

# Linking Climate Change, Migration Patterns and Vulnerability

## The case of Ndem, Senegal

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## Abstract

Projections estimate that by 2050 hundreds of millions to a billion people will migrate elsewhere due to environmental reasons. The increasing frequency and intensity of natural hazards posed by climate change, as well as the slow-onset degradation of habitats all over the planet, will drive more and more species to migrate towards more habitable and safe environments. While much of the literature in this matter focuses on “push and pull” frameworks disregarding the complexity of reality, more efforts are needed to go beyond unilateral investigations of migration drivers and embrace an holistic approach capable of conducting a multifaceted and overarching analysis of this subject. This thesis aim is the one of exploring the complex nexus characterizing climate change and human mobility, through a contextual vulnerability approach adopted in the study of Ndem, a rural village in the Diourbel region of Senegal. During the fieldwork, a combination of qualitative and quantitative methods was applied in the investigation of community resilience, climate perception and vulnerabilities in the village. Results show that, although a rural exodus severely affected the region due to droughts in the 1970s and 1980s, and climatic conditions exacerbated over the past 50 years, Ndem today represents a point of convergence for migratory patterns all over Senegal. This was possible thanks to the interplay of environmental, economic, social, religious and cultural reasons, which, today, brought Ndem to be an example of successful, community-based autonomous adaptation to climate change.

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# Abbreviations

CBA	Community Based Adaptation
DRR	Disaster Risk Reduction
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GHF	Global Humanitarian Forum
IDMC	Internal Displacement Monitoring Centre
IDP	Internally Displaced Person
IFRC	International Federation of Red Cross and Red Crescent Societies
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Countries
NAP	National Adaptation Plan
NGO	Non Governmental Organization
RNA	Regeneration Naturelle Assisté
SDG	Sustainable Development Goals
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
WFP	World Food Programme

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*First, the rain stopped.  
Then the animals died.  
The trees came after.  
Lastly, men went elsewhere.*

- 102 year old Ndem chief

## **Chapter 1: Introduction**

### **1.1 Research Problem**

In the *Special Report on Global Warming of 1.5 °C*, released in October 2018 by the Intergovernmental Panel on Climate Change (IPCC), it is stated that “human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels”, and that “global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate” (IPCC, 2018). If these levels are met, the consequences for the planet would be devastating, with major negative impacts on sea level rise, biodiversity and ecosystems, oceans acidification, glaciers melting, heavy precipitations in some regions, and droughts and precipitation deficits in others (IPCC, 2018). Furthermore, these risks would not remain confined within the environmental sphere, but would also impact “health, livelihoods, food security, water supply, human security, and economic growth” (IPCC, 2018). Finally, it is indicated that “at 1.5°C there will be increased incidents of internal migration and displacement” (IPCC, 2018). Therefore, there is an increasing interest in the link between environmental degradation, climate change and mobility (Lo et al., 2014), as environmental processes taking place today are changing at a faster and unpredictable rate which may exacerbate pre-existing vulnerabilities. Future forecasts concerning people displaced by climate change are variable and, according to the IOM (2019), range from “25 million to 1 billion environmental migrants by 2050, moving either within their countries or across borders, on a permanent or temporary basis”. However, these estimates are still very much debated as, according to some scholars (Gemenne, 2011; Ionesco et al., 2016; Black et al., 2011), they lack “robust methodological foundations”, they are generally “grounded in a deterministic perspective”, and “many of them appear to have been put forward in order to generate media attention rather than to provide empirically grounded estimates and predictions”. In addition, “multiple drivers and embedded social processes influence the magnitude and pattern of [...] changing structure of communities related to migration [and] displacement “, and for this reason

“detecting the effect of observed climate change or assessing its possible magnitude with any degree of confidence is challenging” (IPCC, 2018). In order to dismantle this complexity, there is general agreement about the necessity for more studies and research regarding climate change and displacement. Even in the research agenda released in December 2018 by the Internal Displacement Monitoring Center (IDMC), it is stated that “more concrete examples and evidence of how displacement occurs in different situations is needed to inform more solid risk assessments and evaluations of appropriate policy responses” (IDMC, 2018).

It is for these reasons that this research decides to provide a concrete example regarding displacement and climate change, and to explore their nexus with culture, vulnerability and livelihood, drawing from the experience of Ndem, a small village in central Senegal.

## **1.2 Aim and Scope**

Senegal is situated in a particular geographic area, which experiences substantially different climates according to different locations. Over the last few decades, however, the country experienced a warming phase ranging between 0.3 and 1°C (IPCC, 2013), which was coupled with a “statistically significant decrease in wet season rainfall between 1960 and 2006” (World Bank, 2019). These climatic variables brought, over the 1970s and 1980s, critical droughts which seriously affected rural areas in the country. This resulted in an abnormal *rural exodus*, with thousands of people leaving pastoral provinces to move into urban centres. The Diourbel region, and the village of Ndem, were seriously affected by these episodes. Nonetheless, in 1985, a spiritual leader moved to this village with his wife, founded a textile NGO and boosted the living conditions of the people, providing over the years water, electricity, schools, health centres and sustainable gardens. These actions were not only capable of reducing the heavy rural exodus which was occurring at that time, but also to partially reverse its trend: indeed, the village became a benchmark for the people in the region who started moving there rather than to big cities such as Dakar or Diourbel.

Clearly, it was a broad range of migration drivers and not a unilateral one that generated this change of pattern. Environmental reasons rarely operate individually, but are often influenced by economic, spiritual, political and demographic ones (Black et al., 2011). The aim of this research is the one of understanding the extent to which these drivers influence human mobility, coping mechanisms and vulnerabilities in the region.

### **1.3 Outline of the Thesis**

The following chapter will illustrate the methodology and conceptual framework outlined to conduct the research. Data collection and analysis methods will be explained, as well as a summary of the main challenges and limitations of the study. The third chapter portrays the general features and discourses of both climate and migration patterns in the region, and provides a background about the history and development of Ndem. Chapter four will be dedicated to the presentation of the main findings collected throughout the fieldwork, divided into survey and interview findings. These will be discussed and critically analyzed in chapter five, where three areas of discussions have been identified: different interpretations of vulnerability, the importance of context and autonomous adaptation. Finally, the last chapter will be devoted to conclusions.

# Chapter 2: Research Methodology

## 2.1 Conceptual Framework

A conceptual framework can be defined as “a network [...] of interlinked concepts that together provide a comprehensive understanding of a phenomenon or phenomena” (Jabareen, 2009). This network is thus defined by a number of dependent and interdependent variables, which together form the foundations of the whole research. The purpose of this paragraph will be to define such variables, as well as their connection and relationship, in order to provide the reader with a conceptual understanding of the notions discussed in the future chapters.

In this research the independent variables, namely the factors whose “value does not depend on and is not affected by the state of any other variable” (Helmenstine, 2018), are climate change and climate variability. Although independent, their value can be conveyed as neutral since the way climate is perceived and understood varies according to the value assigned by different people. Often these two terms are used interchangeably, but they actually represent very different concepts. In the last IPCC Special Report, released in October 2018, climate variability is defined as the “variations in the mean state and other climate statistics (standard deviations, the occurrence of extremes, etc.) on all temporal and spatial scales beyond those of individual weather events”. Climate change, instead, refers to “a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer” (IPCC, 2018). Thus, while climate variability relates to short-term variants, climate change runs on the long term.

Dependent variables, on the other hand, are vulnerability, human mobility and coping capacity. Vulnerability is a concept that has been thoroughly discussed and debated in the literature (Brooks, 2003; Adger et al., 2009; Füssel, 2005). O’Brien et al. (2007) make a distinction between “outcome vulnerability” and “contextual vulnerability”. While the former is “considered a linear result of the projected impacts of climate change on a particular exposure unit (which can be either biophysical or social), offset by adaptation measures”, the latter is based on “a processual and multidimensional view of climate-society interactions” (O’Brien et al., 2007). As explained by the authors, these are not just two simple definitions of the word *vulnerability*, but rather two completely different framings in the climate change discourse. As a matter of fact, when adopting a contextual approach, climate change is not seen as the only

underlying cause for vulnerability, but rather an individual element in the multitude of social, economic, political, institutional and technological structures and processes characterizing the complex network of society (Parsons & Nalau, 2016; O'Brien et al., 2007; Sabates-Wheeler, et al., 2008). Connections are rarely linear or unilateral, the boundaries of the systems constantly change and the agents' behaviour is often in line with complexity theories. In other words, contextual vulnerability studies "examine in depth, in one location, how multiple stressors interact with the driving causes of vulnerability" (O'Brien et al., 2007).

Another dependent variable of this research is human mobility, which needs to be conceptually defined in order to narrow down the broadness of its meaning. Human mobility in the context of climate change is an on-going topic of research given the lack of empirical data, its importance for policy making, and the static alarmist approach portrayed by media (De Haas & Bakewell, 2007; McLeman & Hunter, 2010). This last approach from the maximalist school is mainly driven by "push-pull" frameworks, which are characterized by a simple causal relationship between climate and population movements, suggesting migrants to be "pushed-out" of marginal and degraded environments (Jónsson, 2010). Yet, it neglects other social, economic, political and cultural factors of this phenomenon and downgrades the agency of the individual. Therefore, a multi-level contextual approach that analyzes this relationship by "placing [factors] in their historical, economic and political context" (Kälin, 2010) is how this study refers to human mobility in the context of environmental change. Since the movement of population dynamics depend on the societal and environmental processes of transformation, it needs to be studied through a holistic scope "due to its multicausality and multidimensionality" (Schöfberger, 2018).

When linking environmental changes to migration, several definitions emerge depending on the context and frame in which this takes place. In the literature, terms such as internally displaced persons (IDPs), environmental refugees, environmental migrants, climate-induced migrants can be found. These are characterized by voluntary or forced migration, internal or cross-border displacement and sudden-onset or slow-onset hazards. Yet, the framing of these concepts is a current debate since it is difficult to address causal relationships between climate change and mobility (Beyani, 2013; Lo et al., 2014) as migration takes place in a multitude of causes, dimensions, and temporalities. Therefore, the current research and knowledge makes it almost impossible to distinguish a group of environmental migrants (Foresight, 2011). For all these reasons, this study will not refer to such definitions, but will use the terms of "mobility" and "migrants" in order to allow a broader scope and inclusiveness of the findings.

Finally, the last concept of this research is coping capacity. The IPCC (2018) defines coping capacity as “the ability of people, institutions, organizations, and systems, using available skills, values, beliefs, resources, and opportunities, to address, manage, and overcome adverse conditions in the short to medium term”. It represents a peculiar concept of the study, as it can be interpreted as both dependent and independent: while its dependency provides volatility to the value, which can vary according to a given climate, it is also independent as it carries out an influence over the vulnerability and human mobility of the target group. Furthermore, not only it depends on availability but also access to resources, which can be differential and unequal, giving rise to differential and unequal vulnerabilities. In other words, in this study, it will be analyzed if and how diverse climatic conditions impact the coping capacity of the village of Ndem. On the other hand, it will be investigated how different degrees of coping capacity have an influence over the vulnerability of Ndem people and, ultimately, whether these conditions also affect the decision to migrate or not.

Strictly related to the notion of coping capacity stands community resilience. Patel et al. (2017) conducted a systematic literature review to map the broad range of definitions used to outline this concept “that is understood and applied differently by different research groups”. According to Pfefferbaum et al. (2013), for instance, “community resilience entails the ability of community members to take deliberate, purposeful, and collective action to alleviate the detrimental effects of adverse events”; whereas Cohen et al. (2013) simply define it as “the community’s ability to withstand crises or disruptions”. Given the variety in the use and meaning of definitions, Patel et al. (2017) also conclude that, rather than striving “to define and study community resilience as a distinct concept”, it would be more productive and effective to focus on the individual elements, common to all definitions, characterizing its key features and mechanisms. This methodology is applied in the discussion section of chapter 5.

## **2.2 Research Question**

The ultimate aim of this research is the understanding of the role of climate and migration among communities in West Africa. In doing so, the village of Ndem was selected as a case study given its peculiar history and characteristics. Throughout the 1970s and 1980s, due to severe weather conditions and droughts, Ndem witnessed substantial out-migration flows which brought farmers and people in general to move into urban centres. In subsequent years, although climatic conditions worsened, this human mobility pattern stopped and Ndem became a reference for in-migration flows for the neighbouring villages in the region, as well as for large cities in Senegal. Hence, it represents a very interesting case for the purpose of this study.

In order to entangle these ideas into one sentence, we outlined the following research question:

*“To what extent are climatic stressors affecting Senegal’s pre-existing vulnerabilities? To what extent are they shaping migration patterns in the village of Ndem?”*

The answer to these questions and the analysis of the results will be conducted in Chapters 4 and 5.

### **2.3 Data Collection**

For this research, several methodology tools were used to collect and analyse data. Since the study prioritizes the perception of individuals on climate change and migration issues, primary data was essential to obtain. After the gathering of interviews and surveys, results were triangulated with secondary data coming from key literature. Doing so allowed to cross-validate and discuss the findings. Use of both qualitative and quantitative data obtained from different sources was implemented in order to have an overall understanding of the situation and discourses.

<b>Type of Technique</b>	<b>Mode of Interaction</b>	<b>Type of Information</b>
Field Observation	<ul style="list-style-type: none"> <li>- Observation walks with research assistant from the village</li> <li>- Informal chats with the residents</li> </ul>	<ul style="list-style-type: none"> <li>- Data used for framing research questions and interview guides.</li> <li>- Observations used for contextualizing research linking migration to vulnerability and climate variability</li> </ul>
Interviews	<ul style="list-style-type: none"> <li>- In-Depth Interviewing (open ended)</li> <li>- Key Informant (semi-structured interviews)</li> </ul>	<ul style="list-style-type: none"> <li>- Data used to understand changes</li> <li>- Gathered information regarding personal observations, perceptions and living conditions</li> </ul>
Survey	<ul style="list-style-type: none"> <li>- Questionnaires</li> </ul>	Understand and analyse: <ul style="list-style-type: none"> <li>- Perception of the climate variability/change</li> <li>- Type and source of income</li> <li>- Mobility patterns</li> </ul>

*Table 1: Data collection methods*

### **2.3.1 Primary Data Collection Process**

A first three-day field observation to Ndem was made to map possible entry points for research. This led to the acknowledgment of certain factors that, in the literature of internal migration and climate change, are considered as gaps and thus need more research and discussion. A second trip of ten days took place two weeks later, after having conducted a literature review and developed survey and questionnaires. The survey and semi-structured interview guides were prepared to collect as much data as the time frame allowed. These were conceived to gather people's perceptions on climate change and population movement, and to learn and understand the local knowledge and way of living. Conscious about the cultural differences, the avoidance of an ethno-centric approach was omnipresent during the stay. Furthermore, a trustworthy local guide with strong links to Ndem and its residents assisted the research by translating from Wolof to French, French to English and vice versa, organizing interviews, and introducing the researchers to key players and residents in the village. This enabled a proximity with the people in Ndem, making them less skeptical about the purpose of the researchers and building a stronger and honest connection.

During fieldwork, a survey (see Appendix A and B) was completed by 36 people. Through this methodology, data related to their perception and behaviour, their attitudes, opinions and beliefs about the influence of slow-onset hazards (mainly droughts and desertification) in their lives, the issue of rural exodus in the village, and its coping mechanisms was gathered. Simultaneously, semi-structured interviews varying from 15 minutes to over an hour and a half were conducted. Interviews were crucial for the study because voices narrated personal experiences, and in the literature there seems to be a gap in giving local people a space to express their concerns and successes (Antronico & Marincioni, 2018). Along the same lines, interviews with professionals in the area coming mainly from the WFP were also made. A Climate Analyst from WFP gave us insights about the work currently taking place in Senegal in terms of resilience, and the statistician from the Vulnerability and Mapping unit also provided us with key information.

### **2.3.2 Secondary Data Collection Process**

Second hand data was retrieved from a desk review on academic research, UN, International Institutions and NGOs reports. This provided us with further contextual material and understanding to compare with our fieldwork results. Literature on case studies in Senegal and the Sahel were mainly used for contextual matters, and literature on vulnerability, climate-



included migration and climate change was reviewed to analyse different discourses. The literature search was made using keywords in the search bar, mainly retrieved from Google Scholar and LUBsearch, and the platform used to collect and structure the literature was Zotero. The use of secondary data enabled a comparative analysis between what was studied in the literature and what was observed on the field. Plus, since the topic only recently gained global attention in the literature, most of the papers used were written after 2005.

## **2.4 Data Analysis Process**

The survey was converted into statistic charts to diagrammatically represent the results. This enabled a clearer vision of the overall responses that were later categorized in a structured way in the “findings” section.

As for the interviews, all of them were recorded and transcribed into Google Documents. In most cases there was a simultaneous translation from French to English done by the researchers. In order to organize the information from the interviews, researchers coded the transcripts. During the coding process, key words were retrieved from the interviews to summarize the idea of the interviewer. This would allow to spot similar answers and retrieve all relevant information for the research. Since many key words arose, a categorization of these was needed. Therefore, from over fifty key words, five main themes were recognized. Each theme including the main discussion points during the interviews as the table below shows:

<b>Community</b>	<b>Migration</b>	<b>Development/Vulnerability</b>	<b>Climate</b>	<b>Livelihood</b>
Religion	Migration Patterns	Government Helplessness	Climate Change	Current Occupation/Income
Spirituality	Migration Perceptions	Development of Ndem	Harvest	<u>NGO work</u>
Sense of Reality	Migration Outcomes	Transition to Ndem	Climate Variability	Deforestation
Community Participation	Drivers of Migration	Infrastructures	Consequences of Climate Variability	Collecting Water
		Energy	Climate Perception	Coping Mechanisms
		Youth and Education		Sustainability
		Plastic Pollution		

		Ndem Origin		
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*Table 2: Coding themes and sub-themes*

The final document was then coded to obtain themes. Five main themes emerged from this process: community, migration, development/vulnerability, climate and livelihood. In addition, the informal conversations and notes during fieldwork were collected on a side document.

## **2.5 Challenges and Limitations**

As foreseen by the researchers, a number of challenges and potential errors hindered the process of data collection throughout the fieldwork. While some of these challenges had been thought of in advance, and therefore had a solution ready to be applied, others unexpectedly surfaced on the field, compelling the researchers to apply immediate problem-solving skills.

One of the main barriers belonging to the former category was the language one, as the researcher in charge of collecting primary data had a limited knowledge of French, and no knowledge of Wolof, the local language spoken in the study region. For this reason, the choice of hiring an interpreter was made, although aware that “research working with an interpreter can result in linguistic and cultural misunderstandings, and influence the behaviour and response both of the interviewer and of the informant” (Valentine & Skelton, 2003). Besides, “changes in message can also occur as a result of errors when one spoken language is interpreted into another” (Flowerdew & Martin, 2005). Luckily, thanks to the recording of interviews, the other researcher was able to transcribe the full recordings in French, and therefore avoid potential pitfalls in the translation. Unfortunately, for the interviews recorded in Wolof, the researchers had no choice but to entirely rely on the interpreter. This was both a challenge and a limitation for the study.

Another problem arose in terms of sampling, both for the survey and the interviews. While the target for the research was the village of Ndem, a religious celebration started just two days after the arrival of the researcher in the village. The so-called “Magal” brought all of the people from Ndem, plus hundreds of people from nearby villages, to join for a week in Mbacké Kador, a small village 30 kilometers from Ndem. This event brought the target group to mix up with people from Dakar, other parts of Senegal and also Europeans, which made the collection of relevant data much harder to obtain. Besides, throughout the celebration, people spent most of the time dancing and chanting. This made also difficult the identification of spare time slots in the people’s agenda. Nonetheless, this problem was partially overcome by joining the festivity

and spending time with locals. This allowed meeting many people, identifying potential informants, and establishing an informal network to gather data. Furthermore, work was not restricted to daytime but rather to every moment of the day to increase the chances of collecting valuable information.

A third challenge emerged in terms of gender. Indeed, while the researcher tried to keep a gender equality perspective as much as possible among the respondents, this target was hindered by cultural and social factors. Although gender segregation was not identified as a religious issue in the region, most of the times women simply performed different types of tasks, which made them less accessible to the researcher. For instance, being in charge of cooking and children, they spent most of the day either in the kitchen or in the house. Even during the evening, when time for informal conversations in front of the bonfire was found, women were not present as required to wait home. Furthermore, generally speaking, the researcher noticed a much higher literacy rate among men than women. In many occasions, for instance, the survey had to be filled by the researcher with the help of a translator because the female respondent could neither read nor write. The same phenomenon happened with men, but to a much smaller scale.

Finally, the available time frame represented a substantial challenge for the data collection process, as short stays can lead to possible inaccurate information (Jónsson, 2010). One of the researcher could only employ 10 days in the village (out of which 7 were spent in Mbacké Kadior), while the other, which organized the fieldwork and participated in the design component, had to leave Senegal before the research in Ndem. For these reasons many stages of the data collection process had to be rushed through, and the overall study was affected in terms of vastity (number of people to be reached) and precision (available time spent with each respondent). Nonetheless, the researchers strenuously worked on a daily basis to minimise the negative impacts of this challenge.

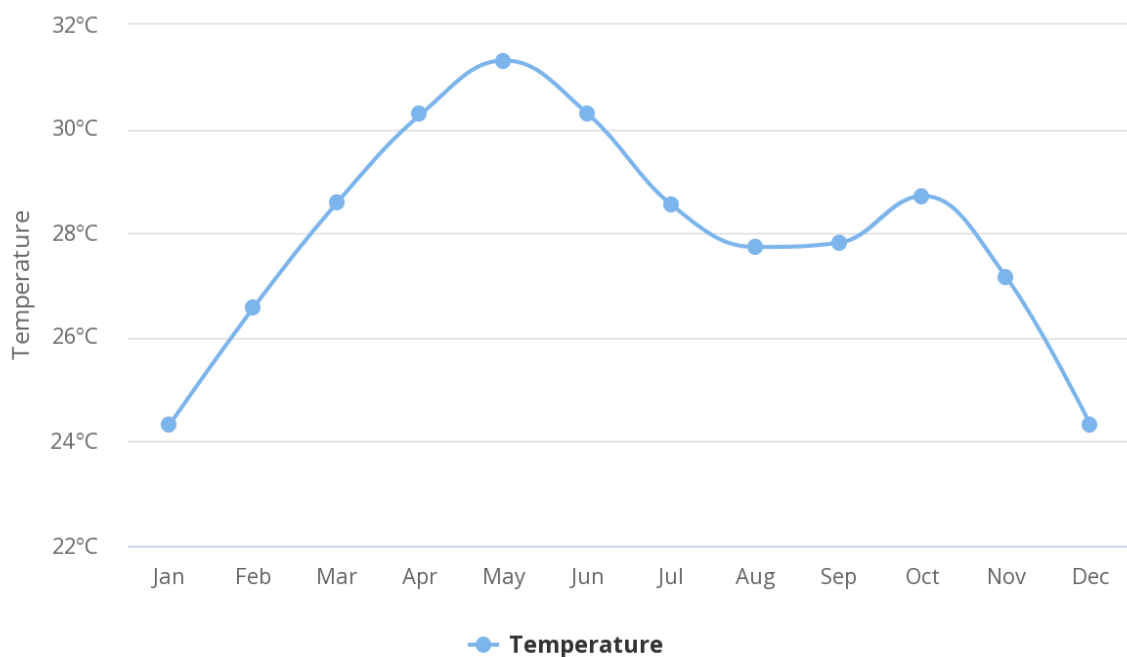
## **Chapter 3: Context and Background**

### **3.1 Climate Change and Variability in West Africa's Sahel**

Senegal's climate is characterized by "high spatial and temporal variability in precipitation" (WFP, 2012), cooler temperatures throughout the wet season, and a warm climate the rest of the year (USAID, 2015). The geographical extent of the territory results in different climatic conditions according to the North, South, East or West zones of the country (Guèye et al., 2007),

and is subject to the dual influence of continental and oceanic climatic processes (Fall et al., 2006). Along the same lines, Senegal benefits from the sudano guinean climate (Guèye et al., 2007) and lies in the westernmost region, transitioning between the tropical moist in the Western African zone, to the arid Sahara desert in the North. All of these conditions result in a very high degree of variability in terms of climate, and many studies have been trying to understand the extent to which these are influenced by climate change (Mbow et al., 2008; Tschakert, 2007; Fall et al., 2006)

In recent decades, the whole of West Africa has experienced a warming phase ranging between 0.3 to 1°C (IPCC, 2013, in Sylla et al., 2016; Lo et al., 2014). This data is also confirmed by



*Chart 1: Average Monthly Temperature of Senegal for 1961 - 1990 (WorldBank)*

the World Bank, according to which “between 1961 and 2000, there was an increase in the number of warm spells over [...] western Africa”, as well as “declines in mean annual precipitation” (World Bank, 2019). As shown in Chart 1 and 2, in Senegal, the mean annual temperature has increased by 0.9°C since 1960, with an average rate of 0.20°C per decade (World Bank, 2019).

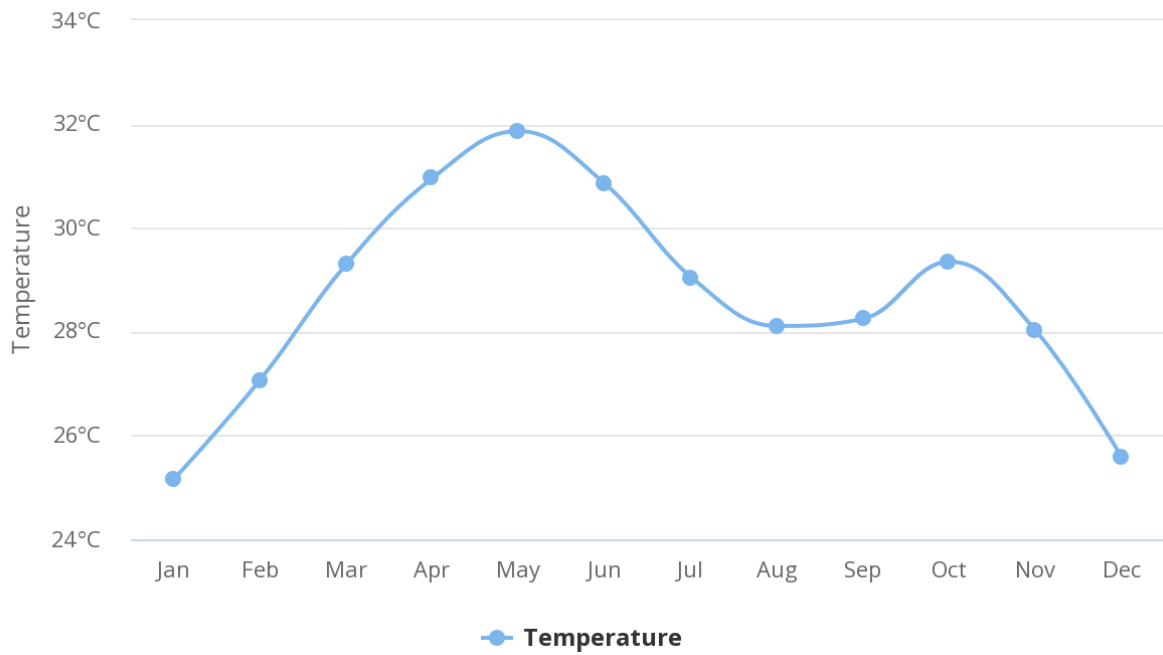


Chart 2: Average Monthly Temperature of Senegal for 1991 - 2016 (WorldBank)

In terms of precipitation, instead, “Senegal has experienced a statistically significant decrease in wet season rainfall between 1960 and 2006” (World Bank, 2019), as shown in Chart 3 and 4.

