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Human solidarity in a divided world

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The Rural Energy Challenge in Senegal: A Mission Report

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The Rural Energy Challenge in Senegal: A Mission Report

1. Introduction

Access to modern energy is a necessary condition for both economic and human development. Besides being an engine for growth, it pervades the many levels of the proper functioning of the household by facilitating cooking and lighting needs. The types of fuels used by households vary in affordability, availability, dependability and cleanliness. These choice related factors, generally determined by income levels location and traditional practices, often indicate the type of energy households decide to use. This is referred as to the energy ladder which varies from electricity to biomass products such as wood, animal dung and crop residues.

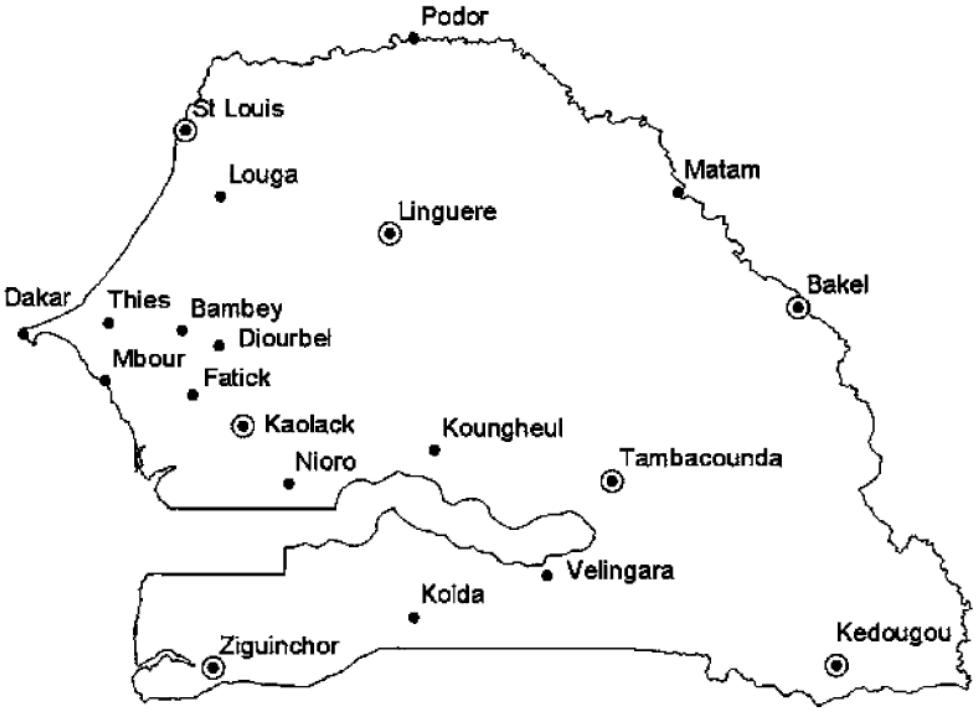
Field research conducted in rural Senegal in March 2007 highlights the scale of the challenge posed by the lack of access to modern energy services. As part of the Human Development Report 2007/2008 *"Fighting climate change: Human solidarity in a divided world"* , the research consisted of a series of interviews with local populations regarding community access to modern sources of energy and the impacts that inadequate energy consumption has on their overall livelihood activities. The field visit also sought to explore the broader linkages between the prevailing high levels of poverty, regional climate variability and the lack of access to modern energy.

The research indicated that energy poverty is acute in these areas and pose a persistent challenge to local populations, particularly women and young girls. However, even though the lack of access to adequate energy services is a major hurdle in its own right, it must also be viewed through the larger perspective of poverty and livelihood activities. The lack of access to clean energy sources is somewhat a symptom of the high levels of multidimensional poverty that prevail in these areas. Consequently, to be effective, policies addressing energy poverty will need to be designed in unison with other prevalent poverty markers. There is also a wealth of knowledge derived from traditional practices that constitute a valuable asset to these communities. These practices, if harnessed and supported through well formulated policies can provide sustainable solutions to poverty reduction initiatives.

