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FUELING THE STATE: ENERGY, POLITICS, AND THE ENVIRONMENT IN SENEGAL,
1450 TO THE PRESENT

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This dissertation is dedicated to my wife, Haley,
and my loving parents, Mary and Paul, for whom I owe everything in this world.

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ABSTRACT

This dissertation investigates the relationship between energy, the environment, and politics from the precolonial to the postcolonial periods in the Senegal Valley. By drawing on a wide range of methods and primary sources, including oral traditions, studies of climate history and archaeology, and archives in West Africa and France, it investigates the ways in which states used, stored, and deployed different forms of energy to broadcast and consolidate power. By chronicling Senegal's transformation from a pre-industrial economy to a mixed energy economy, it shows that control over energy resources played an instrumental role in how precolonial African kings, French colonial officials, and postcolonial African leaders attempted to centralize and maintain power over time and space. In doing so, it argues that energy was not only central to maintaining state authority in Senegal, but it was also synonymous with political power.

The dissertation makes three major contributions to the field of African history. First, the study of energy in Africa addresses a significant lacuna in Africanist scholarship. Studies of pre-industrial states and their various pathways to fossil fuel economies have focused overwhelmingly on Europe and North America. In general, scholars have approached the history of energy as a linear process of technological inventions and innovations. In doing so, they fail to account for the large populations of people—in Africa and elsewhere—that have vastly different experiences in the development and use of energy. Rather than focusing on energy use as a measure of technological and economic progress, this study interprets it as a fundamental practice of everyday life that served as a mechanism of political power over time and space.

Second, the study of energy in Africa reconsiders the relationship between land and politics in the Senegal Valley. In general, scholars of African history associate state formation with the consolidation of people rather than land. Rather than deriving power from control over territory,

which played a critical role in state-making in the West, African elites generated political power by extending control over people, and by accumulating dependents—such as slaves, wives, and clients. Yet, in examining how the states and polities of the Senegal Valley exploited fertile lands, including the grains they produced, I argue that political power did not depend solely on broadcasting authority over people. While the consolidation of people was a critical factor in state formation, the arid and unpredictable climate of the Senegal Valley made fertile lands a valuable political asset in their own right. To that end, I demonstrate that control of arable land played an overlooked but critically important role in state formation in the Senegal Valley.

Third, this dissertation also serves as an environmental history of state-making in the Senegal Valley. While studies of the state in Africa have produced vastly different interpretations of how Africans and Europeans centralized political power, few historians have examined the role of Africa's diverse environments in processes of state formation. By incorporating how ecological and climatic constraints shaped the way people used, stored, and distributed energy, this study also underscores how Africans and Europeans responded to periods of environmental change. Although scholars have noted that recurring droughts, crop failures, and famines in the Senegal Valley often threatened and weakened states over time, the potentially devastating role of ecological crises tends to overshadow the various ways that state actors responded to, and often benefitted from, periods of drought and scarcity. This study, therefore, shows how state actors and political elites developed flexible and adaptive systems of energy use that endured political change and fragmentation, droughts, and various forms of environmental decline and degradation.

Finally, this dissertation examines the recent discovery of oil off the Senegalese coast, as well as the installation of new solar plants and windfarms, which have increased access to power and electricity for many rural households. These recent developments, then, have placed Senegal in an advantageous position to build a mixed energy economy that is not entirely beholden to oil and gas.

By “leapfrogging,” or perhaps bypassing, the aging industrial infrastructure of the oil-rich economies of the West, Senegal’s path from an organic to mixed energy economy presents new possibilities for economic growth and prosperity.

INTRODUCTION

In 2014, the British oil company, Cairn Energy, drilled the first deep water oil wells off the coast of Senegal, discovering two large oil basins. The most substantial basin, known as the SNE field, was the largest global oil discovery that year. Shortly thereafter, a Texas-based company, Kosmos Energy, found the largest offshore gas deposits in West Africa along the maritime border of Mauritania and Senegal. According to Simon Thomson, the chief executive of Cairn Energy, “there had never been a deep-water well drilled in Senegal,” but it was the “epitome of our strategy—to go somewhere which has been under-explored and put dollars at risk when we have belief in a place.”¹ Long considered an impoverished, energy-poor nation, Senegal has now joined other petroleum-producing nations in Africa—Nigeria, Angola, Algeria, Egypt, and Libya—and hopes to use the fossil fuel industry as a catalyst for development.²

The discoveries of oil and gas off the coast of Senegal, a small West African nation along the Atlantic coast, has sparked intense debate among politicians, multi-national corporations, and the general population. Macky Sall, the current president of Senegal and former director of Petrosen, Senegal’s national oil and gas company, has incorporated the discovery of fossil fuels into his *Plan Sénégal Emergent*, an ambitious attempt to transform Senegal into a middle-income economy by 2035.³ Along with Senegal’s recent investment in renewable energy, from solar powered stations and windfarms to biofuels and hydroelectricity, Sall is optimistic that the discovery of fossil fuels will accelerate economic growth. In 2018, at an economic forum in Paris, Sall insisted that “with these resources that will be exploited in two to three years,” Senegal can “accelerate its economic

¹ Andrew Ward, “Discoveries in Senegal Focus Attention on Avoiding the Oil Curse,” *Financial Times*, April 18, 2018, <https://www.ft.com/content/d979a1e0-2ea8-11e8-97ec-4bd3494d5f14>.

² Ibid.

³ Ibid.

emergence” and achieve its desired middle-income status “in a decade or at least a five-year period.”⁴

The discovery of oil and gas, he noted, would further diversify energy use and help transform Senegal into an emerging industrial economy.

While the discovery of oil and gas has the potential to invigorate Senegal’s economy, Sall’s argument that fossil fuels will serve as a panacea to Senegal’s social and economic woes is, for many Senegalese people, both misguided and misleading. That is, not everyone is excited about the discovery of oil and gas in Senegal and the subsequent rush of petrodollars into state and oil company coffers.⁵ While many Senegalese recognize the potential benefits of developing a fossil fuel industry in Senegal, people are also leery of the “malédiction des ressources naturelles,” or the “oil curse,” that has undermined economic growth in other oil-rich African nations.⁶ In 2016, for example, protestors took to the streets of Dakar to voice their concern after Sall awarded offshore permits to a company once linked to his brother, Aliou Sall.⁷ Indeed, since the discovery of fossil fuels off the Atlantic coast, Senegalese politicians and watchdog organizations have sounded the alarm over money laundering, backroom deals, and the general lack of transparency with multinational oil companies.⁸

At first pass, the controversy over the discovery of oil and gas and its ramifications for Senegal may seem like uncharted territory for a once “energy poor” nation. Yet, a closer

⁴ “Macky Sall Sur La Découverte du Pétrole Au Sénégal,” <http://www.rewmi.com/macky-sall-decouverte-petrole-senegal-permettre-datteindre-lemergence-2035.html>

⁵ Ward, “Discoveries in Senegal.”

⁶ Natural Resource Governance Institute, “The Resource Curse: The Political and Economic Challenges of Natural Resource Wealth,” March 2015, https://resourcegovernance.org/sites/default/files/nrgi_Resource-Curse.pdf. According to the NRG, the “resource curse refers to the failure of many resource-rich countries to benefit fully from their natural resource wealth, and for governments in these countries to respond effectively to public welfare needs.” While oil has brought tremendous wealth to nations like Nigeria, it is unevenly distributed and has been the cause of political and social turmoil since its discovery in the 1970s. For an analysis of the “resource curse” in Africa see: Omobolaji Ololade Olarinmoye, “Politics Does Matter: The Nigerian State and Oil (Resource) Curse,” *Africa Development*, Vol. 33, No.3 (2008): 21-34. Cyril Obi, “Oil as the ‘Curse’ of Conflict in Africa: Peering Through Smoke and Mirrors,” *Review of African Political Economy*, Vol. 37, No. 126 (December 2010): 483-495.

⁷ Ward, “Discoveries in Senegal.”

⁸ Ibid.

investigation into the long history of energy use reveals that access to and control over natural resources, from traditional organic fuels and raw materials to the nascent oil and gas industry, has played a critical role in politics and state-making over time. Indeed, the controversy over how to manage and regulate the fossil fuel industry in the twenty-first century is a continuation of what I call the “politics of energy,” that is, how people use, concentrate, govern, and deploy energy in order to consolidate power.

This dissertation, therefore, explores the history of energy in Senegal by examining continuity and change in the “politics of energy” over the *longue durée*. By chronicling Senegal’s transformation from a pre-industrial economy to a mixed energy economy, this dissertation shows that control over energy resources played an instrumental role in how precolonial African kings, French colonial officials, and postcolonial African leaders attempted to centralize and maintain power over time and space. In doing so, it argues that energy was not only central to maintaining and contesting state authority in Senegal, but it was also synonymous with political power.

Studying the history of energy in Senegal over the *longue durée* is especially useful because it underscores the connection between energy and the consolidation and production of political power.⁹ In his recent work on ecology and empire, Corey Ross, a scholar of modern global history, notes that the discipline of history as a whole has “been far less concerned, if at all, with power in the physical sense of the term,” which he defines as energy.¹⁰ Examined more closely, however, physical and social power are more than just separate phenomena sharing the same label, as all “material systems are propelled by flows of energy” and all “societies rely on the capture of energy

⁹ The framework draws on Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World* (Oxford: Oxford University Press, 2017), 199-200. Ross is primarily concerned with how European empires deployed oil as a mechanism of political power. In addition to Corey Ross, some scholars have explored the connection between energy, politics, and power. See: Edmund Russell et al., “The Nature of Power: Synthesizing the History of Technology and Environmental History,” in *Technology and Culture*, vol. 52 no. 2 (April 2011), 246-59; Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011), 1-12.

¹⁰ Ross, *Ecology and Empire*, 199.

and its conversion into particular types of work.”¹¹ The control and capture of energy, therefore, is a fundamental component of exercising and deploying social and political power.

Examining the close relationship between power in its political form, as well as power in its physical form, this study illustrates how political power is intricately tied to material forms of energy.¹² Historians of Africa have drawn insightful connections between political authority and various institutions of trade, from trading slaves and horses to exporting cash crops and natural resources. Although this approach has offered insight into how states in Africa governed their populations and accumulated wealth, it is less attentive to the way that slaves, grains, cash crops, and other organic materials are, in themselves, concentrated sources of energy.¹³ As this dissertation will show, political power is not simply the product of commercial exchange and various forms of governance, but, rather, it is intricately tied to systems of energy use and how states exploit and manage their natural environments.

One of the key traits of energy is that it can be concentrated and stored in various forms, from granaries and forests to coal sheds and refineries.¹⁴ This characteristic, according to Ross, has important social implications, “for the greater one’s access to energy—whether through control over its dispersal or the possession of larger stocks—the greater is one’s ability to convert it into action.”¹⁵ In this way, tracing energy flows and how they are produced, governed, and distributed is a useful tool for examining structures of power over time.¹⁶ This study, therefore, will demonstrate how precolonial elites and state actors attempted to consolidate power through the control and use of energy, from staple grains and labor to cash crops, fossil fuels, and renewable energies.

¹¹ Ross, *Ecology and Empire*, 199.

¹² *Ibid*, 199.

¹³ This framework, in part, draws on Timothy Mitchell’s work on oil and democracy. By examining oil and democracy as intricately tied together, he argues that we must understand contemporary democracy as product of oil itself. See: Timothy Mitchell, *Carbon Democracy*, 1-5.

¹⁴ Ross, *Ecology and Power*, 200.

¹⁵ *Ibid*.

¹⁶ Ross, 200; Russel et al., “Nature and Power,” 249-255; Mitchell, *Carbon Democracy*, 1-12.

In drawing from the *longue durée* studies of the French Annales School, this dissertation presents a detailed history of energy and the physical environment of Senegal over the span of roughly 500 years. For Fernand Braudel, the glacial pace of changes to the physical environment served as the bedrock for continuity and change over time, while the social, economic, and political changes, which he refers to as the “surface disturbances” or “crests of foam which the tides of history carry on their strong backs,” were ephemeral processes of change that did little to alter the course of history.¹⁷ While this study is far less dismissive of political and economic change, it acknowledges that the way people produced, stored, distributed, and deployed different forms of energy was closely tied to environmental and climactic changes.

By incorporating the “surface disturbances” of social and political change with the glacial shifts in climate and ecology, this dissertation offers a textured analysis of how people marshalled various forms of energy, from traditional organic fuels to fossil fuels, as mechanisms of political power. In studying the politics of energy in Senegal over the *longue durée*, then, this dissertation demonstrates how power and authority in Senegal changed in step with how people manipulated and exploited their natural and human environments to produce, store, and deploy energy over time and space.

Senegal and Its People

This dissertation focuses on the kingdoms and polities of the Senegal River Valley during the precolonial period, the French colony of Senegal during the colonial period, and the independent nation of Senegal during the postcolonial period. The Senegal River Valley stretches from the present-day city of Saint-Louis to the Cap Vert peninsula, and from the Fouta Djallon highlands in

¹⁷ Fernand Braudel, *The Mediterranean and the Mediterranean World in the Age of Phillip II*, 2 vols. (New York: Harper and Row, 1972-1973), 35. This interpretation of Braudel draws on Sara Maza’s brief, but helpful, analysis of the Annales School. See: Sara Maza, *Thinking About History* (Chicago: The University of Chicago Press, 2017), 167-169.

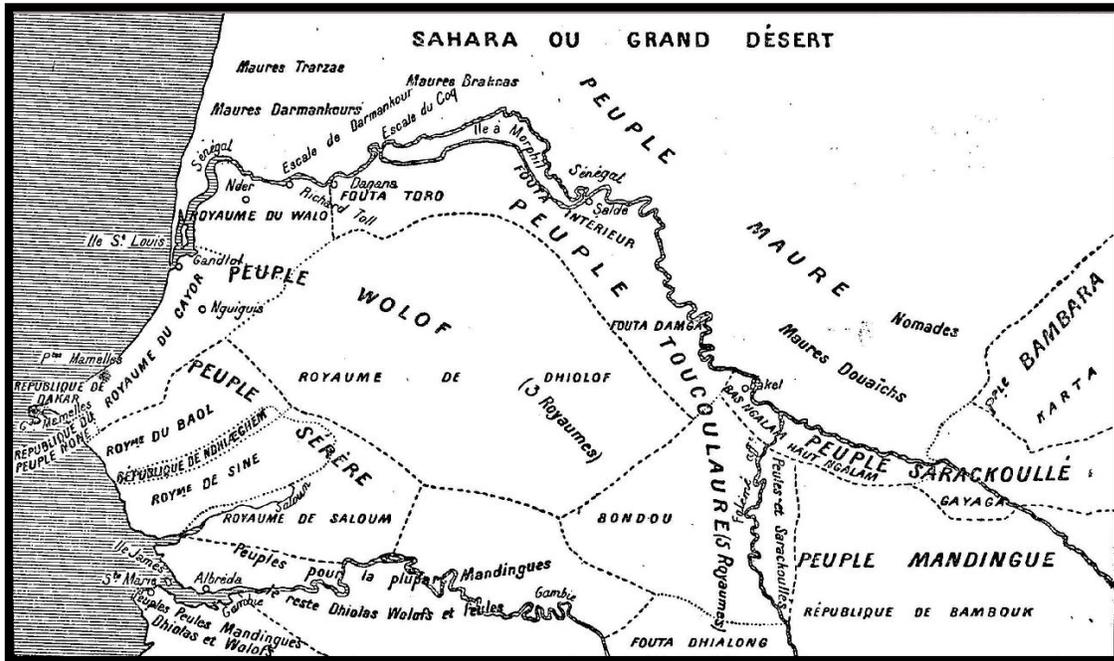


Figure 1: A Map of Senegal and its ethnic groups. This image comes from the Gallica Digital Library and is available under the title: “Carte des peuplades du Sénégal de l'abbé Boilat,” David Boilat, 1853.

the east to the delta of the Senegal River in the west. The Senegal Valley covers three ecological zones, the fertile flood plains of the Senegal River, the arid Sahel, and the wooded savanna.¹⁸ During the rainy season, which starts in June or July, the waters of the Senegal Valley inundate the flood plains and once the water recedes in November, peasant farmers cultivate the fields and harvest their crops in early March. In the Sahelian zone, which is situated between the Senegal River and present day Dakar, the landscape is arid and receives a limited amount of rain each year. The growing season begins in June when the rains arrive and ends in late October. The savanna, which stretches through the middle of the country from east to west, is a region of tall undulating grasslands studded with trees. The savanna receives more rain, has more arable land, and experiences little fluctuations in temperature throughout the year.¹⁹ In general, cultivators in the Senegal Valley produced drought

¹⁸ Senegal’s geographical layout can be found in many scholarly works. See: Boubacar Barry, *Senegambia and the Atlantic Slave Trade* (Cambridge: Cambridge University Press, 1998), 1-3. George Brooks, *Landlords and Strangers: Ecology, Society, and Trade in West Africa, 1000-1630* (Boulder, CO: Westview Press, 1993), 3-6; Philip Curtin, *Economic Change in Precolonial Africa: Senegambia in the Era of the Slave Trade* (Madison, WI: The University of Wisconsin Press, 1975), 13-14.

¹⁹ Curtin, *Economic Change*, 13-16.

resistant crops, namely sorghum and millet, as well as groundnuts, fruits, and fonio. While most of its inhabitants were agriculturalists, the Senegal Valley was also home to pastoralists from present-day Mauritania, who frequently crossed the Senegal River to graze cattle, goats, and sheep along the floodplains and in the grasslands of the savanna.²⁰

The inhabitants of the Senegal Valley share a similar ethnic and linguistic heritage. The oral traditions of the Wolof and Serer, the principle ethnic groups of the Senegal Valley, similarly link their historical origin to the emergence of the state of Takrur.²¹ In the eleventh century, centralized warrior states of Mande origin settled the Lower Senegal Valley and divided society into free persons, occupational castes, and slaves.²² Around the same time, a wave of Islamic reform swept through the Senegal Valley and transformed the Mande warrior states into a more centralized system of authority—the Takrur state. In response to the emergence of the Takrur state, the Serer fled south to the Sine and Saloum Rivers, where they established their own system of governance and authority. According to Wolof oral traditions, Njaajaan Njaay, the legendary founder of the Wolof political and social order, centralized power over the Takrur state and established the Njaay dynasty. The Njaay dynasty then established the Jolof empire, which ruled the Senegal Valley from roughly 1200-1550.²³

With the collapse of the Jolof empire in the sixteenth century, the Wolof divided into four separate kingdoms, Kajoor, Waalo, Bawol, and Jolof. To the south of the Wolof states, the Serer developed their own kingdom in the Sine-Saloum River Delta; to the north of the Senegal River, the

²⁰ Curtin, *Economic Change*, 13-16.

²¹ Barry, *Senegambia*, 6-10; Diouf, *Le Kajoor au XIXe siècle. Pouvoir cédto et conquête colonial* (Paris: Karthala, 1990), 53; Curtin, *Economic Change*, 8-11; Jean Boulègue, *Le Grand Jolof XIIIe-XVIe Siècle, Les Anciens Royaumes Wolof* (Paris: Karthala, 1987), 18-21; James Searing, *West African Slavery and Atlantic Commerce* (Cambridge: Cambridge University Press, 1993), 7-8.

²² Yoro Dyao, as transcribed in: R. Rousseau, “Le Sénégal d'autrefois. Etude sur le Ouâlo,” “Le Sénégal d'autrefois. Etude sur le Cayor,” et “Le Sénégal d'autrefois. Seconde étude sur le Cayor,” *Bulletin du Comité d'Etudes historiques et scientifiques de l'AOF* (1929, 1933 et 1941).

²³ For a more detailed recounting of the founding myth of Njaajaan Njaay, see: Rousseau, “Le Sénégal d'aurefois. Étude sur le Cayor,” 1941; and Searing, *West African Slavery*, 10-18.

Moors, who spoke a local dialect of Arabic, established the Moorish confederations of Brakna and Trarza; and to the east of the Wolof states was the Pulaar-speaking kingdom of Futa Toro and the Soninké Gajaaga kingdom, which were small semi-pastoral Islamic states ruled by powerful marabouts and clerics.²⁴

During the colonial period, which extended from 1895 to 1960, the French conquered the Senegal Valley and established the current borders of post-independence Senegal. The city of Dakar, which served as the capital of *L'Afrique Occidentale Française* (AOF), continues to serve as the capital of present-day Senegal. Today, Senegal borders the nations of Guinée, Mali, the Gambia, and Mauritania and is home to a variety of ethnic groups, including the Wolof, Serer, Fula, Lebu, Jola, and the Mandinka. As one of the major ports in West Africa, Dakar is a bustling city that attracts a diverse population of Africans and international travelers and workers, including migrant laborers, government officials, foreign dignitaries, and numerous multi-national corporations and nongovernmental institutions.

Energy, History, and Africa

As scientist Vaclav Smil explains in his “beginner’s guide to energy,” the term “energy” is typically associated with forms of heat (thermal energy), motion (kinetic or mechanical energy), light (electromagnetic energy) and the chemical energy of fuels and foodstuffs.²⁵ As the foundation of all energy, the process of photosynthesis captures a small share of solar (electromagnetic) energy and converts it into the chemical energy of bacteria and plants. Animals and humans then convert or cook the chemical energy in organic biomass—wood, charcoal, plant life—and transform it into mechanical (animal and human labor) and (fire and heart) energy.²⁶

²⁴ Curtin, *Economic Change*, 29-35.

²⁵ Vaclav Smil, *Energy, A Beginner’s Guide* (London: Oneworld Publications, 2006), 10.

²⁶ Ibid.

For the vast majority of human existence, people fueled and powered their pre-industrial societies through the conversion of organic material into thermal, chemical, and mechanical energy. Prior to the industrial revolution, all human societies operated within what E.A. Wrigley famously coined the “organic economy,” or what Fernand Braudel called “the biological old regime.”²⁷ Organic economies, according to Wrigley, not only relied on fertile land as the source of food, but they also depended on farmlands and forests as the direct or indirect sources of all material production. This meant that the “production horizon for all organic economies was set by the annual cycle of plant growth.”²⁸ In the eighteenth and nineteenth centuries, however, northern European nations, and England in particular, tapped the large reservoirs of fossilized organic materials in Earth’s crust. By mining and burning coal, the industrializing nations of Europe and North America broke through the “production horizon” of the organic economy.²⁹ In using the stored energy of fossil fuels, these societies not only replaced the energy converted from woodlands and farmlands with coal, oil, and gas, but they also sustained their growing economies by exploiting the land and labor of their imperial territories.³⁰

For some historians, and E.A. Wrigley in particular, the switch to coal and the development of the steam engine enabled the British, and eventually continental Europe, to break through the “production horizon” of the organic economy. In a similar manner, Paul Warde, Astrid Kander, and Paolo Malanima examine the economic history of Europe through the lens of energy, demonstrating how energy and economic history are entwined.³¹ For Paul Warde, the transition from an organic to

²⁷ E.A. Wrigley, *Energy and the Industrial Revolution in England* (Cambridge: Cambridge University Press, 2010), 9-21; Fernand Braudel, *The Structures of Everyday Life: The Limits of the Possible* (New York: Harper and Row, 1981), 70-92.

²⁸ Wrigley, *Energy*, 9.

²⁹ *Ibid.*

³⁰ For an analysis of how imperial territories helped fuel industrialization, see: Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton: Princeton University Press, 2000); For a pithy and useful analysis of the historiography of energy and the Industrial Revolution, see: Fredrik Albritton Jonsson, “The Industrial Revolution in the Anthropocene,” in *The Journal of Modern History*, Vol, 84, No. 3 (September 2012): 679-696.

³¹ Paul Warde, Astrid Kander, Paolo Malanima, *Power to the People: Energy in Europe Over the Last Five Centuries* (Princeton: Princeton University Press, 2013), 1.

industrial economy emerged in a highly “regionalized fashion” out of the pressures and resource endowments of the pre-industrial economy. Like Wrigley, he argues that coal was a necessary condition for the emergence of modern growth and the departure from the pre-industrial past.³²

Taken together, studies of pre-industrial states and their various pathways to fossil fuel economies have focused overwhelmingly on Europe and North America. In approaching the history of energy as a linear and evolutionary process from pre-industrial to industrial economies, scholars fail to account for the large populations of people—in Africa and elsewhere—that have different experiences in the development and use of energy over time and space. In focusing on the history of energy in Senegal over the *longue durée*, then, this study traces its pathway from an organic to “mixed energy economy.” While all economies could technically qualify as mixed energy economies—since we all draw on the organic economy in some way or another—this study defines a mixed energy economy as one that is not overly dependent on one type of energy source. Mixed energy economies, then, convert a significant percentage of energy from multiple sources of fuel and power, from biological material and woodfuel to fossil fuels, solar power, and wind power. Total energy consumption in present-day Senegal, for example, draws on fossil fuels (53 percent), renewable energy (42 percent), and alternative fuels (5 percent).³³

In contrast to the industrialized West, the vast majority of African nations have yet to fully break free from the “production horizon” of the organic economy. Although the lack of oil and gas in Senegal has contributed to widespread poverty, and especially in rural areas in the interior, the recent development of clean biofuels, such as green charcoal and peanut shell briquettes, as well as

³² Warde, *Power*, 14-15. Also see: Ross, *Ecology and Power*, 200. For a detailed discussion of New World ghost acres, see: James Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World, 1783-1939* (Oxford: Oxford University Press, 2009), 437-456.

³³ For a more detailed breakdown of Senegal’s energy mix, see the compilation of energy data from the World Bank: “Energy Consumption in Senegal,” last access June 219: <https://data.worldbank.org>. Fossil fuels include oil, natural gas, and liquid petroleum gas; renewable energy includes woodfuels, biomass, and solar; and alternative fuels include hydroelectricity and nuclear.

the installation of new solar plants and windfarms, have increased access to power and electricity for many rural households.³⁴ As such, these developments in renewable sources of energy, along with the recent discovery of fossil fuels off the Atlantic Coast, place Senegal in an advantageous position to construct a dynamic mixed energy economy that is not wedded to oil and gas in the same way as the West.

Since Senegal, like other emerging economies, is not burdened with an outdated and ageing industrial system based solely on fossil fuels, it has the potential to transition from an emerging economy to an advanced industrial and technological state. Similar to the concept of technological “leapfrogging,” which suggests that developing countries have greater opportunities to bypass generations of technology by adopting the most recent versions, Senegal’s path from an organic to mixed energy economy presents new possibilities for economic growth.³⁵ By examining the history of energy use in Senegal over the *longue durée*, therefore, this dissertation broadens the way historians have understood the transition from preindustrial to industrial economies. In chronicling continuity and change in how populations in Senegal produced, stored, and deployed energy, it contends that the combination of “premodern” and “modern” sources of fuels, from charcoal and biofuels to solar power and fossil fuels, may serve as an alternative pathway to industrialization.

Energy, Politics, and Land in Precolonial Senegal

Throughout the precolonial period, the Senegal Valley was an organic energy economy that depended almost exclusively on locally produced fuel. Similar to many pre-industrial societies, the growth of the economy was limited by the use of organic energy—that is, energy produced by the

³⁴ USAID, “Senegal: Power Africa Fact Sheet,” last accessed May 2019: <https://www.usaid.gov/powerafrica/senegal>. According to USAID, current access to electricity is 64 percent nationwide, 43.5 percent in rural areas, and 90 percent in urban areas.

³⁵ José Goldember, “Technological Leapfrogging in the Developing World” in *Technological Leapfrogging in the Developing World*, Vol. 12, No. 1 (Winter/Spring 2011):135-141.

sun and transformed into biological life.³⁶ The availability of energy resources varied considerably and depended on access to arable land, pastures, forests, and in some cases, trade. Moreover, local populations also faced a number of environmental and climatic challenges that imposed physical and ecological constraints on how Africans used energy. As such, the constraints of the organic energy economy were further exacerbated by the difficulties of living in unpredictable climates and environments where floods, droughts, and famines were common. In response to these overwhelming challenges, local populations developed innovative strategies, techniques, and methods to use and convert different forms of organic energy into food, tools, containers, and weapons.³⁷ The climatic, environmental, and physical limitations of the organic energy economy, therefore, forced Africans to develop a system of energy use that was flexible, adaptive, and accommodating to the demands of local energy needs.

By focusing on the relationship between energy use and politics in the Senegal Valley, this study offers a fresh perspective on the volatile era of the transatlantic slave trade. As Boubacar Barry has shown in his extensive research on Senegambia in the pre-colonial period, the transition from a domestic, trans-Saharan economy to one based on the transatlantic slave trade profoundly disrupted Senegambia's political and economic landscape. By the end of the sixteenth century, Barry argues that the dominance of the Atlantic trading system, and especially the slave trade, prompted a dramatic regression in political stability that gave way to internal strife, violence, and coercion.³⁸ In taking Barry's work a step further, this dissertation demonstrates that changes in the climate, as well as energy use in the household, played a significant role in the reconfiguration of the precolonial states in the Senegal Valley.

³⁶ Wrigley, *Energy*, 9.

³⁷ For an analysis of energy use, the environment, and containers see: Emily Lynn Osborn, "Containers, Energy and the Anthropocene in West Africa," in *Economic Development and Environmental History in the Anthropocene: Perspectives on Asia and Africa*, edited by G. Austin (London: Bloomsbury Press, 2017), 69.

³⁸ Barry, *Senegambia*, 32.

Throughout the precolonial period the production, storage, and distribution of energy also depended on an organized system of domestic labor, as well as access to fertile lands throughout the Senegal Valley. As will be shown, since food production was critical to sustaining the domestic and external slave trades, African elites organized their social, political, and economic structures around grain production and the labor and land required to facilitate it. As sources of energy in their own right, food, labor, and land served as mechanisms of political power and the principle sources of wealth accumulation.³⁹

While the consolidation of food, labor, and land among the ruling elite was not a unique characteristic to the organic economy of the Senegal Valley, the limitations of the “production horizon” of the Sahel were exceptionally severe due to its arid climate and dry soils. This was especially true in the eighteenth century, when West Africa, and the region of the Senegambia in particular, endured a 200-year dry period that lasted from 1650 to 1850.⁴⁰ With frequent droughts and locust plagues, the states and polities of the Senegal Valley competed for access to and control over energy. Since staple grains served as the “petrol” of the organic economy, the precolonial Wolof states structured their political and economic systems around access to farmlands and the organic energy they produced.⁴¹ In particular, ruling elites used their control over staple grains and fertile lands as mechanisms of political power. In boycotting the grain trade, for example, Wolof elites coerced their political rivals—and the French in particular—into favorable trade agreements and forms of tribute payments.

³⁹ James Searing makes a similar argument regarding the grain trade. See: James Searing, *West African*, 194-199.

⁴⁰For further insight into climate history in the Sahel, see: George E. Brooks, “A Provisional Historical Schema for Western Africa Based on Seven Climate Periods (ca. 9000 B.C. to the 19th Century)” *Cahiers d’Etudes Africaines*, Vol. 26, Cahier 101/102, Milieux, histoire et historiographie (1986): 43-62; In his classic work on Senegambia, Philip Curtin also discusses these long-term changes in climate history. See: *Economic Change*, 3-8.

⁴¹ Craig Muldrew’s current book on “food energy” offers further insight into energy use in pre-industrial societies and refers to food as the “petrol” or organic economies. See: Craig Muldrew, *Food, Energy, and the Creation of Industriousness: World and Material Culture in Agrarian England, 1550-1780* (Cambridge: Cambridge University Press, 2010).

The study of energy, therefore, requires us to reconsider the relationship between land and politics in the Senegal Valley. In general, scholars of Senegal's precolonial history, namely Boubacar Barry, Phillip Curtin, and James Searing, argue, respectively, that command over land was not an important source of political power, but rather, command over people was.⁴² Similarly, Charles Becker and Victor Martin argue that droughts and political unrest degraded soils, destroyed harvests, and devalued land over time.⁴³ Through acquiring slaves, and military slaves in particular, they assert that precolonial elites consolidated power by accumulating people and dependents—such as captives, women, and political clients.⁴⁴ Taken together, these scholars contend that precolonial states in West Africa lacked the ability to rule over large territories. Rather than deriving power from control over land, which played a critical role in state-making in the West, they claim that African elites generated political power by broadcasting control over people.⁴⁵

Yet, in examining how the states and polities of the Senegal Valley exploited fertile lands, including the grains they produced, I argue that political power did not depend solely on broadcasting authority over people. While the consolidation of people was a critical factor in state formation, the arid and unpredictable climate of the Senegal Valley made fertile lands a valuable

⁴² Barry, *Senegambia*, 30-31 and 306; Curtin, *Economic Change*, 13-29; Searing, *West African Slavery*, 1-27.

⁴³ In their multiple collaborations, Charles Becker and Victor Martin offer insightful analyses into the various ways that ecological decline and political unrest destabilized the Wolof states. See: Charles Becker, "Notes sur les Conditions Écologiques en Sénégal aux 17e et 18e Siècles," *African Economic History*, No. 14 (1985): 167-216; Charles Becker and Victor Martin, "Détails historique et politiques, mémoire inédit de J.A. Le Brasseur, 1778," in *Bulletin de l'Institut Fondamental d'Afrique Noire*, Serie B, Sciences Humaines, No. 1 (January 1977): 81-132 ; Becker and Martin, "Kajoor et Baol. Royaumes Sénégalais et traite des esclaves au XVIIIe siècle," in *Revue Française d'Histoire d'Outre-Mer*. Nos. 226-227 (1975), 270-300.

⁴⁴ Becker and Martin, "Kajoor et Baol," 270-300.

⁴⁵ Among the first to argue that African elites consolidated control over people rather than land was Jack Goody, an anthropologist. See: Jack Goody, *Technology, Tradition, and the State in Africa* (London: Tavistock Publication, 1962), 21-37. For an analysis of how African states broadcasted power over people, and accumulated dependents, see: Herbst, *States and Power*, 33-97. Historians have long argued that African elites consolidated power over people rather than land. For a more detailed analysis of this argument in Senegal, see: Curtin, *Economic Change*, 3-59; A.G. Hopkins, *An Economic History*, Chapter Two: "The Domestic Economy: Structure and Function"; Boubacar Barry, *Senegambia*, 3-11; Searing, *West African Slavery*, 1-27; Martin Klein, *Slavery and Colonial Rule in French West Africa* (Cambridge: Cambridge University Press, 1998), 11; Emily Lynn Osborn also references this assessment of precolonial state making, noting that precolonial states lacked the infrastructure and technological capacity to rule through violence. See: Emily Lynn Osborn, *Our New Husbands Are Here: Households, Gender, and Politics in a West African State from the Slave Trade to Colonial Rule* (Athens: Ohio University Press, 2011), 8.

political asset in their own right. To that end, I show that control of arable land played an overlooked but critically important role in state formation in the Senegal Valley.⁴⁶

As such, this dissertation demonstrates the pivotal role of land in precolonial state formation by studying energy flows—the transfer of physical energy from one body or place to another. Throughout the precolonial period, the center of energy use in Senegal was the household, which collected, processed, stored, and converted food and fodder into mechanical energy, or labor.⁴⁷ In referring to the precolonial household as an “energy refinery”—a place where members of the household, primarily women and slaves, converted organic material into various forms of mechanical (labor), thermal (heat), and metabolic energy (food)—this study illustrates how political power was intricately linked to the agrarian energy systems of the Senegal Valley.⁴⁸ As energy refineries, peasant households fueled the precolonial state by cultivating fertile lands and paying tribute in grains and other material goods to aristocratic families. These large aristocratic households, then, collected and stored the vast majority of grains and served as the principle “energy refineries” of the Wolof states. As will be shown, by consolidating power over peasant households, as well as collecting cereals and grains from the fertile lands of the Senegal Valley, ruling elites directed the flow of organic energy from the peripheral “energy refineries” of the kingdom to the center of state authority, which was typically the household of the monarch. Put simply, the most critical

⁴⁶ Some Africanist scholars are revisiting this old debate through new and innovative studies of the relationship between land, politics, and the spiritual world, see: Assan Sarr, *Islam, Power, and Dependency in the Gambia River Basin: The Politics of Land Control, 1790-1940* (Rochester, NY: University of Rochester Press, 2016), 1-27.

⁴⁷ Experiences of slaves in precolonial Africa were diverse and varied significantly depending on ethnic groups, geographical regions, and time periods. Kinship slavery, plantation slavery, and chattel slavery all existed in Africa to varying degrees. While the field is immense, for more in-depth studies of slavery in Africa start with: Paul Lovejoy, *Transformation in Slavery, A History of Slavery in Africa* (New York: Cambridge University Press, 1983); Igor Kopytoff and Suzanne Miers, Editors, *Slavery in Africa: Historical and Anthropological Perspectives* (Madison: University of Wisconsin Press, 1977); Walter Rodney, *A History of the Upper Guinea Coast 1545-1800* (Oxford: Clarendon Press, 1970); J.D. Fage, “Slavery and the Slave Trade in the Context of West African History” *Journal of African History* Vol. 3 (1969): 393-404.

⁴⁸ For a more in depth analysis of the precolonial household, see: Osborn, *Our New Husbands*, 5.

component of political power in the Senegal Valley was the control over fertile lands and the households that cultivated them.

As the transatlantic slave trade gave way to “legitimate” commerce in the nineteenth century, the precolonial states of the Senegal Valley responded to the demand for cash crops by reconfiguring the organic economy. Through an increase in the production of gum arabic and groundnuts, the two most valuable cash crops of the Senegal Valley, this study demonstrates how African elites transformed their lands into a valuable “ghost acre”—the area outside of the boundaries of a given state that enabled it to overcome a production limit—of the French Empire.⁴⁹ To be sure, few scholars have examined the various ways in which African states contributed to the Industrial Revolution in Europe. Some historians, such as Eric Williams, Joseph Inikori, and Kenneth Pomeranz, have argued that African slave labor in the New World helped fuel the process of industrialization.⁵⁰ Through plantation agriculture in the Caribbean, the American South, and Brazil, they contend that African slaves provided European populations with the capital, food energy, cash crops, and raw materials to industrialize. Since Africa could not be transformed into similar ghost acres of plantation agriculture, they argue that its principle exports to Europe were exotic goods that did little to substitute for European land.⁵¹

⁴⁹ The concept of “ghost acres” is widely used in studies of early modern European history. This definition of “ghost acre” is taken from: E.A. Wrigley, *Continuity, Chance, and Change: The Character of the Industrial Revolutions* (Cambridge: Cambridge University Press, 1988), 52-55. For further discussion of ghost acres, also see: Jonsson, “The Industrial Revolution,” 692.

⁵⁰ For discussion of how slavery in the Americas fueled industrialism and capitalism in Europe, see: Eric Williams, *Capitalism and Slavery* (Chapel Hill: The University of North Carolina Press, First Edition, 1994); For insight into how slave labor in the New World contributed to the English Industrial Revolution, see: Joseph Inikori, *Africans and the Industrial Revolution, A Study in International Trade and Economic Development* (Cambridge, Cambridge University Press, 2002); For a discussion of the Industrial Revolution and ghost acres in the New World, see: Kenneth Pomeranz, *The Great Divergence*, 225-264 ; For an analysis of how New World plantations in sugar and other commodities contributed to the Industrial Revolution, see: Sidney Mintz, *Power and Sweetness: The Place of Sugar in Modern History* (New York: Penguin Random House, 1986).

⁵¹ Pomeranz, *Divergence*, 230-245. Pomeranz suggests that Africa’s main contribution to the Industrial Revolution was slave labor. This argument, which was initially brought forth by Eric Williams in 1944, has continued to inform how historians understand the role of Africans in the industrialization of the West. See also: Inikori, *Africans and the Industrial Revolution*, 362-405. He argues that exogenous factors—slavery in the New World—was a key factor in Britain’s industrialization process.

This may be true for some regions of the continent, yet the agrarian energy systems of the Senegal Valley, through the expansion of gum and peanuts, served as a ghost acre for French industrialization. As a valuable additive, the French used gum for a variety of industries, from textiles and confectionaries to paints and prints. Similarly, peanuts were a cheap and reliable source of vegetable oil among French industries. An inexpensive alternative to other vegetable oils, peanut oil became a staple in the French household and was a useful form of fuel to burn lanterns, stoke high intensity fires, and make artisanal soap and candles.⁵² The rapid growth of the gum and peanut industries in the Senegal Valley, then, contributed directly to the growth of French industries and helped push the metropole through the “production horizon” of the organic economy.⁵³

Although some historians have argued that the end of the transatlantic slave trade in the nineteenth century, and the subsequent transition from slave trading to legitimate commerce, destabilized the Wolof states and created a “crisis of adaptation,” others contend that the Wolof elite effectively adapted to cash crop production.⁵⁴ As Mamadou Diouf argues in his study of the kingdom of Kajoor in the nineteenth century, the end of the transatlantic slave trade and the transition to a cash crop economy created a new demand for a domestic labor force. After 1840, he contends that legitimate commerce created a new “commercial current” that required merchants,

⁵² Paul Masson, *Les Bouches du Rhone, Industries, Tome VIII, Le Mouvement Economique : L'Industrie* (Marseille : Archives Départementales des Bouches-du-Rhone), 93.

⁵³ For a more detailed discussion of ghost acres, see: Wrigley, *Energy*, 13-17. Pomeranz, *The Great Divergence*, 225-264. James Belich, *Replenishing the Earth*, 437-456.

⁵⁴ For a detailed analysis of the “crisis of adaptation,” see: A.G. Hopkins, *An Economic History of West Africa* (New York: Columbia University Press, 1973), 124-51. Martin Klein, “Slaves, Gun, and Peanuts: Adaptation to the End of the Slave Trade in Senegal, 1817-1849” in *William and Mary Quarterly*, Third Series, Vol. 66, No. 4, “Abolishing the Slave Trade: Ironies and Reverberations” (October, 2009), 895-914. For a detailed account of the debate over the “crisis of adaptation,” see: Robin Law, *From Slave Trade to ‘Legitimate’ Commerce: The Commercial Transition in Nineteenth-Century West Africa* (Cambridge: Cambridge University Press, 1995), 1-31. For historians who argue that political elites did not experience a crisis of adaptation, see: Mohamed Mbodj, “The Abolition of Slavery in Senegal, 1820-1890: Crisis or the Rise of a New Entrepreneurial Class?” In *Slavery, Bondage, and Emancipation in Modern Africa and Asia*, Martin Klein, ed. (Madison: University of Wisconsin Press, 1993), 198; Ralph Austen, *African Economic History: Internal Development and External Dependency* (London: James Currey, 1987), 100-102; Roger Pasquier, “Le Sénégal au milieu du XIXe siècle: La crise économique et sociale,” (PhD diss. Paris 4, 1987).

freed persons, and ruling elites to acquire domestic slaves to produce cash crops.⁵⁵ Similarly, Mohamed Mbodj argues that the crisis of adaptation for former slave traders and merchants in urban centers “was less profound” than scholars suggested.⁵⁶ Former slave owners and local entrepreneurs, he claims, made the transition from the slave trade to the commodity trade with ease. In maintaining control of labor, and artisanal apprenticeships in particular, Mbodj contends that former slave owners in urban centers placed “adopted minors” in their workshops, which “guaranteed themselves a free supply of labor” while also controlling “the market of future workers.”⁵⁷ In this way, former slave owners could increase their fortunes through controlling the labor force and trading cash crops and other goods.⁵⁸

Taken together, these scholars offer insightful analyses of how precolonial states responded to the commercial and political changes of the nineteenth century, yet they are less attentive to the ways that changes in energy use—and the distribution of staple grains in particular—fundamentally changed the political landscape of the Senegal Valley.⁵⁹ As will be shown, in devoting fertile lands to groundnuts rather than food crops, the precolonial states of the Senegal Valley became part and parcel of an emerging economy where both the French and the Wolof elites capitalized on the production of cash crops.⁶⁰ This close, but politically charged relationship, changed the balance of

⁵⁵ Diouf, *Le Kajor*, 165-169. For a more detailed account of peanuts and social change, see Bernard Moitt and Lucie Culvin: Bernard Moitt, “Peanut Production and Social Change in the Dakar Hinterland: Kajor and Bawol, 1840-1940,” (PhD Dissertation, University of Toronto, 1985); Luci Colvin, “Kajor and Its Diplomatic Relations with Saint-Louis du Senegal, 1763-1861,” (PhD Dissertation, Columbia University, 1972). They argue, respectively, that the growth of the peanut trade in Senegal demonstrated the remarkable ability of peasant farmers to respond to economic change.

⁵⁶ Mohamed Mbodj, “The Abolition,” 198.

⁵⁷ Mohamed Mbodj, “The Abolition of Slavery in Senegal,” 204.

⁵⁸ Ibid.

⁵⁹ The historiography of Senegal in the 18th and 19th centuries is particularly rich. For studies of the precolonial kingdoms of the Senegal Valley, see: Barry, *Senegambia*; and *Le royaume du waalo, le Sénégal avant la conquête* (Paris: F. Maspero, 1972); Mamadou Diouf, *La Kajor au XIXe Siècle. Pouvoir cedido et conquête coloniale* (Paris: Karthala, 1990); George Brooks, *Landlords and Strangers*; Curtin, *Economic Change*; Jean Boulègue, *Les Luso-Africains de Sénégambie, XVI-XIX siècle* (Dakar : IFAN, 1972) and *Le Grand Jolof XIIIe-XVIe Siècle, Les Anciens Royaumes Wolof* (Paris: Karthala, 1987). Searing, *West African Slavery*; Robin Law, “Horses, Firearms, and Political Power in Precolonial West Africa,” *Past and Present*, No. 72 (August, 1976), 112-132.

⁶⁰ Diouf, *Le Kajor*, 172-172.

power between French settlements along the coast and the precolonial states of the interior. By the 1840s and 1850s, the growth of the peanut trade and the increased prosperity of Saint-Louis made boycotts in cereals and grains—once the preferred method of coercing French traders into favorable trade agreements—far less effective. In other words, boycotts were no longer politically or economically advantageous for the Wolof elite because the profits from the peanut trade far outweighed the political benefits of withholding grains from the French. As will be demonstrated, the abrupt end to grain boycotts in Saint-Louis and Gorée served as a watershed moment in the politics of energy in the Senegal Valley. In supplying the French with a constant flow of cereal and grains, the Wolof states surrendered a critical mechanism of political power and made themselves vulnerable to colonial conquest.

Energy, the State, and the Environment in Colonial Senegal

In examining the history of energy use in Senegal during the colonial period, this dissertation examines the “politics of energy” from 1885 to 1940, and it demonstrates how French colonial officials attempted to centralize and consolidate power over Senegal’s organic economy by developing a new energy infrastructure based on fossil fuels. Through the construction of railways, dirt roads, and the use of petrol-powered trucks and automobiles, the French built, what I call, “energy pathways” to manage and regulate the flow of cash crops from the interior to the coast. The development of these pathways, then, underpinned colonial rule and enabled the French to penetrate and access the organic economy.

In general, studies of the colonial state in Senegal have produced different interpretations of how the French consolidated and exercised power. Some historians have treated colonial rule in Senegal as a clear break from the precolonial past, in which precolonial structures abruptly ended with the defeat and capitulation of the Wolof kingdoms in the 1880s and 1890s. These studies tend

to examine colonial history in Senegal through the lens of French colonial politics, and they often overlook the enduring legacies of the precolonial period.⁶¹ In his classic work on politics in colonial Senegal, G. Wesley Johnson highlights the “awakening” of African politics in the Four Communes. He examines how *originaires* adapted to and used French republicanism as a means to safeguard their own position as citizens of the French Empire.⁶² Similarly, Alice Conklin, in her seminal work on the French civilizing mission, interprets politics in colonial Senegal through the lens of French colonial policy. Indeed, she argues that the *mission civilisatrice*—an unofficial imperial doctrine designed to transform Africans into “civilized” colonial subjects—directly contradicted republican notions of *liberté, égalité, and fraternité*.⁶³ In her recent work on religion and politics, Elizabeth Foster aims to break from the “republican” frame of analysis in studies of colonialism in Senegal. These studies, which focus on a small minority of *originaires* who gained voting rights, fail to place the colony within a more holistic approach. She argues that law and order were not applied universally but to particular groups and territories. This uneven distribution of rights, which favored certain groups over others, resembled the French Old Regime and created a fractured and chaotic system of governance that was incompatible with the republican ethos of French colonial rule.⁶⁴

⁶¹ For scholarship on French colonial politics and the Four Communes, see: Mamadou Diouf, “Assimilation coloniale et identités religieuses de la civilité des originaires des Quatre Communes (Sénégal),” *Canadien Journal of African Studies*, 34 (1999): 565-587. For a *longue durée* analysis of naturalization policy and citizenship in the Four Communes, see: Coquery-Vidrovitch, “Nationalité et citoyenneté en Afrique Occidentale Française: originaires et citoyens dans le Sénégal colonial,” *Journal of African History*, 42 (2001): 285-305; Gary Wilder, *The French Imperial Nation-state: Negritude and Colonial Humanism Between the Two World Wars* (Chicago: University of Chicago Press, 2005); For explorations of French colonial policy, see: Alice Conklin, *A Mission to Civilize: The Republican Idea of Empire in France and West Africa, 1895-1930* (Palo Alto: Stanford University Press, 1997); Emmanuelle Saada, “La République des indigènes,” in V. Duclert and C. Prochasson (eds.) *Dictionnaire Critique de la République* (Paris, 2002): 364-70. For studies of the coercive nature of colonial rule in Senegal, see: Babacar Fall and Mohamed Mbodj, “Forced Labour and Migration in Senegal,” in *Forced Labour and Migration: Patterns of Movement within Africa*, ed. Abebe Zegey and Shubi Ishemo (London: Hans Zell Publishers, 1989): 255-269; Gregory Mann, “What was the ‘Indigénat’? The ‘Empire of Law’ in French West Africa,” *The Journal of African History*, Vol. 50, No. 3 (2009): 353; For a recent study on colonial rule and legacies of the Old Regime France, see: Elizabeth Foster, *Faith in Empire: Religion, Politics, and Colonial Rule in French Senegal, 1880-1940* (Stanford: Stanford University Press, 2013), 4.

⁶² G. Wesley Johnson, *The Emergence of Black Politics in Senegal: The Struggle for Power in the Four Communes, 1900-1920* (Palo Alto: Stanford University Press, 1971), 1-38.

⁶³ Conklin, *A Mission*, 246-256.

⁶⁴ Foster, *Faith in Empire*, 4.

In a similar vein, some scholars emphasize the coercive nature of the French colonial state, bringing into focus the sharp contradiction between French republican ideals and the violent nature of colonial rule. In their collaborative work on forced labor in colonial Senegal, Babacar Fall and Mohamed Mbodj show that French colonial officials enlisted African men (French citizens and *originaires* were exempt) to construct the colony's transportation infrastructure. Through the use of *corvée* labor, the French forced Africans to travel long distances and work away from home—sometimes far longer than the eight days that colonial officers initially proposed.⁶⁵ Similarly, Gregory Mann investigates the role of the *indigénat*, the regime of administrative sanctions applied to colonial subjects. In particular, he argues that the *indigénat* allowed the colonial state to practice a form of government grounded in “coercion while maintaining a republican rhetoric of assimilation and eventual inclusion.”⁶⁶ In this way, forms of colonial governance on the ground seemed to undermine the imperial rhetoric of *liberté, égalité, and fraternité* in the metropole.

In contrast to these scholars, others have been more attuned to the various ways that precolonial structures shaped the context of state-making in the colonial period. In examining the social and cultural structures of the Senegal Valley, these scholars show how traders, merchants, and religious elites adapted precolonial institutions and structures—and agriculture and cash crop production in particular—to accommodate colonial rule.⁶⁷ In his study of Islam in colonial Senegal, David Robinson argues that influential Senegalese clerics, namely Malick Sy and Amadou Bamba, established effective “paths of accommodation” with the French colonial state, thus enabling them

⁶⁵ Babacar Fall and Mohamed Mbodj, “Forced Labour,” 255-269. For a *longue durée* study of labor and forced labor in Senegal, see: Babacar Fall, *Le travail au Sénégal au XXe siècle* (Paris: Éditions Karthala, 2011).

⁶⁶ Gregory Mann, “What was the ‘Indigénat?’” 353.

⁶⁷ Scholarship on the Murid Brotherhood is extensive. For additional reading, see: Jean Copans, *Les Marabouts de l'arachide: la confrérie mouride et les paysans du Sénégal* (Paris: L'Harmattan, 1989); Babacar Fall, *Le travail au Sénégal au XXe siècle* (Paris: Éditions Karthala, 2011); Momar Coumba Diop, ed, *Senegal: Essays in Statecraft* (Dakar: Codesria, 1993). Donal Cruise O'Brien, Momar-Coumba, Diop Mamadou Diouf, *La Construction de l'état au Sénégal* (Paris: Karthala, 2002). Donal Cruise O'Brien, *The Mourides of Senegal: The Political and Economic Organization of an Islamic Brotherhood* (Oxford: Oxford University Press, 1971). Cheikh Anta Babou, *Fighting the Greater Jihad: Amadou Bamba and the Founding of the Muridiyya of Senegal, 1853-1913* (Athens, OH: Ohio University Press, 2007); Robinson, *Paths*.

to practice and expand their respective variations of Islam under French rule.⁶⁸ Drawing on David Robinson's work, Cheikh Anta Babou persuasively argues that examining colonial rule through processes of accommodation, rather than through instances of resistance and collaboration, requires historians to understand colonialism as a process of "mutual adjustments," in which the colonizer as well as the colonized "struggle to minimize conflicts."⁶⁹ For James Searing, the expansion of cash crop production, combined with Murid Islam, enabled slaves to transition peacefully from captives to Muslim peasants. Emancipation from domestic slavery in the late nineteenth and early twentieth century, therefore, was not the result of French colonial policy but the resilience of peasant farmers and the religious institutions of the Wolof population.⁷⁰ Taken together, these scholars show that colonialism in Senegal was a complex and dynamic process that largely accommodated both French and African social, cultural, and religious structures.

In focusing on the politics of energy in the colonial period, this dissertation demonstrates how precolonial agrarian energy systems, from cultivating staple grains to growing cash crops, remained intact throughout the early twentieth century and were under the auspices of powerful religious elites and urban merchants. In particular, it demonstrates how elite marabouts in the Murid Brotherhood, a Sufi order of Islam based on nonviolence, education, and an industrious work ethic, expanded peanut production into new territories by transforming Quranic schools, known as *daara*, into prolific producers of cash crops and grains.⁷¹ This new agrarian energy system brought fertile lands and wealth to the Murid brotherhood while also supplying colonial authorities with peanut harvests.

⁶⁸ David Robinson, *Paths of Accommodation: Muslim Societies and French Colonial Authorities in Senegal and Mauritania, 1880-1920* (Athens, Ohio: Ohio University Press, 2000), 58-97.

⁶⁹ Cheikh Anta Babou, *Fighting*, 1-19 and 141.

⁷⁰ James Searing, *God Alone is King: Islam and Emancipation in Senegal: The Wolof Kingdoms of Kajoor and Bawol, 1859-1914* (Oxford: James Currey, 2001), 197-225.

⁷¹ There is a rich literature on the Murid Brotherhood and the *daara*. This paragraph draws on Cheikh Anta Babou's interpretation of the *daara*, which I believe is the most accurate and unbiased. See: Cheikh Anta Babou, *Fighting*, 105-108.

In examining the agrarian energy systems of Senegal during the colonial period, and of the Murid Brotherhood in particular, this dissertation highlights the various ways that Africans adapted to, and exploited, the energy infrastructure of the colonial state. By inhabiting the lands adjacent to railways and roads, the Murids transported peanuts to local railway stations and developed partnerships with urban merchants and traders who used trucks to transport peanuts to the coast.⁷² By the 1930s, the technological advancements that enabled the French to expand and profit from peanut cultivation—roads, railways, trucks, and petrol—were now being used by African traders, elite marabouts, and peanut-producing peasant communities. Put differently, urban merchants and colonial subjects competed with the French for a significant portion of the export economy by exploiting the colonial state’s energy infrastructure.

Finally, this study explores the relationship between energy use and the environment during the colonial period. In Senegal, and more broadly in West Africa, historians have shown that changes to the African landscape, in contrast to colonial narratives of ecological decline, are the result of local land management schemes that often improve, rather than degrade, the environment. In his work on the environmental history of Africa, James McCann dismisses the myth of “an African Eden lost”—the notion that Africa is a pristine and untouched wilderness—and argues that its many environments are historically anthropogenic.⁷³ A critical part of this “declinist” myth is the tendency of policy makers and state actors to conflate environmental change with degradation, and to use “ill-founded constructions of the environmental past” to inform their policies.⁷⁴ Similarly, James Fairhead and Melissa Leach examine how French colonial botanists and foresters incorrectly

⁷² For a more detailed analysis of transportation, see: Bernard Moitt, “From Pack Animals to Railways: The Transport and the Expansion of Peanut Production and Trade in Senegal, 1840-1940,” in *Outre-mers*, tome 88, no. 330-331 (2001): 241-67.

⁷³ McCann, *Green Land, Brown Land, Black Land, An Environmental History of Africa 180-1990* (Oxford: James Currey, 1999), 5.

⁷⁴ *Ibid*, *Green Land*, 5.

linked African farmers and pastoralists with deforestation.⁷⁵ After a careful examination of colonial maps, aerial photographs, and local histories among farming communities, Fairhead and Leach reveal how the French misread the landscape by “reading forest history backwards.”⁷⁶ Through practices of grazing and shifting cultivation, Africans expanded the forests by planting trees and fertilizing soil through controlled bush fires and livestock waste. In his exhaustive work on charcoal and deforestation in Senegal, Jesse Ribot contends that narratives of forest decline in Senegal are rooted in colonial anxieties over resource scarcity. This “history of fear,” according to Ribot, is driven by unsubstantiated claims of forest destruction rather than measurable environmental decline.⁷⁷

Collectively, these scholars convincingly show that Africans were excellent stewards of their environments, and contrary to colonial narratives of decline and scarcity, rural populations typically regenerated forests and farmlands rather than destroying them. This dissertation, however, is less concerned with whether there was measurable environmental decline or regeneration, but rather, with how narratives of resource scarcity prompted colonial officials to develop new strategies to regulate and control local environments. In other words, whether they were warranted or not, colonial fears of environmental decline, deforestation, and energy scarcity introduced new means of control that attempted to place Senegal’s diverse environments, and the organic energy sources they produced, under the jurisdiction of the colonial state. By incorporating how ecological and climatic constraints shaped the way people used, stored, and distributed energy, this dissertation investigates the meaning of “environmental crisis” and how that trope served various political and social projects over time.

⁷⁵ James Fairhead and Melissa Leach, *Misreading the African Landscape, Society and Ecology in a Forest-Savanna Mosaic*, (Cambridge: Cambridge University Press, 1996), 24.

⁷⁶ Fairhead and Leach, *Misreading*, 3.

⁷⁷ Jesse Ribot, “A History of Fear: Imagining Deforestation in the West African Dryland Forests,” in *Global Ecology and Biogeography*. Vol, 8, No. 3/4. Tropical Open Woodlands Special Issue (May-July, 1999): 291-300.

The Great Acceleration and the Transition to a Mixed Energy Economy

In exploring the history of energy use from 1940 to present day, this dissertation examines how Senegal has transitioned from a predominantly organic economy to one based on a broad range of fuels and energy, from fossil fuels and charcoal to solar power and biofuels. In doing so, it offers an alternative framework to study processes of transformation and change between the colonial and postcolonial periods. The second half of the twentieth century, which environmental historians refer to as the “Great Acceleration,” gave rise to a dramatic increase in global energy use, population growth, greenhouse gas emissions, and the production and use of synthetic fertilizers, plastics, and variety of other goods and materials.⁷⁸ In placing Senegal within the context of the Great Acceleration, this dissertation examines how the postcolonial state responded to local and global processes of change in energy use, from French efforts to industrialize and “modernize” Senegal in the 1950s to the global oil crises of the 1970s and the current challenges of confronting anthropogenic climate change.

