how it was difficult to get solutions from the peoples own mouths, which itself poses a problem for indigenous-led development. We want to help communities build their own projects, because neocolonialism has made it harder for them to do it on their own. But we need enough time and community trust to understand what people really want. Furthermore, many respondents tend to agree with whatever a development professional suggests. There is suggestion that this is because respondents think they might have something personally to gain, but I suspect it is simply to speed along a pointless conversation with an outsider. That being said, there is a conflict here with my framework whose number one tenet is to listen to poor people. That means I have to forgo assumptions about motive to a certain extent. Assuming motive and having disbelief based on perceived cultural norms can often lead to the paternalism I seek to avoid in development. To be frank, this is most easily translated to "these people are lying, so I will do what I think is best," which has not seemed to work in the last 60 years (Easterly, 2005).

In this master's program I have been taught the importance of having a clear theoretical framework with which to inform research and projects. In academia we tend to think of theory in terms of grand, named ideologies: post-development theory, dependency theory etcetera. At the same time, however, we in the social sciences at least tacitly acknowledge that theory is also far less rigid, and can essentially be thought of as a way of knowing and seeing the world or as a lens (Hooks, 1994). Coming from this mindset, theory informs everything that we do. It would appear from the likes of Sachs, Easterly, and Moyo, that we go into development with

preconceived notions and ideologies that are based on these grand frameworks. I would stress that we ought to think less rigidly and form theories based on situational specificity and actual community desires and wants, as more social science theory does already. This is something that post-development and post-colonialism scholarship has seemed to advocate for, while at the same time not fully acknowledging the benefit development has actually had to people's lives. In terms of this particular group of pastoralists in Senegal, I believe this means not entering the field as a disciple of any intellectual camp, but being open to melding various named and unnamed frameworks. The end goal of preserving pastoralism may not be something that everybody wants, and if they do, the solutions may fall outside the prescriptions of either post-development or dependency theory. Both of these ideologues can be unified however by the humanism of Sen that stresses freedom improved quality of life by people's own standards. In terms of whether or not this is the responsibility of intellectuals, I err on the advice of Marxist geographer Peter Kropotkin. Kropotkin argued for geography as a unifying discipline in the sciences to create global brotherhood of "mutual aid" (1885) and I would argue the same today.

Conclusions

From this research, I set out to uncover pastoral relationships to anthrogogeninc climate change induced drought in Senegal. I also set out to uncover traditional herding practices and whether or not they could be incorporated into development interventions. I have concluded that this particular pastoral group in Senegal is indeed experiencing negative effects of climate change induced drought. Furthermore, it would appear that their traditional resiliency strategies have, to some degree, been undermined by the community wide nature of the

problem, and also to some extent by a development paradigm which has largely ignored, miscategorized, or simply hasn't listened to them, by its very nature. In spite of this, they hold merit. I truly believe the only way forward in development practice is to rely on local knowledge.

From this research there are also broader implications for development work in general. The idea that these people are semi-sedentary already and that they engage in agriculture as a secondary activity but still are very tied to the identity of herding is important, in that it shows how they don't fit into an ideological box that makes development easy to prescribe to them. This emphasizes the need for specific development solutions tailored for their specific situations, which conforms to post-development theory. On the other hand, while reminiscing of the golden age one old herder concluded by saying "herding must modernize if it is to survive." Modernity in all its colonial goodness and badness is also something people want, and it is not our job to relegate them necessarily to their "traditional practices" in our righteous critique of colonial development. It is perhaps a boring not so publishable opinion that we need to meld frameworks and ideologies, in order to reconcile with peoples lived experiences, but it still seems to be necessary.

In the continuation of this research I will examine the changes that have happened in the Sahel at large in regards to both herding practices and interregional climate variability in greater detail. I would engage more ethnographic methods to gain a deeper understanding of the impacts and the interactions between stakeholders in this community and then compare them to what is happening in the wider Sahel.

Works Cited

Achebe, C. 1987. *No Longer at Ease*. London: Heinemann Educational.

Adichie, Chimamanda Ngozi. 2009. *The Danger of a Single Story*. Accessed January 20. https://www.ted.com/talks/chimamanda_ngozi_adichie_the_danger_of_a_single_story

Achebe, C. 1987. *No Longer at Ease*. London: Heinemann Educational.

Adriansen, Hannah, and Nielsen Thomas . 2006. "The Geography of Pastoral Mobility: A Spatio-Temporal Analysis of GPS Data from Sahelian Senegal." *GeoJournal* 64: 177–88. doi: 10.1007/s10708-005-5646-y.