2. Study Context

Senegal is located between latitudes $12^{o}30'$ and $16^{o}30'$N and longitudes $11^{o}30'$ and $17^{o}30'$W. It is the westernmost part of Africa and lies entirely within a tropical region. The country is subjected to two types of climates; the northern part of the country lies in the Sahelian zone characterized by low rainfall and the southern part belongs to the Soudanian zone endowed with relatively high annual rainfall (Fall and others 2006). The region of Thies, particularly the department of Mbour (see map) lies between these two climatic zones—formally known as the soudano-sahelian region. It is characterized by an annual rainfall of 600 to 800mm, the bulk of which falls between July and September.

The department of Mbour is located within the central groundnut basin comprising of Thies, Diourbel and Kaolack and supports cultures of groundnuts, millet, cassava, cowpeas and pastoral activities. Dues to its coastal location, it is also a very popular destination for tourists with the industry providing a significant source of employment for the local population, particularly during the dry season.



Source: Fall and Others 2006

As a result, the department displays a marked contrast between its beautiful hotels and houses owned by the affluent few, located steps away from the beach, and the high levels of poverty that are visible in the villages in and around Mbour. As in other rural areas in Senegal, most of the villages in the department do not have access to electricity and must rely instead on other forms of energy to meet their daily needs.

3. The energy challenge

3.1. Energy for lighting and cooking

Households use an amalgam of fuel types for cooking and lighting purposes, often because of price but also because of practicality considerations. This concept is known as fuel switching. Overwhelmingly, in the three villages visited, the fuel of choice used by households for cooking is cow dung, considered to be the lowest quality on the energy ladder. The specific reasons for this choice vary from location to location but are generally symptomatic of the fact that alternatives are either too expensive to consider or simply inexistent. The combination of extensive land clearing activities in the past, and more recently, stricter controls on the use of forest resources—including hefty fines for tree-cutting—have made animal residue the only remaining alternative. However, even

the collection of animal residues can sometimes constitute a source major frustration for households. As stated by Ndiaga Sarr, a resident of the village of Roff, a community of approximately 300 people:

> "…It is obvious that wood is better than cow dung for cooking purposes. However, wood availability has declined a lot over the past two decades, making access to it very difficult. Cow dung generates lots of fumes but remains the only option at our disposal. As a result, the distances that women have to travel to get it will depend on the location of grazing areas which tend to move further away from the village as the dry season sets in.
> …Furthermore, during the rainy season, both wood branches and animal residues become unusable and women have to resort to using old household cloths and plastic pans. Consequently, women often complain of eye injuries and other respiratory problems stemming from the use of these materials".
> *(Ndiaga Sarr, village of Roff)*

Compounding the lack of clean energy sources for cooking purposes is the lack of energy for lighting. Grid access to electricity is virtually inexistent in these villages, making kerosene and candles the main sources of energy for lighting. As Seynabou Faye from the village of Croisement Peuhl explains:

> "The best light source we have in the house is a kerosene lamp (which hangs from the ceiling in the master bedroom)[1]. Lately however, kerosene has been in short supply and its price has increased beyond our reach. As a result, we have increasingly switched to using candles, and when these run out, we simply live in the dark".
> *(Seynabou Faye, Coisement Peuhl)*

This factor more than anything else, exposes the deep dichotomies that constitute a hallmark of the department. Minutes away from these villages, one witnesses the vibrant economy provided by the tourism industry which is primarily fuelled by adequate electrification programmes. It also puts into question the claim that the prohibitive cost of extending the grid to rural communities is the primary constraint to comprehensive rural electrification programmes.

3.2. Gender and energy

First and foremost, the energy challenge in rural areas of Senegal is a gender issue. The fact that gender differences are often reflected in the division of labor within households has always served to highlight the centrality of time constraints that women are subjected to. Indeed, this gender dimension is readily observable in all the places that were visited. Wood and cow dung collection is essentially a duty that is reserved for women and young girls. This task generally starts around eight in the morning and takes several hours, depending on the number of people available and also on the aforementioned seasonal availability of energy resources.

[1] It is made up of a small container and a wick that rises through it. In this particular case, the wick was completely exposed to the wind and as I tried to light it, the flame was blown off within a minute.