Investigating the history of Senegal’s mixed energy economy during the Great Acceleration, then, sheds light on a new politics of energy that emerged during and after World War II. In drawing from both the fossil fuel and organic energy economies, colonial and postcolonial leaders attempted to regulate the flow of fossil fuels into Senegal while also managing the production of organic fuels—woodfuels, peanuts, and peanut oil—and other forms of renewable energy, such as hydroelectric and solar power. In doing so, colonial officials and state actors bifurcated Senegal’s mixed energy economy—fossil fuels and large energy infrastructure projects operated under state

⁷⁸ For a more detailed analysis of the Great Acceleration, see: John McNeil and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (Cambridge, MA: Harvard University Press, 2013); For a discussion of the Great Acceleration and the Anthropocene in Africa, see: Osborn, “Containers,” 69-94; Also see: Gareth Austin, “African and the Anthropocene,” Gareth Austin, ed. *Economic Development and Environmental History in the Anthropocene: Perspectives on Asia and Africa* (London: Bloomsbury Academic, 2017), 95-118.

control while urban merchants, elite marabouts, and rural communities controlled locally produced organic fuels.⁷⁹

The bifurcation of the mixed energy economy was, in large part, due to the Senegalese “social contract” between the state, agricultural cooperatives, and the Murid Brotherhood. The Senegalese “social contract,” according to Mohamed Mbodj, denotes a tacit agreement where “Muslim clerics provide the government with legitimacy to ensure loyalty of the citizens and in return receive recognition and material support from the state.”⁸⁰ In the 1960s, state officials centralized power by establishing a client-patron relationship with agricultural cooperatives and the Murid Brotherhood. Since peanut production accounted for nearly two-thirds of the economy, and since the Murids were the most powerful group of peanut growers in the country, Leopold Senghor, Senegal’s first president, understood that the “key to the national economy” was the groundnut market.⁸¹ In relinquishing state control over the peanut market in return for the brotherhood’s political support, Senghor firmly placed the organic economy, and the production of cash crops in particular, in the hands of the elite marabouts of the Murid Brotherhood. This meant that Senegal’s agrarian energy systems not only remained outside of the regulatory structures of the state, but it also enabled the Murids to funnel large quantities of wealth into the brotherhood.⁸²

In general, scholars of the postcolonial period have regarded the Senegalese “social contract” as the start of patron-client relationships in post-independence Senegal. Mohamed Mbodj, for example, argues that agricultural cooperatives, which were initially designed to support peasant

⁷⁹ For a discussion of how the colonial and postcolonial states bifurcated political and social structures, see: Mahmood Mamdani, *Citizen and Subject: Contemporary Africa and the Legacy of Late Colonialism*. Princeton, (N.J.: Princeton University Press, 1996).

⁸⁰ Mohamed Mbodj, “The Politics of Independence: 1960-1986” in *The Political Economy of Senegal Under Structural Adjustment* ed. Christopher L. Delgado and Sidi Jammeh (New York: Praeger, 1988), 119-120.

⁸¹ Catherine Boone, *Merchant Capital and the Roots of State Power in Senegal 1930-1985* (Cambridge; New York: Cambridge University Press, 1992), 90.

⁸² For a more detailed discussion of the Senegalese “social contract,” see: Mbodj, “The Politics,” 119-126; Cheik Anta Babou, “The Senegalese ‘Social Contract’ Revisited: The Muridiyya Muslim Order and the State Politics in Postcolonial Senega” in *Tolerance, Democracy, and Sufis in Senegal* ed. Mamadou Diouf (New York: Columbia University Press), 138-40.

farmers, quickly transformed into exploitative cabals that enriched urban merchants and religious elites.⁸³ In this way, he contends that the rural sector, which had been liberated from colonial exploitation, fell victim to the new state as well as powerful marabouts who appropriated cooperatives for financial and political gain.⁸⁴ In contrast, Cheikh Anta Babou argues that the client-patron relationship between the state, agricultural cooperatives, and marabouts is far more complicated than the “social contract” suggests.⁸⁵ While Babou recognizes that the Murids have long been one of the most powerful political players in Senegal and have fostered consent for government policies, he contends that the “social contract” is more a *modus vivendi*, that is, a way of living together and getting along.⁸⁶ To that end, the state and the Murids consistently negotiated the terms of the “social contract,” which largely depended on the changing relationships between state actors, clerics, and disciples.⁸⁷

Similar to the client-patron relationships between the state and agricultural cooperatives, urban merchants and state officials collaborated to manipulate and exploit Senegal’s forest resources. In the early 1970s, the Senegalese state implemented a series of new forestry policies, as well as a government subsidized butanization (LPG) project, to reduce woodfuel use in urban centers. For some scholars, such as Papa Faye and Jesse Ribot, the state’s fears of deforestation were often overblown and underpinned by patron-client relationships between the woodfuel industry and the state. In his study of charcoal and the decentralization of forested lands in Senegal, Papa Faye suggests that decentralization was an attempt to involve local villagers in forest management and charcoal production. Under pressure from the World Bank and other international donors, the state required all commercial producers of charcoal to seek the consent of rural councils before they

⁸³ Mohamed Mbodj, “The Politics” 119-120.

⁸⁴ Mbodj, “The Politics,” 120.

⁸⁵ Cheik Anta Babou, “The Senegalese” 138-40.

⁸⁶ Baboud, “The Senegalese,” 138-140.

⁸⁷ Ibid.

could enter the forests.⁸⁸ In theory, this policy gave control of the forests to local communities and limited the role of state authorities and commercial interests. Yet in practice, rural councils were subjected to intense political pressures, threats, and bribes that forced them to sign twenty-year management plans with the Forest Service. This process, according to Faye, essentially gave the forests back to the state and allowed corrupt forestry officials and wealthy merchants to gain control of the market.⁸⁹

In a similar study, Ribot shows that decentralized forestry policies created a conflict of interests between villagers and forestry officials. While decentralized forestry required rural villagers to engage in charcoal production, many locals did not support the exploitation of their forests. To resolve this issue, the state gave rural communities a new system in which villagers could “choose” to work for free by implementing forest service management plans and gain subsistence income from charcoal or, alternatively, they could give urban merchants the rights to their forests.⁹⁰ Similar to Faye, Ribot concludes that forest officers and woodfuel cooperatives established a mutually beneficial relationship that placed the control over Senegal’s forests in the hands of wealthy urban merchants and corrupt state officials.

While the bifurcation in Senegal’s mixed energy economy has concentrated the majority of energy resources in urban centers, and most notably in Dakar, this dissertation explores how new developments in renewable energy and biofuels might close the gap in energy use between urban and rural populations. As solar, wind, and hydroelectric power have become more efficient and more affordable, current government officials are pursuing an aggressive strategy to reduce fossil fuel consumption and increase renewable energy use to one-fifth of total energy consumption.

⁸⁸ Papa Faye, “Choice and Power: Resistance To Technical Domination in Senegal’s Forest Decentralization,” *Forest Policy and Economics*, (2014).

⁸⁹ Faye, “Choice and Power,” 5.

⁹⁰ *Ibid.*

Through the development of locally produced biofuels, such as green charcoal and peanut shell briquettes, the Senegalese are also working to reduce woodfuel consumption by making “traditional” organic fuels more sustainable. In using affordable, clean, and sustainable sources of household energy, government officials hope to alleviate poverty in rural communities and reduce the rate of deforestation in Senegal’s woodlands.

In this way, I argue that pre-modern fuels can offer a viable solution to contemporary problems, from alleviating poverty in rural areas to curbing the effects of anthropogenic climate change. The resilience of the mixed energy economy, therefore, not only demonstrates Senegal’s capacity to adapt to various processes of change and transformation, but it also presents contemporary policymakers with a potential pathway forward to transition from fossil fuels to a renewable energy economy.

Sources and Methods

By investigating the history of energy, politics, and the environment in Senegal from the precolonial to postcolonial periods, this dissertation relies on a variety of historical methods and sources. Methodologically, it draws on elements from the French Annales School of history by examining continuity and change in energy use over the *longue durée*. Similar to other *longue durée* studies of the French Annales School, this dissertation presents a detailed history of the physical environment of Senegal over the span of roughly 500 years. By incorporating social and political change with the shifts in climate and ecology, this dissertation investigates how the states and politics of Senegal deployed various forms of energy, from traditional organic fuels to fossil fuels, as mechanisms of political power.

Since the modern concept of energy is a relatively new term and did not appear in the archive until the twentieth century, this study uses a rich corpus of sources on the organic economy

of the Senegal Valley, namely reports on local agricultural production, changes to the climate and ecology, slavery and the slave trade, interstate conflicts and wars, and access to food, labor, and land. While these sources provide evidence of how Senegal's organic economy changed over time, many French and European merchants were largely confined to the coastal settlements of Saint-Louis and Gorée. These limited interpretations of economic, political, and environmental change often presented misleading narratives of how precolonial Wolof states responded to periods of ecological change, drought, and scarcity throughout the eighteenth and nineteenth centuries.

In reading these sources too literally, historians have focused overwhelmingly on the “devastating” role of ecological crises rather than exploring how the precolonial Wolof states responded to, and often benefitted from, periods of drought and scarcity.⁹¹ However, in reconsidering the letters, diaries, and observations of French merchants, this dissertation shows that food shortages and famines were specific to the coastal settlements of Saint-Louis and Gorée. Rather than taking reports of food shortages and famines in French settlements at face value, I investigate whether disputes in local politics, disruptions in trade, and conflicts between the French and the Wolof kingdoms were the primary causes of food scarcity. By reading against the grain of the archive, I show that many of the reports of scarcity and famine were not necessarily due to environmental decline but to politics, civil wars, and trade disputes between the French and the Wolof elite.

The relative dearth of written sources forced me to investigate other avenues of research. In drawing from oral traditions and archeological studies, I supplemented and crosschecked the evidence I found in the archives with the dynastic histories of the Wolof kingdoms, as well as archeological evidence of food production and storage in Wolof households. In general, Wolof oral traditions rarely recorded incidents of food scarcities and starvation, focusing instead on the dynastic

⁹¹ Barry, *Senegambia*, 110-111.

politics and rivalries of aristocratic households. For many historians, this omission suggests that oral traditions were primarily concerned with the political affairs of the ruling elite, who likely escaped famine by hoarding grain surpluses or raiding neighboring communities. Yet, the lack of droughts and famines in the oral data may also indicate that Wolof households were particularly well adept at weathering extended periods of ecological crisis. By storing surplus grains, rotating fields, grazing livestock, and diversifying agricultural production, it is likely that households in the Wolof kingdoms reserved enough food energy to withstand periods of drought and scarcity. Put simply, this absence in the oral data may suggest that food scarcities and famines were more severe for Europeans along the coast than for their African counterparts in the interior.

For the colonial period, this dissertation relies on a wide range of archival evidence from *Les Archives Nationales du Sénégal* (ANS) in Dakar and *Les Archives Nationales d'Outre-Mer* (ANOM) in France. To demonstrate how the French established “energy pathways” throughout Senegal, I collected colonial reports of railway construction, records of fossil fuel imports, proposals to construct electrical grids in coastal cities, regulations on trucks and automobiles, and decrees on forestry, deforestation, and land use. For the late colonial and postcolonial periods, this dissertation used the extensive collection of documents in the ANS, such as government reports on energy use and fossil fuels, forest decrees, monographs, and agricultural studies and reports, to trace Senegal’s transition from an organic to mixed energy economy. In addition to the archives, I used evidence from the administrative library of the *Direction des Eaux, Forêts, Chasses, et de la Conservation de la sol*, as well as a large quantity of newspaper articles and periodicals on charcoal, renewable energy, deforestation from the private archive at *La Soleil*, a daily newspaper in Dakar. In addition to sources located in Senegal, publications from the World Bank, USAID, and the international development community provided useful data on the development and progress of Senegal’s emerging mixed energy economy in the late twentieth and twenty-first centuries.

This study is also indebted to previous scholarship on precolonial Senegal, without which this dissertation would not have been possible. Through their respective publications on economic and ecological change, as well as slavery and the slave trade, Philip Curtin, Boubacar Barry, and Martin Klein provided the foundation for my analysis on energy, politics, and the environment in Senegal. Similarly, James Searing, Mohamed Mbodj, Mamadou Diouf, and Bernard Moitt, in their respective analyses of the grain and peanut trades during the eighteenth and nineteenth centuries, helped develop a framework for the organic economy of precolonial Senegal and how Wolof elites consolidated power around food, labor, and land. Taken together, these scholars provided inspiration for this project and served as lodestars for my own research.

The chapters of the dissertation that focus on colonial and post-colonial Senegal are similarly beholden to the previous work of Africanist historians. In particular, I rely on Cheikh Anta Babou, David Robinson, and James Searing for their detailed and nuanced accounts of the Murid Brotherhood and the expansion of groundnut cultivation in the Peanut Basin. Jesse Ribot, in his exhaustive work on the Senegalese charcoal market, served as a valuable guidepost in navigating the complexities and regulations of Senegal's woodfuel industry. These scholars, along with many others, were invaluable to developing a framework for examining Senegal's energy economy from the colonial period to the present.

Chapter Outline

This dissertation investigates the relationship between energy, politics, and the environment from the precolonial to the postcolonial periods in the Senegal. By chronicling Senegal's transformation from an organic to mixed energy economy, it shows that control over energy resources played an instrumental role in how precolonial African elites, colonial officials, and postcolonial state actors attempted to centralize and maintain power over time and space.

The dissertation is organized in two parts. The first part focuses on the organic economy of the Senegal Valley until the introduction of fossil fuels in the late nineteenth century. Chapter One explores the agrarian energy systems of the organic economy in the Senegal Valley and examines the relationship between energy use in the precolonial household and state formation among the Wolof kingdoms. As the center of energy production, the precolonial household functioned as an “energy refinery,” a place where raw materials were cultivated, processed, consumed and then disseminated through trade and commerce. In the fifteenth century, the Senegal Valley was a mosaic of politically stable states with reliable systems of agriculture. This stability was in part due to a century of steady rainfall that provided households with good harvests and surplus grains. In the late sixteenth century, however, the climate shifted and fertile lands contracted. This change, along with the emergence of the transatlantic slave trade, presented the Wolof elite with new opportunities to centralize power over the organic economy.

Chapter Two demonstrates how Wolof households not only served as the principle “energy refineries” of the precolonial state in the Senegal Valley, but were also critical to the consolidation of power. As the climate changed from wet to dry in eighteenth century, the Wolof states endured frequent droughts, locust plagues, and political unrest over access to and control over energy. As the climate changed and the traffic of slaves increased, rival kingdoms competed for food, slave labor, and access to the narrow strips of fertile land bordering the Senegal River. This fierce competition meant that peasant households, and the arable lands they cultivated, became valuable political assets. To that end, energy in the Senegal Valley, including how it was produced, stored, and deployed, served as an important mechanism by which social and political power changed over time. Chapter Three continues the analysis of the organic economy by investigating how global process of change, from the Industrial Revolution to the end of the transatlantic slave trade, transformed the Senegal Valley into a valuable “ghost acre” of the French Empire. Rather than competing for slaves and

grains, the Wolof states in the nineteenth century expanded the production of gum arabic and peanuts. By tracking the growth of cash crops, this chapter examines how changes in the agrarian energy systems of the Wolof states contributed to French industrialization, reconfigured the “politics of energy” in the Senegal Valley, and became a focal point for the French colonial conquest.

The second part of the dissertation explores the Senegal Valley’s transition from an organic economy to a mixed energy economy based on fossil fuels, renewable energy, and biofuels. Chapter Four investigates how the French established colonial rule and exploited the organic economy through the construction of various “energy pathways.” This new energy infrastructure, from railways and roads to trains and trucks, enabled the French to penetrate the organic economy and regulate the flow of cash crops from the interior to the coast. At the same time, however, this chapter also demonstrates how peasant farmers, religious elites, and urban merchants manipulated the colonial state’s energy pathways to maintain control over the colony’s organic economy. As Africans adapted to changes in energy use and capitalized on the expansion of cash crop production, the colonial state attempted to control Senegal’s organic economy by restricting access to fertile lands and forests. In doing so, the French associated local practices in agriculture and land use with narratives of environmental decline.

Finally, Chapter Five explores how colonial and postcolonial leaders attempted to regulate the flow of fossil fuels into Senegal while also managing the production of organic fuels—woodfuels, peanuts, and peanut oil—and other forms of renewable energy, such as hydroelectric and solar power. In contrast to fossil fuels, which the state imported and distributed with the help of private industries, the production and distribution of firewood and charcoal frequently operated outside of the state’s regulatory structures. As such, this chapter shows that Senegal’s mixed energy

economy was bifurcated between the fossil fuels and large energy infrastructure of the state and the organic fuels urban merchants, elite marabouts, and rural communities.

CHAPTER ONE

From the Field to the Refinery:

Climate, Energy, and the Household in the Senegal Valley

In 1455, the Italian merchant and explorer, Alvise da Cadamosto, arrived at the estuary of the Senegal River in the present-day city of Saint-Louis. Commissioned by the King of Portugal to increase trade along the West African coast, Cadamosto hoped to obtain slaves, ivory, and gold.¹ As he travelled south along the coast, from the Canary Islands to the Gambia River, Cadamosto marveled at the stark contrast between the regions north and south of the Senegal River. To the north, he observed, was a “sterile and arid” landscape inhabited by “brownish, small, lean, ill-nourished” men. To the south, the country was “green, full of trees, and fertile” and all the “men are black, tall and big and their bodies well formed.”² In a similar manner, Diogo Gomes, an explorer and trader for the Portuguese, noted in 1456 that “it was a marvelous thing” one side of the river was populated by frail, darker skinned white men and the other with stout, muscular “negroes” that lived in green, fertile fields and pastures.³

The stark contrast between the regions to the north and south of the Senegal River underscores the relationship between access to energy resources and the physical and climatic constraints of local environments. Indeed, the “sandy, white, arid, and infertile land” severely limited energy use among Berber populations. As nomadic traders, Berbers consumed relatively small amounts of food—usually just a “mess of barley porridge” a day—and seemed to withstand long

¹ The myth of Prestor John, as well as the legend of Ancient Ghana’s gold, attracted the Portuguese to the Senegambian coast. While there were small quantities of gold among many local populations, the search for an African “El Dorado” ultimately ended in disappointment.

² Alvise de Cadamosto, *The Voyages of Cadamosto*, Translated by G.R. Crone (London: The Hakluyt Society 1937), 28.

³ Valentim Fernandes, *Description de la côte occidentale d’afrique* (Bissau: Centro de Estudos Da Guiné Portuguesa, 1952), 7.

bouts of hunger.⁴ They were experts in conserving the little amounts of energy resources available to them, and they sustained their metabolic needs for long stretches of time in a challenging desert environment. South of the Senegal River, however, people used a wide variety of energy resources.⁵ The Kingdom of Senega, which stretched from present day Saint-Louis to Dakar, possessed excellent pastures and “innumerable great and very beautiful trees” that bore “good and perfect fruit.”⁶ During the rainy season, which typically began in June and ended in October, farmers cultivated “fertile fields” with small spades fashioned like “mattocks.”⁷ Although they lacked any sort of mechanized technology such as wheels, a plow, or even draught animals, African farmers yielded large quantities of grain in a relatively short growing season.⁸

Throughout the precolonial period, the Senegal Valley was an organic energy economy that depended almost exclusively on locally produced fuel. Similar to many pre-industrial societies, the growth of the economy was limited by the nature of its organic energy sources. All acts of material production, whether in the field, the forest, or the household, involved an expenditure of energy that was entirely based on the process of photosynthesis. The conversion of raw materials—plants, trees, and minerals—into finished products—grains, charcoal, and iron—typically required the use of either mechanical or heat energy, or both. In most cases people used mechanical energy—human or animal labor—to convert plant photosynthesis into a form of metabolic energy, or food and fodder.

⁴ Fernandes, *Description*, 7.

⁵ In the fifteenth century, the Kingdom of Senega stretched from Saint Louis to Dakar, and incorporated a significant amount of territory in the interior as well. Throughout the era of the slave trade, the kingdom experienced revolts and rebellions that often splintered its power in the region. From the 17th-19th centuries the Kingdoms of Kajoor and the Lebu States—located on the Cap Vert peninsula—broke away and established a form of self-rule. For a more in depth account of this history, refer to: Boubacar Barry, *Senegambia and the Atlantic Slave Trade* (Cambridge: Cambridge University Press, 1998) and *Le royaume de waalo, le Sénégal avant la conquête* (Paris: François Maspero, 1972); Philip Curtin, *Economic Change in Precolonial Africa, Senegambia in the Era of the Slave Trade* (Madison: University of Wisconsin Press, 1975); A.G. Hopkins, *An Economic History of West Africa* (New York: Columbia University Press, 1973).

⁶ Cadamosto, *The Voyages*, 43. The Portuguese referred to the Wolof states as the Kingdom of Senega. It is likely that the Kingdom of Senega was actually the Kingdom of Kajoor, which was located on the coast and was the largest of the four main Wolof states—Kajoor, Bawol, Waalo, and Jolof.

⁷ *Ibid.*, 42.

⁸ *Ibid.*

People also used thermal energy by burning organic materials, namely firewood and brush, to provide heat for cooking and to clear fields and pastures for agriculture and grazing. Put simply, all forms of energy that people used in the Senegal Valley came from solar radiation and plant photosynthesis, and were limited to the “energy ceiling” of the organic economy.⁹

This chapter examines the “politics of energy” in the Senegal Valley from 1450 to 1700, with a particular focus on energy systems, that is, the different forms and sources of energy that people used to sustain life in a given habitat.¹⁰ As will be shown, energy systems underline the various ways that Africans confronted the constraints and limitations of their local environments.¹¹ People worked different types of land—farms, fields, and woods—to exploit various forms of energy—solar, metabolic, and thermal—to produce and consume goods and materials. As such, most precolonial societies functioned within an agrarian energy system that reflected the physical and geographical characteristics of their local environments.

Confronted with the numerous challenges of cultivating lands in the unpredictable regions of the Sahel and the savanna, local populations developed strategies to accommodate dramatic variations in climate, moisture, and land fertility from year to year. Moreover, people also tailored the way they used energy to the evolving political and economic landscape of the precolonial period, such as the dramatic changes brought on by European incursion and the transatlantic slave trade. This chapter, in effect, demonstrates how Africans developed flexible and adaptive systems of energy use that endured political change and fragmentation, droughts, and various forms of climatic and ecological change.

⁹ This framework is based on the concept of the “organic economy” as presented by E.A. Wrigley. See: E. A. Wrigley, *The Path to Sustained Growth: England's Transition from An Organic Energy Economy to an Industrial Revolution* (Cambridge: Cambridge University Press, 2016), 1-9. This brief overview is largely based on Wrigley's discussion of the pre-industrial organic energy economy of England; Also see: Wrigley, *Energy and the English Industrial Revolution* (Cambridge: Cambridge University Press, 2010), 6-10.

¹⁰ For a good overview of agrarian energy systems, see: Rolf Peter Sieferle, *The Subterranean Forest: Energy Systems and the Industrial Revolution* (Munich: C.H. Beck, 1982), 2.

¹¹ Osborn offers a similar analysis on her study of energy and containers in West Africa, see: Osborn, “Containers,” 69.

At the center of energy use in the Senegal Valley was the household, which collected, processed, and converted available energy sources into different forms of metabolic and mechanical energy. A unit of material, cultural, and social reproduction, the household typically included men, women, and children of similar kinship and lineage.¹² Some households also possessed domestic slaves who performed a variety of duties for their masters and were, in many cases, integrated into the family over time.¹³ As the hub for most economic activities in precolonial Africa, members of the household, primarily women and slaves, processed and converted available energy sources from raw materials into food and fodder. As such, this chapter considers the precolonial household as an “energy refinery”—a place that stored and converted solar and organic material into usable forms of energy.

By reconstructing the agrarian energy systems of the Senegal Valley’s ecological regions—the flood plains, the Sahel, and the savanna—I argue that access to energy resources played a critical role in the development of political and social structures over time. In the fifteenth century, during the nascent stages of the transatlantic slave trade, Senegambia was a mosaic of politically stable African states that had strong and dynamic networks of trade and commerce.¹⁴ This stability was in part due to a century of steady rainfall that provided households with surplus grains and seeds for subsequent growing seasons.¹⁵ With greater and more dependable crop yields, local populations were able to

¹² This definition of the household draws on Osborn’s work on precolonial households. For a more detailed analysis, see: Emily Lynn Osborn, *Our New Husbands Are Here, Households, Gender, and Politics from the Slave Trade to Colonial Rule* (Athens, Ohio University Press, 2011), 5.

¹³ Experiences of slaves in precolonial Africa were diverse and varied significantly depending on ethnic groups, geographical regions, and time periods. Kinship slavery, plantation slavery, and chattel slavery all existed in Africa to varying degrees. While the field is immense, for more in-depth studies of slavery in Africa start with: Paul Lovejoy, *Transformation in Slavery, A History of Slavery in Africa* (New York: Cambridge University Press, 1983); Igor Kopytoff and Suzanne Miers, Editors, *Slavery in Africa: Historical and Anthropological Perspectives* (Madison: University of Wisconsin Press, 1977); Walter Rodney, *A History of the Upper Guinea Coast 1545-1800* (Oxford: Clarendon Press, 1970); J.D. Fage, “Slavery and the Slave Trade in the Context of West African History” *Journal of African History* Vol. 3, (1969): 393-404.

¹⁴ Barry, *Senegambia*, 16. Also in Curtin, *Economic Change*, 34; Hopkins, *An Economic History*, 46.

¹⁵ Senegambia’s “wet century” lasted for about 130 to 150 years. Though the dates are rough, some climate historians believe it started around 1480 and ended around 1630. See: George E. Brooks, “A Provisional Historical Schema for Western Africa Based on Seven Climate Periods (ca. 9000 B.C. to the 19th Century)” *Cahiers d’Etudes Africaines*, Vol. 26, Cahier 101/102 Milieux, histoire, historiographie, (1986), 43-62. Also in Curtin, *Economic Change*, 34.

cultivate the same plot of land for extended periods of time, reducing the need to move from one fertile field to the next. For much of this extended “wet century,” the dramatic improvements of soil fertility and steady rains also enabled the states and polities of the Senegal Valley to extend agricultural production into previously desiccated lands.¹⁶

In the late sixteenth century, however, the wet period came to an end and the climate shifted to an extended dry period that lasted for more than two centuries.¹⁷ The abrupt change in West Africa’s climate, in combination with the rise of the transatlantic slave trade, prompted a continuous chain of environmental, political, and economic changes that reconfigured trade, agricultural production, and interstate politics. Taken together, the shift to a drier climate and the emergence of the transatlantic slave trade triggered a transformation in the “politics of energy” in the Senegal Valley. By investigating how the local populations of the Senegal Valley responded to these dramatic changes, this chapter not only shows how the Wolof states produced, stored, and distributed food during periods of drought and political crisis, but also how food production, slave labor, and the possession of arable lands became valuable political assets in their own right.

For the most part, historians have associated the fragmentation of the Senegal Valley’s social and political landscape to the violence and turmoil brought on by the transatlantic slave trade. For Boubacar Barry, the slave trade promulgated a widespread sense of insecurity that aggravated social conflicts and created a prolonged period of economic stagnation. Wars, slave raids, and internal conflicts, he suggests, prevented peasant societies from settling down and engaging in productive farm work.¹⁸ In contrast to Barry, some scholars argue that aristocratic families were effective political and economic actors that welcomed the growth of trade. In his work on the history of economic change in West Africa, Philip Curtin argues that Africans had dynamic and fluid

¹⁶ Brooks, “A Provisional,” 45.

¹⁷ *Ibid.*, 49.

¹⁸ Boubacar Barry, *Senegambia*, 306.

economies that responded to, and often dictated, the terms of trade between Europeans and Africans. In a similar manner, James Searing suggests that political elites, through the growth of agricultural slavery and the grain trade, played an instrumental role in the development and expansion of the transatlantic slave trade. By providing Europeans traders with provisions to transport, hold, and ship slaves across the Atlantic Ocean, Searing claims that African granaries helped sustain the transatlantic trading system.¹⁹

Absent from these histories, however, is an examination of how Africans responded to environmental change in the sixteenth and seventeenth centuries and how they benefited, both politically and economically, from their control over organic energy sources. Although scholars have noted that recurring droughts, crop failures, and famines in the Senegal Valley often threatened and weakened states over time, the potentially devastating role of ecological crises tends to overshadow the various ways that state actors responded to, and often benefitted from, periods of drought and scarcity. By investigating how ruling elites responded to periods of ecological crises, I argue that scarcity—particularly in organic energy sources—enabled the Wolof political elite to centralize agrarian energy production and increase their power in the region. As the climate shifted from wet to dry, and as Europeans attracted increasing amounts of trade and commerce to the coast, the political elite adjusted their agrarian energy systems to meet, and benefit from, the growing demands of the transatlantic trading system.

¹⁹ James Searing, *West African Slavery and Atlantic Commerce: The Senegal River Valley, 1700-1860* (Cambridge; Cambridge University Press, Cambridge, 1993), 27-59.

The Environment and Precolonial States in the Senegal Valley

The Senegal Valley's environmental and climatic conditions significantly shaped the way people used energy during the precolonial period.²⁰ Covering two climatic zones—the Sahel and the savanna—the Senegal Valley is placed at an ecological crossroads where desert, semiarid grassland, and oceanfront converge. The Sahelian zone, which stretches from the Senegal River to roughly the same latitude as present-day Dakar, is a hot and arid landscape with limited rain. The savanna, a region of tall undulating grasslands studded with trees, passes through the middle of the country from east to west. In comparison to the Sahel, the savanna receives more rain, has more arable land, and experiences little fluctuations in temperature throughout the year. To the south, the tropical forests are climatically and ecologically distinct from the rest of the country, with dense forests, vegetation, and significant amounts of rain. While access to energy resources was, in part, determined by the climate and environment, the actions of local populations played an equally important role in how people used and converted energy.²¹

Aside from the rocky plateaus of Cap Vert and the ancient massifs along the eastern and southeastern borders of present-day Mali and Guinée, the Senegal Valley is relatively flat with alternating patches of grasslands, sun baked drylands, and savanna forests. The two main rivers, the Senegal and the Saloum, are subjected to floods and monsoons that drain into the Atlantic Ocean. The Senegal River, which has long been regarded as the “gateway” into the interior, served as a major avenue of transportation for Africans and Europeans alike. With its headwaters in the Futa Jallon highlands of Guinée, the Senegal River had a relatively constant flow of water, which, during

²⁰ Osborn offers a similar assessment on how climatic and environmental conditions shaped the way Africans made containers. See: Osborn, “Containers,” 72.

²¹ Ibid.

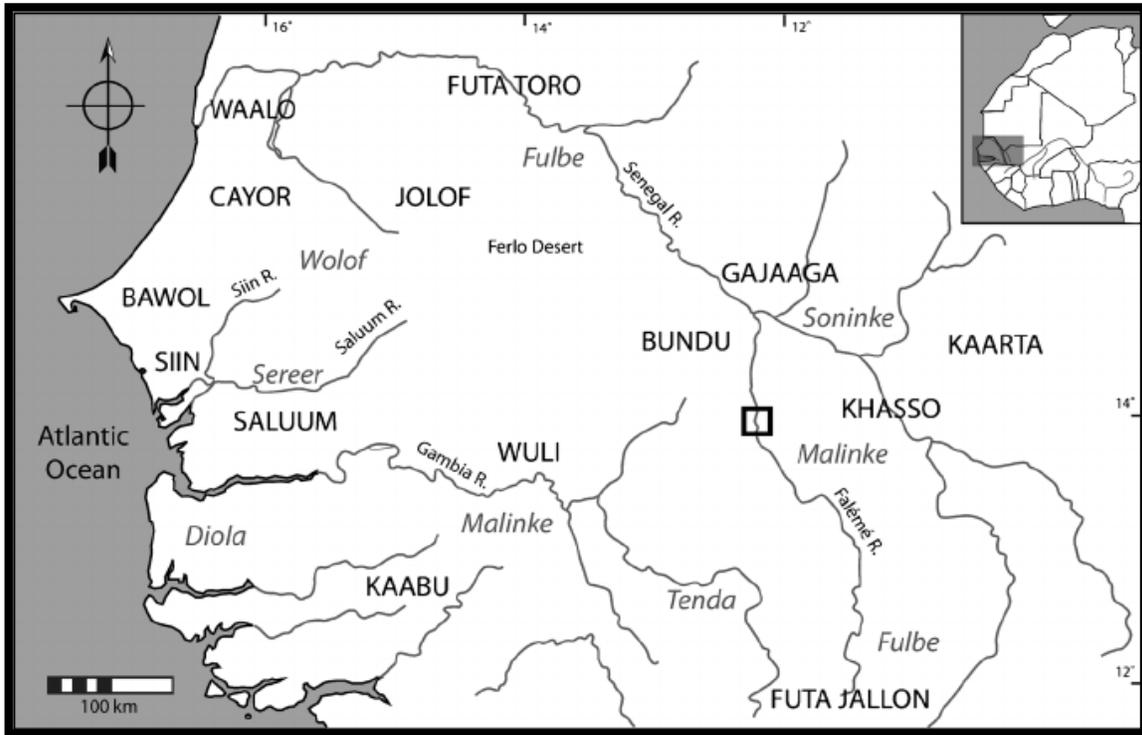


Figure 2: A Map of the Precolonial States of Senegambia. Original map can be found in Cameroon Gokee, “Crafting, Cooking, and Constructing Histories: Women and the Politics of Everyday Life Along the Falémé River,” *The African Archaeology Review*, No. 2, Special Issue: Comparing Craft and Culinary Practice in Africa (June 2014), 233-263.

the rainy season, spilled over into large flood plans and created ideal conditions for wetland farming.²²

The annual amount of rainfall in Senegal also had a profound influence on the ability of local farmers to establish various systems of agrarian energy production. The rainy season, which typically lasted from June to October, was the chief physical determinant of the plants and vegetation that farmers grew. In general, the amount of rainfall in Senegal Valley decreased from the south, where it exceeded 70 inches a year, to the north, where it was less than 16 inches.²³ To an extent, rainfall determined what types of energy sources were available, as well as the opportunities and constraints that people confronted in different environments. In the south, where rainfall was the heaviest,

²² Hopkins, *An Economic History*, 23; Curtin, *Economic Change*, 16.

²³ Barry, *Senegambia*, 13.

people had access to the nutrient rich soils and grasslands of the savanna. In the north, and particularly along the Senegal River, people developed strategies to cope with the low levels of rainfall. For instance, after they sowed and harvested their crops in October, they moved to more fertile lands, like the flood plains of the Senegal River, where they could cultivate the wetlands from November to March.²⁴

Despite the large variations in rainfall, the Senegal Valley's coastal ethnic groups—the Wolof and Serer—lived within comparable agrarian energy systems that depended on similar forms of metabolic energy.²⁵ In the north, from the Senegal River to Cap Vert, Wolof populations relied on rainfall agriculture to meet their dietary needs. During particularly dry years, they looked to external markets to acquire enough grain to last them through the year.²⁶ In the region south of Cap Vert, known today as “la petite côte,” the Serer practiced a more dependable form of mixed agriculture. In grazing their livestock in coastal pastures and grasslands, the Serer used manure to fertilize their crops and increase the harvest. Although the Wolof and Serer worked and developed their lands independently, they were connected through dynamic and complex systems of interstate trade.

As the two dominant ethnic groups in Senegal during the fifteenth and sixteenth centuries, the Wolof and Serer were divided into two separate kingdoms or states—the Kingdom of Senega and the Kingdom of Sine, respectively. Generally speaking, each of these societies was based on a political system of kinship and lineage. Some leaders and ruling elites gained their power and office through a broad association with a *lamant* or “royal” family, where others obtained their power through a single royal lineage.²⁷ The kings typically resided in a capital where the ruling elites held

²⁴ Hopkins, *An Economic History*, 23.

²⁵ While there are many more ethnic groups that lived in Senegal during the fifteenth and sixteenth centuries, the Wolof and Serer were the most prevalent. For a more detailed breakdown of the population, see: Barry, *Senegambia*, 8.

²⁶ Curtin, *Economic Change*, 43.

²⁷ This is a very basic overview of kinship and lineage. For more in depth discussion of the different political systems in Senegal, please refer to: Curtin, *Economic Change*, 35; Hopkins, *An Economic History*, 68; Martin Klein, *Islam and Imperialism in Senegal, Sine-Saloum, 1847-1914* (Palo Alto: Stanford University Press, 1968) 45.

court and delegated power to members of their kinship to manage different territories of the kingdom. Below the ruling class, the Wolof and Serer similarly had a small group of nobles or elites that inherited lesser offices at the provincial level. Spread widely throughout the kingdoms, these political leaders governed and protected local villages from neighboring states. For the most part, political systems in the Senegal Valley changed frequently and variations of the lineage and kinship oscillated between single and plural forms of lineage.²⁸

From the eleventh century onward, a series of mass migrations brought the Serer and Wolof to their respective regions in the savanna and the Sahel. In the eleventh and twelfth centuries, the Wolof and Serer occupied regions to the north of the Senegal River, but were pushed southward as a powerful Berber sect, known as the Almoravides, took control of southern Mauritania. As they migrated south, the Wolof occupied the territory between the Senegal River and Cap Vert, and the Serer settled on the banks of the Saloum River. Due to their common heritage, the Serer and Wolof established comparable political and social systems.²⁹

In the fifteenth century, the Kingdom of Senega, also referred to as the Jolof Confederation, was divided into tributary states that stretched from the Atlantic coast to the Upper Senegal River Valley. The three principle societies of the confederation, Kajoor, Waalo, and Baol, were vassals of the land-locked state of Jolof. The king, known as the *Bour ba*, governed from the capital of Linguère and appointed nobles to each territory, who then elected local rulers to govern and collect taxes and tribute from their political subjects.³⁰ Similarly, in the Kingdom of Sine, the Serer were divided into a series of states that were governed by the Guelowar Monarchy, a conquering dynasty of Malinke origin. The Guelowar took power in the middle of the fourteenth century, and rather than alienating

²⁸ For a more comprehensive overview of social and political structures in Senegambia, see: Curtin, *Economic Change*, 29-46.

²⁹ Barry, *Senegambia*, 1-26.

³⁰ Barry, *Waalo*, 21. The city of Linguère is now the present city of Louga, Senegal.

their conquered subjects, they encouraged local villages to designate chiefs and administrators to elect the Great Jaraf—the equivalent of a Serer prime minister—to represent their interests at the Malinke court of rulers.³¹

Wealthy, powerful, and prestigious, the aristocratic elite of both kingdoms possessed large households with multiple wives, servants, and slaves. Based on lineage and kinship, each kingdom had similar land tenure systems that gave elites the collective rights to arable land as well as a significant portion of its spoils.³² However, while land was certainly an expression of political power, it was not the only manner in which the nobility maintained control over the population.³³ Political and economic power was also based on a system of tributary payments. In this way, the peasant class was not tied to the land, as in feudal Europe, but rather to the states and rulers who collected tributes and taxes.³⁴ Put simply, then, most farmers, pastoralists, and other members of the peasant class did not own land but rented it from members of the ruling elite.

In the mid-fifteenth century, the Jolof Confederation fragmented and the polities of Kajoor, Waalo, and Bawol broke away from the *Bour ba*. According to Wolof oral tradition, Amari Ngoone Soble, the prince of Kajoor, led the rebellion against the Jolof empire and defeated the king at the battle of Danki. After the defeat of the Jolof empire in 1549, Kajoor, Waalo, and Bawol established their own kingdoms.³⁵ The kingdom of Kajoor, which was the most powerful of the Wolof states, extended in a crescent along the Atlantic coast from present day Saint-Louis to Rufisque. The kingdom of Bawol was just to the south of Kajoor, and was often ruled by the monarchs and aristocratic elites of its powerful neighbor. To the north of Kajoor was its chief political rival, the

³¹ Paul Pélissier, *Les Paysans du Sénégal : Les civilisations agraires du Cayor à la Casamance* (Haute-Vienne : Imprimerie Fabrégeu, 1966) 135-188; and Curtin, *Economic Change*, 39.

³² Barry, *Senegambia*, 31.

³³ Ibid.

³⁴ Barry, 32; Hopkins, *An Economic History*, 12; Curtin, *Economic Change*, 14.

³⁵ R. Rousseau, “Le Sénégal d'autrefois. Etude sur le Ouâlo,” “Le Sénégal d'autrefois. Etude sur le Cayor,” et “Le Sénégal d'autrefois. Seconde étude sur le Cayor,” *Bulletin du Comité d'Etudes historiques et scientifiques de l'AOF* (1929, 1933 et 1941).

kingdom of Waalo, which occupied the fertile flood plains of the Senegal River and stretched from the periphery of Saint-Louis to the village of Podor. In the arid desert of the interior was the small kingdom of Jolof. Once the political and economic center of the Wolof states, the Jolof state rapidly declined as trade along the Atlantic coast pulled commerce away from the interior. North of the Senegal River lived the Moors, who spoke a local dialect of Arabic and were subject to the Moorish confederations of Brakna and Trarza. To the east of the Wolof states was the Pulaar-speaking kingdom of Futa Toro and the Soninké Gajaaga kingdom, which were small semi-pastoral Islamic states ruled by powerful marabouts and clerics.³⁶

In general, Kajoor and Waalo were the most powerful and productive states of the Wolof kingdoms. Geographically, Kajoor was divided into three separate ecological zones: coastal plains, vast sand dunes, and fertile farmlands. Since Kajoor had no streams or tributaries of the Senegal River flowing through it, the majority of the kingdom appeared sandy, dry, and arid for seven or eight months of the year, usually from October to May. However, during the rainy season from June through September, it turned lush green and yielded an abundance of crops, namely millet and sorghum. To the north, the kingdom of Waalo occupied the flood plains of the Senegal River and produced large quantities of cereals and grains. Moreover, since it was situated upriver from the French colony of Senegal, the kingdom of Waalo also served as the gate-keeper of trade between European merchants and the slave, gum, and agricultural markets of the interior. Collectively, Kajoor and Waalo were the breadbaskets of the Senegal Valley and their harvests frequently determined the political and economic stability of the region.

The social structures of the Wolof states were similarly based on a hierarchy of endogamous groups. At the top were the kings, known as the *damel* in Kajoor, the *brak* in Waalo, the *teen* in Bawol, and the *buur-jam* in Jolof. Below the kings was an aristocratic class of nobles who were

³⁶ For a more in depth overview of human and physical geography, see: Barry, *Senegambia*, 5-26.

matrilineal relatives of the kings.³⁷ The kings broadcasted much of their power by developing strategic partnerships with powerful and influential aristocratic households, either through marital alliances or political appointees. In addition to the nobles, there were a number of free-born prominent families with hereditary rights to certain high offices and territorial jurisdictions. Included in the free population of the Wolof states were peasants, who farmed, grazed livestock, and traded goods. Peasants were subject to the aristocratic elites and relied on them for land and protection. Below the peasant class was the *nenyo*, which comprised of a number of castes that included leather workers, blacksmiths, woodcarvers, potters, weavers, and griots. At the bottom of the social hierarchy were slaves, who served in a diverse number of roles. Some slaves were agricultural laborers, concubines, and household servants while others were warriors, diplomats, and crown slaves. In some cases, the highest class of slaves, such as the crown slaves, had their own servants and slaves to cater to their needs.³⁸

The Organic Economy of the Senegal Valley, 1450-1600

In the late fifteenth and sixteenth centuries, the Inter-Tropical Convergence Zone—the region where the southern and northern trade winds intersect—moved north of the equator and brought heavy rainfall to both the Sahel and the savanna.³⁹ For more than a century, farmers in these regions received enough rain to produce and conserve cereals and grains to last throughout the year. During this period, Portuguese reports of the coastal regions of the Senegal Valley provided compelling evidence of this climatic phenomenon. Rather than portraying the region as a dry and

³⁷ Curtin, *Economic Change*, 37-46; Barry, *Senegambia*, 5-26.

³⁸ For a more in depth analysis of Wolof social structures, see: Lucie Colvin, “Kajor and Its Diplomatic Relations with Saint-Louis du Senegal, 1763-1861” (PhD Dissertation, Columbia University, 1972), 8-20. Also consider: Paul Pélissier, *Les Paysans*, 135-181.

³⁹ The inter-tropical convergence zone is an area that encircles the earth near the equator where the northeast and southeast trade winds come together. The ITCZ is formed by vertical motion largely appearing as thunderstorms driven by solar heating; which effectively draw air in and are known as the trade winds. When the ITCZ shifts north or south, rain patterns also change significantly. For a more detailed analysis, see: Brooks, “A Provisional,” 154-187.

arid landscape, which is characteristic of the Sahel, the Portuguese marveled at its pastures, grasslands, and forests.

In April of 1455, a few months before the seasonal rains, Cadamosto described the landscape of what is now present-day Saint Louis as productive land with “innumerable great and very beautiful trees of which many are unknown to us.”⁴⁰ In a similar manner, Dinis Dias, the first Portuguese explorer to visit the Cap Vert peninsula, provided an equally praiseworthy account of its beautiful coastline.⁴¹ In approaching the cape from the north, Dias marveled at the green and fertile land that “was covered with trees and an abundance of fragrant herbs and vegetation.”⁴² The elevated landscape of the peninsula, he remarked, remained green throughout the year as the “tall trees and verdant vegetation” maintained their leaves from the winter to the summer.⁴³ In 1456, Diogo Gomes, a Portuguese explorer, reported that the Senegalese coastline was an “impenetrable” and dense forest with trees “so tall they resembled masts or spars” of seafaring vessels. When Gomes went ashore, he cut his way through the forest and found a region of “extensive grasslands” where more than “five thousand beasts were grazing peacefully.”⁴⁴

In contrast to their reports of the Senegal Valley’s fecund natural environment, the Portuguese described the Wolof population as poor, lazy, and unproductive. The “Kingdom of Senega,” according to Cadamosto, was no more than two hundred miles of sparsely populated coastline with “small villages and huts made of straw.”⁴⁵ The “great poverty of these people,” he believed, was due to their “lazy” temperament and reluctance to “sow more grains than would barely support them throughout the year.”⁴⁶ To be sure, Cadamosto’s harsh critique of Wolof communities

⁴⁰ Cadamosto, *The Voyages*, 53.

⁴¹ Valentim Fernandes, *Description*, 32.

⁴² Fernandes, *Description*, 24.

⁴³ *Ibid*, 25.

⁴⁴ Diogo Gomes, *The Voyages of Diogo Gomes*, Translated by G.R. Crone, (London: The Hakluyt Society, 1937) 86.

⁴⁵ *Ibid*, 29. Cadamosto was referring to the kingdom of Kajoor, which at this moment in time, was a province or state of the Jolof Confederation.

⁴⁶ Cadamosto, *Voyages*, 42.

demonstrates the general lack of knowledge that many early European traders had of local agricultural practices.⁴⁷ In contrast to what Cadamosto's report suggests, Wolof populations practiced a highly adaptable form of small-scale agriculture designed to accommodate different amounts of precipitation from year to year. By growing a combination of crops that were suitable for different environmental conditions, farmers developed dynamic agrarian energy systems that could endure an array of climatic and ecological pressures.

In the state of Waalo, for example, farmers cultivated the flood plains of the Senegal River and developed techniques to grow their grains and cereals in sunbaked soils.⁴⁸ According to one Portuguese account, the soil was coarse, very fertile, and heavy, especially "that which is watered by these two rivers during their floods."⁴⁹ In the dry season after the floods receded, the sun made large clefts in the soil and hardened the dirt to such a degree that sowing the fields was nearly impossible. To grow millet in these conditions, farmers cleared the silt left by the floods, then scattered the seeds without further tillage, and covered them with a thin layer of sand. Since the soil was hard and compact, farmers used the sand as an insulating layer to trap the moisture from the night dews. The moisture provided enough water to germinate the seed, and the nutrients from the fertile soils of the flood plains yielded significant quantities of grains.⁵⁰

Despite the climatic and environmental challenges of farming in the Sahel, Wolof farmers produced adequate amounts of grain to sustain the metabolic needs of their communities. During a month long stay in Budomel, a village in the coastal state of Kajoor, Cadamosto observed that local farmers grew various kinds of millet, both small and large, as well as the "largest and finest kidney

⁴⁷ When Cadamosto arrived in April of 1455, Wolof communities were approaching the end of the dry season and were likely pursuing other forms of labor instead of farming. From November to May, most Wolof farmers were not in the fields but were cultivating household gardens, foraging for fruits in local forests, and brewing beer and palm wine. Moreover, Cadamosto's critique of the Wolof work ethic ignored or overlooked the labor of Wolof women, who were often the workhorses of the Wolof household.

⁴⁸ Joao de Barros, *Dacadas da India*, translated by G.R. Crone (London: The Hakluyt Society 1937), 138.

⁴⁹ *Ibid*, 138. This technique is also cited in Curtin, *Economic Change*, 16-17.

⁵⁰ *Ibid*, 138; Curtin, 17.

beans in the world.” Speckled with different colors “as though they were painted,” the beans were broad, thin, and “as big as the long hazel nuts familiar to [Europeans].”⁵¹ A variation of *Canvalia gladiata*, or sword bean, farmers harvested them at the beginning of the dry season and typically consumed them with millet and sorghum.

Cadamosto also reported that many Wolof farmers were already experimenting with crops from Europe and the New World. Local farmers, he believed, acquired these crops from Berbers and Moors through the trans-Saharan trade or from the “Christians who have started trading with these negroes.”⁵² However, efforts to raise corn, rye, barley, and spelt, according to the Cadamosto, were unsuccessful because the “country was very hot” and lacked “rain for nine months in the year.”⁵³ Indeed, the majority of European and New World crops required long periods of temperate weather and frequent and heavy rains. The most successful New World plant in the Senegal Valley, however, was the peanut. Particularly well suited for the region’s sandy soils and climate, the peanut served as a safeguard against failure of the millet harvest, as well as a subsidiary food crop of marginal, though increasing, consequence.⁵⁴ Although Wolof farmers were unsuccessful in their attempts to grow many foreign crops, their willingness to experiment with new grains and methods of farming demonstrates how local communities tested the environmental and climatic constraints of the Sahel.

The most reliable and drought resistant grain for Wolof farmers was millet, and they typically sowed it in alternating fields of tree fallow to protect it from wind and dust storms.⁵⁵ Other cereals and legumes, such as manioc, fonio, and sorghum, were dependent on different types of terrain and soils. Where farmers grew sorghum, for instance, they preferred soils with an abundance of clay; and

⁵¹ Cadamosto, *The Voyages*, 42.

⁵² Ibid.

⁵³ Ibid, 51.

⁵⁴ George E. Brooks, “Peanuts and Colonialism: Consequences of the Commercialization of Peanuts in West Africa, 1830-70” *The Journal of African History*, Vol. 16, No. 1 (1975): 29-54.

⁵⁵ Pélissier, *Les Paysans*, 188.

where they grew fonio, they preferred open fields with clusters of trees. Some crops, such as manioc and cotton, were grown within a short distance of the household and were typically maintained by women and slaves.⁵⁶ Women were typically responsible for the crops within a short distance of the household and used them to cook and provide meals for the family.⁵⁷ As the dietary staple of Wolof communities, sorghum and millet were typically pounded with a mortar and pestle and consumed with dry fish, vegetables, and groundnuts.

When available, women cooked with vegetable oils, namely palm oil, which contained significant amounts of saturated fat to enhance the flavor and to increase its metabolic value.⁵⁸ The production of palm oil was a laborious process that took several days to complete. Villagers, typically women, walked to the palm forests, which were both along the coastline of the Atlantic Ocean and on the shores of the Senegal River, to pick palm fruit from the trees. Using an iron spade, axe, or angular rock, the women cracked open the external shell and extracted the fruit from the interior. After filling a large calabash container, the women head loaded the palm fruits and returned to the household to cook, peel, and break the fruit into smaller pieces with a mortar and pestle. Once the fruit was in small enough pieces, they placed everything into a boiling pot of water and within a few hours the oil separated. After straining the water from the pot, usually with a piece of cloth, the oil congealed into a red and viscous fluid. The women usually placed the final product, which had a potent smell and a rich flavor, into small containers to use sparingly over the course of a few weeks.⁵⁹

The Wolof were also skilled producers of fermented alcohol and were, according to the early Portuguese explorers, “skilled brewers” that took pleasure in drinking palm, honey, and millet wine.

⁵⁶ Pélissier, *Les Paysans*, 149. Also in Curtin, *Economic Changes*, 25. Peanuts were also grown in household compounds, and were introduced to West Africa in the late fifteenth or early sixteenth centuries.

⁵⁷ Fernandes, *Description de la côte occidentale d'Afrique*, 7-9; Also cited in Pélissier, 150.

⁵⁸ *Ibid*, 94.

⁵⁹ Claude Jannequin, *Le Voyage de Lybie au Royaume de Sénégal le long du Niger* (Genève: Editions Slatkine, 1980), 45.

By carving several gashes into the trunks of palm trees, winemakers collected a “brownish liquid like the whey of milk” and left a gourd to collect the liquid for a period of two days.⁶⁰ On the second day, they carried the liquid back to the village and left it in the sun to ferment under the intense heat. In areas where bees were common, villagers produced honey wine by mixing water, honey, and bee’s wax into a large container. Once the honey properly dissolved into the water, they left the container in the sun for two weeks, using the extreme heat to expedite the fermentation process. Millet wine, which was consumed more than any other, was made by pounding the grain into flour, mixing it with boiling water, and then leaving it to macerate in a pot for three to four days. The longer the wine was left in the pot, the more agreeable the taste and the higher the alcohol content.⁶¹

In the kingdom of Bawol, peasant farmers grew similar crops as those living in Kajoor and Waalo, yet they practiced a different yet highly efficient form of mixed agriculture.⁶² Situated among the savanna’s grasslands and forests, the kingdom of Bawol was endowed with reliable rains, fertile fields, and a longer growing season than their northern counterparts. The method of mixed agriculture, which alternated fields between cattle and crops, used a system of “penned livestock” that placed cattle in large enclosed fields. By using the manure as a fertilizer, farmers improved their soils and cultivated the same fields year after year and produced large quantities of cereals and grains. Furthermore, by surrounding their fields with the *Acacia albida*, an acacia tree that sheds its leaves in reverse to the seasons, they developed a more efficient system of exploitation. Due to its long taproot, which pulls from the deep groundwater of the savanna, the tree sheds its leaves just before the rains began. This, in turn, provided farmers with mineral-rich organic material to mix into the soil as a natural fertilizer.⁶³

⁶⁰ Fernandes, *Description de la côte occidentale d’afrique*, 7-9.

⁶¹ Joao de Barros, *Dacadas da India*, translated by G.R. Crone (London: The Hakluyt Society 1937), 140.

⁶² The kingdoms of Bawol shared a similar agrarian energy system as the Serer, who also practiced mixed agriculture in the Sine-Saloum River Delta. See: Pélissier, *Les Paysans*, 245-270.

⁶³ Pélissier, *Les Paysans*, 175-200. The discussion of Serer agriculture is largely based on Pélissier’s study of peasant agriculture.

In general, local blacksmith in the kingdom of Bawol crafted tools for farming, which were typically spades and hoes. As demonstrated in one report from a European explorer from the seventeenth century, blacksmiths cut and manipulated iron by using high quality charcoal. In one instance, a local blacksmith agreed to cut bars of iron for traders and arrived carrying “his shop with him,” including “his bellows and a small anvil,” which he placed under a shady tree and struck into the ground. To give the “iron his true heat,” the blacksmith used “one kind of red wood” to “make a high-quality charcoal.”⁶⁴ His assistant, a young boy, lay on the ground and blew the bellows through a hole made in the earth. Once the charcoal burned hot enough, the blacksmith took his “hammer and a tool” and expertly cut the iron into several bars.⁶⁵ Since most species of trees were unsuitable for charcoal making, blacksmiths had an intimate knowledge of their natural environment and were highly selective in choosing their fuel. The “red wood,” which was presumably a dense, slow burning hardwood, likely had a high content of alkali and silica to sustain prolonged burning and heat.⁶⁶

In the Sahel and the savanna, the use of charcoal was less common. In 1456, Diogo Gomes observed that there was little iron in the Senegal River Valley and the weapons of Wolof warriors—spears, bows, and arrows—were mostly made of solid bamboo with fine “hardwood” tips.⁶⁷ The few iron pointed arrows they did possess, he believed, were produced in “the province of the Mandinga” where “there are great quantities of iron.”⁶⁸ A year earlier, Cadamosto similarly reported that most of the iron came “from the kingdom of Gambia of the Blacks beyond.”⁶⁹ Although they possessed iron

⁶⁴ Richard Jobson, *The Golden Trade; or, A Discovery of the River Gambia, and the Golden Trade of the Aethiopians*. Edited by Charles G. Kingsley (Teignmouth, Devonshire,: Speight and Walpole, 1904), 152.

⁶⁵ *Ibid*, 152.

⁶⁶ Candice Goucher, “Iron is Iron ‘Til it is Rust: Trade and Ecology in the Decline of West African Iron-Smelting” in *The Journal of African History*, Vol. 22, No. 2 (1981): 181. According to Goucher, the preferred hardwoods in precolonial charcoal making in West Africa were *Burkea Africana*, *Acacia*, *Prosipis Africana*, and *Zizyphus mucronata*.

⁶⁷ Gomes, *Voyages of Diogo*, 11.

⁶⁸ Fernandes, *Description*, 13.

⁶⁹ Cadamosto, *Voyages*, 33.

tools and weapons, Cadamosto noted that they were not “skilled in working iron” and “if there was iron in their land, they did not know of it.”⁷⁰ The absence of iron making suggests that there was little need for thermal energy beyond the consumption of firewood within the household. In contrast to other regions in Africa where iron forging and charcoal production placed significant stress on forest resources, the lack of metallurgical industries in the Wolof kingdoms left coastal forests relatively unscathed.⁷¹

Although the majority of the Wolof population relied on staple grains and a variety of other foodstuffs, from fonio and dried fish to peanuts and locally grown fruits, they also relied on hunting and fishing for their metabolic needs. Through the sixteenth and seventeenth centuries, European traders reported that many Wolof communities developed highly efficient techniques of fishing and hunting. Wolof fisherman used wooden canoes, or “pirogues,” to navigate Senegambia’s rivers and coastal fisheries. Using finely constructed nets made from palm leaves, Wolof fisherman designed them to open and close by loosening or tightening a drawstring.⁷² In the middle of the net, they placed two sticks in the shape of a cross, covered them with bait, and then attached a stone to weigh down the net in the water. While standing in the pirogue, they threw the net into the ocean and let it drop to a depth of two fathoms, or roughly six feet, and patiently waited for fish to arrive. When the fish tugged at the bait, they pulled the drawstring and the net closed with the fish inside. In repeating this process several times a day, they caught substantial quantities of fish and distributed them to local markets for trade.⁷³

⁷⁰ Ibid, 33. While iron making was not widespread along the Senegambian coast, it is likely that the Wolof and Serer still produced and used charcoal. Even though European reports of life on the coast in the fifteenth century do not include any evidence of charcoal, most villages and communities had blacksmiths that likely worked with iron and charcoal.

⁷¹ Goucher, “Iron is Iron ‘Til it is Rust,” 181. In regions of West Africa where iron smelting and forging were intense, such as Benin and Nigeria, early European explorers reported instances of deforestation and resource exhaustion.

⁷² Cadamosto, *Voyages*, 15.

⁷³ Gomes, *Voyages de Diogo*, 16.

In the kingdom of Bawol, Europeans reported that men were highly skilled hunters that pursued game on foot through coordinated strategies. They carried only bows, poison tipped arrows, and spears and tracked elephants and other large game.⁷⁴ When an elephant came within the distance of a bowshot, they hid behind trees to set up an ambush and, in unison, they released their arrows and threw their spears. As the elephant retreated into the woods, the Wolof hunters pursued it by scrambling and jumping from “tree to tree” until it succumbed to fatigue. The hunt, which could last a number of hours, was a carefully orchestrated process in which the hunters used the forests to confuse and trap the elephant.⁷⁵

Taken together, the different forms of agrarian energy production in the Senegal Valley, from flood plain agriculture to penned livestock, show how local populations tailored their agrarian energy systems to the conditions and limitations of their natural environments. While access to arable land, pastures, and forests shaped how local populations produced and used energy, the scattered reports of European traders during the fifteenth and sixteenth centuries also illustrate that various ways that precolonial states used flexible and adaptive strategies and techniques to meet their energy needs.

Household as An Energy Refinery

The agrarian energy systems of the Wolof states during the fifteenth and sixteenth centuries illuminate the various ways that local populations used and converted different forms of solar energy into chemical energy, or food and fodder. Although the Wolof depended overwhelmingly on arable land, and to an extent on coastal fisheries, their resourceful systems of agricultural production allowed them to operate within the physical, climatic, and environmental limitations of the Sahel and

⁷⁴ Jobson, *The Golden Trade*, 157.

⁷⁵ Ibid.