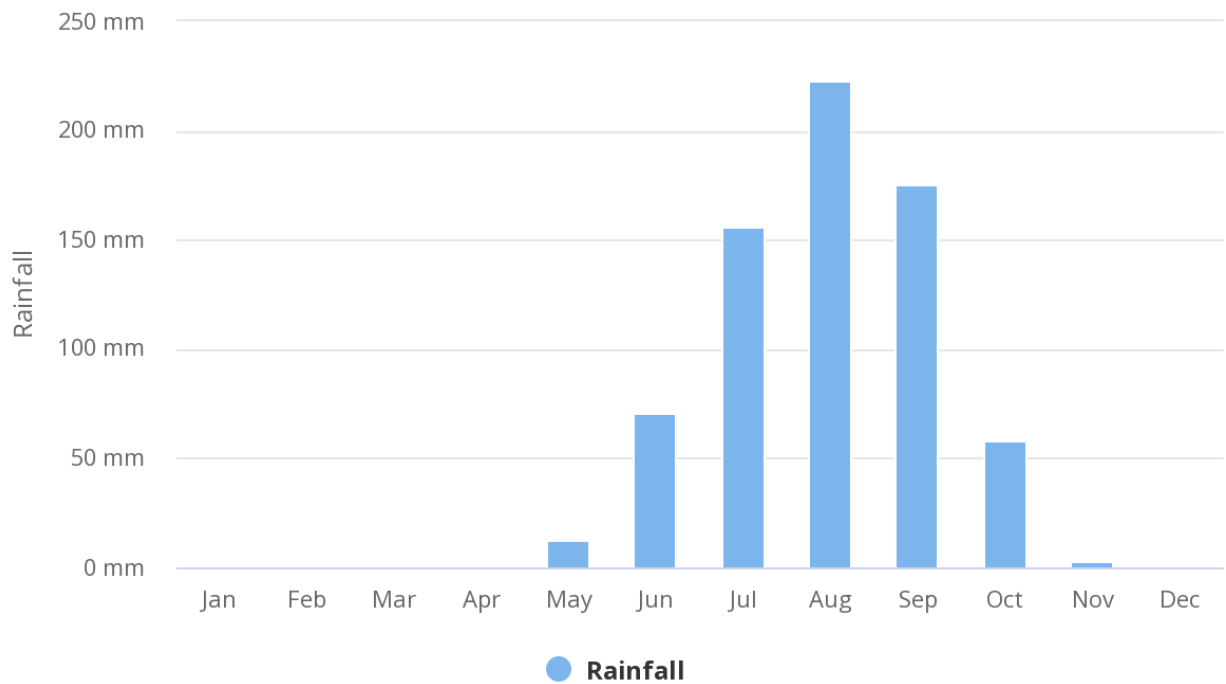


Chart 3: Average Monthly Rainfall of Senegal for 1961 - 1990 (WorldBank)

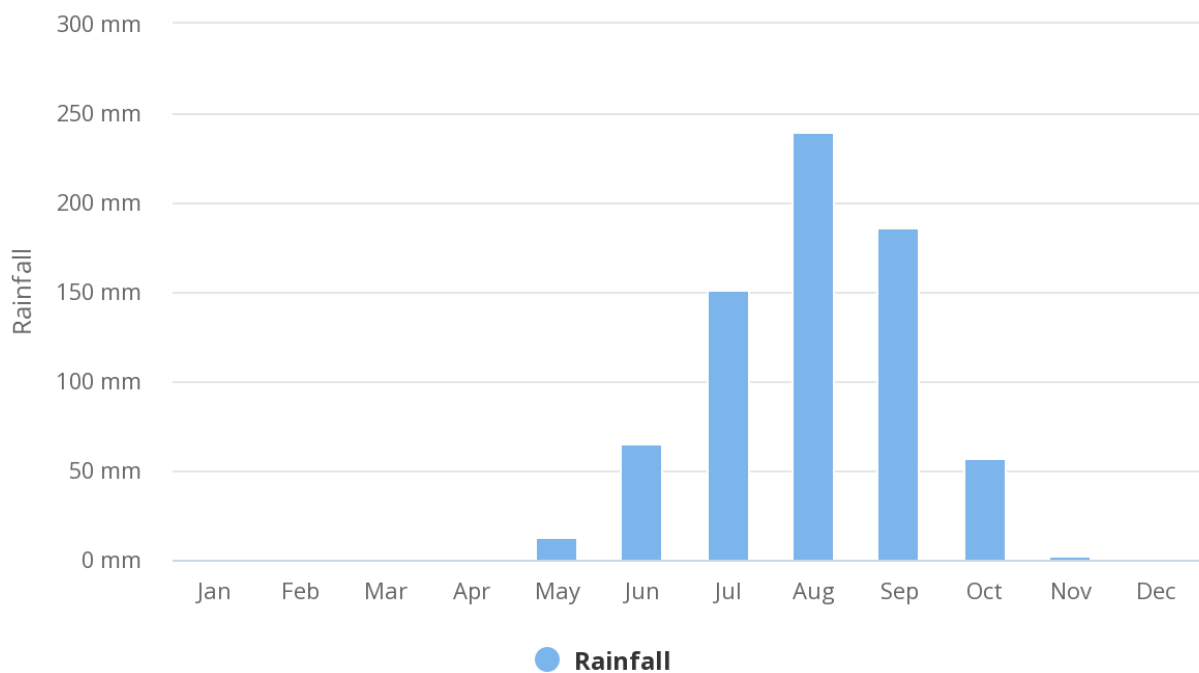


Chart 4: Average Monthly Rainfall of Senegal for 1991 - 2016 (WorldBank)

As the charts show, the rainfall patterns in Senegal are divided into the rainy season (*hivernage*) which usually lasts for about two months and a half from July to August, and the dry period, where both the seeding and harvest takes place. Senegal’s rainfall patterns are highly volatile and uncertain since can range “between 200mm and 600mm with coefficients of variation ranging from 15% to 30%” (Kandji et al., 2006). If one looks back to the catastrophic drought years of the 1970s, 1980s and 1990s, compared to the following ones, it seems that no apparent climatic pattern can be observed.

1969	1970	1971	1972	1983	1997
962.8mm	653.6mm	825mm	504.9mm	411mm	460mm

Table 3: Rainfall Variability of the Catastrophic Drought Periods (Guèye et al., 2007)

A surplus of rainfall in the 1960s, in contrast with the long periods of drought in the Sahelian region between 1970s and 1990s (Guèye et al., 2007), shows how hard it is to obtain accurate projections from this area. The past climate variability is not related to climate change (Climate Analytics, 2018), but rather to the projections of extreme variables due to Senegal’s geographical situation. Yet, downscaled estimates indicate a possible reduction in the rainfall

by the 2050 horizon, similar to the ones observed in the 1970s, 1980s and 1990s, along with an increase in the maximum and minimum temperatures of 2°C to 5°C (USAID, 2014) leading to a drier climate (Afifi et al., 2012). Plus, Senegal is already a drought propitious place, where throughout the past few decades the aridity in the Sahel has only been increasing (Lo et al., 2014). These projections of extreme changes are, unlike the drought periods, now closely relatable to climate change effects.

Along the already unstable climate, concerns on desertification, massive loss of agricultural production and livestock, deforestation, water availability, soil erosion, reduction of organic matter and loss of biodiversity are expected to put further stress on the population (Kälin, 2010; Sylla et al., 2016; Kandji et al., 2006). These slow-onset environmental degradations in an economy which is mainly based on agriculture<sup>1</sup>, employing 77% of the economically active population and accounting for the 12% of the GDP (Funk et al., 2012), are expected to have devastating effects on the population in terms of livelihoods and health security. A forecast on the global crop yield expects a loss as large as 5% in 2030 (Hallegatte et al., 2015). This is troublesome in a country where despite its importance as primary economy generator, agriculture is still a “highly underdeveloped sector characterized by (i) an almost total dependence on rainfall, (ii) low use of external inputs, (iii) absence of mechanisation and (iv) poor linkages to markets” (Kandji et al., 2006). If we add this to non-climatic stressors such as agricultural expansion, new policies (IOM, 2018), livestock grazing and population growth (Mertz et al., 2011), the only way to remain resilient is by adapting to the complex context with a holistic mind-set. Even though in the past the natural and societal systems have shown resilience vis-à-vis climatic variability, current data on extreme changes and projections on future climatic trends due to climate change are leaving no choice but to take unparalleled measures to cope with these difficulties. Therefore, there is a clear requirement of an overarching assessment of potential disasters, with a multi-hazard and societal approach.

### **3.1.1 Multi Hazard Approach - Slow Onset Hazard**

Climate change is a “multi hazard phenomenon” (Birkmann, 2007). Thus, in order to be effectively confronted, it necessarily requires a multi-hazard approach simultaneously tackling existing hazards and vulnerabilities. In the Hyogo Framework for Action 2005-2015 it was acknowledged that “an integrated, multi-hazard approach to disaster risk reduction should be factored into policies, planning and programming” (UNISDR, 2005); and in the following

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<sup>1</sup> Mainly peanuts, millet, sorghum, rice, cotton, manioc, sugar cane and nièbe (FAO, 2019)

Sendai Framework for Disaster Risk Reduction 2015-2030 it is stated that “disaster risk reduction practices need to be multi-hazard and multisectoral, inclusive and accessible in order to be efficient and effective” (UN, 2015). Although many international frameworks have been including this term in treaties and agreements, only a few managed to conceptually define what a multi-hazard approach is in the context of disaster risk reduction. Kappes et al. (2012) define it as “the totality of relevant hazards in a defined area”. Nonetheless, with this definition, it is necessary to also define what can be deemed as *relevant*, which would open another discussion out of the scope of this study. For this reason as part of the aim of this research, the definition by Budimir et al. (2013) as “an approach that considers more than one hazard in a given place and the interrelations between these hazards, including their simultaneous or cumulative occurrence and their potential interactions” is used. This framing is suitable for this study as not only it includes hazards simultaneously occurring in one place, but also their interrelations and consequentiality, which are critical factors in the discourses of climate change.

One of the most common differentiations in the context of DRR is the distinction between sudden-onset and slow-onset hazards (UNISDR, 2017). While the former are usually characterized by events occurring very quickly and/or unexpectedly, the latter usually emerge gradually over time (UNISDR, 2009). Due to limited timeframe and resources, for the purpose of producing more valuable and precise results, this study will exclusively focus on the latter. In a technical paper released by the UNFCCC (2012), slow-onset events “were identified to include sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinization, land and forest degradation, loss of biodiversity and desertification”.

According to the INFORM Index for Risk Management, Senegal is particularly vulnerable to coastal erosion, droughts and floods (INFORM, 2019). While flooding “annually affects about 200,000 people and has an \$89 million impact”, droughts “generally impact the arid and semi-arid Sahelian regions (northern Senegal) every three to four years” (INFORM, 2019). Since 1980, more than 3 million people have been affected by droughts (GFDRR, 2019). These hazards threaten to increase the level of vulnerability and affect the ability to cope of the population. Yet, the complex combination of processes cannot leave climate as the main source of vulnerability, since this would mean to “oversimplify and misunderstand the complex Sahelian dynamics” (Kandji et al., 2006).

## **3.2 Adaptation and Vulnerability**

### **3.2.1 Approaches**



The IPCC defines adaptation to climate change as “the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (2014), and can be classified either as planned or autonomous (Malik et al., 2010). This term, also known as spontaneous adaptation, is usually a reactive response to the vulnerabilities perceived by the community since it takes place after impacts are perceived (Malik et al., 2010). As Rahman & Hickey (2019) mention, it is the direct experience with stress events that initiates autonomous adaptation. Thus, autonomous adaptation can only come from local perceptions, hence widely considered by private actors instead of governments. The spontaneous actions aim to reduce the risks of slow-onset hazards to which the community is exposed, such as drought, resource scarcity, loss of biodiversity, loss of cultivable land, deforestation; and provide sustainable alternative livelihoods instead. Contrary to Community-Based Adaptation (CBA), which is defined as “a focus to empower communities to use their knowledge and decision-making processes to take action” (IIED, no date), autonomous adaptation does not entail that an external partner participates in the creation and planning of adaptation activities.

On the other hand, vulnerability, defined as the ability of a population to cope with different hazards (UNISDR, 2009), depends on the level of resilience, defined as “the ability of individuals, communities, organizations or countries exposed to disasters, crises and underlying vulnerabilities to anticipate, prepare for, reduce the impact of, cope with and recover from the effects of shocks and stresses without compromising their long-term prospects” (IFRC, 2014). Vulnerability is the state of susceptibility, powerlessness and marginality of both physical and social systems (Adger, 2006) and is shaped by its exposure to the threat, its sensitivity and adaptive capacity. In the contextual vulnerability approach, the different interrelated environmental, social and economic components are all relevant to measure the overall state of vulnerability (UNISDR, 2017; Tacoli, 2011). Senegal, in the matter of climate change, is sensitive and vulnerable to its effects (IOM, 2019; Lo et al., 2014). The country is part of the “Least Developed Countries” (LCD), which are characterized by a low per capita income and severe structural impediments to sustainable development (IOM, 2019). Besides Senegal’s poor economic situation, its exposure to environmental threats regarding slow-onset hazards poses severe challenges in terms of livelihood strategies, and threatens health, human and food security sectors. Furthermore, climate change is expected to worsen the situation through the increase of temperature variability and seasonal uncertainty<sup>2</sup>, considering the country’s main

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<sup>2</sup> It is also important to point out that despite their vulnerability to the climate change effects, they also contribute the least to this phenomenon (IOM, 2019). Senegal is ranked #107 with 9.3 MtCO<sub>2</sub>, compared to China ranked #1 with 9 839 MtCO<sub>2</sub> and France ranked #18 with 356 MtCO<sub>2</sub> (Global Carbon Atlas, 2018)

economic activity being agriculture. Even though governmental led on-going programmes for climate change adaptation plans in Senegal are taking place, such as the National Adaptation Plan adopted in 2015, a recent report from Climate Analytics states that they still lack efficiency in practice. This is due to the absence of a national budget to do research and implement climate change adaptation strategies, leaving adaptation plans for the country primarily dependent on foreign aid (Noblet et al., 2018). Thus, not only adaptation plans rely on external financial resources, but the lack of a national solid structure challenges local autonomy opportunities. Furthermore, the same report finds that there is little incorporation of the climate change situation into development policies; and vulnerability assessments heavily disregard other non-environmental stressors enhancing vulnerability (Noblet et al., 2019). When vulnerability is reduced to a single metric, it goes by hand that its dynamic characteristic will also be disregarded (Adger et al., 2006). Yet, this characteristic is key to develop effective adaptation measures, as it needs to be constantly adapted to the context, especially given the complexity and uncertainty of the world we live in (Becker, 2014). In the Senegalese context, one response to economic, social and environmental vulnerabilities has been migration from urban to rural areas; and current research has gained interest in this phenomenon. Since alarmist approaches have triggered a fear of a “massive exodus” towards the West, many studies have been made and are still on-going, into analyzing this mechanism of environmentally induced mobility as part of a response to social vulnerability and adaptive capacity of individuals and groups (Van der Land & Hummel, 2013).

### **3.2.2 Contextual Migration: Patterns in West Africa, Senegal**

Mobility in the West African Sahel and Senegal has a long-standing tradition, from pastoralists to nomads to young people looking for better opportunities. It has been a way to answer the population needs and a key element for improving livelihood strategies (Schöberger, 2018; Mertz et al, 2011). During the ecological crisis of the drought periods the Sahel faced during the 1970s, 1980s and 1990s, the principal response has been the intensification of internal and international migration (Guèye et al., 2007). Even though this example shows a clear path between environment and mobility, linking climate and environmental changes with migration still remains a complex issue to analyse, as it is particularly hard to observe and monitor (Beyani, 2013). Furthermore, making the link with slow-onset hazards in this region is especially difficult to illustrate because of the wide range of drivers, impacts, factors and types of movements they provoke (IDMC, 2018; Lo et al., 2014; Mertz et al., 2011).

As already mentioned, the Sahel constitutes a vast zone of mobility with different shapes, rhythms and multiple directions, yet the intensification of urban growth and the decay of rural villages has become an issue for the population. Due to economic, environmental and social reasons, villages are being emptied and people are being forced to move; whereas the receiving of migrants in urban areas, mainly Dakar, Diourbel and Touba (USAID, 2014; Tacoli, 2011) are stressed by the demand and lack of sustainable infrastructures and employment opportunities (IOM, 2019). The movement from rural to urban centres began as part of a normalized seasonal migration during the dry season, called “*noorane*”; but it has now become a long-term migration leading to the development of slums within and around these cities (Lo et al., 2014). Moreover, these slums are usually prone to flooding, with poor sanitation and access to health facilities, thus exacerbating inequality and insecurity (IOM, 2019). Yet, in the literature there is a debate on whether migration is a bad outcome, or rather could be adopted as an adaptation mechanism for current socio-economic and ecological challenges that rural areas may be facing (Gemenne, 2010; Adger & Adams, 2013).

The first one states that migration is the result of a failure in the provision of sustainable livelihoods, therefore a development issue gradually driven by the evolution of environmental changes (IDMC, 2018), defined also as the “push and pull” approach (McLeman & Hunter, 2010). This causal approach, dominating the debate, has nevertheless been criticized in the literature as static and basing itself on just one component, neglecting the interplay of environmental, political, economic and cultural factors (Jónsson, 2010; McLeman et al., 2010). It also perpetuates the myth of African migration desire to reach Europe for a better life, when data show that regional migration “still is at least seven times higher than migration from West Africa to the rest of the world” (De Haas & Bakewell, 2007).

On the other hand, there is a discourse of whether migration can be part of an adaptation strategy. Migration as a coping measure, indeed, could avoid further pressure on natural resources, provide income and benefits for the community staying<sup>3</sup> and diversify the income of migrants, recipient community and families staying (Van der Land & Hummel, 2013; Schöbergber, 2018). Yet, it seems that no clear pathway can link this process as it is extremely context dependent (Lo et al., 2014), and remains highly complex as all social spheres need to

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<sup>3</sup> According to Climate Analytics, the remittances of migrants to the households are higher than the overall GDP of Senegal (2019). “The remittances help to increase household income, support consumption and investment, thus contributing to poverty reduction and improvements in the welfare of families and communities in migrants’ origin countries” (IOM, 2019)

be integrated to understand this process. This is the main reason why, as Table 5 shows, predictions are thoroughly distinct from each other.

<i>Source</i>	<i>Estimates at the time of this study</i>	<i>Predictions by 2010</i>	<i>Predictions by 2050</i>
<i>UK Gov Office</i>	17 million	42 million	-
<i>World Bank</i>	-	-	140 million <sup>4</sup>
<i>IDMC</i>	18.8 million	42.3 million	-
<i>CILSS</i>	-	10 million	200 million
<i>IOM, 2019</i>	-	18.8 million	1.9 billion
<i>Christian Aid, 2007</i>	10 million per year	50 million	200 million
<i>Lo et al., (2014)</i>	-	-	200 million
<i>Myers (1993)</i>	-	-	212 million
<i>Myers (2002)</i>	-	-	200 million
<i>Christian Aid (2007)</i>	-	-	300 million
<i>Stern (2007)</i>	-	-	150-200 million
<i>GHF (2009)</i>	-	78 million	-

*Table 4: Estimates and forecasts of the number of people displaced by environmental changes.*

Modern discourses on migration in Africa tends to ignore, for example, the relationship between poverty and migration, and give little recognition to the importance of social practices that emerge from below and shape migration patterns (De Haas & Bakewell, 2007). By integrating different components into mobility, a pathway towards successful disaster risk reduction and climate change adaptation practices, that will allow to decrease the overall vulnerability level of the populations concerned, can finally be paved (McAdam, 2016).

### **3.3 Ndem**

#### **3.3.1 Origins and History**

The village of Ndem is situated in the “Peanut Bassin” in the Diourbel region.

<sup>4</sup> From which 86 million in Sub-Saharan Africa



Figure 1: The location of Ndem in Senegal (Google Maps)

Its proximity to the city of Touba, a nationally known place of devotion and annual pilgrimage, brings a strong sense of spirituality and religion to the area. The community living in Ndem is part of the Baye Fall community, a Sufi branch of the Murid brotherhood. As part of the Muslim tradition, they practice the *zīkr*<sup>5</sup>, chants and praises to Allah. However, they distinguish themselves by their peculiar looks often confused with Rastafarians. Their hair is locked, they wear thick black leather amulets around their necks and patchwork tunics. Not only their looks differ, but also they do not follow the rules and religious obligations imposed by Islam such as praying and fasting, as their belief preaches that physical work is the entrance to paradise (Crowder, 2015).

The main religion in Senegal is Islam, representing 95.9% of the total population (CIA, 2019), and even though the religious harmony between different beliefs in Senegal is well-known, there still is devalorization and criticism towards the Baye Falls, who are often perceived as not “real” nor “good” Muslims due to their practices. However, beyond the criticism, there is a collective imagination in Senegal that sees them as tireless workers at the service of their spiritual guide, the “*marabout*” (Pezeril, 2008). Work is a key component in this society due to

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<sup>5</sup> A form of devotion in which the worshiper is absorbed in the rhythmic repetition of the name of God or his attributes.

its spiritual and religious value: “we are the army of work” as their spiritual leader Serigne Babacar states. Their work is particularly active in the agriculture sector, and their philosophy is based on Muslim values such as peace and respect of the other. Bayfalism is based on the acceptance of differences of others and welcomes anyone into the community, making Muridism a social cohesion lever, “you are not born a Baye Fall, you become one”. They also vindicate a total indifference of the world issues and believe in the detachment of material possessions (Pezeril, 2008). Therefore, Bayfalism is not only spiritual, philosophic and social, but also economic (Crowder, 2015). Even though they can be perceived as “traditional”, the Baye Fall movement is progressive and shows a big adaptation capacity to current issues due to its openness to other cultures, religions and beliefs. This is the reason why they welcome foreigners from other countries and other beliefs into their community, as long as they can participate and contribute.

In 1985, the now spiritual guide Serigne Babacar and his French wife Sokna Aissa Cisse (originally named Pascale Blanchard), came to this area, which suffered from rapid desertification and rural exodus, to implement adaptation measures to attract people to return to their land. This area suffered from rapid desertification and soil loss due to human activities and climatic variability and changes. The over-exploitation of its soil, due to mainly peanut monocultures that accounted for around 40% of the cultivated land in Senegal (Mikadshi, 2019), eroded the soil and left the land of forest into an almost desert. In this area of the Peanut Bassin, the spiritual leader and his wife worked to revitalize this almost abandoned village and remedy the situation of vulnerability. The solution was to develop social entrepreneurship (Mikadshi, 2019), which relates to the Baye Fall way of living since work is an act for God. As Sokna Aissa Cisse claims: “In Ndem, we live spiritually in combination with our presence on this earth. For us, spirituality entrust us with concerns of material, economic, social and environmental needs in the service of collective life” (Fert, 2015).

### **3.3.2 Ndem Today**

Ndem used to be one of the abandoned villages with problems of rural exodus, unemployment and lack of basic infrastructures. Today, the eco-village of Ndem has access to potable water thanks to their two water towers, to electricity since 2006, to health facilities including a maternity guard, and to education thanks to the construction of a school. Moreover, the development of the NGO “ONG des Villageois de Ndem” created in 1985, currently gives employment to over 365 people in the region through the making and selling of art crafts, with the use of local and organic cotton, destined to the capital and even major cities in Europe (Ndem Info, no date). This enterprise called “Les Ateliers de Maam Samba” allowed the

residents to have another source of income different from the agriculture industry, which is increasingly unstable. Yet, since agriculture cannot be dismissed, measures for sustainable development were implemented through agroforestry practices, and by composting waste into fertilizer obtaining organic products. Furthermore, the intensive use of coal for the kitchen and for heating, that further stressed the environment, was replaced by the use of peanut shells as biofuel. This helped the reforestation process and gave awareness to the population on sustainable practices. Also, since deforestation led to a decrease in biodiversity, a rescue shelter for animal species was also integrated in the organic garden, and often used for educational purposes related to the environment.

The particularity of this village in terms of vision and spirituality has attracted visitors from other nearby villages, cities and regions, and also at the international level. There is a big support by visitors who want to participate in this initiative. At the time of the research, an ongoing activity to install solar panels in the school was being delivered by two visitors from Europe. This has therefore allowed an increase of the income and diversification of livelihood for both men and women.

## **Chapter 4: Findings**

This section summarizes the main findings obtained throughout the fieldwork. In order to facilitate their understanding, they are divided into (i) Survey Findings and (ii) Interview Findings. While the former is represented in the forms of charts obtained from the survey, the latter are a description of the different codes which emerged from the interview transcripts. The discussion of these results will be conducted in chapter 5.

### **4.1 Survey Findings**

In the villages of Ndem and Mbacké Kadior, 36 surveys were distributed and completed by the local community. The survey's primary objective was the one of getting an overall understanding about climate change in the area, environmental degradation, and coping mechanisms adopted by local communities. The questionnaire has been divided in three categories: (a) Climate Perception, (b) Livelihoods and (c) Natural Hazards and Coping Mechanisms.

The main findings are summarized as follows:

(a) Climate Perception

1. Temperature intensity seems to have “slightly increased” over the past years. Results regarding predictability are instead quite unclear:

Have you perceived any changes in the temperature during the dry season in the last few years?

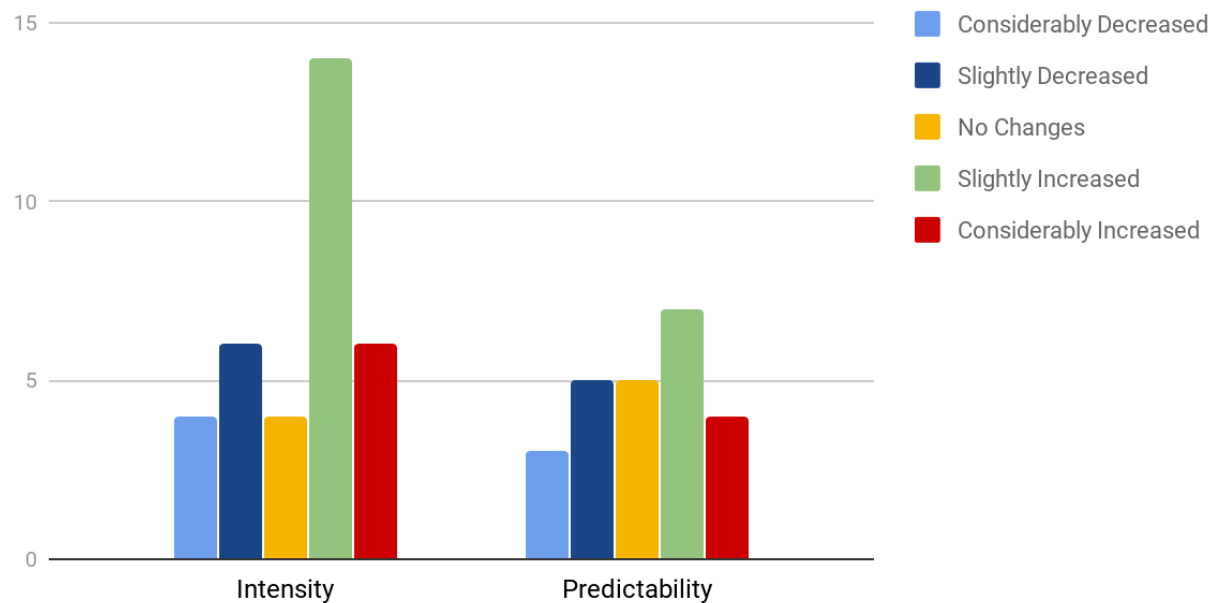


Chart 5: Changes in temperature over dry season



- About 60% of the respondents perceived an extension in the length of the dry season over the past few year

Have you perceived changes in the length of the dry season for the last few years?