Adriansen, Hanne Kirstine. 2008. "Understanding Pastoral Mobility: The Case of Senegalese Fulani." *The Geographical Journal* 174 (3): 207–22.

Aktipis, C. Athena, Lee Cronk, and Rolando de Aguiar. 2011. "Risk-Pooling and Herd Survival: An Agent-Based Model of a Maasai Gift-Giving System." *Human Ecology* 39 (2): 131–40. doi:10.1007/s10745-010-9364-9.

Alidou, Salihou. 2016. "Cross-Border Transhumance Corridors in West Africa." *CapEX*, February. https://www.shareweb.ch/site/Agriculture-and-Food-Security/aboutus/Documents/pastoralism/pastoralism_brief_couloirs_transhumance_e.pdf.

Antrobus, Peggy. 1993. "Structural Adjustment: Cure or Curse?" *Gender & Development* 1 (3): 13–18. doi:10.1080/09682869308519975.

Baden, Sally. 2013. “Women’s Collective Action in African Agricultural Markets: The Limits of Current Development Practice for Rural Women’s Empowerment.” *Gender & Development* 21 (2): 295–311. doi:10.1080/13552074.2013.802882.

Banerjee, A. V., and E. Duflo. 2011. *Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty*. 1st ed. New York: PublicAffairs.

Barkindo, Atta. 2020. “The Sahel: A New Theatre for Global Jihadist Groups?” *Counter Terrorist Trends and Analyses* 12 (2): 21–26.

Bassett, Thomas J. 1986. “Fulani Herd Movements.” *Geographical Review* 76 (3): 233–48. doi:10.2307/214143.

Benjaminsen, Tor A. 2008. “Does Supply-Induced Scarcity Drive Violent Conflicts in the African Sahel? The Case of the Tuareg Rebellion in Northern Mali.” *Journal of Peace Research* 45 (6): 819–36. doi:10.1177/0022343308096158.

Biasutti, Michela. 2019. “Rainfall Trends in the African Sahel: Characteristics, Processes, and Causes.” *WIREs Climate Change* 10 (4): e591. doi:https://doi.org/10.1002/wcc.591.

Brisebarre, Anne-Marie. 2017. “L’évolution de La Pratique Du Sacrifice de l’aïd El-Kebir En Contexte Urbain Français.” *Ethnologie Française* 47 (4): 607–21.

Brooks, Nick . 2004. “Drought in the African Sahel: Long Term Perspectives and Future Prospects.” *Tyndale Center for Climate Research* . https://www.researchgate.net/profile/Nick-Brooks-3/publication/245975267_Drought_in_the_African_Sahel_variability_change_and_agency/links/58abf908458515040205deec/Drought-in-the-African-Sahel-variability-change-and-agency.pdf.

"CAB Direct." 2021. Accessed January 20. https://www.cabdirect.org/?target=%2fcabdirect%2fabstract%2f19812609527.

"Climate Change and the Sahel Region." 2015. *MrGeogWagg*. October 5. https://mrgeogwagg.wordpress.com/2015/10/05/climate-change-and-the-sahel-region/.

Cooke, Jennifer, and Kimberly Flowers. 2016. "Senegal:: Some Background." INTEGRATED APPROACHES TO FOOD SECURITY AND NUTRITION. Center for Strategic and International Studies (CSIS). https://www.jstor.org/stable/resrep23132.7.

Cresswell, J.W. 2018. *Qualitative Inquiry & Research Design: Choosing among Five Approaches,*. 14th ed. Thousand Oaks CA: Sage Publications .

Dahl, Gudrun, and Anders Hjort. 1976. *Having Herds: Pastoral Herd Growth and Household Economy*. Department of Social Anthropology, University of Stockholm.

Davis, D. K. 2016. *The Arid Lands: History, Power, Knowledge*. History for a Sustainable Future. Cambridge, MA: The MIT Press.

Desai, Raj M., and Shareen Joshi. 2014. "Collective Action and Community Development: Evidence from Self-Help Groups in Rural India." *The World Bank Economic Review* 28 (3): 492–524. doi:10.1093/wber/lht024.

Dossa, S. 2007. "Slicing up 'Development': Colonialism, Political Theory, Ethics." *Third World Quarterly* 28 (5): 887–99. doi:10.1080/01436590701371595.