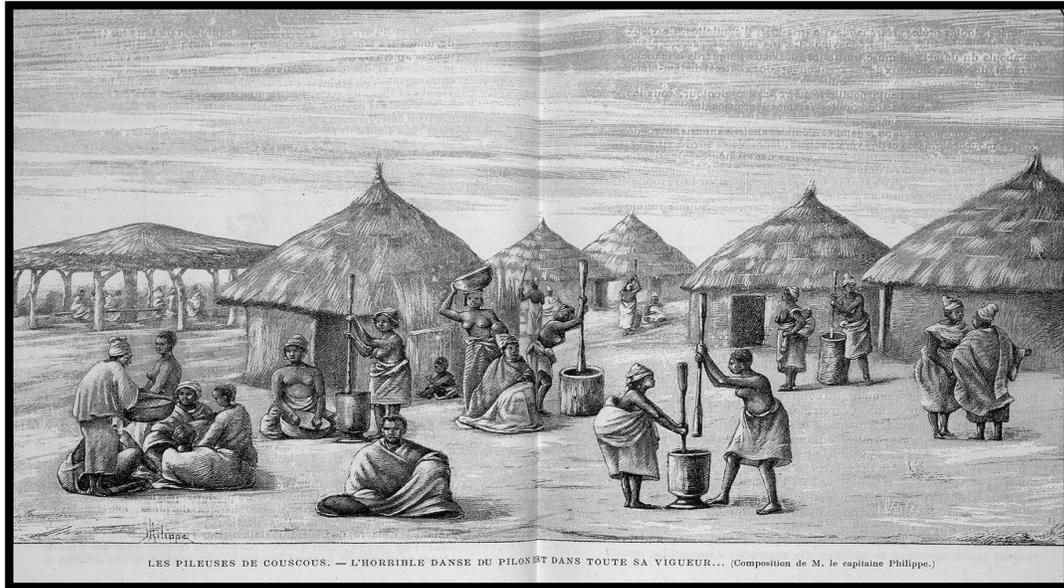


Figure 3: Women in a village pounding millet or sorghum for the household. BnF, “Les Pileuses de Couscous—Le danse du pilon et dans toute sa vigueur,” M. Le capitaine Phillippe, last accessed July 2017: <http://gallica.bnf.fr/>

savanna. Yet, it was ultimately Wolof women and slaves who converted the grains, legumes, fruits, and fish into usable energy sources. As the center of food production and consumption, the household was an energy refinery where Africans stored, converted, distributed, and deployed food, fodder, and labor to sustain their organic economy.

The engraving below, which depicts a small Fula village during the nineteenth century, offers a visual representation of how the household functioned as an energy refinery. In the engraving, women serve as the primary focus of the image: they are pounding couscous, tending to their children, and engaged in conversation. As the principle laborers of the village, the women—some who may have been slaves—refined raw materials into useable forms of energy that were then converted into thermal and mechanical energy. In the foreground of the engraving, a number of men are gathered around a basin of grains and one presumably younger man is seated by himself. In the background, several men—who were likely village elders—are seated under a large canopy that often served as a locale to discuss important matters within the village. Constructed from local raw

materials, the huts, basins, and mortars and pestles are representations of Senegal's agrarian energy systems and reflect the constraints and limitations of the organic economy in the Sahel.

In the Senegal Valley, as elsewhere in precolonial Africa, the household was a unit of material, cultural, and social reproduction that included men, women, children, and slaves.⁷⁶ For many scholars, the household was the core of economic and political activities and, in broadcasting their power through large and extensive households, the ruling elite aimed to accumulate "wealth in people."⁷⁷ Due to Africa's relatively low population density and its vast territories of unoccupied land, political elites valued people as the primary form of productive wealth.⁷⁸ As a result, the elites married many wives, raised large families, captured and integrated slaves into the household, and protected the "free class" of political subjects in exchange for fealty, tribute, and military support.⁷⁹

In part, political power was based on the accumulation of energy in the household, from cereals and grains to slaves and horses, and on the household's ability to capitalize on them through trade and distribution. In order to control the flow of energy from the household to local markets and trading centers, local populations also developed various means of transportation, from canoes and beasts of burden to slave caravans and headloading.⁸⁰ In other words, power in the Senegal Valley was not solely based on accumulating people, but also on controlling the means of energy production, storage, distribution, and deployment.

The Wolof household organized agrarian energy production through long-standing systems of land tenure based on kinship and lineage. In general, land tenure was divided into three separate regimes—*lamant*, *gormon*, and *lew*—and corresponded with social status. The *lamant* system was the most common form of communal tenure and was managed by the free peasant classes. In the Wolof

⁷⁶ Osborn, *Our New Husbands*, 5.

⁷⁷ Herbst, *States and Power*, 11-31.

⁷⁸ Ibid, 8; Also in Curtin, *Economic Change*, 1-30;

⁷⁹ Osborn, 8. Also in Jeffrey Herbst, *States and Power*, 11-31.

⁸⁰ For an insightful analysis of how precolonial states mobilized and transported energy resources, see: Osborn, "Containers," 69-94.

states, lineage elders, known as the *laman*, were the descendants of the first settlers and had the exclusive rights to the land. Although the *laman* leased their land to local farmers, they did not necessarily collect “rent” but demanded loyalty from the households that worked on their lands.⁸¹

In contrast, the political elite developed the *gormon* and *lew* tenure systems to increase their access to, and control over, agricultural production. In the Wolof states, the ruling elite developed the *gormon* system of land tenure to manage unclaimed and vacant lands.⁸² Designed to benefit the aristocracy, the *gormon* system gave landholding rights to the political elite who then collected tribute payments from newly established villages. The inhabitants, who were former slaves or free peasants seeking protection from the aristocracy, paid hefty dues to the political authorities. Similarly, the *lew* system, which existed in the Wolof states of Kajoor and Bawol, guaranteed households’ usufruct rights to the land but charged the tenants 10 to 20 percent of the harvest. Through these systems of land tenure, then, the political elite had access to multiple land tenure claims, as well as a large population of servants, slaves, and political subjects that paid taxes and tribute.⁸³

The relationship between energy production, political power, and the household is most evident in oral traditions and early European reports of aristocratic households.⁸⁴ Oral traditions of precolonial Wolof society, particularly in the sixteenth and seventeenth centuries, separate the aristocracy from the rest of society.⁸⁵ The aristocrats, or *garimi*, broadcasted their power through an intricate network of elites that were divided into two tiers. The first tier was comprised of a small group of royal families that were eligible to serve in the highest political offices. The second tier, typically the offspring of polygamous marriages, was a group of lesser nobles that served as

⁸¹ Curtin, *Economic Change*, 13-29.

⁸² Ibid..

⁸³ Ibid.

⁸⁴ The most comprehensive collection of oral traditions in Senegal was collected by Yoro Dyao and published by R. Rousseau, “Le Sénégal d’autrefois. Etude sur le Oualo, Cahiers de Yoro Dyao,” *Bulletin du comité des études historiques et scientifique sur l’Afrique Occidentale Française*, XII (1929), 133-211; R. Rousseau, “Le Sénégal d’autrefois. Second étude sur le Cayor,” *Bulletin de l’IFAN*, III, B (1941), 79-144.

⁸⁵ Ibid, “Le Sénégal d’autrefois,” 133-211.

provincial commanders.⁸⁶ Positioned in villages throughout the kingdoms, these nobles had land tenure rights, collected taxes from their political subjects, and provided the first tier with tribute payments, surplus grains, and slaves.⁸⁷ Through these provincial commanders and their multiple claims of land tenure, the ruling class used their wealth in people and land as a means to accumulate a wealth in energy.

During his stay on the Wolof coast in 1455, Cadamosto witnessed the stark social division between the ruling elite and their political subjects. In particular, Cadamosto noted that the King, Zucolin, established his authority by collecting tribute, taxes, and gifts from the political elite. Each year, aristocratic families demonstrated their loyalty by presenting the king “with horses, forage, cows, goats, vegetables, millet, and the like.”⁸⁸ In addition, aristocratic families raided and pillaged their own villages, or those of neighboring states, to present the king with slaves. As the most valuable commodity in Senegal Valley, the king either used the slaves to cultivate his land or sold them to Moorish merchants for horses, iron, and weapons.⁸⁹

Furthermore, the king extended the reach of his household by traveling from village to village and taking as many wives, concubines, and servants as he wished. During his stay along the Wolof coast, Cadamosto observed that Zucolin, in one coastal village, had thirty wives, a house for each one, and “young servants and slaves to cultivate the possessions and lands assigned [to them] by the king.”⁹⁰ Each morning, at sunrise, his wives individually prepared three or four dishes of grains, meat, and fish that were sent, via slaves, to the king’s compound. With nearly 130 dishes assembled, the king picked the ones he wished to eat and left the rest for his entourage. The king’s power, in this instance, was not only displayed through his wealth in people, but also through the

⁸⁶ James Searing, “Aristocrats, Slaves, and Peasants: Power and Dependency in the Wolof States, 1700-1850” in *The International Journal of African Historical Studies*, Vol. 21, No. 3 (1988): 477.

⁸⁷ *Ibid.*

⁸⁸ Searing, “Aristocrats,” 30.

⁸⁹ Cadamosto, *Voyages*, 47.

⁹⁰ *Ibid.*

extravagant and lavish demonstrations of his abundance in energy sources—namely wives, slaves, and food.

Within the household, the ruling class organized their living quarters around political rank and social status. During his stay with lord Budomel, a provincial noble from the state of Kajoor, Cadamosto reported that his compound was comprised of forty or fifty straw huts grouped in a circle and surrounded by hedges and groves of trees. Each straw hut had its own courtyard that was fenced in, and people went from one house to the next freely passing through the individual courtyards. Each hut, he observed, corresponded to the standing and condition of the different members of the household. The first enclosures were reserved for slaves, servants, and people of low rank; and the final enclosures, typically at the center of the village, were for people of higher notoriety such as the nobility, political advisors, and wives.⁹¹

In each village of his province, Budomel had four or five wives that managed and tended to the household. Each wife, according to Cadamosto, had six “black girls” as well as a large number of slaves that performed a variety of domestic duties, such as farming and looking after the livestock. Each day, one of the wives prepared a decadent meal of three or four dishes of meat and fish, and once Budomel selected a dish, his wives, slaves, and servants helped themselves to the rest.⁹² When he was away at “court” or visiting other villages, his wives managed the farms and employed slaves to maintain the property and cultivate the fields.⁹³ Similar to the king, Budomel’s power and social position were linked to his access to, and control over, his many wives, slaves, and servants—as well as his store of cereals, grains, and other forms of organic energy.

For the Wolof elite, slaves and horses served as valuable sources of energy that enabled them to accumulate wealth and consolidate power in the Senegal Valley. Usually captured in warfare and

⁹¹ Cadamosto, *Voyages*, 82.

⁹² *Ibid.*

⁹³ *Ibid.*, 83.

slave raids, slaves performed a variety of tasks that contributed to energy production within the household. Household slaves, for example, fulfilled a number of roles such as domestic servants, farmers, concubines, cooks, housekeepers, and personal attendants to their masters.⁹⁴ For the most part, household slaves were second or third generation captives that lived in the aristocratic compound or settled in nearby villages.⁹⁵ Agricultural slaves, who resided in neighboring villages, usually split their time between cultivating their own land and growing crops for their masters.⁹⁶ As such, they paid nearly two-thirds of their harvest to their masters and, during the dry season, half of their earnings from weaving and manufacturing textiles. In some cases, slaves were permitted to pay their masters a tribute that was comparable to the labor owed, which enabled them to have more control over their own time and land.⁹⁷ In this way, domestic and agricultural slaves were a vital part of the household, as they replenished the granaries of the aristocratic household and refined and converted organic energy into food and fodder.

Captives of war typically worked their master's land and performed the most taxing forms of labor. In cultivating the fields of the political elite, they produced valuable commodities for trade as well as large surpluses of staple grains. According to one European slave trader, these slaves worked under the supervision of soldiers and to the "sound and rhythm of energetic music" played by six griots.⁹⁸ The presence of griots and soldiers in the fields—playing music and standing guard—signified the critical importance of agricultural production and slave labor. The presence of the griots suggests that agricultural production was not merely a routine process of growing grains and

⁹⁴ In most cases, domestic slaves were women who served as attendants, advisors, and concubines, and stayed within the same residence as their masters. According to Emily Lynn Osborn, in some precolonial states women played a critical role in politics and state-making. See: Osborn, *Our New Husbands*, 23-74.

⁹⁵ Searing, "Aristocrats, Slaves, and Peasants," 480.

⁹⁶ *Ibid.*, 478.

⁹⁷ This discussion of tenant-labor relations among Wolof masters and slaves draws on Yoro Dyao, "Etude de le Oualo," 34, and Searing, "Aristocrats, Slaves, and Peasants," 481.

⁹⁸ Michel Jajolet de La Courbe, *Premier voyage du sieur de la Courbe fait a la coste d'Afrique en 1685*, Edited by Prosper Cultru (Paris: E. Champion, 1913), 45.

cereals, but a ritual practice that required the presence of the guardians of traditions, stories, and history.⁹⁹ The presence of soldiers in fields, though somewhat self-explanatory, implies that both the slaves and the products they produced were valuable commodities that needed surveillance and protection. As will be demonstrated, the fertile lands of the Senegal Valley, as well as slaves and staple grains, became increasingly important in the late seventeenth century as political conflicts broke out and a steady decrease in rainfall enforced new ecological limits on the Wolof states.

In addition to domestic labor and agriculture, the Wolof elite used slaves to transport goods from one place to another. As Emily Lynn Osborn demonstrates in her study of containers and energy in Africa, captives often facilitated the movement of goods from the interior to the coast. Through coercion, the aristocratic elite and slave traders forced slaves to carry headloads of produce and other trade goods.¹⁰⁰ In this way, slaves themselves became vessels for the transport and distribution of organic energy from the fields of the Senegal Valley to elite households and centers of trade. Furthermore, slave traders and merchants deployed captives to man canoes and distribute goods along the Senegal River. These slaves, which in the eighteenth century became a central component of the river trade, were highly skilled sailors known as *laptots*.¹⁰¹ As will be shown in the following chapter, these slaves not only transported captives of war into the transatlantic slave, but they were also critical to the distribution of staple grains and other goods.

In the sixteenth and seventeenth centuries, slaves also played a fundamental role in the accumulation of horses, which played a critical role in the armies of the Wolof kingdoms. Due to its arid environment, the Sahel and savanna were inhospitable to the *tsetse* fly, which frequently

⁹⁹ For more on griots, see: Thomas Hale, *Griots and Griottes: Masters of Words and Music*, (Bloomington: Indiana University Press, 1998); Barbara Hoffman, *Griots at War: Conflict, Conciliation and Caste in Mande* (Bloomington, Indiana University Press, 2001); Isabelle Leymarie, *Les griots wolofs du Sénégal* (Paris: Maisonneuve et Larose, 1999).

¹⁰⁰ Osborn, "Containers," 83.

¹⁰¹ James Searing offers a detailed analysis of the *laptot*. Searing, *West African Slavery*, 59-93.

devastated populations of livestock and horses in more tropical environments.¹⁰² In the Wolof states, however, the absence of the *tsetse* fly enabled aristocratic families to build large cavalries through trading slaves with Europeans.

In his encounter with Lord Budomel, Cadamosto noted that the Wolof elite were eager to acquire Europeans horses in exchange for slaves. In May of 1455, Cadamosto anchored off the shores of “Budomel,” a territory about 80 miles from the Senegal River. The region of Budomel, which was named after its Wolof chief, had a good reputation among Portuguese traders as both an honest and hospitable host. Once ashore, Cadamosto sent a “black interpreter” to summon “Lord Budomel” for trade. Equipped with Spanish horses and “other things which were in demand in the land of the blacks,” Cadamosto intended to trade large quantities of European goods for slaves.¹⁰³ As soon as the chief received the invitation to trade, he arrived on horseback with fifteen mounted men and an additional 150 men on foot. In their initial encounter, they shared a great feast and Cadamosto gave him “all that he wished,” and horses in particular, in exchange for 100 slaves and a “handsome young negress” to attend to the service of his chamber. After the agreement, Cadamosto returned with Budomel to an inland village where he waited to receive his cargo of slaves.¹⁰⁴

After the Portuguese arrived in the fifteenth century, the exchange of slaves for horses became a routine affair between the Wolof elite and European slave traders. As Cadamosto noted in an exchange with the Lord Budomel, Spanish horses were in “much demand in the land of the blacks” and Portuguese traders were “paid handsomely” for them.¹⁰⁵ For the Wolof, horses were a symbol of military power that provided a decisive edge in warfare and slave raiding. Indeed, when a member of the nobility purchased a horse, he performed a variety of rituals to ensure its health and

¹⁰² For a more comprehensive discussion of the cavalries of the precolonial savanna kingdoms, see: Robin Law, “Horses, Firearms, and Political Power in Pre-colonial West Africa,” in *Past and Present*, No. 72 (August, 1976): 112-132.

¹⁰³ Cadamosto, *Voyages*, 37.

¹⁰⁴ *Ibid.*

¹⁰⁵ *Ibid.*

safety. Immediately after the purchase of a horse, the political elite sent for a “horse doctor” to construct a large fire of fresh tree branches and twigs, so as to produce significant amounts of smoke.¹⁰⁶ When there was a heavy plume of smoke coming from the fire, they lead the horse by its bridle through the smoke while uttering words and incantations. Afterwards, they placed amulets, or *gris-gris*, around the horse’s neck and smeared its entire body with a fine ointment. Through this process, the Wolof believed that their horses were better prepared for battle and could go safely into harm’s way.¹⁰⁷

In some cases, though, the wet period of the fifteenth and sixteenth centuries introduced new challenges for horses and other draft animals in the Senegal Valley. Heavier rains were followed by a northward push of the tsetse fly, which threatened livestock, horses, and people alike through the spread of sleeping sickness.¹⁰⁸ According to some accounts, the tsetse flies decimated the cavalry forces of political elites during the sixteenth century.¹⁰⁹ Long regarded as status symbols, European horses were highly coveted by the ruling class and, despite their high mortality rate during the wet period, elites continued to barter slaves for horses.¹¹⁰

Taken together, the various forms of energy concentrated in the Wolof households, from horses and slaves to cereals and grains, were not simply physical sources of energy but were also representations of political power. As the “wet period” came to a close at the end of the sixteenth century, arable lands in the Senegal Valley contracted and the organic economy of the Wolof kingdoms experienced climatic and ecological limitations. Indeed, for the next two centuries,

¹⁰⁶ Cadamosto, *Voyages*, 37. Cadamosto’s description of a horse doctor is a bit literal. In all likelihood, the “horse doctor” was either a griot or a local shaman.

¹⁰⁷ Ibid, 37. Also refer to Robin Law, “Horses, Firearms, and Political Power,” 112-132.

¹⁰⁸ Brooks, “A Provisional,” 78-151.

¹⁰⁹ Ibid.

¹¹⁰ Senegambian populations were skilled in mitigating the spread of the tsetse fly and sleeping sickness. While creating buffer zones and planting crops away from tsetse habitats was successful, some unfortunate people (and cattle) still fell victim to sleeping sickness. Perhaps the best study of trypanosomiasis in Africa is: John Ford, *The Role of the Trypanosomiasis in African Ecology: A Study of the Tsetse Fly Problem* (Oxford: Clarendon Press, 1971).

recurring droughts pushed the Wolof states, as well as the Moorish kingdoms of Trarza and Brakna, to the fertile regions of the Senegal Valley. As such, the precolonial states and polities of the Senegal Valley contested for access to, and control over, fertile lands and harvests of staple grains and other foodstuffs. As the following section will show, the combination of the new “dry period” and the escalation of the transatlantic slave trade along the coast reconfigured the politics of energy in the Senegal Valley and made the energy resources of the precolonial household all the more valuable.

Drought, Scarcity, and the Centralization of Energy Production

Although climatic and ecological change occurred frequently during the era of transatlantic slave trade, historians have regarded them as minor incidents in comparison to the violence, destruction, and turmoil brought on by European incursion. While there is little doubt that the transatlantic slave trade was a destructive political and economic force, historians have overlooked environmental change as a major player in the reconfiguration of the Senegal Valley’s political and economic landscapes. To an extent, historians have focused predominantly on the link between European trade and the steady decline of political and economic stability. By establishing trade with coastal states and polities, they contend that the Portuguese reconfigured the economic landscape of the region and significantly diminished the trans-Saharan trading networks that long supplied West Africa with goods from the north. The growth of coastal trade, then, gradually diverted trading networks from the interior and the slave trade became the main determinant in political and economic activities.¹¹¹

¹¹¹ The discussion of the transatlantic slave trade and its effect on West Africa’s political economy has received considerable attention from historians of Africa. For a more in-depth analysis, please refer to: Barry, *Senegambia*, 1-46; Philip Curtin, *Economic Change*, 92-153; J.D. Fage, “Slavery and the Slave Trade,” 393-404; Walter Rodney, “African Slavery,” 431-443.

Furthermore, many historians, and Boubacar Barry in particular, argue that the Jolof Confederation disintegrated as trade gravitated toward the coast. When the confederation collapsed, so too did a centuries-old system of economic exchange between the Berbers, Moors, and the Wolof kingdoms. As trade consolidated along the coast, the Berbers and Moors lost access to their once reliable sources of slaves and staple grains. To make up for the lack of trade, Berbers conducted frequent raids in Wolof territories and set fire to farmlands, captured slaves, and stole grain surpluses. The constant state of insecurity, as well as the rapid growth of the transatlantic trade, ushered in a prolonged period of violence that destabilized the region.¹¹²

However, political and economic instability during the seventeenth century was also rooted in ecological and climatic shifts. Sudden changes to the environment disrupted the flow of organic energy sources—namely cereals and grain—between local communities, the political elite, and slave traders on the coast. As droughts threatened grain supplies, conflicts over fertile land and surplus grains pitted Wolof states, Europeans traders, and Berbers and Moors against one another. Simply put, the upheaval of the Senegal Valley’s social and political systems cannot be attributed to the transatlantic slave trade alone, but also to the contraction of fertile lands during the Senegal Valley’s two hundred year “dry period.”

Spanning more than two centuries, from approximately 1650 to 1850, inconsistent rains and frequent droughts brought new challenges to the states and polities of the Senegal Valley. During this extended period of low precipitation, which coincided with the “Little Ice Age” in Europe and North America, the Inter-Tropical Convergence Zone pushed south and brought increasingly drier conditions to West Africa.¹¹³ Indeed, reports of the Sahel’s drier climate emerged in the historical record during the early 1600s as slave traders, merchants, and explorers established trading posts

¹¹² Barry, *Senegambia*, 1-46. While I single out Boubacar Barry in this analysis, the vast majority of scholarship offers a similar reading of the Wolof states during the era of the transatlantic slave trade.

¹¹³ Brooks, “A Provisional,” 154-187.

along the coast. In contrast to the reports of the early Portuguese explorers in the fifteenth century, which largely focused on Senegambia's lush and fertile environment, European traders in the seventeenth century frequently encountered arid landscapes and populations suffering from droughts, locust plagues, and constant food shortages.

In 1606, Pieter van den Broecke, a trader with the Dutch East India Company, made landfall in a small Wolof village south of the Cap Vert peninsula. When the Dutch arrived on the coast they reported that drought, as well as a plague of locusts, had ravaged the countryside and decimated the majority of the region's food supply. According to one Dutch trader, times were so challenging that Wolof households sold their children into slavery for a modest amount of cereals and grains.¹¹⁴ One desperate family, for example, sold Van den Broecke "a pretty little girl aged about ten years" for 130 pounds of rice and exchanged another for "a measure of millet that did not exceed the contents of a hat."¹¹⁵ For some peasant communities, then, selling members of the household into the transatlantic slave trade served as a mechanism to endure extended periods of drought and scarcity. Similarly, from 1609-1611, Spanish and Portuguese missionaries recorded instances of drought and famine that depleted grain stores and drove peasants and farmers into slavery.¹¹⁶ The drought, which was made worse by a locust plague, was responsible for "many deaths" and pushed several people into captivity to avoid starvation.¹¹⁷

Around the same time, one of the first French explorers to visit the Senegambian coast, Claude Jannequin, arrived at the estuary of the Senegal River and offered a bleak picture of the Sahelian landscape. In stark contrast to Portuguese reports 150 years earlier, Jannequin described the

¹¹⁴ Broecke, Pieter van den, and La Fleur J. D. *Pieter van den Broecke's journal of voyages to Cape Verde, Guinea and Angola, 1605-1612* (London: Hakluyt Society, 2000), 12-15.

¹¹⁵ Broecke, *Journal of Voyages*, 14.

¹¹⁶ Balthasar Barreira, "La description de la côte de Guinée du père Balstar Barreira" published by Guy Thilmans and Nize Isabel de Moraes in *Bulletin de l'I.F.A.N.*, 31, 1-50; Manuel Alvares *Tratado breve des rios de Guine de Capo Verde* (Spain: 1594), 21.

¹¹⁷ Broecke, *Journal of Voyages*, 14. Also cited in: Becker, Charles. "Notes sur les Conditions Écologiques en Sénégal aux 17e et 18e Siècles," *African Economic History*, No. 14 (1985), 172.

region as a hot, sandy, and inhospitable environment. Shortly after his arrival on what is now the island of Saint-Louis, Jannequin complained that laboring in the intense sun “was incredibly painful due to heat exhaustion” as well as the “tremendous difficulty of finding potable water in this terrible land.”¹¹⁸ Reports of ecological crises become increasingly common after the French established settlements on the islands of Gorée and Saint-Louis in 1647 and 1659, respectively. With the establishment of major trading post along the Atlantic coast, French trading companies appointed governors to oversee and facilitate trade. In particular, the governors of the *Comptoir de Saint-Louis de Sénégal*, a French trading company, took detailed records of the food shortages, famines, and droughts that frequently interfered with the company’s economic affairs.

While these reports underscore the transition of the Sahelian environment from a “wet” to “dry” climate, the suffering of peasant populations was not solely linked to ecological change, and drought in particular. More specifically, these reports show the various ways in which droughts, famines, and food shortages were deeply entangled with political instability and interstate warfare. Conflicts and political disputes often erupted over access to grain surpluses, and French traders frequently complained that the Wolof states had too much control over the flow of grains from the interior to the coast.¹¹⁹ When droughts and famines occurred, aristocratic families incorporated starving farmers and peasants into their households. In using them as servants, agricultural slaves, or captives to be sold to Europeans, the political elite not only increased the size of their households but also profited from the slave trade during times of scarcity. In effect, when cereals and grains were scarce—due to political unrest or ecological change—control over energy sources was a primary mechanism for the Wolof elite to centralize and maintain power.

¹¹⁸ Jannequin, RC. *Voyages de Lybie au royaume du Sénégal, le long du Niger, avec la description des habitants qui vont le long de ce fleuve, leurs coutumes et façon de vivre, les particularités les plus remarquables de ces pays* (Paris: C. Rouillard, 1643), 56.

¹¹⁹ Louis Moreau de Chambonneau, “Relation de Sr. Chambonneau,” in *Bulletin de géographie historique et descriptive* 2. (1898), 308-21.

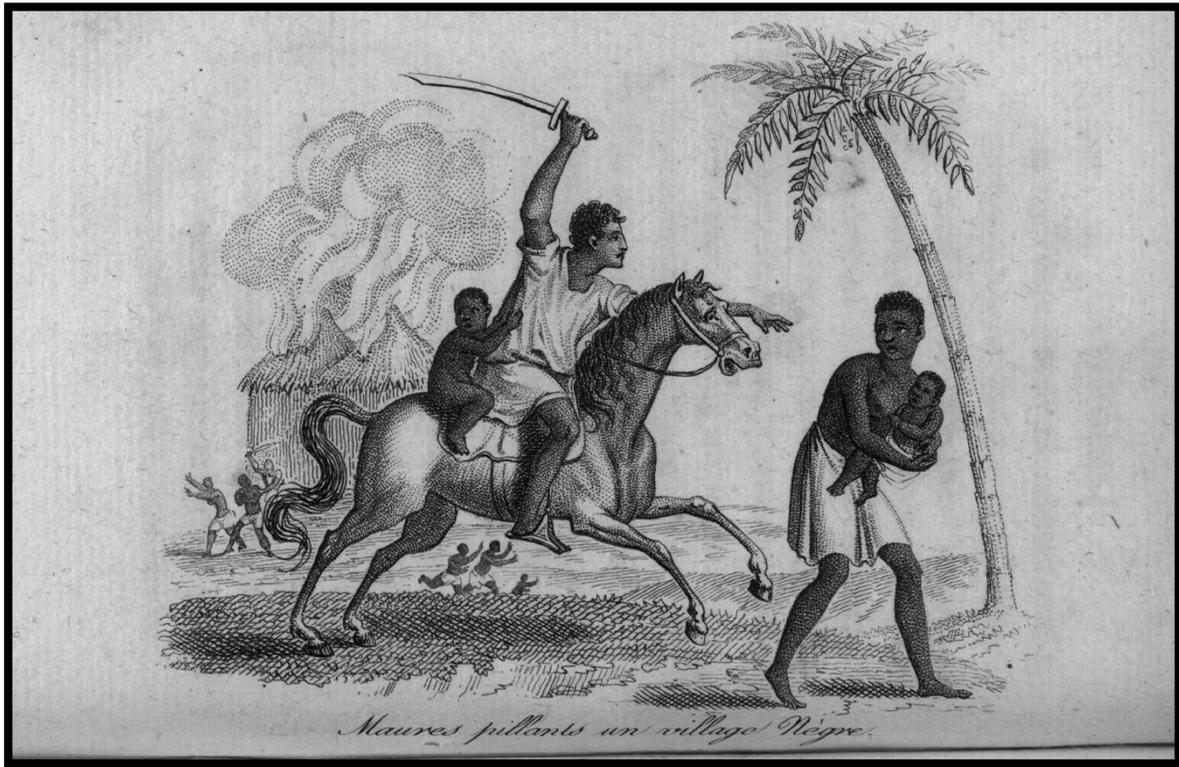


Figure 4: An engraving of a Moorish warrior raiding a Wolof village for slaves. David Boilat, *Esquisse Sénégalaise*—Nouvelle édition, introduction de Abdoulaye Bara Diop (Paris: Karthala, 1984), 73.

In the mid-seventeenth century, the Wolof states competed for access to trade along the Atlantic coast. Due in part to their geographical locations, the kingdoms of Kajoor and Waalo emerged as the two most powerful Wolof states. Kajoor, which was located on the coast, and Waalo, which encompassed the fertile lands of the Lower Senegal River Valley, traded at the nexus of European, Berber, and Senegambian trading routes. In the 1670s, the tension between the Berbers and the Wolof kingdoms came to a head during the “War of the Marabouts.” With the development of slave entrepôts on the coast, the majority of the grain trade was directed to Saint-Louis to feed the slave houses, ships, and traders awaiting departure for the New World. Cut off from the “bread

basket” of the Sahel, Berbers and Moors experienced food shortages and political and economic alienation.¹²⁰

In response to the changing economic landscape of the Senegal valley, Nasir al-Din, a Muslim cleric from present day Mauritania, waged *jihad* on the states of Kajoor and Waalo. The objective of Nasir’s “holy war” was twofold. First, Nasir hoped to restore access to Senegambia’s grain and slave markets, and second, he intended to bring Wolof populations under a “pure” form of Islam.¹²¹ In quick succession, Nasir conquered and set up viceroys to rule over the Wolof states. Throughout the war, Nasir traveled from “village to village preaching in the public square,” proclaiming that “God never allowed Kings to pillage, kill, or make their people captives” and that “people were not made for the kings, but the kings for people.”¹²² Although Nasir’s populist message gained support among local Wolof populations, he died shortly after gaining control of the Senegal Valley.¹²³ In the wake of his death, his movement quickly unraveled and the Wolof aristocracy attempted to restore their power in the region.

The tumultuous years of the “War of the Marabouts” served as a watershed moment for the organic economy of the Senegal Valley. As one of the primary objectives of the war, Nasir’s plan to take possession of fertile lands fundamentally changed the “politics of energy” between the Wolof states and their political rivals. As mentioned earlier, the politics of energy denotes how people concentrated, governed, and deployed energy flows—the transfer of physical energy from one body or place to another to consolidate power. Since Nasir hoped to gain control over the fertile flood

¹²⁰ Barry, *Senegambia*, 50-51.

¹²¹ Ibid, 51. The purpose of al-Din’s holy war is contested among historians. Some believe he wanted to put an end to the transatlantic slave trade, which in turn, would reintroduce a more robust internal slave trade between the Wolof and the Berbers. Others, however, believe that al-Din simply protested the enslavement of Muslims and, more specifically, those of the same ethnic or kinship group. In either case, most historians tend to agree that the driving force behind the “War of the Marabouts” was the attempt to capture the grain market. Also see: Searing, *West African Slavery*, 27-59; Curtin, *Economic Change*, 92-153; Barry, *Senegambia*, 50-51.

¹²² Cited in Barry, *Senegambia*, 352.

¹²³ Barry, *Senegambia*, 50-54.

plains of the Senegal River, as well as the fecund grain fields of the kingdom of Kajoor, the Wolof states used access to fertile lands, and the grains they produced, as a strategy to defeat the Moors and the Berbers. By instituting a scorched earth policy, the Wolof states forced Nasir's armies to retreat from the Senegal Valley.¹²⁴

For three years, from 1674-1677, the Wolof elite resisted the Berber movement by cutting off grain supplies and burning crops. Consequently, the flow of grains and cereals from the hinterlands to Saint-Louis also suffered. Without a consistent supply of grains, slave traders in Saint-Louis struggled to provide sufficient amounts of food for the large slave populations awaiting shipment to the Americas. In 1674, Louis Moreau de Chambonneau, the commander of the *Comptoir de Sénégal*, reported that the continued conflict between “marabouts” and Wolof “kings” prompted a large-scale famine in the Senegal River valley. The severity of the famine, he believed, was the result of poor political leadership within the states of Kajoor and Waalo. Their kings, he observed, did nothing but “kill enemies, take captives, and pillage and burn” the fertile floodplains of the Senegal River.¹²⁵ As a result, Chambonneau noted that the political elite, in need of weapons and horses, willingly captured and sold their own subjects to European slave traders in order to gain an edge over their rivals. In this way, French slave traders not only recorded dramatic increases in Saint-Louis' slave populations but also expressed their growing concerns over the lack of cereals and grains along the coast.¹²⁶

¹²⁴ This was reported by Louis Chambonneau. See: Chambonneau, “Relation,” 367. Also referred to in Searing, *West African*, 25.

¹²⁵ Ibid.

¹²⁶ Ibid, 368. To be sure, during the 1670s the number of slave ships that departed Saint-Louis for the Americas spiked from the previous decade. From 1670 to 1680, the total number of Senegambian slaves that were shipped to the Americas was 5,488, as opposed to the 448 that were sold from 1660-1670. Of this total, nearly two-thirds came from Saint-Louis and Gorée. While many of the slaves that embarked for the plantations of the New World were prisoners of war that were sold into captivity, many of them were desperate villagers and peasants that would have otherwise succumbed to famine and starvation. Data taken from: Transatlantic Slave Trade Database, “Embarkations from Senegambia,” accessed June 2016, <https://www.slavevoyages.org>.

The increase in the coastal slave population created an urgent demand to provide slave houses and trading vessels with provisions. In July of 1674, Chambonneau departed Saint-Louis for a trading post in the Futa Toro, a region in the northeastern corner of present day Senegal, to rekindle the grain trade and procure “millet” for the “large quantities of slaves we trade every day.”¹²⁷ In travelling up the Senegal River, however, he quickly observed the lasting effects of the war and the toll that famine had taken on local populations. As he passed through the kingdom of Waalo, he observed several peasants “collecting grasses, leaves, and bits of leather” to boil and consume as a meal. In some places, where armies had “devastated millet farms by cutting down seedlings,” entire families “were reduced to killing each other to steal food” or “placed themselves into slavery” in hopes of procuring a small ration of millet.¹²⁸ Even further, the number of Wolof peasants who sought refuge from starvation was so vast that Chambonneau, upon returning to Saint-Louis, complained that his crew “could have collected more than six hundred” captives along the way had they “not run out of space” on their slave ships.¹²⁹ In effect, while the scorched earth strategy of the Wolof states was effective, Chambonneau’s account of the devastation and destruction of farmlands also shows that depleting grain supplies had a detrimental impact on the Senegal Valley’s vulnerable peasant communities.

In the later stages of the war, the French, reeling from several years of food shortages and famines, partnered with the kings of Waalo and Kajoor to drive out the remaining Berber armies. In 1677, the alliance pushed the Berbers north and the kingdoms of Waalo and Kajoor re-established their control over their respective territories. At the end of the war, Chambonneau expressed his great relief in reopening trade along the Senegal River. In his final report on the “War of the Marabouts,” he optimistically stated, “it is with great hope for our commerce, Sirs, and for the

¹²⁷ Chambonneau, “Relations,” 351. Also cited in Barry, *Senegambia*, 52-53.

¹²⁸ Chambonneau, 351.

¹²⁹ *Ibid.*

Blacks, that they continue to live in peace; for the trade of millet, leathers, gum, amber, livestock, and other things will be better.”¹³⁰ Although the French helped bring an end to the conflict, the lackluster flow of grains from the interior to the coast exposed the precarious position of French settlements along the Atlantic Coast. Since they possessed little to no arable land, the French were at the mercy of the kingdoms of Kajoor and Waalo for provisions, slaves, and food supplies. Careful not to offend the ruling elite, but also eager to pursue the profits of the slave trade, the French, for decades to come, were forced to balance their economic interests while maintaining peaceful and workable relationships with the Wolof aristocracy.

As the following chapter will demonstrate, the Wolof states, in response to the “War of the Marabouts,” established large armies of slave-soldiers to protect fertile lands and the valuable grain stores they produced. These soldiers, referred to as the *ceddo*, enabled powerful Wolof elites to centralize political power and control the organic economy of the Senegal valley. In part, the rise of the *ceddo* monarchies was both a response to the rapid and swift invasion of the Berbers and Moors during the “War of the Marabouts” and the increased frequency of droughts and famines. Throughout the eighteenth century, the consolidation of energy resources under the *ceddo* monarchies would significantly alter the politics of energy in the Senegal Valley. In controlling the trade of slaves and grains, the Wolof elite were well situated to endure periods of scarcity and political volatility. In using the *ceddo* to raid and pillage local villages for slaves and grains, the political elite not only profited from selling their captives and slaves to European merchants, but they also supplied elite households with a slave labor force to cultivate fertile lands and increase the production of staple grains.

¹³⁰ Chambonneau, “Relations,” 352.

Conclusion

As a place where Wolof elites and peasant farmers produced, stored, distributed, and deployed different forms of energy, this chapter has shown that the precolonial household functioned as an “energy refinery.” Through the establishment of land tenure systems, tribute payments, and systems of agrarian energy production, the political elite consolidated various forms of energy, from staple grains to slave labor and horses, to accumulate both wealth and political power. As the climate shifted from a “wet” to “dry” period in the seventeenth century, however, the household not only functioned as an energy refinery but also as a valuable political asset. As fertile lands contracted during the dry period, the states and polities of the Senegal Valley competed for access to and control over the organic economy. As the “War of the Marabouts” demonstrated, slaves, staple grains, and land became critical to the consolidation of political power. Rather than simply sustaining and supporting the powerful households of the economic elite, slave labor and the agrarian energy systems of the Wolof states became a fundamental component of maintaining authority in the Senegal Valley.

CHAPTER TWO

Fueling the Precolonial State: The Organic Economy, Drought, and Environmental Change in the Senegal Valley

In 1706, Sieur de La Courbe, the commander of the *Compagnie du Sénégal*, reported that the kingdom of Kajoor enforced a commercial blockade of Saint-Louis and Gorée. The boycott was in response to a violent skirmish that erupted over the allocation of grains from the king, or *damel*, to the traders and merchants along the coast. The conflict, he complained, caused prolonged food shortages in “beef and millet” and forced the French to rely on the limited quantities of grains imported by slave ships and trading vessels.¹ For weeks on end, all forms of trade and commerce were suspended until the company and the *damel* could agree on a fair system of trade and taxation. After nearly a month of fighting—and subsequent food shortages in Saint-Louis and Gorée—they agreed to terms and the *damel* ended the boycott. With a return to commerce the French replenished their granaries and the *damel* re-established the slave trade by selling “fifty-six slaves” to French merchants.²

The boycott of grains and beef, as well as the food shortages and famines that followed in Saint-Louis and Gorée, highlights the critical role that the Wolof kingdoms played in providing the French with their basic energy needs. As one French trader grumbled in the early eighteenth century, the “essential problem for Senegal” was the constant threat of famine and the unfortunate reality that merchants and urban dwellers relied entirely on the *damel* for cereals and grains.³ As the breadbasket for Saint-Louis and Gorée, the Wolof kingdoms—and the kingdom of Kajoor in

¹ ANS C 6 14; Also quoted in Charles Becker, “Notes sur les Conditions Écologiques en Senegambie aux 17e et 18e Siecles,” *African Economic History*, No. 14 (1985): 174.

² Ibid.

³ Ibid.

particular—used their control of staple grains as a means to exercise and broadcast their power. Indeed, as long as they maintained their monopoly over cereals and grains, the Wolof kingdoms could uphold their dominant economic and political position in the Senegal Valley.

The dispute between the French and the kingdom of Kajoor was, in effect, a conflict over the “politics of energy”—the transfer of physical energy from one body or place to another—to consolidate power. By examining the politics of energy in the Senegal Valley in the eighteenth century, this chapter argues that control and access to fertile lands, and the cereals and grains they produced, was synonymous with political power and played a critical role in state formation.

Pre-colonial societies in the Senegal Valley developed systems of agrarian energy production that were constrained by the organic economy, or what Fernand Braudel called, “the biological old regime.”⁴ This system produced essential energy needs from the sun, or more specifically photosynthesis, and provided human populations with organic sources of fuel.⁵ The limitations of the organic economy were exceptionally severe in the Senegal Valley, since its arid climate and dry soils placed additional constraints on farming and grazing livestock. This was especially true in the eighteenth century, when West Africa, and the region of the Senegambia in particular, endured a 200-year dry period that lasted from 1650 to 1850.⁶ With frequent droughts, crop failures, and locust plagues, the states and polities of the Senegal Valley competed for access to and control over energy. As the climate changed and arable lands contracted, rival kingdoms competed for food, slave labor, and access to the narrow strips of well-watered land bordering the Senegal River and Atlantic coast.

⁴ Fernand Braudel, *The Structures of Everyday Life: The Limits of the Possible*. (London: Collins, 1981), 70-92.

⁵ For a more detailed discussion of the organic economy, see: E.A Wrigley, *Energy and the English Industrial Revolution* (Cambridge: Cambridge University Press, 2010); Astrid Kander, Paolo Malanima, and Paul Warde, *Power to the People, Energy in Europe over the Last Five Centuries* (Princeton: Princeton University Press, 2013).

⁶For further insight into climate history in the Sahel, see: George E. Brooks, “A Provisional Historical Schema for Western Africa Based on Seven Climate Periods (ca. 9000 B.C. to the 19th Century)” *Cahiers d'Etudes Africaines*, Vol. 26, Cahier 101/102, Milieux, histoire, historiographie, (1986): 43-62; In his classic work on Senegambia, Philip Curtin also discusses these long-term changes in climate history, see: *Economic Change in Precolonial Africa: Supplementary Evidence* (Madison: The University of Wisconsin Press, 1975), 3-8.

This fierce competition meant that fertile lands and the basic sources of energy they produced became valuable political assets and were critical to the consolidation of power. To that end, I argue that energy in the Senegal Valley, including how it was produced, stored, and deployed, served as an important mechanism by which social and political power changed over time.

In general, the history of agriculture and labor in the Senegal Valley has focused on the various ways that precolonial states and Europeans exercised power through different forms of trade and exchange—from trading slaves and horses to exporting cash crops and staple grains.⁷ In his study of slavery and Atlantic commerce in the Senegal Valley, James Searing argues that the Wolof states responded to the emergence of the transatlantic slave trade by capturing and selling slaves, as well as developing a robust system of agricultural production. To that end, he argues that Wolof elites not only accumulated wealth by selling captives into the transatlantic slave trade, but also through the production and exchange of staple grains. In doing so, the Wolof states developed networks of exchange that laid the foundation for “legitimate” commerce in the nineteenth century.⁸

This chapter contributes to this scholarship by examining power in the Senegal Valley in its political and physical form.⁹ In considering slaves, grains, and fertile land as concentrated sources of energy, I contend that political power was not simply the product of commercial exchange and various forms of governance, but it was intricately tied to energy use in the Senegal Valley.¹⁰

Collectively, the Wolof states functioned within a system of agrarian energy production that relied

⁷ The study of precolonial systems of trade and exchange in the Senegal Valley is extensive: Boubacar Barry, *Senegambia and the Atlantic Slave Trade* (Cambridge: Cambridge University Press, 1998) and *Le royaume du waalo, le Sénégal avant la conquête* (Paris: F. Maspero, 1972); Mamadou Diouf, *La Kajoor au XIXe Siècle. Pouvoir cédde et conquête coloniale* (Paris: Karthala, 1990). George Brooks, *Landlords and Strangers*; Curtin, *Economic Change*; Jean Boulègue, *Les Luso-Africains de Sénégambie, XVI-XIX siècle* (Dakar: IFAN, 1972) and *Le Grand Jolof XIIIe-XVIe Siècle, Les Anciens Royaumes Wolof* (Paris: Karthala, 1987). Searing, *West African Slavery*; Robin Law, “Horses, Firearms, and Political Power in Precolonial West Africa,” *Past and Present*, No. 72 (August, 1976), 112-132.

⁸ James Searing, *West African*, 198.

⁹ This framework draws on Corey Ross’s work on ecology and power. See: Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World* (Oxford: Oxford University Press, 2017), 199.

¹⁰ This framework draws on Timothy Mitchell’s work on oil and democracy. By examining oil and democracy as intricately tied together, he argues understand contemporary democracy “as oil.” See: Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011), 1-5.

on fertile land and two fundamental forms of energy: food and labor. I focus on food because it fueled the metabolic systems of humans and animals and served as the “petrol” of the precolonial state;¹¹ and I focus on labor, and slave labor in particular, because it was the primary source of mechanical energy in the Senegal Valley and it served as the “engine” of the organic economy. While access to pastures, forests, and coastal fisheries provided the Wolof kingdoms with a broad spectrum of energy, food and labor were the most widely used and politically contested forms of energy, as well as the most vulnerable to climatic and ecological change in the Senegal Valley.

Although energy use in Africa has followed a different trajectory than the industrialized nations of Europe and North America, recent work on the history of energy in early modern Europe offers a valuable framework for a study of energy use and politics in the Senegal Valley.¹² In his study of the diet, work, and income of pre-industrial agricultural laborers in England, Craig Muldrew deciphers the caloric value of agricultural production from 1600 to 1800 to determine whether output met the energy needs of the population.¹³ As such, he argues that the English population not only ate more and better food than scholars previously suggested, but also increased “industriousness” to cover the basic needs of rising food prices. In taking a similar approach to the Senegal Valley, this chapter argues that the Wolof kingdoms organized their division of labor, their households, and their political and economic infrastructure around food and fertile land.¹⁴ In examining the amount of calories that the Wolof states produced and consumed through cultivating,

¹¹ This framework was inspired by Craig Muldrew’s work on food in the “industrious revolution” in England. See: Craig Muldrew, *Food, Energy and the Creation of Industriousness: Work and Material Culture in Agrarian England, 1550-1780* (Cambridge: Cambridge University Press, 2011).

¹² Studies of England’s pathway to the Industrial Revolution are numerous. Recent work, however, has focused increasingly on pre-industrial energy use. See: Craig Muldrew, *Food, Energy and the Creation of Industriousness: Work and Material Culture in Agrarian England, 1550-1780* (Cambridge: Cambridge University Press, 2011); Jan de Vries, *The Industrious Revolution: Consumer Behavior and the Household Economy, 1650 to the Present* (Cambridge: Cambridge University Press, 2008); E.A. Wrigley, *Energy*, 2010; Paul Warde, Astrid Kander, Paolo Malanima, *Power to the People: Energy in Europe Over the Last Five Centuries* (Princeton: Princeton University Press, 2013).

¹³ Muldrew, *Food, Energy*, “Chapter Three: Calories Consumed by the Poor,” 117-163.

¹⁴ Searing offers a similar analysis, but he fails to make the connection between political power, food, and fertile land in particular. Searing, *West African*.

refining, and stockpiling cereals and grains, this chapter shows that political elites consolidated power by expanding their control over fertile lands, building a large labor force of agricultural slaves, and centralizing the “energy refineries,” or households, of the Senegal Valley under their control. While some scholars, and Searing in particular, have demonstrated the critical importance of the grain trade to domestic slavery and the transatlantic slave trade, they have generally overlooked the connection between fertile land and the development of robust agricultural systems. As a fundamental component to the production and distribution of staple grains, this chapter argues that arable land played a vital role in how precolonial states centralized and maintained power throughout the eighteenth century.

In general, scholars of African history associate state formation with the consolidation of people rather than land. Rather than deriving power from control over territory, African elites generated political power by extending control over people and by accumulating dependents—slaves, wives, and clients.¹⁵ While the consolidation of people was a critical factor in state formation, the arid and unpredictable climate of the Senegal Valley made fertile lands a valuable political asset in their own right. To that end, I argue that control of arable land and the grains produced from it played an overlooked but critically important role in state formation in the Senegal Valley.¹⁶

For the most part, historians of precolonial Senegal have understood state-making and politics in the eighteenth century within the context of both the transatlantic slave trade and environmental decline. For Boubacar Barry, slave raids, droughts, and famines contributed to the

¹⁵ For a more detailed discussion of how Africans consolidated and broadcasted power over people, rather than land, see: Jeffrey Herbst, *States and Power in Africa, Comparative Lessons in Authority and Control* (Princeton: Princeton University Press, 2000), 11-31.

¹⁶Historians of African history associate state formation with the consolidation of people rather than land. Scholars who focus on the history of Senegambia, such as Phillip Curtin, Boubacar Barry, and James Searing, contend that command over land was not an important source of political power, but rather, command over people was. Since access to and control over energy was, as I argue, the fundamental component of political power, the Wolof kingdoms also structured their political and economic systems around access to farmlands and the grains they produced. For more detail on state formation in precolonial African history, see: Herbst, *State and Power*, 11-31; Barry, *Senegambia*, 30-31 and 306; Curtin, *Economic Change*, 13-29; Searing, *West African Slavery*, 1-27; Osborn, *Our New Husbands*, 8.

ongoing “demographic drain” of the transatlantic slave trade and destabilized systems of agricultural production.¹⁷ In his study of climate cycles and social change in Senegambia, George Brooks similarly argues that environmental degradation caused human misery, social dislocation, and was a major factor in “the phenomenal growth of the Atlantic slave trade.”¹⁸ Philip Curtin and James Searing contend, respectively, that droughts, locust plagues, and famines periodically destabilized the political and economic structures of the Wolof states. Curtin suggests that droughts and famines sparked economic stagnation due to brief periods of depopulation,¹⁹ while Searing claims that ecological decline increased slave exports and severely undermined the political power of the Wolof states.²⁰ For Charles Becker, a French scholar of slavery and the environment in Senegambia, prolonged periods of drought ignited tensions between aristocratic families and rival states. In the midst of ecological crises, he argues that food shortages led to a series of civil wars and dynastic conflicts that pushed the Wolof kingdoms into a state of political turmoil.²¹

Although scholars have noted that droughts, crop failures, and famines further contributed to the social disruptions of the transatlantic slave trade, the devastating role of ecological crises tends to overshadow the various ways that Africans responded to periods of drought and scarcity. As such, this chapter will reconsider the way scholars have understood environmental decline in the Senegal Valley, and will demonstrate how the Wolof states were far less affected by droughts and famines than scholars have previously thought. By examining the production, concentration, and distribution of staple grains in the Senegal Valley, this chapter ultimately argues that the political and economic structures of the Wolof states remained relatively stable despite frequent wars, civil

¹⁷ Barry, *Senegambia*, 307.

¹⁸ Brooks, “A Provisional Schema,” 56.

¹⁹ Curtin, *Economic Change*, 110-111.

²⁰ Searing, *West African Slavery*, 150-162,

²¹ Charles Becker, “Notes sur les Conditions Écologiques en Sénégambie aux 17e et 18e Siècles.” *African Economic History*, No. 14, 1985 and “La Sénégambie à l’époque de la traite des esclaves. A propos d’un ouvrage récent de Philip D. Curtin: Economic Change in Senegambia in the Era of the Slave Trade.” *Outre-Mers Revue d’histoire*, No. 235 (1977): 203-224.

conflicts, and periods of rapid ecological change.²² Through their access to, and control over, the Senegal Valley's agrarian energy systems, the ruling elite consolidated power over peasant households, expanded their labor force, established and protected their borders, and used their grain surpluses as leverage over political rivals.

The Energy Refineries of the Senegal Valley in the Eighteenth Century

As demonstrated in the previous chapter, the Wolof household served as an “energy refinery,” a place where members of the household, primarily women and slaves, cultivated fields, harvested crops, and refined and stored cereals and grains for consumption and distribution. As energy refineries, Wolof households fueled the kingdoms of the Senegal Valley by cultivating lands, storing grains, and distributing and paying tribute in grains and other material goods to the political elite. The large households of the monarch, which were spread throughout the kingdoms, served as the principle “energy refineries” of the Wolof states. These households usually had eight to ten wives and each of them had a house, servants, and a large labor force of slaves to sow and harvest their lands.

Slavery, therefore, was a critical factor in the organic economy of the Senegal Valley. Indeed, historians have estimated that the Wolof elite enslaved at least 30 percent of their population, or 400,000 of approximately 1.2 million people.²³ As discussed in Chapter One, slaves fulfilled a variety of roles in Wolof society. First, military slaves, known as the *ceddo*, possessed certain privileges due to

²² The historical literature on environmental change in Senegal is limited. For discussion of ecological change in the Senegal Valley during the TAST, see: Charles Becker, “Conditions écologiques, crises de subsistance et histoire de la population à l'époque de la traite des esclaves en Sénégal 17ème à 18ème siècles,” *Canadian Journal of African Studies*, Vol. 20, no. 3 (1986): 357-376; Becker, “Notes sur l'écologie sur les conditions écologiques en Sénégal aux 17ème et 18ème siècles,” *African Economic History*, No. 14, pp 167-216. Philip Curtin, in *Economic Change*, references the possibility that environmental decline and ecological crises played a role in Wolof politics and economy, but he stops short of in depth analysis. Searing, *West African Slavery*, 129-163. He argues that drought and famine helped fuel a dramatic increase in slave trading, which he corroborates with slave trading statistics from Curtin and Paul Lovejoy, *Transformations in Slavery: A History of Slavery in Africa* (Cambridge: Cambridge University Press, Third Edition, 2016).

²³ Martin Klein, *Slavery and Colonial Rule in French West Africa* (Cambridge: Cambridge University Press, 1998) 35-42.

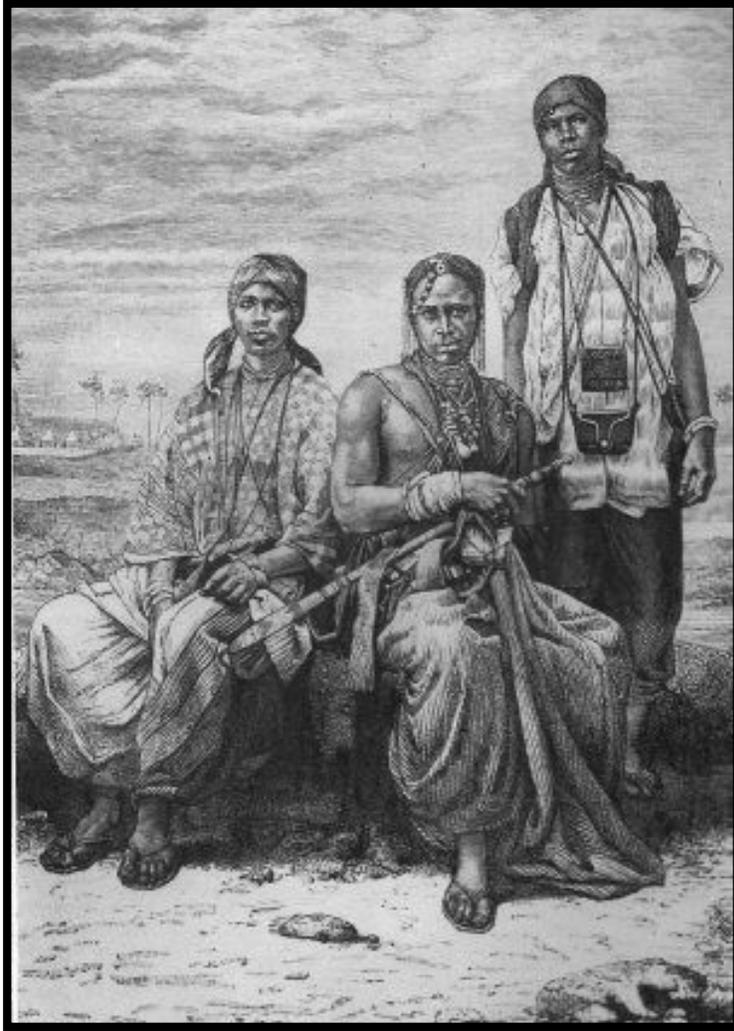


Figure 5: Ceddo Warriors “Warriors of Waalo,” BnF: www.gallica.bnf.fr

their status as the soldiers of aristocratic families. As warriors and slave raiders, the *ceddo* captured prisoners, provided elite households with agriculture slaves, and traded captives to Europeans for horses and guns. The three *ceddo* warriors depicted above, for example, are dressed in non-traditional clothing and are decorated with talismans, or *gris-gris*, as well as exotic goods that they collected in raiding villages and trading slaves. As soldier slaves, then, some *ceddo* warriors accumulated substantial amounts of wealth and power within the Wolof states. As one early European trader noted, the *ceddo* also patrolled the fields with “swords at their sides and spears in their hands” to

prevent agricultural slaves from escaping, and to deter enemies from pillaging their grain fields.²⁴ In this way, the *ceddo* directed the flow of energy, most notably food and slave labor, into the large households of the political elite.

Second, domestic slaves, who were mostly women, typically lived in the household of their masters. As laborers within the “energy refinery,” they shucked grains, pounded millet and sorghum, and prepared meals for the household.²⁵ Furthermore, domestic slaves stored grains in small spouted vessels, or jars, and typically placed them in areas protected from wind and rain. These jars usually had small openings and large, round bodies that settled nicely in sandy and loose soils. Setting the jars a few inches deep in the sand also kept the grains relatively cool, which reduced the chances of spoilage and prolonged their shelf life through the dry season.²⁶

And third, agricultural slaves labored in the fields, cultivated crops, and furnished the household of their masters with grains to refine, store, and distribute to external markets. Agricultural slaves typically resided in neighboring villages and split their time between cultivating their own land and growing crops for their masters.²⁷ As such, they paid nearly two-thirds of their harvest to their masters and, during the dry season, half of their earnings from weaving and manufacturing textiles. In addition, these slaves fulfilled critical roles in energy production within the household. First, in cultivating their own fields and those of the political elite, they produced valuable commodities for trade as well as large surpluses in grains and cereals. According to one early European account of slave labor in the kingdom of Kajoor, agricultural slaves worked with a

²⁴ Michel Jajolet de La Courbe, *Premier Voyage du Sieur de la Courbe Fait a la Coste d’Afrique en 1685* (Paris: E. Champion, 1913), 51-62. Also cited in Searing, *West African*, 55.

²⁵ James Searing, “Aristocrats, Slaves, and Peasants: Power and Dependency in the Wolof States, 1700-1850” in *The International Journal of African Historical Studies*, Vol. 21, No. 3 (1988), 475- 503.

²⁶ For a more detailed account of how households stored organic energy, see: Cameron Gokee, “Crafting, Cooking, and Constructing Histories: Women and the Politics of Everyday Life Along the Falémé River,” *The African Archaeology Review*, No. 2, Special Issue: Comparing Craft and Culinary Practice in Africa (June 2014), 233-263. For a general analysis of energy and containers, see: Osborn, “Containers,” 69-95.

²⁷ Searing, “Aristocrats, Slaves,” 478.