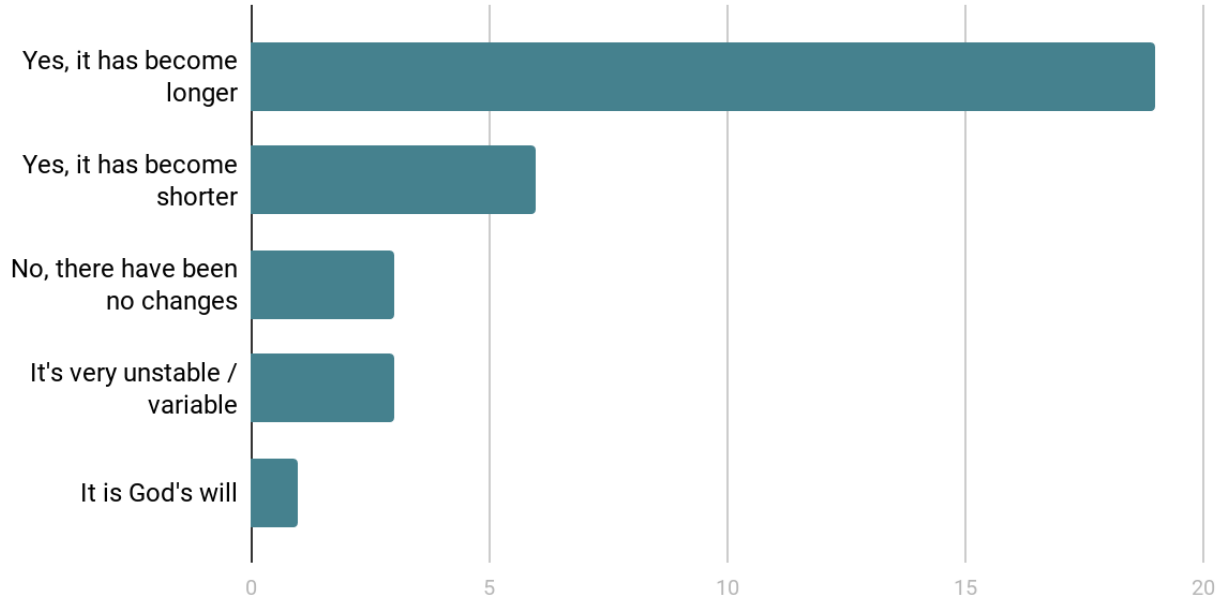


Chart 6: Changes in the length of dry season

- Both intensity and predictability of rainfall patterns seem to have decreased over the past few years.

Have you perceived any changes in the rainfall patterns during "hivernage" in the last few years?

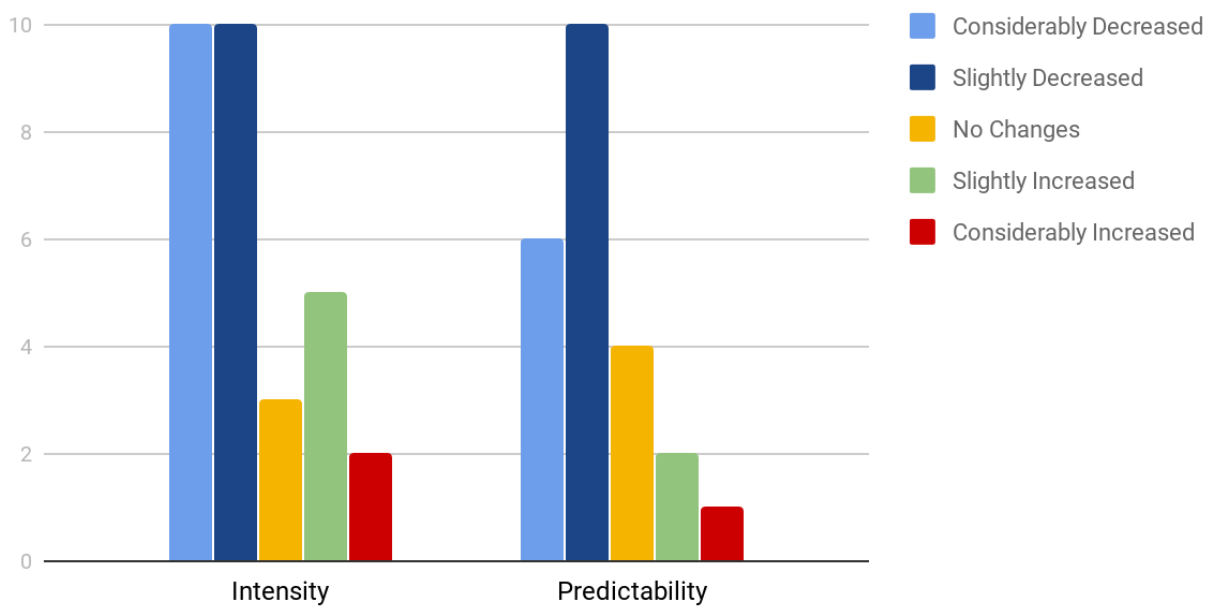


Chart 7: Changes in rainfall patterns over wet season

4. About 60% of the respondents perceived a reduction in the length of the rainy season:

Have you perceived changes in the length of "hivernage" during the last years?

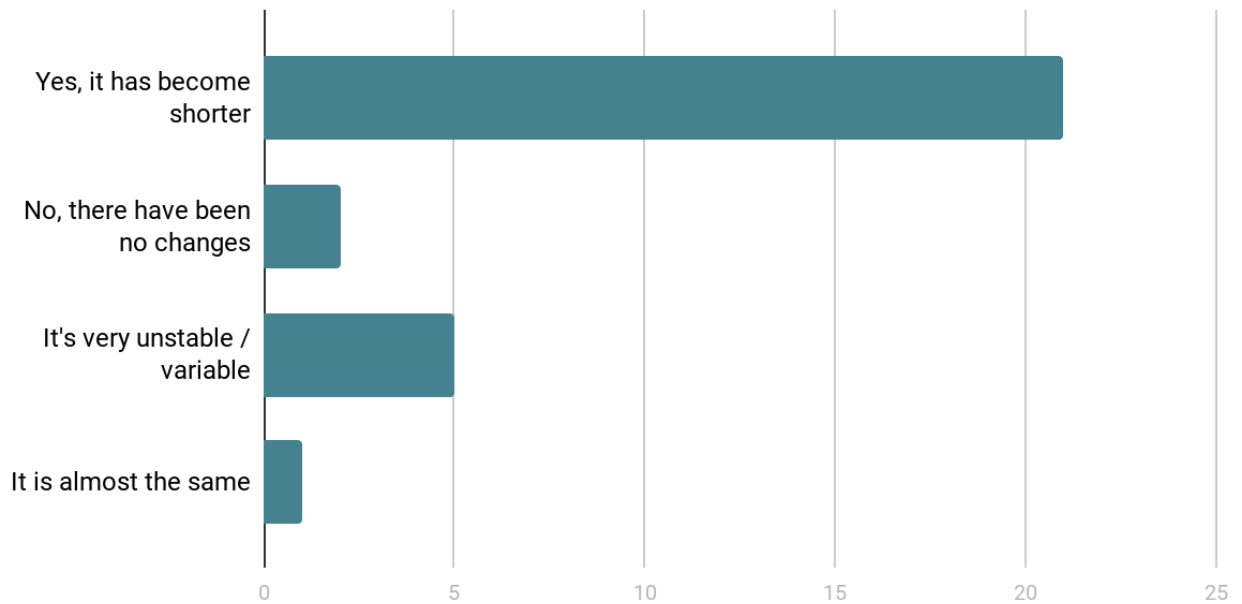


Chart 8: Changes in the length of wet season

5. People attribute climatic changes to both a normal variability in the weather patterns, and to abnormal climatic conditions. However the latter slightly prevails on the former with >50% of the votes.

These changes are attributable to...

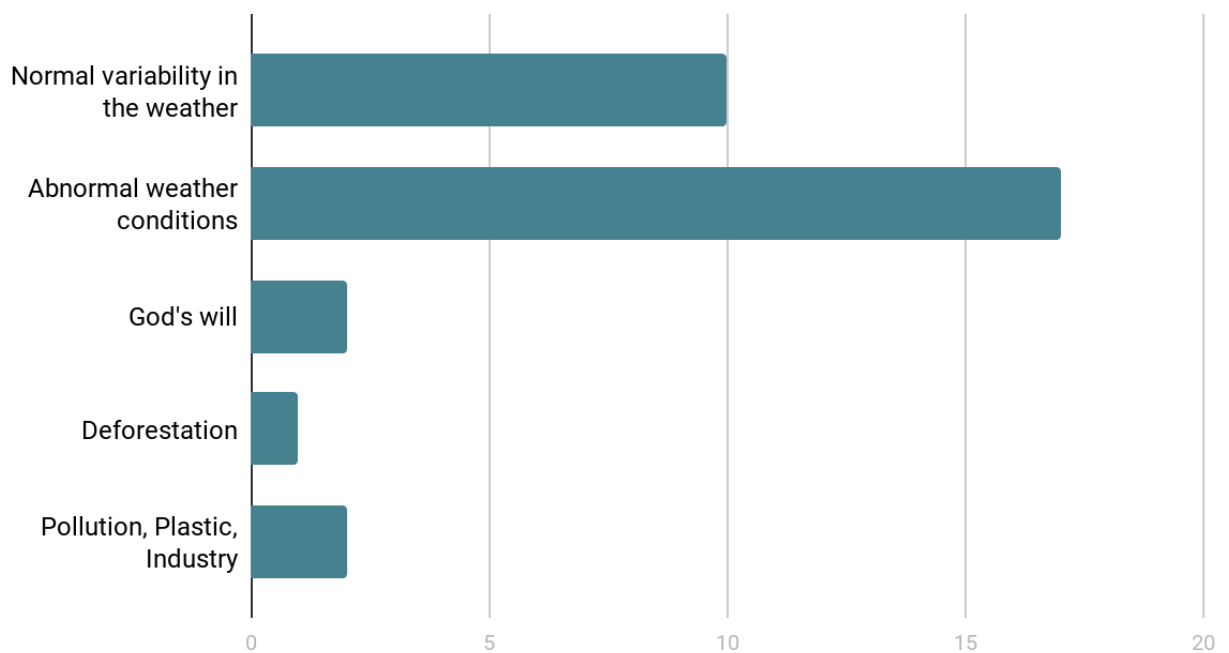


Chart 9: Attribution of climatic changes

(b) Livelihoods

6. 50% of the respondents feel their revenues are affected by abnormal weather conditions in a negative way, whereas 33% do not feel affected at all:

If you feel that there is abnormal weather conditions, has this had an impact on your revenues?

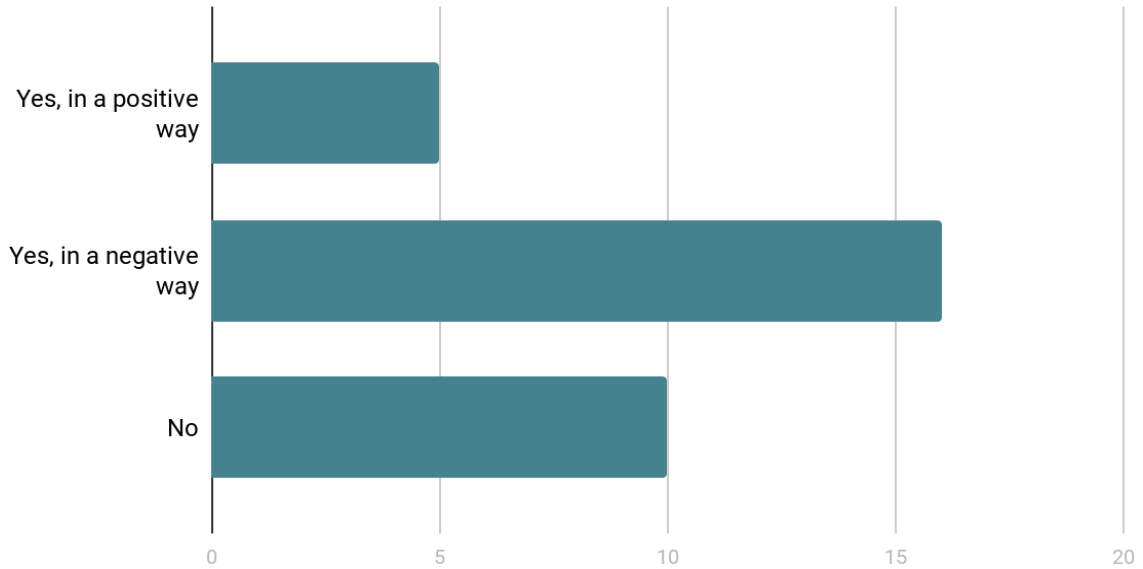


Chart 10: Impact on revenues

7. The balance between people moving to work elsewhere during the dry season, and of people staying, is quite similar. However, people staying represent the majority.

Have you left the village during the dry season to work elsewhere?

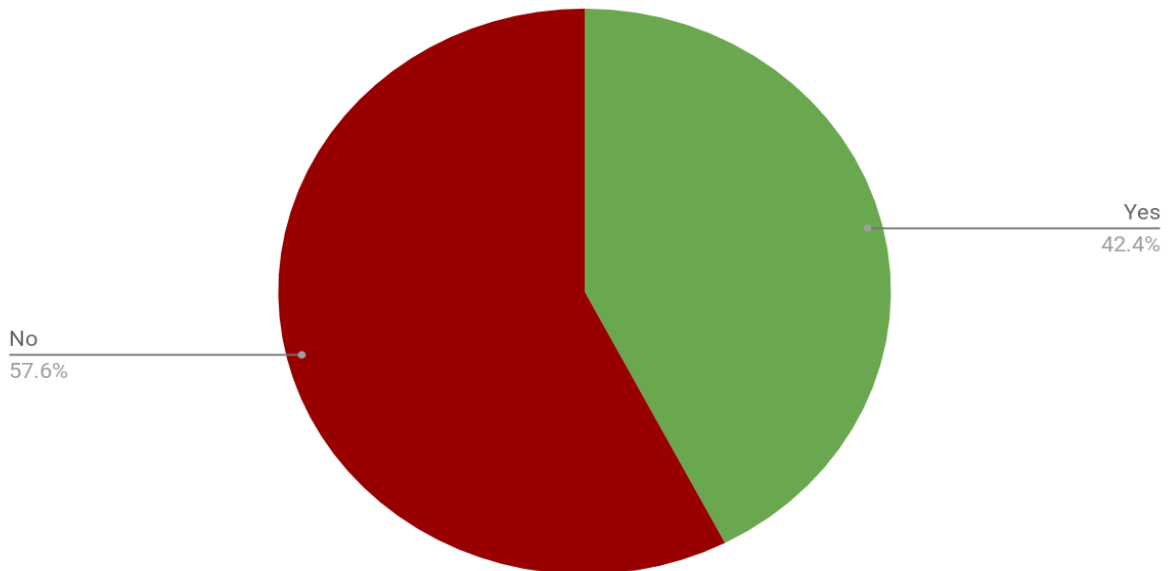
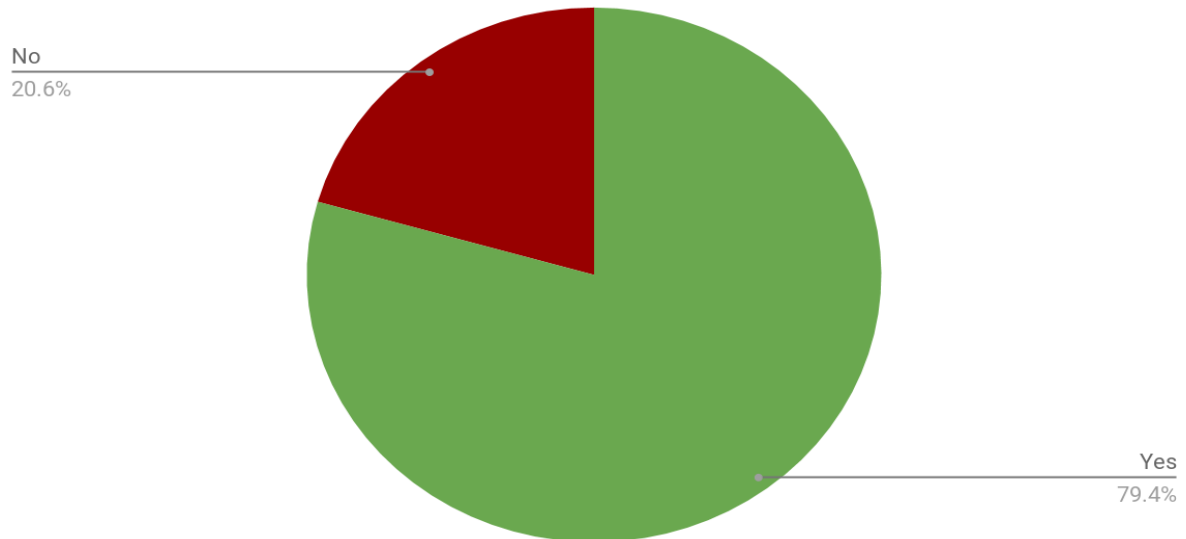


Chart 11: Out-migration over dry season

(c) Natural Hazards and Coping Mechanisms

8. About 80% of the respondents perceive desertification and droughts as hazards for their village:

Is desertification and/or drought something that concerns your village?

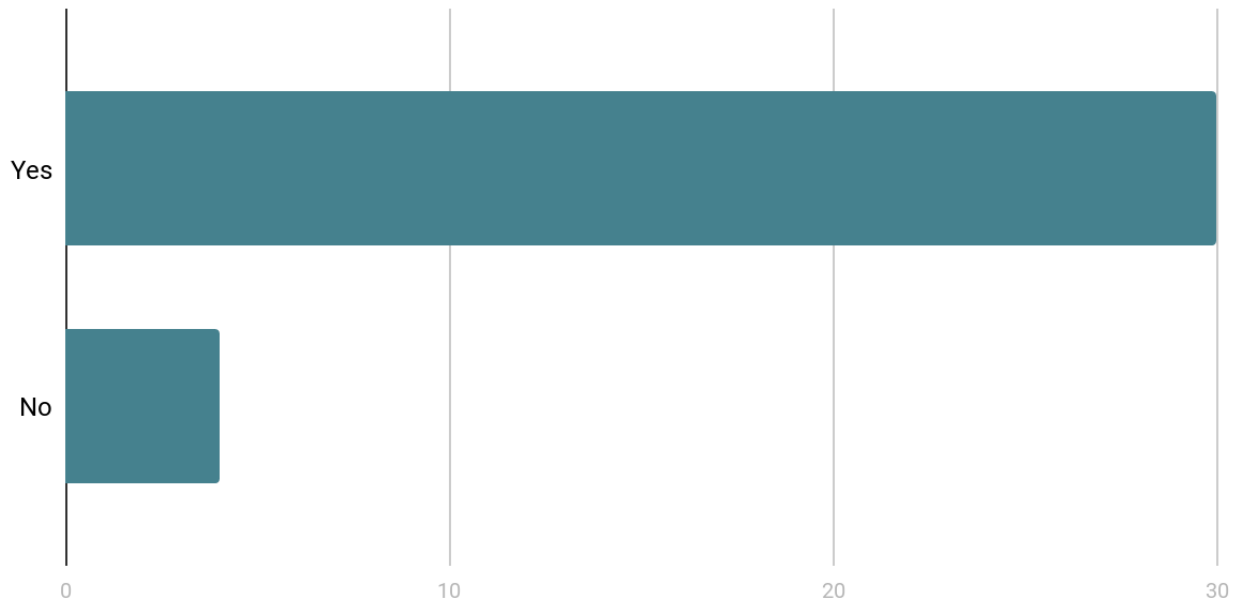


*Chart 12: Desertification as an hazard to the village*

9. Agriculture, livelihoods and water availability are the assets regarded as most vulnerable towards these hazards.

10. About 91% of the respondents think their village is doing something to tackle these hazards:

Does your village takes measures to tackle these issues such as drought and desertification?



*Chart 13: Measures to tackle drought/desertification*

11. Organizational measures include reforestation, awareness campaigns, agricultural diversification, praying, creation of different livelihoods and economic activities, and creation of infrastructures such as wells and forages.
12. Individual measures include anticipation and rations restrain, migration for economic purposes, and trading in bi-weekly markets.

13. About 91% of the respondents feel personally affected by droughts and desertification:

Is desertification/drought, something concerning you personally?

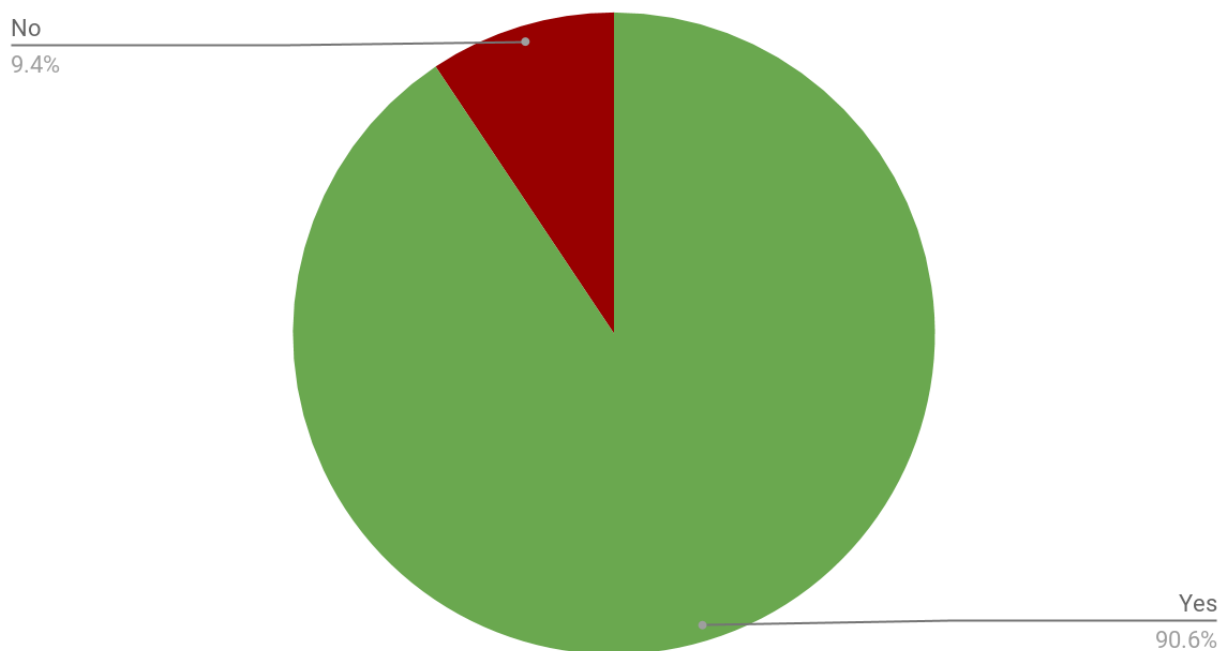


Chart 14: Desertification as an hazard to people

14. People feel affected as the level of productivity sinks due to a poor harvest, leading to higher prizes. Diet options get much more restricted, while the dependence on external support increases. Eventually, all dimensions of life are somehow affected (social relations, collective consciousness, physical conditions, etc.)

## **4.2 Interview Findings**

Nine semi-structured interviews were performed with key people in the village, and two interviews with key informants from the World Food Program office in Dakar. According to the interest and the time available, duration varied between 15 minutes and 1 hour and a half. Findings from this methodology will be grouped into three categories summarizing the themes emerging from the interview transcripts: (a) Patterns of Migration, (b) Factors Shaping Migration and (c) Coping Mechanisms. The purpose of this paragraph is the one of categorizing and outlining what has emerged as relevant or recurrent in the different interviews. Information obtained through field observations and informal conversations will also be included.

a. *Patterns of Migration*

Different patterns of migration have emerged throughout the interviews. Many respondents highlighted how, during the droughts of the 1970s and 1980s, a massive rural exodus affected many areas of Senegal. Due to a substantial lack of rain, and a consequent failure of crops, many farmers and breeders decided to move to the main urban centres (especially Dakar) and Europe. This period is remembered as a tough challenge in the history of the country. People who at that time left their home, and got back there only in recent years, believe that the climate challenges occurring nowadays are nothing compared to 40 years ago. Furthermore, someone reported:

*“The populations [t]here were really left on their own. Migration patterns were to bigger cities in Africa (such as Dakar and Saly or Europe, with males migrating to send back remittances; without forgetting that back then there was no such thing as Western Union, no telephones, etc. The women and children were left in a really critical situation.”* (Female, Interview #2)

The 102 years old chief of the village also declared that:

*“With the lack of rain, trees and vegetation died. Without food, the animals could not survive, and without animals humans were forced to leave.”*

In 1985 the migration trend reversed. When Ndem founders, Babacar and his wife, arrived in the region, one of the respondent declared that:

*“They immediately realized they needed to bring people together from 16 villages and define an orientation, so that they could come out of the situation and enable people to remain [t]here in dignity and close to their culture, families and their spiritual aspirations.”* (Female, Interview #2)

Starting from that moment, Ndem became an attraction point for many people in the area, and a catalyst for the migration patterns in the region. While the reasons for such phenomenon will be described and discussed in the following sections, what it is important to highlight here is the extent to which people seasonally moving to the cities, started moving to Ndem instead. One of the recurrent patterns noticed in the interviews was the one of going to the village only

for a few days or weeks, going back to the hometown and finally returning to Ndem like explained in the quote below:

*“The first time I came for a few days, I really liked it and so I came back.”*

(Male, Interview #3)

Nonetheless, this does not mean things got suddenly easy for the people of Ndem. According to the respondents, indeed, good seasons alternated with bad seasons, so mainly men occasionally left the village to look for alternative livelihoods. However, these patterns of migration remained seasonal - especially during the dry season - and the population steadily increased over the years. Nearly all of the respondents proved a very strong attachment to the land, enhanced also by the spirituality of the place, which makes people stay in spite of existing challenges. When asked whether climate will bring people to move, one of the interviewees said:

*“I think they will stay. Because their ancestors are here, their grandfather chants are here. And the attachment towards the land is very intense. In the villages people do not want to move.”* (Female, Interview #1)

It is for this reason that more than one interviewee declared:

*“Yes, sometimes someone leaves. But eventually they all come back.”*

(Female, Interview #2)

Today, the village enjoys respectable living conditions compared to other realities in the area, and warmly welcomes any person seeking for food and shelter. Notwithstanding the role played by Ndem, not all of the villages in the area can praise the same attractivity, as relevant patterns of migration historically brought many people to move from rural to urban centres. In the case of Senegal, Dakar represents the central hub for this migration pattern, with slums mushrooming all over the city to cope with overpopulation. As a WFP interviewee declared:

*“Cities are not prepared to foster so many people. Today Dakar is completely asphyxiated. Imagine that, in numbers, Dakar host over 60% of the country population. Everybody left their village to go to Dakar. And that is a security*



*problem, a health problem, and access to water problem, that needs to be managed.” (Male, Interview #10)*

#### *b. Factors Shaping Migration*

The discourse concerning factors shaping migration is doubtlessly the most delicate amongst the findings. As a matter of fact, what has emerged from the fieldwork, and has also been confirmed by existing literature, is that migration is rarely (not to say never) shaped by unilateral factors. Rather, it is a combination of intertwined and interdependent complex factors, continuously changing and shaping different patterns according to the specific context.

Analyzing the interviews transcripts, five themes have emerged as the main drivers for migration in the context of Ndem: (i) sense of community, (ii) spirituality and religion, (iii) development, (iv) economy and livelihoods and (v) climate. It is critical to highlight that, although in individual narratives some of these factors may have prevailed over the others, overall, they were all present to different extents in nearly all of the interviews conducted. Clearly, many of the themes here described cannot be entangled into one single category, but are rather fluid and multifaceted concepts.

##### (i) Sense of Community

Many of the respondents reported Ndem sense of community as one of the main reasons for moving there. In Wolof language, the official motto of the village is “Niokobok”, or “On Est Ensemble” (in French): we are together. This sentence is representative of the welcoming spirit of the community. When asked about the process of integration within the village, one of the interviewees said:

*“I was not a stranger, because the community is a spiritual one, and when I came we had the same feeling, the same things in our hearts. It wasn’t difficult to integrate. We have the same feeling, the same vision of life. It was natural. It was beautiful.” (Male, Interview #3)*

Another respondent expressed how this sense of community is well visible also in the working context:

*“So there is no task at all that you can say is yours, you don’t have to attach. If they need me I can be anywhere. From the simplest tasks to the more complicated ones. But according to what people like to do, or what they are good at, then some task is done by some people.”* (Female, Interview #5)

Moreover, people hardly ever use possessive pronouns, as what they own is also shared with the rest of the community. The ways in which this sense of community is also capable of playing a role in the resilience of the village will be discussed in Chapter 5.