Furthermore, although biomass collection is a tedious and physically taxing task for women, it only constitutes one layer on the entire spectrum of the various activities women are engaged in. Elisabeth Faye and Marie Thiaré from the village of Nianing, on their way back from wood collection, stopped to explain the extent of the difficulties they need to overcome on a daily basis:

> "[We] fetch wood and sell it as our main source of income. Typically, [our] day starts before five in the morning as we need to collect water, prepare breakfast for the family and get our children ready for school. At around eight, we start collecting wood. The journey is several kilometers long and takes about an hour. Once the wood is collected, we bring it back to the village (each woman was carrying a load of over 20kg of wood). As you can see, it is almost noon now and we need to rush home to prepare lunch and dinner with part of the wood that we have collected.
>
> Once we have finished preparing lunch, we generally take the remainder of the wood to market for sale, generating about 1000 francs daily (around US$2), which we use to buy condiments and other household necessities. On days when there is not enough wood around or if forest inspectors are here, we resort to using animal residues for cooking in order to sell the bit of wood we have been able to collect. Meanwhile, it is needless to say that both wood and animal dung are bad for the eyes and for the welfare of our children. This lifestyle does not afford us a moment of respite as the proper functioning of our households depends on it".
> *(Elisabeth Faye and Marie Thiaré, village of Nianing)*

The time constraints virtually manifest themselves in all the interviews with women. The combination of activities, ranging from child rearing, milling, water collection, wood collection, cooking, cleaning and the list goes on, tends to overwhelm women and makes all the more pressing their constant pleas for labor saving devices. Ndeye Sene, a woman in her sixties from the village of Croisement Peuhl explains:

> "We are old and lack the strength to carry out the physically demanding activities that are needed. Yet the need to send out sons and daughters to town, so that they can support us through remittances, ensures that we have to carry out these activities by ourselves. Furthermore, these are my grandchildren (pointing to a group of about 10 children of various ages); as you can see, these children should be in school, but we do not have one around. We need help from authorities, be it schools, water pumps, milling machines or anything that can help us with our relentless daily activities. We will accept any type of help we can get."
> *(Ndeye Sene; village of Croisement Peuhl)*

The heavy burden bestowed on women is also shared by young girls. Interviews with households back a peculiar feature of observed education data in Sub-Saharan Africa, which indicates that gender parity in enrollment ratios at the primary level is often close to 1 but declines substantially afterwards. In the three villages visited, well intentioned parents indicated that young girls are sent to school and are only required to help perform house chores at night and on week-ends, particularly regarding the collection of water

and biomass products. In contrast, boys are only required to help in the family farm which consists of clearing the bushes right before the planting season—typically near the end of the school year—and also with various other chores during the planting and harvest seasons. This difference in chore requirements clearly puts girls at a disadvantage, and can perhaps constitute one of the many reasons why transitions rates to secondary school and beyond are much lower for girls than for boys.

3.3. Energy and education: a challenge for educators

The clearest indication of the energy challenge that persists in rural areas comes from the lone primary school in the village of Roff. The school consists of four classrooms where levels one through six are taught. Typically, two rookie teachers are given the lowest levels while their more experienced counterparts are in charge of teaching two levels each in a single classroom. Astonishingly, For lack of a place to stay, each teacher lives in his own classroom, which he turns into bedrooms at night. To make matters worse, the school has no electricity and teachers must use other forms of light sources to do their work after dark. As Mr. Diop, the school's headmaster explains:

> "We live a desperate situation. Besides the logistical constraints posed by the school's remote location, we are unable to do our work properly due to a complete lack of a bare minimum of infrastructure like an adequate number of classrooms and teachers, a place to stay for instructors, electricity and so forth. In order to teach our classes properly, we need to prepare our lessons the night before. This is very difficult considering the fact that we have no electricity in this school. Instead, we must rely on candles when it gets dark. Moreover, children who attend this school face similar energy problems and are rarely able to do their homework. An inevitable result of this is the disconcerting high levels of absenteeism and dropout rates that we observe at each level.
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> …We issue a mandatory yearly report in which we highlight the plethora of difficulties that we encounter but to no avail. Consequently, teacher retention rates are extremely low and people are adamantly opposed to serving in these remote areas. To add insult to injury, my students have to compete in the upcoming national exams—with 52% success rate in 2004—for passage to secondary school. Inevitably and somewhat ironically, their performance will reflect upon me and my fellow teachers. This is literally "a lose-lose" situation for us teachers and students alike."
> *(Mr. Diop, Headmaster Roff primary school)*