Figure 6: David Boilat. “Carte des peuples du Senegal pour servir à l'intelligence de leur histoire,” dressée par D. Boilat et gravée par L. Bouffard. 1853.

small hoe to cut down the weeds and work and till the soil.²⁸ And second, agricultural slaves were also valuable commodities themselves and could be exchanged for useful goods, such as horses, guns, and ammunition. As one European trader noted in the early eighteenth century, horses were in “much demand” and traders received anywhere from one to six slaves per horse.²⁹

For the most part, peasant farmers and agricultural slaves produced the majority of cereals and grains in the well-watered floodplains of the kingdom of Waalo and the fertile fields of the kingdom of Kajoor. Since the Senegal Valley is a narrow and linear floodplain with an average width of 20 kilometers, Wolof populations divided the valley into three separate zones: the uplands, the floodplains, and the flood basins, which were tiered in parallel bands along the river.³⁰ This tiered

²⁸ La Courbe, *Premier*, 51-62.

²⁹ W.R. Crone, *The Voyages of Cadamosto and Other Documents on Western Africa in the Second Half of the Fifteenth Century* (London: Hakluyt Society, 1937), 37.

³⁰ Susan K. McIntosh, “A tale of two floodplains: comparative perspectives on the emergency of complex societies and urbanism in the middle Niger and Senegal valleys,” Research Gate, pg. 10, https://www.researchgate.net/publication/265363379_A_tale_of_two_floodplains_comparative_perspectives_on_the_emergence_of_complex_societies_and_urbanism_in_the_middle_Niger_and_Senegal_valleys

system enabled farmers and pastoralists to cultivate grains during and after the rainy season. As the rains began in June or July, the upland fields of millet flourished as the floodplains below took on water. In November, as the flood waters receded, farmers harvested the uplands while cultivating the floodplains and flood basin. This, in turn, enabled cultivators to work the land during the dry season and to harvest sorghum during the lean months of March, April, and May.³¹

In the kingdom of Kajoor, villagers and farmers cultivated lands known as *jeeri*, which were mainly used for shifting cultivation. The most reliable and drought resistant grain was millet, and farmers typically sowed it in alternating fields of tree fallow to protect it from wind and dust storms.³² Other cereals and legumes, such as manioc, fonio, and sorghum, were dependent on different types of terrain and soils.³³ As the dietary staples of Wolof communities, slaves and domestic servants pounded sorghum and millet with a mortar and pestle and prepared it with fish, vegetables, and groundnuts. Collectively, these methods and practices of local agriculture, slavery, and food production served as the foundation of the organic economy in the Senegal Valley.

Consolidating the Energy Refineries

Throughout the late seventeenth and eighteenth centuries, the Wolof states of the Senegal Valley competed for control over trade, grains, slaves, and fertile lands. While scholars have drawn attention to the dynastic politics of the Wolof states and the social and economic instability of this period, the vast majority have overlooked the relationship between political power and energy. As will be demonstrated, the Wolof elite expanded and centralized political power by conquering rival states and incorporating peasant and aristocratic households into their kingdoms. In doing so, they

³¹ McIntosh, "A tale of two floodplains," 10.

³² Péliissiere, *Les Paysans*, 135-181.

³³ For a more detailed account of agrarian energy production, see Chapter One of this dissertation: "From the Field to the Refinery: Climate, Energy, and the Household in the Senegal Valley, 1450-1700," 14-33.

not only consolidated control over various forms of energy, from slaves and horses to grains and fertile land, but they also used them as an effective mechanism to broadcast power and manipulate trade.

In the late seventeenth century, a wave of Islamic reform swept through the Senegal Valley. From 1674 to 1677, a Muslim cleric from the Moorish states in present-day Mauritania, Nasir al-Din, invaded the Wolof states and waged *jihad* on the kingdoms of Kajoor and Waalo. As demonstrated in the previous chapter, the objective of Nasir's "holy way" was twofold. First, he hoped to gain control of the grain and slave markets; and second, he intended to bring Wolof populations under a pure form of Islam.³⁴ For three years, the Wolof elite resisted Nasir's armies by cutting off grain supplies, burning crops, and enduring severe periods of food scarcity and in some places, famine. In the end, the Wolof states drove the Berbers north of the Senegal River and restored peace to the kingdoms of Waalo and Kajoor. Yet, the violence of the war, and the famines it produced, fundamentally changed the way the Wolof states consolidated and centralized power. Wary of future invasions from the Berbers and Moors, the Wolof states not only provisioned *ceddo* warriors with horses, guns, and ammunition, but they also used access to cereals and grains as leverage over their enemies. Rather than burning farmlands and destroying granaries, the Wolof states—and the kingdom of Kajoor in particular—enforced boycotts in the grain trade to pressure political rivals into paying taxes and tribute. This strategy was nearly perfected by the famous Wolof king, Latsukaabe Faal, who used grain boycotts to impose his political will on rival states, and the French in particular.

Throughout his reign, which lasted from 1695 to roughly 1720, Latsukaabe Faal centralized political power by consolidating control over people, staple grains, and land. In 1697, Faal assembled

³⁴ Yoro Dyao, voir Sall, T. O., "*Les cahiers de Yoro Jaw comme source de l'histoire du Sénégal*," Mémoire multigraphié, (Paris I, 1979). Also in Barry, *Senegambia*, 50-54.

the first *ceddo* army equipped with European guns and horses. With an armed and mounted cavalry, he rapidly conquered the kingdoms of Bawol and Kajoor and expanded the size of his territories from Saint-Louis to the port of Rufisque. As *damel-teen* (*damel* of Kajoor and *teen* of Bawol), Faal broadcasted and maintained power by enforcing tribute payments for “the protection of harvests, and animals” against the “pillages and raids which were common.”³⁵ In particular, Faal considered himself the “protector of property,” and claimed that he deserved a “reward, or rather a compensation” for safeguarding the fields, farms, and peoples of his kingdoms.³⁶ In return for his protection, peasant households paid Faal nearly 10 to 20 percent of their grain harvests.³⁷ By collecting grains and cereals as tribute, Faal directed the flow of organic energy from all the peasant communities in the kingdom of Kajoor and Bawol to his household. This, in turn, provided Faal with significant quantities of cereals and grains to support and expand his *ceddo* armies and to withstand droughts and ecological crises.

While most peasant households could endure the dry season with the remainder of their harvests, the annual tribute payments reduced any possibility of trading surplus grains for their own economic benefit.³⁸ Since the majority of their surplus grains went to the monarch, peasants were forced to conserve their harvests for the long dry season ahead. This, in particular, had profound political consequences since it forced peasant populations to be entirely preoccupied with providing and conserving enough food for the household. In other words, tribute payments in cereals and grains were an effective way to prevent peasant populations from revolting or resisting the authority of the *ceddo* monarchs.

³⁵ Andre Bruë, “Premier Voyage de Bruë, 1697,” in C.A. Walckener *Histoire Général des Voyages* (Paris, 1826), II, 383.

³⁶ As cited in Charles Becker and Victor Martin (eds), “Recueil sur la Vie de Damel par Tanor Latsoukabe Faal,” in *Bulletin de l'IFAN* (Dakar : IFAN, 36, B, 1, 1974) 114.

³⁷ Searing, *West Africa*, 47.

³⁸ Lucie Colvin discusses the detrimental effect of tribute payments in cereals and grains on peasant households in the nineteenth century. See: Lucie Colvin, “Kajor and Its Diplomatic Relations With Saint-Louis du Senegal, 1763-1861” (PhD Dissertation, Columbia University, 1972), 53.

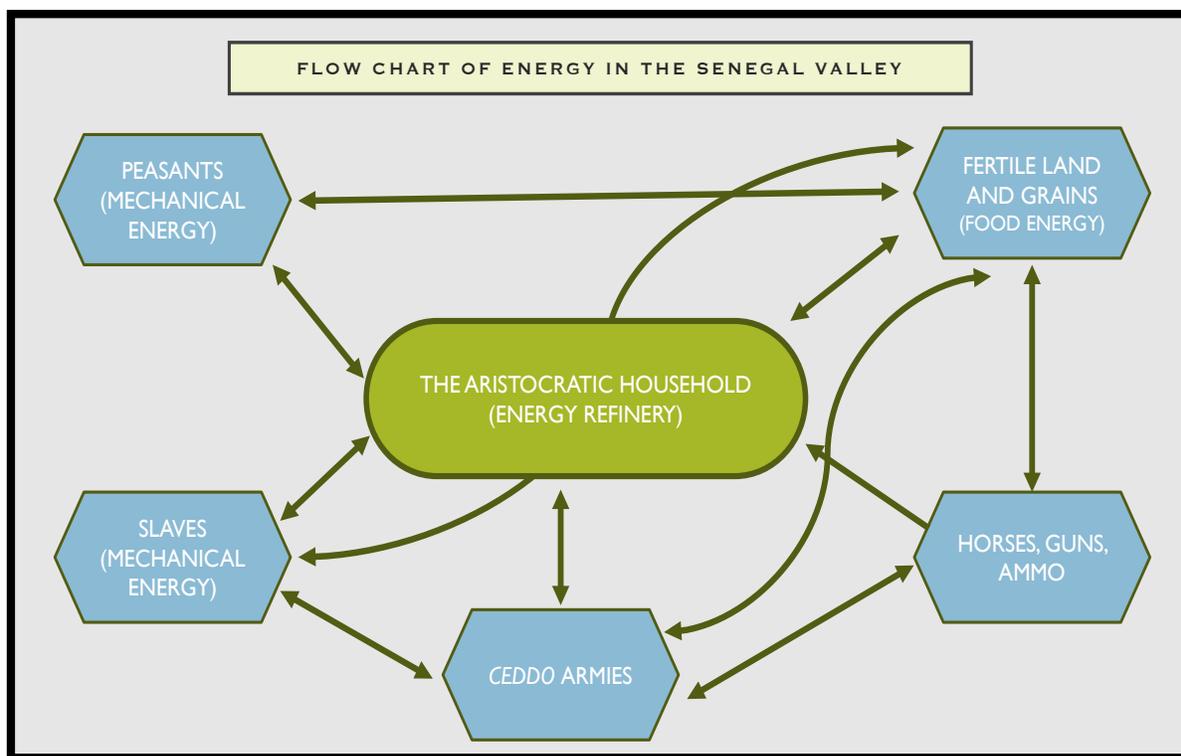


Figure 7: Energy Flows in the Senegal Valley in the Eighteenth Century.
Created by author.

In order to collect tribute, Wolof kings developed sophisticated political networks to consolidate fertile land under the control of the precolonial state. In the early eighteenth century, Latsukaabe Faal built alliances with aristocratic elites and clerics, as well as placing crown slaves and loyal *ceddo* warriors on the peripheral edge of his kingdom. In doing so, Faal created a ring around the state of Kajoor that separated his territory from his rivals. He maintained this “hard” border by offering both marabouts and crown slaves land titles in exchange for their loyalty.³⁹ In addition to the land, each marabout or crown slave received a large drum that was both a symbol and a tool for territorial jurisdiction. When there was a perceived danger on the periphery of the kingdom, they used the network of drums to warn the *damel* of an invasion.⁴⁰

³⁹ Colvin, “Kajor,” 53.

⁴⁰ Ibid.

The *ceddo* monarchs also understood the Atlantic coast as a firm border between themselves and European traders. In general, the Wolof kings referred to Europeans as “the people of the water” and refused to grant them land rights in their kingdoms.⁴¹ As one French trader remarked, “Many of these Negroes cannot persuade themselves that there are other lands beyond the seas” and they “think that we live on the water, and in their songs they call us Bour Gueye; that is to say King of the sea.”⁴² The Wolof elite, then, prohibited Europeans from building structures more permanent than a grass hut, and they frequently charged traders and merchants taxes and tribute payments to conduct trade in their territories. When French traders violated this general rule and erected buildings on the mainland, the *ceddo* monarchies often responded harshly and implemented trade boycotts and raided European settlements.

By collecting tribute payments in grains, expanding access to fertile lands, and maintaining relatively stable borders, the *ceddo* monarchies controlled large stocks of energy that they could distribute and deploy as they please. Perhaps the most effective method of energy use, then, was to construct large armies of *ceddo* warriors. In 1702, Andre Bruë, the governor of Saint-Louis, noted that the Wolof “kings ordinarily make war” in order to take on new territories and to seize “a large number of subjects” to work as slaves.⁴³ The *ceddo* army of Latsukaabe Faal, he reported, was capable of “capturing two thousand slaves—men, women, and children” in one campaign.⁴⁴ Similarly, one French officer observed that Faal fielded a cavalry of 200 horsemen and 2000 soldiers to defeat the *buur-ba* of the Jolof state. In order to maintain a *ceddo* army of this size, Faal needed considerable amounts of cereals and grains. To sustain 200 horses for his cavalry, Faal required nearly ten pounds

⁴¹ ANOM, C 14 21, *Moniteur du Sénégal*, July 4, 1865, 123. Also cited in Colvin, *Kajor*, 96.

⁴² *Ibid.*, 187; Colvin, 96-97.

⁴³ André Brüe, *Journal d'André Brüe, commissaire général des affaires de la colonie du Sénégal (8 novembre 1722-8 juillet 1723)*, Edited by Gérard Lafleur (Saint-Claude Guadeloupe: G. Lafleur, 2010), 157.

⁴⁴ *Ibid.*

of grains per day per horse, which was roughly 2,000 pounds of millet each day.⁴⁵ In addition, his soldiers needed a minimum of two pounds of grains each, which would have totaled another 4,000 pounds of grains for just one day. Thus, to conduct one military campaign, Faal needed a minimum of 6,000 pounds of millet for each day his army was in the field.⁴⁶

While assembling a large army was an effective way of consolidating power in the Senegal Valley, the difficulties in transporting food and water during military campaigns made the large *ceddo* armies vulnerable to the clever tactics of smaller and more mobile forces. Local populations repelled invading armies by burning fields and plugging or poisoning wells, which forced the invaders to retreat or die of hunger and thirst. In one account, a French trader observed that the *damel* of Kajoor had a *ceddo* army of 30,000 soldiers at his disposal.⁴⁷ Since large armies required thousands of pounds of grains per day, he noted that they rarely stayed in the field for more than a few days due to the difficulties of providing men and horses with water and provisions.

Because fertile land was so scarce in the Senegal Valley, and since villagers destroyed harvests and poisoned wells, the *ceddo* monarchs developed strategies that enabled them to stay in the field longer and to avoid succumbing to thirst and starvation. In the 1770s, Joseph Alexander La Brasseur, a French commissioner who lived in Saint-Louis, reported that a dignitary of the kingdoms of Kajoor and Bawol, the Farakaba, created a system for storing provisions in the field. By chopping wood and building several ‘place de guerres’ at different locations throughout the kingdom, he could store and protect grains for his army and remain in the field for up to 40 days. This innovative

⁴⁵ W.W. Albert, “Feeding Suggestions for Horses” (Urbana, IL: University of Illinois Urbana-Champaign, 1987), 2-4, http://www.aces.uiuc.edu/vista/html_pubs/horse/horse.html.

⁴⁶ These figures do not account for the strenuous activities of fighting and marching, which would have required larger totals of food energy. These totals simply show the minimum amounts of grain staples needed to sustain an army for just one day. The consumption of grain per person per day is based on a report from Michel Adanson, a French naturalist who lived in Saint-Louis during the 1750s. To read further, refer to: Charles Becker and Victor Martin (eds.), “Mémoire d’Adanson sur le Sénégal et l’Île de Gorée,” *Bulletin de l’IFAN*, B, 42, 4 (1980) 736-737.

⁴⁷ Baron Roger, *Kélédor: Histoire Africaine* (Paris: Chez Moreau, 1829) 107. La Courbe also reported in the early eighteenth century that the king of Waalo could mobilize 10,000 troops to fight the Moors of Trarza. An army of this size, no doubt, required a considerable amount of provisions to mobilize. See : La Courbe, *Premier voyage*, 147.

strategy to fuel the *ceddo* armies with provisions in the field enabled the kingdom of Kajoor to respond swiftly to invading armies and to intimidate their enemies.⁴⁸

Although the *ceddo* monarchs used large armies and sophisticated political networks to consolidate and maintain power, the most critical component of precolonial statecraft in the Senegal Valley was the control over fertile land, as well as the production and dispersal of stocks of grains. In a sense, the various levels of infrastructure to support and expand the state, from the use of *ceddo* armies to the political alliances they forged with aristocratic elites, were designed to provide the state with its basic energy needs. Since food was the petrol of the organic economy, the Wolof states—and the kingdom of Kajoor in particular—structured their political and economic systems around access to farmlands and the grains they produced.

The Politics of Energy: Staple Grains, Labor, and Land

Although the Wolof peasants, traders, and elites traded cereals and grains on a daily basis in the Senegal Valley, there is little concrete historical evidence of how much grain was produced, exported, and consumed. French and European trading companies, such as the *Compagnie du Sénégal* and the *Compagnie des Indes*, maintained close records of valuable commodities, namely slaves, gum, ivory, and gold, but rarely documented the purchase and exchange of foodstuffs.⁴⁹ On rare occasions, however, the French did offer some evidence of how much grain individuals, and slaves in particular, required on a day-to-day basis. On average, French slave traders observed that an adult

⁴⁸ Charles Becker and Victor Martin, “Détails historique et politiques, mémoire inédit de J.A. Le Brasseur, 1778,” *Bulletin de l’Institut Fondamental d’Afrique Noire*, Serie B, Sciences Humaines, No. 1, January 1977, 81-132. Also cited in Colvin, “Kajoor,” 104.

⁴⁹ ANOM, C 6 12; C 6 14; Most company records had extensive inventories of European imports—flour, rye, barley, beer, wine, and other types of provisions—but they rarely if ever reported the total amount of grains they purchased from the Wolof states. Also referenced in Searing, *West African*, 140.

male required a minimum of two pounds of millet per day.⁵⁰ Applying this figure to the census data that is available for Saint-Louis and the broader slave populations of the Senegal Valley will offer a basic understanding of how much food the Wolof states both produced and consumed.

In Saint-Louis, the consumption of grains varied with the periodic influx of slaves, traders, and merchants during the trading season. According to Michel Adanson, a French naturalist who lived in the colony of Senegal in the 1750s, an individual living in Saint-Louis required one hogshead of grain, roughly 500 to 700 pounds, per year. With a population of about 2,500 to 3,000 people, Adanson calculated that 3,000 hogsheads of grain, or roughly 750 tons, were needed to sustain the residents of Saint-Louis for one year.⁵¹ The actual amount of grain consumption, however, was likely much higher. Since scores of slaves were harbored in Saint-Louis until they were sold and shipped across the Atlantic, European trading companies needed large reserves of staple grains to keep their slave populations healthy. At times, slave trading houses held as many as 1,000 captives in Saint-Louis, which, in turn, required at least 2,000 pounds of millet per day over the course of several weeks or even months.⁵²

In addition to feeding their slaves in port, traders and merchants also needed to purchase grains for the voyage across the Atlantic, which could take anywhere from three weeks to several months depending on winds, weather, and other variables such as slave revolts, local political disputes, and illness. For example, to feed the cargo of the *Friendship*, an American slave vessel that transported 549 slaves to New York in 1758, the captain, Duncan Brown, would have needed a minimum of 1,098 pounds of millet per day. For the entire voyage, which lasted a little over six

⁵⁰ Historians have generally agreed that one kilogram of millet per slave per day is a reasonable estimate of the rations allotted to slaves. For more in-depth analyses of slave diets, see: Judith Carney, *Black Rice: The African Origins of Rice Cultivation in the Americas* (Cambridge: Harvard University Press, 2001), 12-25.

⁵¹ Becker and Martin, "Mémoire d'Adanson sur le Sénégal et l'Île de Gorée," *Bulletin de l'IFAN*, B, 42, 4 (1980) 737. Searing also cites Adanson, see: Searing, *West African*, 140.

⁵² *Ibid*, 737.

weeks, Brown would have needed a minimum of 46,116 pounds of grains to feed his cargo.⁵³ More broadly, for the entirety of the eighteenth century, slave traders and merchants shipped 54,024 slaves from Saint-Louis to the Americas, averaging 540 people per year.⁵⁴ Thus, in order to sustain the transatlantic slave trade for just one year, Saint-Louis provisioned slave traders with a minimum of 25,000 pounds of millet for an average voyage of three weeks or 45,000 for an average voyage of six weeks.⁵⁵ For the century as a whole, the human cargo shipped from Saint-Louis into the transatlantic slave trade would have consumed between 2.2 and 4.5 million pounds of grains depending on how long it took to sail to the New World.

While these figures are simply an approximation, they demonstrate the striking amount of food required to sustain the transatlantic slave trade. For the *ceddo* monarchies, the demand for cereals and grains in Saint-Louis presented lucrative opportunities to profit from both the slaves they traded to Europeans and the food that those slaves needed to survive the Middle Passage. This dual system of profits, then, provided further incentive for the Wolof states to expand agriculture and to control and maintain energy flows—in calories and in human labor—from the interior to the coast.

Although traders and merchants in Saint-Louis required large quantities of cereals and grains to fuel the transatlantic slave trade, their slaves consumed only a fraction of the grains produced in the Senegal Valley.⁵⁶ To start, the *ceddo* monarchies needed to produce a substantial amount of grains to support their population of domestic slaves. According to the earliest French census of slave

⁵³ Transatlantic Slave Trade Database (TAST): Voyage 25014, *Friendship* 1758-1759, last accessed April 2016, <http://www.slavevoyages.org/voyage/25014/variables>

⁵⁴ TAST Database, last accessed April 2016, <http://www.slavevoyages.org/>

⁵⁵ This calculation assumes that one slave will consume two pounds of millet per day over the course of a three week—21 day—voyage. This is a rough estimation, as some slaves died on the voyage and populations of men, women, and children consumed different amounts of food.

⁵⁶ Searing, *West African Slavery*, 27-59.

populations, there were roughly 200,000 slaves in Senegal in the eighteenth century.⁵⁷ The French, however, likely underestimated the slave population and failed to account for nearly one-third, or 100,000 people, who lived in bondage. Martin Klein, for example, contends that the Wolof elite enslaved at least 30 percent of their population, or 400,000 of approximately 1.2 million people, and forced most of them to work as agricultural laborers.⁵⁸ Similar to Klein, Searing posits that nearly half of the slave population was concentrated in the grain producing regions of Waalo, Kajoor, and Bawol, with the other half in Gajaaga and Futa Toro.⁵⁹ Thus, in drawing from these rough estimates of the census data, it is likely that the Wolof kingdoms needed no less than 400 tons of grains per day, and 146,000 tons per year to sustain a minimum of 400,000 slaves.⁶⁰

To be sure, the total grain consumption of domestic slaves was likely higher, as different forms of agricultural labor required different expenditures of energy. For example, eight hours of hoeing a field of millet burned 5,100 calories, while tending to the household required 3,940 to 4,420 calories.⁶¹ Thus, during the growing season, when slaves worked long hours in the early mornings and late evenings, they likely consumed at least four pounds of millet, or 7,000 calories per day.⁶² In addition to farming, slaves did a considerable amount of intense labor that required substantial quantities of calories, such as hauling water, making clothing, collecting firewood, shucking grains, blacksmithing, and pounding sorghum and millet for food preparation. All of these forms of labor

⁵⁷ This estimate must be regarded with skepticism, as it was based on an actual census of more than 150,000 slaves with adjustments for regions with inadequate data.

⁵⁸ Martin Klein, *Slavery and Colonial Rule in French West Africa* (Cambridge: Cambridge University Press, 1998) 35-42.

⁵⁹ These regions, which were major suppliers of millet to European merchants in the eighteenth century, exported relatively few slaves to the transatlantic trade. This discussion of slave populations in the eighteenth century draws on Searing's analysis of the census data. For a more comprehensive discussion of slave populations, see: Searing, *West African Slavery*, 50-52. Furthermore, data from the TAST database, which is the most current estimate for slave exports from Africa, corroborates his claims and shows that few slaves were exported from the grain producing regions of Senegambia. See: TAST Database, "Embarkation Points from Saint-Louis 1700-1800," <https://www.slavevoyages.org>.

⁶⁰ French reports frequently note that, on average, slaves consumed two pounds of millet a day. See: Joseph Pruneau in Charles Becker, ed., *Memoire sur le Commerce de la Concession du Senegal* (Kaolack : Mimeographed, 1983).

⁶¹ The FAO has conducted extensive studies on calories burned and food production in tropical countries, notably Africa. See: FAO, "Energy and Protein Requirements," last accessed April 2017, <http://www.fao.org/docrep/003/aa040e/AA040E15.htm#an5>

⁶² FAO, "Energy and Protein."

were more or less year-round activities that necessitated a large expenditure of calories.⁶³ Put simply, the demands of intense physical labor among the slave population necessitated a high rate of grain consumption and likely required between two to four pounds of grains per day.⁶⁴

The amount of food used to support the slave populations was, indeed, only one-third of the total amount needed to sustain life in the Senegal Valley. As noted above, census data for the general population of the Wolof states in the eighteenth century is unavailable, yet there is a common consensus among historians that the entire population of the Wolof states was 1.2 million.⁶⁵ In terms of consumption, then, Wolof households needed to produce 2.4 million pounds of grains per day, and 438,000 tons per year to feed the entire population. Of course, the Wolof states produced much larger quantities than these base figures, as they provided fuel for the transatlantic slave trade, the trafficking of slaves from the interior to the coast, and for the trans-Saharan trade with the Berbers and Moors. For the interest of this study, then, the total amount of grain production and consumption in the Senegal Valley underscores the critical importance of land in establishing and maintaining power. Since one acre of millet yields approximately fifty pounds of grains, the Wolof states required access to large territories of land—roughly 48,000 acres—that could sustain the basic energy needs of their population for just one day.⁶⁶ Of course, this rough estimate does not include the ecological and climatic constraints of cultivating millet in arid conditions. During the extended

⁶³ For a similar analysis of work output and calorie consumption in early-modern England, see: Muldrew, *Food, Energy*, 131.

⁶⁴ Craig Muldrew offers a similar analysis of a caloric table from the FAO on temperate environments in Europe. See: Muldrew, *Food, Energy*, 29 and 131.

⁶⁵ Martin Klein uses a similar method in estimating populations during the eighteenth and nineteenth centuries. He claims that 30 to 40 percent of the Wolof population was slaves. With a slave population of around 300,000, he figures that the general population was close to 1.2 million people. See: Klein, *Slavery and Colonial Rule*, 45. See also: John Thornton, *Africa and Africans in the Making of the Atlantic World, 1400-1800* (Cambridge: Cambridge University Press, 1997). Thornton has a similar estimation, though slightly higher at 1.5 million.

⁶⁶ FAO, “Energy and Protein.” The FAO makes a basic estimate that one acre of millet will yield fifty pounds of grains. This does vary, however, depending on the type of millet and the different ecological and climatic constraints.

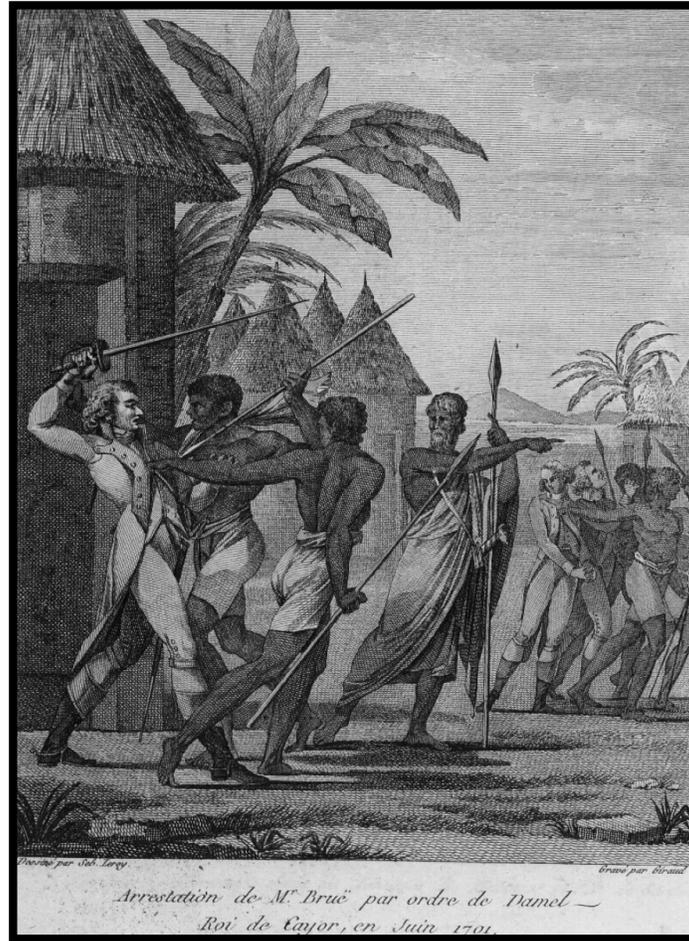


Figure 8: L'arrestation de l'Andre Brue par l'ordre de Damel—Roi de Cayor, Juin 1701, in Jean-Baptiste Durand, Atlas pour servir au voyage du Sénégal (Paris: BnF, 1802)

dry period of the eighteenth century, it is likely that the Wolof states required substantially larger territories of fertile land to accommodate the needs of their populations.

As the breadbasket of the Senegal Valley the Wolof states used the production and distribution of staple grains as a political asset. Along the Atlantic coast, Wolof monarchs frequently used their control of arable land and grain production as leverage over European traders. Their preferred strategy, to enforce trade blockades along the coast, forced European slave traders and merchants to submit to their economic and political agenda. For example, in 1701, Latsukaabe Faal ordered a devastating embargo of cereals and grains on Saint-Louis and Gorée. The trade boycott was in response to a French policy that stifled trade between the Wolof states and other European

powers, namely the British and the Dutch. The governor of Saint-Louis, Andre Bruë, hoped to gain exclusive access to trade along the Senegal River Valley by seizing and repelling British and Dutch trading ships from the region. Displeased with the French attempt to monopolize trade, Faal, as depicted in the engraving above, captured the governor at the port of Rufisque and boycotted all forms of commerce with the French.⁶⁷ For weeks, Faal held Bruë ransom and seized 6,000 livres worth of guns, ammunition, and other trade goods from the governor's ship.⁶⁸ Without a steady supply of cereals and grains, company officers eventually submitted to Faal's demands and Bruë was returned to Saint-Louis.

In a similar account, Michel de La Courbe, Bruë's successor as governor and commander of the *Compagnie du Sénégal*, complained of the devastating effects of another trade blockade on Saint-Louis and Gorée.⁶⁹ In one company report, La Courbe reported that "an ongoing war with the king of Kajoor" prompted an embargo on the grain trade. The lack of food, he noted, forced company men to "look for sustenance in Jaol" which was "seventeen kilometers" from Gorée and a few days journey from Saint-Louis. Again, in 1716, the governor of Saint-Louis reported that the disastrous repercussions of the most recent trade blockade caused widespread food shortages on the coast. Due to the constant "avarice and greed of the blacks," urban traders "had suffered much from the famines" caused by Faal's boycotts.⁷⁰ While the trade boycotts were clear symbols of his military strength, Faal's primary assets—the control of arable land and grain production—served as the foundation of his political and economic power.

For the most part, Wolof kings enforced trade boycotts with Europeans due to discrepancies over tribute and customs payments. In the 1730s, a French trader with the *Compagnie du Sénégal*

⁶⁷ Rufisque, in the eighteenth century, was a small trading post south of the Cap Vert peninsula.

⁶⁸ Bruë, *Journal*, 158.

⁶⁹ La Courbe did two tours as director of the *Compagnie du Sénégal* and Governor of Saint-Louis from 1689-190 and 1706-1709.

⁷⁰ ANOM, C 6 12, also quoted in : Becker, "Notes sur les Conditions Ecologique en Sénégambie aux 17e et 18e Siecles," in *African Economic History*, No. 14, (1985), 175.

complained that the Wolof states, despite healthy harvests and abundant surpluses, frequently diverted grains away from the coast. In spite of the large populations of slaves awaiting passage to the New World, he noted that the *damel* of Kajoor possessed “a greater market for grain” but frequently refused to trade with the French due to disagreements over tribute payments. Although Kajoor was “more attached to the cultivation of the land” and “cultivated four times as much as they did fifteen years ago,” the *damel* stubbornly withheld staple grains until traders agreed to an increase in customs and payments.⁷¹

The granaries of the Wolof states also supported the trans-Saharan networks of trade, which frequently received the bulk of the region’s grain production. Like Europeans, the Moors of Trarza relied on the Wolof states for grains and regularly travelled to the Senegal Valley to purchase millet and to trade horses, guns, and iron for slaves. As one French trader grumbled in the 1760s, the Moors purchased “all the millet of the interior of the country” and left the urban dwellers and traders of Saint-Louis with rapidly diminishing supplies of food.⁷² This was of particular concern when ecological and political crises prompted food scarcities on the coast. During periods of drought, the *ceddo* monarchies sold grains, usually at prices five to ten times higher than the average to European traders.⁷³

The inflated prices of grains prompted brief attempts to cultivate the sandy and arid soils of Saint-Louis. In most French accounts of the island, traders and merchants complained about the lack of potable water, the poor quality of the soil, and the inability to grow even modest quantities of grains and vegetables. When the French botanist, Michel Adanson, arrived in Saint-Louis in 1749, he noted that the expansive “sand plains baked under the violent rays of the sun” and the island was nothing but “a plain of shifting white sand with small dunes that take on new shapes as the wind

⁷¹ ANOM, C 6 9, “Lettre au gouverneur,” 1731. Also cited in Becker, “Notes,” 175.

⁷² Ibid.

⁷³ Curtin, *Economic Change*, 10-15; Searing, *West African Slavery*, 20-35; Barry, *Senegambia*, 303-314.

blows.”⁷⁴ In contrast to the barren and infertile landscape of the island, Adanson noted that the fields and plains of the interior were lush, wooded, and fertile. These regions, which were in Waalo and northern Kajoor, were full of mangroves, acacia trees, and baobab trees that yielded a sweet fruit, known as “pain de singe.”⁷⁵

The contrast between the sterile island of Saint-Louis and the lush and fertile interior served as a reminder to many European traders that their fate was inextricably linked to the grain producing kingdoms of the Senegal Valley. As the following pages will show, the small trading settlement of Senegal was at the mercy of the *ceddo* monarchs, who were keen to use their control over staple grains as an effective way to exercise authority and to consolidate power under the precolonial state. Indeed, by controlling the production, concentration, and dispersal of cereals and grains, the Wolof states used the flow of staple grains to gain political and economic leverage over their rivals, and the French in particular.

The People of the Water

In 1714, the French governor of Saint-Louis, André Bruë, established the Fort Saint-Joseph at Galam, a small trading town where the Senegal River meets one of its tributaries, the Falémé. While the fort served as a strategic base for trade and provided access to the slave and gum markets of the Soninké state of Gajaaga, the French also hoped it would provide access to the granaries of the middle Senegal Valley. With access to new grain markets, Bruë aimed to put an end to Senegal’s dependence on the agrarian energy systems of the Wolof states. The French, he reported, “should consider upon whom their trading posts in Saint-Louis and Gorée depended,” as the *damel* of Kajoor

⁷⁴ Michel Adanson, *Histoire Naturel du Sénégal: coquillages avec la relation abrégée d’un voyage fait en ce pays pendant les années 1749-1753* (Paris : Chez Claude-Jean-Baptiste Bauche, 1757) 17.

⁷⁵ This is only a snapshot of Adanson’s rich description of the Senegambian environment. During his stay in Senegal, Adanson traveled from Saint-Louis to the Upper Senegal Valley in Gajaaga and Futa Toro. Throughout his travels, he consistently reported on the fertility of the Senegal Valley and its dense forests and fecund flood plains, Adanson, *Histoire Naturelle*, 245.

could “expel them or starve them to death by forbidding his subjects to provide them with provisions.”⁷⁶ Bruë’s wary observation of the imbalance of power between the French and the Wolof kingdoms served as a warning to his successors. Indeed, if future French governors failed to free Saint-Louis from its dependence on the Wolof kingdoms, they would consistently find themselves at the end of a long pecking order of cereals and grains in the Senegal Valley.

Throughout the eighteenth century, the French faced a number of political and geographical challenges that obstructed their efforts to establish a self-sustaining colony. Confined to the narrow and mostly infertile island of Saint-Louis, the French colony of Senegal was more or less a landless state. All forms of food—staple grains, fruits, legumes, beef, and fish—came from nearby villages and the grain producing regions of the Wolof states. Aside from a few modest gardens, the French noted that the island was “very arid and sandy” and there was nothing to eat but “a few sheep, goats, and pigs.”⁷⁷ In addition to the lack of food, there was no fresh water on the island and the French were forced to “dig wells in the sand” to acquire “fairly good water though a little brackish.”⁷⁸ The absence of fertile land and fresh water made the French completely dependent on trade for their basic needs.

Since the aristocratic elite prohibited the French from establishing warehouses and trading settlements on the mainland, the French relied on local *métis*, known as the *habitants*, to navigate the river and to conduct business with Wolof traders in the interior.⁷⁹ As the middlemen of the river trade, the *habitants* facilitated the flow of energy from the Wolof states to Saint-Louis. By transporting slaves, grains, and other agricultural commodities, the *habitants* took full advantage of their middleman position and founded large trading houses that provided the French with riverboat

⁷⁶ Bruë, *Journal*, 380. Also cited in Searing, see: Searing, *West African*, 87.

⁷⁷ La Courbe, *Premier Voyage*, 27.

⁷⁸ *Ibid.*

⁷⁹ Colvin, “Kajor,” 125-127.

crews, slaves, and interpreters. This lucrative business, then, enabled the *habitants* to establish themselves as a politically influential slave-owning class in Saint-Louis.⁸⁰ For the French, however, the emergence of the *habitants* reinforced their dependence on local populations to sustain their basic energy needs. With little or no access to arable land, the French not only relied on the food staples of the Wolof states, but they also depended on the *habitants* to maintain energy flows from the interior to the coast.

French efforts to open new grain markets in the Upper Senegal was in response to the dramatic increase of slave trading in the mid-eighteenth century. To be sure, demand for slaves in the sugar colonies of the New World brought an increasing amount of slave traders and merchants to Saint-Louis.⁸¹ Between 1685 and 1720, the population of European traders increased from 65 to 188, which included sailors, soldiers, surgeons, domestics, and company administrators. The local population—namely free African traders, *métis*, cooks, gardeners, *laptots* (sailors), and craftsmen—totaled 142. The rest of the population were domestic slaves and totaled approximately 2,000 men, women, and children.⁸² In addition to the 2,500 permanent residents of Saint-Louis, the population increased during the trading season as slave caravans from the interior passed through the colony.

To sustain their small trading colony, the French needed a steady flow of staple grains from the Wolof states, requiring a minimum of 5,000 pounds of grain per day and close to 1,095 tons per year.⁸³ In addition, the French also required large quantities of grains to feed slaves bound for the

⁸⁰ For more in-depth discussion of the *habitants*, see: Searing, *West Africa*, “Chapter Four: Slavery on Saint-Louis and Gorée,” 97-128; and for an account of the *signares*, see: Hilary Jones, *The Métis of Senegal, Urban Life and Politics in French West Africa* (Bloomington: Indiana University Press, 2013).

⁸¹ Phillip Curtin and James Searing argue that roughly 52,000 slaves were exported during this period. The total amount of slaves exported from Saint-Louis and Gorée from 1720-1740 was 23,159.

⁸² ANOM C 6 11, Mémoire sur la Concession du Sénégal, October 8, 1734; C 6 14, Réponse du Conseil Supérieur au Mémoire et Observations, February, 1754. Also cited in Curtin, *Supplementary*, 36-45. Both of these reports contain census data for Saint-Louis and show similar population levels. The data, however, must be interpreted with some scrutiny. The French had difficulties deciphering between free residents of Saint-Louis and domestic slaves, as they often lived in the same households, wore similar clothing, and conducted similar work. There was also a large fluctuation of slaves, traders, and merchants who passed through Saint-Louis regularly, which temporarily increased or decreased the population.

⁸³ This figure is based on the assumption that one person consumed an average of 2 pounds of grain per day.

New World.⁸⁴ Due to variations in trade winds and weather, which could delay the departure of slaves for weeks and sometimes months, the French needed considerable supplies of grains to ensure that their human cargo did not succumb to hunger or illness.⁸⁵ From year to year, then, the success or failure of the slave trade hinged on whether the Wolof states were willing to supply French trading companies with grain.⁸⁶

The precarious and often volatile relationship between the French and the Wolof kingdoms compelled many company officials to search for grains elsewhere in the Senegal Valley. Yet, in order to expand their access to the granaries of the Upper Senegal, the French depended on the *habitants* to facilitate trade along the river. Some *habitant* households, for example, accumulated as many as 100 slaves and used them as laborers in the river trade.⁸⁷ As the French governor, Sieur de La Courbe, noted in the early eighteenth century, the *habitants* were “the ones who control almost all the trade of Senegal” and they “own female slaves who they send far away into the country” to purchase “hides, millet, *pagnes* or cotton clothes.”⁸⁸ More specifically, the *habitants* used highly skilled slave sailors, known as *laptots*, to conduct trade between themselves, Europeans, and the Wolof states. When the French arrived in Saint-Louis, for instance, they entrusted many of their trade goods to the *habitants* who, in turn, sent their *laptots* upriver to trade with the Wolof states. When the *laptots* returned to Saint-Louis, French companies collected their earnings—usually in slaves and gum—from the *habitants* who then kept a percentage of the profits for themselves.⁸⁹

⁸⁴ ANOM C 6 12, also cited in: Becker, “Notes,” 176. Inventories of foodstuffs appear frequently in the historical record, but they rarely refer to the diets of local households. Europeans often kept imports for themselves, or on occasion, they would use them as valued trading goods with African merchants. Furthermore, millet was the dietary staple of the Senegal Valley, yet residents in Saint-Louis also had access to fish, legumes, groundnuts, and meat. On occasion, traders imported flour, beer, wine, and maize from Europe and the Americas.

⁸⁵ As mentioned previously, the French observed that most slaves awaiting departure for the Americas consumed two pounds of millet per day, which roughly amounted to 2,430 calories.

⁸⁶ Searing makes a similar argument. See: Searing, *West African*, 79-88.

⁸⁷ There are several accounts of the large slave populations of Saint-Louis. See: Saugnier, *Voyages to the Coast of Africa* (White Fish, MT: Kessinger Publishing, English Edition, 2010) 175. Adanson, *Histoire naturelle*, 342.

⁸⁸ ANOM C 6 11, *Mémoire sur la Concession du Sénégal*, 1734.

⁸⁹ Jones, *The Métis of Senegal, Urban Life and Politics in French West Africa* (Bloomington: Indiana University Press, 2013) 19-39; Colvin, “Kajor,” 83.

By facilitating trade between the French and the Wolof states, the *habitants* directed flows of energy in the Senegal Valley from the fertile fields of the interior to the islands along the coast. The *habitants* lived in *tapades*, or compounds, that housed their families and their domestic slaves. Michel Adanson, the French naturalist, observed in 1749 that the *tapades* were “regulated in such a manner as to form a small town with several streets drawn in a direct line.” The individual compounds, he noted, were surrounded with sharp wooden stakes driven deep into the soil. Inside the compound, the huts were fifteen feet in diameter with “a round covering of straw” as the roof.⁹⁰ In the huts, there were “one or two beds that accommodated the whole family, including domestics, who lied pell-mell along their masters and their children.”⁹¹ In general, most of the *habitants* were women and they usually outnumbered men by a ratio of two to one. During their time in Saint-Louis, European men often established semi-permanent relationships with *habitant* women, also known as *les signares*, who managed to improve their social and economic status through trade and the accumulation of slaves.⁹² Many of these women took on multiple European husbands—who either died from tropical diseases or returned to Europe—and thus emerged as wealthy inheritors of property and slaves.⁹³

To a large degree, the *signares* accumulated wealth and political influence by directing and facilitating the flows of energy between the Wolof states and the French. As one French officer noted, “the river trade can only be carried out by the *signares*, who understand better than the Europeans the character of the nations with whom they trade.”⁹⁴ According to Pierre Saugnier, a French slave trader, the *signares* leased riverboats crews comprised of *laptots*, *pileusses* (female slaves), and *repasses*, or young children who served as “cabin boys.” The *pileusses* cooked for the crew, traded for grains with local communities along the river, washed their linens during the voyages, and

⁹⁰ Adanson, *Voyage au Sénégal*, 35.

⁹¹ Ibid.

⁹² For a detailed and comprehensive analysis of *les signares*, see: Jean Boulegue, *Les Luso-Africains de Sénégambie, XVI-XIX siècle* (Dakar, IFAN, 1972); Hilary Jones, 19-39; Searing, *West African Slavery*, 93-129.

⁹³ Boulegue, *Les Luso-Africains de Sénégambie*, 142.

⁹⁴ La Courbe, *Premier Voyage*, 234.

watched over the young boys. The *repassee*, in turn, “undertook the voyage for free” in order to “acquaint themselves with the river, and the languages of the nations on its banks.”⁹⁵ The most critical actor of the river trade was the *laptot*, who guided the riverboats through the constantly fluctuating water levels of the Senegal River.

During a voyage to the Upper Senegal Valley, for example, Saugnier grounded his boat onto a sandbar near the village of Galaam. Stranded with a small crew, Saugnier feared that local bandits would spot them in the river, kill his crew, and steal his cargo of ivory, grains, gum, and slaves. The pilot of Saugnier’s vessel, a *laptot* named Scipio, had left the crew to trade iron bars for slaves and gum in a nearby village. After receiving word of Saugnier’s troubles, Scipio returned and assembled the crew to dislodge the boat from the shallow waters. After an hour of directing and working with the crew, Scipio was “perfectly acquainted with the river” and “examined the passes, saw there was no danger to be apprehended, directed all the operations, and in less than half an hour, succeeded in getting her into deep water.” Once the ship was moving steadily down river, Scipio stayed on board to “steer the crew clear of the more dangerous shoals, which we passed without striking once, and without any fatigue.”⁹⁶ Scipio’s skillful handling of the boat likely saved Saugnier and his crew, but even more critically he was able to save its cargo. According to Saugnier, the loss of the cargo would have plunged Saint-Louis into extreme distress, as the boat was transporting millet for the subsistence of the colony.⁹⁷

For the *habitants*, the grain trade was the most reliable way to accumulate wealth and to maintain their political and economic positions in Saint-Louis. Since the trading season in the Senegal Valley was relatively short, usually from July to October when water levels were high, the *habitants* had a small window to sell valuable commodities, like gum, slaves, and ivory. Through the

⁹⁵ Saugnier, *Voyages to Africa*, 308.

⁹⁶ *Ibid.*, 253.

⁹⁷ *Ibid.*

grain trade, however, they could stockpile large quantities of grains to sell to French traders during the dry season, which they sold at inflated prices. The French, in contrast, consistently found themselves at the end of a long line of grain distribution. During good years, when harvests were robust and when politics were peaceful, the French were able to obtain adequate supplies of grains; yet when crops failed or when political strife blocked the flow of grains from the interior to the coast, they scrambled to obtain even the slightest amounts of cereals and grains in the region. French traders and merchants, therefore, were typically the first, and at times the only, part of the population to suffer from drought and food scarcities.

Since most governors and company officials did not stay long on the island, mostly due to disease and the internal politics of the company, they failed to establish any legitimate authority over the *habitant* population. These limitations were, to a large degree, linked to the company's marginalized position in trade as well as the *signares* monopoly on energy resources. Similar to the Wolof kingdoms of the interior, the *signares* centralized political power by accumulating resources—mostly in slaves, gum, and food—through their longstanding connections with the Wolof elite.⁹⁸ Their power was based on the success of trade, and with their profits they purchased scores of domestic slaves, established partnerships with local merchants and traders, and sought politically advantageous marriages to expand their commercial networks. Indeed, wealthy *signare* households not only possessed many slaves, but also dozens of clients and relatives living in the interior.⁹⁹ Through these networks, which they constructed and cultivated over decades, the *signares* were able to facilitate, and to some extent direct, the flow of food staples from the Wolof states to the coast.

The limitations of French commerce created a deeply rooted sense of anxiety over resource scarcity, and of staple grains in particular. Throughout the eighteenth century, French company

⁹⁸ Similar observations have been made in: Jean Boulegue, *Les Luso-Africains*; Hilary Jones, *Métis*, 19-39.

⁹⁹ Colvin, "Kajor," 84; Jones, *Métis*, 25.

officials and traders monitored the harvests of the Senegal Valley, as well as the political conflicts that prevented their supply of provisions from arriving on the coast. They believed, in effect, that the Wolof states were incapable of producing sufficient quantities of cereals and grains to endure periods of drought and scarcity. Yet, while reports of drought, widespread famine, and failed harvests appear regularly in French reports, there is little evidence that local populations were unable to weather dramatic periods of ecological change. In other words, reports of drought, locust plagues, and famine indicate that food shortages were frequently—but not always—a European problem rather than an African one.

Reports of food shortages and famines in Saint-Louis notably increased during the 1720s, otherwise known as the decade of the “Gum Wars.” Throughout this tumultuous decade, a combination of interstate conflicts and brief periods of drought in the Lower Senegal Valley severely disrupted the transport of grains from the Wolof states to the coast. For the French, these political and ecological crises reinforced the need to expand their access to grain markets in the Middle and Upper Valleys of the Senegal River.

In the early eighteenth century, the trade of “gum arabic” or “gum *acacia*,” a natural gum made from the hardened sap of the *acacia* tree, increased as European textile industries expanded. A useful material for manufacturing clothes, dyes, paints, and a variety of other goods, gum was a valuable commodity and served as an alternative source of revenue to slavery. In the Senegal Valley, stands of gum *acacia* were spread along the northern banks of the river and were often under the control of Berbers and Moors as well as the kingdoms of Waalo and Futa Toro. In an attempt to expand their interests in the gum trade, the aristocratic elite from Waalo and Kajoor employed “merchant marabouts,” a group of landlord-brokers for gum caravans, to collect tribute from European and Moorish traders.¹⁰⁰ Merchant marabouts were a group of Moors who, over time, took

¹⁰⁰ Searing, *West African Slavery*, 75.

up residence in the kingdoms of Waalo and northern Kajoor. Their primary business was to negotiate the trade of gum, grains, and slaves between the Wolof states and the Moorish Emirs. Over the generations, the merchant marabouts adopted the Wolof language, established marriage and kinship ties with local households, and became known locally as the Moors of Kajoor.¹⁰¹

Tensions in the river trade escalated when the merchant marabouts of Kajoor began to enforce and collect tribute for the gum trade. The French, enraged by Kajoor's attempt to dominate the gum trade, formed an alliance with the Emir of Trarza. Their agreement, which gave the *Compagnie du Sénégal* entitlements to trade on the Senegal River, was an attempt to push the Wolof states and other European powers, namely the British and the Dutch, out of riparian commerce. However, just as the French and Moors were preparing an invasion of Kajoor, the powerful *ceddo* monarch, Latsukaabe Faal, died. After his death, Faal's sons engaged in a power struggle that crippled the kingdom for nearly a decade. With Kajoor in civil war, the Emir of Trarza withdrew from the alliance and aimed to take control of the gum trade.¹⁰²

In 1722, the Emir invaded the kingdoms of Waalo and northern Kajoor. In a letter dating from May of 1723, one French merchant noted that "Moorish raids" had "entirely plundered Waalo villages and deposed several of their leaders for refusing to pay tribute."¹⁰³ The Moors, he recorded further, not only "stole or killed the majority of livestock and grain," but also placed many "men, women, and children" into slavery.¹⁰⁴ As the kingdom of Waalo fell under the tyranny of the Trarza warriors, the power struggle between Faal's sons escalated into a violent civil war that destroyed the

¹⁰¹ For a more in depth study of the merchant marabouts, see: Searing, *West African Slavery*, 75; Barry, *Senegambia and the Atlantic Slave Trade*, 69-73. Boulege, in his work, *Les Luso-Africaines*, offers a compelling analysis of the merchant marabouts and their role in trans-Saharan commerce. In particular, the merchant marabouts facilitated the grain trade between the Wolof states and the Moors and Berbers. Although some Moorish communities could grow cereals and grains on the desert's edge, most communities depended on the grain producing states of Kajoor and Bawol.

¹⁰² For a detailed re-telling of this period, see: Gérard Lafleur, *Journal d'Andre Bruë, Commissaire générale des affaires de la colonie du Sénégal, 1722-1723*, 42.

¹⁰³ ANOM C 6 8, "Lettre de Julien de Bellay au gouverneur," 1723. Also see: Becker, "Notes," 176.

¹⁰⁴ Ibid.

region's grain supplies. According to one French trader, the civil war in the kingdoms of Kajoor and Bawol had "destroyed the breadbasket" of Saint-Louis and set fire to the arable land in the Lower Senegal Valley.¹⁰⁵ In a similar account from 1723, Julien du Bellay, a French trader in Saint-Louis, recorded that the combination of civil war, weak rains, and locust plagues pushed the Wolof kingdoms to the brink of starvation. The "widespread famine," he observed, forced nearly "three-quarters of the population of peasants to eat dirt and roots" to survive.¹⁰⁶ In the midst of the political turmoil, a drought struck the Senegal Valley and pushed grain prices to a premium. To save grains, aristocratic households in Kajoor and Waalo offloaded scores of agricultural slaves to European traders and merchants.¹⁰⁷

The French, though content to acquire slaves, found it increasingly difficult to keep their captives alive. In 1720, Nicolas Desprès de Saint-Robert, a company officer, recorded that the price of "merchandise," or slaves, dropped significantly and the price of cereals and grains increased.¹⁰⁸ One French trader, Joseph Morin, also observed that the "great drought" of 1720 sparked widespread grain shortages on the island of Gorée and was directly responsible for the death of eleven captives.¹⁰⁹ The following year, in May of 1721, he claimed the drought was so severe that famine struck Gorée again, killing 133 of 737 slaves. Although slaves were inexpensive during periods of scarcity, French traders not only lacked the resources to keep them alive but were also incapable of finding viable alternatives of food.¹¹⁰

The drought and political turmoil of the early 1720s placed the *Compagnie du Sénégal* on uncertain terms. Although the French initially hoped to destabilize the Wolof kingdoms by allying

¹⁰⁵ ANOM C 6 8, "Lettre de Julien de Bellay au gouverneur," 1723. Also cited in Becker, "Notes," 176.

¹⁰⁶ Ibid.

¹⁰⁷ Barry, *Senegambia*, 69-86. Also see: Searing, *West Africa*, 79-81.

¹⁰⁸ ANOM C 6 8, also cited in Becker, "Notes," 176. The price of grains and millet during good harvests averaged four livre per hogshead, but during periods of drought the prices were as 30 livres per hogshead. A hogshead, or barrel, usually could hold about 500kilos of grain.

¹⁰⁹ ANOM, C 6 8, "Lettre de Joseph Morin," 1720. Also cited in Becker, "Notes," 175.

¹¹⁰ Becker, "Memoire d'Adanson," 734.

with the Emir of Trarza, they quickly realized that the Moors were intent on monopolizing the river trade for themselves. In 1723, the company sent Andre Bruë, the former Governor of Saint-Louis, back to the Senegal Valley for a second tour. As a reliable and experienced trader and administrator, the company directed Bruë to rekindle commerce and to establish a lasting peace with the Wolof states.¹¹¹ In a passage from his journal, dating April 9th, 1723, Bruë claimed that “the main purpose of my return to Africa was only to contribute to the peace and tranquility of the country” and to “reconcile the conflict” between the sons of Latsukaabe Faal. In his view, the quarrel between the two brothers was the result of “fake reports and the dangerous traps that the Moors had laid out for them.” The Trarza warriors, he believed, were trying to pit the brothers against one another in order to “weaken and invade the kingdom.” According to Bruë, however, the “trickery and malevolence” of the Moors “would never succeed if [the two brothers] are united” and if the *Compagnie du Sénégal* blockaded the Moors “with all her armed boats, as she did for twenty years during their father’s lifetime.”¹¹² Although French traders and the political elite in the kingdom of Kajoor often clashed over tribute payments and customs, Bruë understood that maintaining stability in the kingdom was critical to maintaining commerce in the Senegal Valley.

Soon after his arrival in 1723, however, Bruë grew increasingly frustrated with the lack of cooperation from the feuding sons of Latsukaabe Faal. In one report, he complained that the conflict stifled food production and “if hunger did not press them, they would never resolve to sow their lands.”¹¹³ Due to the constant infighting between the brothers, the kingdoms “only sow what they need” and “would be reduced to famine and slavery” if drought conditions worsened.¹¹⁴

Despite French efforts to normalize trade and reconcile the differences between the brothers, the

¹¹¹ Andre Bruë served several tenures in Saint-Louis. He returned for the last time in 1723 to rekindle commerce between the French and the Wolof.

¹¹² In Gérard Lafleur, *Journal d'Andre Bruë, Commissaire générale des affaires de la colonie du Sénégal, 1722-1723*, 42.

¹¹³ Etienne Félix Berlioux, *André Bruë, ou l'origine de la colonie française du Sénégal* (Lyon: Louis Perrin et Marinet, 1874) 72.

¹¹⁴ Ibid.

political crisis grew considerably worse. From 1723 to 1725, the rains returned for a brief period but failed once gain in 1726. According to Dubellay, the states of Waalo and Kajoor “had been long afflicted by continuous civil war” and required “two or three years of peace” to return to the “abundance of the years before.”¹¹⁵ Even further, he noted, the kingdom of Kajoor was once “fertile and prosperous but is today so miserable that its population is barely able to feed itself.”¹¹⁶ The conflict in Kajoor also meant that traders and merchants in Saint-Louis and Gorée struggled to provide nourishment for the slaves awaiting departure for the Americas. The average price of one hogshead of grain, he complained, had risen from “four livres in iron” to “thirty and thirty-five livres.” The price, he exclaimed, was “quite unbelievable” but it was nevertheless true.¹¹⁷

While the French documented several instances of drought and famine in Gorée and Saint-Louis throughout the 1720s, their observations offer little evidence that the Wolof states experienced similar forms of scarcity. For French officers like Dubellay, the arrival of starving peasants and slaves on the coast was an indication that harvests in the Wolof kingdoms had failed. Although this seems like a logical connection, French officers misinterpreted the plight of starving peasants and slaves as a sign of widespread drought and famine in the interior. For the Wolof states, however, the disappearance of slave and peasant populations during warfare was typical, as most aristocratic families and political elites lost many captives, farmers, and warriors to battles and raids. Indeed, as one French trader observed, warfare between rival Wolof states was “nothing more than depredation” and involved “stealing cattle, ravaging the fields of millet, and thus depriving their neighbors of their property.”¹¹⁸ Furthermore, the inflated price of cereals and grains on the coast was not the product of food scarcity in the interior, but rather the result of stifled trade between the

¹¹⁵ ANOM C 6 8, Also cited in : Becker, “Notes,” 177.

¹¹⁶ Oumar Kane, *La Première hégémonie peule: le Fuuta Tooro de Koli Tenella à Almaami Abdul* (Paris : Karthala, 2004) 551-552.

¹¹⁷ Kane, *La Première*, 51-52.

¹¹⁸ Saugnier, *Voyages to Africa*, 480.

French and the Wolof kingdoms. Since the kingdoms of Waalo and Kajoor were mired in civil wars and political conflicts, the normally reliable networks of trade between Saint-Louis and the Wolof states were temporarily blocked. The French, therefore, were forced to buy provisions from the grains stores of the *habitants*, who, subsequently, sold their surpluses at inflated rates.¹¹⁹

In November of 1729, French traders reported that good rains had returned to the Lower Senegal Valley and yielded abundant harvests of millet, sorghum, and fonio.¹²⁰ Along with the good harvests, political and economic relations between the French and the Wolof states normalized. The internal conflicts and civil wars in the kingdom of Kajoor came to an end, and the Emir of Trarza slowly retreated from the kingdom of Waalo.¹²¹ For many French officers in the *Compagnie du Sénégal*, the food scarcities and famines of the previous decade were a stark reminder of their dependence on African systems of food production, as well as their vulnerability to the political ebbs and flows of the Wolof kingdoms. The constant threat of food shortages and famine, therefore, reinforced the need for company officials to establish alternative sources for cereals and grains.

From 1730 to 1750, French officers in the *Compagnie du Sénégal* hoped to exploit the grain producing regions of the Upper Senegal Valley. When drought hit in 1734, Sebastian Devaulx, the Governor of Saint-Louis, complained that poor harvests in the coastal kingdoms pushed Saint-Louis to the brink of famine. The shortages in grain, he lamented, “were so severe that we had to use all the means available to us just to provide enough for our own needs.”¹²² In particular, Devaulx noted that the combination of drought and poor harvests depleted the grain surpluses of Kajoor and prompted the shortage. The following year was even worse, and he reported again that “the whole country is in flames, and the famine has caused everyone to desert the villages” and search for food

¹¹⁹ Saugnier, *Voyages to Africa*, 480; Barry, *Senegambia*, 110; Becker, “Notes,” 177.