### (ii) Spirituality and Religion

Hand in hand with the sense of community goes the spirituality of the village. As explained in chapter 3, Ndem was founded by the spiritual guide Serigne Babacar and his french wife Sokna Aissa Cisse. They are extremely important representatives of the Baye Fall brotherhood, which is extensively spread in this part of the country. For this reason, many people see in Ndem the “spiritual” home of their belief, like Rome could be for Christians or Mecca could be for Muslims. As reflected in the interviews, spirituality seems to be the most influential in shaping different migration patterns. One of the most interesting things discovered throughout the field work has been the finding of a cultural practice perpetrated in the past to tackle a past issue concerning many women leaving from the village after marriage: whenever a woman got married, a nail used to be hammered in the sacred baobab at the entrance of the village. This meant that the woman’s soul was forever attached to Ndem, and that therefore she could not ever leave the place. Evidence of this practice was found on the baobab’s trunk (Figure 2).



*Figure 2: Nails in the Baobab as part of a cultural tradition and practice*

In parallel to the religious aspect, there is a great sense of respect towards the spirits of the village, living mainly in the main baobab, which are considered sacred and worth of reverence. One woman declared:

*“[The spirits], they are like my family. I feel things. It is another dimension [...], in this village things happen.”* (Female, Interview #1)

All of these beliefs most certainly play a key role in shaping people’s behaviour and decisions.

### (iii) Development

In terms of development, interesting ideas emerged from the interviews. The notion of development in the village is very much detached from the Western one, as people do not feel a constant urge to “move forward”. As one of the respondents declared:

*“I think we are cautious to not jump into this sort of futuristic modern context where the most vulnerable people will be left behind. Because this is what happened in the 80s. [...] If we try to propel people into this alphabetized, mechanised, high-tech world, they are going to be left behind again. That is not at all the spirit of this community.”* (Female, Interview #2)

Another interesting facet of development is that, paradoxically, many people moved from more “developed” contexts such as Dakar, Saly, or even Europe and, in a way, downgraded their living conditions, but still declared themselves happier than ever before.

*“If you look at here, this place actually makes people come from better living conditions. Which is a regression in terms of livelihood, and material wise, [...] you cannot modelize it.”* (Female, Interview #5)

However, it is important to notice the capacity of the village to start from nothing, and build up living conditions which are, today, more than decent. When Babacar and his wife in 1985 got to the area where today the village stands, they had in front of themselves nothing but dry grasslands and baobabs. Nonetheless, little by little, they managed to develop resistant houses, to bring running water in 1996 through the building of a “water castle” and, finally, to bring electricity in 2006. Like the chief of the village said:

*“It’s not like people from nearby places have more challenges and problems than we have. We all are on the same boat. The thing is, we sail better than others.”*

This sentence is very representative of the spirit of the community, of its consciousness about the value of non-materialistic things, and especially of solving problems everybody has, in a more efficient and effective way. This also resulted in a very high level of resilience which made the village survive a burden the Western economy could not bear:

*“We are in the middle of the Sahel and we survived the 2008 crisis when the biggest international banks went under. So that says a lot about us.”*

(Female, Interview #2)

#### (iv) Economy and Livelihoods

This sub-paragraph is strictly related to the one above, although there are a few elements which make it distinctive and independent. As previously mentioned, one of the things Ndem people are most proud of is their ability to cope with the same challenges better than others. Then, how could they cope with climate variability and survive decreasing rainfall when most of their livelihoods were given by agriculture? The answer lies in economic diversification, and in particular in the capability of the founders to create “L’Association des Villageois de Ndem”: a NGO which today is involved in art crafts, clothing, eco-tourism, agroecology and hotels. The NGO was capable of establishing a network with Europe, mainly in Spain, France and Italy, and organizing international trade and workshops. Today it employs over 200 people, and it contributed to the creation of a school, a health centre, a library and a park for organic farming. The NGO became an organization with a clear vision and mission, and also functioned as an opportunity for people from Europe who wanted to contribute to this project:

*“When I came [to Ndem], I saw the artisanal workshops which still lacked a solid infrastructure, the administration and the commercial partners were not on-point nor centralized. I then identified the needs, I went back to France, I started a project, I found the fundings, I created a volunteer position which I took. I then moved to Ndem to follow up on the project, to strengthen, supervise and manage the art craft centre.”* (Male, Interview #4)

Furthermore, as already mentioned, work has a key role in the definition of one's self, as it is an important component of the Baye Fall movement. According to people there:

*"The human spirit manifests itself through work"* (Female, Interview #2)

Thus, the lack of livelihoods does not only aggravate the economic conditions of people, but their intrinsic *raison d'être*.

#### (v) Climate

The last factor shaping migration is, of course, climate. This driver can be labelled as the most controversial, since it has been the one receiving the most discording voices throughout the interviews. What everybody seems to agree on, is the fact that over the past few decades climate has, indeed, changed. While someone believes that the temperature has remained the same but the rainfall has decreased, others say that:

*"No one can be in power of this [predicting the climate]. Everything is extreme. If it's hot it's way too hot, if it's cold it's freezing. Sometimes if it rains, it can be very strong, or sometimes you just don't see water."* (Male, Interview #9)

According to others, whatever happens to the climate is not questionable nor predictable, since it exists and changes according to God's will and power. As a WFP climate analyst declared:

*"People are hard to convince for example of rain forecasts, because they do not believe it. They think that the climate in the time of the ancestors hasn't changed, while it is obviously not the case. So there is a big work in awareness, capacity strengthening, and training that needs to be done."* (Male, Interview #10)

However, in terms of desertification and soil degradation, he declared that:

*"A recent analysis showed that there was an increase of 5% to 8% of arid and semi-arid areas in the Sahel. So degradation is continuous even though*

*there are adaptation and mitigation activities. [...] Cities and villages are condemned to disappear.” (Male, Interview #10)*

According to this data, consequences are going to severely impact also biodiversity, as well as bring to a rise in the frequency of floods.

From the interviews and survey, though, high disagreement is present in the opinions regarding the consequences on the environment, livelihoods and economy of village and individuals. In fact, someone said:

*“I am convinced that climate change is not something universally negative, [...] as [here] it brought a very regular rainy season and more water.”*  
(Male, Interview #8)

Many other people declared instead that, due to climate change, goods' prices skyrocket and it is much harder to maintain the livelihoods. Given this variety in the responses, it is hard to draw a pattern or a model as far as migration is concerned. However, this heterogeneity is also capable of highlighting the paradoxical subjectivity of something universal like climate, namely the peculiar perception each individual has of it.

### *c. Coping Mechanisms*

This section will include all of the codes which, both at individual and village level, can be categorized in the theme of coping and adaptation mechanisms. Numerous and varied are the coping tools adopted by Ndem and its people to deal with a changing and variable climate. According to one of the respondents, when there's a lack of crops or food:

*“People don't just wait and see. They take action and continue to believe. They go to the weekly markets to trade, raise chickens and sell them. In regard to the soil, they prepare the soil in a good way because they do a lot of compost due to a lack of fertilizers.[...] I've also seen organized farmers that put money on the side for common agricultural practices. I started the campaign for 2018-2019. The farmers put money on the side for the next season, like a social bank, to protect the workers from future dangers.”*  
(Male, Interview #9)

Farmers in Ndem always think “one step further”, and prepare in advance for any inconvenience or trouble concerning the land. Agricultural insurance does not exist in the area.

Clearly, as previously mentioned, in the case of Ndem the most successful and evident coping mechanisms has been the setting up of the NGO:

*“When you manage to develop an economic activity that is not agriculture nor breeding, such as the art craft for example, it reverses the rural exodus. In Ndem this is what happened. People came to live here. Like what is happening in Mbacké Kadior, we develop diversified economic activities, which can help the inversion of the rural exodus.”* (Male, Interview #4)

Other important measures were adopted in terms of water management and reforestation:

*“If the water doesn’t come down from the sky, then we need to look for it underground with dwells. Also, reforestation, we did a lot of work for this. The trees who are around the village we planted them. Because all these problems are going to encourage migration in all regions in the Sahel.”* (Male, Interview #6)

While for the water the problem has been temporarily solved, with the digging of plenty of “forages” - big wells capable of retrieving water from more than 100 meters under the ground -, in terms of trees and deforestation the situation is still controversial. During field observations and informal conversations, indeed, diverging voices have been noticed on this matter: while on the one hand many people believe that deforestation is not a concern, because of governmental patrolling and expensive fines for transgressors; on the other many argue that trees are being voluntarily cut down, and that deforestation is giving space to desertification to spread in the region. In terms of coping mechanisms, one of the most interesting practices followed by the people of Ndem is the donation of a tree to each child in the village. This way the child will have to take care of the tree throughout his/her entire life and forests will be able to grow in the area. This practice was adopted also by WFP through the RNA (Regeneration Naturelle Assisté/Assisted Natural Regeneration) project:

*“So it works by allowing the plants to grow. We do not plant, but ask the people to protect them. So, if new species appear in the cultivable land of some farmers, instead of cutting them we ask the farmers to contour them to let them grow. In 2013 we recovered over 15% of degraded land. And here*

*we understood that nature itself can recover on its own, we just need to protect it.” (Male, Interview #10)*

Since the trees are mainly used for cooking, the village also managed to devise a biofuel out of peanut shells. This helps the population to have a sustainable energy source, and to avoid cutting down any more trees for logs.



## Chapter 5: Discussions

While in the previous section the mere findings were described and presented, in this chapter they will be critically analyzed and compared with the literature reviewed. In doing so, three areas for discussion are used to highlight the most relevant thematics that emerged throughout the fieldwork: (i) interpretations of vulnerability, (ii) the importance of context and (iii) autonomous adaptation.

### **5.1 Interpretations of Vulnerability**

Overall, during the interviews, different perceptions and statements were made about environmental changes and rural exodus, yet a common feeling was shared in the community. People there managed to cope with environmental hazards and remain resilient. Hence, they do not perceive themselves as vulnerable anymore, but rather forgotten. They did not receive governmental support during the heavy droughts of the last decades, and therefore mistrust it as it made many unfulfilled promises. During an interview it was mentioned how the feeling of underestimation and forgetfulness prevail over a feeling of vulnerability. In this scenario forgetfulness represents the state of total abandonment from the local government and institutions. Clearly, this is not something universal as it can vary over time. Throughout the years Ndem was most in need, though, the level of forgetfulness was extremely high. The discourse of vulnerability perpetuated by using a mere climate focus provides a very limited understanding of the context. Thus, as already mentioned in the conceptual framework, this study focuses on contextual vulnerability rather than on the outcome one (O'Brien et al., 2007).

In the 2030 Agenda for Sustainable Development (UN, 2015), it is stated that “the new Agenda builds on the Millennium Development Goals and seeks to complete what they did not achieve, particularly in reaching the most vulnerable”. Moreover, statements such as “people who are vulnerable must be empowered” and the vision of a “just, equitable, tolerant, open and socially inclusive world in which the needs of the most vulnerable are met” are included. As much as the inclusion of these values is critical for the achievement of the Sustainable Development Goals, the experience in Ndem suggests something different. Villagers there, indeed, do not feel neither vulnerable towards any specific hazard nor more susceptible than urban centres’ citizens. Conversely, they consider themselves as very resilient. The broad range of coping mechanisms characterizing Ndem, which was able to withstand challenges such as water

scarcity, desertification and rural exodus, considerably increased the resilience of the village and its people, who nowadays do not think anymore of themselves as vulnerable. Notwithstanding this high degree of coping capacity, they still feel *forgotten* as everything was achieved exclusively relying on their own resources. Ndem experiences a feeling of being left on the side, as even when government and media intervene, it is only for an advertisement purpose rather than a humanitarian one. As Tacoli (2011) puts it, “it is largely the socio-economic context that makes [gradual climate change] so catastrophic, specifically by restricting people’s ability to rely on well-tested strategies of local diversification of activities, both within the agricultural sector and in the non-farm sector”. The ability of Ndem was exactly the one of creating a resilient system despite the lack of support from the socio-economic and political context.

The experience of the village has not always been positive, though. The drought years in the 1970s and 1980s raised a number of challenges for the villagers who - at that time - were still very much exposed and vulnerable to adverse climatic conditions, and most times were left with no choice but migration. Albeit West Africa has always been a place of intensive mobility (UNHCR, 2008), the rural exodus characterizing Senegal in those decades is remembered with an extremely negative connotation. In that situation, as previously mentioned, people were forced to leave on a more permanent basis compared to the seasonal migration patterns distinguishing pastoralist groups in the area. They basically had no alternatives, since villages were not able to provide sustainable livelihoods; and they were compelled to give up the spirituality and connection with their ancestors’ land. Furthermore, not everybody had the chance to leave (McLeman & Hunter 2010), hence most times the youth managed to find sources of income in urban centres whereas vulnerable groups were abandoned in rural villages. This is another reason why the community’s collective memory refers to forgetfulness rather than vulnerability.

In 1985, Serigne Babacar and his wife realized the needs of the people, managed to create an environment with alternative livelihoods and opportunities, and increased the level of infrastructures within the village. The out-migration flows did not stop altogether, but people were left with a choice to decide what was best for their future, which they did not have before. They stopped being forgotten, not by the government or national institutions, but by their village and community.

## **5.2 Context Matters**

According to Hagelsteen & Becker (2013), one of the most important aspects in projects related to capacity development and disaster risk reduction is local context. While “a unified approach to what understanding the local context means” does not exist, and a broad range of methodologies and interpretations are being used, they also acknowledge that “often there are not enough studies and pre-planning done” to understand this aspect (Hagelsteen & Becker, 2013). In other words, it does not matter the way this element is approached, whether through a hazard and risk-based, cultural and religious or social one, as long as sufficient time is devoted to the analysis of the mechanisms and dynamics underpinning the context being analyzed. Even in the Logical Framework Approach tailored by Becker & Abrahamsson (2012), the “analysis of project context” represents the first step of the ladder, without which the whole value of the project would lose meaning and effectiveness.

In the previous chapter, many of the different coping mechanisms adopted by Ndem have been analyzed. Among these, the establishment of the NGO, reforestation programmes and the creation of a water supply system stand out for their value in the fight against climate change and slow-onset stressors. While nearly all of the strategies implemented by the villagers were established through a bottom-up approach, here it is interesting to note how contextual factors are able to influence the effectiveness of such strategies. Above all, community and religion.

### **5.2.1 Community Resilience**

The community bonding characterizing Ndem has already been introduced in the previous chapter. However, it is very interesting to note how this factor does not end in itself, but rather has an effect over other aspects of the village. In terms of coping capacity, for instance, this astonishing sense of unity, cooperation and coordination shares many values with the notion of *community resilience*. As aforementioned in the conceptual framework, this study will not attempt to define the scope of this concept, but it will rather adopt the framework outlined by Patel et al. (2017). Drawing from the literature, nine elements were identified to be the foundations of community resilience: local knowledge, community networks and relationships, communication, health, governance and leadership, resources, economic investment, preparedness and mental outlook (Patel et al., 2017). In order to understand if the sense of community in Ndem can also be translated into community resilience, it will be now investigated whether these elements are present in the village or not.

**Local knowledge**, subdivided into factual knowledge base, training and education and collective efficacy and empowerment, was found in Ndem, as great efforts are being conducted, especially by the elders, to raise awareness about climatic and environmental problems among the youth. The simple custody of trees to children is exemplificative of the transfer of knowledge towards new generations to contribute to the fight against deforestation.

**Community networks and relationships** are based on the hypothesis that “positive effects on a community and its members can occur during a crisis when its members are well connected and form a cohesive whole” (Patel et al., 2017). This is definitely the main forte for Ndem since, as illustrated in the findings, the community bonding, trust and philosophy of the *niokobok* make the village as a one rather than a multitude of individuals.

**Communication** is an added value for the village, because its small size and compactness make every message delivered in a prompt and far-reaching way. Furthermore, the central mosque represents the place where people can be quickly gathered in case of emergency, and where weekly meetings are held in occasion of the *Jumu'ah* (Friday Prayer).

**Health** might be considered both as an asset and a liability. The doctor of the village declared that in the past few years there has been a considerable switch both in the awareness and the behaviour towards hygiene, that the establishment of the NGO boosted the health conditions of Ndem and, lastly, that a few years ago a small clinic was built 5 kilometers from the village. Nonetheless, on the other hand, there are only one doctor, one assistant and two midwives for over 300 villagers, only regular childbirths can be delivered in place (complex deliveries such as Caesarean sections require more specialized clinics further away) and even for advanced injuries and emergencies reaching the clinic might be complicated as usually transport is by horse or donkey.

**Governance and Leadership** are subdivided into infrastructure and services, and public involvement and support; where in the former their “effectiveness, efficiency and capability to respond quickly” were deemed fundamental, whereas in the latter priority was given to local participation and representation in strategic planning, response, and recovery (Patel et al., 2017). Generally speaking, infrastructures in Ndem are quite humble, most of the huts are made of wood and stones, and the village is poorly connected to other towns and urban centres in the region. Nonetheless, service-wise, the system in place allows everybody to get what they need to achieve fair living standards such as access to water and electricity.



*Figure 3: Straw and concrete huts in Ndem*

The levels of public involvement and support are very high, every member of the community has a voice in the decision-making process and everybody contributes to the fulfillment of a common aim.

**Resources** in disaster management contexts include a countless amount of tangible and intangible assets which can be employed in a number of different ways (Auf der Heide, 2000; Baas et al., 2008). Patel et al. (2017) include in their framework material supplies (such as food, water and first aid kits), technical resources (such as machineries, equipment, shelter) and, finally, intangible natural, physical, human, financial, and social resources. One of the most critical skills in disaster management is the capability of identifying “what resources are needed and what resources are available”, in order to subsequently “suggest appropriate matches” between the assets and the needs of the community (Ghosh et al., 2018). For this reason, while pinpointing the exact resources present in Ndem would be useless, it is much more interesting noting how the village is capable of employing the scarcity at its disposal in an effective way.

As a matter of fact, given the objective limit in materials, equipment and intangible resources, it is even more impressive noting the level of resilience achieved.

**Economic Investment** include all of the proactive investments made to make a system or community resilient. Again, although with scarce financial possibilities, Ndem successfully managed to implement this action through the investment in the NGO which was able to provide economic diversification and stability to the people of the village.

Disaster **Preparedness** is defined by UNISDR (2009) as “the knowledge and capacities developed by governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions”. Several frameworks have been developed for the measurement of this concept (Gillespie & Streeter, 1987; Simpson & Katirai, 2006; Cutter et al., 2010), but they will not be applied to this scenario. Nonetheless, the outcome of this study will give a tentative response to the degree of preparedness of the village.

Finally, **Mental Outlook** is defined as “attitudes, feelings and views when facing the uncertainty that typically occurs after a disaster or when contemplating a future one” (Patel et al., 2017). This last element characterizing community resilience is also the one which is capable of defining by itself the village and the people of Ndem. The communitarian mindset found in the village, indeed, brings union and cohesiveness in the actions of the people, who act as a whole rather than individuals. This definitely is the added value which brings, together with the aforementioned ones, resilience to the community.

### **5.2.2 Spirituality and Religion**

The other element shaping the peculiar context of Ndem is spirituality. Clearly, this element goes hand in hand with the formerly discussed community resilience as, to a certain extent, this cohesiveness is a product of the religious attachment of the village. There still is a great importance in independently analyzing this concept as “all major recent treaties on hazards and disasters – as well as older ones – have overlooked or totally omitted religion in their assessment of the works issues in the field” (Gaillard & Texier, 2010). It is for this reason that “belief systems must be recognized by policy and project planners as institutions, which must be part of the process to reduce vulnerability” (Krüger et al., 2015), in a way that all dimensions of vulnerability can be tackled simultaneously in future trends of climate change.

The Baye Fall movement in Ndem certainly represents something which cannot be disregarded in any discourse or policy regarding climate change adaptation and disaster risk reduction in the region. One of the findings related to this aspect, for instance, has been the one of people addressing to God’s will as the rationale of a changing climate. A very interesting aspect highlighted by Schipper (2010), though, is that “although God might be seen as the cause of a drought, there are clearly widely differing attitudes about what this means”. She argues that “there are many [...] possible entry points for examining religion in the context of vulnerability, and outlined a framework to respond to the different needs a research, illustrated in Table 4.

<i>Focus on capacity</i>	<i>Focus on reducing risk</i>	<i>Focus on responding to disasters</i>
<b>A-1.</b> Role of religion in supporting development	<b>B-1.</b> Role of religion in influencing policy on environment and climate change (positively)	<b>C-1.</b> Role of religion in help people to emotionally overcome disaster (mental health)
<b>A-2.</b> Role of religion in encouraging social capital (organisation) for coping during difficult times	<b>B-2.</b> Role of religion in raising vulnerability to hazards	<b>C-2.</b> Role of religious institutions in supporting disaster relief and recovery processes
<b>A-3.</b> Role of religion in influencing preventive and reactive responses to disaster risk and climate change	<b>B-3.</b> Role of religion in reducing vulnerability to hazards	<b>C-3.</b> Role of religion in influencing relief and recovery processes (rebuilding, planning)

*Table 5: Entry points for examining religion in the context of disaster risk reduction and adaptation to climate Change (Schipper, 2010)*

Although these categories have similarities and are cross-cutting issues, the primary approach of this study is the one described in A-3 and B-3. Considering the local religious and spiritual context helps boosting the validity and precision of the study, as “the religious doctrine by which individuals and societies live determines their perspectives on risk, which thus influences whether they decide to make changes that will minimise current and future risk, or whether they decide not to take any action because they do not think they can change their fate, or because they believe that more prayer and “good” behaviour is sufficient” (Schipper, 2010). In relation to this matter, it is interesting to note how for many of the respondents having to face a situation of climatic struggle, and possible migration forced by the lack of economic livelihoods, was pushed in the background when compared to the benefits simply given by the spirituality of the Baye Fall. Most of the people there were not wealthy, yet they considered themselves rich just because of the bond they managed to develop thanks to religion. Once they establish a

connection, they can just aim for the *talibé* - the complete sharing of emotions, feelings, thoughts within the souls of a community - and everything else suddenly loses meaning. These factors ought to be considered in national policies and projects, since they are capable of pinpointing the real needs and priorities a community has when the government often fails to recognize them.

In this paragraph it has been highlighted how two important contextual factors - namely community and religion - in the case of Ndem have been able multiply the level of resilience of the village. At this point the question of whether this is a case of successful autonomous adaptation emerges. The next sub-chapter will be dedicated to the investigation of this matter.

### **5.3 Triggering Autonomous Adaptation**

In Ndem, the lack of support from the local government coupled with the lack of capacity drove Serigne Babacar and his wife to take the lead and create new opportunities for the villagers, even just to have a humble life. They came back from France to implement their project, so the level of adaptation, which is “determined by the agent’s education, access to information, financial and natural resources, social networks and the absence of conflict” (Malik et al., 2010), was one step further given their European background<sup>6</sup>. Another major component that encouraged these adaptation strategies, was the sense of community. As previously mentioned, the Baye Fall in Ndem have a strong connection to their land and to work itself, leaving behind any individualistic or materialistic thought. Therefore, it has a positive impact on the development of new practices for the benefit of the community, such as the NGO des Villageois. Even though the literacy rate and education level remain low (total adult literacy rate is less than 50%), everyone can still participate and contribute, as it is sort of a community participation in the way the village functions.

Taking social, economic and political aspects into consideration will give flexibility to the continuum adaptation measures and empower locals on decision-making, as constant needs and new opportunities will be taken into account by the community itself. Therefore, their adaptation was not only restricted to responses to climate change, but to a variety of factors such as lack of health facilities, access to water, education and electricity. By diversifying the economy, which was highly dependent on agriculture, the spiritual leader and his wife were able to offer job opportunities and provide safety-nets to the village in case of hazardous events.

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<sup>6</sup> Serigne Babacar as the spiritual leader of the village, and Cissoko as a french woman with higher education.



Furthermore, the sale of products from the villages to city centres and even Europe, drove the attention of future partners such as: the University of Verona (Italy), Chico Mendes Fair Trade Organization (Italy), Mag Verona Micro Financing Organism (Italy), Solidarité Ndem Nantes (France), Maam Samba (France), ONG Défi Belgique Afrique (Belgium), Artisans du Monde Gap (France), among many others (Ndem Info, no date). This provided them with financial resources through donations, and know-how of best practices through knowledge transfer and sharing. As a result, their local economy grew and, along with the community belief of sharing and the spirituality of working, the village was able to build an environment where today there is a kindergarten, a primary school, a secondary school, a health centre with a maternity ward that conserves 11.000 people, a pharmacy, a park for organic farming and school outings with activities for children like garbage pick-ups and workshops, conventional electricity, 3D dwells that serve the 16 villages and alternative coal.

Unfortunately, not much research has been done on autonomous adaptation due to a lack of tangible case studies (Malik et al., 2010, Rahman & Hickey, 2019; Forsyth & Evans, 2013), which can lead to general assumptions that the poorest are often the least able to adapt (Malik et al., 2010), and that of autonomous adaptation as inefficient (Eisenack, 2009). Yet, some call for the importance of incorporating autonomous adaptation when considering planned adaptation. As a matter of fact, even though the community itself has taken positive measures, the use of knowledge from external partners is useful. When dealing with slow-onset hazards, the high degree of unpredictability and the current climate change trends, technological assistance would certainly be beneficial for the community. For instance, the use of meteorological forecasts for farmers would definitely improve food production<sup>7</sup>. As the Climate Analyst from WFP mentioned during the interview, it is through capacity development, building and technical cooperation that people can be better protected from increasing natural hazards (McAdam, 2016)

### **5.3.1 Perceptions about climate change**

As a grass-rooted activity, the importance of the inhabitants' perceptions on vulnerability and climate change are vital to consider. According to Bustillos Ardaya (2017), "risk appraisal and perception modifies risk management decisions and, therefore, management actions". Thus, for someone to adapt to climatic changes and extreme variables, there is - first of all - a need to

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<sup>7</sup> Even though in Senegal most of the meteorological resources are mainly used only for aviation purposes, WFP is currently working to achieve an agreement and share the information (Climate Analyst, Interview #10)

recognize them and ensure that within the community there is the same level of comprehension of this phenomenon (Climate Analyst WFP, Interview #10). Through surveys and interviews, it has been acknowledged that overall there is a certain degree of comprehension in the village about climate change and its effects. Several have perceived a change in the weather, mainly the irregularity of rainfall patterns, which is making agriculture vulnerable and some have even lost their seeds and harvest. Yet, the females working in the organic garden, whom were mostly illiterate, attributed these changes as an act of God, therefore they believed nothing could be done to prevent it. As the Climate Analyst stated during the interview, these beliefs are challenges when implementing measures of adaptation. Therefore, there is a need to deploy further efforts in sensitization activities and education on how climate variability is a reality that can be coped with, regardless of its origin. This highlights the importance of the cultural background, considering the perceptions the community builds towards climate change and variability (Rahman & Hickey, 2019). The role of non-climatic factors, such as religion, spirituality and way of life, play a major role in shaping their adaptive capacity. Being a component of vulnerability, adaptive capacity is defined as the “ability of a system to evolve in order to accommodate environmental hazards or policy change and to expand the range of variability with which it can cope” (Rahman & Hickey, 2019). As autonomous adaptation integrates the social sphere, in Ndem, the religious context, the welcoming spirit and flexibility are components that lead to the success of autonomous adaptation.

## Chapter 6: Conclusions

This study aimed at exploring the links between vulnerability, climate change and migration patterns, and see the extent to which they influence and are influenced by each other in the village of Ndem. The case study took place in a rural village in the Peanut Bassin, which suffered from a massive rural exodus phenomenon due an excessive land use for peanut production and also due to the heavy droughts of the 1970s and 1980s which affected most of the Sahel. These climatic events exacerbated pre-existing vulnerabilities which resulted in migration as the main coping mechanism. Since it has been estimated that climate change will turn temperatures more extreme, leading to a domino effect of environmental changes and natural hazards, climate-induced migration is a current topic of research. In the literature, there is a need to better understand whether climate change and variability are components for current and future migration patterns, and what are the community perceptions and local responses when facing climatic stressors. Analysing the trend in discourses concerning migration as an adaptation measure to climate change and variability, or as an example of a failure to adapt, the study aimed to:

*“To what extent are climatic stressors affecting Senegal’s pre-existing vulnerabilities? To what extent are they shaping migration patterns in the village of Ndem?”*

Yet, during the research and analysis, the researchers faced new unexpected information that led to a mis match with the initial research question. Indeed, the initial goal was to understand how climatic stressors shaped migration patterns in the village of Ndem. But the findings pointed at other major key drivers playing a bigger role rather than climate in the migration patterns, Moreover, it was acknowledged that the village of Ndem is a clear example of autonomous adaptation, something that the researchers were not aware of at the beginning. And since literature calls for more case studies on it, it was an opportunity to further explore this subject in Ndem.