Dresch, J., V. C. Robertson, R. Dodoo, and W. E. Ormerod. 1977. "The Evaluation and Exploitation of the West African Sahel [and Discussion]." *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 278 (962): 537–42.

Easterly, William. 2007. *The White Mans Burden* . United kingdom : Oxford University Press.

———. 2013. *The Tyranny of Experts:* . New York: Basic Books.

"Farmer Adaptation, Change and 'Crisis' in the Sahel." 2001. *Global Environmental Change* 11 (1): 49–57. doi:10.1016/S0959-3780(00)00044-3.

Giannini, Alessandra. 2010. "Mechanisms of Climate Change in the Semiarid African Sahel: The Local View." *Journal of Climate* 23 (3): 743–56.

Grandia, Liza. 2015. "Slow Ethnography: A Hut with a View." *Critique of Anthropology* 35 (3): 301–17. doi:10.1177/0308275X15588616.

Grove, A. T. 1978. "Geographical Introduction to the Sahel." *The Geographical Journal* 144 (3): 407–15. doi:10.2307/634817.

Harrison, Graham. 2005. "Economic Faith, Social Project and a Misreading of African Society: The Travails of Neoliberalism in Africa." *Third World Quarterly* 26 (8): 1303–20.

Hay, Ian. 2016. *Qualitative Research Methods in Human Geography,*. 4th ed. London: Oxford university Press.

Hegel , Georg . (1813) 2010. *The Science of Logic*. New York: Cambridge University Press.

Hein, Lars, Marc J. Metzger, and Rik Leemans. 2008. "The Local Impacts of Climate Change in the Ferlo, Western Sahel." *Climatic Change* 93 (3): 465. doi:10.1007/s10584-008-9500-3.

Helldén, Ulf. 1991. "Desertification: Time for an Assessment?" *Ambio* 20 (8): 372–83.

Hooks, Bell. 1994. *Teaching to Transgress*. New York: Routledge.

IZUAGIE, Lexington, and Austen A. SADO. 2015. "Communalism in Pan Africanism: A Retrospect." *Journal of African Union Studies* 4 (2/3): 101–24.

JISAO DATA.2018. “Sahel Percipitation Anomolies.” (Graph) *University of Washington.* doi:10.6069/H5MW2F2Q

Kanya-Forstner, A. S., and Paul E. Lovejoy. 1994. “The Sokoto Caliphate and the European Powers, 1890-1907.” *Paideuma* 40: 6–14.

Kisangani, E.F. 2012. “THE TUAREGS’ REBELLIONS IN MALI AND NIGER AND THE U.S. GLOBAL WAR ON TERROR.” *International Journal on World Peace* 29: 59–97.

Kropotkin, P. 1885. “What Geogrpahy Ought to Be.” *The Nineteenth Century* 18: 940–56.

McMichael, P. 2012. *Development and Social Change: A Global Perspective*. 5th ed. Los Angeles: SAGE.

Mortimore, Michael. 2010. “Adapting to Drought in the Sahel: Lessons for Climate Change.” *WIREs Climate Change* 1 (1): 134–43. doi:https://doi.org/10.1002/wcc.25.

Moyo, D. 2009. *Dead Aid: Why Aid Is Not Working and How There Is a Better Way for Africa*. New York: Farrar, Straus and Giroux, .

Nicholson, Sharon E. 2013. “The West African Sahel: A Review of Recent Studies on the Rainfall Regime and Its Interannual Variability.” Review Article. *ISRN Meteorology*. February 17. doi:https://doi.org/10.1155/2013/453521.

Nyong, A., F. Adesina, and B. Osman Elasha. 2007. “The Value of Indigenous Knowledge in Climate Change Mitigation and Adaptation Strategies in the African Sahel.” *Mitigation and Adaptation Strategies for Global Change* 12 (5): 787–97. doi:10.1007/s11027-007-9099-0.

Oreskes, Naomi. 2018. “The Scientific Consensus on Climate Change: How Do We Know We’re Not Wrong?” In *Climate Modelling: Philosophical and Conceptual Issues*, edited by

Elisabeth A. Lloyd and Eric Winsberg, 31–64. Cham: Springer International Publishing. doi:10.1007/978-3-319-65058-6_2.

Paolo, Friere. (1970) 2017. *Pedagogy of the Oppressed*. United Kingdom: Penguin Books .

Parker, Ron. 1991. "The Senegal-Mauritania Conflict of 1989: A Fragile Equilibrium." *The Journal of Modern African Studies* 29 (1): 155–71.