¹²⁰ Saugnier, 478.

¹²¹ Searing, *West African*, 134-135.

¹²² ANOM C 6 10, also cited in: Becker, “Notes,” 179.

elsewhere.¹²³ Devaulx hoped to expand the trade by sending riverboat crews to the grain markets in Futa Toro and Gajaaga. In 1736, a French administrator reported that the harvests in Gajaaga “were beautiful” and that the farmers had cut “handsome millet” throughout the region. The crop, he recorded, yielded 1,000 barrels of surplus grains that could be transported from the interior to the coast.¹²⁴ Yet, in spite of the abundant harvest, the company only transported 200 tons of grains because the *pirogues* of the riverboat crews, though agile in shallow waters, were limited in size and could only transport modest quantities of grains.

The other challenge that French traders faced was the relatively short trading season of the Upper Senegal Valley. Since farmers in Gajaaga and Futa Toro harvested their grains at the end of the wet season, French traders had just under two months to transport large quantities of grains back to Saint-Louis before the river became too shallow to navigate. Due to these limitations, then, the granaries of Futa Toro and Gajaaga provided company officers in Saint-Louis with a modest supply of grains that lasted for only two or three months.¹²⁵

Nevertheless, the *Compagnie du Sénégal*, in the wake of another period of food scarcity in 1743-1744, attempted once more to expand the grain trade to Futa Toro.¹²⁶ After consecutive years of poor harvests and a severe famine that killed scores of slaves in Saint-Louis, Pierre David, the Governor of Saint-Louis, declared the Upper Senegal Valley as an important source of cereals and grains. According to David, the kingdoms of Kajoor and Waalo refused “to sell their grains” because they had “the same fear of scarcity and famine as we do.”¹²⁷ By 1744, Saint-Louis suffered enormous losses with nearly 25 percent of its slave population succumbing to starvation. The food

¹²³ Becker, “Notes,” 180.

¹²⁴ Ibid, 179.

¹²⁵ Pierre David, *Journal d'un voyage fait en Bambouc en 1744* (ed. André Delcourt Paris : Société d'Histoire d'Outre Mer, 1974), 79-80.

¹²⁶ Becker, “Notes,” 181.

¹²⁷ ANOM, C 6 14. “Lettre de David au Ministère,” 1744. Also cited in Becker, “Notes,” 181-82.

shortages on the coast, therefore, were not caused by drought or a lack of grain production but rather by the strategies and methods that local populations used to endure periods of scarcity.

Moreover, during the lean years of drought, the French were forced to compete with other states and polities that relied on the Wolof states for food. Throughout the 1740s, the Trarza Moors consistently undermined French efforts to trade for grains by purchasing the vast majority of surpluses available in Kajoor. For David, the *damel* “ruined the trade with Kajoor” by selling all of their staple grains to the Moors and leaving the French with “nothing left to receive.”¹²⁸ In order to avoid food scarcities in the future, David urged all French settlements “on the river Senegal and Senegal [Saint-Louis] itself” to bypass the kingdom of Kajoor and to trade for grains in Gajaaga and Futa Toro.¹²⁹ Yet, just as before, the French could only trade with Futa Toro for a limited amount of time due to the shallow waters. Unable to attain sufficient quantities of grain from the Upper Senegal, the French had few options but to rely on the Wolof kingdoms for grains. As one French trader noted in the mid-eighteenth century, “the essential problem for Senegal” was that “the government cannot ignore famine” and that “all of our commerce depends on the *damel*.”¹³⁰ Indeed, French trading companies in Saint-Louis were restricted by their energy dependence, which made them increasingly vulnerable to the political and economic agenda of the *damel* of Kajoor.

To be sure, the difficulties in transporting provisions from the Upper Senegal Valley to Saint-Louis forced the French to accept a troubling reality. Commerce in the Senegal Valley, as well as the trading posts of Saint-Louis and Gorée, fully depended on both the *habitants* and the Wolof states. From staple grains to riverboat crews, the French relied on the local expertise of African traders, sailors, and farmers to sustain their economic activities in the Atlantic trading system. In contrast to the mainland kingdoms, which possessed effective strategies to endure lean harvests and

¹²⁸ ANOM, C 6 14. “Lettre de David au Ministère,” 1744. Also cited in Becker, “Notes,” 181-82.

¹²⁹ Ibid. Also: Becker, 184.

¹³⁰ Becker, 195-96; Also referenced in Searing, *West African Slavery*, 87.

episodes of drought, the French were helpless when political or ecological crises threatened their access to staple grains. When droughts, locust plagues, or warfare stifled trade and incited food shortages on the coast, the merchants and traders in Saint-Louis and Gorée were the first to suffer.

The Great Famine and the Myth of Decline

From 1747 to 1754, the French reported that a crippling drought, known as the Great Famine, set-off a series of debilitating conflicts that drove the Wolof kingdoms into civil war and interstate conflicts. In 1752 and 1753, French officers reported that drought conditions worsened and famine spread throughout the entire region of the Senegal Valley. As more and more slaves sought refuge in Saint-Louis, the French governor, Estoupan de Bruë, complained that “never before in this territory has there been such widespread famine. With such limited quantities of cereals and grains, he noted that traders were “having a difficult time finding food for nearly 600 captives.”¹³¹ Yet, while reports of drought, widespread famine, and failed harvests appear regularly in French reports, there is little evidence that Wolof populations were unable to endure dramatic periods of ecological change.

For some historians, the Great Famine of the 1750s created a severe crisis that generated the largest exodus of slaves from the Senegal Valley in the eighteenth century.¹³² According to James Searing, the crisis of the 1750s was the “central event” of the eighteenth century, in which neither the slave-trading economy nor the political order ever quite recovered.¹³³ In a similar vein, Boubacar Barry and Charles Becker argue, respectively, that the combination of natural disasters, wars, and slave raids exacerbated famine conditions and reduced the productive capacity of the population.¹³⁴

¹³¹ ANOM C 6 13, also cited in Becker, “Notes,” 184-85.

¹³² In the wake of the Great Drought in the 1750s, civil wars, ecological decline, and political fragmentation weakened the Wolof states and generated large populations of slaves. From 1750 to 1780, approximately 34,666 slaves were sold from Saint-Louis and Gorée. TAST Database: <http://www.slavevoyages.org/voyage/search>

¹³³ Searing, *West African Slavery*, 129.

¹³⁴ Barry, *Senegambia*, 110-111; Becker, “Notes,” 160.

However, in revisiting the letters, diaries, and observations of French merchants, it becomes clear that the majority of food shortages and famines were specific to the coastal settlements of Saint-Louis and Gorée rather than to the Senegal Valley as a whole. Since the French possessed no arable land and no dependable system of food production, they were not only susceptible to famine but were also forced to rely on the Wolof kingdoms for their basic energy needs. Thus, during periods of scarcity and drought, the Wolof states produced, stored, and conserved grains while French traders were at the end of a long line of grain distribution in the Senegal Valley.

Furthermore, Wolof oral traditions rarely recorded incidents of food scarcities and starvation, focusing instead on the dynastic politics and rivalries of aristocratic households. For many historians, this omission suggests that oral traditions were primarily concerned with the political affairs of the ruling elite, who likely escaped famine by hoarding grain surpluses or raiding neighboring communities. Yet, the lack of droughts and famines in the oral data may also indicate that Wolof households were particularly well adept at weathering extended periods of ecological crisis. By storing surplus grains, rotating fields, grazing livestock, and diversifying agricultural production, households in the Wolof kingdoms reserved enough food to withstand periods of drought and scarcity. Put simply, this absence in the oral data may suggest that food scarcities and famines were more severe for Europeans along the coast than for their African counterparts in the interior.

During the most difficult years of the drought, many slave traders and merchants in Saint-Louis watched desperate and starving peasants sell themselves into slavery and then die from hunger just days after arriving on the coast.¹³⁵ In 1751, a letter from the *Conseil du Sénégal*, noted that the millet harvest was “lost again” and the absence of provisions “has left us in fear of another famine

¹³⁵ Becker, “Notes,” 184.

which will likely be uglier than the last.”¹³⁶ In a similar account, Estoupan Bruë recorded that consecutive harvests failed in the states of Kajoor and Bawol, stopping all commerce except for small quantities of millet and slaves. Even still, he claimed, the “famine has nearly destroyed them” and the company will have to wait “some time for them to recover.”¹³⁷ With widespread food shortages along the coastal hinterlands, the French looked to the Upper Senegal Valley and the interior for cereals and grains. Yet, in both regions, they reported that entire harvests also failed. In Futa Toro, one company officer observed that the “millet trade failed completely at Podor” and unless the rains returned the trading post would collapse.

From 1752 to 1753, French officers reported that drought conditions worsened and famine spread throughout the entire region of Senegambia. As more and more people sought refuge in Saint-Louis, Bruë complained that “never before in this territory has there been such widespread famine,” with populations from “Bissau all the way to Gajaaga” suffering from starvation. With such limited quantities of cereals and grains, he noted that traders were “having a difficult time finding food for nearly 600 captives.”¹³⁸ A year later, French traders reported that a mass of peasants and farmers migrated to Saint-Louis in an attempt to escape starvation. In a letter from the *Conseil du Sénégal*, one officer observed that “these poor people knew for certain they would be captured” and sold into slavery.¹³⁹ Yet, that did not stop them “from going to the only place where they could find relief from their misery.” Their choice, he lamented, was either “death or captivity.”¹⁴⁰ For local populations, then, seeking refuge in Saint-Louis and submitting themselves to the transatlantic slave trade was the final, and desperate, attempt to avoid starvation.

¹³⁶ ANOM C 6 13. Also see: Becker, 184-85.

¹³⁷ ANOM C 6 14. Also cited in Becker, “Notes,” 186.

¹³⁸ Ibid.

¹³⁹ Ibid.

¹⁴⁰ Ibid.

Although some peasants submitted themselves to slavery as an alternative to starvation, the majority of the slaves that the French received from the Wolof kingdoms were prisoners of war. In 1749, rival aristocratic families overthrew the Geej dynasty in the kingdom of Kajoor, which had been in power since the start of Latsukaabe Faal's reign in 1695. For the next ten years, a violent civil war splintered the kingdom into groups of bitter rivals who preyed on one another for slaves, grains, horses, and other valuable goods. For some aristocratic families, selling prisoners of war into the slave trade was an effective way to strengthen their *ceddo* armies. In 1752, for example, the *damel* of Kajoor sold 400 "starving" captives to the French traders for horses, guns, and ammo. In a similar account, one French officer recorded that the *damel* sold 50 slaves to British traders for 12 muskets a piece.¹⁴¹ Rather than retaining prisoners of war as domestic and agricultural slaves, then, the Wolof elite outfitted their armies with weapons and ammunition. In other words, in selling captives of war to French traders in Saint-Louis, which was a common practice among the ruling elite in the Senegal Valley, the Wolof states were not necessarily offloading "starving" slaves as some French reports indicated, but rather, they were equipping their armies with European-made guns and ammunition.

While some French traders were sympathetic to the suffering of local peasants and slaves, others noted that it was good for business. According to one French official, "Never before have the kingdoms of Senegal produced so many captives. Famine has prevailed throughout the region and has given us this beautiful trade."¹⁴² In some cases, they even hoped that drought, political conflicts, and civil wars within the Wolof states would continue. Indeed, with each battle fought in the Senegal Valley they acquired more slaves to sell into the Atlantic trade.

¹⁴¹ ANOM, C 6 14. Also see: Becker, "Notes," 186-88.

¹⁴² Ibid.

In the autumn of 1754, famine reached its peak in Saint-Louis and Gorée. Due to the scarcity of grains along the coast, one French trader noted that staple grains were so scarce that one hogshead of millet sold for the “cost of ten or twelve guns,” which was approximately the same price as a slave.¹⁴³ While some French officials blamed consecutive years of drought for the famine, the absence of cereals and grains was the result of a political conflict in the kingdom of Kajoor. The estranged *damel*, who had been forced out a few years earlier, retook his throne with the assistance of the *brak* of Waalo. Although the rains returned and would have produced a decent harvest, the *damel* accomplished his *coup d'état* by “completely ravaging the countryside” and “destroying the majority of the seeds that would have contributed to an abundant harvest.”¹⁴⁴ Since the majority of the cereals and grains were destroyed in the civil war, the French hoped to supplement their diets by purchasing livestock from farmers and pastoralists. Yet, according to Estoupan Bruë, herds of cattle were extremely rare in the Lower Senegal Valley because “three years of consecutive famine forced the blacks to eat all of their beasts of burden.”¹⁴⁵ Shortages in livestock along the coast, then, underscore how the Wolof populations endured periods of drought and famine. Rather than selling their beasts of burden to the French, local communities maintained possession of their livestock as a last resort to avoid starvation.

Despite the numerous reports of failed harvests and famines on the coast, the Wolof states—and the aristocratic elite in particular—did not suffer from food shortages and starvation. In fact, reports from the *Conseil du Sénégal* suggest that the Wolof kingdoms had sufficient supplies of grain, but were simply unwilling to trade them during the civil war. In recognizing the fragile political situation of Kajoor, Charles Godeheu, a company officer, reported that trade in provisions between Saint-Louis and the *damel* required a delicate political touch. As the most powerful king on the coast,

¹⁴³ Becker, “Notes,” 186-88.

¹⁴⁴ ANOM C 6 14, “Mémoire de Estoupan de Bruë,” 1754. Also cited in: Becker, “Notes,” 188-90.

¹⁴⁵ Becker, “Notes,” 190.

Godeheu argued, “there is, therefore, no other policy to observe with the *damel* than that of maintaining his friendship, without appearing to fear it.”¹⁴⁶ This policy, he urged, was especially true now that “the kingdoms of Kajoor and Bawol harvested all the millet along the Senegal River.”¹⁴⁷ The threat of famine in Saint-Louis and Gorée, then, was not necessarily due to ecological decline but to the complex political landscape of the Senegal Valley.

During the famine, the *Compagnie du Sénégal* conducted a census of Saint-Louis.¹⁴⁸ The analysis showed that the number of slaves held by European traders actually declined, while the number of slaves held by the *habitants* increased.¹⁴⁹ This was in part due to the fact that European traders rapidly turned over their captives to slave vessels bound for the Americas. By contrast, the permanent residents of Saint-Louis, which included local traders, métis, and *signares*, owned nearly 550 slaves, of whom they kept for domestic labor. To feed this growing population of domestic slaves, their masters stored large quantities of grains and other provisions.

The large population of domestic slaves gave some French residents reason to believe that the *habitants* were responsible for the famine. For Michel Adanson, the hoarding of food, grains, and other goods was one of the primary causes of starvation on the island. The *signares*, he averred, “had double or triple rations of bread, meat, fish, wine, brandy, and firewood stored away” and they had “all things necessary for life for them, their children, and their slaves.” These abuses, he sneered, “occasioned shortages of bread, wine, and other supplies for lower ranking officers” who were “deprived of them long before the scarcity.” Disgusted with their brazen display of wealth, Adanson regarded the *signares* as “leeches” and “blood suckers” that wasted valuable resources on “banquets

¹⁴⁶ ANOM C 6 14, “Lettre, Saint-Louis,” June 3, 1754. Becker, “Notes,” 188.

¹⁴⁷ ANOM C 6 14, “Lettre du Conseil du Sénégal,” July 11, 1754. Becker, “Notes,” 189.

¹⁴⁸ ANOM C 6 12, “Lettre à Gorée,” 1754. Also in Becker, “Notes,” 191-193. The 1754 population census concluded the following: of the 2,500 people on the island, there were 800 men, 550 slaves, and the remaining 1150 were women and children. For a more in depth account of Saint-Louis and its population during the eighteenth, refer to Searing, *West African Slavery*, 104.

¹⁴⁹ *Ibid.*

and feasts.”¹⁵⁰ To an extent, Adanson’s rant offers compelling evidence that the food shortages in Saint-Louis during the 1750s were not due to pervasive drought and grain scarcities in the interior, but rather, they were the result of disputes in local trade and politics. Since the *habitants* had direct access to the trading networks of the Wolof states, and thus the flow of staple grains from the interior to the coast, they were well positioned to provide provisions for their families and their large population of slaves. French traders and merchants, meanwhile, struggled to acquire staple grains and to provide their company employees and captives with their basic energy needs.

While reports of scarcity and famine in Saint-Louis are pervasive in the archive during the 1750s, some company officials seemed to report the opposite. In 1752, a year when drought sparked food shortages in Saint-Louis, Adanson recorded that the millet harvest in the hinterlands of Saint-Louis were healthy and abundant:

The next day I went foraging and coursing over the beautiful fields on the opposite (southern) bank of the river. At that time they were covered with a large kind of millet, called *Guinea corn*: it was now almost ripe, and the blacks had covered the ears with its own leaves, to shelter it from the sparrow, which do a great deal of mischief in this country. It was no small labor to walk across those spacious fields of millet, the stalks being very large and compact, and full eight feet high. The heat was quite stifling, for not the least breath of air could be perceived amidst those high plants.¹⁵¹

Adanson’s account offers a stark contrast to the numerous reports of droughts and famines in the Senegal Valley. Indeed, his description of eight-foot tall stalks of millet, as well as the difficulties of traversing the densely-planted fields, indicate that peasant farmers produced robust harvests of millet during the Great Famine. Moreover, he seems to suggest that the biggest threat to harvests in the Senegal Valley was not drought, but, rather, flocks of sparrows that arrived as the millet crop ripened.

¹⁵⁰ ANOM, C 6 15. Also see: Becker, “Notes,” 190.

¹⁵¹ Adanson, *Histoire naturelle*, 75.

In October of 1752, Adanson embarked on another expedition into the interior, this time visiting the small town of Kionk in the Lower Senegal Valley. Similar to his previous excursion, Adanson observed that the land “was very agreeable” and the “fallow grounds formed large meadows checkered with mangroves and calabash trees, which made for a delightful landscape.” Furthermore, Adanson reported that the millet crop was nearly ripe and showed “its golden ears” to an “infinite number of birds that created havoc” among the local population. In order to scare the sparrows away, Adanson noted that the “inhabitants had crossed their *lougans* with a great number of threads, to which they hung shells, bones, and other such bodies that are apt to make a noise upon the least collision.”¹⁵² Furthermore, Adanson noted that women and children, posted at opposite ends of the field, observed the sparrows from covered perches that were seven to eight feet above the ground. When the sparrows dived towards the crops, they pulled the cords, shouted loudly, and clapped their hands. This watch, however, was not always successful. According to Adanson, the black and yellow sparrows arrived “like clouds of which fell like hail upon the grain and when they spread desolation into one quarter they flew to another.”¹⁵³ As such, these sparrows did “irreparable mischief that occasionally caused famine among our negroes.”¹⁵⁴ Put simply, the peasant farmers of the Wolof states did not experience drought and food scarcities in the way that many French traders seemed to suggest. In taking the reports of drought and scarcity at face value, historians have overlooked the numerous ways that African systems of agrarian energy production enabled local populations to endure rapid ecological change.

During his time in the Senegal Valley, which extended from 1749 to 1754, Adanson lived in Saint-Louis and recorded and catalogued the flora, fauna, and ecology of the Senegal Valley. Curiously, in his two published works, *Histoire Naturelle du Senegal* and *A Voyage to Senegal, the isle of*

¹⁵² In this case, the word *lougans* refers to a cultivated area in a treed region of the savanna.

¹⁵³ Adanson, *Histoire*, 76.

¹⁵⁴ *Ibid.*

Gorée, and the River Gambia, he did not include a single reference to drought, scarcity, or widespread famine in the interior. In fact, his observations of the Senegal Valley contradicted reports of drought and scarcity in the interior. In 1751, for example, one French officer noted that the “millet trade failed completely at Podor” and further contributed to the “terrible famine that exists in the Lower Senegal.”¹⁵⁵ Yet, in the same year, Adanson traveled to Podor with a small riverboat crew and noted that, “instead of a dry barren plain, I beheld an agreeable landscape, intersected with morasses, where rice grew naturally without being sown.” The higher grounds, he observed, were covered with millet, indigo, and cotton plants that “displayed a most lovely verdure.” The fecundity of the land, he continued, “was not confined to the adjacent fields” but also “extended to the woods and *marigots*” where there were “many new species of trees and birds of exquisite beauty.”¹⁵⁶

The conflicting reports of scarcity and abundance were, to a degree, due to the uneven distribution of staple grains from the interior to the coast. On the one hand, Adanson’s detailed observations of local agriculture and the fertility of the Senegal Valley indicate that the Wolof states, as well as the smaller states and polities of Futa Toro and Gajaaga, produced sufficient quantities of grains during the lean years of the Great Famine. On the other hand, reports of widespread droughts, food shortages, and famines reveal that the French—in spite of relatively successful harvests in the interior—were unable to acquire enough food to sustain their settlements on Saint-Louis and Gorée. Simply put, the French experienced severe periods of famine and starvation during the 1750s because they were unable to secure a consistent flow of staple grains from the Wolof states to their coastal settlements.

The constant threat of food shortages and scarcity in Saint-Louis and Gorée significantly shaped how the French viewed agriculture in the Senegal Valley. They believed, in effect, that the

¹⁵⁵ ANOM C 6 14. Also cited in Becker, “Memoire d’Adanson,” 754.

¹⁵⁶ Adanson, *A Voyage to Senegal*, 151.

region was not only in a state of ecological crisis, but also that the Wolof states were incapable of producing surplus quantities of cereals and grains. In some cases, French traders claimed that Wolof farmers and peasants were the primary cause of famine in Saint-Louis and Gorée. According to a report from the *Conseil du Senegal*, the local population “shun labor as the worst thing in the world, and if hunger did not press them they would never resolve to sow their land.” Without the “extraordinary fecundity of their country,” they “would each year be reduced to famine and be forced to give themselves up as slaves to those who have something to eat.” The root cause of famine, therefore, was not drought or ecological change but rather the lazy and improvident behavior of the “natives.”¹⁵⁷ While French traders and company officers linked the causes of famine to a number of political, ecological, and social factors in the Senegal Valley, the production of grains in the Wolof states did not slow or stop. Indeed, the agrarian energy systems of the Wolof states were far more dynamic than the French, and contemporary historians, have previously suggested.

To that end, ecological change in the Senegal Valley, and most notably drought, did not have the dramatic impact on the Wolof states that some historians have suggested. With firm control over the organic energy economy—and notably the grain market, slave labor, and fertile lands—the Wolof states were well provisioned to endure the prolonged periods of drought throughout the eighteenth century.

Sowing the Seeds of Colonialism

During his five-year stay in the Senegal Valley, Michel Adanson conducted research on the flora and fauna of Senegambia, collecting data and developing a new system of classification for plants. In contrast to his contemporaries on the island of Saint-Louis, who were mostly slave traders

¹⁵⁷ Etienne Felix Berlioux, *André Bruë, ou l'origine de la colonie française du Sénégal* (Lyon: Louis Perrin et Marinet, 1874), 276.

and merchants, Adanson was a well-educated young man with aspirations of entering the prestigious *Académie des Sciences* in Paris. His voyage to Senegal, therefore, was an attempt to gain recognition among his colleagues in the metropole and to conduct the first comprehensive botanical study of France's colonial settlements in sub-Saharan Africa.

Adanson's work in the Senegal Valley has attracted the attention of many scholars, from historians to botanists, but few have examined his role as a pioneer of French colonialism in West Africa. Through his obsessive work on the local gardens of Saint-Louis, as well as his frequent excursions into the coastal hinterlands, Adanson developed a comprehensive knowledge of the region's potential for agricultural production. In 1753, Adanson approached the directors of the *Compagnie des Indes* with a proposition to establish plantation agriculture in the Senegal Valley. The project, he argued, would not only alleviate food shortages in Saint-Louis and end the colony's reliance on the Wolof states for staple grains, but it would also bring economic prosperity to the company and to the region. Adanson's proposal stirred immediate controversy among company officials in Saint-Louis. The young botanist advocated for a colony under the control of "five to six hundred whites" that could oversee "all the blacks, all the freed slaves, and all the cultivators" to support the "annual consumption of sugar, coffee, cocoa, gum arabique, and incense."¹⁵⁸ The slaves, he contended, "should be replaced by deported criminals...who would be chained and would work in this torrid country in place of slaves."¹⁵⁹ The boldest idea of his project—to abolish slavery and replace the labor force with criminals from France—received little support from the company officials in the colony and the metropole.

While the idea of liberating slaves in the Senegal Valley was unpopular among slave traders and merchants in Saint-Louis, Adanson's ambitious vision for French colonialism in the Senegal

¹⁵⁸ Cited in J.P. Nicolas, "Michel Adanson, The Man" (Pittsburgh, PA: Hunt Botanical Library, 1963), 12-45. These plans were scribbled in the margins of his *Encyclopédie de Diderot and D'Alembert*.

¹⁵⁹ *Ibid.*, 27.

Valley signaled the start of French imperialism in the late eighteenth century. In recognizing both the high cost and risk of the transatlantic slave trade, many French company officials wanted to grow lucrative cash crops in Africa rather than capturing, purchasing, and shipping slaves to the Americas and the Caribbean. In other words, by occupying the fertile lands of the Senegal Valley, the French hoped to construct a monopoly on its agrarian energy systems through domestic slave labor. This, in turn, would reverse their dependence on the Wolof states for staple grains and force the aristocratic elites of the Wolof kingdoms to submit to French authority.

These aspirations, however, came to an abrupt halt as the outbreak of the Seven Years' War in 1756 significantly changed France's imperial agenda. The British, who were also attracted to the idea of a plantation economy along the Senegal River, aimed to weaken the French Empire by conquering its most lucrative trading posts. In April of 1758, the British arrived on the coast of Senegal with a fleet of five warships. With favorable winds and an abnormally high tide, the British crossed the treacherous sandbars of the Lower Senegal—a feat that was typically impossible without the assistance of local sailors, or *laptots*. The sudden arrival of the British fleet caught the French off guard and within a few short days the French resistance collapsed. The capture of Saint-Louis gave British traders control of coastal forts in the Senegal Valley with the exception of Gorée, which was retained under the Treaty of Paris in 1763.¹⁶⁰

After the Seven Years' War, the British crafted a plan to construct a large settler colony in the Senegal Valley based on plantation agriculture. Yet, similar to their French predecessors, the British were entirely dependent on the Wolof states for food and trade.¹⁶¹ According to Charles O'Hara, the British governor of Senegal, the only way to throw off the yoke of the Wolof states was

¹⁶⁰ For a more detailed account of British occupation during the Seven Years' War in Senegal refer to: Matthew P. Dziennik, "Till these Experiments be Made': Senegambia and British Imperial Policy in the Eighteenth Century," *English Historical Review* Vol. CXXX No. 546 (October 2015): 1132-1161.

¹⁶¹ *Ibid*, 1145.

to increase trade and revenue “by making the Native dependent on Government” and by controlling the production and distribution of gum, tobacco, and staple grains.¹⁶² In 1766, O’Hara proposed a plan to free domestic slaves from the *habitants* in Saint-Louis to work on British owned tobacco, sugar, and cotton plantations.¹⁶³ To accomplish this ambitious goal, O’Hara argued that colonial officers needed to apply British law to the colony, and the notion of private property in particular, to encourage industriousness and civility among the Wolof kingdoms.¹⁶⁴ By developing the concept of private property, he believed that local populations would look to the British for the protection and security of their lands. The “natives,” he averred, “would retire under the protection of our guns” when “oppressed by their chiefs or their enemies.” In this way, they “would be attached to Our interest” and would become “industrious...and grow rich, provident, and more civilized.”¹⁶⁵ In reality, however, O’Hara’s plans met heavy resistance from the *habitant* population. Reluctant to free their slaves for the benefit of the British, the *habitants* refused to comply with the governor’s demands by stifling the flow of grain supplies from the interior to the coast. Facing a potential famine due to grain scarcities in Saint-Louis, O’Hara backed down and the domestic slave populations of Saint-Louis remained under the authority of the *habitants*

O’Hara’s vision for a British colony in the Senegal Valley also included a large population of white settlers to grow indigo, tobacco, grains, and cotton. In 1771, he began the development of a plantation settlement in Podor, a small trading village in the Middle Senegal Valley. In order to acquire enough fertile land for plantation agriculture, O’Hara hoped to partner with sympathetic leaders in the region. In particular, he approached Makodu Kumba Joaring, the *damel-teen* of Kajoor and Bawol, and the Emir of Trarza to partner with the British and drive out the inhabitants of the

¹⁶² Anonymous, *A Plan for Improving the Trade at Senegal Addressed to the Lords Commissioner for Trade and Plantation*, (London, 1763), 3-18. Also in Barry, *le Royaume de Waalo*, 201.

¹⁶³ Barry, *le Royaume de Waalo*, 201.

¹⁶⁴ Dziennik, “Experiments,” 1146.

¹⁶⁵ *Ibid*, 1147.

kingdom of Waalo. As one British officer reported, O'Hara's partnership with the *damel-teen* and the Emir was an effort to overrun "the inhabitants of Waalo, then exceedingly powerful" and to open up networks of trade in the "upper part of the river."¹⁶⁶ In 1775, during a year of poor rains and bad harvests, the Trarza warriors and the British collectively invaded the kingdom of Waalo.¹⁶⁷ After the invasion, however, the Emir tightened his control of the Lower Senegal and disrupted the flow of goods from the interior to the coast. The presence of the Trarza warriors in the Senegal Valley ignited tensions between the Emir and the *damel-teen*, which, in time, escalated into a series of violent conflicts. Due to the ongoing skirmishes, O'Hara ultimately abandoned his settlement in Podor and complained that interstate conflicts were too complex to maintain a plantation economy.¹⁶⁸

With the loss of Podor, O'Hara turned to the transatlantic slave trade to generate revenue for British trading companies in Saint-Louis. Conveniently, the constant fighting between the Emir, *damel-teen*, and the *brak* of Waalo yielded thousands of prisoners of war, of whom the British purchased in staggering numbers. In August of 1775, O'Hara noted that the Moorish warriors "totally submerged all nations of Blacks inhabiting the banks of the Senegal River," and "killed and sold several thousands of persons and forced others to flee the country."¹⁶⁹ During the Trarza occupation of Waalo, the British had captured, purchased, and sold close to 8,000 slaves into the transatlantic slave trade.¹⁷⁰ In one report, a British officer claimed that O'Hara's alliance with the Emir delivered "a blow from which the Waalo country has never since recovered."¹⁷¹ Two years later, in 1777, conflict escalated once again and a French officer on Gorée, Armeny de Paradis,

¹⁶⁶ ANOM, C 6 14, "Fort Lewis, Senegal, the 18th of August 1775." Also see: Barry, *Le Royaume*, 209.

¹⁶⁷ Barry, *Senegambia*, 208-211.

¹⁶⁸ P. Dziennik, "Till these Experiments be Made," 1140-1145.

¹⁶⁹ ANOM, C 6 14, "Rapport Générale" 18 August 1775. Also cited in Barry, 67.

¹⁷⁰ *Ibid.*

¹⁷¹ *Ibid.*

recorded that the British and French purchased 6,000 slaves and 3,000 slaves from the Emir, respectively.¹⁷²

The destruction from years of violent battles and skirmishes all but destroyed the kingdom of Waalo. According to one British trader, the Waalo “villages on the river’s banks are deserted and abandoned, its people have been carried into captivity, and those who remain are constantly subjected to the plunder of the Moors, who treat them as a dependent and tributary state.”¹⁷³ The invasion and subsequent ruin of the Waalo state enabled O’Hara to generate substantial profits from the slave trade. In fact, during his tenure as governor in Saint-Louis, O’Hara oversaw the largest exodus of slaves from the Senegal Valley in the eighteenth century. From 1763 to 1783, the British exported an approximate total of 25,000 slaves—nearly half of the total for the entire eighteenth century. During the heaviest years of the slave trade, the market was so saturated that some company officers noted, “we sold slaves for a piece of cloth in the streets of Senegal [Saint-Louis].”¹⁷⁴ Surprisingly, the dramatic increase of slaves along the coast did not cause widespread food shortages in Saint-Louis or Gorée. Although Waalo was in ruin, trade between Europeans on the coast and the grain producing regions of the Senegal Valley remained fluid and open. In fact, the decline of the kingdom of Waalo was a favorable outcome for rival Wolof states. With the growth of slave populations in Saint-Louis, the granaries of Kajoor and Bawol were in high demand.

Ultimately, the ambitious plans of the French and the British to colonize the Senegal Valley in the late eighteenth century were bold attempts to control the agrarian energy systems of the Wolof states. In both cases, they believed that establishing a monopoly on the production and distribution of goods—from staple grains to gum arabic to tobacco—would eventually bring the Wolof political elite under their authority. Their inevitable failure, however, was due in large part to

¹⁷² ANOM, C 6 14, “Rapport Générale” 18 August 1775.

¹⁷³ Barry, *Senegambia*, 67.

¹⁷⁴ ANOM, C 6 18. Also quoted in Barry, *Le Royaume de Waalo*, 210.

their marginalized position in Saint-Louis and Gorée and to the enduring resilience of the Wolof kingdoms. Despite the political, economic, and ecological turbulence of the mid-eighteenth century, the Wolof states maintained their dominance in the production and distribution of food in the region. Indeed, the failures of the French and the British to develop plantation agriculture were, in a sense, fledgling attempts to replace African kings and aristocrats as the ruling elite of the Senegal Valley.

Conclusion

To conclude, this chapter has argued that control, and access to, energy was synonymous with political power in the Senegal Valley. Since the vast majority of energy came from, or depended on, the control and production of staple grains and slave labor, fertile land was paramount to the processes of state-making. Although the Wolof elite used large armies and sophisticated political networks to consolidate and maintain power, a critical component of pre-colonial statecraft in the Senegal Valley was the control over fertile land. Since food was the petrol of the organic economy, the Wolof states—and the kingdom of Kajoor in particular—structured their political and economic systems around access to farmlands and the grains they produced.

By examining the politics of energy in the Senegal Valley, this chapter has brought further attention to the critical role of food, labor, and land to state formation. In this way, control over grain markets, slave labor, and fertile lands enabled the Wolof states to expand and broadcast power over political rivals, and the French in particular. While some historians have argued that droughts, civil wars, and famines destabilized the Wolof states and eventually led them into a tumultuous decline in the 1750s, I have argued that the kingdoms of the Senegal Valley possessed flexible and adaptive systems of agrarian energy production that could withstand prolonged periods of crisis. Although the eighteenth century was riddled with civil wars and droughts, Wolof households

maintained a level of agrarian energy production that enabled the Wolof states to remain as the dominant political and economic power in the Senegal Valley.

CHAPTER THREE

The Imperial Refinery:

The Politics of Energy and “Legitimate Commerce” in Precolonial Senegal

In July of 1817, Colonel Julien Schmaltz, the Governor of Senegal, crafted a letter to the Colonial Ministry in Paris. Impressed with the climate and fertility of the Senegal River Valley, Schmaltz noted that Senegal was destined to become a model colony and would place France in the lead of world trade. “I have traveled extensively,” he wrote, “and I have always carefully observed the countries I have traveled to and I have not seen any more beautiful, more suitable for large enterprises than Senegal.” The “banks of the Ganges,” he recorded, “have not appeared to me more fertile than those of our river, and I have not the slightest doubt that all the crops which we will attempt to plant will succeed.” In addition to sugar, tobacco, and cotton, which would be the “chief occupation of the colonies,” he believed that Senegal could easily yield large quantities of “cocoa, the clove, and the vine which produces pepper.”¹ Senegal, he hoped, would serve as a replacement for the lucrative sugar-producing colony of Saint-Domingue, which the French lost in the Haitian Revolution in the late eighteenth century.

During the volatile years of the French Revolution and the Napoleonic Wars, the French lost their most valuable colonies—in West Africa and the New World—to slave uprisings or to British imperial expansion. After the Treaty of Paris in 1816, the French reclaimed Senegal and returned to Gorée and Saint-Louis with a determined agenda to re-invigorate their overseas empire. In contrast to the eighteenth century, when French trading companies governed and protected the

¹ Georges Hardy, *La mise en valeur du Sénégal de 1817 à 1854* (Paris : Emile Larose, 1921), 29.

coastal trading posts, the restored monarchy of Louis XVIII was directly involved in the development and expansion of French commerce in West Africa.

In this way, Colonel Schmaltz's plan to develop a plantation economy in the Senegal Valley was, at its foundation, an effort to replace the sugar plantations of the French West Indies. In order to develop plantations, the French brokered deals with aristocratic elites in the kingdoms of Kajoor and Waalo. These agreements, which required the Wolof kingdoms to provide land and labor for custom payments and taxes, enabled the French to attempt plantation agriculture in the Lower and Middle Senegal Valley. While the project failed due to arid conditions, labor shortages, and politics, the metropole's hope of developing a robust agricultural economy in the Senegal Valley did eventually occur—just not in the way they intended.

This chapter places the organic economy of the Senegal Valley within a broader framework of historical transformation and change, from imperial expansion and French industrialization to the transition to “legitimate” commerce and the colonial conquest. In the nineteenth century, the peanut and gum industries of the Wolof states transformed the Senegal Valley into a valuable “ghost acre”—the area outside of the boundaries of a given state that enabled it to overcome a production limit—of the French Empire.² By tracking the growth of cash crop production throughout the nineteenth century in the Senegal Valley, this chapter examines how changes in the agrarian energy systems of the Wolof states contributed to French industrialization, reconfigured the “politics of energy,” and became a focal point for the French colonial conquest.

The study of energy flows—the transfer of physical energy from one body or place to another—is particularly useful because it reveals how peasant households, African rulers, and

² The concept of “ghost acres” is widely used in studies of early modern European history. This definition of “ghost acre” is taken from: E.A. Wrigley, *Continuity, Chance, and Change: The Character of the Industrial Revolutions* (Cambridge: Cambridge University Press, 1988), 52-55. For further discussion of ghost acres, also see: Jonsson, “The Industrial Revolution,” 692.

French colonial officials contested and maintained political power over time.³ Throughout the nineteenth century, the slow but steady pace of industrialization in France increased the demand for raw materials from its colonial territories. These external ghost acres, then, served as reservoirs of organic energy that helped fuel the process of industrialization in Europe. For many historians, it was the colonial ghost acres of the New World, rather than Africa, that provided Europe with enough food, fodder, and raw materials to break through the energy ceiling, or the “production horizon,” of the organic economy.⁴ Due to disease and the marginalized political position of European traders in coastal villages and towns in Africa, they argue that attempts to transform the continent into colonial ghost acres routinely failed.⁵

To that end, few scholars have examined the various ways in which African states contributed to the Industrial Revolution in Europe. Some historians, and Eric Williams, Joseph Inikori, and Sidney Mintz in particular, have argued that African slave labor in the New World helped fuel the process of industrialization.⁶ Through plantation agriculture in the Caribbean, the American South, and Brazil, they contend, respectively, that African slaves provided European populations with the capital, food energy, cash crops, and raw materials to industrialize. The most

³ Corey Ross, *Ecology and Power in the Age of Empire* (Oxford: Oxford University Press, 2017), 200. This chapter draws on Ross’s discussion of energy flows, politics, and power.

⁴ E.A. Wrigley, *Energy*, 9-25. For a detailed discussion of New World ghost acres, see: James Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Anglo-World, 1783-1939* (Oxford: Oxford University Press, 2009), 437-456. For further reading on energy and the Industrial Revolution, see: Paul Warde, Astrid Kander, Paolo Malanima, *Power to the People: Energy in Europe Over the Last Five Centuries* (Princeton: Princeton University Press, 2013), 131-159.

⁵ Plantation agriculture typically failed in Africa because, in most places, African kings and political leaders prohibited Europeans from settling their lands and cultivating their fields. For a more in depth analysis, see: John Thornton, *Africa and Africans in the Making of the Atlantic World, 1400-1800* (Cambridge: Cambridge University Press, 1992); For a more detailed discussion on conflicts between the French and the Kingdom of Kajor, see: Lucie Colvin, “Kajor and Its Diplomatic Relations with Saint-Louis du Senegal, 1763-1861” (PhD Dissertation, Columbia University, 1972) Pg. 82-103.

⁶ For discussion of how slavery in the Americas fueled industrialism and capitalism in Europe, see: Eric Williams, *Capitalism and Slavery* (Chapel Hill: The University of North Carolina Press, First Edition, 1994); For insight into how slave labor in the New World contributed to the English Industrial Revolution, see: Joseph Inikori, *Africans and the Industrial Revolution, A Study in International Trade and Economic Development* (Cambridge, Cambridge University Press, 2002); For a discussion of the Industrial Revolution and ghost acres in the New World, see: Kenneth Pomeranz, *The Great Divergence, China, Europe, and the Making of the World Economy* (Princeton: Princeton University Press, 2001), 261-265; For an analysis of how New World plantations in sugar and other commodities contributed to the Industrial Revolution, see: Sidney Mintz, *Power and Sweetness: The Place of Sugar in Modern History* (New York: Penguin Random House, 1986).

valuable imports, which were sugar and cotton, provided the rising populations of urban workers in Europe with calories and raw materials to work in factories and manufacture textiles. Similarly, Kenneth Pomeranz argues the raw materials from the New World were not simply cash crops that flooded European markets, but inputs of relatively cheap forms of energy that increased production capacity in the metropole. In this way, he argues that the use of slavery to produce sugar, cotton, tobacco, and wood in overseas territories enabled Europeans to acquire raw materials cheaply without exhausting their own organic energy resources, namely forests, farmlands, and labor. In outsourcing the production of raw materials to colonial “ghost acres,” Pomeranz argues that Europeans, and the British in particular, advanced the process of industrialization by escaping the Malthusian constraints over land and labor.⁷

Taken together, these historians not only overlook the various ways that Africa served as a ghost acre for European empires, but they also dismiss its principle exports to Europe as exotic goods and materials, such as pepper, gold, and ivory, that did little to substitute for European land.⁸ While this may be true for some regions of the continent, the agrarian energy systems of the Senegal Valley—through the expansion of gum and peanuts—served as a ghost acre for French industrialization. As a valuable additive for textiles and confectionaries, the French used gum to produce clothing, dyes, foods, beverages, paints, and prints. Similarly, peanuts were a cheap and reliable source of vegetable oil among French industries. As an inexpensive alternative to other vegetable oils, such as olive oil and flax seed oil, peanut oil became a staple in French households and was a useful form of fuel to burn lanterns, stoke high intensity fires, and make artisanal soap and

⁷ Pomeranz, *Divergence*, 261-65.

⁸ Ibid, 261-65. Pomeranz suggests that African’s main contribution to the Industrial Revolution was slave labor. This argument, which was initially brought forth by Eric Williams in 1944, has continued to inform how historians understand the role of Africans in the industrialization of the West. See also: Inikori, *Africans and the Industrial Revolution*, 1-11 and 156-215.

candles.⁹ The rapid growth of the gum and peanut industries in the Senegal Valley, then, served as valuable energy inputs that enabled the French to devote fertile lands to other forms of agrarian energy production, and to contribute directly to the growth of French industries and escape the constraints of the organic economy.

Since energy was a fundamental component of day-to-day life, studying how it was produced, stored, and distributed helps untangle how peasant households, African rulers, and French colonial officials contested and maintained political power. As will be shown, the agrarian energy systems of the Wolof states not only provided France with raw materials for textile industries, but it also reconfigured the politics of energy in the Senegal Valley. In contrast to the eighteenth century, when the Wolof kingdoms centralized the state around staple grains and slave labor, the growth of the peanut and gum trades in the nineteenth century shifted the focus of the organic economy away from subsistence agriculture and the slave trade to the production and export of cash crops. In producing, storing, and distributing cash crops from the household to the Atlantic coast, the peasant populations of the Wolof states not only transformed the Senegal Valley into a valuable ghost acre, but they also improved their social and economic status by managing and facilitating energy flows. This chapter, therefore, argues that the Wolof household expanded its role from the “energy refinery” of the organic economy in the Senegal Valley to an “imperial refinery” of the French Empire.

The transition to “legitimate” commerce in the mid-nineteenth century has received significant scholarly attention. In his classic work on the economic history of West Africa, A.G. Hopkins argues that the transition from the slave trade to cash crops produced a “crisis of adaptation.”¹⁰ In general, historians of precolonial Senegal have produced contrasting interpretations

⁹ Paul Masson, *Les Bouches du Rhone, Industries, Tome VIII, Le Mouvement Economique : L'Industrie* (Marseille : Archives Départementales des Bouches-du-Rhone), 93.

¹⁰ A.G. Hopkins, *An Economic History of West Africa* (New York: Columbia University Press, 1973), 124-51.

of the “crisis of adaptation” and whether the transition to legitimate commerce destabilized the precolonial kingdoms of the Senegal Valley. Martin Klein, in his study of slaves, gum, and peanuts in nineteenth-century, contends that the ruling elite struggled to control peasant farmers and traders in the same way as slaves. According to Klein, whereas “the slave trade strengthened the elite, the peanut trade put money, and thus guns, in the hands of the peasants.”¹¹ In this way, Klein shows that peasant populations in the nineteenth century were less vulnerable to the violent predations of the *ceddo* monarchies.

In contrast, Mamadou Diouf argues that the end of the transatlantic slave trade and the transition to a cash crop economy did not prompt a “crisis in adaptation” but created a new demand for a domestic labor force. After 1840, he contends that legitimate commerce created a new “commercial current” that required merchants, freed persons, and ruling elites to acquire domestic slaves and dependents to produce cash crops.¹² Similarly, Mohamed Mbodj argues that the crisis of adaptation “was less profound” than scholars suggested.¹³ In maintaining control of labor, and artisanal apprenticeships in particular, Mbodj contends that former slave owners in Saint-Louis placed adopted minors in their workshops, which provided them with “free labor” while also controlling the future of the labor market.¹⁴

¹¹ Martin Klein references this famous quote in several places. See: “Social and Economic Factors in the Muslim Revolution in Senegambia,” *The Journal of African History*, Vol. 13, No. 13 (1972), 424 and *Islam and Imperialism in Senegal; Sine-Saloum, 1847-1914* (Stanford, CA: Published for the Hoover Institution on War, Revolution, and Peace by Stanford University Press, 1968), 36-38. For a more current analysis from Klein, see: “Slaves, Gun, and Peanuts: Adaptation to the End of the Slave Trade in Senegal, 1817-1849” in *William and Mary Quarterly*, Third Series, Vol. 66, No. 4, “Abolishing the Slave Trade: Ironies and Reverberations” (October, 2009), 895-914; For a more detailed account of peanuts and social change, see Bernard Moitt and Lucie Culvin: Bernard Moitt, “Peanut Production and Social Change in the Dakar Hinterland: Kajoor and Bawol, 1840-1940,” (PhD Dissertation, University of Toronto, 1985); Luci Colvin, “Kajoor and Its Diplomatic Relations With Saint-Louis du Senegal, 1763-1861,” (PhD Dissertation, Columbia University, 1972). They argue, respectively, that the growth of the peanut trade in Senegal demonstrated the remarkable ability of peasant farmers to respond to economic change.

¹² Diouf, *Le Kajoor*, 165-169.

¹³ Mohamed Mbodj, “The Abolition of Slavery in Senegal, 1820-1890: Crisis or the Rise of a New Entrepreneurial Class?” In *Slavery, Bondage, and Emancipation in Modern Africa and Asia*, Martin Klein, ed. (Madison: University of Wisconsin Press, 1993), 198.

¹⁴ Ibid. For a detailed account of the debate over the “crisis of adaptation,” see: Robin Law, *From Slave Trade to ‘Legitimate’ Commerce: The Commercial Transition in Nineteenth-Century West Africa* (Cambridge: Cambridge University Press, 1995), 1-31. For historians who argue that political elites did not experience a crisis of adaptation, see: Ralph Austen,

This chapter contributes to this scholarship by examining how changes to the agrarian energy systems of the Senegal Valley reconfigured the relationship between the Wolof states and French traders and merchants in Saint-Louis and Gorée. As Mamadou Diouf argues in his study of the kingdom of Kajoor, the transition from trading slaves to groundnuts introduced new possibilities to accumulate wealth for the ruling elite. In devoting fertile lands to groundnuts rather than food crops, the precolonial states of the Senegal Valley became part and parcel of an emerging economy where both the French and the Wolof elites capitalized on the production of cash crops.¹⁵

While Diouf argues that peanut cultivation was, at its foundation, a “colonial enterprise” that eventually undermined the Wolof kingdoms,¹⁶ I argue that the close, but politically charged relationship between the French and the Wolof elite substantially changed the politics of energy. As demonstrated in the previous chapter, the ruling elite of the Wolof states used boycotts in staple grains as a mechanism to consolidate power and pressure political rivals, and French traders in particular, into favorable trade agreements. However, by the 1840s and 1850s, the growth of the peanut trade and the increased prosperity of Saint-Louis made boycotts in cereals and grains less effective. As such, boycotts were no longer politically or economically advantageous for the Wolof elite because the profits from the peanut trade far outweighed the political benefits of withholding grains from the French. With the abrupt end of grain boycotts, then, the Wolof states no longer had political leverage over Saint-Louis and Gorée. The French, who were now free from the constraints of food shortages and scarcities, gradually expanded their commercial and political interests in the Senegal Valley.

African Economic History: Internal Development and External Dependency (London: James Currey, 1987), 100-102; Roger Pasquier, “Le Sénégal au milieu du XIXe siècle: La crise économique et sociale,” (PhD diss. Paris 4, 1987). For a discussion of the “crisis of adaptation” and the precolonial household, see: Emily Lynn Osborn, *Our New Husbands Are Here: Households, Gender, and Politics in a West African State from the Slave Trade to Colonial Rule* (Athens, OH: Ohio University Press, 2011), 6-7.

¹⁵ Diouf, *Le Kajoor*, 172-173.

¹⁶ *Ibid.*

In this way, the study of energy in the Senegal Valley during the nineteenth century underscores the relationship between the organic economy and the French colonial conquest of the Wolof states. Throughout the 1850s and 1860s, French colonial officers justified colonial conquest by emphasizing the importance of protecting the peanut and grain industries from the violent raids and reckless agricultural practices of the Wolof states. Through the “liberation” of peasants and farmers, the French insisted that trade and commerce would flourish under colonial rule and would transform the Senegal Valley into a rational system of agricultural production. As will be shown, French colonial officers in the late nineteenth century constructed narratives of deprivation and decline as a mechanism to capture and control the organic economy of the Wolof states.¹⁷

Replacing Saint-Domingue: A Failed Ghost Acre in the Senegal Valley

In the early nineteenth century, the political and economic landscape of the Senegal Valley experienced a rapid period of transformation. From the start of the French Revolution in 1789 to the end of Napoleon’s empire in 1815, the settlements of Saint-Louis and Gorée repeatedly changed hands between the British and the French. During this period, the transatlantic slave trade declined and the exploitation and trade of *gum Arabic* became the primary focus of Europeans and Africans alike. Although the slave trade did not disappear altogether, slave traders and merchants faced heavy opposition from abolitionists both in London and Paris. Between 1789 and 1815, the status of the slave trade oscillated with the political ebbs and flows of the metropole. In 1794, the revolutionary government in France abolished slavery in all of its colonies, but was then reinstated by Napoleon in

¹⁷ The term “declinist narrative” is taken from the field of African environmental history. For more detailed accounts of how it has been deployed throughout the 19th and 20th centuries, see: James McCann, *Green Land, Brown Land, Black Land, An Environmental History of Africa 180-1990* (Oxford: James Currey, 1999); William Beinart and Joann McGregor, *Social History and African Environments* (Oxford: James Currey, 2003); James Fairhead and Melissa Leach, *Misreading the African Landscape: Society and Ecology in a Forest-Savanna Mosaic* (Cambridge: Cambridge University Press, 1996).

the early 1800s. The British, for their part, abolished the transatlantic slave trade in 1807 and then patrolled the West African coast to capture and force the return of slave ships to the continent.

With the status of the slave trade in doubt, European merchants turned to “legitimate commerce”—namely in gum, peanuts, and palm oil—to export directly back to the metropole. From 1810 to 1830, the gum trade became the primary focus of the colonial economy in the Senegal Valley and attracted an increasing number of people to Saint-Louis and Gorée. In the first three decades of the nineteenth century, the population tripled from 3,000 to roughly 9,000 people.¹⁸ The rapid growth of Saint-Louis, both economically and demographically, presented new opportunities for the French Empire to regain its footing after the defeat of Napoleon and the loss of its sugar colonies in the Caribbean. After the Treaty of Paris in 1814, which returned Gorée and Saint-Louis from British to French rule, colonial administrators in Paris developed a new colonial policy to develop plantation agriculture in West Africa. Due to its rapid and sustained growth, the French identified the burgeoning trading post of Senegal as the ideal location for their project. In 1815, shortly after the official abolition of the transatlantic slave trade, the French constructed concrete plans to transform the Senegal valley into an agricultural colony, or ghost acre, based on indigenous labor.¹⁹

As demonstrated in the previous chapter, French plans to establish plantation agriculture in the Senegal Valley emerged in the second half of the eighteenth century. Michel Adanson, the French naturalist, was the first among many to consider the potential benefits of constructing plantations along the Senegal River. Rather than capturing and shipping African slaves to the Americas, Adanson believed that the French should simply bring the work to the workers. Although

¹⁸ Philip Curtin, *Economic Change in Precolonial Africa: Supplementary Evidence* (Madison: The University of Wisconsin Press, 1975), 3-8.

¹⁹ Even though Europeans ended the transatlantic slave trade in 1815, illegal trading continued for another 60 years. See: Klein, *Slavery and Colonial Rule in French West Africa* (Cambridge: Cambridge University Press, 1998). 19-37.

his ideas were brushed aside by colonial officials as an unrealistic fantasy, the loss of valuable colonies in the Caribbean and the Americas during the eighteenth and early nineteenth centuries brought renewed interests to the Senegal Valley. Nearly 50 years after Adanson first presented the idea to the governor of Saint-Louis, the French, newly emergent after the turbulent years of the revolution and the Napoleonic Wars, were keen to re-build their Empire. This time, however, the French government was directly involved in the process of colonization. The Colonial Ministry, rather than the trading companies of Nantes and Bordeaux, financed the expeditions and paid the salaries of colonial governors and officials.²⁰ This, in turn, meant that the development of plantations in Africa was of national interest. The colony of Senegal, therefore, was no longer a simple trading post governed by traders and merchants, but rather it became a ghost acre of the French Empire.

The plan to establish a ghost acre and settle the Senegal Valley through plantation agriculture was, in a sense, an attempt to extract organic energy resources from the Wolof states to sell in the metropole. With the loss of Saint-Domingue, as well as other valuable colonies in the Americas, the French were desperate to establish a new colony that could provide the metropole with sugar, cotton, and gum. In this way, the French wanted to generate cash flow and profits from their colonies by providing the metropole with natural resources to develop and expand industrialization. Before the French could plant and cultivate fields of cash crops, such as sugar, cotton, and tobacco, they needed to develop a reliable system of food energy production. Thus, the development of plantation agriculture was not only a way to grow and cultivate cash crops, but also a way to produce food independently from the Wolof kingdoms. By establishing a reliable agrarian energy system, the French could reconfigure the Senegal Valley's politics of energy and throw off the yoke of the Wolof states.

²⁰ Hardy, *La Mise en Valeur de S n gal 1817-1854* (Paris: Emile Larose, 1921), 1-11.

The first step, therefore, was to acquire fertile land in the Senegal Valley, which they would either purchase from the Wolof states or take with force. The primary challenge for the French, however, was that the Wolof states, and the kingdom of Kajoor in particular, adamantly opposed the development of French plantations, gardens, and mills on the mainland. In order to acquire enough arable land for plantation agriculture, the French needed to navigate the complex political landscape of the Senegal Valley.

In 1816, two years after the Treaty of Paris marked the end of the Napoleonic Wars, Colonel Julien Schmaltz left France for the West African coast. Despite a troublesome journey, which included a shipwreck off the coast of Mauritania and the loss of several crew members to starvation, Schmaltz arrived in Saint-Louis with an ambitious plan to establish a lucrative colony in the Senegal Valley. For Schmaltz, France's renewed interests in Senegal was an attempt to "completely transform the economic and social life of the country, and to open it up to an era of prosperity and expansion."²¹ According to Schmaltz, Senegal was a clear choice for a plantation economy because it possessed "idle slaves"²² and a vast amount of human resources that "was great enough to exploit the natural resources which the natives could not possibly accomplish on their own."²³ Indeed, Schmaltz sought to transform the Senegal Valley—as Adanson had recommended nearly half a century before—by "transporting the work to where the workers are" instead of "transporting the workers to where the work is located."²⁴

²¹ As cited in Hardy, *La Mise en Valeur*, 11.

²² ANS 2 B 4, C. G. Schmaltz, "Lettre au Gouverneur MacCarthy," February 24th, 1817, also cited in Hardy, *La Mise en Valeur*, 11.

²³ *Ibid.*

²⁴ Hardy, *La Mise en Valeur*, 7. The slave trade was in its final years of operation, and very few slaves departed for the Americas from Saint-Louis and Gorée. From 1815 onward, the British navy conducted anti-slavery patrols and captured slave ships that attempted to transport captives from Africa to the Americas. The French did not officially ban the slave trade until 1835, but the combination of British intervention and the closing of slave ports in the Americas made the slave trade a financial risk.

Along with plantation agriculture, the French wanted to re-establish old trading networks and rebuild many of the decrepit forts scattered along the Senegal River. In doing so, Schmaltz argued that the French could easily establish control over the gum trade, increase the production of grains and cereals, and entice local kingdoms to provide laborers for the plantation economy. In a letter to the metropole, he noted that the first step in establishing a colony in Senegal was to provide “the commerce of the Upper Senegal with a supply of rice, millet, sorghum, and wheat.” Above all, he stated, the French must improve local agriculture with a greater system of production that can yield enough cereals and grains for the colony.²⁵ The expansion of grain production, however, was much more difficult than he anticipated. In June of 1817, a drought from the previous year prompted a poor harvest and the cereal and grain stores of Saint-Louis were emptied. Due to the scarcity of grains, Schmaltz wrote to the government in Paris, explaining that drought “had depleted all of our resources” and it was not possible “to replace them before the rainy season which starts in June.”²⁶ Forced to delay the development of the colony due to food scarcity, Schmaltz lamented that the project would not continue until the city’s granaries were replenished and the labor force could return to health.

In the dry season of 1817, just as Schmaltz was preparing plans to construct plantations along the Senegal River, a privately sponsored company of 200 volunteers arrived on the Cap Vert Peninsula. The company, which was funded by the *Société coloniale africaine* and the *Société colonial philanthropique*, planned to colonize Cap Vert and establish plantation agriculture. Although the expedition was in part funded by the French government, Schmaltz was only informed of their expedition weeks before they arrived. In a panic, he wrote a letter to the Colonial Ministry, explaining that the mission was bound to fail due to the lack of fertile land, water, and firewood on

²⁵ ANOM C 6 17, “Rapport Générale,” 1817.

²⁶ ANS 2 B 4, C.G. “Schmaltz, au Ministre,” April 2, 1817; Cited in Hardy, *La Mise en Valeur*, 14.

the peninsula. In addition to the barren landscape of the cape, he noted that the settlers would meet fierce resistance from the Lebu villages, who had just won their independence from the kingdom of Kajoor. Without the help of French colonial officials and the *habitants*, who traded frequently with the Lebu, the settlers were likely to fall prey to their warriors.²⁷

When the expedition arrived in April of 1817, the French reported that Cap Vert was an arid wasteland. The leader of the company, a French trader who spent two weeks along the coast the previous year, had only seen Cap Vert during the lush and fertile rainy season.²⁸ Although the king of the Lebu, Mohktar Diop, agreed to let the settlers camp on a small plot of land in exchange for annual custom payments, the first attempts to cultivate the soil were a complete disaster. The settlers quickly depleted their provisions and within three weeks of their arrival, they broke into separate camps and clashed over the remaining supplies.²⁹ In the end, some of the settlers sought refuge in Saint-Louis, while others stayed on the cape to farm. After six months, in which they lived off of provisions from Gorée, the remaining settlers were uprooted from their camp and shipped back to France.³⁰

Having predicted the company's failure, Schmaltz ensured that he was not to be blamed for the blunder. In the winter of 1817, he claimed that when the association published their intentions "to make incessant expeditions to Cap Vert," the government in Saint-Louis was "altogether foreign to such enterprises."³¹ In response to the failed expeditions, Schmaltz pushed to suspend all company passports for Senegal except for those "that exhibited a freedom and interest in commerce." The object of the measure, he pressed, was "to prevent a second expedition from meeting a similar fate as the one that has just taken place."³² In order to establish a successful system

²⁷ G. Schmaltz, "Lettre au Ministre," April 2, 1817; Cited in Hardy, *La Mise en Valeur*, 14.