Indeed, the village of Ndem provides evidence of successful self-development and autonomous adaptation thanks to its mechanisms to cope with climate variability. Several components were found to play a major role in the adaptation process, which had an impact on the migration trends. One component playing a significant role was the economic

diversification, mainly through the NGO Association des Villageois de Ndem, which was able to provide new opportunities to the village. Through the sale of textiles, they managed to avoid dependency on an uncertain source of income such as agriculture. Hence, they were able to adapt themselves to current challenges related to weather better than surrounding villages, tackling the myth of African people's helplessness portrayed by the West. The autonomous adaptation process in Ndem gave the inhabitants the choice to either migrate or not, instead of being forced to. The effectiveness of their coping activities succeeded in reversing the rural exodus. It brought people, even from abroad, to stay no matter the livelihood uncertainties. Two major components were observed to play a major influence in the effectiveness of autonomous adaptation strategies: the sense of community and the religious and spiritual context.

The Baye Fall brotherhood living in Ndem believe in the community feeling and sharing, and their *raison d'être* is work, as it is their way to connect with God. Therefore, the willingness to participate, by working, in the building and development of the NGO, the organic farm and gardens, and the overall well-being of the community was shaped by their beliefs and way of living. Several drivers influence human mobility. In the case of Ndem, community participation and feeling of belonging are among the most influential, as they have a role in the perception of risk and the coping mechanisms adopted by the community. Therefore, the key importance of recognizing belief systems and cultural practices when implementing adaptation activities, doing vulnerability assessments and disaster risk reduction policies is acknowledged in this study.

In Ndem, adaptation responses in terms of lack of facilities and access to basic needs such as health, sanitation, electricity, water and food availability and education took place. The vulnerability level of the community decreased, and the village is now constantly reacting to challenges and preparing proactively for future needs. This is an example of successful, community-based, autonomous adaptation.

It is agreed that environmentally induced migration is a multi-causal phenomena, and that multiple drivers and social processes can have an influence in the magnitude and nature of migration patterns in a community. A clear cut pattern between climate change and migration is difficult to establish. Therefore, projections regarding future "environmental refugees" "invading" Northern countries has no meaning when compared to the reality of Ndem. This trend of the alarmist approach lacks substantial data, as this study showed how the feeling of empowerment from a community, their knowledge and capacities to understand and adapt to these hazards gives them the choice to either migrate or not. And as Ndem shows, if basic infrastructures are in place, massive rural exodus can be avoided.

## References

- Adger, W. N. (2006). Vulnerability. *Global environmental change*, 16 (3), 268-281.
- Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., ... & Wreford, A. (2009). Are there social limits to adaptation to climate change?. *Climatic change*, 93(3-4), 335-354.
- Adger, N., & Adams, H. (2013). Migration as an adaptation strategy to environmental change.
- Affi, T., Govil, R., Sakdapolrak, P., Warner, K. (2012). *Climate Change, Vulnerability and Human Mobility: Perspectives of Refugees from the East and Horn of Africa*. United Nations University Institute for Environment and Human Security Report No.1
- Agulanna, C. (2010). Community and human well-being in an African culture. *Trames*, 14(3), 282-297.
- Antronico, L. & Marincioni, F. (2018). *Natural Hazards and Disaster Risk Reduction Policies. Geographies of the Anthropocene*, Il Sileno Edizioni, ISSN 2611-3171
- Auf der Heide, E. (2000). *Disaster response - Principles of Preparation and Response*. Online edition designed by the center of excellence in disaster management and humanitarian assistance.
- Baas, S., Ramasamy, S., DePryck, J. D., & Battista, F. (2008). *Disaster risk management systems analysis*. Rome: FAO.
- Becker, P., & Abrahamsson, M. (2012). *Designing Capacity Development for Disaster Risk Reduction: A Logical Framework Approach*. Myndigheten för samhällsskydd och beredskap.
- Becker, P. (2014). *Sustainability science: Managing risk and resilience for sustainable development*. Newnes.
- Beyani, C. (2013). *Climate Change and Displacement*. Brookings Institution
- Birkmann, J. (2007). *Climate change & vulnerability: Challenges for spatial planning and civil protection*. In Forum DKKV/CEDIM.
- Black, R., Adger, W. N., Arnell, N. W., Dercon, S., Geddes, A., & Thomas, D. (2011). The effect of environmental change on human migration. *Global environmental change*, 21, S3-S11.

- Brooks, N. (2003). Vulnerability, risk and adaptation: A conceptual framework. Tyndall Centre for Climate Change Research Working Paper, 38(38), 1-16.
- Budimir, M., Duncan, M., Gill, J. (2013). The Dynamics and Impacts of Interacting Natural Hazards. Defining Multi-Hazard. Retrieved from <http://www.interactinghazards.com/defining-multi-hazard>
- Bustillos Ardaya, A. B., Evers, M., & Ribbe, L. (2017). What influences disaster risk perception? Intervention measures, flood and landslide risk perception of the population living in flood risk areas in Rio de Janeiro state, Brazil. *International journal of disaster risk reduction*, 25, 227-237.
- CIA. (2019). The World Factbook: Senegal. Retrieved from: <https://www.cia.gov/library/publications/the-world-factbook/geos/sg.html>
- Cohen, O., Leykin, D., Lahad, M., Goldberg, A., & Aharonson-Daniel, L. (2013). The conjoint community resiliency assessment measure as a baseline for profiling and predicting community resilience for emergencies. *Technological Forecasting and Social Change*, 80(9), 1732-1741.
- Crowder, N. (2015). The roots of fashion and spirituality in Senegal's Islamic brotherhood, the Baye Fall. *The Washington Post*, Retrieved from [https://www.washingtonpost.com/news/in-sight/wp/2015/01/23/the-roots-of-fashion-and-spirituality-in-senegals-islamic-brotherhood-the-baye-fall/?noredirect=on&utm\\_term=.dad0977370df](https://www.washingtonpost.com/news/in-sight/wp/2015/01/23/the-roots-of-fashion-and-spirituality-in-senegals-islamic-brotherhood-the-baye-fall/?noredirect=on&utm_term=.dad0977370df)
- Cutter, S. L., Burton, C. G., & Emrich, C. T. (2010). Disaster resilience indicators for benchmarking baseline conditions. *Journal of Homeland Security and Emergency Management*, 7(1).
- De Hass, H. & Bakewell, O., (2007). African Migrations: continuities, discontinuities and recent transformations, *African Alternatives*. Leiden: Brill: 95-118
- Eisenack, K. (2009). Autonomous Adaptation to Climate Change is Inefficient. In *Paper presented at the European Association of Environmental and Resource Economists*. Amsterdam
- Fall, S., Niyogi, D., & Semazzi, F. H. (2006). Analysis of mean climate conditions in Senegal (1971–98). *Earth Interactions*, 10(5), 1-40.
- FAO. (2019). Country Briefs: Senegal. Retrieved from: <http://www.fao.org/giews/countrybrief/country.jsp?code=SEN>

- Fert, B. (2015). Solidarité Ndem - France [Video].  
Retrieved from: [https://www.youtube.com/watch?v=meM9Q0ea\\_bI](https://www.youtube.com/watch?v=meM9Q0ea_bI)
- Flowerdew, R., & Martin, D. (Eds.). (2005). *Methods in human geography: a guide for students doing a research project*. Pearson Education.
- Foresight: Migration and Global Environmental Change (2011). Final Project Report: Executive Summary, *The Government Office for Science, London*
- Forsyth, T. & Evans, N. (2013). What is Autonomous Adaptation? Resource Scarcity and Smallholder Agency in Thailand. *World Development* Vol. 43, 56-66
- Funk, C. C., Rowland, J., Adoum, A., Eilerts, G., Verdin, J., & White, L. (2012). A climate trend analysis of Senegal (No. 2012-3123). US Geological Survey.
- Füssel, H. M. (2005). Vulnerability in climate change research: A comprehensive conceptual framework.
- Gaillard, J. C., & Texier, P. (2010). Religions, natural hazards, and disasters: An introduction.
- Gemenne, F. (2011). Why the numbers don't add up: A review of estimates and predictions of people displaced by environmental changes. *Global Environmental Change*, 21, S41-S49.
- Ghosh, S., Ghosh, K., Ganguly, D., Chakraborty, T., Jones, G. J., Moens, M. F., & Imran, M. (2018). Exploitation of Social Media for Emergency Relief and Preparedness: Recent Research and Trends. *Information Systems Frontiers*, 20(5), 901-907.
- Gillespie, D. F., & Streeter, C. L. (1987). Conceptualizing and measuring disaster preparedness. *International Journal of Mass Emergencies and Disasters*, 5(2), 155-176.
- GFDRR. (2019). Senegal, retrieved from <https://www.gfdrr.org/en/senegal>
- Global Carbon Atlas. (2018). Retrieved from <http://www.globalcarbonatlas.org/en/CO2-emissions>
- Guèye, C., Fall, A. S., & Tall, S. M. (2007). Climatic perturbation and urbanization in Senegal. *The Geographical Journal*, 173(1), 88-92.
- Hagelsteen, M., & Becker, P. (2013). Challenging disparities in capacity development for disaster risk reduction. *International Journal of Disaster Risk Reduction*, 3, 4-13.

- Hallegatte, S., Bangalore, M., Bonzanigo, L., Fay, M., Kane, T., Narloch, U., ... & Vogt-Schilb, A. (2015). *Shock waves: managing the impacts of climate change on poverty*. The World Bank.
- Helmenstine, A.M. (2018). Independent and Dependent Variable Examples. Retrieved from: <https://www.thoughtco.com/independent-and-dependent-variable-examples-606828>
- IDMC. (2018). No matter of choice: displacement in a changing climate. Thematic Series. Research agenda and call for partners. December, 2018.
- IFRC. (2014). IFRC Framework for Community Resilience.
- IIED. (no date). Collection: Community-based adaptation. Retrieved from: <https://www.iied.org/community-based-adaptation>
- INFORM. (2019) Senegal, retrieved from <http://www.inform-index.org/Countries/Country-profiles/iso3/MMR>
- IOM. (2019). Migration, Climate Change and the Environment. A Complex Nexus. Retrieved from: <https://www.iom.int/complex-nexus#estimates>
- Ionesco, D., Mokhnacheva, D., & Gemenne, F. (2016). *The atlas of environmental migration*. Routledge.
- IPCC. (2013). *Climate change 2013: the Physical Science Basis*. Working Group I contribution to the Fifth assessment report of the Intergovernmental Panel on Climate Change. *Cambridge University Press*.
- IPCC. (2014). *Climate Change 2014: Mitigation of Climate Change*. Working Group III contribution to the Fifth assessment report of the Intergovernmental Panel on Climate Change. *Cambridge University Press*
- IPCC. (2018). Annex I: Glossary [Matthews, J.B.R. (ed.)]. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press
- Jabareen, Y. (2009). Building a conceptual framework: philosophy, definitions, and procedure. *International journal of qualitative methods*, 8(4), 49-62.



- Jónsson, G. (2010). *The Environmental Factor in Migration Dynamics – A review of African Case Studies*, International Migration Institute (IMI), University of Oxford
- Helmenstine, A. (2018). *Examples of Independent and Dependent Variables*. Retrieved from <https://www.thoughtco.com/independent-and-dependent-variable-examples-606828>
- Kandji, S., Verchot, L., Mackensen, J. (2006). *Climate Change and Variability in the Sahel Region: Impacts and Adaptation Strategies in the Agricultural Sector*. World Agroforestry Centre (ICRAF) & United Nations Environment Programme (UNEP)
- Kälin, W. (2010). *Conceptualising Climate-Induced Displacement. Climate Change and Displacement, Multidisciplinary Perspectives. Oxford and Portland; Hart Publishing*
- Kappes, M. S., Keiler, M., von Elverfeldt, K., & Glade, T. (2012). *Challenges of analyzing multi-hazard risk: a review. Natural hazards, 64(2), 1925-1958.*
- Kronlid, D. (2014). *What modes of moving do to me – reflections on technogenic processes of identification. In Spaces of Mobility (pp. 147-176). Routledge.*
- Krüger, F., Bankoff, G., Cannon, T., Orłowski, B., & Schipper, E. L. F. (Eds.). (2015). *Cultures and disasters: understanding cultural framings in disaster risk reduction. Routledge.*
- Lo, H., Coulibaly-Tandian, O., Sakho, P. (2014). *Impacts des Changements Environnementaux sur les Migration Humaines: Cas du Sénégal. Institut des Sciences de l'Environnement (ISE). Université Cheikh Anta Diop*
- Malik, A., Qin, X., & Smith, S. C. (2010). *Autonomous adaptation to climate change: a literature review. Institute for International Economic Policy Working Paper Series, Elliott School of International Affairs. The George Washington University, Washington, DC.*
- Mbow, C., Mertz, O., Diouf, A., Rasmussen, K., & Reenberg, A. (2008). *The history of environmental change and adaptation in eastern Saloum–Senegal—Driving forces and perceptions. Global and Planetary Change, 64(3-4), 210-221.*
- McAdam, J. (2016). *From the Nansen Initiative to the Platform on Disaster Displacement: Shaping International Approaches to Climate Change, Disasters and Displacement. University of New South Wales Law Research Series UNSW Law Journal 1518*
- McLeman, R. & Hunter, L. (2010). *Migration in the Context of Vulnerability and Adaptation to Climate Change: Insights from Analogues. Wiley Interdiscip Rev Clim Change 1 (3), 450-461.*

- Mertz, O., Mbow, C., Reenberg, A., & Diouf, A. (2009). Farmers' perceptions of climate change and agricultural adaptation strategies in rural Sahel. *Environmental management*, 43(5), 804-816.
- Mertz, O., Mbow, C., Reenberg, A., Genesio, L., Lambin, E., D'haen, S.,... & Sandholt, I. (2011). Adaptation strategies and climate vulnerability in the Sudano-Sahelian region of West Africa. *Atmospheric Science Letters* 12: 104-108.
- Mikdashi, Z. (2019). The evolution of economic well-being progress-driven economic policies in the era of globalization. London: Routledge.
- Ndem Info. (n.d.). Retrieved from <http://www.ndem.info/>
- Noblet, M., Seck, A., D'haen, S., Tovivo, K. (2019). Evaluation des Références aux Changements Climatiques et de leur Base Scientifique dans les Politiques et Stratégies au Sénégal. Report produced under the project: “*Projet d'appui scientifique aux processus de plans nationaux d'adaptation (PAS-PNA)*”, Climate Analytics gGmbH, Berlin
- Noblet, M., Secak, A., Tovivo, K., D'haen, S. (2018). Evaluation des Références aux Changements Climatiques et de leur Base Scientifique dans les Politiques et Stratégies au Sénégal. Report produced under the project “*Projet d'appui scientifique aux processus de plans nationaux d'adaptation (PAS-PNA)*”, Climate Analytics gGmbH, Berlin
- O'Brien, K., Eriksen, S., Nygaard, L. P., & Schjolden, A. (2007). Why different interpretations of vulnerability matter in climate change discourses. *Climate policy*, 7(1), 73-88.
- Parsons, M., & Nalau, J. (2016). Historical analogies as tools in understanding transformation. *Global Environmental Change*, 38, 82-96
- Patel, S. S., Rogers, M. B., Amlôt, R., & Rubin, G. J. (2017). What do we mean by 'community resilience'? A systematic literature review of how it is defined in the literature. *PLoS currents*, 9.
- Pezeril, C. (2008). Histoire d'une stigmatisation paradoxale, entre islam, colonisation et « auto-étiquetage ». Les Baay Faal du Sénégal. *Cahiers D'études Africaines*, 48(192), 791-814. doi:10.4000/etudesafricaines.15513
- Pfefferbaum, R. L., Pfefferbaum, B., Van Horn, R. L., Klomp, R. W., Norris, F. H., & Reissman, D. B. (2013). The communities advancing resilience toolkit (CART): An intervention to build community resilience to disasters. *Journal of public health management and practice*, 19(3), 250-258.

- Rahman, T. & Hickey, G. (2019). What Does Autonomous Adaptation to Climate Change have to Teach Public Policy and Planning about Avoiding the Risks of Maladaptation in Bangladesh? *Climate Vulnerability of the North-Eastern Floodplain Communities in Bangladesh PhD Thesis*
- Sabates-Wheeler, R., Devereux, S., Mitchell, T., Tanner, T., Davies, M., & Leavy, J. (2008). Rural disaster risk–poverty interface.
- Schipper, E. L. F. (2010). Religion as an integral part of determining and reducing climate change and disaster risk: an agenda for research. In *Der Klimawandel* (pp. 377-393). VS Verlag für Sozialwissenschaften.
- Schöfberger, I. (2018). Environmental Change and Translocal Vulnerability in Senegal, Policy Brief Series: Migration, Environment and Climate Change (MECC), IOM Issue 3, Vol 4
- Simpson, D. M., & Katirai, M. (2006). Indicator issues and proposed framework for a disaster preparedness index (DPi). University of Louisville.
- Sylla M.B., Nikiema P.M., Gibba P., Kebe I., Klutse N.A.B. (2016) Climate Change over West Africa: Recent Trends and Future Projections. In: Yaro J., Hesselberg J. (eds) *Adaptation to Climate Change and Variability in Rural West Africa*. Springer, Cham
- Tacoli, C. (2011). Not Only Climate Change: Mobility, Vulnerability and Socio-Economic Transformations in Environmentally Fragile Areas in Bolivia, Senegal and Tanzania
- Tacoli, C. (2011). Migration and mobility in a changing climate: A policy perspective. *REMHU-Revista Interdisciplinar da Mobilidade Humana*, 19(36), 113-124.
- Tschakert, P. (2007). Views from the vulnerable: understanding climatic and other stressors in the Sahel. *Global Environmental Change*, 17(3-4), 381-396.
- UN. (2015). Sendai Framework for Disaster Risk Reduction 2015-2030. United Nations.
- UNFCCC. (2012). Slow Onset Events. Technical Paper. FCCC/TP/2012/7. Retrieved from: <https://unfccc.int/resource/docs/2012/tp/07.pdf>
- UNHCR. (2008). West Africa as a Migration and Protection area.
- UNISDR. (2005). Hyogo framework for action 2005–2015: Building the resilience of nations and communities to disasters. In Extract from the final report of the World Conference on Disaster Reduction (A/CONF. 206/6) (Vol. 380). Geneva: The United Nations International Strategy for Disaster Reduction.

- UNISDR. (2009). 2009 UNISDR Terminology on Disaster Risk Reduction. *International Strategy for Disaster Reduction*.
- UNISDR. (2017). Report of the Open-Ended Intergovernmental Expert Working Group on Indicators and Terminology Relating to Disaster Risk Reduction.
- United Nations. (2015). Transforming our world: The 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly.
- USAID. (2014). Senegal Climate Change Vulnerability Assessment and Options Analysis. *African and Latin American Resilience to Climate Change Project, ARCC*.
- USAID. (2015). Climate Change and Health Risks in Senegal. Technical Report.
- Valentine, G., & Skelton, T. (2003). Living on the edge: The marginalisation and 'resistance' of D/deaf youth. *Environment and Planning A*, 35(2), 301-321.
- Van der Land, V. & Hummel, D. (2013). Vulnerability and the role of Education in Environmentally induced Migration in Mali and Senegal. *Ecology and Society* 18 (4): 14
- Wang, H. G., Montoliu-Munoz, M., & Gueye, N. F. D. (2009). Preparing to manage natural hazards and climate change risks in Dakar, Senegal: A spatial and institutional approach.
- WFP. (2012). Climate risk and food security in Senegal: Analysis of climate impacts on food security and livelihoods.
- World Bank (2019). Climate Change Knowledge Portal. Retrieved from <https://climateknowledgeportal.worldbank.org/region/africa/climate-data-historical>

# Appendices

## **Appendix A: Survey Questionnaire (translated from French to English)**

Exploring the Nexus Between Slow-Onset Stressors, Human Mobility and Vulnerability: a  
Case Study from Dakar's Region, Senegal

We are Anna Chesnier and Giordano Margaglio, students of the Master's programme in "Disaster Risk Management & Climate Change Adaptation" at Lund University, Sweden. For our Master's thesis, we are investigating the relationship between climate change, human mobility and vulnerability in selected areas in Senegal. In particular, we would like to understand whether there is a causality between the increase of slow-onset environmental stressors, such as desertification, droughts, environmental degradation, coastal erosion and sea level rise; and migration patterns within this area. At the same time, we would also like to understand the extent to which these climatic events are affecting the existing vulnerabilities of the country.

We are aware some questions might not fit your situation if so, feel free to leave a blank

The survey consists of both multiple-choice and open-ended questions. All answers will remain strictly anonymous and confidential. The participation to the survey is entirely voluntary.

If you wish to interrupt the questionnaire, you are free to do so at any time.

If you wish to request the results of the study, or have any questions, please feel free to contact us at either of the following email addresses:

an8283ch-s@student.lu.se / gi4357ma-s@student.lu.se

### **Part I – Context**

#### 1. Age

- 18 – 25
- 26 – 35
- 36 – 50
- 51 – 75
- 76 and above

#### 2. Gender

- Male
- Female
- Other
- Rather not answer this question

3. Village: \_\_\_\_\_
4. Current Employment: \_\_\_\_\_
5. Level of Education and type of education (French system or “ecole corannique”):
  - Primaire
  - College
  - Lycee
  - Ecole Corannique
  - Other
  - Rather not reply

## Part II

### Definitions

Intensity: The magnitude of strength and force as per area, charge or mass<sup>8</sup>

Predictability: The ability to foretell on the basis of observation, experience or scientific reason<sup>9</sup>

1. Main source of income (can X several answers):

- NGO: “ONG des villgeaois de Ndem”
- Private Sector
- Agriculture
- Breeder
- Small business (ex: boutiques)
- Education Sector
- Religion
- Entrepreneur
- Other: \_\_\_\_\_

2. Have you perceived any changes in the **temperature** of the dry/lean season in the last few years?

	No	It considerably decreased	It slightly decreased	It remained the same	It slightly increased	It considerably increased
Intensity						
Predictability						

3. Have you perceived any changes in the **duration** of the dry/lean season over the last few years?
  - Yes, it has lasted longer

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<sup>8</sup> Merriam-Webster

<sup>9</sup> Merriam-Webster

- Yes, it has become shorter
- No, it has remained the same
- Other: \_\_\_\_\_

4. These changes can be attributed to:
- Normal variability in the weather
  - Atypical weather patterns
  - Other: \_\_\_\_\_

5. Have you perceived any changes in the **rainfall patterns** of the rainy season in the last few years?

	No	It considerably decreased	It slightly decreased	It remained the same	It slightly increased	It considerably increased
Intensity						
Predictability						

6. Have you perceived any changes in the **duration** of the rainy season over the last few years?
- Yes, it has lasted longer
  - Yes, it has become shorter
  - No, it has remained the same
  - Other: \_\_\_\_\_

7. These changes can be attributed to:
- Normal variability in the weather
  - Atypical weather patterns
  - Other: \_\_\_\_\_

8. Have atypical climatic changes (if they took place) affected your source of income?
- Yes, positively affected
  - Yes, negatively affected
  - No

9. Have you ever left your village over the dry season to work elsewhere?
- Yes
  - No

10. If yes, **where** did you go? Which **job** did you do there?

Seasons	Activities related to income
<b>Noor:</b> dry and hot – Nov to May	
<b>Cooroon:</b> pre-rainy – June	
<b>Navet:</b> cooler rainy – July to September	

Lolli: post-rainy or harvest time - October	
--	--

11. Have you ever left the village to work outside during the dry/lean season?

- Yes
- No

12. Have you ever left the village to work outside during the rainy season?

- Yes
- No

### Part III

1. Is desertification or drought something that concerns your village?

- Yes
- No

2. If so, is any specific aspect/sector being affected?

3. Is your village doing something to tackle this?

- Yes
- No

4. If yes, please specify what:

5. Is desertification or drought something that concerns you personally?

- Yes
- No

6. If yes, how does it affect you?



## **Appendix B: Survey Questionnaire (in French)**

“Explorer les liens entre les facteurs atypiques dans l’environnement, la mobilité humaine et la vulnérabilité”

Bonjour,

Nous sommes Anna Chensier et Giordano Maraglio, deux étudiants de Master en “Gestion de Catastrophes Naturelles et Adaptation au Changement Climatique” à l’Université de Lund.

Pour notre mémoire de fin d’études, on étudie les liens entre le déplacement des populations et les facteurs de stress environnementaux, dont la sécheresse et la dégradation de l’environnement. Nous aimerions comprendre d’autant plus les aspects culturels qui interagissent avec ce phénomène, pour ainsi ouvrir une discussion autour de ce sujet.

Ce questionnaire est composé de questions à choix multiples et à développer. Il n’y a pas de bonne ou mauvaise réponse, mais toute information est prise en compte.

Ce questionnaire est anonyme et confidentiel, et la participation est strictement volontaire. Vous êtes en mesure d’arrêter le questionnaire quand vous le souhaitez, et si vous voulez faire un suivi de vos réponses, n’hésitez pas à nous contacter.

### **1ere Partie – Contexte**

1. Age

- 18 – 25
- 26 – 35
- 36 – 50
- 51 – 75
- 76 ou plus

2. Genre

- Homme
- Femme
- Préfère ne pas répondre

3. Village : \_\_\_\_\_

4. Emploi Actuel : \_\_\_\_\_

5. Niveau ou Type d’éducation (French system or “école coranique”):

- Primaire
- Collège
- Lycée
- Ecole Coranique

- Autre : \_\_\_\_\_
- Préfère ne pas répondre

## 2eme Partie - Définitions

Intensité : La magnitude d'une force ou masse<sup>10</sup>

Prédictibilité : L'habilité de prédire en se basant sur l'observation, l'expérience et/ou par raisonnement scientifique<sup>11</sup>

1. Principale source de revenu (peut marquer plusieurs réponses) :

- ONG : "ONG des villageois de Ndem"
- Secteur Privé
- Agriculture
- Fermier
- Petits business (ex: boutiques)
- Education
- Religion
- Entrepreneur
- Autre : \_\_\_\_\_

2. Avez-vous aperçu des changements dans la température pendant la **saison sèche** dans les dernières années ?

	A <i>considérablement</i> baissée	A <i>légèrement</i> baissée	Aucun changement aperçu	A <i>légèrement</i> augmentée	A <i>considérablement</i> augmentée
Intensité					
Prédictibilité					

3. Avez-vous aperçu des changements dans la durée de la **saison sèche** dans les dernières années ?

- Oui, elle est plus longue
- Oui, elle est plus courte
- Non, il n'y a pas de changements
- Autre : \_\_\_\_\_

4. Ces changements peuvent être attribués à :

<sup>10</sup> Merriam-Webster

<sup>11</sup> Merriam-Webster

- Variabilité normale dans le climat
- Conditions météorologiques atypiques
- Autre : \_\_\_\_\_

5. Avez-vous aperçu des changements dans les précipitations pendant l'**hivernage** dans les dernières années ?

	Elles ont <i>considérablement</i> baissées	Elles ont <i>légèrement</i> baissées	Aucun changement aperçu	Elles ont <i>légèrement</i> augmentées	Elles ont <i>considérablement</i> augmentées
Intensité					
Prédictibilité					

6. Avez-vous aperçu des changements quant à la durée de l'**hivernage** dans les dernières années ?

- Oui, la période est plus longue
- Oui, la période est plus courte
- Non, elle est pareil
- Autre : \_\_\_\_\_

7. Ces changements peuvent être attribués à :

- Variabilité normale dans le climat
- Conditions météorologiques atypiques
- Autre : \_\_\_\_\_

8. Si vous sentez qu'il y a des conditions météorologiques atypiques, est-ce que ces dernières ont eu un impact dans vos revenus ?