4. Energy, poverty and livelihoods: an intricate mix

4.1. Energy and poverty

The problems highlighted above indicate that there is a persistent energy challenge in rural Senegal. However, this challenge must also be viewed through the larger lens of the high levels of multidimensional poverty that persist in the country, especially in rural areas. Between 1990 and 2004, almost two thirds of the country lived under the threshold of US$2 a day with the poorest 20% of the country commending only 6.6% of total income in 2001 (UNDP 2006; WDI 2007). Consequently, the low levels of energy use observed are often accompanied by numerous other markers of poverty.

Chief among those markers of poverty is the country's heavy reliance on rainfed and subsistence agriculture, a sector that accounts for over two-thirds of total employment. The overall regional trend in desertification which traces its roots back to the 1970's, accompanied by lower average annual rainfall and land pressures, has resulted in decreased yields and food security pressures and higher levels of transient vulnerability in most parts of the country. To cope with these issues, people increasingly resort to migration. Mr. Sarr from the village of Roff for instance attests to this fact:

> "Twenty to thirty years ago, we used to be able to fill one and a half to two storage containers[2] of millet after each harvest. This was enough to sustain my family throughout the dry season. Nowadays, we even consider one full such container a blessing, even though that is nearly not enough to sustain us until the next harvest. To cope with this situation, some of my twelve children engage in fishing during this period while others are sent to town to do odd jobs so that they can scrape a living, help the family and yet be close enough to be ready for the next season."
>
> *(Ndiaga Sarr, village of Roff)*

4.2. Poverty and livelihoods: adaptation through local knowledge

As these interviews have shown, poverty is fact of life in rural areas and people must contend with it while trying to devise ways to alleviate it. This process is not always straightforward and sometimes fails to deliver the results expected. For instance, family members who decide to migrate may well encounter adverse conditions that will only exacerbate their poverty. Additionally, examples of inefficient indigenous risk reduction strategies abound in the academic literature.

Nonetheless, there is also a case to be made for learning from local practice. This is relevant for adaptation mechanisms to climate change which constitutes a looming threat to human development. Adaptation to climate change may constitute a relatively new term but adaptation to climate variability has existed in one form or another for centuries, representing a real knowledge bank for these communities. This local knowledge, if harnessed and supported through well designed policies can bring forth a real opportunity to tackle the current and future impacts of climate change.

The Roff village collective illustrates such a potential. Emanuel Sarr runs this collective of 10 people whose main activity is irrigated agriculture. Mr. Sarr and his colleagues work year round, alternating between the culture of bananas, lettuces, tomatoes etc. This is Mr. Sarr's testimony:

> "During the dry season, we get water from nearby groundwater tables using small scale irrigation schemes. This has been increasingly difficult recently in light of the steady increase in fuel prices and the increasing depths at which water can be found. As a result, water savings are a necessary component of the success of our operations as we cannot simply pass this increase in cost to our

[2] These are cylindrical storage containers made of bamboo and are about one and a half meters wide in diametre and two to two and half meters deep.

customers. Drip irrigation would be a good away of solving our water problems but we simply lack the means to invest in it. Instead, we use a local practice to save on water and energy costs for our water-intensive products such as bananas.

The practice involves using the leaves of local plants that grow in arid and semi arid areas—such as the Neem tree. These leaves serve as a cushion inside the soil. More importantly, they reduce the rate at which water is absorbed while providing nutrients to the roots. This process is generally supplemented by laying dry leaves on the soil, a process that also reduces evaporation. This technique, among others, is very time consuming and can easily add up to three months to our harvest cycle. However, one of its valuable benefits is that it contributes to soil and water conservation. As a result, in 10 years time, in contrast to my competitors, I will still be able to generate decent yields."
(Emanuel Sarr, Head of Roff village cooperative)

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