²⁸ ANOM, C 6 14. "F. de Venancourt, report, July 29, 1816," also referenced in Hardy, *La Mise en Valeur*, 35.

²⁹ Colvin, "Kajor," 193; Diouf, *Le Kajor*, 123.

³⁰ Colvin, 194; Diouf, 123.

³¹ 2 B 4, C. G. Schmaltz, "Lettre au Ministère," February 8th, 1917: Referenced in Hardy, *La Mise en Valeur*, 36.

³² Ibid.

of plantation agriculture, then, Schmaltz insisted that the next attempt would be much better prepared to face the challenges of cultivating the fertile lands of the Senegal Valley.

Throughout 1817, Schmaltz completed a detailed study, which he submitted to the Colonial Ministry at the end of the year, of the Senegal Valley and its potential for plantation agriculture. In the Lower Senegal, he believed that large plantations of sugar cane would flourish, as local villagers were already cultivating “white sugar cane with beautiful tufts and shoots that were six to eight feet high.”³³ Cotton was another crop he hoped to exploit, and he aimed to construct a number of plantations in the Upper Senegal Valley. More specifically, Schmaltz wanted to plant Dragau cotton, also known as drago cotton, which grew remarkably well in the interior. In the region of Galam, the governor reported that local cotton was “one of remarkable superiority” and could be cultivated in considerable quantities and at a modest price.³⁴

In his first voyage to the trading post of Podor, a small village in the Middle Senegal Valley, Schmaltz became increasingly enthusiastic about the prospect of establishing large-scale agriculture. In one report, he claimed, “I am now certain that with some sacrifices, it will be possible to make Senegal into one of the most beautiful colonies of the world.” Even further, Schmaltz reported that he had never seen a country any more “beautiful and cleaner for enterprise than Senegal” and “there is little doubt that we will succeed in all that we pursue.”³⁵ Politically, he argued that large scale agricultural plantations would provide the French with the upper hand, as it would force local kingdoms to depend on them for food, security, and labor rather than the other way around. The Wolof states, therefore, would recognize the French as powerful allies and “a force the natives of the country cannot do without.”³⁶ Once the kingdoms were firmly under French control, the colony

³³ 2 B 4, C. G. “Schmaltz au Ministre, March 10, 1817,” quoted in Hardy, *La Mise en Valeur*, 36. The sugar cane that was grown in the Senegal Valley came from the Cap Verde islands. Although it could grow in the Senegal Valley, the arid climate produced inconsistent harvests and was not suitable for large-scale agriculture.

³⁴ Hardy, *La Mise en Valeur*, 36; Also discussed at length in Diouf, *Le Kajoor*, 124-128.

³⁵ *Ibid.* Also see: Diouf, *Le Kajoor*, 124-128.

³⁶ *Ibid.*

“will have more than three million men at her disposal” to work the land and to help “restore her to the commercial prosperity which she had before the Revolution destroyed her finest colonies.”³⁷

Simply put, in cultivating abundant harvests and surplus grains through plantation agriculture, Schmaltz believed that the French could reverse their existing position in regards to grain boycotts along the coast. With abundant supplies of food, the French, rather than the Wolof, would use their control of the organic economy as a mechanism of political power.

Schmaltz’s quixotic description of the Senegal River Valley, as well as his nostalgic pledge to restore France to its former colonial glory, gained favor in the metropole. Shortly after his voyage to Podor, the French government summoned Schmaltz to Paris to develop a comprehensive plan for colonization. After a few months in Paris, Schmaltz returned to the Senegal Valley with 1.6 million francs, three expeditions totaling 1,000 men, and all of the materials necessary to construct a plantation economy.³⁸ Yet, upon his return to Senegal, Schmaltz was immediately confronted with the sobering realities and challenges of colonizing the Senegal Valley. For one, Schmaltz misread the political landscape of the region and his plans to establish and cultivate plantations along the river exacerbated old rivalries and political tensions. Rather than soothing the precarious political relationships of the region, Schmaltz sparked a violent political conflict between the Wolof states, the Trarza kingdoms, and the traders and *habitants* in Saint-Louis.³⁹

Initially, Schmaltz hoped to construct his plantations in the Upper Senegal but his plan was met with strong resistance from the political elite in the Trarza state, as well as those in Futa Toro and Gajaaga. In a sudden change of course, Schmaltz partnered with the king, or *brak*, of Waalo and signed the Treaty of Ndiaw in 1818 to start agricultural production in the Lower Senegal Valley. As the weakest state in the region, the kingdom of Waalo hoped a partnership with the French would

³⁷ Hardy, *La Mise en Valeur*, 36.

³⁸ Colvin, “Kajor,” 204.

³⁹ Ibid, 197-99; Also see: Diouf, *Le Kajor*, 128.

lead to political and economic prosperity. In exchange for French protection and 10,000 francs of tribute payments, the Waalo elite promised to provide land and workers to the French. However, in 1819, the Trarza Moors raided the newly cultivated plantations in the kingdom of Waalo, stole cereals and grains, and slashed and burned the budding cash crops.⁴⁰ In response, Schmaltz assembled three ships to travel upriver and defend the rest of the plantations in the kingdom. By 1820, the colony was at war with the Trarza and Futa Toro, which precipitated a boycott in the gum trade and a rapid decline in commerce.⁴¹

As the war dragged on, the kingdoms of Kajoor and Bawol also took up arms against the French and the kingdom of Waalo. Anxious over the size of the French army, which numbered nearly 1,200 soldiers, the *damel* of Kajoor pressured Schmaltz to negotiate with the newly formed coalition of African kingdoms.⁴² The French, however, refused to broker a deal and the ensuing war reduced the hinterlands of Saint-Louis to an infertile wasteland.⁴³ In an effort to end the conflict, the *damel* closed its grain markets to the French, initiating a prolonged period of food shortages and scarcity in Saint-Louis.⁴⁴ The boycott in cereals and grains was, according to the *damel*, an attempt to pressure Schmaltz into peace talks with representatives from the kingdoms. Nevertheless, Schmaltz refused to capitulate and as the war reached an impasse, the Colonial Ministry recalled him to Paris.

Shortly after Schmaltz left Saint-Louis in 1820, the Colonial Ministry sent Louis Le Coupé to govern the colony and restore peace between the French and the Wolof kingdoms. Le Coupé, however, was a poor statesman and struggled to make negotiations with the ruling elite in the Senegal Valley. In March of 1821, he refused a request from the *damel* of Kajoor to discuss peace. The *damel* hoped to arrange a meeting between political envoys in a neutral location, but Le Coupé

⁴⁰ Colvin, "Kajor," 204. Also see: Diouf, *Le Kajoor*, 129.

⁴¹ Hardy, *La Mise en Valeur*, 49-50; Also in Colvin, "Kajor," 201.

⁴² Hardy, 90; Colvin, 201-203.

⁴³ Colvin, "Kajor," 201.

⁴⁴ ANS, 2 B 5, "Gov. Le Coupé to the Ministère," November 3, 1820.

declined and claimed that he had no one to spare for the trip. As a result, commerce stagnated and the populations of Gorée and Saint-Louis suffered due to the ongoing boycott of cereals and grains. In a report to the Colonial Minister in Paris, Le Coupé admitted that the commercial situation was “deplorable” and that the “agricultural project is suspended, the exportation of cotton is almost nil” and thus “colonization is halted and the colony in desperate straits.”⁴⁵ Frustrated with Le Coupé’s inability to broker peace, the Ministry pulled him from Saint-Louis and replaced him with a botanist, Jean François Roger, to reinvigorate commerce and develop plantation agriculture.⁴⁶

In 1822, Roger, the new governor of the colony, sought to establish peace with the Trarza Moors and the Wolof kingdoms. In promising the Moors tribute payments from the kingdom of Waalo, as well as a fixed rate on taxes for the gum trade, the French pacified the region and reestablished the agricultural plantations destroyed during the war. With the conflict in the past, Roger aimed to establish a plantation at Richard-Toll, a small outpost in the Lower Senegal River named after a renowned French naturalist. Richard-Toll, according to Roger, was the ideal location for a “jardin d’acclimation,” where all the crops and plants could be developed through experimentation and trial and error.⁴⁷ It was, in a sense, an agricultural laboratory for early French colonial officials to put their botanical skills to the test. Should one strategy work particularly well, as Roger explained in a letter to the metropole, then other plantations along the river in Dagana, Podor, and Bakel could follow suit.⁴⁸

At Dagana, a small village in the kingdom of Waalo, Roger hoped to establish a large plantation of cereals, grains, fruits, and vegetables that could support an entire battalion of French and African soldiers.⁴⁹ The idea was to create a breadbasket along the Senegal River for the French

⁴⁵ ANS 2 B 5, “Letter to Ministère,” March 8, 1821.

⁴⁶ Hardy, *La Mise en Valeur*, 116-18.

⁴⁷ ANS 2 B 5, “Letter to Ministère,” June, 1822.

⁴⁸ *Ibid.*

⁴⁹ ANS 2 B 5, “Letter to M. Richard,” June 9, 1822. Also see: Hardy, *La Mise en Valeur*, 186.

military, so that when conflicts emerged the French would no longer need to depend on the Wolof kingdoms for provisions. Despite strong support from the metropole, the sparse population of military officers and soldiers could not execute the plan and Roger's plantations barely produced enough grains to feed its inhabitants. Indeed, the establishment of a large-scale plantation in the Lower Senegal never amounted to more than a simple "potager" for the small colonial garrison. Similarly, in Bakel, a small village in the Upper Senegal Valley, Roger hoped to establish the same type of military-run plantation. Although he sent a variety of seeds and plants to the outpost—namely plantains, coffee, grains, and cotton—only some of them took to the region's hot and arid climate. In sum, both attempts to establish plantations in Dagana and Bakel failed and forced colonial officials to re-evaluate their plans and methods of agricultural exploitation.

Despite these initial setbacks, Roger considered his mission a success. By the time he left in 1827, he had persuaded several *habitants* from Saint-Louis to establish plantations in the Lower Senegal. In promising land concessions and financial incentives—which were based on the number of plants cultivated on an individual plot of land—Roger was able to establish 42 plantations totaling 1200 hectares.⁵⁰ To that end, he was confident that plantation agriculture would expand and transform Senegal into a robust tropical colony. Yet, the actual data of cash crop exports did not match Roger's optimism. In its peak year of production, the Senegal Valley's plantation economy produced a lackluster 188,000 francs worth of goods.⁵¹ As it turns out, many of the *habitants* that possessed plantations manipulated Roger's system of incentives. Through various schemes, such as sticking plants in the ground in one field while the inspector visited and then moving them to another the following day, the *habitants* were able to collect payments through fraud.⁵²

⁵⁰ Hardy, *La Mise en Valeur*, 231-233.

⁵¹ M. Courtet, *Étude sur le Sénégal* (Paris: Librairie Maritime et Coloniale, 1903), 2-3.

⁵² Discussed in detail in Colvin, "Kajor," 209; This is also cited in Hardy, 236.

Another problem was labor shortages. According to the Treaty of Ndiaw, local Waalo elites agreed to furnish “free laborers,” as well as fertile land, in exchange for custom payments and a fixed fee per laborer.⁵³ However, the promised laborers never appeared because the political elites could not compel free persons to work for the French.⁵⁴ In order to address the labor shortages that doomed previous agricultural projects, the French sanctioned the use of “indentured servants” that were captured in the Upper Senegal Valley and trafficked downriver. To ensure a consistent and reliable supply of African laborers, the French hired the *Compagnie de Galam*, a French trading company that captured “indentured servants” in the interior and sold them to colonial officials, traders, and merchants in Saint-Louis.⁵⁵

From 1827-1831, the French, with a somewhat reliable workforce, focused their efforts on the hinterlands of Saint-Louis in the Lower Senegal Valley. In particular, they concentrated their efforts on a large fertile territory near the small village of Ntiago, a short distance from the colonial garrison of Richard-Toll. To ensure the project’s success, the governor, Jean-Guillaume Jubelin, appointed Lt. Castille, a French botanist, as the “agricultural officer” of the colony. Castille’s first assignment was to pick a suitable location for the plantation, as well as a convenient place for “native” workers to live during the growing season. The primary goal of the plantation, he noted, was “to create large quantities and industries of cotton.” All efforts, he implored, must be “directed by this goal, and under no pretext, should we apply our labor to another crop.”⁵⁶ In doing so, the French rapidly established a “vast plantation” of cotton that prospered in its first few growing seasons.

⁵³ ANS 13 G 22, “Rapport générale,” July 1825. Also cited in Hardey, 188; Colvin also discusses the difficulties of recruiting both labor and land: Colvin, 208-210.

⁵⁴ Hardy, *La Mise en Valeur*, 188; Colvin, “Kajor,” 210.

⁵⁵ Abdoulaye Bathily, “Guerriers, Tributaires et Marchands, Le Gajaaga le ‘pays de l’or’. Le Développement et la Régression d’une formation économique et sociale sénégalaise (c. 8019e siècle),” thèse pour le Doctorat à lettres, Université de Dakar, 1985, II, 523-530.

⁵⁶ ANS 2 B 9, “Lettre de Col. II a M. Richard, November 30th,” 1825.

Excited by the success of the plantation, Castille noted that it “was for me a great hope, but at this moment, I only have a large cotton plantation.” The labor and time that the new plantation required, he complained, prevented him “from undertaking anything else.”⁵⁷ Although the cotton harvests did well initially, the plantation suffered from consecutive years of poor rainfall and eventually collapsed. By 1829, Castille lamented that the plantations were in a desperate situation, and in “in order to save this unfortunate establishment” he would have to undertake other forms of production. At this point in time, however, he did not have the ability to “take any more care of it” and little by little the plantation fell prey to the bush.⁵⁸ Similar to previous French attempts to cultivate the Senegal Valley, Castille’s efforts, though initially successful, fell prey to labor shortages and the challenges of growing cotton in the Sahel.

By the end of the decade, French efforts to establish plantation agriculture in the Senegal Valley began to fizzle. Although countless political conflicts, wars, and trade boycotts marred French attempts to colonize the region, most colonial officials blamed the inhospitable and erratic climate of the Sahel for their failure. In particular, the French claimed that a severe drought in 1828 destroyed the mangrove forests in the Senegal Delta, which in turn, withered crops and eroded farmlands. As one French officer noted, the regions surrounding Saint-Louis, and the kingdom of Waalo in particular, was nothing but an arid desert. Trade in the kingdom, he noted, “was nearly zero” and the continued protection of Waalo from the Trarza Moors was costly and outweighed its benefits.⁵⁹ In a separate report, another French official claimed, “We do not protect the kingdom of Waalo anymore, except for a few stones and pieces of land that degrade themselves.” This “miserable country,” he continued, “is always being more or less pillaged by the Moors who, this year, have

⁵⁷ ANS 2 B 9, “Lettre de CG. À M. Hugon au gouverneur, August 28th,” 1824.

⁵⁸ Hardy, *La Mise en Valeur*, 188.

⁵⁹ ANS 2 B 6, “Lettre de Gouverneur a Ministère,” 1832.

profited from the division of the Waalo chiefs.”⁶⁰ With the poor results of plantation agriculture, then, the French abandoned their agreement with the kingdom of Waalo and placed the blame on labor shortages and the environmental challenges of the Senegal Valley.

The combination of drought and Moorish raids put a definitive end to the colony’s efforts to establish plantation agriculture. As the governor, Renault de Saint-Germain, noted in 1832, “rather than a superb and vast plantation where all the products of Europe thrived, we find nothing more than a withering field and an arid desert.”⁶¹ Once regarded as the potential “Saint-Domingue of Africa,” the French now viewed the kingdom of Waalo and the Lower Senegal Valley as an arid backwater of commercial and economic activity. The failure of plantation agriculture, however, was not altogether surprising. Despite the enthusiastic support and funding of the Colonial Ministry, the French ultimately confronted the same difficulties and challenges that their predecessors faced in the eighteenth century. Even with a sizeable army, French colonial officials were powerless to resist trade boycotts and the raiding and pillaging of the *ceddo* armies. Simply put, the kingdoms of the Senegal Valley, with their large networks of political elites, slaves, and laborers, still dominated the production and distribution of energy.

Yet, in contrast to the eighteenth century, the French did have access to sizable plots of arable land in the 1820s. Although they attributed the failure of plantation agriculture to ecological challenges and labor shortages, they squandered the opportunity to establish an imperial ghost acre by growing tropical crops in an arid and highly variable climate. This was, in large part, due to their blatant disregard for local ecologies and their dismissal of local agricultural practices. Rather than borrowing the methods and techniques of Wolof farmers, the French believed that their systems of agriculture were technologically superior and would produce bountiful harvests. In fact, the French

⁶⁰ Ibid.

⁶¹ ANS 2 B 6, “C. G. au Ministère,” June 26, 1839; Hardy, *La Mise en Valeur*, 285.

were so convinced in their own superiority that, over time, they believed the “natives” would see their success and emulate French methods of agriculture.⁶²

While colonial officials failed to exploit the Senegal Valley through plantation agriculture, their fledgling attempts had lasting consequences. In particular, it created a new system of colonial infrastructure that laid the foundation for future land improvement projects. Throughout the 1820s, the French constructed field manuals, hosted agricultural expositions, started an agricultural library, and founded two organizations for planters and cultivators—*la Société d'agriculture du Sénégal* and *la Société agricole et commerciale du Waalo*.⁶³ Through these various resources, they intended to instruct future European settlers and free “indigenous” farmers how to “awaken the spirit of research inside of them” and to adopt the technical “progress achieved by agricultural science.”⁶⁴ Even though their technical skills in farming and cultivation produced disappointing results, the French maintained a commitment to their own agricultural methods, which, later in the nineteenth century, would resurface during the colonial conquest and occupation.

The failure to establish an imperial ghost acre based on plantation agriculture in the Senegal Valley was only a momentary setback for the French. Although Senegal did not become the “Saint-Domingue” of Africa, it soon became a critical player in France’s gradual movement toward industrialization in the nineteenth century. Rather than producing lucrative cash crops from tropical plantations, Senegal fueled French industries in the metropole with gum and, beginning in the 1840s, peanuts. As will be shown, through its thriving industry of peanut production, Senegal became an imperial ghost acre for the French Empire.

⁶² See the reports and letters of Schmaltz, ANS, 2 B 4-5. George Hardy, in his work on this period, compiled several of his letters. See: Hardy, *La Mise en Valeur*, 185-99.

⁶³ Hardy, *La Mise en Valeur*, 128-143.

⁶⁴ ANS, 13 G 22, “Rapport générale,” 1827.

The Emergence of an African Ghost Acre

From 1820 to 1850, dramatic increases in the trade of gum and peanuts transformed the Senegal Valley from a small entrepôt on the fringe of the French Empire to one of its most important commercial centers. During this time, gum exports climbed from 1,759 to 4,200 metric tons while peanut exports grew from 1 metric ton in 1840 to an impressive 3,000 tons by 1850.⁶⁵ Between 1818 and 1837, the total annual commercial activity of the trading settlement increased six-fold, from two million to twelve million francs in value.⁶⁶ Indeed, the rapid growth of gum and peanut exports sparked a sharp increase in Saint-Louis' population, attracting a growing number of European and African traders and merchants. By 1844, family dwellings jumped from 50 to 1,500, the population climbed to 13,523, and the amount of trading companies based in Saint-Louis expanded from 5 to 36.⁶⁷ The number of riverboats, which were constructed with local wood and timber, also increased from 40 in 1818 to over 200 in 1841.⁶⁸

The Gum Trade

Although Europeans began trading gum in the Senegal Valley in the late seventeenth and early eighteenth centuries, it became a valuable cash crop only after the end of the transatlantic slave trade in the early nineteenth century. The most important and lucrative species of the gum tree, *Acacia Senegal*, grew along the northern banks of the Senegal River. Each year, acacia trees absorbed groundwater during the wet season, causing the bark to expand. Then, with the dry season, the bark contracted and the gum pushed to the surface in the small natural openings of the tree.⁶⁹ When the

⁶⁵ These figures are taken from: James Searing, *West African Slavery and Atlantic Commerce: The Senegal River Valley, 1700-1860* (Cambridge: Cambridge University Press, 1993), 174-75.

⁶⁶ James L. Webb, "The Trade in Gum Arabic: Prelude to the French Conquest in Senegal" *Journal of African History*, Vol. 26, No. 2 (1985), 156.

⁶⁷ Webb, "The Trade," 155.

⁶⁸ *Ibid*, 165.

⁶⁹ Curtin, *Economic Change*, 216.

secretion was finished and when the northerly winds of the Sahara sufficiently dried out the sap, laborers picked yellow balls of gum hanging from the trunks and the larger branches. During particularly good years, they used knives to cut small openings in the bark to encourage a higher yield of gum. Though effective, this technique could also kill the tree or severely reduce its yield over time.⁷⁰

The boom in the gum trade during the 1820s and 1830s was buttressed by an increase in slave labor. With the decline and eventual abolition of the transatlantic slave trade in the early nineteenth century, African states retained their slaves to work in local industries.⁷¹ In the gum trade, groups of fifty slaves worked thickly populated “gum forests” and collected an average of six pounds of gum per day.⁷² Since slaves picked most of the gum collected in the Senegal Valley within a manageable distance of the river, gum traders and merchants were able to transport it by boat and at a relatively low cost.⁷³

As French industries expanded in the mid-nineteenth century, manufacturers purchased unprecedented amounts of gum for textiles, paints, paper, candy, and other confectionaries. In response to the rising demand for gum, French traders from Bordeaux and Marseille competed for access to the gum forests, igniting a fierce rivalry that prompted dramatic increases in gum exports. In 1824, French and Senegalese merchants in Saint-Louis persuaded the colonial administration to form a joint-stock company, the *Compagnie de Galam*, to transport gum from the Upper Senegal. The company, mostly funded by traders from Bordeaux, received the rights to trade along the river year-round and virtually eliminated competing firms.⁷⁴ In the 1830s, however, the Trarza Moors, who were the primary producers of gum, exploited the gum forests with increased intensity by doubling

⁷⁰ Curtin, *Economic Change*, 216.

⁷¹ For a more detailed discussion of how the former slave owning class transitioned to legitimate commerce, see: Mbodj, “The Abolition,” 197-198.

⁷² ANS, 2 G 13, “Rapport d’ensemble,” 1830; Also cited in Searing, *West African*, 174-75.

⁷³ Curtin, *Economic Change*, 216.

⁷⁴ Diouf, *Le Kajoor*, 130-132; Searing, 170-171.

and, during good years, quadrupling the volume of exports.⁷⁵ The increase in production, as well as the high prices of gum in France, attracted many independent traders unaffiliated with the trading companies of Marseille and Bordeaux. By the late 1830s, these traders captured a large share of the market by selling gum at marginally reduced prices, thereby undermining the *Compagnie de Galam*.⁷⁶

In response, the Bordeaux trading companies lobbied for a government-recognized trading association limited to French merchants and traders in Saint-Louis. The proposed association, the *Société pour la Traite de la Gomme*, tried to eliminate the *habitants* (local merchants) from the trade by establishing partnerships with free African traders.⁷⁷ In the past, the *habitants* served as middlemen between French traders and the Wolof kingdoms. As locally born *métis* with longstanding networks of trade, the *habitants* loaned slaves, sailors, translators, and riverboat crews to facilitate trade for the French. In turn, they received custom payments from French trading companies, usually in slaves, gum, valuable trade goods, and food staples for the colony.⁷⁸ By the 1840s, however, the growing population of French merchants in Saint-Louis became an influential political and economic force that aimed to push the *habitants* out of the river trade. Rather than hiring the *laptots* (slave sailors) and riverboat crews from the *habitants*, the association wanted direct access to the gum forests in the Senegal Valley by creating their own crews with independent African traders.⁷⁹

Competition to control the river trade between the association, independent traders, and the *habitants* flooded Saint-Louis with cheap gum. Low prices destabilized the market and by the 1840s profits from the gum trade stagnated. Between 1847 and 1849, for example, the price of gum dropped from 2.20 francs per kilogram to a meager 0.89 francs.⁸⁰ In the midst of the downturn, the

⁷⁵ Curtin, 215-218.

⁷⁶ Searing, *West African*, 170-71.

⁷⁷ Ibid, 185; Also see: Hardy, *La Mise en Valeur*, 266-67.

⁷⁸ For a more detailed account of the *habitants*, see: Searing, 175-187.

⁷⁹ For an insightful analysis of the budding colony of Saint-Louis, see: Diouf, *Le Kajoor*, 129-130.

⁸⁰ Curtin, *Economic Change in Precolonial Africa, Supplementary Evidence*, (Madison: University of Wisconsin Press, 1975), 65. Courtet, *Étude*, 17.

association blamed both the *habitants* and the independent traders for undercutting prices and increasing gum imports from the interior. The *habitants*, however, argued that the colonial government in Saint-Louis was responsible. By allowing French traders and merchants to hire their own crews and trade freely upriver, the *habitants* blamed the colonial administration for the flood of cheap gum into Saint-Louis.⁸¹

In 1848, the Second Republic abolished slavery throughout the French Empire and extended the rights of citizen to all those living on French soil. The emancipation of slaves hit the slave-ruling class in Saint-Louis particularly hard, as thousands of slaves left their masters' households in search of paid labor.⁸² The *laptots*, or sailor slaves, joined French trading companies or established their own businesses on the island. Women, who constituted the majority of slaves in Saint-Louis, worked in local textile factories or crafted their own goods to sell in local markets.⁸³

With the dissolution of their slave-based households, some *habitants* lost the majority of their wealth and social standing. As the *métis* priest, David Boilat, remarked in 1850, the gum trade was once “an inexhaustible resource” that signified the wealth of the *habitants*. During the best years of the trade, the *habitants* had “gold sparkled around their necks, ears, and arms” and even their servants were adorned in lavish and valuable objects provided by the trade. Yet, he lamented, the trade “is no longer a subject of joy for the families but one of chagrin and sadness.”⁸⁴ Although the Second Republic provided the *habitants* with indemnities as compensation for the loss of their slave populations, they were paid one part in cash and the other in stock certificates issued by the newly established Bank of Senegal.⁸⁵ In order to pay off debts or to increase their liquid assets, most of the

⁸¹ Searing, *West African*, 170-173.

⁸² *Ibid.*, 185-6.

⁸³ *Ibid.* For a more detailed discussion how the former slave owning class transitioned to legitimate commerce, see: Mbodj, “The Abolition,” 197-198.

⁸⁴ Hilary Jones, *The Métis of Senegal, Urban Life and Politics in French West Africa* (Bloomington: Indiana University Press, 2013), 55.

⁸⁵ Searing, 184-85; Diouf, *Le Kajoor*, 131-132

habitants sold their stock shares to French traders or converted their indemnity payments into debt repayment. As a result, the *habitants* lost their social and political standing in the colony, and by the 1850s, many looked to the expanding French commercial houses for work.⁸⁶

The “boom and bust” cycle of the gum trade ultimately upended the longstanding social and political structures of Saint-Louis.⁸⁷ With the decline of the *habitants*, the political and economic position of the French expanded and commerce became increasingly oriented toward the metropole.⁸⁸ In fact, cheap gum prices in Senegal sparked a sharp increase in consumption. Throughout the nineteenth century, gum imports in France continued to climb and by 1896, French industries consumed a total of 6.3 million kilograms of gum, with nearly two-thirds coming from the Senegal Valley.⁸⁹

Thus, the gum trade in the Senegal Valley not only served as a valuable cash crop for the merchants and traders of Saint-Louis, but it also operated as a ghost acre for the metropole. Since the vast majority of gum producers relied on domestic slaves to work the gum forests north of the Senegal River, it was possible for France to acquire gum without devoting its own labor force or land to gum production. Simply put, gum arabic, like other cash crops throughout the European colonies of the New World, was a “non-negligible input of energy” for the French economy that left greater surface area for cultivation on home soil.⁹⁰ In this way, then, the gum industry gradually transformed Senegal from a backwater entrepôt of the Atlantic World to a critical ghost acre of the French Empire.

⁸⁶ Jones, *Métis*, 54; Also in Searing, *West African Slavery*, 186.

⁸⁷ Searing, *West African*, 186; Curtin, *Economic Change*, 217-18; and Diouf, *Le Kajoor*, 130-133 all seem to come to a consensus on this point.

⁸⁸ Searing, 184-186; Diouf, 132.

⁸⁹ Webb, “The Trade,” 149-168. Also see: Curtin, *Economic Change*, 217 and Curtin, *Supplementary*, 98-99.

⁹⁰ Pomeranz, *The Great Divergence*, 264-285; Also see: Pierre Charbonnier, “The Yield and the Loot: An Ecological Perspective on the History of Capitalism,” in *Actuel Marx*, no. 111 (2013), 5.

The Peanut Trade

As the prosperous years of the gum trade in Saint-Louis came to an end, some French traders were already in pursuit of an alternative industry to take its place—the peanut trade. Initially, Portuguese traders introduced the peanut to the Senegal River Valley in the sixteenth century by way of Brazil.⁹¹ A highly drought resistance crop that flourishes in the light, sandy soils of the Senegalese interior, the peanut was grown widely throughout the Wolof states. Yet, while the peanut thrived in the arid climate of the Senegal Valley, most communities cultivated it in small quantities and used it as a safeguard against drought.⁹² With such an abundance of locally grown peanuts, French traders began to experiment with the potential uses of the crop. In 1833, a French trader named Jaubert purchased a large quantity of *pistache de terre* from English traders in the Gambia, who boasted of its useful industrial qualities.⁹³ Shortly thereafter, Jaubert sent a sample to the Marseille chamber of commerce along with a request to develop peanut plantations and refineries in the colonies. Nothing came of his request, yet the idea of using peanut oil for French industries attracted the attention of other ambitious traders.

Two years later, an officer in the French military, General Bernard, visited the Cap Vert peninsula where a local *habitant* from Gorée, a man named Baudin, planted a mixed garden where he experimented with a wide variety of plants, and peanuts in particular.⁹⁴ After his visit, General Bernard believed that groundnut cultivation was the future of the colony and petitioned the Colonial Ministry in Paris to finance efforts to establish state-sponsored peanut plantations in Senegal.⁹⁵ Around the same time, a trading firm in Bordeaux, *Déves and Chaumet*, also sought permission to use

⁹¹ The Portuguese introduced the peanut by way of South America, and Brazil in particular.

⁹² Hardy, *La Mise en Valeur*, 288.

⁹³ Brooks, “Peanuts and Colonialism,” 32.

⁹⁴ *Ibid.*

⁹⁵ *Ibid.*

a government-owned building in Saint-Louis to press peanut oil to export to France.⁹⁶ Both requests were turned down in favor of developing a local peanut industry in the south of France.

The refusal to fund peanut plantations and refineries in the Senegal Valley was an effort to protect local French industries, and olive oil producers in particular, from outside competition.⁹⁷ Although most French producers of olive oil manufactured large quantities for cooking and soap making, particularly in the southern region of Provence, they struggled to meet the growing demand of consumers and French industries. Indeed, the process of planting, growing, and waiting for olive trees to mature took several years and prevented producers from keeping pace with industrialization.⁹⁸ Thus, in an effort to expand the vegetable oil industry, the French encouraged local growers to plant peanuts and flax seed as potential alternatives for consumers. These efforts ultimately failed because the French climate was not conducive to peanut growing and flax seed was too demanding for the already exhausted French soils.⁹⁹

Without a local alternative, the French began to import Russian flax seed. Between 1833 and 1840, flax seed imports climbed from 536 metric tons to 23,782, and the number of flax seed oil refineries increased from four to several dozen. According to one French administrator in the south of France, “numerous factories, representing an enormous amount of capital,” relied on flax seed oil to lubricate “generators, steam engines, and hydraulic presses.”¹⁰⁰ Yet, flax seed oil had a number of unpleasant qualities that frustrated French manufacturers. For soap makers in particular, flax seed produced an unsavory color, odor, and texture that was difficult to sell to customers. Import taxes on Russian flax seed were also high—a tariff designed to protect local olive oil producers—and drove up production costs in many French factories.¹⁰¹

⁹⁶ Moitt, “Peanuts and Social Change,” 67.

⁹⁷ Masson, *Marseille*, 93.

⁹⁸ *Ibid.*

⁹⁹ *Ibid.*

¹⁰⁰ *Ibid.*

¹⁰¹ Brooks, “Peanuts and Colonialism,” 32-35.

In an effort to find a cheap and more customer friendly alternative to flax seed oil, a growing number of French industries took a keen interest in peanuts. In a report on the industrial qualities of peanuts and peanut oil, Charles Sonnini, a French naturalist, argued that peanut oil was superior to all other forms of vegetable oils, including olive oil and flax seed oil. Peanut oil, he claimed, “was less oily than the finest olive oil” and was far healthier, more agreeable to taste, and was “therefore the only one which can replace olive oil in our kitchens and on our tables.” Furthermore, he noted, “peanut oil was preferable for the service of lamps,” as it “gives a flame clearer and more durable and produces less residue” than other types of vegetable oils.¹⁰² Since oleaginous plants were not “sufficiently distributed in France,” the “prodigious consumption of oil” outpaced the ability of producers to harvest and press crops to meet demand. For Sonnini, this meant that farmers in the south of France should either grow peanuts themselves or French industries should import them from abroad, which, he lamented, would require the added expense of import taxes.¹⁰³

Despite the growing interest in peanuts among French entrepreneurs and industrialists, the industry got off to a slow start in the Senegal River Valley. From 1833 to 1840, French tariffs on peanuts were extraordinarily high and merchants and traders struggled to turn profits. Similar to the taxes on Russian flax seed, the tariffs were meant to protect the interests of the French olive oil industry, which had a large presence in the local textile markets. By 1838, however, a growing number of trading firms from Bordeaux petitioned the government to finance a commercial expedition to research the West African peanut market.¹⁰⁴ In 1838, the trading vessel, the *Malouine*, sailed along the West African coast as far south as Gabon, all the while taking note of local practices in peanut and palm oil cultivation. In particular, the report noted that peanuts from the

¹⁰² Charles Nicolas Sonnini, *La traite de l'arachide ou Pistache de Terre : Contenant la description, la culture et les usages de cette plante ; avec des Observations générales sur plusieurs sujets* (Paris: D. Colas, 1808), 75.

¹⁰³ Sonnini, *La traite*, 76.

¹⁰⁴ Brooks, *A Provisional Schema*, 39.

Senegambian region contained a higher percentage of oil than those grown in other regions, such as Egypt, the Congo, and the United States, and were well-suited for light industrial purposes.¹⁰⁵ When it returned in May of 1839 the leader of the expedition, Lieutenant Louis-Édouard Bouet, compiled his reports and submitted them to the chambers of commerce of Rouen, Havre, Nantes, Bordeaux, and Marseille.¹⁰⁶ The chambers of commerce were satisfied with the results and lobbied the French government to reduce the duties on West African imports.

In July of 1840, the Minister of Agriculture and Commerce ordered a reduction in duties levied on peanuts imported by French vessels. The duties on peanuts decreased from 2 francs 50 centimes per 100 kilograms to 1 franc.¹⁰⁷ In order to protect the interests of French industrialists, however, the reduction on import duties only applied to nuts in the shell.¹⁰⁸ Traders that imported peanut oil, presumably refined in West Africa, were still subject to the same taxes as before. According to the Minister of Agriculture and Commerce, the importation of peanut oil was “irreconcilable” for the proprietors of the olive oil industry, since they feared that “peanut oil would replace olive oil as a food substance” or as a product in “certain industrial manufactures.”¹⁰⁹ The high duties on peanut oil meant that traders used valuable cargo space by shipping raw peanuts in bulk to France. This, in turn, explains why many peanut oil refineries in Saint-Louis failed during the early years of the trade.

The decrease in import taxes on peanuts had an immediate effect on local industries in the regions surrounding Bordeaux and Marseille. By 1842, there were 36 vegetable oil refineries in Marseille and 10 more were in the process of being built.¹¹⁰ Twenty of these oil refineries used steam

¹⁰⁵ Brooks, “Peanuts and Cultivation,” pg. 39.

¹⁰⁶ For a more detailed account of the nascent stages of the peanut market in Senegal, see : Brooks, “Peanuts and Cultivation,” pg. 39; Bernard Schnapper, *Politique et commerce français dans le golfe de Guinée de 1838-1871* (Paris: Mouton et Company, 1961), 16-19; Colvin, “Kajor,” 255.

¹⁰⁷ Brooks, *A Provisional Schema*, 39.

¹⁰⁸ Hardy, *La Mise en Valeur*, 289-290.

¹⁰⁹ ANS 1 G 9, “Rapport d’ensemble,” July 1840. Also see: Hardy, *La Mise en Valeur*, 289.

¹¹⁰ Masson, *Marseille*, 97.

engines to press the peanuts and to extract the oil, while several others used a hydraulic system powered by a water wheel. The factories employed nearly 800 workers and produced a quantity and quality of oil that was far superior than the preceding years. Thus, with low tariffs and the rapid growth of peanut imports, peanut oil quickly became a staple for industrial use and everyday life in France.¹¹¹ French cities used it as a fuel for street lamps, industrialists used it as a catalyst for various forms of combustion and heat energy, and soap makers became one of the largest consumers of peanut oil when they developed an agreeable blend of olive oil and peanut oil that consumers preferred.¹¹² Other industries used peanut oil to make wax for candles, lubricants for machinery, and various types of adhesives. For French households, peanut oil also became a dietary staple as families increasingly adopted it as a cheap and energy-rich alternative to olive oil. In Bordeaux alone, French merchants built four peanut-oil refineries to manufacture “table oil” for cooking.¹¹³

Similar to the gum trade, the expansion of peanut production in the Senegal Valley during the eighteenth century positioned Senegal as a valuable ghost acre of the French Empire. Through imports of peanuts and peanut oil, the French decreased the demand for locally produced flax seed and olive oil, which, in turn, opened up labor to other industries and left a greater surface area of land for cultivation on French soil.¹¹⁴ By the end of the nineteenth century, peanuts replaced gum arabic as the primary export of the Senegal Valley, climbing from 3,000 tons in 1850 to 140,922 tons by the end of the century.¹¹⁵ In this way, the peanut industry in the Senegal Valley not only served as a cash crop for French and African merchants in coastal urban centers, but it also transformed

¹¹¹ Masson, *Marseille*, 97.

¹¹² Klein, “Slaves, Gums, and Peanuts,” 912.

¹¹³ Masson, 97.

¹¹⁴ This line of argumentation draws on Pomeranz’s work on the British Industrial Revolution: Pomeranz, *The Great Divergence*, 245-61.

¹¹⁵ Data on peanut exports were taken from James Searing, *“God Alone Is King”: Islam and Emancipation in Senegal, The Wolof Kingdoms of Kajor and Bawol, 1859-1914* (Oxford: James Currey, 2002), 199.

Senegal into an imperial ghost acre that decreased the constraints of the organic economy in France and helped facilitate French industrialization.

Changes in the Politics of Energy: Legitimate Commerce, Grain Boycotts, and Conquest

In the mid-nineteenth century, the Wolof states smoothly transitioned from the slave trade to legitimate commerce. As James Searing argues in his work on slavery and commerce in the Senegal Valley, the peanut and gum trades in the 1840s and 1850s “continued patterns of commerce established in the eighteenth century.”¹¹⁶ In using the longstanding networks of trade between the interior and the coast, Wolof elites distributed peanuts, gum, and staple grains from the kingdoms of Kajoor, Futa Toro, and Gajaaga. As discussed in the previous chapter, the states and polities of the Senegal Valley already had a robust agrarian energy system that produced and distributed staple grains and agricultural goods through domestic slave labor. In response to the increasing demand for cash crops, the Wolof states responded by devoting considerable land and labor to the production and distribution of peanuts. As such, Mohamed Mbodj, in his work on legitimate commerce in the Senegal Valley, argues that cash crop production gave rise to a new entrepreneurial class. As production expanded, he contends, peanuts provided urban merchants and peasant farmers with currency to purchase cloth, manufactured goods, food staples, and money to pay taxes.¹¹⁷

Along with the relatively smooth transition from the transatlantic slave trade to legitimate commerce, the growth of the peanut trade reconfigured the politics of energy in the Senegal Valley. In the early years of the peanut industry, the most influential trading houses were located in Saint-Louis. The oldest and most prominent of these commercial firms was Maurel and Prom, which Hubert Prom, a trader from Bordeaux, started in 1822. Prom arrived in Senegal with the hopes of

¹¹⁶ Searing, *West African Slavery*, 188.

¹¹⁷ Mohamed Mbodj, “The Abolition,” 197-99.

establishing new networks of trade for his family's firm in the metropole. After ten years of working in Saint-Louis, Prom partnered with his cousin, Hilaire Maurel, and opened a new trading post on the island in January of 1831.¹¹⁸ As one of the pioneers of the peanut industry in Saint-Louis, the firm established powerful political partnerships with trading houses in Bordeaux and frequently lobbied the French government for tariff reductions and other trade incentives. In the early 1850s, Maurel and Prom, together with the merchants of Bordeaux, lobbied the Colonial Ministry in Paris for the appointment of Louis Faidherbe to serve as governor of Senegal. Faidherbe, who strongly advocated for peanut expansion, became governor in 1854 and proposed an aggressive strategy to grow the industry.

As production increased and as the demand for peanut oil in the metropole continued to grow, it was no longer a question of how much potential the peanut industry had for the French and colonial economies, but rather, it was a question of how quickly peanut production could be expanded.¹¹⁹ For the French, the expansion of peanut production depended on the willingness of local African populations to plant, cultivate, and sell their harvests to merchants and traders. Concerned that local farmers and villagers would not respond to the economic potential of the peanut market, French colonial officers explored the idea of giving bonuses to village chiefs whose farmers produced peanuts. The size of the bonus, they noted, would largely depend on the quantity and quality of peanuts that each village produced.¹²⁰

Wolof farmers, however, needed little incentive to participate in the trade. In contrast to the gum and slave trades, which were localized to specific regions along the Senegal River, the peanut trade was ubiquitous throughout the Senegal Valley. Since peanuts thrived in the sandy soils of the Wolof states, most households grew peanuts and could participate in the trade directly. This, in turn,

¹¹⁸ J. Maurel, *Bordeaux et la Pacification du Sénégal*, (Bordeaux, 1953), 7.

¹¹⁹ Moitt, "Peanuts and Social Change," 69.

¹²⁰ Colvin, "Kajor," 256.

meant that traders not only transported peanuts from the interior to the coast by pirogue and riverboat, but also through a variety of networks and avenues of overland trade. As one French trader observed in 1846, canoes ferried large quantities of peanuts by sea from the kingdom of Kajoor to Saint-Louis on a daily basis. In many cases, however, the French reported that these canoes were poorly constructed and piloted by inexperienced peasants who risked their lives to participate in the trade. The canoes, he remarked, “were unsafe, flat, and measured about twenty feet or more.” They were manned by two men, and because they were poorly built and “badly navigated,” many of the boats capsized and resulted in numerous casualties over time.¹²¹

While it is possible that some peanut traders were inexperienced in constructing and piloting pirogues and riverboats, the French were highly critical of unregulated and undetectable forms of peanut transport. Since small boats were difficult to detect, many local peanut producers avoided the tax and customs fees of doing business in Saint-Louis. In this way, then, many of the disparaging accounts of peanut cultivators and their methods of transporting their harvests from the interior to the coast underscore a growing anxiety of French traders’ inability to control the peanut trade.¹²² In addition to the Atlantic Coast and the Senegal River, peanuts arrived in Saint-Louis via the overland route from Kajoor. For the most part, Moorish caravans served as the primary middlemen between peanut cultivators and French merchants on the coast.¹²³ Since the majority of peanuts in the Wolof states were grown in the kingdom of Kajoor, the Moors transported peanuts to the main markets in the coastal villages of Ganjool in the north and Rufisque in the south.¹²⁴

With a greater variety of peanut suppliers and trading routes, the longstanding structures of trade in the Senegal Valley changed. Although the political elite in the Wolof kingdoms profited

¹²¹ Moitt, “Peanuts and Social Change,” 72.

¹²² Hardy, *La Mise en Valeur*, 295.

¹²³ Moitt, 79-82.

¹²⁴ Colvin, “Kajor,” 256.

from the peanut trade, the proceeds of the peanut industry were more evenly distributed throughout the Wolof states. Since peanuts were a cash crop, peasants could pay tribute to the political elite—usually ten percent of their crop—and still retain large quantities to sell to French trading houses.¹²⁵ With this new form of income, Wolof peasants had access to the thriving markets of Saint-Louis where they purchased valuable commodities, such as guns, ammunition, and liquor, which had long been reserved for the nobility.¹²⁶ Some scholars have associated the accumulation of small amounts of wealth as an indication that elites struggled to adapt to legitimate commerce, yet small increases in peasant household income does not necessarily mean that all peasant populations were insubordinate or unruly. As Mamadou Diouf argues, the peanut trade, rather than undermining the Wolof elite, presented new opportunities for both peasants and elites to accumulate wealth.¹²⁷

By the mid-nineteenth century, peasant households in the kingdoms of Kajoor and Bawol functioned as individual peanut refineries. The head of the household, typically an older male living in a compound, distributed different plots of land to his wives, children, and other members of the family. Individual members of the household could cultivate their own land to grow millet, sorghum, vegetables, and graze livestock, but they were also required to give a portion of their peanut harvest to the head of the household and to work his lands.¹²⁸ During the growing season, which lasted from June to November, young single men, known as *surga* in Wolof, cleared the land and prepared the fields for planting. Women, in turn, sowed and weeded the fields and shelled the peanuts for local markets. In the late nineteenth century, Jean Adam, a French colonial officer, recorded that peasant

¹²⁵ Mbodj, “The Abolition of Slavery in Senegal,” 197-211. Unlike millet or sorghum, peasants did not need peanuts for their own consumption, so even when the political elite collected tribute payments there was still more than enough to sell to French merchants and traders along the coast. Although nearly every household grew staple grains, they were unable to profit from them because aristocratic families collected their surplus gains as tribute payments. Thus, rather than selling their remaining grains to local markets, Wolof households kept them for their own consumption.

¹²⁶ Searing, *God Alone is King*, 195-224; Colvin, “Kajoor,” 290-293; Moitt, “Peanuts and Social Change,” 69-75; Klein, “Slaves, Guns, and Peanuts,” 895-901.

¹²⁷ Diouf, *Le Kajoor*, 153-168.

¹²⁸ Searing, *God Alone*, 195-224.

farmers took approximately 25 to 30 days to clear a field before it could be sowed; three days to plant the crop; 30 days for weeding; 15 days for the first harvest; and 80 days to shell and refine the crop for export.¹²⁹ These figures indicate that women, in addition to maintaining household gardens, pounding millet, and fetching water, did the majority of the labor in peanut production since their main obligations—to weed the fields and to shell the nut—took the longest amount of time.

For the most part, the *surga* were the primary millet and peanut farmers and were required to work five days a week for the head of the household. On their days off, the *surga* cultivated their own peanuts to sell in the market, which enabled them to save money for bridewealth and to eventually work their way out of the household. Slaves were also a critical part of peanut production within the Wolof household.¹³⁰ By the turn of the twentieth century, the kingdoms of Kajoor and Bawol, commonly referred to as the Peanut Basin, exported nearly 95,000 metric tons of peanuts.¹³¹

The rapid expansion of the peanut industry, then, required a substantial increase in slave labor. Although slaves had long been an integral part of the agrarian energy systems of the Wolof kingdoms, the vast majority of the slaves were owned by aristocratic families. In a French census taken in the early 1900s, colonial officials noted that 40 and sometimes 50 percent of the population in the Peanut Basin were agricultural slaves from the Bambara regions of contemporary Mali.¹³² To maintain steady peanut production, then, the typical Wolof household required a substantial amount of food—about four pounds of millet per day—to sustain one laborer who expended an average of 850 calories per hour cultivating peanuts.¹³³ With a population of nearly 47,000 slaves, the households in the Peanut Basin needed to produce a minimum of 188,000 pounds of grains per day

¹²⁹ Jean Adam, *L'Arachide: Culture, Produits, Commerce, Amélioration de la Production* (Paris: 1908), 53-57.

¹³⁰ Searing, *West African*, 204-207.

¹³¹ *Ibid*, 195-224

¹³² Moitt, "Slavery and Emancipation in Senegal," 29.

¹³³ FAO, last accessed May, 2017, <http://www.fao.org/docrep/003/aa040e/AA040E15.htm#an5> ; For a better sense of energy output in humans, see Vaclav Smil, *Energy: A Beginner's Guide* (New York: Oneworld Publications, 2017), 74-85.

just to sustain production at the height of the peanut growing season.¹³⁴ In other words, the same Wolof households that grew large quantities of peanuts were also producing large quantities of food energy to fuel their cash crop economy.

By the late nineteenth century, the agrarian energy systems of the Wolof kingdoms were completely centered around the expansion of the peanut industry. Taken together, farmers, women, *surga*, and slaves worked in tandem to produce enough food to feed the population and to increase peanut production. With the majority of their labor and energy devoted to this lucrative cash crop, Wolof households in the Peanut Basin became imperial energy refineries that helped fuel the industrial metabolism of the metropole.

The End of Grain Boycotts

The growth of the peanut industry in the mid-nineteenth century brought the Wolof states and French traders and merchants into a mutually beneficial economic relationship. Political elites, in collecting tribute payments from peasant households, sold large quantities of peanuts to trading houses in Gorée and Saint-Louis. The French, in turn, exported the lucrative cash crop to France where businesses purchased and used peanut oil for a wide variety of industries. As cash crop production brought new economic opportunities to the Senegal Valley, this close, but fraught relationships between the Wolof states and the French reconfigured the politics of energy in the Senegal Valley. When political elites and French traders engaged in disputes over trade, the Wolof kings no longer used grain boycotts as a mechanism to deploy their political authority over Saint-Louis and Gorée. In abandoning this longstanding and effective strategy, I argue that the Wolof

¹³⁴ Searing offers a rough estimate of slave populations in the Peanut Basin, see: Searing, 207.

states relinquished a critical component of the organic economy and made themselves vulnerable to French military conquest.¹³⁵

In 1851, the *Commission des Comptoirs et du Commerce des Côtes d’Afrique* submitted a report to the Colonial Ministry in Paris, highlighting the vast potential of the peanut industry to transform the Senegal Valley into a “civilized” commercial colony. Its authors, which included Governor Bouet-Willamez, Victor Regis, and other notable merchants and traders in Saint-Louis, noted that “the commerce in oleaginous materials,” and “peanuts and palm oil” in particular, “has been causing a revolution in the habits of certain parts of these coasts.”¹³⁶ In providing these countries “with a new means of exchange,” the committee urged that “by giving value to labor, so productive on such fertile land, one does more for the development of civilization and the abolition of the odious traffic in slaves than by any repressive measure.”¹³⁷ By associating the trade of oleaginous materials with the abolition of slavery and the development of “civilization” in West Africa, French colonial officers in Saint-Louis indicated that the growth of local agriculture in the Senegal Valley was critical to the success of their colonial agenda.

By 1854, the Colonial Ministry accepted many of the commission’s recommendations and requests. To start, influential traders in Bordeaux lobbied the ministry for an administrative change in the colony of Senegal. Frustrated with paying annual customs payments to the Wolof kingdoms along the Senegal River, they advocated for a proven officer in the French military with experience in the French colonies.¹³⁸ In 1854, the Colonial Ministry assigned Louis Faidherbe, a reputable soldier with experience in Guadeloupe and Algeria, to serve as Governor of Senegal and to liberate trade along the river. From the outset, Faidherbe received significant funds from the Second

¹³⁵ Diouf, *Le Kajor*, 168. Diouf argues that peanut cultivation was, in its true essence, a French colonial activity. As Wolof households increasingly adopted peanut cultivation, they transformed their fields into colonial territories that undermined the political authority of the Wolof kingdoms.

¹³⁶ ANS 2 B 28, “Commission de Comptoirs,” 1851. Also cited in: Klein, *Islam and Imperialism in Senegal*, 40

¹³⁷ *Ibid.*

¹³⁸ Diouf, *Le Kajor*, 171-174.

Republic to fortify France's commercial trading posts along the Senegal River and to "liberate" French trade from the Wolof states, Futa Toro, and Gajaaga.¹³⁹

The growth of the peanut industry also turned small coastal villages into robust trading centers. Although Saint-Louis and Ganjool served as the commercial hub for the early years of the peanut industry, several other coastal towns emerged as significant ports for the peanut trade. Since peanuts were pervasive throughout the kingdom of Kajoor, both the nobility and the peasantry benefitted by trading independently with the French, especially in the emerging ports of Rufisque, Portudal, and eventually Dakar. Although the *damel* levied taxes on aristocratic and peasant households, the profits from the peanut industry enabled the broader population to pursue their own political and economic interests. In 1852, for example, aristocratic households in Ganjool broke off from the kingdom over a trading dispute and sought refuge on the Isle of Babagee, just opposite Saint-Louis. Fearing an attack from the *damel*, the chiefs of Ganjool pleaded with the Governor to send troops to the island to protect them from the *ceddo*. The Governor sent troops to the island and offered to take them in as subjects of the colony, so long as they freed their slaves and agreed to end the practice of slavery among their population. In the end, the chiefs were unwilling to make such a drastic sacrifice and after nine months of deliberation they reconciled their differences with the *damel* and returned to the mainland.¹⁴⁰

While the conflict between Ganjool and Kajoor was ultimately resolved, it revealed the diminishing power of the *damel* and the growing authority of the French in the Senegal Valley. To an extent, the political instability in Kajoor was due to French efforts to expand the peanut trade by undermining traditional systems of tribute and custom payments. In 1849, the *damel* of Kajoor, Maissa Tenda, attempted to regulate the industry by requiring all the inhabitants of Saint-Louis to

¹³⁹ Searing, *West African*, 190-193.

¹⁴⁰ Colvin, "Kajor," 297.

pay an annual tax to trade peanuts in his kingdom.¹⁴¹ Yet, at the same time, the French were simultaneously offering local peasants tax exemptions on all crops grown along the Senegal River.¹⁴² In a letter to the Governor, the *damel* complained that the “people of Saint-Louis” had been “ruining my country for a longtime” by farming and grazing livestock in his kingdom without authorization.¹⁴³ The French, he claimed, depended on his kingdom for “many products” but consistently failed to pay customs to the king.¹⁴⁴

To be sure, the diplomatic approach of Maissa Tenda underscores the gradual shift in the politics of energy in the Senegal Valley. In contrast to the eighteenth and early nineteenth centuries, when the *damel* coerced French officers and traders into trade agreements and tribute payments by withholding cereals and grains from coastal populations, Maissa Tenda was forced to seek a more passive and less coercive strategy. In seeking a peaceful resolution, the *damel* noted that the people of Kajoor were “friends” of the French and that he fully intended to “live in peace” so long as they could bring justice to the matter.¹⁴⁵ After much deliberation, Governor Baudin agreed to pay the king an annual customs payment and then pledged to negotiate a more permanent solution for the years to follow.

Nevertheless, the French and the kingdom of Kajoor continued to spar over a proper trading arrangement. The French believed that the customs payments should be directed toward the merchants and traders living in Saint-Louis rather than the colonial administration. The French Governor, who claimed to be acting in the name of the traders of Saint-Louis, indicated that the merchants would divide the payment among themselves based on how much they traded with Kajoor. As such, the Governor gave the *damel* rights to collect payments from individual traders

¹⁴¹ Colvin, “Kajor,” 274.

¹⁴² Brooks, “Peanuts and Colonialism,” 46.

¹⁴³ ANS 2 B 25, Damel Maissa Tenda to the Gov., Jan 9th, 1849. Also cited in Colvin, “Kajor,” 297.

¹⁴⁴ *Ibid.*

¹⁴⁵ *Ibid.*

knowing full well that the traders would refuse to pay. From the outset, the agreement heavily favored the French, as it was unrealistic to assume that traders would accurately record how much trade they conducted with Kajoor and then voluntarily pay their contribution of the customs payment.¹⁴⁶

The dispute eventually came to an end when the Governor and the *damel* agreed to an exit duty which was based on peanut exports from Kajoor. This agreement, however, was an affront to the *damel*. In contrast to previous customs payments, which were paid from one sovereign to another, the exit tax was an insult to the king's honor since his own men were required to collect the tax.¹⁴⁷ Symbolically, this was an important shift because it undermined the longstanding role of the *damel* as the political strongman of the region and, moreover, it underscored the emergence of Saint-Louis as a formidable political rival.¹⁴⁸

Between 1830 and 1850, the Wolof states yielded robust harvests that provided local populations and coastal cities with adequate amounts of millet and sorghum. In Saint-Louis, grain imports from the interior averaged 2,200 tons per year, which, as Searing contends, was more than enough food to feed its population of 14,000 residents.¹⁴⁹ In addition to locally produced grains, the French also imported 450 tons of rice and wheat flour each, providing the population of Saint-Louis with provisions to sustain their basic needs and expand their commercial interests.¹⁵⁰ These figures, which were recorded by French colonial officials in Saint-Louis, indicate that the population lived well beyond the margins of hunger despite recurring periods of drought in the 1840s.¹⁵¹

¹⁴⁶ For a lengthy analysis of the nascent peanut market, see: Moitt, "Peanuts and Social Change," 76-121.

¹⁴⁷ Ibid.

¹⁴⁸ Ibid.

¹⁴⁹ Searing, *West African*, 189.

¹⁵⁰ Courtet, *Étude*, 48-52.

¹⁵¹ These figures are taken from Roger Pasquier, "Le Sénégal au milieu du XIXe Siècle: La crise économique et sociale" (PhD dissertation, Université de Paris-Sorbonne, 1985), 185; and Searing, 189.

In comparison to previous episodes of scarcity, such as the “Great Famine” in the 1750s, Saint-Louis possessed large grain surpluses to avoid starvation. The constant threat of famine, which often paralyzed commercial activity in Saint-Louis during the eighteenth century, was no longer a recurring existential threat. The reconfiguration of political power in the Senegal Valley, therefore, was most evident in the 1850s when there was a sudden decline in trade boycotts between the Wolof states and the inhabitants of Saint-Louis. Prior to the peanut trade, most disputes between the French and the Wolof states ended in grain boycotts and famines in Saint-Louis. When the Wolof elite were frustrated with the French colony, they simply cut off its food supply. By the 1840s and 1850s, however, the growth of the peanut trade and the increased prosperity of Saint-Louis made boycotts in cereals and grains far less effective. In other words, boycotts were no longer politically or economically advantageous for the Wolof elite because the profits from the peanut trade far outweighed the political benefits of severing off trade with the French. With Saint-Louis well-provisioned, the ruling African elite could no longer use boycotts in staple grains as a mechanism to broadcast authority over French settlements along the littoral.

Despite the infrequency of food shortages and famines in Saint-Louis in the mid nineteenth centuries, French colonial officials continued to emphasize the critical importance of conquering the fertile regions of the Senegal Valley. The primary concern for the French was the expansion of the Trarza Moors into the kingdom of Waalo. For nearly a decade, the Moors controlled the Lower Senegal and raided and pillaged grain and peanut producing villages on the periphery of Saint-Louis.¹⁵² According to Marc Maurel, a trader with the commercial house of Maurel and Prom, the new administration in Saint-Louis needed to “guarantee the safety of the African producers of peanuts, grains, and possibly gum.” The Governor, he continued, should “prohibit the Mauritians [Moors] of the north bank from raiding the south, where except as peaceful traders and transporters,

¹⁵² Moitt, “Peanuts and Social Change,” 125.

they should not be welcome.”¹⁵³ Although French traders and merchants no longer feared trade boycotts and food scarcities, gaining control over and access to the fertile lands of the Senegal Valley remained a top priority.

Colonial Conquest, Peanuts, and Grains

With the support of the Bordeaux trading houses, as well as the Colonial Ministry in Paris, General Louis Faidherbe became governor of Senegal in 1854 and gradually expanded control over the Senegal Valley through a series of military campaigns.¹⁵⁴ To be sure, scholarship on the French conquest of the Senegal Valley is extensive and has examined the various ways that political, economic, and religious changes contributed to the decline of the Wolof states and the emergence of French colonialism. Some historians, such as Martin Klein and A.S. Kanya-Forstner, argue that the ambitions of a small group of military officers used the colonial conquest of Senegal as an opportunity to gain wealth and to advance their military careers.¹⁵⁵ Others, such as Bernard Moitt and Lucy Colvin, demonstrate how the skillful—and at times spurious—diplomacy of French colonial officers undercut the political standing of the Wolof ruling elite. French governors, through a series of empty promises, illegitimate treaties, and military confrontations, slowly encroached on Wolof territory and eventually installed themselves as the ruling elite.¹⁵⁶ And still others have linked the onset of French colonialism with the Islamic rebellions of the nineteenth century and the subsequent decline of slavery. For James Searing, the French conquered the Senegal Valley by participating in religious and civil wars that were already in progress. By intervening at crucial

¹⁵³ L.C. Barrows, “General Faidherbe, the Maurel and Prom Company and French Occupations” (PhD Diss., University of California, 1974), 250.