- Oui, de façon positive
- Oui, de façon négative
- Non

9. Avez-vous déjà quitté le village pendant la saison sèche pour travailler ailleurs ?

- Oui
- Non

10. Si oui, **où** est-ce que vous êtes parti et pour quel **métier** ?

Saisons	Cochez la saison ou vous êtes parti	Type de travail
<b>Noor</b> : sec et chaud, Novembre-Mai		
<b>Cooroon</b> : pré-pluvieux – Juin		
<b>Navet</b> : pluvieux – Juillet-Septembre		
<b>Lolli</b> : après la pluie/saison de récolte - Octobre		

### 3eme Partie

1. Est-ce que la désertification et/ou sécheresse est quelque chose qui concerne votre village ?
  - Oui
  - Non
  
2. Si oui, qu'est ce qui se voit le plus affecté ?
  
3. Est-ce que votre village prend des mesures pour s'attaquer à la désertification et/ou sécheresse ?
  - Oui
  - Non
  
4. Si oui, lesquels ? (ex : changement de travail, migration, création de nouveaux types d'emploi, etc...)
  
5. Est-ce que la désertification et/ou sécheresse est quelque chose qui vous concerne personnellement ?
  - Oui
  - Non
  
6. Si oui, de quelle façon ça vous affecte ?

## **Appendix C: Interview Guide for Villagers in Ndem**

### Interview Guide for villagers in Ndem

Introduce yourself and your work. Explain why do you need the respondent for the research. Clarify that there are no good nor bad answers. Ask the permission for using a recorder.

#### a. **Opening Questions**

1. How long have you been living in Ndem?
2. Do you have any children?
3. How many people do you live with?
4. Can you tell me something about their occupation?
5. Where did you live before coming to Ndem?
6. Tell me about your life experience in your former village.
7. Which were the main institutions there? (NGOs, schools, etc.)
8. What was your main employment there?
9. Have you ever had any challenges related to it?
10. If so, how did you deal with them?
11. Which are the main similarities between your former village and Ndem?
12. Which are the main differences between your former village and Ndem?

#### b. **Migration and Displacement**

1. Which factors made you move to Ndem?
2. Did you move alone or with someone else?
3. How long did the moving process take?
4. Tell me about your experience throughout this process.

5. Which challenges did you have to face?
6. How long did you prepare before moving?
7. Did you have any reference contact/someone you knew in Ndem, before moving?
8. Tell me about your adjustment process once arrived to Ndem.

c. **Life in Ndem**

1. Have you noticed any major change in the village ever since your arrival?
2. Tell me about some of the challenges you face in the village (livelihood? social relations?)
3. How do you cope with these challenges?
4. Which is the main external partner helping you face these challenges? (Community, NGO, government?)
5. What is your current main employment?
6. Tell me about the way migration is perceived in Ndem.
7. Are you aware of any social practice related to it? (ritual, baobab, etc.)
8. Are there any social divisions in Ndem?
9. Would you still want to live in Ndem in the next few years?
10. If not, how come?

## **Appendix D: Interview Guide (French)**

### **Guide d'entretien pour les habitants de Ndem**

Se présenter et présenter le travail qu'on veut effectuer. Expliquer pourquoi on a besoin du répondant pour la recherche. Clarifier qu'il n'y a pas de bonnes ou mauvaises réponses. Demander la permission pour enregistrer la conversation. Cet entretien reste confidentiel, et sera utilisé que pour notre étude.

#### **a. Questions d'ouverture**

1. Depuis quand habitez-vous à Ndem ?
2. Avez-vous des enfants ?
3. Avec combien de personnes vous partagez votre foyer ?
4. Pourriez-vous m'en parler sur leurs occupations ?
5. Avez-vous vécu quelque part d'autre avant d'être venu à Ndem ?
6. Si oui, parlez-moi sur votre expérience de vie dans ce village.
7. Quelles étaient les institutions principales dans ce village ? (ONG, écoles, communauté agricole, etc).
8. Quel était votre occupation principale là-bas ?
9. Avez-vous eu des défis liés à cette dernière ?
10. Si oui, comment l'avez-vous surmonté ?
11. Quelles sont les principales similarités entre votre village passé et Ndem ?
12. Quelles sont les principales différences entre votre village passé et Ndem ?

#### **b. Migration et Déplacement**

1. Quels facteurs vous ont fait bouger à Ndem ?
2. Avez-vous déménagé seul(e) ou avec quelqu'un ?
3. Combien de temps ça vous a pris pour déménager ?

4. Parlez-moi sur cette expérience.
5. Quels ont été vos principaux défis ?
6. Combien de temps à l'avance vous vous êtes préparé avant de déménager ?
7. Vous aviez déjà eu un contact à Ndem avant de déménager ?
8. Parlez-moi sur votre processus d'ajustement une fois à Ndem.

c. **Vie à Ndem**

1. Avez-vous perçu des changements majeurs au village depuis votre arrivée ?
2. Parlez-moi sur des possibles défis que vous avez rencontré au village. (relations sociales, moyens de subsistance, etc..)
3. Comment vous gérez ces défis ?
4. Quel est le principal partenaire pour vous aider à relever ces défis ? (communauté, ONG, gouvernement, etc...)
5. Quel est votre emploi présent ?
6. Parlez-moi de la façon dont la migration est perçue à Ndem.
7. Êtes-vous au courant de certaines pratiques sociales liées à ce dernier ? (rituels, traditions, etc...)
8. Y-a-t-il des divisions sociales à Ndem ?
9. Est-ce que vous pensez rester à Ndem dans les prochaines années à suivre ?
10. Si non, pourquoi ?



## Appendix E: Interview Transcripts

### Interview Transcript #1

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- **Interviewer:** Giordano Margaglio
- **Interviewee:**
- **Interpreter/Assistant:** Aziz Gueye

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

Aziz G.: [...] So important because of climate change, before it's getting more hot, and here is less than hot before.

- Woman: Sometimes it is just 2 degrees. But in the end it does not change that much, 41 instead of 43. The warmness doesn't change that much.

Aziz G.: The problem is the rain. It comes early or late.

- Woman: Yes, it's the **rain**. That is a **big problem**. Because here already it doesn't rain much. If the rain comes late, it is a big problem because like last year it rained just one month and a half.

G.M: So, the temperature is the same.

- Woman: Yes.

G.M: But the dry season is getting longer.

- Women: Yes, like last year, we did not get enough water. This year I don't know, but sometimes one year is good, another year is not that good. *It's never the same.*

Aziz G.: She's saying it is raining one month and a half, and at the end of the rainy season maybe some cultures can be saved.

- Women: Yes, like last year. Because the rain arrived for at least one month and a half, it saved the *mille* (type of cereal) and *cacahouètes*. Unlike the beans that could not be saved.

Aziz G.: The problem was that there were not enough beans. And it is so important because of the nutritional values.

G.M: How many years have you been here? (to the woman)

- Woman: 15 years in Senegal, and 12 years in Ndem. I just go to Dakar for a few days each month.

G.M: And when there is no water or no beans, what do you do? Where do you take the supplies from?

- Woman: Well, since I am French, I **anticipate** and calculate.

Aziz G.: It's a **western thing** what she does.

- Woman: Yes, so I have everything here. I have rice, I have some flour, I have powdered milk. But I do not have a lot of money. Even though I go to France, I have to restrain myself. Because I am part of the poorest people in France.

Aziz G.: So here she is poor too, but with the advantage of having a different mentality about it.

- Woman: I am use to it [anticipating]. n France I use to go to the forest to pick up wood to warm myself. Like that I would save money because if you do not have a lot of money you know...I had my own small garden, I did my soup you know? I breaded rabbits. Well, to do that here is hard because there is no grass. We used to have sheeps but they were all stolen. For me here, it is very spiritual. I am not young. And here is very spiritual so I feel protected. Even though there is not water there are trees here, and we do what we can with what we have.

Aziz G.: In the village we create life. We take care of nature and in return nature takes care of you.

- Woman: And also I realize that small things are important too.

Aziz G.: It is important to take care of nature and life. And if it is not too personal, do you have kids here? (to the woman)

- Woman: No, but Unta has kids. One in Saint Louis, one married daughter in Saint Louis and another married daughter in *Tihouahouan*. But my daughter and son are in France.

Aziz G.: So you both here? (the woman and Unta)

- Woman: Yes. Unta helps me in the house

Aziz G.: Unta helps with the house, dogs and plants. If she goes out, he takes care of it.

-PAUSE-

- Woman: [...] That do commerce in Ziguinchor, or in Dakar. And like that it helps the family because here everybody helps each other out. Because otherwise when it gets too hard, it is the youngest ones who do business in Ziguinchor or Dakar.

Aziz G.: It is in the hard periods that the youngest people move.

- Woman: But even every day, not just when it's dry. It's the teens, sometimes kids.

Aziz G.: And what are the main activities? (to the woman)

- Woman: Usually they sell clothes, second hand clothes, vegetables, pretty much anything.

Aziz G.: They try to do anything to sustain themselves.

- Woman: And sometimes even woman who are going to do laundry an cleaning in Dakar.

Aziz G.: Is there a lot of women who move from the village? (to the woman)

- Woman: Not really, but it happens. I met women who left to help.

Aziz G.: Is it married women or...?

- Woman: Yes, sometimes it's married woman.

Aziz G.: And is the husband here or do they usually meet them in Dakar?

- Woman: Uhm...(changes subject). We saw it last year. Three cows were dead because there was nothing to feed them with. I get sick when I see that. You can see starving horses too. It's a reality.

Aziz G.: He's not sick, just hungry.

G.M: There is no water no food.

- Woman: What they eat is plastic. Around here there is a lot of garbage and plastic bags, because people do not take care of it. So sometimes you see sick animals because they ate that.

Aziz G.: There is a lot of plastic pollution. A cow or a horse are going to have the reflex to eat that. And by letting it free, it will eat those things.

G.M: Ok. Back to the problem with vegetation, do you feel it's expanding, like there is less vegetation even in areas where there used to be more trees? Is it getting larger, broader?

- Woman: It's rare to see animals that stay in place. The breeders are starting to get them further.

G.M: And how do you cope with the problem of water mentioned earlier? (to the woman)

- Woman: Before the construction of the water tower is finished, I'm taking big water bottle carriers underneath the trees, with small holes in them to collect water.

Aziz G.: Is it through a drop system?

- Woman: No, because it is too warm and hot here to do that. You need something bigger.

Aziz G.: So it is collecting water from the trees.

- Woman: We are trying our best but it is sometimes still lacking.

G.M: You are planning to stay here in the coming years?

- Woman: Yes, I live here. I do not go to France.

G.M: But the problem of water and heat is not going to make you go away?

- Woman: **No, I am staying here.** I do not know if the situation is going to get better, but I am staying. I'm surviving. Plus, spirituality I feel at home, this is my place. Sometimes it's difficult but I'm here.

Aziz G.: Even though there are hard situations, here there are beliefs, religion, brotherhood and faith. There is a spiritual contract that motivates you to stay, makes you feel you are in the right way.

- Woman: But even in France I had a very tough life. I am very marginal and had a tough road, but I am where I am suppose to be.

Aziz G.: (To Giordano) This is one like many stories who have found themselves here. Do you feel this village is inhabited by others? Such as spirits? (to the woman)

- Woman: Yes, by spirits yes. I even saw the precursor of the biggest brotherhood in April 2009.

Aziz G.: So, he [the precursor of the brotherhood] is the leader. And in this brotherhood, nobody can see him if you are just a simple person. So, this woman is lucky to have seen him.

- Woman: I know it's my way. When I was 21 years old I did a hunger and water strike. And I was about to die.

Aziz G.: She was fasting

- Woman: For me it was important, it was not for me but for the world.

Aziz G.: You feel you coexist with the spirits here?

- Woman: Yes, they are like my family. I feel things. It is another dimension, but you can feel that everywhere. But in this village things happen.

G.M: You found your spiritual way here, but what do you think of people in other villages that are suffering from no rain and no food? You think they are going to stay with these climatic stressors?

- Woman: **I think they will.** Because their ancestors are here, their grandfather chants are here. And the **attachment** there is towards the **land** is very **intense**. In the villages people do not want to move.

Aziz G.: What about the kids?

- Woman: As I say, some will move for business reasons but in general people stay here. They do not want to abandon it.

Aziz G.: Even when you go, you come back.

- Woman: Always in Senegal. People think outside is better. French people, Italians, English. But here no. They also say United States is better.

G.M: But paradise is here?

Aziz G.: It's a different mentality, yes. People who leave and then come back, sometimes do not tell the truth. They make it seem as if it was perfect, although they had many problems.

G.M: Yes, we met one guy who went to Italy, and he stayed for 5 years. And apparently those were the worst 5 years of his life and then came back to Senegal. But to people he said it was OK because he was so ashamed. So everybody wants to go afterwards.

Aziz G.: Is killing 5 years of your life. Once you are there, you do things for money you would not do here. You are in the golden jail. And sometime even people are blocked on the other side and cannot return. A dead dying alive.

## Interview Transcript #2

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** NGO Co-Manager, Fatou
- **Interpreter/Assistant:** Aziz Gueye

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

G.M : How long have you been living in Ndem ?

- Woman : 15 years

G.M : Can you tell me something about the experience when you moved here, what was your project ?

- Woman : Okay, so I moved here for personal reasons, but also because Ndem incarnates certain spirits. Human spirits, and addresses all the dimensions of human life with spirituality as a foundation and that is my path, my aspiration. So that is what brought me here.

G.M: You work as the co-manager for the NGO right?

- Woman: Right. I've managed different programmes that we've had, different initiatives that were with international partners. So that has been one of my jobs. In reality, it is sort of a community participation in the way the village functions. It is not really, *at least for the talibes*, about employment but simply working within your community.

G.M: Like sharing?

- Woman: Yes, during our passage here. It is not only our obligation but just the way it is, we manifest our being through our hands, through our work. Call it a project, call it a garden, call it whatever. So coordinating projects has been one of my jobs here.

G.M: So, when you came here, the NGO was already here?

- Woman: Yes, so the association started in 1983. Formally in 1985, when the *founders Babacar and Aisha came*. And there was nothing here. No infrastructure, and the community was witnessing a massive rural exodus. So women, children and elderly were left here, approximately 30 people were here. And no infrastructure, no water, the dwell was broken, no electricity of course. No jobs, no health care, no school, nothing at all. And the rains had dramatically decreased during the droughts of the 70's and early 80's, which was a phenomenon across Africa. So the populations here were really left on their own. The men had gone to the cities, either African or European, to try to get a job in order to send back money; without forgetting that back then there was no such thing as western union, no telephones, etc. Making the women and children in really critical situations. So that is what happened in 1985. And they [founders] arrived for spiritual aspirations. And they immediately realized they needed to bring people together from 16 villages and define an orientation so that they can come out of the situation and enable people to remain here in dignity and close to their culture and families and their spiritual aspirations. So they gathered the 16 villages, mostly women and defined priorities. The main priorities were the water situation, and a mill for the millet because it's a lot of work. And it took 12 years to get water from a water tower and a deep dwell. They did fix the manual dwell in the mid team, and started working by plating trees, they got a sewing machine, they sold some local clothes in Paris for the "*Salvation's Mums*" boutique, reinvest the funds, started a little health box with basic medication, improvised school for reading and writing. And slowly but surely people joined and men came back and everything evolved into an official structure, were today there is a kindergarten, a primary school, a secondary school, a health center with a maternity ward that conserves 11 000 people, a pharmacy, the workshops with 13 different local professions and employs over 200 people, there is a park for organic farming and school outings, were we have activities with children, like garbage pick up, workshops, conventional electricity, 3D dwells that serve the 16 villages, alternative coal, etc. The population in Ndem is up to 500 and with the whole villages it sums up to 4 000. And just a little local economy that has been generated, by sealing vegetables and fish in the cities. There is a whole community activity that is addressed to the whole 16 villages, it's an effect that extends, because the healthcare center extends to over 33 villages. There is professional training center, a library, just daily activities, community activities that go on. And the first generation that was able to go to the university and was able to come back to serve the community. So, with the transition today of water, electricity, internet, telephones, they all can drive, so know you know, we have sort of a trampoline. And that's it. And we've mushroomed in *Darondimbo* [nearby village] where we opened a health center, it's 10 km away. But over there the women, still do not have running water, so they still are at a dwell, which is 70m deep, so that takes over 6 hours a day of work to get the water. And they had no health center, so there is a health center with a maternity ward now. And we are working to get funds for a deep dwell and a water tower, and all the pipes, etc. And in *babacadioir*, which is a bigger community, there is another similar initiative asked from the *mauriad hadif*, so over there is also similar, with also coranic studies, religious studies,

professional training, organic farming, bee hives, fish, sort of everything. It is at a much larger scale and it addresses typically *the mauried* community because we are in *mauried areas* but its open to everybody. Again, it is a community project so everybody is taking part in the actual construction of it, the decision making, the participating, the community spirit.

G.M: That's very impressive.

- Woman: This is just a summary of everything. To set things up.

G.M: So, every since the problem with the rains, as you mentioned during the 80's, over these years has there been any other shortage of rain. Have you seen droughts?

- Woman: Yeah, well I think the issue started to become dramatic and did sort of a snowball effect that started in the 60's in this area because this was the peanut culture. So, all the trees had been cut, and intensive peanut harvesting drained the soil from its nutrients and left it with sand. And different cultural practices. So that snowballs during the 70 and 80's. And then later in the 80's, I wasn't here but the rain kind of came back. But since the 60's it has been cut in half. From 800mm a year to 400mm or less. So what I have seen in the 15 years that I have been here, more than, although a few years we've had serious rainfall shortage, is instability in the rain patterns. So that has changed. In the 1<sup>st</sup> year I was here, the rains came in June. Two years ago they came in mid-august. Last year it came in the end of June but stopped until mid-august. So these kinds of patterns that are completely unpredictable. So what happens is that it really affects agriculture, because people plant. **And because of the rain shortage the plant dies, so that's the real issue that has economic consequences, and exodus and etc.**

G.M: Do you think there is a link between atypical weather patterns with climate change? Or do you think it is just normal weather variability?

- Woman: **In reality, I have no idea. You get absolutely mixed information about climate change, or cycles, normal cycles, or whatever.** What I can definitely see is that the situation is not addressed. To be able for people to stay in their environment. The reasons behind the change, in this area in terms of consumption and footprint, environmental food print, is quiet low.

G.M: Close to 0 I would say.

- Woman: Yeah, so the real issue is whatever the reasons behind, how do we create an ecosystem...

G.M: which is sustainable towards this...

- Woman: "Eco" meaning that it addresses all dimensions you know? And makes it liveable, and of course sustainable. So we are talking about planting more trees, maybe water management, but you can't do both. You can't plant trees and not waste water so, uhm, those are the real questions. How do we address the situation? You can use different environmental factors, economic factors, political subsidizing of agriculture to do certain types of agriculture, or to compensate when there is a problem, so people don't have to leave. The one positive thing about the rural exodus, is that the cattle and the people not being here cut less trees down. So I have seen trees that are 15 years old, because the cattle did not eat them, they grow. Yeah, I think there needs to be a real holistic solution, or approach. Which is what Ndem has done, which is why when you are here, it looks like things are so liveable and pleasant, when you cross the street and go to another village maybe you'll last 48 hours and run somewhere else, because it is too hot, because there is too much sand, because, because, because. So yeah, I think the real issue lies in how do we change, whatever the reasons are, to make life plausible.

G.M: Yes, so as you said, Ndem has a more holistic approach compared to other villages around, so do you think that if conditions get worse or remain the same, there could be an exodus towards big cities or Dakar or Ndem?

- Woman: **Well, when agriculture doesn't work, people have to leave, because there is just not enough food, so we don't have a strong enough economy for people to work here.** We can sustain 200 people working at the workshop, that allows them to live a decent daily live. But in times of crisis, we can't address that crisis. Particularly if Dakar or Europe is also having an economic crisis. Because the price of oil has gone up, the price of millet has gone up, the beans, everything has gone up. So, it has a snowball effect. The workshops are going to produce less, because there is less orders, people are going to work less, etc. It's always a ripple effect. And in both directions. So I think what needs to be done, of course as a community we could try to address the subsidizing that I was saying by finding alternative maybe family farming ways, or irrigation system when there is a rain problem. Maybe have an agriculture co-op where we could store food and etc. But in order to have that, we need the basic funds already, and for sure if we had irrigation systems even during a drought, in any case the fields need to be fenced, because the animals are only tied up when there is no farming going on. So these little things need to be address before any situation. As far as community participation to implement an idea is never a problem. Even when the second water tower was brought to the village, the entire community came and dugged for the pipeline. So, community mobilization is not an issue. The issue are funds for material things. Even farming when there is rain is not an issue, they have one tool and it happens. But storage, irrigation, fencing are things to be addressed. The work, people in Africa, work more than anywhere in the world, although nobody seems to acknowledge it.

G.M: Yeah, but in terms of fund, do you seek any help from the government or any external institution?

- Woman: Well, personally I am not informed enough. I know in Ndem we have a lot of partners, that have helped with funds and work and good spirited people who come and participate in our community because it's also the spirit of our community, it's sharing. On a political point of view, from the Senegalese government itself, I am not aware personally because I am not officially in the NGO. I know they have come through, I know we've had professional training and things like that, and of course they have taken over the schools and the health center and those kinds of things. Other than that, I don't know. But I don't think the tendency is for a holistic approach, and the reason I say that is because I see a brand-new airport and a highway coming in an area where people don't have running water. So, when we are talking about a country as Senegal, which is now turned into an emerging country, so that sounds like China and India, sounds like a huge architectural infrastructure that address a social layer that can already use it. But here we are talking about people that are going by foot or by horse carriage, or donkey, not by car or airplane. So, I am a little bit, at least, aware of that tension between local reality for the thousands of people living here and a highway that is 5 minutes away.

G.M: Yeah. One thing I really like about Ndem is the unity I've seen. It's really a community, were we are all sort of a bog family. But I was wondering, do you think in case of another crisis, or if another exodus was to happened, is there any more vulnerable layer of this community?

- Woman: Well, I think we are strong enough that we can survive a crisis like 2008, here it hit in 2011. To put things into context, we are in the middle of the Sahel, and we survived the crisis when the biggest international bank went under. So that says a lot about us. We divided our yearly profits in three, we divided also the employment by three, but now we've increased it again, so we are not at the numbers we were in 2003 but we survived with basically completely illiterate employees that have really a simple life, and simple training for things. I think we were

able to address, because this was the second biggest crisis. So we are doing ok. Also, we didn't have very good rains. So I think we are solid enough as a community, and organised enough to overcome a difficulty. The other thing also, is that we live in sort of a universe that is still, when I say universe, I mean context, that we still are self-sufficient in a way that urban areas aren't. We still know how to walk to places, how to ride a horse, how to go to a manual dwell, how to cultivate entire fields with one hand tool, how to cook on firewood, etc. Which makes, you would need the droughts of the 80's, where there is absolutely nothing left here for people to make them leave again. So maybe a few people might look for work elsewhere, to solve medical issues, or maybe things like that. But in general, we are still capable of learning the alphabet by writing in the sand. That is not been lost culture at all. So, mash'allah. And I think we are cautious to not jump into this sort of futuristic modern context where the most vulnerable people will be left behind. Because this is what happened in the 80's. People who are here are people who are left here. The most vulnerable, well, the most forgotten. They are not vulnerable because between me and somebody from here, during a drought, believe me, the other person is going to make it and I'm going to need their help. So it depends what we mean by vulnerable. But, I think we are quiet cautious of not compromising the spirits of community of course, of cultural heritage in the sense of knowledge, heritage of knowledge, we know how to do this traditionally. And to not compromise it with this high-tech, modern materials, mechanics, capital. Even communication, I think is one of the things that needs to be addressed. Is not to compromise that very spirit, what has made the people who live here able to live here. If we try to propel people into this alphabetized, mechanised, high-tech world, they are going to be left behind again. That is not at all the spirit of this community. So, I think we have to be very cautious not to be left behind. So it has to be a transition, it has to operate together, and I think we have ups and downs but I think it's essential. What is good is that the people who are taking over, are born and brought up here, so they have certain cultural obligations also, in the decision making, that prevents certain compromises, that, is not that they are immoral, but will not be very clever. We have to bring everybody up to the same, we have to maintain it in a way that everybody can participate. Which I think it's one of the biggest disfunctions in the western world, is that some people can no longer participate. So, they have to be subsidised in order to live, they are not even allowed to work. That's a real issue because the human spirit manifests itself through work. So, when you are not allowed because you are too old, or too sick, or you are not from that country, or you don't know how to read, then you are not allowed to manifest your being. And then you become spiritually ill, and we see it. We see people that life makes no more sense because we do manifest our human spirit by working. That's just the way it is.

G.M: I really like your point about not rushing the stages of development because in the western world there is this urge to move forward but what if we are ok in the point where we are, and especially considering that probably in 50 or 100 years time frame, the work with the land is going to be the way more important than working with machines or technology. It's really interesting. So, one last thing off-topic, could you tell me about the cultural and spiritual life here?

- Woman: The *murid spirit*, the *murid* means the person who aspires. So we are aspiring to something, which obviously means that we don't have it all the time. So we are working for it, so spiritually this community, the foundation is spiritual. That is the first dimension addressed, that every aspect of creation shares, which is the birth of life. How we distinguish a dead branch from a lived one, is that there is something in it that is very magical that we notice, and we all share. And that is the foundation and it's a gift. Nobody said "beep - I'm alive". No, it's a mystery, so of course our term is god. It's from a different order, a divine order. That is the first and foremost aspect. So then, we work as an aspiration, to make that divine dimension the first one. And from that everything will grow. So the work is the temporal one, which I said before, in which you manifest your person, my personhood, my service hood, my kin, through my work.



And then there is the spiritual work, which is the *zickr*, and the remembrance of what I am doing and why I'm doing it. Which nourishes the initial being in me, that we all have. And that is the glue between us. This is what we try to do in this community. Which is the reason why we have the *sunfaal*, *hasaids*, the women have their *zickr*. The work you see, the mobilization to build a house, women, children, elderly people, western people, areligious people, any people taking part in this passage together. Which is the only thing we can share, and all the rest we are living here so I think this is what we mean by work. And in the Baay Fall community, work is our prayer. By meaning prayer, meaning also an inside approach in a communal one, which makes a communion between all of us. I always think in sort of a radio "making distorted noises" until we are all syntonized in the same channel. So, all of us move in and out of that, that perfect tune. Sometimes we have those incredible moments when everybody and everything is the one. The one is "no other god than god", there is just one. So, we have that sort of special privilege moment when we are all in-tuned. It's very powerful. No past, no future, it's just is. That's what we want. That's what we aspire too through all these different exercises. The first one being work.

She then showed pictures of how it works.

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### Interview Transcript #3

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** NGO Worker, Babacar
- **Interpreter/Assistant:** Aziz Gueye

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

G.M: How long have you been living in Ndem?

- Babacar: 7 years.

G.M: Do you have any children?

- Babacar: Yes, I have one daughter, Mama. She's 3 years old.

G.M: So, you live with your daughter and wife?

- Babacar: Yes, in Ndem. We live together.

G.M: So, which is the reason you moved into Ndem 7 years ago?

- Babacar: Because after highschool, I had to go to the University, but I didn't wanted this. The reasons that make me move to Ndem, were that I wanted to do something real and important of my life. And I saw that universities is a system where we are all canalized. And I also saw that in the villages there were things to do. So I committed myself to the project of Ndem, where I saw what Celine Babacar was trying to do for the local populations, for the local development. I felt I belonged there. So I left everything behind and I joined Ndem's project.

G.M: Before Ndem you used to live in Dakar?

- Babacar: No, not in Dakar? But in Diourbel, near Bambey.

G.M: Can you tell me something about your life in your previous city?

- Babacar: I was just a student at a high school, like every human.

G.M: Did you live with your parents?

- Babacar: No, I didn't live with my parents, they passed away. I lived with my grand-mama.

G.M: In your previous city, was there something like an Ngo or Institution similar to Ndem?

- Babacar: There was an NGO similar to Ndem. They were capitalism. They had so much money for local development, but they do nothing. They stayed in the city, they do the reports, but they don't do nothing really for the locals. There are many NGO's, I don't want to tell you the names, but there are many but don't do anything.

G.M: So, how these people lived if there was no help? Was the majority farmers? Breeders?

- Babacar: In Diourbel, the young people don't have work, because they have no opportunity. They don't know how to grow, and usually stop school. The only thing is that they know they want to go, like to Europe, migration because they see people leaving to Europe and coming back with a lot of money. They say: "I stopped my studies, it doesn't make sense to continue studying, try to go to Europe or Dakar".