Pedersen, Jon, and Tor A. Benjaminsen. 2008. "One Leg or Two? Food Security and Pastoralism in the Northern Sahel." *Human Ecology* 36 (1): 43–57.

Potts, Malcolm, and Alisha Graves. 2013. "Big Issues Deserve Bold Responses: Population and Climate Change in the Sahel / Les Grandes Questions Méritent Des Réponses Audacieuses: La Population et Le Changement Climatique Au Sahel." *African Journal of Reproductive Health / La Revue Africaine de La Santé Reproductive* 17 (3): 9–14.

Prendergast, Renee. 2006. "Schumpeter, Hegel and the Vision of Development." *Cambridge Journal of Economics* 30 (2): 253–75. doi:10.1093/cje/bei052.

Radcliffe, S.A. 2005. "Development and Geography: Towards a Postcolonial Development Geography?" *Progress in Human Geography* 29 (3): 291–98. doi:10.1191/0309132505ph548pr.

Roe, Emery M. 1988. "Individualism Versus Community in Africa? The Case of Botswana." *The Journal of Modern African Studies* 26 (2): 347–50.

Sachs, Jeffery. 2005. *The End of Poverty: Economic Possibilities for Our Time*. New York : Penguin Books.

———. 2008. *Common Wealth: Economics for a Crowded Planet*. New York : Penguin Books.

Sen, A. 2001. *Development as Freedom*. Oxford ; New York: Oxford University Press.

Shapland, Peter . 2019. Personal Interview.

Shettima, Abba, and Tar Usman. 2008. “Farmer Pastoralist Conflict in West Africa: Exploring Causes and Consequence.” *Information, Society, and Justice*, no. 1.2. doi:10.3734/isj.2008.1205.

Silvey, R., and K. Rankin. 2011. “Development Geography: Critical Development Studies and Political Geographic Imaginaries.” *Progress in Human Geography* 35 (5): 696–704. doi:10.1177/0309132510385523.

Sissoko, Keffing, Herman van Keulen, Jan Verhagen, Vera Tekken, and Antonella Battaglini. 2011. “Agriculture, Livelihoods and Climate Change in the West African Sahel.” *Regional Environmental Change* 11 (1): 119–25. doi:10.1007/s10113-010-0164-y.

Swift, J. 1977. “Sahelian Pastoralists: Underdevelopment, Desertification, and Famine.” *Annual Review of Anthropology* 6 (1): 457–78. doi:10.1146/annurev.an.06.100177.002325.

Turner, Matthew D. 1999. “Labor Process and the Environment: The Effects of Labor Availability and Compensation on the Quality of Herding in the Sahel.” *Human Ecology* 27 (2): 267–96.

———. 2004. “Political Ecology and the Moral Dimensions of ‘Resource Conflicts’: The Case of Farmer–Herder Conflicts in the Sahel.” *Political Geography*, Ethics in Political Ecology, 23 (7): 863–89. doi:10.1016/j.polgeo.2004.05.009.

———. 2009. “Capital on the Move: The Changing Relation between Livestock and Labor in Mali, West Africa.” *Geoforum*, Themed Issue: Land, Labor, Livestock and (Neo)Liberalism: Understanding the Geographies of Pastoralism and Ranching, 40 (5): 746–55. doi:10.1016/j.geoforum.2009.04.002.

Turner, Matthew D., John G. McPeak, and Augustine Ayantunde. 2014. “The Role of Livestock Mobility in the Livelihood Strategies of Rural Peoples in Semi-Arid West Africa.” *Human Ecology* 42 (2): 231–47.

“Using Long-Term Daily Satellite Based Rainfall Data (1983–2015) to Analyze Spatio-Temporal Changes in the Sahelian Rainfall Regime.” 2017. *Journal of Hydrology* 550 (July): 427–40. doi:10.1016/j.jhydrol.2017.05.033.

Walker, Bridget. 1993. “Welcome to Focus on Gender.” *Gender & Development* 1 (1): ii–ii. doi:10.1080/09682869308519942.

White, Cynthia. 1997. “THE EFFECT OF POVERTY ON RISK REDUCTION STRATEGIES OF FULANI NOMADS IN NIGER.” *Nomadic Peoples* 1 (1): 90–107.

Woodke , Jeff. 2012. “Cash Transfers and Vulnerability in Niger .” *The Humanitarian Exchange* , no. 55. https://odihpn.org/wp-content/uploads/2012/10/humanitarianexchange055_1.pdf.