¹⁵⁴ Spearing, *West African Slavery*, 191. Also see: Diouf, *Kajoor*. He argues that Lat Joor both resisted and accommodated French colonial conquest and often played the French off of his political rivals.

¹⁵⁵ Kanya-Forstner, A.S. *The Conquest of the Western Sudan: A Study in French Military Imperialism*. Cambridge: Cambridge University Press, 1969; Martin Klein, *Slavery and Colonial Rule in French West Africa* (Cambridge: Cambridge University Press, 1998).

¹⁵⁶ Colvin, “Kajor,”; Moitt, “Peanuts and Social Change.”

moments and on various sides, the French were able to play aristocratic families off one another and create an opening for colonial conquest.¹⁵⁷

Taken together, these studies suggest that the French conquered the Senegal Valley by successfully navigating and exploiting the longstanding political, religious, and economic tensions between rival states and polities. Yet, they seem to overlook how the French conquest was also a determined effort to gain access to, and control over, local systems of agriculture. Throughout the 1850s and 1860s, French colonial officers justified colonial conquest by emphasizing the importance of protecting the peanut and grain industries from the violent raids and transgressions of the Wolof kings. Through the “liberation” of peasants and farmers, they believed that trade and commerce would flourish under colonial rule and would transform Senegal into an invaluable political and economic asset for the French Empire. As such, this chapter concludes by showing that the expansion of the colonial state in the late nineteenth century was also an attempt to capture and control the distribution of agrarian energy, and cash crops and staple grains in particular, from the Wolof states.

In 1855, Faidherbe invaded the kingdom of Waalo with four hundred men. Despite the clear challenges of the campaign, Faidherbe claimed that the French must “free trade” and that “everyone must recognize that the river is ours and that we will not pay to go or stay anywhere.” The conquest, he wrote, will liberate the “Left Bank states from the Moors” and will provide the colony with the opportunity to “take all the millet and oxen from the enemy.”¹⁵⁸ Faidherbe’s campaign against the Trarza Moors was swift, capturing 2,000 heads of cattle, three camels, fifty donkeys, and one hundred and fifty prisoners after having burnt 25 villages.¹⁵⁹ The successful conquest of the Lower

¹⁵⁷ Searing, *God Alone*, 8.

¹⁵⁸ ANS 2 B 31, “Governor Faidherbe to Minister of the Colonies, Saint-Louis,” January 10, 1855, also quoted in Barry, *Royaume de Waalo*, 302.

¹⁵⁹ Barry, *Royaume de Waalo*, 302.

Senegal Valley, with its fertile flood plains and abundance of cereals and grains, opened access to valuable energy resources and served as the first critical step in France's efforts to expand its empire in West Africa.

With an abundant supply of cereals and grains, as well as a growing army of *tirailleur sénégalais*, Faidherbe possessed the resources to seize control of the entire Senegal River Valley.¹⁶⁰ Shortly after the conquest of Waalo, Faidherbe led a force of *tirailleur sénégalais* to the Upper Senegal Valley to defeat Al Haj Umar Tall, a Muslim cleric and political leader in Futa Toro. By 1861, Faidherbe successfully blocked Tall's armies from expanding into the Senegal Valley, and he also expanded French territories in the fertile regions of Kajoor and Bawol. In brief, Faidherbe's victories established and secured the right of merchants and traders in Saint-Louis to trade freely along the river, and they also ensured that Saint-Louis had a direct line to the millet and sorghum fields of the Lower and Upper valleys of the Senegal River.

After the success of his military campaigns in the Upper Senegal, Faidherbe targeted the kingdom of Kajoor. Despite their relatively peaceful alliance and prosperous trading partnership, Faidherbe lobbied the Colonial Ministry to support an invasion of Kajoor to overthrow the *damel*. To convince his superiors in Paris, Faidherbe argued that the violent depredations of the *ceddo* interfered with commerce and was an affront to French imperial expansion.¹⁶¹ In August of 1855, Faidherbe explicitly made the case for the invasion, noting that "Kajoor will have to be the object of our special attention" since it "feeds all the traders of Saint-Louis by itself alone." In addition to grains, Faidherbe also stated that "the production of peanuts is growing in a remarkable manner despite the vices of a government which is the ultimate in stupidity and the band of brigands which

¹⁶⁰ The *tirailleur sénégalais* were paid African soldiers that fought for the French. They were often former slaves who joined the ranks of the French military to improve their social and economic status. For further reading on their critical role in the conquest of Senegal, see: William B. Cohen, "Malaria and French Imperialism," *The Journal of African History*, Vol. 24, No. 1 (January, 1983), 23-36.

¹⁶¹ The history of French imperial expansion on the Senegal Valley has been well studied. See: Searing, *God Alone Is King*, 180-193; Colvin, "Kajor," 301-352.

under the name of the *damel's ceddó* exacts heavy tribute in the countryside.”¹⁶² By removing the *damel* from power, Faidherbe seemed to suggest that the peanut industry, which was already booming, would do even better under French authority. In a letter to the *damel* in January of 1857, Faidherbe warned that unwarranted attacks and raids on merchants and traders would no longer be tolerated and would be met with a severe response:

I warn you that your *ceddo* are beginning to behave very badly in the neighborhood of Saint-Louis. Lately they attacked people from Gandon under the pretext that they are my friends and they prevented the farmers from bringing us their products. If it is enough to be my friend and to be mistreated in your country, it is because you obviously want to be at war with me, in that case you have only to say it frankly, I am ready; If, on the contrary, you wish to remain at peace with Senegal [Saint-Louis] as your interest involves you, it is absolutely necessary to prevent your warriors from trying to hurt my people or those whom I protect, for you must understand that I cannot suffer this for a long time. Your subjects who come to St. Louis are protected; it is absolutely necessary that you do the same with me.¹⁶³

A year later, in 1858, Faidherbe again voiced his frustration with the seemingly “unprovoked” attacks of the *ceddo* warriors. This time, however, he not only threatened to remove the *damel* as the ruler of Kajoor, but he threatened to cease all trade with the kingdom and to capture the town of Ganjool—which at the time was the most important trading post for the peanut market.

How do you want friendship to exist for a long time between us, and every moment the people of Waalo or Saint-Louis who go peacefully into your country to trade there complain that they have been arrested, abused, or plundered by your drunken *ceddo* that came in your name to destroy?...If you continue to do these infamies as you have done lately, I warn you that I will prevent from paying you any custom for your millet, peanuts, oxen, etc...and moreover, I will take Ganjool.¹⁶⁴

In a surprising reversal of roles, Faidherbe, rather than the *damel*, threatened to boycott trade with Kajoor if the violent depredations of the *ceddo* warriors failed to stop. With access to, and

¹⁶² ANS, 2 B 3, “Gouverneur Faidherbe to the Minister,” August 27, 1855.

¹⁶³ ANS, 3 B 91, “Gouverneur à Damel, Saint-Louis,” January 21, 1857.

¹⁶⁴ ANS 3 B 91, “Gouverneur à Damel Birahima,” Saint-Louis, May 25, 1858.

control over, the fertile fields of Waalo, Gajaaga, and Futa Toro, Faidherbe no longer relied on the kingdom of Kajoor for cereals and grains. Moreover, his threat to “take Ganjool,” the principle port for the peanut trade in northern Kajoor, revealed a growing confidence in the colony’s military might. This turn of events, then, underscored the shifting balance of power in the politics of energy between the colony of Senegal and the kingdom of Kajoor. As word of a potential conflict between the French and the *damel* spread quickly throughout the kingdom, aristocratic households with close ties to Saint-Louis—mostly through the grain and peanut trades—favored French expansion. In the southern regions of Kajoor, the nobility also split into two separate camps. The success of the peanut trade in Rufisque, as well as the growing colonial port of Dakar, lured many provincial chiefs away from the *damel* and they, too, sided with the French.¹⁶⁵ As a result, the kingdom of Kajoor collapsed into a prolonged civil war that de-stabilized trade and politics in the Senegal Valley for nearly two decades.

In the 1860s, the political conflict in Kajoor prompted an increase in raiding and pillaging as well as a dramatic decline in trade. To make up for the lack of trade, the French turned to the Upper Senegal Valley for staple grains and Faidherbe, once again, lobbied the Minister of the Colonies to invade and conquer Kajoor. If the trade in “millet and peanuts comes to anything at all this year,” he lamented, “we would be happy.” The longer the Ministry allowed “the question of Kajoor” to drag on without “a definitive and vigorous settlement,” he argued, “we will lose a considerable amount of influence there.”¹⁶⁶ With the kingdom divided, Faidherbe saw a potential opening to attack and conquer the *damel*. In order to gain the metropole’s support for the invasion of Kajoor, Faidherbe insisted that the nonstop raiding and pillaging of the *ceddo* warriors was an existential threat to the peanut trade.

¹⁶⁵ Moitt, “Peanut Production and Social Change,” 121-125; Diouf, *Le Kajoor*, 217-222.

¹⁶⁶ ANS 3 B 91, “Lettre No. 5, Gouverneur au Ministre,” Saint-Louis, January 6th, 1860.

In the numerous reports that he submitted to his superiors in Paris, Faidherbe promised that French military action would liberate the hard-working peasants from the tyranny of *damel*. The “brigandage of the kingdom of Kajoor,” he remarked, “would continue under the new *damel*, Makodu...who has resorted to drinking *l'eau-de-vie*...and destroying innocent villages and selling the inhabitants just like his predecessors.”¹⁶⁷ These “miserable cultivators,” he observed, “ask for nothing but peace” and “they would produce ten times more [peanuts] if guaranteed protection.”¹⁶⁸ Within the year, the Colonial Ministry agreed to the invasion of Kajoor and French forces invaded on March 5, 1861.

Faidherbe easily defeated Makodu’s army and pushed the *damel* out of Mboul, the kingdom’s capital. In the process, the French annexed the important ports of Rufisque and Ganjool and replaced the *damel* with a political puppet of the merchants and traders of Saint-Louis. With the defeat of Kajoor, Faidherbe left Senegal in 1861 after seven years of service. In his absence, the *damel* was overthrown by Lat Joor, a widely-supported aristocrat that resented French intervention in Kajoor.¹⁶⁹ In an attempt to restore order in the colony, the French re-installed Faidherbe as Governor and, by 1864, the French retook the kingdom of Kajoor. With a return to stability, Faidherbe, who was in poor health, left Senegal for the last time. Just as before, Faidherbe’s departure left the door open for Lat Joor to invade Kajoor and retake the throne. After several violent skirmishes between the Wolof and French armies, the new Governor, Émile Pinet-Laprade, and the *damel* established a treaty and peace returned to the Senegal Valley.¹⁷⁰

From 1865 until 1886, the kingdom of Kajoor remained an independent state under the leadership of Lat Joor. As *damel*, Lat Joor recovered some of the kingdom’s former prosperity by

¹⁶⁷ ANOM, IV 46 B, “Gouverneur au Ministre,” Saint-Louis, April 13th, 1860.

¹⁶⁸ ANS, 3 E 29, “Procès-Verbal du Conseil d’Administration du Sénégal,” Saint-Louis, February 28, 1861.

¹⁶⁹ Diouf, *Le Kajoor*, 217-22.

¹⁷⁰ Moitt, “Peanut Production and Social Change,” 136-39.

capitalizing on the extraordinary growth of the peanut industry.¹⁷¹ During his reign, the coastal trading towns of Saint-Louis, Rufisque, and Dakar witnessed an explosion of peanut exports, expanding from 8,762,000 kilograms in 1870 to 43,500,000 in 1883.¹⁷² As Rufisque gradually became the hub of the peanut industry in the 1870s, the French constructed a more protected port on the nearby Cap Vert peninsula. The port, which would become the thriving city of Dakar, was easily accessible for trading vessels and had an agreeable maritime climate for French colonial officers and traders. Established initially as a French military fort in 1857, Dakar served as a more viable alternative for the peanut trade than the island of Gorée, which had limited space for the expansion of warehouses and administrative buildings.

As commerce increased in the late 1870s, the French recognized Dakar, along with Saint-Louis, Gorée, and Rufisque, as a French commune with representation in the National Assembly in Paris. By establishing these trading centers as part of the French Empire, the Colonial Ministry sent a clear message to Lat Joor that imperial expansion was inevitable. By 1882, the French began to build a railway between Saint-Louis and Dakar that cut through the heart of the *damel's* territory. Lat Joor resisted the construction of the railway for four years but was eventually killed in November of 1886. After his death, the French divided the kingdom into six cantons and installed politically appointed chiefs. As the principle producer of peanuts in the Senegal Valley, the kingdom of Kajoor's capitulation to the French put both the peanut industry and the grain market firmly in the hands of the colonizers. When the Saint-Louis-Dakar railway was completed in 1886, some French officers referred to it as the "peanut railway" since each of its 16 stations became important trading hubs for the peanut trade. Merchants and commercial houses established warehouses and offices

¹⁷¹ Moitt, "Peanut Production and Social Change," 147; Diouf, *Le Kajoor*, 220.

¹⁷² *Ibid.*

along the route and, by the 1890s, nearly 70 percent of all peanut exports were transported to the coast by railway.¹⁷³

Conclusion

This chapter has shown the connections between the organic economy of the Senegal Valley with broader processes of historical change, from imperial expansion and conquest to the transition from the slave trade to legitimate commerce. In doing so, it has demonstrated how the Senegal Valley became an imperial ghost acre through the expansion of gum and peanut production. Although the French hoped to transform the Senegal Valley into a system of plantation agriculture that would supply the metropole with sugar, cotton, and tobacco, those attempts ultimately failed.

Indeed, it was through the rapid growth of the peanut and gum trades that ultimately reconfigured the political and economic landscape of the Senegal Valley. Despite the ongoing conflicts between the Wolof and the French, the rapid growth of the cash crop economy was, for a time, mutually beneficial. For the French, cash crops not only brought a stable stream of revenue to the merchants and traders of Saint-Louis, but it also provided the metropole with a valuable input of energy that helped facilitate the process of industrialization in France. As this chapter has shown, the growth of the peanut and gum industries transformed the Senegal Valley into an imperial ghost acre. By importing raw materials from the Senegal Valley, the French replaced labor intensive oleaginous crops—namely olive oil and flax seed oil—with cheaply produced peanut oil. In doing so, the French not only opened a greater surface area for agriculture on their own lands, but they also acquired raw materials without occupying their own labor force. By drawing on Senegal and other

¹⁷³ Moitt, “From Pack Animals to Railways: The Transport and the Expansion of Peanut Production and Trade in Senegal, 1840-1940” *Outre-mers*, tome 88, no. 330-331, 2001.

overseas territories as imperial ghost acres, the French gradually broke free of the constraints of the organic economy and initiated the process of industrialization.

For the Wolof states, the growth of the gum and peanut trades not only provided them with opportunities to accumulate wealth, but it also forced them to reconsider how they managed their relationship with the French. In contrast to the eighteenth century, when the ruling elite regarded the French trading post as a landless state, the Wolof kingdoms were now drawn to the economic and political opportunities of the peanut trade. However, in spite of the new possibilities, the peanut trade also reconfigured the politics of energy in favor of the French. Due to the close commercial relationship between Saint-Louis and the Wolof kingdoms, the once effective strategy of coercing the French into desirable trade agreements and tribute payments were no longer applicable. In ceasing to enforce grain boycotts on Saint-Louis, the Wolof states gave the French an opening to cease control over the river trade and abolish all forms of taxation and tribute payments. As the peanut industry continued to flourish in the late nineteenth century, the French made their case for colonial conquest by emphasizing the importance of protecting agricultural production in the Senegal Valley. By defeating the Wolof kings, the French argued that they were not only safeguarding the economic future of the colony, but also liberating peasants and villagers from the violent depredations of the *ceddo* warriors.

CHAPTER FOUR

Fueling the Colonial State: Fossil Fuels, Energy Pathways, and the Organic

Economy in Senegal, 1885-1940

In February of 1916, Raphael Antonetti, the Lieutenant-Governor of Senegal, reported that the lack of “surveillance of woodcutting” has made “sustaining the energy needs of the colony more and more difficult.”¹ The demand for woodfuel and the increase in deforestation threatened “the principal centers of the colony” since the requisite “amount of wood and charcoal” was becoming increasingly difficult to procure.² Anxious over the sustainability of charcoal production, Antonetti advocated for a “more organized practice in exploitation” that would permit the colony’s relatively sparse population to possess “all the wood and all the charcoal necessary.” The preservation of the forests, therefore, was “of utmost urgency” since the disappearance of woodfuel would “have disastrous consequences” for the future of the colony.³

Antonetti’s report on charcoal production and deforestation underscores the precarious nature of the colonial state’s energy economy. Due to the limited quantities of fossil fuels in Senegal, the colonial state was relatively “energy poor” and supplemented its use of fossil fuels with organic sources of energy, namely woodfuels, peanuts and peanut oil, and other oleaginous plants. While the French controlled the little amount of fossil fuels imported into the colony, they struggled to regulate the production and distribution of local, organic sources of fuel. As Antonetti’s report suggests, the colonial state hoped to establish a seemingly sustainable and rational system of

¹ ANS 2 G 16, “Gouverneur General l’Afrique Occidentale Française,” 1916. Also cited in Jesse Ribot, “Markets, States, and Environmental Policy: The Political Economy of Charcoal in Senegal” (PhD diss., UC-Berkeley, 1990) 97.

² ANS 2 G 16, “Gouverneur,” 15-16

³ *Ibid*, 16.

woodfuel production that would not only provide the colony with firewood and charcoal, but would also conserve Senegal's forests.

This chapter examines the “politics of energy” in colonial Senegal from 1885 to 1940, and it demonstrates how French colonial officials attempted to centralize and consolidate power over Senegal's organic economy by developing a new energy infrastructure based on fossil fuels. Through the construction of railways, dirt roads, forced labor, and the use of petrol-powered trucks and automobiles, the French built “energy pathways” to manage and regulate the flow of cash crops from the interior to the coast. The development of these pathways, then, underpinned colonial rule and enabled the French to penetrate and access the organic economy.

However, as the French expanded the cash crop economy through the use of fossil fuels and modern technology, local populations in the Senegal Valley responded by exploiting the energy infrastructure of the colonial state. In particular, the Murid Brotherhood, a Sufi order of Islam based on nonviolence, education, and an industrious work ethic, expanded peanut production in the interior by exploiting lands adjacent to railways and dirt roads. In search of work, peasants and former slaves joined the brotherhood and, after several years of labor, were granted their own plots of land in the New Peanut Basin.⁴ The brotherhood was so effective in expanding peanut production that the French encouraged, and then legally bestowed, the Murids with rights to uncultivated lands in the interior. Through these various “paths of accommodation,” to draw from David Robinson's study of Islam and colonialism in Senegal, cash crop production expanded and brought previously unexploited lands under the control of the Murid brotherhood.⁵

⁴ Mark Pires, “Energy and Environment, A Political Ecology of Woodfuels in Senegal” (PhD dissertation: Michigan State University, 1999), 111.

⁵ David Robinson, *Paths of Accommodation: Muslim Societies and French Colonial Authorities in Senegal and Mauritania, 1880-1920* (Athens: Ohio University Press, 2000). More specifically, see: “Part 2: Bases of Accommodation,” 37-117.

The history of energy use during the colonial period is particularly useful because it brings attention to the various ways that Africans adapted to, and used, the infrastructures of the colonial state to their own benefit. By the 1930s, urban merchants, elite marabouts, and peasant farmers established a dynamic network of trade that combined the use of fossil fuels and modern technology with more traditional methods of transportation, and pack animals in particular.⁶ Through the use of railways and dirt roads, trucks and automobiles, and human and animal labor, Africans developed their own networks of cash crop distribution that circumvented the regulatory structures of the colonial state. In response, colonial officials attempted to tighten their grip on agricultural production by restricting access to new lands, implementing new regulations on trucks and motor vehicles, and blaming peanut cultivators for deforestation and soil erosion. By associating the expansion of cash crop production with forest decline and soil erosion, the French used narratives of environmental decline as a mechanism to consolidate the organic economy, and the energy produced from it, under the authority of the colonial state.

Yet, as scholars of Africa's environmental history have shown, colonial interpretations of environmental change frequently produced "misreadings" of the African landscape.⁷ Indeed, these studies convincingly show that Africans were excellent stewards of their environments, and contrary to colonial narratives of decline and scarcity, rural populations typically regenerated forests and

⁶ For a detailed study of the use of pack animals in the colonial period, see: Bernard Moitt, "From Pack Animals to Railways: The Transport and the Expansion of Peanut Production and Trade in Senegal, 1840-1940," *Outre-mers*, tome 88, no. 330-331, (2001): 241-267.

⁷ In their classic study of forests in West Africa, Fairhead and Leach argue that French colonial officers misread the forest-savanna region of Guinée. See: James Fairhead and Melissa Leach, *Misreading the African Landscape, Society and Ecology in a Forest-Savanna Mosaic*, (Cambridge: Cambridge University Press, 1996). The environmental history of Africa is a growing field. For additional studies on environmental decline, see: Andrew F. Clark, "Environmental Decline and Ecological Response in the Upper Senegal Valley, West Africa, From the Late Nineteenth Century to World War I" *The Journal of African History*, Vol. 36 (1995) 198; James McCann, *Green Land, Brown Land, Black Land* (Oxford: James Currey, 1999); William Beinart, "Soil Erosion, Animals, and Pastures over the Longer Term: Environmental Destruction in Southern Africa," in *The Lie of the Land*, edited by Melissa Leach and R. Mearns (Cambridge, Oxford Univ. Press 1996) 31; William Beinart and Joann McGregor J. eds (*Social History and African Environments*. Ohio University Press, Athens, OH: 2003); Ribot, "A History."

farmlands rather than destroying them.⁸ This chapter, however, is less concerned with whether there was measurable environmental decline or regeneration, but rather, it demonstrates how narratives of resource scarcity prompted colonial officials to develop new strategies to regulate and control local environments. In other words, whether they were warranted or not, colonial fears of environmental decline and deforestation introduced new means of control that attempted to place Senegal's diverse environments—and the organic energy sources they produced—under the jurisdiction of the colonial state.

In general, studies of the colonial state in Senegal have produced different interpretations of how Europeans consolidated and exercised power. Some historians interpret colonial rule in Senegal as a clear break from the precolonial past, in which precolonial structures abruptly ended with the defeat and capitulation of the Wolof kingdoms in the 1880s and 1890s. These studies tend to examine colonial history in Senegal through the lens of French colonial politics, and they often overlook the enduring legacies of the precolonial period.⁹ In a similar vein, some regard the French colonial state as coercive. Through studies of the colonial conquest, French colonial law, and forced labor, these scholars stress the violent nature of colonial rule.¹⁰ Others, however, have been more attuned to the various ways that precolonial structures shaped the context of state-making in the colonial period. In examining the social and cultural structures of the Senegal Valley, these scholars

⁸ Fairhead and Leach, *Misreadings*, 3.

⁹ For scholarship on French colonial politics in the Four Communes, see: Mamadou Diouf, "Assimilation coloniale et identités religieuses de la civilité des originaires des Quatre Communes (Sénégal)," *Canadien Journal of African Studies*, 34 (1999), 565-587; C. Coquery-Vidrovitch, "Nationalité et citonnété en Afrique Occidentale Française: originaires et citoyens dans le Sénégal colonial," *Journal of African History*, 42 (2001), 285-305; Gary Wilder, *The French Imperial Nation-state: Negritude and Colonial Humanism Between the Two World Wars* (Chicago: University of Chicago Press, 2005); For a study of French colonial policy, see: Alice Conklin, *A Mission to Civilize: The Republican Idea of Empire in France and West Africa, 1895-1930* (Palo Alto: Stanford University Press, 1997); Emmanuelle Saada, "La République des indigènes," in V. Duclert and C. Prochasson (eds.) *Dictionnaire Critique de la République* (Paris, 2002), 364-70.

¹⁰ For studies of the coercive nature of colonial rule in Senegal, see: Babacar Fall and Mohamed Mbodj, "Forced Labour and Migration in Senegal," in *Forced Labour and Migration: Patterns of Movement within Africa*, ed. Abebe Zegeye and Shubi Ishemo (London: Hans Zell Publishers, 1989), 255-269; Gregory Mann, "What was the 'Indigénat'? The 'Empire of Law' in French West Africa," *The Journal of African History*, Vol. 50, No. 3 (2009), 353;

show how traders, merchants, and religious elites adapted precolonial institutions and structures—and agriculture and cash crop production in particular—to accommodate colonial rule.¹¹

Few historians, however, have examined the role of energy in processes of colonial state-making. While technological advancements, from trains and trucks to telegraphs and modern weapons, enabled European colonizers to establish and maintain authority, historians have overlooked the various ways that Europeans fueled the infrastructures of colonial rule.¹² This study, then, contributes to this scholarship by demonstrating how energy and its use constituted a key component in the extension of colonial power. Through the use of fossil fuels, the French built an energy infrastructure to facilitate the flow of cash crops from the interior to the coast. The development of this infrastructure, then, underpinned French colonial authority and made the export economy possible.

However, as Africans began to use the energy infrastructures of the colonial state, they created a vibrant network of trade and accumulated wealth by expanding cash crop production. Although the French tried to maintain their “hegemony on a shoestring” by regulating the use of fossil fuels and rationalizing the exploitation of forests and farmlands, the colonial state ultimately failed to consolidate power over the material base of the organic economy.¹³ Over time, the

¹¹ For studies on the enduring social and political structures of Senegalese society, see: Jean Copans, *Les Marabouts de l'arachide: la confrérie mouride et les paysans du Sénégal* (Paris: L'Harmattan, 1989); Babacar Fall, *Le travail au Sénégal au XXe siècle*. Paris: Éditions Karthala, 2011); Momar Coumba Diop, ed, *Senegal: Essays in Statecraft* (Dakar: Codesria, 1993). Donal Cruise O'Brien, Momar-Coumba, Diop Mamadou Diouf, *La Construction de l'état au Sénégal* (Paris: Karthala, 2002). Donal Cruise O'Brien, *The Mourides of Senegal: The Political and Economic Organization of an Islamic Brotherhood* (Oxford: Oxford University Press, 1971). Cheikh Anta Babou, *Fighting the Greater Jihad: Amadou Bamba and the Founding of the Muridiyya of Senegal, 1853-1913* (Athens, OH: Ohio University Press, 2007); Robinson, *Paths*.

¹² Daniel Headrick, *The Tools of Empire: Technology and European Imperialism in the Nineteenth Century* (Oxford: Oxford University Press, 1981); Michael Adas, *Machines as the Measures of Men: Science, Technology, and Ideologies of Western Dominance* (Ithaca, NY: Cornell University Press, 2015). Daniel Headrick, for example, argues that new technologies provided Europeans with the tools to swiftly conquer and colonize the continent, while Michael Adas similarly contends that new advancements in science and technology not only enabled Europeans to conquer Africa but also to validate their own sense of superiority over Africans.

¹³ Sara Berry, “Hegemony on a Shoestring: Indirect Rule and Access to Agricultural Land,” in *Africa: Journal of the International African Institute*, vol. 62, no. 3, “Rights over Land: Categories and Controversies,” (1992), 327-355. In her study of land use and agriculture in the British colonies in Africa, Berry examines changing patterns of struggles over access to land, as well as the meaning of land rights, during the early colonial period. In doing so, she contends that that

introduction of fossil fuels ultimately expanded the possibilities for colonial subjects to accumulate wealth and compete with the French for control over Senegal's cash crop economy.

The Energy Pathways of the Colonial State

With the official establishment of colonial rule in 1895, the French introduced a new energy infrastructure based on the use of fossil fuels. This system largely operated along the littoral, where French colonial officers, merchants, and expatriates constructed government buildings, urban residences, trading houses, factories, and ports of trade. Although the use of fossil fuels was largely confined to coastal cities, the French constructed fossil fuel powered infrastructure—from railways and roads to imported trucks and automobiles—to expand the production of Senegal's primary cash crop: peanuts. Put simply, the French colonial state used fossil fuels, and coal and petrol in particular, to access and exploit the organic economy of the Senegal Valley.

A Nascent Fossil Fuel Economy

In 1904, Ernest Roume, the Governor General of French West Africa, presented an ambitious plan to construct large-scale infrastructural projects that would transform Saint-Louis and Dakar into bustling commercial centers. After the colonial conquest of Senegal in the 1880s and 1890s, the populations of both Dakar and Saint-Louis increased rapidly. Between 1891 and 1910, Dakar's population tripled from 8,700 residents to 24,914, while Saint-Louis' increased from 15,980 to 22,093.¹⁴ Dakar's population growth was, in large part, due to the completion of the Port of

“colonial administrators’ own economic and political interests often had contradictory implications for their strategies of exploitation and control.” These contradictions over how to regulate access to land and labor weakened British colonial rule and forced them, in part, to exercise control by maintaining “hegemony on a shoestring.” In drawing from this framework, this chapter shows that similar contradictions in French colonial policy existed. Indeed, the French aimed to expand the peanut market but, at the same time, they tried to regulate and control its expansion by limiting access to land and systems of transport.

¹⁴ Johnson, *Black Politics*, 35.

Dakar, which became the major trading port of French West Africa. Since the majority of the colony's exports were shipped from Dakar rather than Saint-Louis, the economic axis of Senegal changed and Dakar became the capital of AOF in 1902. As a result, Dakar experienced a rapid period of urbanization in the early twentieth century that necessitated a wide range of energy resources to sustain its populations and to maintain the development of colonial infrastructure.¹⁵

In order to sustain the growth of its urban centers, the colonial state imported coal and petroleum from the fossil fuel rich nations of Europe and North America.¹⁶ Between 1897 and 1914, the colony of Senegal imported an average of 52,000 metric tons of coal each year. During Ernest Roume's tenure as Governor General, from 1902 to 1907, Senegal's consumption of coal increased from 29,545 to 79,694 tons.¹⁷ Since the metropole possessed few coal mines, which were located along France's northeastern border with Belgium, the majority of coal in Senegal came from Great Britain and, primarily, the United States. In 1907, for example, the colony imported 81,294 tons of coal, of which only 2,220 came from the metropole while the remaining 79,704 tons came from America.¹⁸

Although coal imports increased in Senegal during the 1900s, the colonial state was unable to satisfy the growing energy demands of the colony. In 1907, for example, Senegal imported enough coal to provide the Senegalese population with .067 tons per head of population.¹⁹ By comparison,

¹⁵For a more comprehensive discussion of Roume's infrastructural projects and their relationship to the civilizing mission, see: Alice Conklin, *A Mission*, 1-20.

¹⁶ Candice Goucher, "Iron is Iron 'Til it is Rust: Trade and Ecology in the Decline of West African Iron-Smelting," *The Journal of African History*, Vol. 22, No. 2 (1981), 181. Also see: R.J. Harrison Church, *West Africa: A Study of the Environment and Man's Use of It* (London, 1963), 143-144. Coal, in particular, was relatively scarce in West Africa with the majority of reserves in present day Nigeria and Niger. The deposits, which are around 150 million tons, are relatively small in size and could yield enough energy to power an industrialized nation in the early twentieth century, such as France, for three years before they would be completely exhausted. Furthermore, France consumed nearly 50 million tons of coal each year in the early 1900s, thus West Africa's coal reserves would have been exhausted within three years.

¹⁷ Institut National de la Statistique et des Etudes Economiques, *Annuaire Statistique de la France* (Paris: Imprimerie Nationale, 1907), 260.

¹⁸ Ibid, 260.

¹⁹ Senegal's population in 1903 was approximately 1.2 million people. This is a rough estimate, as the colonial state faced tremendous difficulties in gathering an accurate census of the population.

in France, where coal consumption reached 50.3 million tons in 1907, the French used 1.28 tons of coal per head of population.²⁰ For Senegal to achieve a similar level of coal consumption, then, the colonial state would have needed to import at least 1.6 million tons of coal per year. In addition to the limited amount of coal available for the colony, it was exceedingly expensive. From 1907 to 1909, the colonial state paid an average of 30 francs for one ton of coal. By the start of World War One, however, the price of coal soared to 45 francs per ton and by the end of 1915, when the Germans occupied the coal basins of northeastern France and Belgium, it jumped to 117 francs per ton. Although the French looked to their allies to provide both the metropole and the colonies with coal, shipments from Britain and the United States were not only inconsistent during wartime but vulnerable to German submarine attacks.²¹

Coal consumption was also a privilege, and the energy it produced was not equally distributed throughout the colony. In general, the colonial state used the majority of coal to provide French neighborhoods, colonial administrative buildings, and privately owned factories with electricity. With a collective population of 60,770 people in the early 1900s, the Four Communes of Senegal—Dakar, Rufisque, Gorée, and Saint-Louis—were the largest consumers of coal with an average consumption of .85 tons per head of population.²² The first town in Senegal to establish a functioning electrical grid was Rufisque (1887), then Saint-Louis (1889), and eventually Dakar and Gorée (1904). In response to the growing demand for electricity, the Governor General partnered with a private investor, André de Traz, who helped finance the *Compagnie d'électricité du Sénégal* (CES). In 1909, the CES developed an official contract with the colonial government and, by 1910, redesigned Dakar's electrical plant to produce 6,600 volts through three steam powered electro-

²⁰ Frank Moore Colby, editor, *A Compendium of the World's Progress for the Year 1907* (New York: Dodd, Mead, and Company, 1908), 281.

²¹ Céline Ardurat, "L'électrification du Sénégal de la fin du XIXe siècle à la Seconde Guerre mondiale," in *Outre-Mer*, tome 89, no. 334-335 (1er semestre 2002).

²² Ardurat, 445.

generators.²³ With more capacity, colonial officials further developed Dakar's electrical grid by installing more street lamps in the city center, extending electrical lines to the port, and replacing the oil lamps of the light house with electricity.²⁴

Aside from powering administrative and residential buildings with electricity, the main purpose for colonial electrical plants was to pump potable water to urban populations. In 1898, the French constructed a water station in Hann, a small village situated six kilometers from Dakar, to provide the capital with potable water. Between 1900 and 1904, the French expanded the station to increase the volume of water pumped to the colonial capital. The expansion included the installation of two steam engines that could pump approximately 100 cubic meters of water per twenty-four hours.²⁵ From the station, the water flowed through 250mm pipes and crossed nearly ten kilometers of land where it emptied into forty public fountains and sixty watering holes.²⁶ By 1907, however, the population of Dakar exceeded the water station's capacity and the colonial state drafted new plans for another water station closer to Dakar. In order to expand water distribution, the colonial state also needed a more robust electrical plant that could sustain a constant flow of water from the water stations to public fountains and private residences.

Although the availability of fossil fuels decreased throughout World War One, the CES continued to intensify the production of electricity after the war. Between 1923 and 1930, the electrical plant at Hann increased its capacity from 840,000 kWh to 3,540,000 kWh. The rise in the consumption of energy was, in large part, due to a growing population and the development of new energy intense industries. With the increase of peanut production in the interior, French merchants, mostly from Bordeaux, constructed large oil refineries in the periphery of Dakar. To power these

²³ Ardurat, 445.

²⁴ ANOM, 1 P 223. Also see: Ardurat, "L'électrification," 445.

²⁵ ANS, 1 P 225, "Réalisées dans le Perimetre de notre Concession," 1919; also referenced in Ardurat, 444.

²⁶ Ardurat, 444.

refineries, merchants petitioned the colonial state to expand the capacity of its electrical grid. In addition to peanut oil refineries, the Hann electrical plant extended the grid to ice-making factories, which produced seven tons of ice and used approximately 3,730 kWh per day.²⁷ In order to meet the growing demand for electricity, the colonial state constructed five additional steam turbines with a capacity to produce 350, 500, 625, and two turbines at 1250 kWh.²⁸ This, in turn, meant that villages and cities on the periphery of Dakar were able to plug into the electrical grid, which enabled Rufisque, Thiès, and Kaolack to pump water to public fountains and buildings and to provide local industries with electricity.

In 1929, the CES became the *Compagnie des eaux et électricité de l'Ouest Africain* and oversaw the development of electricity in Dakar, Rufisque, Thiès, Saint-Louis, and Kaolack. Initially, the French hoped to establish a large enough electrical grid to provide electricity to all urban residents. Yet, due to a lack of resources, funding, and competent personnel, the majority of electricity was funneled to warehouses, factories, and administrative and public buildings.²⁹ Moreover, colonial officials did not include African neighborhoods in their electrical grids. In Dakar, for example, colonial authorities modeled the capital of AOF after a modern European city, and the straw huts of Lebu and Wolof residents on the Cap Vert peninsula did not fit within this paradigm. Thus, electricity was reserved for expatriate residents of Dakar who occupied the *Plateau*, a French neighborhood that housed colonial officials, merchants, and *originaires*. Located on an elevated plateau on the Cap Vert peninsula, the French often referred to the *Plateau* as the “European village” or the “white city,” as it features the wide boulevards, cafés, and bakeries of the metropole.³⁰

²⁷ Ardurat, 451.

²⁸ Ibid.

²⁹ ANS, 1 P 225, “Réalisées dans le Périmètre de notre Concession,” 1919. A similar reference can be found here: Liora Bigon, *A History of Urban Planning in Two West African Colonial Capitals: Residential Segregation in British Lagos and French Dakar, 1850-1930* (New York: The Edwin Mellon Press, 2009), 228-230.

³⁰ Ibid.

Despite the energy and resources used to develop Dakar, only nine percent of the city's population, which was predominantly French, lived in the *Plateau* and had access to electricity and the amenities of "modern" European life.³¹ The disparity between the French and African neighborhoods, such as the *Medina*, a Wolof and Lebu commune two kilometers from the *Plateau*, was frequently recorded by visitors to the colonial capital. In one account of early colonial Dakar, a Nigerian expatriate from Lagos noted that "one must leave the busy quays, the 'palace', with its cool and stately interior, and even the gorgeous views from the terraces and cafés" and "walk or drive through the native town, two or three kilometers away."³² In the "native" villages, he observed, there were "mile upon mile of compounds" with thatched huts "often covered with creepers resembling a vegetable narrow in the leaf."³³ Thus, the stark differences in neighborhoods, from Parisian style boulevards of the *Plateau* to the thatched huts and compounds of the *Medina*, portray two different energy economies within the same cityscape: a nascent fossil fuel economy supported by coal imports from abroad, and the organic economy buttressed by local agricultural production and labor.

Accessing the Organic Economy: Trains, Peanuts, and the Murid Brotherhood

Completed in 1885, the Dakar-Saint-Louis railway was the first rail line in West Africa. Often referred to as the "peanut railway," the French constructed the railroad through the Peanut Basin of the Senegal Valley, hoping that it would open the colony's peanut industry to the world market. Through the construction and gradual expansion of railways in Senegal, the colonial state attempted to funnel the colony's organic sources of energy to the factories, blast furnaces, and trading house of coastal urban centers.

³¹ Bigon, *A History of Urban Planning*, 230.

³² E.D. Morel, *The Nigerian Chronicle*, 24 February 1911; Also cited in Bigon, *A History of Urban Planning*, 230.

³³ Bigon, 230.

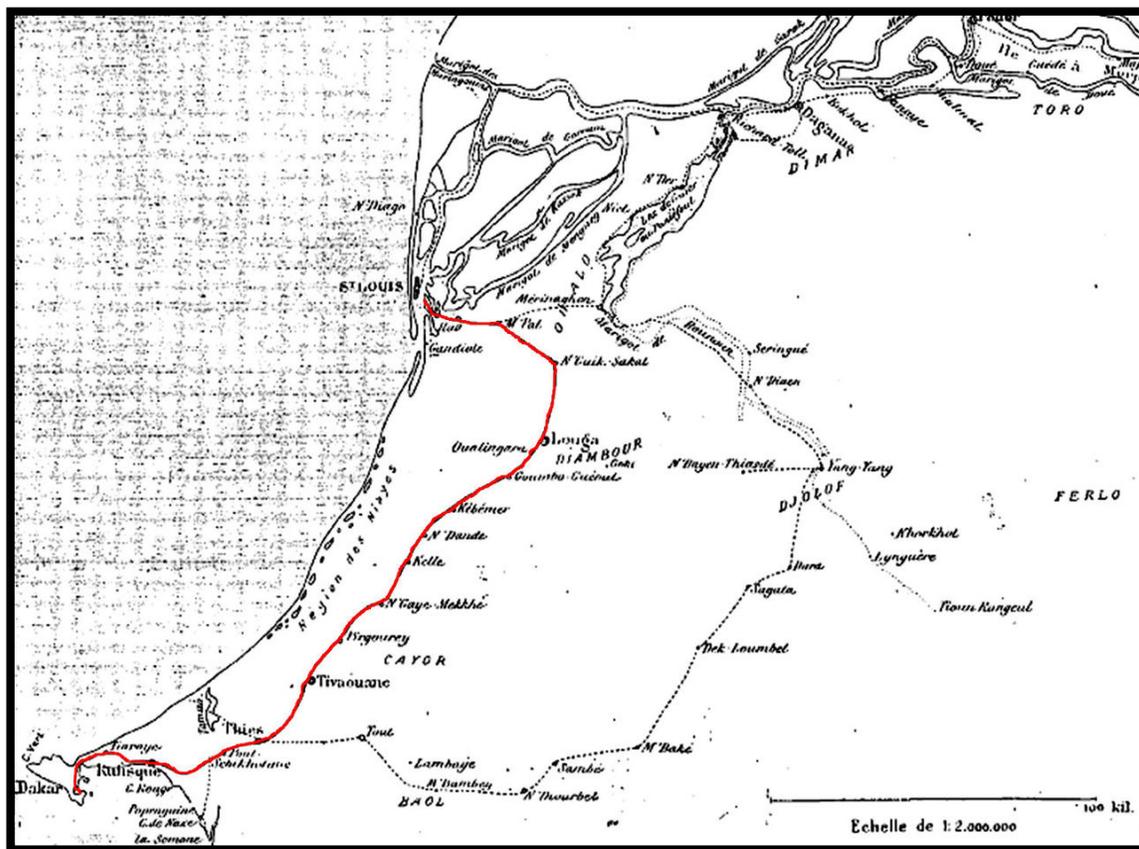


Figure 9: Dakar-Saint-Louis Railway, Circa 1901. *La Géographie*, tome IV, 15 juillet 1901.

In its first twenty years of operation, the railroad transported approximately seventy percent of Senegal’s peanut exports and attracted migrant workers and peasant farmers to the region.³⁴ From the small village of Ganjool in the north to the emerging city of Thiès in the south, land-seeking peasants and French commercial interests moved to areas along the railway. More specifically, the colonial state sold hundreds of plots of land, ranging from 1,250 to 2,500 square meters, to European trading houses in Saint-Louis and Dakar.³⁵ In a report from 1889, one colonial official observed that merchants from prominent European commercial firms arrived “en masse around railway stations with an eye on the next peanut crop” and, as a result, they benefitted “considerably from the facilities made possible by the administration.”³⁶ As commercial activity increased along the

³⁴ Moitt, “From Pack Animals to Railways,” 253.

³⁵ ANS 2 B 64; A similar reference can be found in: Moitt, “From Pack Animals to Railways,” 253.

³⁶ ANS 2 G 10. Also quoted in Moitt, *Peanut Production and Social Change*, 181.

railways, some commercial centers became the focal point of the peanut trade. In the late 1890s, French officials recorded that caravans of peasants and merchants arrived in Thiès, a town just 70 kilometers from Dakar. Settling along the railway and in the hinterlands of Thiès, peasant farmers dramatically increased the production of peanuts in the region. According to one report, peanut production expanded so rapidly that the colonial state operated special “peanut trains” that travelled back and forth between Thiès and Dakar, sometimes numbering six to seven trips per day.³⁷

Between 1885 and 1910, the Dakar-Saint-Louis railway contributed to a remarkable expansion in peanut exports from Senegal, which climbed from 45,000 to 227,000 tons. Due to its overwhelming success, French colonial administrators were eager to expand rail transportation further into the interior. In 1904, the Governor General of French West Africa, Ernest Roume, spearheaded a large-scale public works campaign to provide Senegal with modern infrastructure.³⁸ For Roume, the transformative power of railroads was “the indispensable first step in a country’s development in the modern world,” and that “no material or moral progress is possible in our African colonies without railroads.”³⁹ To be sure, from the acceleration of commercial exchanges to the development of agricultural production, he was convinced that the establishment of a network of railways would transform French West Africa into a “modern” and “civilized” society.⁴⁰

From 1906 to 1924, the French colonial state constructed a new railway linking Thiès to Kayes, a bustling town in present day Mali. Prior to the construction of the railway, prominent

³⁷ ANS 2 G 1, Dakar-Thiès. Also quoted in Moitt, “Pack Animals to Railways,” 254.

³⁸ French West Africa, or l’Afrique Occidentale Française, was officially established as a colony in 1895. Initially, Saint-Louis served as the capital of French West Africa from 1895-1902. In 1902, however, Ernest Roume moved the capital to Dakar, as its geographical location and natural port made it a more suitable location for the capital of the colony. In particular, the combination of the Dakar-Saint-Louis railroad and the port of Dakar attracted significant commerce and sparked a period of rapid urban growth.

³⁹ Conklin, *A Mission to Civilize*, 53.

⁴⁰ *Ibid*, 53.

**PEANUT EXPORTS IN COLONIAL SENEGAL
(SELECTED YEARS, 1905-1934)**

Year	Peanut Exports in Tons
1905	96,174
1910	227,300
1914	280,000
1917	175,240
1920	286,000
1921	346,742
1922	331,000
1923	350,000
1929	406,666
1930	508,195
1931	456,000
1933	391,384
1934	541,281

Figure 10: Peanut exports from Senegal, 1905-1934. Moitt, "Peanut Production and Social Change," 269.

French traders and commercial firms, mostly from Bordeaux, established trading centers and peanut farms east of Thiès, and most notably in Diourbel and Bambey.⁴¹

The construction of the new rail line also attracted peasant farmers, migrant workers, and marabouts from the Murid Brotherhood looking to expand peanut production in the interior. As the rail line extended south and east, from Thiès to Kaolack and then to Tambacounda, local populations staked claim to lands that were either adjacent to the railway or within a short distance. Indeed, the construction of the Thiès-Kayes line sparked a decades long boom in peanut production, and by 1930, peanut exports from Senegal climbed to 508,195 tons.⁴²

⁴¹ The most powerful commercial firms were Maurel et Prom, Maurel Frères, and Pascal et Buhon. For more information, see: Leland Conley Barrows, "The Merchants and General Faidherbe: Aspects of French Expansion in Senegal in the 1850s," in *Outre-Mers*, vol. 223 (1974), 236-283.

⁴² Moitt, "From Pack Animals to Railways," 245.



Figure 11: Thiès-Kayes Railway, Pechristener, 2017.

Railways and the Sociétés de Prevoyances

While the rapid growth of peanut production was, in large part, due to the religious elites, urban merchants, and peasant farmers who capitalized on the newly constructed railways, the colonial state attempted to invigorate the groundnut market through a variety of agricultural policies and strategies. In 1912, Joseph Clozel, the Governor General of A.O.F., claimed that there were only “two ways of intensifying production: to increase the extent of land cultivated with peanuts and to increase the selection of suitable crops.”⁴³ With the extension of the railway, the colonial state could “create news zones of cultivation” and introduce peanut farming to new populations. Furthermore, at each railway station he hoped to establish small factories to treat and shell the peanuts, which would increase the volume of peanuts by stripping away the shell. This, in turn, would benefit the buyer of the peanuts since he would “reduce transportation costs and increase the

⁴³ ANS, 1 R 18, Joseph Clozel, “Rapport Générale,” 1912, 13.

value of the product purchased.”⁴⁴ For cultivators who possessed and exploited lands within walking distance of the railway stations, Clozel wanted to distribute small shelling machines that would “permit them to harvest and shell the grains on the spot.”⁴⁵ These machines, he claimed, could be “easily distributed as long as we choose robust models that are light in weight, easy to repair, and come with stocks of spare parts” to replace those that “deteriorate or wear out.”⁴⁶ Through the extension of railways and the distribution of “modern” technology, then, the French hoped to invigorate peanut production by connecting the interior to the coast and transforming African households into individual peanut refineries.

These ambitious plans to increase grain and groundnut production, however, relied heavily on the establishment of the *Sociétés de Prévoyance*.⁴⁷ Adapted from the colonial administration of North Africa, and Algeria in particular, the *sociétés* were designed to operate as communal granaries and to encourage cash cropping.⁴⁸ In doing so, the French provided loans of seeds and capital to farmers at reduced rates, which encouraged cash savings and deterred colonial subjects from taking loans from unreliable commercial interests.⁴⁹ In distributing seeds, which were carefully selected by agents in the *Service d'agriculture* for specific climatic and ecological conditions, the *sociétés* were intended to serve as grain reserves during periods of drought and crop failures. Furthermore, the *sociétés* were also meant to train and teach farmers how to select proper seeds, enrich their lands through different strategies of fertilization and shifting cultivation, and cultivate cash crops.

Established in 1907, the first *sociétés* were placed in the southern region of the Peanut Basin in the regions of Bawol and Sine-Saloum. One of the initial aims of the *sociétés*, according to Jean

⁴⁴ ANS, 1 R 18, Joseph Clozel, “Rapport Générale,” 1912, 13.

⁴⁵ Ibid.

⁴⁶ Ibid, 14.

⁴⁷ For an excellent overview of the *Société de Prévoyance*, see: Gregory Mann and Jane Guyer, “Imposing A Guide on the Indegène, The Fifty-Year Experience of the Société de Prévoyance,” in Endre Stiansen and Jane Guyer, *Credit, Currencies, and Culture: African Financial Institutions in Historical Perspective* (Nordic Africa Institute, 1999) 124-152.

⁴⁸ Mann and Guyer, “Imposing,” 124-132.

⁴⁹ 2 G 10, Jean Adam, “Rapport d'agricole,” 1912, 118.

Adam, an officer in the *Service d'agriculture*, was to establish a robust cash crop economy by addressing the “imperfect methods of soil exploitation adopted by the natives,” which, he argued, were the direct consequence of “their temperament, their morals, and their general way of life.”⁵⁰ As such, Adam believed that the “natives” were the primary reason for inconsistent peanut harvests as well as the unreliable production of staple grains, most notably “sorghum and millet.” Although Adam believed that the “native cultivator, by his apathy and his laziness, was a detrimental factor of production,” he also noted that peasant farmers were “perfectible” and despite “all of the disillusionments and all of the hesitations of this nature,” the “smallest progress obtained can have important results in the future of the colony.”⁵¹ The *Sociétés de Prévoyances*, therefore, served as an extension of the colonial state in the interior. In establishing *sociétés* throughout the Peanut Basin, the French hoped to invigorate cash crop production while monitoring, and improving, how peasant farmers exploited their lands.

To increase both peanut and grain cultivation, Adam urged the Governor General to construct several *sociétés* within reach of the railways, which, he argued, would enable the French to provide local peanut producers with the “foresight, relief, and finances to expand cultivation.”⁵² In June of 1910, the colonial state implemented a decree to expand the *sociétés* to provide farmers with seeds and more effective methods to cultivate and harvest peanuts. According to Adam, the most critical aspect of this training was “seed selection” and constructing “seed reserves” for years of drought and scarcity. This process, he claimed, would not only be useful for peanut cultivation, but also for the expansion of staple grains. By providing peasants with drought resistant seeds, local

⁵⁰ 2 G 10, Jean Adam, “Rapport d'agricole,” 1912, 35.

⁵¹ *Ibid*, 36.

⁵² *Ibid*, 18.

farmers and households could endure lean years and prepare for locust plagues that frequently disrupted harvests.⁵³

Once the *sociétés* distributed grain and peanut seeds to peasant communities, farmers were then expected to reimburse the *société* after the harvest. In this way, peasants could turn to the *sociétés* to procure seeds during periods of drought and scarcity and, once the rains returned, could harvest their crops and repay their debts. In addition to financial assistance, the colonial state hoped that *sociétés* would reconfigure the way that rural populations exploited their lands. According to Jean Adam, the *sociétés* “allow the native to replace his hoe with harnessed instruments, the superiority of which will be recognized (by the farmers) in a certain way.” Over time, he averred, “the native will arrive at completely modifying his primitive methods of cultivation” and will “even use high-priced equipment, transported to him by the railways, such as threshing machines and oil presses.” The creation of the *sociétés*, then, “will be the surest foundation of any progress among the agricultural populations of Africa.”⁵⁴ Through their attempts to stimulate cash crop production, the *sociétés* hoped to transform the “natives” from traditional peasant farmers into “modern,” industrious agricultural workers.

By 1934, there were a total of 102 *sociétés* in French West Africa and 15 in the colony of Senegal alone.⁵⁵ In its first twenty years of operation, the *sociétés* expanded from a number of grain reserves to open markets where farmers could find new seeds, tools, sieves, animals, and other types of food staples, such as cassava and rice. In general, the *sociétés* were financed by both the *sociétés* members and the state. Each member of the *sociétés* paid one franc per year for membership, and the colonial state allocated several millions of francs per year—227 million in 1934, for example—to

⁵³ 2 G 10, Jean Adam, “Rapport d’agricole,” 18.

⁵⁴ Ibid.

⁵⁵ Mann and Guyer, “Imposing A Guide,” 118.

stimulate rural economies.⁵⁶ Since the main purpose of the *sociétés* was to store seeds, and distribute them as a type of loan to peasant farmers, French colonial officials were constantly concerned with recovering the capital used to finance the *sociétés*. As such, farmers were required to reimburse the *sociétés* the amount they borrowed as well as 25 percent of that total.

Although the initial purpose of the *société de prévoyance* was to protect and sustain peanut cultivation, one of its primary roles was to loan rural communities stockpiles of millet. This, in turn, had profound consequences because it encouraged peasants to abandon millet production. Since they could purchase their millet from the *sociétés*, farmers decided to replace their millet fields with groundnuts. While, in the short term, this might increase peanut production and provide peasant communities with more disposable income, during periods of scarcity when grain prices were high and peanut prices were low peasants often tumbled into irrecoverable debt.⁵⁷

Despite French efforts to expand peanut cultivation into new territories, the rapid growth of the industry was a cause of grave concern for those in the *Service d'agriculture*. The growth of the peanut industry, they urged, was a threat to the production of staple grains and other food crops.⁵⁸ In one report, an officer in the *Service d'agriculture* complained that “the natives often neglect food crops, particularly millet, and concentrate solely on peanut cultivation.” The peasants, he feared, extended “peanut fields as much as possible to the detriment of millet fields and, in this, there is much danger.”⁵⁹ Even though growing and selling peanuts provided peasant populations with an opportunity to accumulate wealth, Jean Adam, in a similar report in 1912, stated that “it matters little that the native produces a great quantity of peanuts” because the prices of staple grains “are now

⁵⁶ Mann and Guyer, “Imposing A Guide,” 118.

⁵⁷ Auguste Chevalier, “Monographie de l'arachide,” in *Revue de botanique appliquée et d'agriculture coloniale*, 16e année, bulletin n°181-182 (Septembre-octobre, 1936), 673-837.

⁵⁸ Moitt, “Peanut Production and Social Change in the Dakar Hinterland: Kajoor and Bawol, 1840-1940” (PhD Dissertation, University of Toronto, 1985), 272.

⁵⁹ ANS 2 G 12 “Rapport d'agricole,” 1912; There is a similar reference in Moitt, see: Moitt, “Peanut Production and Social Change,” 273.

being sold at a rate they are unable to afford.” In replacing millet fields with peanut fields, Adam believed that peanut cultivators “will become indebted year after year” and “the day will come when this will be the most profound destitution of all.”⁶⁰ Put simply, while cash crops served as the lifeblood of the colony, French officers in the *Service d’agriculture* worried that peanut production would gradually undermine other sectors of the organic economy, and food production in particular.

Ultimately, Adam’s fears were validated as an extended period of drought increased prices in grain staples from 1910 to 1914.⁶¹ At the start of 1911, peanuts were priced at 25 francs per 100kg and millet was being sold for 20 francs per 100kg. By the end of that year, however, the prices of peanuts fell to 17.15 francs and the price of millet rose to 35 francs. Indeed, the volatility of the prices in both peanuts and millet underscores the precarious position of peanut cultivators in the colony, and especially during periods of grain shortages and scarcities.⁶² Yet, while Adam’s prescient agricultural forecast for the colony was ultimately substantiated by rising grain prices, he also underestimated local agricultural producers. Almost immediately, peasant farmers responded to grain shortages and inflated prices by decreasing peanut cultivation and dedicating their time and energy to millet and sorghum production. In 1915, one colonial administrator noted that the millet harvest in Bawol “was a record 85,000 tons compared to the 65,000 of a normal year.”⁶³ Millet production, according to one report, provided “the natives with food in a way that they have not been able to in two years.”⁶⁴ In this way, peasant farmers—without the help and guidance of the colonial state’s *Sociétés de Prévoyances*—responded to climatic and ecological change by shifting priorities from cash crops to staple grains.

⁶⁰ ANS 2 G 13, “Rapport d’agricole,” 1913.

⁶¹ For a more detailed study on drought in this period, see: Andrew Clark, “Environmental Decline and Ecological Response in the Upper Senegal River Valley, West Africa, From the Late Nineteenth Century to World War I.” *The Journal of African History*, Vol. 36, (1995): 197-218.

⁶² *Ibid*, 290.

⁶³ Moitt, “Peanut Production and Social Change,” 294.

⁶⁴ ANS 2 G 13.

While the purpose of the *sociétés* was to invigorate groundnut production by connecting rural communities to the railways, or energy pathways, and offering support to peasant farmers and their households, they had a detrimental long-term effect on local communities. Indeed, attempts to invigorate peanut production by providing seeds and loans to peasant farmers often left local populations worse off than they were before. Rather than empowering rural households through increased cash crop production, the *sociétés* saddled them with debt, made them more vulnerable to droughts, and undermined their ability to respond to abrupt changes in the peanut market.⁶⁵ For peasants who faced mounting debt and growing food insecurity, a viable and stable alternative to the *sociétés* was to migrate to regions of the Peanut Basin cultivated by the Murids. As will be shown, Murids were not only successful peanut producers but were also careful to produce and stockpile reserves of staple grains.

Railways and the Murid Brotherhood

The rapid growth of the peanut industry was, in large part, due to a group of influential Islamic marabouts, and Amadou Bamba in particular, who expanded peanut cultivation into new territories serviced by the Thiès-Kayes railway. By settling the lands adjacent to the railway, often referred to as the “Terre Neuve,” the Murid Brotherhood inhabited a fertile and uncultivated region that was directly connected to coastal urban centers. In using the colonial state’s energy pathways to their advantage, the Murids consolidated control over fertile lands in the interior by developing an effective system of agrarian energy systems based on a hierarchical structure of labor and land use.

⁶⁵ Mohamed Mbodj, “The Politics of Independence: 1960-1986” in *The Political Economy of Senegal Under Structural Adjustment* ed. Christopher L. Delgado and Sidi Jammeh (New York: Praeger, 1988), 119-20. Mbodj argues briefly that the *société* ultimately served as a form of exploitation by the state, and then only to be replicated through the cooperative system of the postcolonial state.