G.M: So there was a problem of young generations leaving, did the government or anybody tried to do something to stop this or help?

- Babacar: The government has sensibilization campaigns, but they don't do nothing. If you don't want people to do it, you have to give them something to do. But in the city where I was, there were no jobs, no industries, nothing. If they stopped their studies, the only thing to do, is to be a seller. If you haven't studied that you don't have a profession, you don't have the level to work in an office. People interrupt their studies and when you go there you find many people in the morning, they seat in front of their home doing nothing, jut waiting to leave. Bu the government doesn't really do something for them. That's why the go to Dakar.

G.M: So when you came to Ndem, you were by yourself or with someone?

- Babacar: I was with a friend I studied with in high school. The communication with him was nice, and one day he proposed me to go to his village. And I go there and I see what Babacar is doing [founder].

G.M: So when you decided to move, you did it in one day or took longer the process?

- Babacar: The first time I came for some days, I really liked it and came back. After thinking about myself, wat I want to do really with my life, I realized it didn't make sense to go to the university and obtain a degree. The best thing I can do is to help the local population. And they can live with dignity in their own locality. I tell to myself that it was more important than to obtain a degree.

G.M: Can you tell me something about once you arrived in Ndem, how was the process to adjust in the community? Did you adapt easily or they saw you as a stranger?

- Babacar: No no no, I was not a stranger, because the community is a spiritual one, and when I came we had the same feeling, the same things in our hearts. It wasn't difficult to integrate. We have the same feeling, the same vision of life. It was natural. It was beautiful

G.M: Where there any challenges or problems in Ndem, like with cultivation or any problem?

- Babacar: Well, everywhere you go you find problems. Life can be problematic. But here there are not problems that will disturb your way of life. You might see things you don't want to. We all have daily struggles but you have to deal with them.

G.M: So, in Ndem you found the NGO that was really helpful for the community. So there was a big difference between your city where no one helped or cared, and Ndem where you have both the community and NGO helping you.

- Babacar: Yes yes. I am a member of the NGO so I really feel the difference. The government came to Ndem to make promises, saying "what you are doing is beautiful for the community; we have to help you, to make it larger;". Everytime but you never see them again. They come with their cameras, taking videos for the T.V., showing how Ndem works. But that's it. And the NGO is for the heart, not for the media. We have everything, artisanal, agroecology, a system for the local development. Our water is us who make it, and we have our own food for the population. The artcrafts for people who want to stay and do something else. And we see in the health, we also have a school. At first it was the Baay Fall who led the school, but then the government is the one who sends the teachers. We made everything. We have finance for people to make their own money, like a bank for them, micro finance.

G.M: So, eventually it was the same problem. The government didn't help in Ndem as in your previous city. After you moved to Ndem you saw other people from different villages coming for the same reasons or different reasons? You feel like the population increased every since you got here 7 years ago?

- Babacar: 7 years ago? Yes, there is new people, not from other villages but from other towns, even from Europe or from the world. When they hear what we are doing in Ndem, they have the urge to come. Because what we are doing makes sense. It's for the population, not just in the spiritual way. You can be in Europe and they want to be part of us. They don't have to have the same spirituality as us. Just the good will and if you want to help. Sometimes they stay.

#### Interview Transcript #4

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** Bashir
- **Interpreter/Assistant:** Aziz Gueye

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

Aziz: He was saying the rainy season is aleatory. Even in Europe it's changing.

G.M: Yes, the thing is that it's just not usual patterns of change, because of course the weather has never been stable all the time. They are always cycles of change. It's just that this time the change is more unpredictable than usual.

Aziz: Yes, he was saying that. The change is more visible.

G.M: The thing is in Europe, if for a few days it gets hotter then people are going to go out and just notice it. Maybe here if it's hotter, people might not have food. So you can see that the impact is different.

Aziz: Yes, the impact is more important. Is like when you see a dead cow outside. It's true, it's happening.

- Bashir: Well, in consequence of the bad "hivernage" this year, the "silene" we were doing were not found to answer to these needs. The "nyebes" (plant) did not grow. Prices got higher. The mill is going to become more expensive this year too because the production was lower than usual.

Aziz: Even the beans are going to get more expensive.

- Bashir: Even the wheat straws for ceilings or for cows, we are forced to go and get them from Somone, you imagine?

Aziz: Yes, because there is nor food nor water. It's complicated. Is it because it rained less or just because the pattern changed? (to Bashir)

- Bashir: I don't have the exact measures to compare, but I think that it rained less this year. So there is something with both the quantity and a time difference. And also the "hivernage" it is very important. There needs to be a certain regularity. This allows for the agriculture to work.

Aziz: Yes, otherwise it disturbs the cycle.

- Bashir: Some here have lost their seeds. Then the next time they didn't wanted to take the risk and plant more. And it is at that time that the "hivernage" came. And when you lose your seeds, when you have to buy them again the poorest farmer won't have the means to do so, to reinvest in seeds.

Aziz: It's like a gamble, like playing chess.

- Bashir: Yes, well agriculture is very vulnerable.

Aziz: It's never protected right?

- Bashir: No, there is no way. Although in France and Europe there are insurance systems.

Aziz: Yes, that what we wanted to ask. Is there an insurance policy?

- Bashir: No, there is not.

G.M: How long have you been here?

- Bashir: I came to Senegal in 1993. First in Dakar, and then in the 2000's I came to Ndem.

Aziz: During the years that you've been here have you seen people moving, because of maybe environmental degradation or for another reason? People who leave to avoid staying in this difficult situation.

- Bashir: Well, my position might be wrong...But in Ndem I did see people moving. But it's because of economic reasons that they do so. First of all, the ones who moved the most were the ones who worked in the art craft workshops, when their income was no longer enough. They preferred to open a couture business in Dakar or Mali. There was an economic crisis in 2008 which had negative effects. And it was a factor for the reversal of the rural exodus. Because when you manage to develop an economic activity that is not agriculture nor breeding, such as the art craft for example, it reverses the rural exodus. In Ndem it is what happened. People came to live here. Like what is happening in *Babacadior*, we develop diversified economic activities, which can help the inversion of the rural exodus.

G.M: That is what we noticed, that people come to Ndem instead of living to bigger cities. Because of the NGO, the spiritual community, etc. Could you tell me about your experience in Ndem? Do you see yourself here in 5 years?

- Bashir: I came to Senegal first for my military service, the civil one. I came here to teach what I learned in school at first. Industrial design and mechanics in 1993 to 1995, almost 2 years. During this period, I lived in Mermoz (Dakar). And I met these people who talked to me a lot about Ndem. And at some point I just said I needed to go and see what happens. After 3 months of people talking to me about it so much, at some point I had to come. I had a girlfriend at that time, and we just came here for a week-end. That's how it started. We got along with everyone here. We stayed in touched while teaching in Dakar. I was in the technical domain, I also did a bit of cultural animation, but I realized that the teaching was something that did not interested me. So I became a professional to work in the domain of international solidarity and cooperation. First in logistics, administration, and funds expert. After this, when I had to go on a mission in the context of the school I was working with, I looked for a mission in a foreign country. Working in French NGO's was not successful. I said that I wanted to go back to Ndem, see what was going on. And when I came back, I saw the artisanal workshops which still lacked a solid infrastructure, the administration and the commercial partners were not on-point nor centralized. I then identified the needs, I went back to France, I started a project, I found the funding's, I created a volunteer position which I took. I then moved to Ndem to follow up on the project, to strengthen, supervise and manage the art craft center. That was in 2002. After a year there was a big donation which strengthen the management. I then was hired by an Italian NGO to work in a sanitation project in Louga, and finally we made trainings for tanning, dyeing, and computer science between Louge and Ndem's women. We manage to train 200 women in tanning and dyeing. And we also trained the bureau of the NGO's in Ndem and the association in Louga in computer science. But after 4 years I got tired of that work, and I found the same school I did in Lyon (France), "la bioforce". And I engaged in a master's degree in International Cooperation Management. So I went to do this with a couple of friends from Ndem. We were both accepted at the decentralize level in Dakar. So we studied together the 3 of us for 6 months, and at the end of it, we already wanted to start a project for Senegal, even though we still didn't know what. But I did a geopolitical watch on fair trade and organic cotton. And I realized that in West Africa, the link in the transformation of fair-trade cotton was not done in West Africa. The raw material was exported first, and the link of industrial transformation was missing for the artisanal sector to profit from this. At that moment, there was a "boom" in fair trade commerce in Lyon (France). I was very close to the president leading this, and we discussed a lot. I talked to him about my project and he liked it. So we built a project, an association, a structure. We got the funds. Six months later I came back to Senegal, in my network I find OXFAM Women in Dakar who had 1 or 2 tons of cotton in front of their office. But they didn't know what to do. They lacked the budget to transform it, and I offered them a solution, a project. I suggested to send it to Ndem, so they can transform it into "prêt-à-porter" with the fair-trade and organic cotton, at that moment we had a French stylist who released a collection. We can then show the work to the international exhibition; We can give half a tone to Mali, because I had contacts there, and the other half to Burkina. We then created a solid business plan with the little budget we had to export it to Europe. After 4 years of work, with just 2 workers we were tired of the work. I came back to Senegal, to Ndem to coordinate "Bio Terre Ndem" to help with the trade and commerce. I did that for a year but had to move yet again, I did other things. And finally, I got a position in Haiti in Handicap International for organizational capacity strengthening of the disable people. Then I decided to base myself in Senegal and bought a land and built a house.

[...]

I came back to Ndem and there was an opportunity to present the art craft workshop to a German NGO. I had the strategic vision to reorganize the center. I already had in mind so I did it. In 15 days we delivered the project, and got 100 000 euros. It started in October and since then I am the coordinator of such project. But I am not planning to live in Ndem. I mean, work makes me move, depending on how pertinent and interesting a project is. I am not a consultant that works for money, but for the engagement and ethics that goes behind that interests me. This is what motivates me. I accompany another project here in Ndem related to deforestation, which is very interesting. But the reality of Ndem is another thing. The lack of will, the lack of ability to question themselves, the side that they believe they know more than they actually know. Which as a result, after 4 months of this project, and for the first time I say to myself that I am here because I like it, but if I see that the guys (workers) block everything I bring...it's not motivating.

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### Interview Transcript #5

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** Bertha

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

- Bertha: [...] Globalization, and attraction to other parts of the world, there is the fact that even the perceptions of professions change, even if you continue to make a living from a job, the perception that job can change, and not be attractive for you anymore. And in Ndem, we try to create different factors that make it work for people to stay, or come, or come back. And some of them are opportunities for work, some of them are spiritual, and then there is the community factor because I mean, if you look at here, this place actually makes people come from better living conditions. Which is a regression in terms of livelihood, and material wise right? For the spiritual factor, and this is very... Probably you cannot modelize it, you cannot say you do that everywhere, because it's something that works for people who feel attracted to it. And it's a place, I mean I think about it and I see, it makes people stay and realize hold on to very simple living conditions, all while kind of also opening to the world. Because the people living in this place are used to see foreigners, they are used to receive new ideas.

G.M: May I ask, how many years have you been living in Ndem?

- Bertha: Seven and half years.

G.M: And which is the reason that drove you here in the first place.

- Bertha: The first time I visited it was for the **agricultural** project. And then I came back for the **spiritual path**.

G.M: At the moment what are your current responsibilities or activities in the village?

- Bertha: In the community? I have always been involved in the agriculture, but the thing is as a member of the community, it is different as if you have an employment or a job. So there is no task at all that you can say, you don't have to attach. If they need me I can be anywhere. From the simplest tasks to the more complicated ones. But according to what people like to do, or what they are good at, then some tasks are done by some people. But for me is mainly the agricultural and ecological work, so that can be, right now I try to organize the **organic waste**

behind the kitchen and make a **compost**. It can be writing proposals for funding's. It can be doing training, planting trees, doing a tour or whatever. Sometimes I do activities for the children or youth, sometimes I help in the construction.

G.M: So, in terms of agriculture, have you had any major challenges regarding for example rain shortage or maybe drought, or any climatic conditions which affected your work?

- Bertha: There has been definitely very different rainy seasons. And I must say that I am mainly in charge of the things, the traditional agriculture is done but lead by other people here. So I am not the main person there. I am usually involved in the irrigated dry season gardening, tree planting and others. So I am impacted when the water pumps breaks for a few weeks.

G.M: Ok, so more technical problems.

- Bertha: Yes, technical problems of irrigation systems. But we have been affected. This year we had very little harvest because there was one big rain at the end of June, and then no substantial rain until the end of August. And then it rained a little bit but harvest was very poor in this region. And the year before it was very good.

### Interview Transcript #6

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** Mohamadou
- **Interpreter/Assistant:** Aziz Gueye

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

Aziz: First question is to introduce yourself, since when have you been living in Ndem? What is your approach to Ndem's community?

- Mohamadou: Well, hello. My name is Mahamadou. I am part of the NGO in Ndem, and I have been here since the beginning of the project, since it started as an association from the villagers until today. I work as a manager of several projects, and also I created with the NGO a thing called "campement", which is sustainable and solidarity tourism in order to create new sorts of income to complement with the existing ones. But at this moment I am in Bacacadior, where Ndem's project has been solicited to make a similar one.

Aziz: Since when do you live in Ndem?

- Mohamadou: I discovered Ndem in 1988, but I came to live here in 1992.

G.M: So before coming, where were you?

- Mohamadou: I was between Casamance and Dakar.

G.M: Which were the main reasons for moving here?

- Mohamadou: I was born in Casamance, I studied high school there, and Dakar because I went there to work. After in my job in Dakar I discovered Ndem's project. And it's like that, that I came here. I live with my family here.

G.M: When you arrived to Ndem how many people were there already?

- Mohamadou: I came with my wife and two kids. Well, population now can go to 300 to 400 people. Because there is a migrant population too, people work. The officials for example do not live here, but just come here to work.

G.M: Every since you've been here, has there ever been a problem of rural exodus, of people leaving for whatever reasons. Because other people told us that young generations have been leaving for certain periods from Ndem to work in Dakar or Europe. So did you experience this issue while in Ndem?

- Mohamadou: Ndem at the beginning, the project was to fight against that, against rural exodus. So when there was the creation of art craft workshops, schools and a health care center people came back. Well, in the new generations some stayed, and some left. Some left and never came back, some left and came back. It's like that. But in general, thanks to the project many people came back. From Africa, from Europe.

Aziz: People search for something on the other side but here people can also have the option to stay in the village, not far from the family.

G.M: So the people who started joining the project of the NGO, would you believe it started with the problems with agriculture because there was less rain, therefore people needed something different to make money, therefore the people work at the NGO? Or is it some other factors?

Aziz: I think the NGO proposed other activities without agriculture.

G.M: Could you elaborate on how the NGO has provided different livelihoods?

- Mohamadou: The workshops, "la maison des métiers". There were no previous trainings, because the workshops in Ndem were based on the "know how" from the people. What did they do in Dakar? Most of them were tailors and not in the best conditions.

Aziz: So the NGO did a study of what people are doing on the other side (talking about the ones who left the village), and they planned the activities similar to what they were doing on the other side. So it was a win win. You have your family, get the same income as if you were in the capital. You have opportunities to even export your product.

G.M: Within the NGO what are your responsibilities?

- Mohamadou: I am a member, I do not have a settle function, but it can happen that I am solicited to coordinate projects. I am quite polyvalent. The communication, I have a partnership with the hostel (relating to the eco-tourism project).

G.M: More talking about climatic conditions, have you experience any change in the rainfall patterns?

- Mohamadou: Well, it was pretty serious in Senegal. The biggest one we had was in the years around 1975. Several organizations from all states in Senegal took initiatives to fight the droughts, called CILSS (<http://www.cilss.int/>). Like in all states it is slow, such as Senegal too, in Ndem we "took the bull by the horns" by awareness and reforestation activities.

Aziz: What were the main actions in Ndem in this regard?

- Mohamadou: We wanted to create awareness and mainly things related to water management. If the water doesn't come down from the sky, then we need to look for it underground with dwells. Also reforestation, we did a lot of work for this. The trees who are around the village we planted them. Because all these problems are going to encourage migration in all regions in the Sahel.

Aziz: So you think it is one of the main reasons why people migrate?



- Mohamadou: Yes, because those who migrate come from the rural world for most of them.

Aziz: Do you think it's because of climate change or...?

- Mohamadou: There are 2 factors. The lack of infrastructures and climate change. Because the disruption of weather patterns has a big impact on agriculture. But after comes the lack of infrastructure. Because these people cannot heal themselves or it can be just very hard to get. So there is (was) no water, no education and no health systems. The villagers were isolated. And also some do not have the means to move. Senegal is an agricultural country.

G.M: I'm curious to know how migration, in general terms, is perceived by people in the village and also by yourself. When someone moves is seen as a failure or just different opportunity or as a necessity to have food? What is the relationship with migration for the people?

- Mohamadou: Well in general there is this view. It is a lack on consciousness. They think they need to go to Europe. But also they are changing their mentality because they see the dramatic scenes.

Aziz: People who come back and tells many lies.

G.M: We talk to another woman the other day, that even the NGO suffered from the 2008 crisis, so how did the NGO cope with the situation?

- Mohamadou: Well, it affected the workshops mainly. We realized we were too dependent on the West. I was planning to make one exhibition shop inside the workshop because the principal costumer was the West. I decided to do a guest house in Dakar, around the sea. And export all artisanal products from Ndem to Dakar, in Senegal. To try to be independent from the West and to have more local economy. Sell and buy in Africa. At that time I was in Europe, in Madrid as the principal link, the official distributor.

[Casual discussion in Spanish:

- Mohamadou: Several people from our community has houses in the north of Italy, the Murid. The house of Sereign Touba is there (founder). Migrants go to usually to this part of Italy, the community is there so they can work. The north of Italy is richer than the south. In the south people work by selling stuff, while the ones working in the north have better jobs.]

Aziz: For how long did you stay in Europe?

- Mohamadou: 12 years

G.M: And what type of contacts you had there? And the ressources you had? Did it played a role in your work here in Ndem?

- Mohamadou: How I invested that here?

G.M: Yes.

- Mohamadou: Yes, well I have a lot of connections there. So I came back bringing that project of eco-tourism. We have people that wish to buy the art crafts, and we are always in contact with them. But since 2012 I haven't been back. I've stayed here in Senegal.

G.M: And how many people engage in the eco-tourism project? Is it big?

- Mohamadou: I have a capacity of 20 people that can sleep, to visit and eat I have the capacity of over 100 people. Little by little there is a growing demand. What is missing are camps and activities and training because it is something new. The hardest thing is to share the gains.

Because this tourism is for all, it's sustainable and fair trade because we protect the environment. We avoid mass tourism.

G.M: You mentioned that there are no rains for some years, or that there is very little. When this happened, how do you cope with this?

- Mohamadou: The NGO used to be an association by villagers to seek for help. That was in 1984 that looked for help around the world. The youth were in the cities. When the project started, in 2006 the Senegalese government gave it a status as an NGO.

G.M: And what was the impact of it?

- Mohamadou: Well the kid born in Ndem can remain in Ndem. To heal itself in Ndem, to educate itself in Ndem. Well people wanted to come here because there was more infrastructure. We manage to have light and we have a vision of ecology, like the gardens we have. We even have solar power. Kids can get education and health, there is a future they can create here. If he wants a bachelor degree he can go to Mombay which is not far from here.

G.M: In 2007 electricity arrived to Ndem right?

- Mohamadou: Yes, it is the state that gave electricity, but we work a lot with solar electricity. We have an ecological perspective. It's called the ecological fields. We want everything that's ecological.

### Interview Transcript #7

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** Edu
- **Interpreter/Assistant:** Aziz Gueye

**Location:** Ndem

*This interview was recorded in Wolof, French and English. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

G.M: Since when do you live in Ndem?

- Edu: Its been around 3 months

G.M: Where were you before?

- Edu: I was in Saly, in Mbour. Its a touristic place.

G.M: So why did you come to Ndem?

- Edu: Because I am sick, I got fever. But I work in Saly

G.M: Can you tell me a little but about the place you used to work before?

- Edu: Saly? Well, it's a touristic place. People from all over the world go there. The season starts since October until March. But during the summer its closed. Back there I am a musician. I played in bars, restaurants and hotels. Music is my life.

G.M: Before Saly did you live someplace else?

- Edu: I lived in Dakar. My house is in Dakar. My wife and three children are there.

G.M: And how is your experience in Ndem?

- Edu: Well, its cool. I wanna buy a house here if I got money. Its the first time I discover this place.

G.M: How did you discover this place?

- Edu: Many things. The spiritual mind. All is nice. I like. All people I see here are positive.

G.M: Would you like your wife and kids to move here?

- Edu: Yes, why not. If I have what I want I want to bring them. One kid has 11 years and 9.

G.M: Since you've been here, have you realized if other people around you are moving as well for money or friends.

- Edu: Here people live in the truth, on the other side its just for money. Its not the reality, and here it is. No materialistic.

G.M: Have you perceived any changes in the dry or rainy season in matter of intensity or something, through out your life in Senegal?

- Edu: I dont know. But I know that before was better than today.

G.M: Has this problem affected you? The lack of rain? Because some people that when it doesnt rain, everything becomes expensive

- Edu: Yeah man, when it doesnt rain everything is very expensive. And its a problem for everybody.

G.M: But I guess as a musician its fine.

- Edu: We are together, nio ko bok.

G.M: After you moved to Ndem, did you have any sort of challenges with the integration?

- Edu: I was very well integrated here. I tell you, if I was to have money, I would like to have something here, to do something here. I dont know what, but I want to do something here to help other people too. Yeah man. I pray god to give me what I want. Everybody lives together. We live today because tomorrow we might die. And its power, if you see people together, its power. There is no difference in colours, we are together, we are all together, in the same house.

G.M: Many people in Europe should listen to your words.

- Edu: Yes, that's the truth quoi. You just need to know how to write, and if you think a lot in something, you know there is a bigger thing moving everyone. And thats god. All they say in the holy books its peace and love. No fight no crime. Dance, move, eat, for everybody. Its not nice seeing people crying. We are all the same. Im 48 years old

G.M: Since you've been here in Ndem, do you think there is a problem with desertification in the area? Because we noticed that around the area there is no green. Are you concerned?

- Edu: No, all is nice. I wish this village to have all they want.

G.M: Do you know anyone, maybe among your friends, who have moved?

- Edu: There is a lot of sexual tourism in Saly.

## Interview Transcript #8

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** Babacar Ndoye
- **Assistant:** Flavio Mancini

**Location:** Mbacke Kajor

*This interview was recorded in Italian. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

G.M: Can you please briefly introduce yourself?

- B: I am 61 years old, my name is Babacar Ndoye and I live in Dakar. I've been living for a long time away from Senegal. When I was 22 I left my country and I've been away for 35 years. I spent the first 2 years in Belgium, I've been a few times to Paris. It was very easy travelling across Europe, as I did not need a visa. When I got to Italy people were not used in seeing a black person, they were very surprised. I've always been the "different one". People don't care about integration, they care about the way you look.

G.M: May I ask you the reason why you left Senegal when you were 22?

- B: I thought I knew everything. When you become an adult, it used to be at 21, you could be free and do whatever you wanted. Today I think I failed my mission, but in 1977 I had discovered the world of IT and became sort of a fixation. I thought it would have been the job of the future, so I had to anticipate the trend. I knew nothing of this world, but still I thought I knew everything.

G.M: Before you came to Italy, here in Senegal there was a big drought during the 70s. I would like to know which are the main differences/similarities you noticed with your "before" and "after" in Senegal from a climatic perspective.

- B: The climate considerably improved. In those years the drought was very heavy. There was not even the mentality of creating a "forage". You can retrieve water from 200m under the soil, and it's not expensive. This didn't use to exist, now it does. Now you don't wait anymore for the rainy season, as you can just retrieve water from the forage. There used to be only 1 season for farming, then we got 2.

G.M: So which was the impact of climate change on your life?

- B: Usually you hear to radio and news about this "terrible" thing called climate change. But what it actually did bring was a very regular rainy season and more water. I don't have a scientific explanation, but I got convinced that climate change is not something universally negative. It is positive for some and negative for others. The pollution produced by other countries gets weakened over its journey. The dioxin leaving from here, when it gets to China for instance it's not still dioxin. Wind dissipates it. Climate change is not gonna be a problem for everybody. In Central Africa they usually have 8 or 9 months of rain, here 1 or 2. Now it got 4-5, thanks to the climate change. Let it be welcome!

G.M: From a vegetation/land cover perspective, how did the environment change?

- B: Still today trees coal is used to cook, mainly imported from Casamance. Who has not the coal, may have a tree, therefore cuts the tree down to get the coal. Cooking is something you do everyday, if you use logs for cooking trees are gonna die. We could use biofuels, cause we have the primary resources to create it. We just need to create it. Today if I go out and I see somebody cutting a tree down, I can't even stop him anymore. They need to eat, therefore they need to cook. Luckily here the scale is very small, but in Casamance they deforest everything. Lately the army was put to patrol the border with Gambia, so deforestation is less likely to occur. Sooner we had an agreement with Chinese people, so poachers could just pass by with the wood and nobody would tell them anything. Now Gambia changed regime so the Senegalese army is there and the crossing is not anymore possible.

G.M: What about the local level? Has the government done anything over here to stop this problem?

- B: The government doesn't do anything, otherwise it would have to provide an alternative. Wood is only used for cooking and eating, nobody creates furniture with it. Apparently teenagers do this bad thing: they put bad weed around trees and plant it. After sometime they burn it and the tree dies, so when they cut it down is already dry and dead. What can you tell them? It's something very hard to prohibit, and it's very hard to make them understand why this should not be done.

G.M: In your opinion, does deforestation come along with a problem of desertification?

- B: Have you been to Dakar? It happens everywhere, but in Dakar especially there's million of growing trees. Have you noticed any nursery place for trees? These people have the competence to maintain and grow trees, and then they sell them in hundreds every day. A few years ago they brought 4000 trees here. When there is such an amount, everybody seem to want a tree. They are beautiful, they provide shadow. When they know they give it away for free, everybody wants one. The current project is to plant big trees. The first stage of the project kind of failed. But we have the means and technology to move trees around and make them grow faster and better. We needed to take some trees from a forest nearby and move them there. There is a precise technique to cut them. However this was done in a poor way.

G.M: Since you said many trees are being cut, but also many are being planted, which do you think the balance is? Positive or negative?

- B: Not many trees are being cut. Here there are naturally three types of tree: cad, the sump and the baobab. All of them are big. Only the first two provide logs. If you need log for a forest, you can only take 2 or 3 of them cause they are huge. Now we are planting many different varieties so we have dozens of them. Every time we find a new species, even from Europe, we plant it. In a few years there's gonna be many. One sure thing after the Magal is that they are gonna plant trees. If you want 100 trees you need to plant 300, as not all of them eventually make it.

G.M: May I ask you where does your knowledge about agriculture and trees comes from?

- B: I spent many years in the countryside and in the woods, in Italy. In Umbria I spent 8 years in a forest.

## Interview Transcript #9

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- **Interviewer:** Giordano Margaglio
- **Interviewee:** Doctor, **Daouda**
- **Assistant:** Aziz Gueye

**Location:** Mbacke Kajor

*This interview was recorded in French and Wolof. For practical reasons, a full translation into English was done. Colours were also included in order to facilitate the reading and analysis.*

G.M: What do you here? Your work? Your life?

- Daouda: I arrived to Ndem the 5th of September 2000. The 30th of June 1997 I started working as a doctor.

G.M: Before coming to Ndem where were you?

- Daouda: I was in Mbombay, in the Health Center. I stayed there for 3 years.

G.M: So what was the reason for you to move to Ndem?

- Daouda I was deployed to Ndem from the Health Center.

G.M: How did your life change when moving from there to Ndem? Like at the community level, with the local environment.

- Daouda: The difference is that in Mbobay I was in a city, and here I am in a village. When I arrived there was not even electricity. So life has changed a bit.

G.M: So you were working as a doctor for 7 years without electricity.

- Daouda: And pretty much everything. If you needed something you had to go to Mbobay (11km from Ndem).

G.M: So in 19 years how did you experience the development of Ndem? More people came, the electricity.

- Daouda: So many changes. I think the life condition of the population here dramatically change. The awareness of hygiene, the behaviour towards hygiene. And also we used to live from agriculture and breeding, and we had though years. People reunited to tackle this, and created workshop groups. The NGO was born which busted many things in Ndem, at the hygiene level, educational, environmental, hydrolic. Many things changed.

G.M: What about the size of the population? Did it remain the same or decrease/increase?

- Daouda: Yes, of course population increased. The number of concessions currently present in Ndem, at the beginning there were 17 or 18 families. Now we are at 25 or more.

G.M: Was it related to reproduction or migration patterns?

- Daouda: It's both. A lot of foreigners also come here to live and work in the workshops. I know live here, have a family and children.

G.M: And in terms of environmental change. Do you witness any changes in the rains over these 20 years?

- Daouda: Yes. Noone can be in power of this. Everything is extreme. If it's hot it's way too hot, if it's cold it's freezing. Sometimes if it rains, it can be very strong, or sometimes you just don't see water.

G.M: What about the impact on production?

- Daouda: There is a severe impact on production. There is less yield compared to previous years. There is less production

G.M: So if there is less production, how did the village cope with that lack of crops or food?

- Daouda: The people don't just wait and see. They take action and continue to believe. They go to the weekly markets to trade, raise chickens and sell them. In regard to the soil, they prepare the soil in a good way because they do a lot of compost due to a lack of fertilizers. People working in agriculture here, to have access to quality seeds or fertilizers it's hard. The accessibility is hard. Even if they have the product, they need to know how to use it, and this goes along a training. I've seen organized farmers that put money on the side for common agricultural practices. I started the campaign for 2018-2019. The farmers put money on the side for next season, like a social bank, to protect the workers for future dangers.

G.M: So you think there is a danger of climate?

Aziz : Yes, so he takes the necessary solutions to get quality seeds and fertilizers for the land.

G.M: So this is the main solution proposed?

Aziz: Yes. And not just wait for the climate to take away everything, but think one step further.

G.M: And what about the trees? I heard discordance opinions. For example the cutting of trees, the desertification, that the trees need more water, what is your opinion about it?

- Daouda: Yes, we all know this. Even the farmers know that since last year, 2 or 3 years ago we signed a decree where, if you wanted to cut a tree, you needed an authorization. Even if it's for cut and shape, you need an authorization/permission. You know, the villager needs wood. So obviously you attack the trees to make a house, and to cook. So you see, in the village the wood is very much used. And only trees can give wood. So people will just cut them. So here, the NGO brought bio-fuel to fight against this. And the consequences of cutting trees are tragic. So certain people are conscious about this, the school directors they tell students to take a tree and raise it, take care of it. So these are ideas that are being cultivated and are growing. Because the kid that starts planting a tree at 7 years old, and starts taking care of it, he will understand. We want to instaure this programme of reforestation even if it's

ambitious. The problem with trees is that you cannot plant here and not there, so it should be engaged as a national problem. It is throughout all regions, except from the south. So it's a program that the state should take in hands. One student, one tree. So the student just needs to take care of it. Very simple. And how many schools and students are they? In all Senegal?

G.M: How does the water management work in Ndem? And what are the challenges?

- Daouda: It evolved a lot. It is a problem. But now people have water in their houses, and before was not like that. Last year there was just one pump station in the middle of the village and women needed to go there to gather water. Before the drilling there was just the wells. After the drilling we had fountains, and now water is accessible. It's true that we still need to manage the amount of the water intake by each person. We need to see the needs of everyone, and of the animals. So water needs to come in a regular way and in big amounts.

G.M: So, you mentioned earlier that you foresee a danger in the future for the climate. So is this potential danger is gonna bring people out of Ndem or from other villages towards Ndem because of its stability?

- Daouda: Well, migration already started in Ndem. People go work in Dakar. Climate has changed and people are conscious about it.

Aziz: Migration already started, and he doesn't think there is going to be a big wave of migration. Because people going to Dakar is not just for the climate, it is not the main reason. It is because of social reason, and to see people going to other places you want to do the same things. It's sort of a gamble.

G.M: Are you the only doctor here?

- Daouda: No, we have an assistant and 2 midwives.

G.M: At the moment if someone is sick, and it might need special treatment where do they go?

Aziz: Well, he has all the tools here now.

G.M:And what about woman who delivered? Can they have the baby in Ndem or they have to go to Mbombay?

- Daouda: No, they can have the baby in Ndem if it's not complicated.

Aziz: Now with the new president, Macky Sall, it is the only little area where we do sanitary things (??)

G.M: You want to add anything relevant for the research?

- Daouda: Your research is ambitious, because it is something that everyone should start think, to establish foundations to avoid reaching this stage.

G.M: One of the main reasons we are focusing in Ndem, its because if you look at national policies, with climate change and migration, they never consider the cultural value, the spiritual value. So you have anything to say regarding, if there is religious or spiritual practice for people to stay or leave?



- Daouda: Of course there are religious beliefs that make people stay. And they are a lot of people like that here. Too many, even the ones who are not from here, they prefer to stay because even if they don't have anything, the main things remain.

G.M: Thank you for your time.

## Interview #10

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- **Interviewer:** Anna Chesnier
- **Interviewee:** Boubacar Issoufou, Climate Risk Analyst, WFP Senegal

Presentation of our research to him. He did not know Ndem. He arrived to Dakar 3 months ago after being deployed from Niger.

- B: My role is to support WFP in implementing a climate risk service in the region of Matam, xxx, and Kolda. The thing is that today, climate variability is so frequent that producers cannot cope with this. And today WFP brings several projects to support them. But one thing that we saw was missing, is climate services. Because without this information, the producers are not able to take decisions on time. Even though they have support in terms of advices and seeds, what is missing is climatic information to enable a proper decision making for better productivity results. If for example, the climatic profile of the season announces already that there is going to be moments of heavy drought, this information can help them choose if they plant seeds of "short cycle" or "long cycle". And I am here, I work closely with the National Meteorology Agency to produce and spread at the national level this kind of information.

A.C: But, if we there is a national meteorology agency, isn't this information already being produced?

- B: No, the problem is not that it doesn't exist. The thing is that in Africa this information is mainly provided to aviation agencies, civil aviation services. Because in reality, this information takes means to produce it and the tools the meteorology agency has comes mainly from the civil aviation services, so it is shaped for aviation purposes. And you are going to see this same scenario a bit everywhere in Africa, specially in the Sahel, because most of the meteorology services work mainly for aviation services and not for the agriculture nor the agroforestry domain.

A.C: So what were and are the methods used by the farmers to predict? Or is it just based on past historical data?

- B: They predicted the climate but just for aviation (*talking again about aviation civil services*). But now it is changing due to the climate variability that is changing the national products. Today, states are focusing on creating and providing meteorological services information adapted to agricultural productions, pastorals. And states are focusing in temperatures, which is attracting more and more the attention in the Sahel and in the world, because it can also bring problems related to public health. So, since I am here, we already started working and elaborating an action plan to know how we are going to elaborate and put in practice this kind of information. But also, this is not enough, in parallel we need to strengthen the capacities of small holders to better know how to use and understand this information. Because it is true that, even though the information might be available, to understand it and use it is another thing. It

has to go together, and this will allow it. And you also might know but at the community level they have empirical perceptions from past historical data.

A.C: Yes, they mainly depend on past historical events.

- B: Yes, sometimes they are hard to convince for example of rain forecasts, because they do not believe it. They think that the climate in the time of the ancestors hasn't changed, while it is obviously not the case. So there is a big work in awareness, capacity strengthening, and training that needs to be done.

A.C: Yes, in fact in the village we had a lot of opinions relating these events to religion, as if the weather was in the hands of God and there was the impossibility to predict God's will.

- B: Exactly, that is hard to manage. We have to continue with sensitization activities, and deploy further efforts so they can understand that nature, that variability is a reality, it is not divine but can be caused by human activity. I come from a country where  $\frac{2}{3}$  of the space is desertic, I come from Niger, so I know about this phenomena. The problem today of climate variability is that, yes, climate of all time is in a changing dynamic, but today human actions amplified this process, so this change is very fast. And humans can't cope with it. Changes are extreme and fast, and consequences are severe. Today in the Sahel, the impact of variability is the advancement of the desert, and extreme rains which causes floods. After an intense drought season the village can still suffer from it for 2 or 3 years later. So communities in the village are forced to leave.

A.C: Yes, that is exactly what we found, massive rural exodus.

- B: If a human can no longer live his life in his comfort zone, then he is going to leave of course. And if nothing is done to ameliorate his life conditions he is gonna leave. And I think the Marabou (spiritual guide), is doing a very good job as he understood the consequences. It is important to create new economic opportunities so people can stay home. Otherwise the village would have disappeared.

A.C: Yes, like many other villages nearby. But then, when we talk about desertification, we hear a lot about the 70 and 80 droughts, could you elaborate on this?

- B: I think that these ones are one of the most severe droughts that affected the Sahel and had a negative impact in all the ecology. The biggest drought that affected the Sahel was the one from 1973 to 1974. I do not have information about Senegal, but I know that in Niger, before the peanut harvest was one of the biggest land use spaces, and now it is a desert. I know that over 60 000 hectares became desertic. And this equally affected Senegal because it was the whole Sahel being affected. And after this, ten years later another drought hit the Sahel. A big number of animals and pastoral activities were displaced. So you can see that there was a big variability before, from which all resources from the communities were destroyed. In addition, small season of droughts throughout the year are present, which puts more stress on the land and people. They come but are continue. And since then, since these droughts people don't manage to become resilient to changes imposed to them. They have a hard time. And another factor is the demography. Because in the village the only mean of energy production, are plants. Today, people cut trees to produce energy, yet, a tree has an utility. A tree fights against erosion and helps with water absorption. So if millions of trees are cut, it means that the desert is only going to grow. In people's mind the Sahara desert is going to move gradually to the Sahel. But this is

not the answer! In a place with no trees, the water will not be absorbed, and will be redirected to the next basin, leaving many groundwater basins empty. And this is in a place with a hard access to water.

A.C: It seems as if it a vicious cycle.

- B: Yes, it is a vicious cycle. Very complicated and very hard to comprehend by the community. Unfortunately, the level of literacy is also very low and people are not in the same level of comprehension of these phenomena.

A.C: Well, the problem is that access to education is challenging, even when talking about the logistics matter. If it takes 4 hours to walk to the school, many kids won't go. But right now, do you know if the Senegalese government is taking measures to tackle the advance of the desert? Or is it more like from the UN branches and NGO's

- B: Yes yes, last year WFP made an activity dealing with the environment were the plant vegetation in recovery areas. We recover degraded lands, and do the activities there.

A.C: Bu this is a WFP activity.

- B: Yes, but even there are several UN branches who are involved. Actually there is a general plan for Senegal for the next five years to come and they talk about desertification and the recovery of lands. And it takes around 4 to 5 years for people to have access to it. Naked areas are taken back and rehabilitated. If for example there was a field before who was home of 50 to 60 homes, today I can find myself with just 5 or 6. When we see Senegalese communities, the ones affected the most by international migration are the ones near dead areas and with desertification problems. They look for better opportunities to help those who stayed

A.C: Ye, we say that during dry season it was mainly men who went to the city to work. And international migration, we also realize there is a need for contacts and monetary resources, so the biggest.

- B: Yes, maybe they are going to come back one day, 2, 3 but maybe by the 4th they are not going to come back anymore. They are just going to send money to their parents, and will have a family in the city. And you can see that in Dakar there is a lot of slums. And usually they are inhabited by people from villages that went to city and could not afford an apartment.

A.C: Yes, usually working selling things or as a tailor;

- B. Exactly, exactly. The problem of the climate impact in the Sahel is very serious very serious. And recently, last month there was a conference in Niamey, in Niger to mobilize as many resources as possible to cope with climate change consequences. Because today the cities are growing and villages are becoming empty. **And the thing is that the cities are not prepared to foster so many people.**

A.C: Yes, there are not so many infrastructures nor jobs. People think that by going to the city life is easier, but sometimes even more complicated.

- B: Today Dakar is completely asphyxiated. Imagine that, in numbers, Dakar host over 60% of the country population. Everybody left their village to go to Dakar. And that is a security problem, a health problem, and access to water problem, that needs to be managed.

A.C: Also the impact on the environment is quite severe.

- B: Yes, because Dakar is becoming more and more polluted. And all that is linked to the internal migration, when people come to the city. Everybody wants to be a taximan, etc.

A.C: And by creating new information and access to meteorological information, this could help solve the problem? To help with the massive rural exodus? To give a certain degree of choice and resilience to farmers and villagers.

- B: That is the goal, that is the goal. To create more opportunities in the villages to avoid massive migration.

A.C: But then, what do you think, we did a lot of literature research, and we read some authors that said that basing activities in pronostics can lead to maladaptation.

- B: Yes, well... Anna there is something that needs to be understood. Before making any decision is made, people are asked. In reality, decisions are taken from a higher level with taken into consideration the people themselves. And here, you can find a maladaptation. But by talking to them you can have successful adaptation measures. For example, right now with WFP we realized producers need climatic information, and it is out of question that us, from our bureaus, decide what information to give and what not to give. We need to know the exact type of information that they need. Because every producer, from one are to an other, might need different information. And in reality, we did surveys to these producers, to collect communitie's perception first in relation to climate variability and climate change, and also to collect information about the kind of meterological information in regards with their agricultural activities. We know that responses are important because they talk from the heart, the people we met knew exactly what they needed, so know we are working to produce this information.

A.C: Would it be possible to have access to this report?

- B: Yes, there is no problem, I can share with you the results. It is interesting because the perception we have in the bureau and theirs, are totally different. And now, what were are doing is based specifically in the recommendations they made to us. Now we are sure that the needs they express are going to be translated into activities, so here you have no maladaptation.

A.C: So they can become autonomous in regards to the decisions they make.

- B: Exactly, so today, no matter what the intervention is going to be done, it is important to put together the communities and discuss exactly what they need. By associating them we can have success. And if they participate in the project, we are sure we can obtain valuable results. But if we decide on their place, it is normal that after 1, 2 or 3 years, nothing might change because it was not decisions that came from them.

A.C: And here you can find maladaptation.

- B: Yes, interventions cost a lot of money, and in reality the impact is minimal because the community is not taken into account for the initial decision phase.

A.C: Yes, exactly. In Ndem we discuss with them the vulnerability, because we have a vision of vulnerability and they have another one. And what the mentioned is that they did not felt so vulnerable but mostly forgotten and put aside by the government.

- B: Yes, it depends. The vulnerability depends on how you approach it. Because they might not feel vulnerable in terms of access to water or food security, but they might be vulnerable to future climate change impacts, because that is hardly predictable so decisions are not made. But if information was available then decisions could be made.

A.C: So here, WFP's project for meteorological services, how would it be in practice?

- B: When we produce this information, specifically per season and adapted per area of WFP's intervention areas. And then there will be a communication platform to share this, by text, to the beneficiaries in the local language. To say: here are the predictions for the rain, for the next 3 or 4 days to come. And here, people will be able to take their own decisions, maybe to protect themselves from risk, like floods. And there will be, besides text, a partnership with local radio to create a sort of open space to share information about climate change, the environment, climate variability, adaptation measures. The hosts will be trained for this, and between the community themselves they will introduce their own solutions. Beyond these community radio, there will be WFP or ANASIM deployees to discuss with the communities and exchange knowledge. And little by little see what works and what doesn't. This will give us results by the end of the year.

A.C: It is very necessary

- B: Yes, also there needs to be a close connection and regular contact with these communities.

A.C: But it just started the project right?

- B: Yes, it is just starting, it starts in May. There is going to be a global prevision in the Sahel, so this project is support by the Centre Africain de la Meterologie and the Centre National AGRIMET. It will be a collaboration for creating a climate risk profile of the Sahel, including Senegal of course. All countries are in the climatic zone so starting in May, this information will be shared to all countries, and has to be shared at the local level.

A.C: And I imagine that is a challenge, to share it at the local and community level.

- B: Exactly, you need resources. And here, if we share that information about predictions, let's say the rainy season is going to be good, the community is going to be happy to hear that. In the opposite side, if we say there is going to be drought periods, then states need to make decisions regarding this and discuss it with the communities themselves.

A.C: And this needs to go by hand with education and capacity development.

- B: Yes, in theory. So that the information shared can have a practical aspect too at the local level.

A.C: And after, do you have satelital images about the state of Senegal from the 70 or 80's?

- B: Unfortunately I do not have access to this kind of information. Even when I was in Niger it was hard for me to have access to this. I want to make a point. You need to know that in the Sahel the main consequences of climate change is first, the desertification and soil degradation because I think there was a recent analysis that showed that there was an increase of 5% to 8% of arid and semi-arid areas in the Sahel. So degradation is continuous even though there are adaptation and mitigation activities. And here you can imagine that it's cities and villages condemned to disappear.

A.C: So the effect is exponential.

- B: Yes, exactly. So besides natural resources, there is also a big loss of biodiversity. Some species are going to disappear, either it's animals or plants. And a higher frequency of floods. Every 2 to 3 years, there is going to be a major flood in the Sahelian countries.

A.C: Yes, and actually we talk very little about floods in the Sahel.

- B: Yes, it is a heavily undermined subject. The soil cannot absorb the water because there are no trees, yet there is no water to be absorbed. So it is not only the agriculture affected, but everything. Everything is linked. The loss of a sector has an impact on another one. And if the production of harvest is lost, it's normal that people will leave.

A.C: Yes, and then cities are suffocated.

- B: Yes, today the big problem we have is that the natality level is very high in these areas mainly. It's that. It's very complicated it is hard for African states to face this. Today around 65% people is young.

A.C: Yes, and here you have the cultural aspect that come sin. It is very hard to manage because it seems that it is part of the culture to have many kids and parental decision making is low.

- B: Yes, I also read in a document from le Plan Senegal Emergent, in 2006 there was a drought, same for 2007, 2008, 2009, 2011, so there is a succession in drought periods. And all this affects the natality. And in 2012 they were confronted to a flood. Which is paradoxical. In 2012, they counted 800 000 people living with food insecurity. So you see that from these 800 000 people, no one is going to stay where they are, they are going to move, maybe even to another country. So this is the problem of climate variability and climate change.

A.C: Yes, we also saw that while working the peanut bassin, even they try to agriculture and seasons were good, the soil was sterile because of the over exploitation.

- B: Yes, yet it is not only peanut harvest but also erosion. You have to think that today, because there is an absence of a vegetal cover, there is an absence of nutritious elements. This is the reality of things. As for the sun, when the sun hits the soil, the nutritious elements are going to be destroyed. So everything is linked.

A.C: Like a domino effect. Everything needs to be taken into account.

- B: Yes, therefore we need to work together and bring to the table joint answers.

A.C: Yes, now we talk more about the holistic approaches. It's like you say if we want to solve the problem without thinking about the other thing then there is no good results.

- B: I can give an example of desertification in Niger. Imagine in the capital, the river passes by the capital. But today, the communities have destroyed the biodiversity around the basin. But it is dying because of the overexploitation of the resources and the pressure on the ecosystem. And what to do? Many people in the community left the village to go to the capital but uses the same way to subtract their resources, meaning they cut all the trees to use it for warming up or for cooking purposes.

A.C: Yes, it is very complicated and it is a vicious circle. I think it's really through education and communication that change can be made.

- B: Yes, we must bring awareness to the people. So they can change from exploitation methods for natural resources. So they can resist climate variability and change.

A.C: Actually, now that we are talking about this. You often use climate variability and climate change, why? What is the difference between one and another?

- B: Yes, well climate change extends over a long term. Climate change can be perceived from one year to another, but variability can be felt one day to another. You understand? The problem is that it is not climate change that people are struggling with, because climate change is here, but rather the rapid and very frequent climate variability (quite extreme too). I can take an example, if you predict today that there is going to be 45mm of rain for the next two hours, and it can happen that 3 days later we receive 50mm in 45 minutes. Imagine what that can create as a catastrophe. And this is a variability that people did not expect. Equally, you can know the temperature, today it can be 20 to 25 degrees, but next week it might be 45 degrees. You see? And it is that, how to cope with this variability, since it modifies the crop system from the agricultural point of view. And that is what makes the national production suffer.

A.C: So climate change is on the long term, we know that there might be more droughts over the years.

- B: Yes, but the monthly and weekly predictions are the most important and what causes the problems.

A.C: Yes, that actually illustrates a lot.

- B: Variability is key, and on the other hand climate change is here, but slower and less noticeable than variability. Because variability, people do not understand it. And when talking about change, like the person you interviewed who was 100 years old, they can perceive that change. I didn't know there was a forest there.

A.C: That illustrates a lot because it seems like there is a big confusion. Would you like to add something else?

- B: Mmm...have you thought about adaptation measures against desertification?

A.C: Yes, well, in our study we are not going to talk about it at a large scale since we will mainly discuss the current situation in Ndem. What they are doing is that they have this project in which school teachers

give trees to students so they can take of it, it's their tree. And that is what the spiritual guide started doing and he would like to do so at a larger scale because he said that if we were to do this in all school in Senegal then the results will be impressive. And also they created a new fuel, by using peanuts instead of trees to tackle deforestation.

- B: Actually, what WFP started doing is the RNA (Regeneration Naturelle Assisté/Assisted Natural Regeneration). So it works by allowing the plants to grow. We do not plant, but ask the people to protect them. So if new species appear in the cultivable land of some farmers, instead of cutting them we ask the farmers to contour them to let them grow. In 2013 we recovered lot of degraded land, over 15%. And here we understood that nature itself can recover on its own, we just need to protect it.

A.C: But after, giving the fact that the effects of climate change are going pretty fast, other methods more actives are also needed right?

- B: Yes, but we proved that if we let nature recover itself, then the vegetation cover can regrow and make soil fertile.

A.C.: That also reminds me that in Ndem, every time we cut a tree, they need to ask a permission from the chief leader. I think it is a way to monitor and count how many are cut.

- B: Yes, and we need to be sure that this tree is dead before cutting it. Because sometimes people cut healthy trees in a bad way, sometimes they cut their roots without thinking that they are taking away the heart of the tree. In Niger, people do this in certain areas (laughs). So it makes no sense. Unfortunately there in Niger this happens not with the head of the village but with the forestry services, which are often corrupted, and their role is dangerous. They give permissions just to do "a job", and do not create space for natural restoration.

A.C: You mean in terms of corruption too?

- B: Yes, exactly.

A.C: Yes, that is another problem.

- B: Yes, here in Senegal I am not sure how it works but in Niger the forestry agents are more like destruction agents rather than environmental agents.

A.C: Must be frustrating.

- B: Really, it really is very frustrating. I had an environmental profile because I was interested in agroforestry before entering the field of climate change. I worked in forests during the 1st month, to see how they changed throughout the time.

A.C: They are very sensitive, even if it doesn't look like, forest are very sensitive. It's like a domino effect sometimes.

- B: What we can do is that if you have ideas, do not hesitate, write to me and with the information that I have I can share it with you. I will later share the document we discuss before.

A.C: Thank you a lot for all your help it is very appreciated it.



- B: Courage.

### Interview #11

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- **Interviewer:** Anna Chesnier
- **Interviewee:** Briceaem Bagoa, Officer from Vulnerability and Mapping Unit

AC: Please introduce yourself and the work you deliver in WFP

- BB: I am here since July 2015. I participate in the development of methodologies for food safety studies in Senegal which will allow WFP management and project managers to take decisions with regard to identification of cyclical and structural factors affecting food security and its evolution over time and space. I support the Programme Unit in the Development of Targeting approaches of food aid beneficiaries and participate to the National Food Security surveys with the Government and other partners. I coordinate the monitoring assessments (baseline, endline and Post distribution monitoring) for all WFP activities (Targeted food assistance (TFA), 4R, Nutrition, School Feeding, etc), questionnaire design, sampling, ODK programming, data analysis and reporting. I also train WFP staff and Government on statistical methods and approaches for the Food Security Analysis, represent WFP and provide expertise in working groups (Cadre harmonise, EWA, Integrated context analysis, dividende demographique, food security cluster and household economy approach).

AC: Do you know Ndem?

- BB: I know Touba but not Ndem

AC: (here I explain what Ndem is, the marabout started to undertake resilience and livelihood diversification activities due to a loss on natural resources and environmental degradation, which lead to big concerns on the negative impact of rural exodus. And he wanted people to be able to stay and have opportunities in their village.). I would like to know the approach on vulnerability that WFP has. If we mention that a region is vulnerable, how do we understand that?

- BB: Ok, well vulnerability is a large term, in WFP when we talk about vulnerability we refer to food security/insecurity. You can have vulnerability in regards to health, to economy, to many things. So vulnerability of food security, WFP has its own parameters. We have indicators, when you were working here you saw those. The score of score of food consumption, score of food diversification.

AC: Yes

- BB: So with this we determine the level of vulnerability in a place.

AC: Ok, and then, I know that WFP has activities in certain regions depending on the level of vulnerability, but how does WFP choose its zones of intervention?

- BB: WFP intervenes in the zones, and each zone has its own activity that was specifically adapted to the local needs. We call it conjunctive vulnerability which is more in link with

climate change, and that gets worse during the “soudure” (hungry gap, when there is little or no fresh food available) period. This is usually in June, July and August, people do not have easy access to food. It’s right before planting the seeds. Harvests are exhausted and prices are high, so it’s complicated. So WFP intervenes with activities such as “assistance alimentaire cible” (targeted food assistance). So that is what we did in Matam and Podor this year. And now, you have other areas where we need to work more on livelihoods and food security. It’s not that people are in a critical state, but if they stay as they are, when a shock will arrive, they will perish. So we need to strengthen resilience. So there we apply the 4R initiatives. Now, we have school feeding programmes. There, in reality, one of the goals is to keep children in school. So we targeted areas where food security is precarious but also where the level of education and alphabetisation is low. Well education indicators are not interesting. So with that information we determine which areas need interventions. You have the nutrition unit that also enters, under the same principle.

AC: But then, with all these activities, how do you engage when weather and climatic variability is so uncertain? The activities need to be constantly changing?

- BB: Well, all of this information we retrieve it through the analysis of surveys. For example, if we know that a part of the country is being affected by climatic shocks, we cannot just target a community and say we are going to help them. No. We go on field to see concretely what is happening. There is a type of evaluation that we do, a survey called Emergency Food Safety Assessment. We did this in the north of the country in pastoralist areas. And this helps us perceive what is actually going on in the households

AC: Did you analyse the region of Louga? (where Ndem is btw haha)

- BB: No, we did not have Louga. And it is true that the region suffered from climate change, but the pastoralist households where the most affected so our focus was on that. Therefore we choose the department with pastoralists in the North.

AC: By any chance do you have data regarding Louga?

- BB: Mmm...the data can be found in previous reports but not in this one (2018). Or in the Cadre Harmonise. I could find you the results and share it with you. But you won’t have anything specific, it just mentions it in a general way.

AC: Now, when talking about rural exodus, what do you think about this “problem” as a mean of adaptation?

- BB: Well, this issue does not enter in WFP mandate. In does enter as an indicator but it is not use who analyse this issue. For that you will have to address to IOM. What we do, well, in the adaptation strategy of households, we know that people migrate to other regions for economic purposes. But it is not something that we focus on. We work more on food security.

AC: Yes, but regarding results from food security reports, there is local adaptation. Have you perceived autonomous adaptation?

- BB: So you are asking how the community manage and cope with the issues?

AC: Yes

- BB: Could you send me this question so I send you the results? 'Cause we usually work with focus groups in regard to this type of questions. Because it hasn't been analyzed. But I know there are these things that are done, but for now we haven't analyzed so it might not be very interesting.

AC: Ok, perfect. I have another question too in regards to the indicators. The ones you use to measure vulnerability. Are these ones general or do we change them and adapt them depending on the region you intervene? Is it a horizontal study and then we have the results or...?

- BB: Well, it is adapted, but not that much. For example if you take the score of food security, in West Africa it is going to stay the same. And if you go to another region it will be different. But within Senegal we use the same indicators. You cannot use different indicators everytime because then you have no baseline. It creates problems of comparativity. But then, you can adapt some small things. At the country level, not regional. The country can decide their own practices. So in general, you will see similar indicators in the country.

AC: Ok, and then for the mapping and GIS, how do we use it in practice? Because I know we use it for the reports as an easy way to understand things, but do we use it in another case? Like previous from going there, for preparedness activity, etc

- BB: No, we really just use it to synthesize the information we collect after surveys. So then, with that we know where we will implement the activities.