In general, the Murids expanded peanut production by transforming Quranic schools, known as *daara*, into prolific producers of cash crops and grains. In general, former slaves and peasants entered the *daara* and worked in the service of a marabout for several years until they were eventually granted land of their own. The marabouts, in turn, paid tribute to the brotherhood with their earnings from the *daara* and then traded the remainder of the harvest to merchant houses in Dakar and Saint-Louis. This new agrarian energy system brought fertile lands and wealth to the Murid brotherhood while also supplying colonial authorities with peanut harvests.⁶⁶

Since the *daara* focused primarily on agriculture, the abundance of millet, peanuts, and other food staples attracted former slaves and peasants who, after embracing the brotherhood, would have little fear of going hungry or providing their households with food.⁶⁷ Although there was a hierarchy within the brotherhood, peasants could ascend its ranks by entering the *daara* system and possibly achieving the status of a marabout. To enter the *daara*, the disciples, or *talibé*, were required to submit themselves completely to the marabout. Each *daara* consisted of roughly ten to fifteen *talibé* and a *janvrigne*, who served as the representative of the marabout. While the *janvrigne* assisted with Quranic education, their primary responsibility was to enforce discipline, assign work, and oversee the *talibé*. In most cases, disciples within the *daara* were illiterate and were not required to engage in

⁶⁶ For more detailed studies of the Murid Brotherhood, see: Paul Marty, *Études sur l'Islam au Sénégal*, (Paris: Hachette Livre-BNF, 2013); Robinson, *Paths*; Babou, *Fighting*; Donal Cruise O'Brien, *The Mourides of Senegal: The Political and Economic Organization of an Islamic Brotherhood* (Oxford: Oxford University Press, 1971); James Searing, *God Alone*. For some scholars, the *daara* served as an extension of agricultural slavery from the precolonial period to the colonial period. In place of slavery, the *daara* enabled powerful and influential marabouts to consolidate large labor forces of former *ceddo* warriors, agricultural slaves, and peasants. Since *daara* is also the Wolof word for Quranic schools, some historians, and Donal Cruise O'Brien in particular, argue that marabouts used its religious connotation as a way to legitimize their exploitation of cheap labor and fertile land. For others, and Searing more specifically, the *daara* was, in fact, a type of religious institution that reflected the central ethos of the Murid Brotherhood—that an education based on work, discipline, and obedience to religious authorities paved the way for a pious and moral life. For these scholars, then, the *daara* was not meant to serve as a replacement for slavery but rather as a way to practice Islam and to pursue a life of religious piety and discipline. And still others, and Cheikh Anta Babou in particular, argue that the *daara* served as a mutually beneficial institution for both the Murids and the French. In this way, the expansion of cash crop production, combined with Murid Islam, enabled peasants and former slaves to improve their socio-economic status while also benefitting the French colonial economy.

⁶⁷ Babou, *Fighting*, 108.

Quranic education. Instead, the *talibé* performed manual labor, typically in the millet and peanut fields, and were often encouraged to beg for alms and tend to the compound. Since very few *talibé* could read or write, the hardships of manual labor and begging was considered a form of spiritual education.⁶⁸ Once the *talibé* completed their training, the marabout provided them with a plot of land and assisted his disciples in finding a wife and starting a family. For some, the expansion into new territories provided them with the opportunity to establish their own *daara* and to achieve the status of marabout. Although most *talibé* did not become marabouts, the possibility of upward mobility, the stability of life within the *daara*, and the future prospect of procuring land attracted vulnerable populations throughout the early colonial period.

In the early part of the twentieth century, large populations of peasants, former slaves, and *navétanes* (migrant laborers) migrated to the Senegal Valley in search of work and land.⁶⁹ The migration, which was part of a larger “slave exodus” from the French Soudan starting in 1905, also coincided with both the French abolition of slavery in AOF and the construction of the Thiès-Kayes railway.⁷⁰ The decline of slavery in Senegal, along with the mass departure of slaves from the Niger Valley, generated a large labor force eager to work and settle uncultivated lands. As such, the *daara* not only offered peasant communities the opportunity to work and possibly acquire land of their own, it also centralized the production of organic energy sources—peanuts, staple grains, and labor—under the auspices of religious elites.⁷¹

⁶⁸ For a good analysis of the *daara*, see Babou, *Fighting*, 105-108.

⁶⁹ For more detailed information on the process of emancipation in AOF, see: George Poulet, *Enquête Sur La Captivité en A.O.F* in Lovejoy and A.S. Kanya-Forstner, eds., *Slavery and its Abolition in French West Africa* (Madison; University of Wisconsin, 1994). Moreover, the French also recognized that the immediate emancipation of slaves would have significant social and economic consequences, especially within the Old Peanut Basin. In Kajoor and Bawol, the French feared that freed slaves would ultimately lead to a decline in peanut production by dropping out of the labor force, turning to crime, or leaving the region altogether.

⁷⁰ Martin Klein and Richard Roberts, “The Banamba Slave Exodus of 1905 and the Decline of Slavery in the Western Sudan.” *Journal of African History* 21 (1980), 275-94.

⁷¹ The practice of slavery did not disappear overnight, since many households concealed their slaves by labeling them as wives, concubines, or children. The *daara* system, therefore, could serve as a mechanism of emancipation. As Searing argues in his study of slavery and liberation in the early colonial period, the Murids offered former slaves a pathway to emancipation that enabled them to break free from a life of dependency. Through the *daara* system, he argues that slaves

By promising vulnerable peasants and former slaves work, food, and access to land, the Murids constructed a vast labor force that brought new territories under their control, as well as considerable amounts of material wealth. For example, Cheikh Ibra Faal, a close disciple of Amadou Bamba and the alleged founder of the *daara*, was better known as an urban elite and successful entrepreneur rather than a cultivator and pious practitioner of Islam. In 1913, colonial officials reported that Faal was a “proprietor thirteen times over,” and that his revenues from agriculture were at least 50,000 francs a year, which did not include the large sum of donations given to him by



Figure 12: Postcard of the railway stations of the Dakar-Niger Railway, circa 1919. Note: All reasonable efforts have been made to find copyright owner.

could accumulate modest amounts of wealth to pay bridewealth, purchase farmland, and have a family. Yet, the road to liberation was not as smooth as Searing suggests. According to Bernard Moitt, the decision to leave the master’s household was a serious one, as slaves had to consider whether liberation was a viable economic alternative. To be sure, access to land and credit was difficult for newly liberated slaves to procure, and remaining in the household of their masters guaranteed access to land and staple grains. Some masters, as Moitt contends, were even willing to provide their slaves with new lands to entice them to stay and work in their household; and, in many cases, masters did not require slaves to pay them a percentage of their annual earnings as in the past. Nevertheless, some former slaves migrated to a *village de liberté*, which were small villages established specifically for slaves, while others joined the Murid brotherhood or sought employment in the urban centers of Dakar, Saint-Louis, and Rufisque. See: Searing, *God Alone*, 195-231; Moitt, “Slavery and Emancipation in Senegal’s Peanut Basin: The Nineteenth and Twentieth Centuries,” *The International Journal of African Historical Studies*, Vol. 22, No. 1 (1989): 40-44.

his disciples.⁷² In a separate report, one colonial administrator in Thiès noted that Faal received 35,000 francs from five marabouts in the *cercle*, and reportedly gifted 50,000 francs to Amadou Bamba in 1913.⁷³ These large sums of money were, in fact, just a sliver of Faal's actual wealth, since each of his over 1,000 disciples provided him with annual "gifts."⁷⁴

In a similar account, Maam Cerno, an elite marabout and Amadou Bamba's brother, expanded his control over fertile land by sending his disciples into uncultivated territories. With the village of Dar Mousti as the hub, Maam Cerno directed his former *talibé*, who had become marabouts themselves, to establish more than fifty satellite communities along the railways in southern Kajoor and Baol.⁷⁵ In this way, each new village fell under the protection of Maam Cerno and all of the major decisions concerning the growth and expansion of the *daara* went through him. This practice of consolidating labor enabled the Murids to accumulate wealth and power by increasing their access to fertile lands, cash crops, and the energy infrastructure of the colonial state.

In a striking resemblance to the precolonial system of tribute payments, Maam Cerno required all of his satellite villages to provide him with a substantial portion of their grain and peanut harvests, which was understood as the annual "gift" to the brotherhood. Indeed, the marabouts collected "hundreds and thousands of francs worth of donations," including "animals, horses, oxen, goats, chickens, eggs" as well as "bags of rice, millet, peanuts, and beans."⁷⁶ While contributions from peasant farmers were not obligatory, marabouts emphasized the importance of providing gifts as a spiritual necessity, and those who failed to do so risked alienation from the brotherhood. Though non-violent, this otherwise coercive practice enabled the marabouts to accumulate wealth

⁷² Searing, *God Alone*, 251.

⁷³ ANS, 13 G 67, "Mémoire: Islam dans le domaine économique." Also referenced in Searing, *God Alone*, 251.

⁷⁴ The figures in this paragraph are taken from Searing, *God Alone*, 251; and ANS 13 G 68, "Fiche de renseignement: Cheikh Ibra Fall," 1912.

⁷⁵ Ibid, 182. Also see Marty, *Études*, 1917.

⁷⁶ Marty, *Études*, 353.

by expanding their territories along the railroads and funneling staple grains and cash crops into the households of the religious elite.

Amadou Bamba also received countless gifts from his disciples, ranging from peanuts and grains to livestock and money, which he stockpiled in his compound in Diourbel, a centrally located trading entrepôt on the Thiès-Kayes line. According to Murid oral traditions, elite marabouts within the brotherhood provided Bamba with lavish gifts, such as camels and ostriches, as well as large portions of their harvests.⁷⁷ In 1912, for instance, Maam Cerno sent Amadou Bamba a gift of 78 grain stores of millet, transported by 100 donkeys, to furnish his new residence at Diourbel. In a separate account of Amadou Bamba's wealth, one French official reported that his compound was at least 100 square meters consisting of several courtyards, a large library and mosque, and hundreds of chests containing money, cloth, and other valuables.⁷⁸

Indeed, the power structure of the Murid Brotherhood, which resembled a pyramid with Amadou Bamba on top and his lieutenants and disciples below, was designed to generate wealth and power for its founding elite. Even though the *daara* system served as a refuge for people escaping slavery and famine, as well as an opportunity for migrant laborers to find work and settle new lands, it also redirected nearly all the material wealth of the Senegal Valley into the hands of a few religious elites. While the marabouts did redistribute some of their wealth by building infrastructure in new villages for their disciples—cement buildings, roads, and wells—the expansion of the *daara* system enabled the marabouts to exploit peasant communities and control the material base of the organic economy.⁷⁹

⁷⁷ Marty, *Études*, 353.

⁷⁸ ANS 2 D 13-14, "Cercle de Thiès, Rapport de tournée de Prempain," August 1903; Also referenced in Searing, *God Alone*, 252.

⁷⁹ Searing, *God Alone*, 253. Searing argues that the Murids provided their disciples with "modern" infrastructure, and electricity in particular, but the colonial archive and evidence drawn from the expansion of electricity does not corroborate this contention. Murids were also not responsible for electrification, which was solely the enterprise of the colonial state. The French extended the electrical grid to towns in the Peanut Basin—namely Thiès and Kaolack—but it

By the late 1920s, the Murid Brotherhood not only used the colonial state's energy pathways to their own advantage, but they also developed their own plans to construct a railway connecting the town of Diourbel with Touba—the final resting place of Amadou Bamba. Prior to his death in 1927, Bamba began the construction of the Great Mosque of Touba, which was the central hub of the Murid Brotherhood. Due to the challenges of transporting heavy materials and equipment to Touba, the Murids lobbied the colonial state to construct a new branch of the railway that would connect the city to the Thiès-Kayes line. In 1929, the colonial state approved the construction with the hope that that the Murids would settle the lands adjacent to the Diourbel-Touba railway and export 15,000 to 20,000 tons of peanuts per year.⁸⁰ Although the French provided the technical expertise for the project, the Murids supplied the labor to build the railway and provided a significant portion of the funding. Influential marabouts, and Ibrahima Fall Madior in particular, recruited 700 *talibé* to clear the land and lay the tracks. For two years, the Murids supplied a rotating labor force of *talibé*, oxen, and horses to complete the job.⁸¹

Almost immediately, the railway proved to be a great success, as peanut production expanded throughout the region and pilgrims traveled to Touba to visit the tomb of Amadou Bamba.⁸² While the Diourbel-Touba railway was a relatively small project, spanning the short distance of forty-six kilometers, it demonstrates the accumulation of the Murid Brotherhood's wealth and power in the Senegal Valley. Put simply, the Murids not only exploited the energy pathways of the colonial state by settling and cultivating lands alongside the railways, they also lobbied for and successfully constructed a railroad that provided direct access to the central hub of the brotherhood and the fertile lands that surrounded it.

was to expedite peanut exports. Moreover, most rural areas in Senegal did not have access to the electrical grid until after World War II.

⁸⁰ Moitt, "Pack Animals to Railways," 262.

⁸¹ Ibid.

⁸² Moitt, "Peanut Production and Social Change," 295.

While the Murid Brotherhood effectively adapted to, and exploited, the energy infrastructure of the colonial state to accumulate wealth and power, the majority of the Murid population remained relatively poor. In general, the gifts and donations the *talibé* sent to the marabouts and clerics of the brotherhood were in addition to the taxes they paid to the colonial state. In 1912, for example, the five *cercles* of the peanut basin paid a five-franc head tax, which meant that a family of four would pay twenty francs per household.⁸³ Joseph Clozel, the Governor-General of AOF from 1915 to 1917, noted that colonial subjects paid 75 percent of the colony's taxes but received very little in return. To be sure, the revenue generated from territories outside of the Four Communes was "spent almost entirely in the territories of direct administration [the Four Communes] and for their benefit."⁸⁴ Thus, the peasant farmers of the Murid brotherhood faced the burden of paying two types of taxes: a colonial head tax and an annual gift to the marabouts. These financial obligations, then, further drained the peasant economy of its resources and concentrated the majority of the colony's wealth in urban centers and among the Murid elite.

Although the *daara* system provided peasant populations with new opportunities to settle and cultivate their own lands, the organic energy economy of the early colonial period still relied on a highly exploitative system of agricultural labor. While some scholars, and James Searing in particular, contend that the *daara* system and its devotion to peanut and millet production provided new economic opportunities for peasant communities, the vast differences in wealth between the marabouts and their disciples resembled the stark inequalities between the aristocratic elite and the peasant and slave populations of the precolonial period. To be sure, the Murids provided a refuge for vulnerable communities and contributed to the decline of slavery in the Senegal Valley, but they

⁸³ Searing, *God Alone*, 258.

⁸⁴ Joseph Clozel, *Haut-Sénégal-Niger: Soudan Français: séries d'études publiées sous la direction de M. le gouverneur Clozel* (Paris: Larose, 1912), 23.

also capitalized on the influx of former slaves, migrant workers, and the colonial state's new energy infrastructure to consolidate wealth and power.

Alternative Energy Pathways: Pack Animals, Trucks, and Corvée Labor

Although railways provided local populations with new possibilities to accumulate wealth and capitalize on their harvests, they were not entirely dependent on the colonial state's energy infrastructure to transport and distribute goods. By the 1920s, colonial officials complained that the colony's railways were in a state of disrepair and required a massive replacement of rail material. While the French updated the Dakar-Saint-Louis line in 1922, the Thiès-Kayes line suffered from over use and large portions of the track were damaged and caused significant delays. For many French commercial houses and urban traders, the unpredictable nature of the railways was potentially disastrous, especially since "peanuts were not being shipped before the arrival of the season's rains" and valuable harvests spoiled as a result.⁸⁵

When the colony's railways broke down or were delayed, the Murids—as well as other communities living in the interior—relied on horses, donkeys, camels, and later trucks to transport their harvests to urban centers. In 1923, for example, the Thiès-Kayes line unexpectedly broke down outside of Kaolack. As one French observer noted, urban merchants and peanut farmers hired a "camel caravan to come to the aid of the railway and transport peanuts to Kaolack."⁸⁶ To be sure, as problems with the railway continued to plague the peanut industry, French traders and urban merchants preferred animal transport over the railroads. Between 1912 and 1926, the number of

⁸⁵ Paul Pheffer, "Railroads and Aspects of Social Change in Senegal, 1878-1933," PhD dissertation, (University of Pennsylvania, 1975), 249.

⁸⁶ ANS 2 G 27. Also quoted in Moitt, "From Pack Animals to Railway," 259.

donkeys in the Senegal Valley climbed from roughly 25,000 to 43,000 while the number of camels increased 5,000 to 7,100.⁸⁷



Figure 13: Peanut cultivators loading camels with sacks of groundnuts, circa 1917. “La Traite des Arachides Chameliers chargent les Graines,” 1917, ANS 2 G 4.

Throughout the 1920s, then, peanut cultivators, urban merchants, and French commercial houses used pack animals as an effective alternative to the railways. As the above image suggests, farmers and urban merchants purchased pack animals from Moors who traveled south to the Senegal Valley during the trading season. In general, peasant populations preferred donkeys to camels, as donkeys were considerably cheaper and were more agile for domestic and agricultural work.⁸⁸ Though more expensive, camels possessed a larger capacity to carry weight over long distances, averaging 300-350 kilograms over a 30-kilometer distance. The donkey, in comparison, could carry approximately 100-110 kilograms over the same distance—a significant reduction in

⁸⁷ ANS R 12 Jean Adam, Rapport d’Agricole; and ANS 2 G 30, Rapport Annuel, 1926. Similar figures are quoted in Moitt, “From Pack Animals to Railways,” 259.

⁸⁸ ANS 2 G 27. In 1926, camels cost 2,000 to 2,500 francs, while donkeys cost 600 to 1,100 francs.

carrying capacity. As animal transport increased in the Senegal Valley, the French reported that “numerous roads and paths which converged on trading posts and which will enable peasants to transport their products easily, has been established.”⁸⁹ In this way, peasant farmers developed a flexible system of cash crop distribution that relied on the energy systems of both the organic and fossil fuel economies.

By the late 1920s, however, animal transport steadily declined as the colonial state extended its network of dirt roads and imported an increasing amount of trucks and automobiles. Although peanut cultivators and traders continued to use donkeys and camels to transport their crops, pack animals gradually became more expensive and thus limited the amounts of peanuts that cultivators transported. The cost of animal transport ranged from one to five francs per 100kg of peanuts, and cultivators often spent the majority of their profits on transportation costs. According to one report, many peasant farmers were “reduced to costly means of transport which are not only slow and limited,” but also “require them to spend nearly all the profits from the sale of peanuts on the transportation of their crop.”⁹⁰ Although the cost of transportation ultimately depended on where peasant farmers lived in relation to roads and railways, the advent of the truck resulted in a reduction of transport costs from 40 percent of the value of the peanut crop to 12.5 percent.⁹¹ The reduction in cost was largely due to the carrying capacity of trucks, which could haul 4.5 tons of peanuts per load, the equivalent of a dozen camels or forty donkeys.⁹²

While the arrival of trucks and automobiles provided the French with an effective strategy to access, and exploit, the organic economy of the Senegal Valley, the colonial state relied on forced labor, or *corvée* labor, to build the colony’s network of roads. Throughout the 1920s and 1930s, the

⁸⁹ ANS 2 G 26. Also quoted in Pheffer, “Railroads,” 232.

⁹⁰ Moitt, “Peanut Production and Social Change,” 308-314.

⁹¹ Ibid, 308.

⁹² Ibid.

colonial state used forced labor during the dry season—as not to disrupt cash crop production—to extend its network of roads further into the interior. Due to Senegal’s predominantly free agricultural labor force, as well as the continual increase in peanut exports, the French colonial state did not use *corvée* labor for cash crop production as it did in other regions of French West Africa.⁹³ Rather, French colonial officials relied on local chiefs and French administrators to recruit workers to construct the dirt roads that linked peanut farms deep in the interior with railway stations.

The system of *corvée* labor was officially codified into law in 1912, when the French colonial state passed a local decree legalizing the use of coercive labor throughout AOF. In general, forced labor required tax payers—French citizens and *originaires* were exempt—to work a fixed number of days for the colonial state. According to the decree, every healthy adult male belonging to the indigenous population, aside from the elderly, soldiers, and those working in customs and forestry, was expected to work eight days a year for the colony.⁹⁴ In Senegal, as peanut exports steadily increased throughout the 1920s, colonial administrators emphasized the importance of constructing a new network of dirt roads that facilitated the transportation of cash crops while reducing costs for commercial interests. Indeed, trading houses in Dakar and Saint-Louis argued that the commercial value of the railways was limited by the absence of a large network of rural roads.⁹⁵ In response to the growing demands of commercial trading houses, the Governor of Senegal, Raphael Antonetti, commissioned administrative officials to use *corvée* labor to construct a network of dirt roads throughout the Peanut Basin. Between 1918 and 1928, the French, with the help of local chiefs, conscripted large labor forces of local men to connect urban centers and railway stations via dirt roads.⁹⁶

⁹³ Babacar Fall and Mohamed Mbodj, “Forced Labour,” 258-59. In the French Soudan, for example, *corvée* labor was used for cotton production, and in Guinée and the Côte d’Ivoire it was used for rubber and timber extraction.

⁹⁴ Ibid, 258-59. Among the colonies of AOF, Senegalese workers served the least amount of days in the *corvée* system. In other colonies, such as Côte d’Ivoire, local populations were forced to work 12 days a year.

⁹⁵ Ibid, 259.

⁹⁶ Moitt, “From Pack Animals to Railways,” 261; Fall and Mbodj, “Forced Labour,” 259.

Recruitment of *corvée* labor typically occurred at the end of the rainy season in October or November, and once the chiefs received the request from the colonial administration they consulted the village elders and then selected members of their villages for *corvée* labor. In the field, *corvée* laborers were expected to weed the road bed, fell trees and uproot bushes, flatten anthills, and fill in holes and level rises in the terrain.⁹⁷ Due to the lack of mechanized equipment and machinery, such as tractors or earth movers, *corvée* laborers toiled with rudimentary tools such as spades, hatchets, machetes, and baskets. Although *corvée* laborers were supposedly limited to eight days of labor a year and were expected to travel no more than five kilometers from their villages, many of them spent weeks away from their families and were frequently required to travel up to 50 kilometers from their homes.⁹⁸

Poor treatment, abuse, and exploitative behavior was common among the colonial administrators who oversaw *corvée* laborers. In one complaint from Galandou Diouf, a colonial intermediary, a group of *corvée* laborers in Louga were forced to work 10 to 15 kilometers from their villages without food, water, or shelter. In constructing the road from Louga to Saint-Louis, which he regarded as a truly “Herculean task,” *corvée* laborers constructed 30 kilometers of road by clearing the land, leveling sand, and placing a thick layer of millet stalks over the road to make it drivable. In addition to the absence of adequate food or water, Diouf complained that the laborers “work at 7am and continue without a break until 6pm,” which he noted, was “nearly 11 hours per day.”⁹⁹ While abusive and exploitative practices among French colonial officials was not condoned by the state, most administrators in Dakar and Saint-Louis turned a blind eye to the abuse that many *corvée* laborers experienced. For the majority of colonial officials, the poor treatment of *corvée* laborers was

⁹⁷ Fall and Mbodj, “Fourced Labour,” 261.

⁹⁸ *Ibid*, 263.

⁹⁹ *Ibid*.

an unfortunate byproduct of the colonial state's ambition to establish a network of roads throughout the colony.

Although *corvée* labor was not used for peanut cultivation directly, forced labor played a critical role in the growth of cash crop production of the 1920s and 1930s. In coercing men in rural communities to construct roads for the colonial state, the French used gas-powered vehicles to further penetrate the interior and provide peanut producers, who previously relied on donkeys and camels to transport goods, with a quicker and more cost-effective link to railway stations. In other words, before the French could use fossil fuels and vehicles to exploit the organic economy of the Senegal Valley, they required a coercive system of labor that relied on African men to construct the energy pathways of the colonial state.

While the use of *corvée* labor was, indeed, regrettable, the network of new roads throughout the interior offered new possibilities for urban merchants and peanut growers. Prior to the 1920s, the French possessed a limited amount of trucks and automobiles that were reserved for colonial administrators and the military. However, when cheaper vehicles hit the market in the 1920s, the colonial state began to import them with haste.¹⁰⁰ Between 1925 and 1930, the number of vehicles in Senegal grew from 935 to 8,435, of which two-thirds were trucks.¹⁰¹ As the number of trucks increased throughout the colony, so too did the network of passable roads. By 1930, the total distance of roads amounted to over 11,000 kilometers, which included a paved stretch from Dakar to Rufisque.¹⁰² The sudden increase of truck transport had an immediate effect on the peanut trade. In Diourbel, an emerging urban center in the Peanut Basin, one French officer noted that trucks transported 200 to 250 tons of peanuts to Dakar per day. The reason for this growth, he noted, was

¹⁰⁰ Moitt, "Peanut Production and Social Change," 314. The more affordable vehicles were imported from the United States, and Ford in particular.

¹⁰¹ Ibid, 314

¹⁰² Ibid, 309.

the speed of truck transport, its relatively low cost, and the “ability of trucks to circulate widely as a result of the development of a dirt road network usable by automobiles.”¹⁰³ This new network of energy pathways, then, provided French and African merchants with a cheap and efficient way to access and transport cash crops from the fertile fields of the interior to the coast.

In general, urban merchants developed partnerships with truck owners who, throughout the 1930s, were Lebanese and Syrian immigrants that migrated to Dakar. According to one French colonial officer, merchants in Dakar and Saint-Louis “controlled the business of buying peanuts directly from the Murids” and they “set up operations in the villages where they remain in close contact with them.”¹⁰⁴ In particular, colonial officials complained that Syrian merchants travelled deep into the hinterlands of the colony and monopolized truck transport. Since truck transport was not formally regulated by the colonial state, Syrian merchants could move freely within the colony and avoid paying customs and export taxes to the state. Without the burden of taxes and fees, Syrians were able to undercut the price of the railways and offer peasants more competitive prices to transport their crops. As a result, peanut freight on the Dakar-Saint-Louis line declined from 178,000 tons in 1929 to 47,870 tons in 1932, while the Thiès-Kayes line experienced a reduction in passenger traffic, falling from over 1 million in 1925 to 346,000 passengers in 1931.¹⁰⁵

In an attempt to regulate truck transport, the French introduced a strict regulatory structure designed to reduce the use of trucks in the peanut trade. To start, the colonial state imposed a limit on the points of trade to 143 designated spots, which colonial administrators controlled directly. In spite of the new transport policies, Syrian merchants increased their distribution networks by circumventing the colonial state’s trading posts and dealing directly with peasant farmers. According to one French officer in Bawol, the Syrians “are free to travel widely and by peanuts with the

¹⁰³ Moitt, “Peanut Production and Social Change,” 310.

¹⁰⁴ ANS 2 G 30, 1930. Also see Moitt, “Pack Animals to Railways,” 262.

¹⁰⁵ Pheffer, “Railroads,” 450-460.

complicity of the natives...who go along with these illegal transactions” to ensure that their crops arrive in urban centers at a reasonable cost.¹⁰⁶ Alternatively, some French administrators believed that they could directly compete with the urban merchants by increasing the colonial fleet of trucks. In reality, however, the French could muster only thirty-two trucks and twenty-two smaller commercial vehicles to the peanut trade, which amounted to a miniscule percentage of trucks already in the colony.¹⁰⁷

In 1934, the colonial state attempted a last-ditch effort to gain control over truck transport by prohibiting trucks in large peanut-producing regions, and by offering higher prices than market value. In doing so, the French hoped to price-out Syrian merchants and encourage local populations to use pack animals for transportation. Once again, the colonial state’s efforts to control truck transport failed. Rather than decreasing the circulation of trucks in the colony, the number of trucks continued to climb throughout the decade. To be sure, by the 1930s, the technological advancements that enabled the French to expand and profit from peanut cultivation—roads, railways, trucks, and petrol—were now being used by African traders, elite marabouts, and peanut-producing peasant communities. In other words, urban merchants and colonial subjects competed with the French for a significant portion of the export economy by exploiting, or even circumnavigating, the colonial state’s energy infrastructure.

Renewable Energy Pathways: Irrigation Projects and Hydroelectricity

In addition to railways and roads, the French also hoped to construct a number of irrigation projects in eastern Senegal to open new lands to peanut cultivation. In 1922, the *Service d’agriculture* produced a comprehensive report on the construction of a dam at the confluence of the Senegal

¹⁰⁶ ANS 2 G 32. “Rapport économique annuel,” 1932. Also see: Moitt, “Pack Animals to Railways,” 263.

¹⁰⁷ *Ibid.*, 263.

River and its tributary, the Falémé. Situated near the border of Mali and Senegal, the Falémé meets the Senegal River at the town of Bakel, a longstanding trading hub. The purpose of the dam was to elevate water levels to feed a network of canals which would have traversed the arid regions of the Ferlo Desert to the Atlantic Ocean near Dakar. According to the report, the canal would irrigate 380 meters of farmland on either side of the waterway, which was approximately 76 hectares per kilometer. Over its entire length, the *Service d'agriculture* claimed that it would irrigate 40,000 hectares of land for peanut cultivation.¹⁰⁸ By opening up new territory to peanut farmers, agents of the *Service d'agriculture* could invigorate peanut production by using new virgin lands and leaving exhausted soils time to recover from years of exploitation.¹⁰⁹

The dam and the canal were never built due to budget constraints and the gradual realization that intense heat over long stretches of desert would evaporate and ultimately deplete water levels. However, in the 1920s, the French did construct a small hydro-electric dam at the *Chutes de Félou*, a rocky waterfall on the Senegal River near the town of Kayes.¹¹⁰ The purpose of the dam, which was constructed between 1924 and 1927, was not only to provide Kayes with electricity, but it was also meant to spur economic growth in the interior.

In 1909, M. Martin and M. Raffin, two French colonial engineers, submitted the first proposals to transform the *Chutes de Félou* into a hydroelectric dam. Since Kayes was “at the center of three trading routes,” Martin and Raffin insisted that it was an ideal location for a mechanized vegetable oil refinery, which, they believed, would attract “diverse industries that would be of great interest to the colonies.”¹¹¹ In particular, they argued that the hydroelectric dam would serve as a catalyst for a “modern, mechanized oil refinery” that would process “all the varieties of oleaginous

¹⁰⁸ ANS 2 G 27. Jean Adam, *Rapport d'agricole*, 34.

¹⁰⁹ Chevalier, “*Monographie d'arachide*,” 718.

¹¹⁰ ANS P 409, 1927. According to several reports, the maximum energy output of the dam was 700 horsepower, which occurred at the height of the rainy season in August.

¹¹¹ ANS P 409, 1927.

grains” on site. In using the “shell as a combustible,” the byproducts of the oil refinery would serve as a “remedy for the lack of coal” in the region and could also be used as food and fodder for animals.¹¹² This, in turn, would also provide new opportunities for entrepreneurs to establish industries by using the byproducts of the oil refineries to power their soap factories and paper mills.¹¹³

The construction of the dam was also an attempt to curb the production and use of woodfuels in the region. For Martin and Raffin, hydroelectric power would greatly reduce the use of charcoal and would also help conserve the forests along the Senegal and Mali border. In one report, Martin wrote to the Governor of Senegal: “Permit us, Mr. Governor, to call your attention specifically to the following consideration...It goes without saying that our enterprise will replace local fuels (woodfuels) with regard to the illumination of the town of Kayes.” In this way, he alleged, “the first consequences of our enterprise will be the diminishment of deforestation in the region.”¹¹⁴ Yet, in the years following the completion of the dam, French reports indicate that the use of woodfuels did not decrease nor did the rate of “indigenous woodcutting.”¹¹⁵ In fact, some colonial officials lamented that the construction of the dam might have actually increased, rather than reduced, the rate of deforestation in the region. In a report from the Upper Senegal Valley in the late 1920s, one colonial administrator complained that “it is not possible to police these people from denuding forests and their misdeeds go unpunished as a result.” In the majority of cases, he complained, “the people engaged in peanut cultivation are destroying the forests” and then “selling the wood for cash.” In light of the rapid pace of deforestation, he urged that the colony “needs a department of forestry” to match the rapid “deforestation that is now occurring as a result of the

¹¹² ANS P 409, 1927.

¹¹³ ANS P 409, 1918.

¹¹⁴ Ibid.

¹¹⁵ Ibid.

extension of peanut cultivation in the colony, which is becoming more and more pronounced.”¹¹⁶ In a similar manner as other energy pathways in colonial Senegal, the construction of the hydroelectric dam created new possibilities for Africans to capitalize on the colonial state’s energy infrastructure. While the dam may have invigorated the production of vegetable oils within the region, it also provided peasant communities with an opportunity to profit from both firewood and charcoal production.

As the following section will demonstrate, the extension of the colony’s energy infrastructure, and the agricultural expansion that followed it, had unintended environmental consequences that many French colonial officials feared would undermine the peanut industry. As will be shown, the continued growth of the cash crops in the Senegal Valley stoked Malthusian fears of energy scarcity and deforestation, which, for many colonial officials, would precipitate the collapse of Senegal’s organic economy.

Energy Pathways and Environmental Decline

Although new modes of transportation—and trains and trucks in particular—sparked a dramatic increase in agricultural production, it was the religious elites, local farmers, former slaves, and peasant communities that drove the expansion of cash crop production. The French were, of course, content to accommodate the growth of the peanut industry and to provide local populations with the means to transport cash crops from the interior to the coast, but beneath this enthusiasm was a deep sense of insecurity about how this expansion was ultimately taking shape. As farmers, and Murids in particular, followed the construction of the railways into what would become the New Peanut Basin in the regions of Kaolack and Tambacounda, the French grew increasingly concerned about deforestation and soil erosion. Colonial experts, namely botanists and officers in

¹¹⁶ ANS 2 G 3, 25.

the *Service d'agriculture*, reported that Senegal's forests were in peril as farmers cleared the forests to make way for peanut and millet fields. To slow the rate of deforestation, these colonial experts proposed a variety of solutions that targeted farming practices, land management, and the establishment of forest reserves.

Railways, Woodfuels, and Deforestation in the Peanut Basin

While the French generally encouraged the rapid growth of peanut production along the railways and dirt roads of the interior, reports of forest destruction and soil erosion highlight the unintended consequences of cash crop expansion. As merchants, marabouts, and local farmers flocked to the region to clear land and occupy new territories, agents of the *Service agriculture* became increasingly concerned with the disappearance of the region's forests. As early as 1890, Paul Gaffarel, a French colonial officer, recorded that "all along the Dakar-Saint-Louis Railway, the forests are in retreat and fields of peanuts have replaced the bush."¹¹⁷ Furthermore, in a separate report from the *Service d'agriculture*, one French officer emphasized the need to "adopt rigorous provisions to exercise effective protection of the forests of the colony."¹¹⁸ Deforestation, he implored, was "occurring in diverse regions throughout the colony, and in the peanut basin in particular." With the growth of "groundnut production," Wolof farmers "cleared the land regardless of whether it was good for the crop," and then abandoned it "after a few years of harvests."¹¹⁹ In this way, the officer noted that "several forests in the *cercle* of Thiès along the railway are in the process of rapidly disappearing" and required a rigorous system of conservation and protection.¹²⁰ These early reports of deforestation in the Peanut Basin, then, spurred French colonial officials to

¹¹⁷ P. Gaffarel, *Sénégal et le Soudan Français*, (Paris : Ch. Delegrave, 1890), 24. Also quoted in Moitt, "Peanut Production and Social Change," 181.

¹¹⁸ 2 G 104. Rapport de la service d'agriculture, Sénégal.

¹¹⁹ Ibid.

¹²⁰ Ibid.

weigh the benefits of the cash crop economy and its seemingly harmful environmental consequences.

In addition to clearing the land for peanut cultivation, the forests bordering the railroad were also used to fuel the energy pathways of the colonial state. According to Maurice Mangin, a forester with the colonial administration, nearly “all of the railroads and industries use firewood, of which the consumption has attained a fearful level.” The “attacks” on the forests, he noted, were immeasurable as the “Thiès-Kayes railroad consumes 15,000 to 20,000 tons of firewood for its normal traffic.” Along the entire length of the railway, Mangin observed that “for a width of one kilometer on each side of the tracks, the forests have disappeared or are destroyed.” In this case, then, he lamented that the locomotives could no longer “provide fuel economically” and were forced to construct kilometers of narrow-gauge tracks, which supported smaller train cars, yielded slower speeds, and required less fuel.¹²¹ Although Mangin’s assessment was, as Jesse Ribot suggests, a “view from the road” and offered a narrow interpretation of forest decline, it nonetheless demonstrates the anxieties that that French colonial officers experienced over deforestation and the extension of the railway.¹²²

By 1915, emerging trading centers, such as Kaolack and Tambacounda, became robust regions of peanut cultivation as local populations, and the Murid brotherhood in particular, occupied new lands. According J. Belvert, a colonial administrator in Kaolack, the “*talibés* (disciples) place themselves in a line and begin to cut down the trees and clear the ground with frenetic zeal.” The Murids, he continued, “progressively advance by cutting down all the trees, even the most useful

¹²¹ Maurice Mangin, *La question forestière en Afrique occidentale Française* (Paris: Académie d’agriculture de France, 1924), 472. Narrow gauge trains are built with smaller radius curves, smaller structured gauges, and lighter rails. They are less costly to build, and they are frequently used in mountainous terrain where standard gauge rail is not suitable. For more a more detailed discussion of narrow gauge trains, see: Richard Dunn, *Narrow Gauge to No Man’s Land: U.S. Army 60 cm gauge railways of the First World War in France* (Benchmark Publications, 1990).

¹²² Jesse Ribot, “A History of Fear: Imagining Deforestation in the West African Dryland Forests,” in *Global Ecology and Biogeography*. Vol, 8, No. ¾. Tropical Open Woodlands Special Issue, May-July, 1999.

ones: dye trees, calabash trees, baobabs, etc.”¹²³ In a separate report, another colonial forester noted that “each time a station was opened along the route, the Murids established a village and proceeded to attack the forest.”¹²⁴ In 1912, the Governor General wrote that the forests, especially in the Sahel, are “suffering and deteriorating” from the “immemorial abusive use by natives or excessive exploitation.”¹²⁵ Thus, while the French generally supported the expansion of peanut farming, they became increasingly aware of the environmental repercussions of cash crop expansion.

Furthermore, once the forests were denuded for cultivation, the French worried that the strong easterly winds of the dry season would blow away all of the valuable top soil, and would thus create “dust bowl” conditions in the Peanut Basin.¹²⁶ As Mangin reported in 1924, “the natives denude the terrain, cultivate the land for two or three years, and then, when its fertility is exhausted, they abandon it for new terrain” and the same process “occurs again and again.”¹²⁷ This “systematic destruction” of the forests, he lamented, did not “correspond with any gains in agriculture” since it “leads to regrettable deforestation on flat land” and “is even more disastrous in the regions affected by erosion, of which makes all arable land disappear.”¹²⁸ For the French, deforestation was not only a threat to the colony’s supply of woodfuels, but also to the fertility and health of its soils.

In a similar report, Yves Henry, an officer in the *Service d’agriculture*, noted that the decline of Senegal’s forests also threatened the prosperity of the colony’s cash crop economy. In 1916, he reported that the “effects of deforestation between Dakar and Saint-Louis,” which was the result of peanut cultivation, reduced the quality of the soil and produced unsatisfactory harvests. From Louga to Saint-Louis, a region where “deforestation was nearly complete,” Henry claimed that the absence of trees “causes such a weakening of yields that the crop is often miserable, if not impossible” to

¹²³ Cruise O’Brien, *The Mourides*, 197.

¹²⁴ Ibid. Also quoted in Marc Pires, “Energy and Environment,” 124.

¹²⁵ Jean Adam, “Rapport d’agricole,” 1912.

¹²⁶ Ibid.

¹²⁷ Mangin, *Une Mission Forestière*, 471.

¹²⁸ Ibid.

harvest. Due to the loss of forests, he lamented that the process of evapotranspiration occurred more slowly, rain levels dropped, top soils blew away, and the remaining humiferous matter of the soil diminished precipitously. This phenomenon, according to Henry, pushed the productive capacity of the soil “to the point of becoming practically nothing.”¹²⁹ The degradation of the soil was also exacerbated by nearly half a century of intense peanut cultivation. The combination of deforestation and soil exhaustion, then, made “successive harvests of peanuts and millet” unsustainable.¹³⁰

In the peripheral regions of Dakar, and most notably Thiès, Henry also reported that the exploitation of woodfuels for the capital had far reaching consequences for local agriculture. In certain districts of Thiès, he recorded that the forests were “completely denuded” and that the intensity of deforestation had severe repercussions on levels of rainfall and groundwater. In particular, he argued that the destruction of the forests “depleted the aquifer on the Thiès Plateau” by destroying the root systems that once held the groundwater in place. In examining records of precipitation in Dakar, Saint-Louis, and Rufisque from 1858 until 1914, Henry concluded that each “measuring station” showed a constant reduction of rainfall over time. Although he admitted that many of the measurements and data were not the most precise, they nonetheless provided enough evidence to show a downward trend in precipitation.¹³¹

More specifically, Henry argued that rainfall was at its lowest point in regions most affected by deforestation. In the Senegal Valley, for example, he noted that the “regression of rain was the most noticeable” along the river, especially in the regions of Saint-Louis, Richard-Toll, and Dagana, where “deforestation was almost total.” In contrast, the regions that experienced little deforestation,

¹²⁹ ANS 3 R 15, Yves Henry, “Gouvernement général de l’Afrique Occidentale française. Inspection de l’agriculture,” 11.

¹³⁰ *Ibid.*

¹³¹ *Ibid.*, 25.

such as the Casamance, did not “appear to have been touched by the same phenomena.”¹³² Through this comparison, then, Henry claimed that “since the forest plays a primordial role in the retention of water on the surface of the soil and facilitates its penetration into ground,” it was clear that “deforestation must be blamed, in most regions of Senegal, where we witnessed the extinction of forest resources and the diminishment of groundwater levels.”¹³³ For Henry, the link between forest destruction and groundwater levels further demonstrated the unforeseen consequences of cash crop production and the expansion of cultivation into new territories in the interior. However, Henry’s comparison of forests along the Senegal River with those in the region of Casamance was inherently flawed. Casamance, a tropical region in the south of Senegal, undoubtedly received more annual rainfall than the dry and arid regions of the Senegal Valley. The low groundwater levels in the north, then, were not necessarily due to deforestation but to significant differences in climate and precipitation.

Although it is critical to take French reports of environmental decline and scarcity seriously, these reports must also be examined with a healthy dose of skepticism. As recent scholarship on the environmental history of West Africa has shown, land use practices among peasant populations in the Sahel and savanna at times regenerated, rather than destroyed, their local environments. In his study on the charcoal market in Senegal, Jesse Ribot argues that anxieties over charcoal and firewood production were driven by misguided policies and Malthusian fears of scarcity. According to Ribot, charcoal and woodfuel consumption throughout the colonial period amounted to an average of 2000 tons per year—a relatively modest amount that did not lead to an unsustainable rate of forest destruction.¹³⁴

¹³² ANS 3 R 15, Yves Henry, “Gouvernement général,” 11.

¹³³ *Ibid.*

¹³⁴ Ribot, “A History of Fear,” 291-300.

While it is likely that the French overestimated the rate of deforestation and “misread” the landscape in Senegal, the colonial state’s fear of environmental decline and energy scarcity manifested through a series of administrative regulations and forest decrees that were designed to control how Africans managed their lands. In other words, colonial narratives of decline helped to introduce new means of control, in which controlling or managing the environment took precedent over whether there was measurable decline.

Thus, reports of deforestation along the railways and the Peanut Basin underscore the colonial state’s internal conflict over the expansion of the colonial economy, its new energy infrastructure, and their seemingly severe environmental consequences. In developing an energy infrastructure to facilitate the growth of cash crop production, the colonial state not only encouraged the expansion of a land-intensive form of agriculture, but it also created a system of energy use that required large quantities of both fossil fuels and traditional organic fuels. As such, the colonial state’s efforts to reduce the rate of deforestation and soil erosion was not so much an attempt to control how Africans managed and exploited their lands, but rather, it was a desperate response to police its own energy intensive approach to economic growth.

A Self-made Energy Crisis: Urban Centers, Woodfuels, and Forest Destruction

During the early colonial period, the alleged decline of coastal forests both in the peripheries of Saint-Louis and Dakar incited Malthusian fears of population growth and resource scarcity. According to Courtet, a French colonial officer in Saint-Louis, the increase in deforestation in the hinterlands of Saint-Louis reflected the rapid growth of the urban population. The consumption of charcoal, he reported, averaged about 2 kilograms per person per day. Thus, with a population of 20,173 inhabitants in 1910, the population of Saint-Louis consumed approximately 40,346 kilograms

of woodfuels a day.¹³⁵ In addition to this total, the French used charcoal and firewood to fuel a variety of industries in Saint-Louis. According to Courtet, local industries used woodfuels to sustain “the power plant which supplies lighting to the city, the factory which supplies the ice for the colony, the materials for the construction of indigenous huts, the heat for brick factories, and for a few establishments belonging either to the state or the private industries.”¹³⁶ In a similar manner as St. Louis, other colonial cities experienced sharp increases in population and woodfuel consumption. Between 1902 and 1906, the population of Dakar ballooned from 8,737 to 25,000 and woodfuel consumption increased to roughly 50,000 kilograms per day. According to Courtet, the urban population’s growing demand for woodfuels “transformed a region that was once sufficiently fertile into a desert.”¹³⁷ Simply put, reports of woodfuel consumption within the colonial administration demonstrate how forest decline in the periphery was ultimately linked to the increase of urban populations along the coast.

Nevertheless, many French colonial officials believed that woodfuel consumption was sustainable if only local populations knew how to properly manage their forests. As one colonial administrator noted, since the “natives” seemed to destroy trees for “futile motives” and would “set fire to forests out of habit,” their consumption of woodfuels was “considerable given the low population.”¹³⁸ Rather than establishing a system of “afforestation or creating methodically exploited reserves,” the “native cuts at random and progressively” and expedited the “disappearance of forests along the Senegal River and the railways.”¹³⁹ Through this logic, then, the French believed that they could prevent forest destruction so long as they established control over how people managed and exploited their environments.

¹³⁵ Courtet, *Étude*, 62.

¹³⁶ Ibid.

¹³⁷ Ibid.

¹³⁸ Mangin, *La question forestière*, 59.

¹³⁹ Mangin, “Une mission forestière en Afrique Occidentale Française,” in *Géographie*, XLII. 449-483 and 629-654.

As early as 1900, Noel Eugène Ballay, the Governor General of French West Africa, drafted the colony's first forestry code. The law gave usufruct rights to local populations and required European trading houses and commercial interests to apply for permits to gain access to the colony's forests.¹⁴⁰ Furthermore, the law restricted wood cutting in previously denuded areas and protected valuable species of trees from over exploitation. However, since there were no forestry agents to enforce this law, French colonial officials relied on the police or, in most cases, on local chiefs to stop illegal exploitation. This, in turn, had profound environmental consequences since local chiefs could use the new forestry code to their own benefit. In regions along the Dakar-Saint-Louis railway, for example, local chiefs encouraged villagers to clear the forests and to sell firewood and charcoal to the railway. While the French generally encouraged woodfuel production to fuel their trains, the director of the railway, Commander Digue, complained that the "absence of technical supervision created considerable disadvantages in terms of maintaining, conserving, and exploiting the forests."¹⁴¹ Similarly, steamships that traveled up and down the Senegal River required considerable amounts of woodfuels. According to one colonial report in 1903, the banks of the Senegal River were deforested for more than 300 kilometers, and the growing shortages of woodfuels in Saint-Louis necessitated a more comprehensive approach to forest regulation.¹⁴²

These concerns, then, prompted Ernest Roume, Bally's successor as the Governor General, to draft a new forestry code in 1904 that placed all vacant and unclaimed lands under the control of the colonial state.¹⁴³ In addition to the new forestry code, the French also attempted to register all occupied lands and territories in the colony through an administrative system of private property. This law, which was passed in 1906, created confusion between the French *commandant de cercles* and

¹⁴⁰ Ribot, "Markets, States," 102.

¹⁴¹ ANS, 3 R 15, "Note sur la chauffe au bois des Chemins de Fer de l'AOF," circa 1905.

¹⁴² Ibid.

¹⁴³ Ibid.

the local chiefs tasked with implementing the law. Since Wolof land tenure systems, known as *borom dai* (the right of fire), were based on lineage and passed down from the first man who settled and cleared the land to his descendants, the French had difficulties assigning ownership to individuals. In general, the head of the lineage, known as the *laman* (master of the land), collected customary payments from the various families that worked the land. While the customary payments were not substantial—sometimes a sack of grains sufficed—they ensured that the extended family had rights to their own land, which the Wolof termed *borom ngajo* (right by ax).¹⁴⁴ This claim provided each family with their own plot of land, which could then be passed on from one generation to the next.¹⁴⁵ Since most occupied land belonged to a Wolof lineage, and since many Wolof families were substantial in size, the French had considerable difficulties in identifying the “rightful” owners of property. Although largely ineffective, the attempt to introduce private property was an effort to make the Senegalese environment more legible for French colonial officials.¹⁴⁶ Indeed, the 1904 and 1906 decrees served as mechanisms by which the French attempted to consolidate productive lands and forests under the auspices of the colonial state.

Anxieties over forest destruction manifested in punitive policies designed to protect the colony from illegal exploitation. In his report on colonial commerce in the early 1900s, Courtet stressed that “the person who first cuts a tree and does not reproduce it” should be prosecuted for committing a crime. Moreover, he also argued that “the administrator who let it happen committed another crime,” which was “all the more serious.” Since Senegal was the “anti-chamber of the desert,” Courtet believed that “each shrub and each tree” that was destroyed “brings the desert closer” to the colony.¹⁴⁷ While the colonial state, at this time, did not prosecute individuals for

¹⁴⁴ Babou, *Fighting*, 105-108.

¹⁴⁵ Curtin, *Economic Change*, 25; Péllissier, *Les Paysans*, 345.

¹⁴⁶ For a more detailed account of how European colonial states attempted to control and regulate colonial environments by making them more “legible,” see: James C Scott, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed* (New Haven: Yale University Press, 1999).

¹⁴⁷ M. Courtet, *Étude*, 58.

denuding the forests, colonial officials aimed to establish a regulatory system designed to deter people from illegal exploitation.

Between 1900 and 1910, the French colonial state developed, in piecemeal, a forestry policy that not only regulated and taxed woodfuels, but also enforced financial penalties for illegal cutting. In general, the fines were categorized according to species and the destruction of more valuable trees, such as mahogany and gum trees, garnered heftier penalties. Furthermore, in 1907, the French issued a decree to combat illegal exploitation on unclaimed lands, which belonged to the colonial state. In focusing specifically on populations outside of the Four Communes, the decree prohibited “native cutting, slaughtering, and deteriorating of state timber without authorization,” as well as the “lighting of bushfires.”¹⁴⁸ These transgressions, according to the decree, would be penalized in accordance with the damage.

However, according to Jean Adam, an agent in the *service d'agriculture*, these forest decrees were, in fact, inapplicable since the proposed measures to protect the forests “were not promulgated” and no form of “prosecution was exercised” against suspected transgressors.¹⁴⁹ Since the decrees were only applicable to “non-citizen natives,” Europeans and *assimilé* could exploit the forests of the Senegal Valley without fear of prosecution. Even further, Adam complained that “although the regulation existed and would permit the prosecution of delinquent individuals,” its application “in practice would present serious difficulties since the absence of specialized personnel” would ultimately “undermine this task.”¹⁵⁰ Thus, while colonial officials voiced concern over the increase of deforestation throughout the colony, they tacitly accepted the reality that French merchants and *originaires* would exploit, and sell, woodfuels in urban centers.

¹⁴⁸ ANS 2 G 10 “Senegal Service d'agriculture, Rapport Agricole,” 1910.

¹⁴⁹ *Ibid.*, 15.

¹⁵⁰ *Ibid.*

In response to the threat of deforestation, August Chevalier, a renowned French botanist, strongly lobbied for the creation of a colonial forest service. In 1907, he urged the colonial state to introduce large “reserves forestière,” or “forêts classés,” to protect the forests from “harmful indigenous practices.”¹⁵¹ According to Chevalier, the colonial state “must act against the disorderly exploitation” that has, for decades, “created a veritable pillage of the colony’s forest.” To that end, Chevalier advocated for a colonial “corps de forestières” that would not only provide surveillance of the forests, but would designate predetermined areas for exploitation.¹⁵² In time, he explained, the French would train “a serious corps of indigenous forestry experts” that would conduct proper forestry practices.¹⁵³ Although the Governor General recognized the need for a colonial forest service, the French colonial state did not officially create one until after the First World War. Until then, the French relied on agents of the *Service d’agriculture* to regulate forest use in its colonies.

Throughout the early colonial period, officers in the *Service d’agriculture* targeted charcoal production, and the migrant laborers who produced it, as the primary culprits of forest destruction. According to Jean Adam, the charcoal industry provided many former slaves with an opportunity to work and make a living. In examining deforestation in the region of Thiès, Adam reported that Bambara migrants from the French Soudan settled in the forested region of Thiès during the dry season. The Bambara, he recorded, “make charcoal with the wood they cut down and sell in Dakar, Rufisque, and along the stations of the railway.”¹⁵⁴ These migrants, he complained, denuded all of the “calcidrat (mahogany) trees” which “have disappeared under the axe of the charcoal producers.”¹⁵⁵ The largest trees, which measured between three to four meters in circumference, were the primary targets of charcoal makers. To fell these massive trees, the “charbonniers” cut the

¹⁵¹ ANS 2 G 10 “Senegal Service d’agriculture, Rapport Agricole,” 1910.

¹⁵² Ibid, 48.

¹⁵³ Ibid, 50.

¹⁵⁴ ANS, R 12. Jean Adam, “Rapport Annuel sur l’état de la colonisation officielle et privée,” 1911.

¹⁵⁵ Ibid.

trunk at the base of the tree and gathered kindling to ignite a small fire. After the fire significantly weakened the base of the tree, the tree then “collapsed under the thrust of a strong gust of wind.” The “charbonniers,” then, “attack the big trees which provide them with a quantity of charcoal” measuring from “40 to 50 sacks” of valuable mahogany. For Adam, this method of forest exploitation was a “rapid waste of our forest wealth” since the “future of our forests cannot be renewed” by “charred” stumps.¹⁵⁶ The problem, according to Adam, was not woodfuel production per se, but, rather, the way African forest workers produced it.

In a similar report, Yves Henry, an agent in the *Service d'agriculture*, believed that the production and consumption of woodfuel was the most imminent threat to Senegal's forests. In examining the forests between Dogana and Bakel, which constituted 300,000 hectares of gonakié (*acacia adansonii*) and gum trees (*acacia senegalaise*), Henry observed that local charcoal producers rapidly deforested the Senegal Valley to stoke and maintain the “fires of the electrical plant and the local bakeries of Saint-Louis.”¹⁵⁷ Furthermore, Henry noted that the *originaires* who lived in Saint-Louis established trading companies to exploit, transport, and sell woodfuels. According to Henry, the demand created “veritable corporations of *originaires* who build flotillas of barges with the goal of cutting and transporting gonakié wood.”¹⁵⁸ Although the gonakié, when cut down with an ax or saw, rejuvenates in the course of a few short years, the “charbonniers” of the Senegal Valley burned, rather than cut, the forests. Similar to the practices of the Bambara charcoal producers in the peripheral regions of Dakar, Henry noted that “the Toucouleur charcoal producers employed by the Saint-Louisians” burned the forest floor to “clean the soil” of roots and vegetation. This practice, he

¹⁵⁶ ANS, 3 R 15, “Note sur le chemin de fer,” 1915.

¹⁵⁷ *Ibid.*, 6.

¹⁵⁸ *Ibid.*

lamented, damaged the soils, reduced groundwater levels, and made it significantly harder for forests to repopulate the region.¹⁵⁹

Indeed, the destruction of forests along the railways, within the peanut basin, and in the peripheral regions of Saint-Louis and Dakar incited panic within the colonial administration. In 1916, the Governor General admitted that the decrees and regulations designed to protect the forests were ineffective. In one report, he noted that even though “regulations have been decreed, their application to date has been very weak.” Even further, he stated, “It is now of utmost urgency to prevent the destruction of the remaining forests of which will not lack in the short term to have disastrous consequences for the future of the colony.”¹⁶⁰ In a separate account, the Governor General also observed that all of the “beautiful stands of trees that existed between the capital [Dakar] and Thiès” were “now destroyed due to charcoal production to supply the industries and growth of Dakar.” To that end, he insisted that “it is urgent to establish a policy of reforestation in all of AOF, but especially in the northern colonies, such as Senegal, Niger, and Soudan.”¹⁶¹ In response to the increase in charcoal consumption in urban centers, the French attempted to regulate charcoal production in the interior in place of restricting woodfuel consumption in coastal urban centers. In this way, the colonial state used narratives of woodfuel scarcity along the littoral as a mechanism to control the local environments of African populations in the interior.

As reports of deforestation and desiccation became more frequent throughout the 1920s and early 1930s, the colonial administration recognized the need to regulate forest exploitation by assigning forestry experts to the colonies. In a 1920 report in the *Comité des études historique et scientifique*, Henry Hubert, the Inspector General of Public Works, similarly warned of the “progressive deforestation” of territories in French West Africa. Echoing reports from the *Service*

¹⁵⁹ ANS, 3 R 15, “Note sur le chemin de fer,” 1915.

¹⁶⁰ *Ibid.*

¹⁶¹ ANS, 2 G 16, “Rapport d’agricole,” 1916.

d'agriculture, Hubert believed that the “extension of the railways, the fabrication of charcoal for Dakar, and the use of firewood in the peanut refineries and factories of Rufisque” were the primary culprits of deforestation and desiccation in the region.¹⁶² Hubert’s report garnered the attention of the Governor General, who, a few years later, similarly blamed the decline of Senegal’s forests on indigenous populations. There was little doubt, he argued, that “the forest throughout the entire territory of French West Africa are threatened,” and in particular, “the forests of the Sahel are suffering and deteriorating due to the abusive use by natives.”¹⁶³ In response to administrative reports of forest decline, the Governor General established a colonial Forest Service in 1932 and implemented a more elaborate forestry code in 1935, which gave the state ownership and complete control of French West Africa’s forests and forest products.¹⁶⁴

While the new forestry code did not apply to private property, there continued to be discrepancies between private land holders and the colonial state. As mentioned previously, Wolof land tenure systems were difficult for colonial officials to navigate and, as a result, private lands were often incorporated into state owned lands. Furthermore, through the new forestry code, the colonial state assumed the right to create forest reserves or “*forêts classes*.” For the most part, these reserves were created to protect and manage forests for commercial ends, and were proposed as a means to manage concentrations of valuable trees, such as gum arabic, mahogany, and ebony trees.¹⁶⁵ In Senegal, colonial officials aimed to protect and classify the forests along the railroads, which were meant to provide trains with an adequate supply of fuel to transport cash crops from the interior to the coast.¹⁶⁶ In addition, the forest service set aside forest reserves, which constituted nearly ten

¹⁶² Henry Hubert, “Le désèchement progressif en Afrique Occidentale,” in *Comite d’études historique et scientifique*, 1920.

¹⁶³ ANS, 3 R 15. Hubert, “Note sur la chemin de fer,” circa 1915.

¹⁶⁴ Ribot, “Markets, States,” 108.

¹⁶⁵ *Ibid*, 109.

¹⁶⁶ ANS 3 R 15, Mangin, *La question forestière*, 4.

percent of the forests in AOF, to establish game preserves for colonial hunters, protect valuable and exotic trees, and maintain timber reserves for woodfuels and infrastructure.

Collectively, reports of environmental decline, forest destruction, and energy scarcity show a uniform consensus among French colonial officials that deforestation threatened the future of the colony, yet they also reveal a deep contradiction within the French colonial state's own "politics of energy." Indeed, these reports illustrate how peanut fields and forests were part of the same ecology, and that the expansion of cash crops gave way to the destruction of forests, which in turn, gave way to soil erosion, groundwater depletion, and the decline of peanut production. The expansion of peanut cultivation and the perceived "decline" of Senegal's forests, therefore, generated a self-made "energy crisis" that colonial officials were all too ready to blame on local populations. This, in turn, reveals how little control the French colonial state had over the agrarian energy systems of the organic economy. As marabouts, former slaves, and peasant communities settled, cleared, and cultivated new lands along the railroads, the French were ultimately powerless to control how people exploited and used their lands. Whether or not there was measurable forest decline and soil erosion, the anxieties that environmental degradation instilled within the French underscores their precarious position in coastal urban centers. With little control over land and forest exploitation, the French were ultimately dependent on their colonial subjects to sustain the flow of organic energy—charcoal, woodfuel, and peanuts—from the interior to the coast.

Conclusion

While the colonial state maintained political authority over its colonial citizens and subjects—meaning it held the exclusive right to pass laws and use, threaten, or authorize physical force—the French never fully established control over the organic economy of the Senegal Valley. In fact, their attempts to control the organic economy through the establishment of the colonial

state's energy pathways seemed to have the opposite effect. Rather than centralizing the agrarian energy systems under the authority of the colonial state, the introduction of fossil fuels, trains, and trucks brought new possibilities to Senegal's diverse population of urban merchants, religious elites, and peasant farming communities. The expansion of cash crop production in the 1920s and 1930s, therefore, was not a function of colonial laws, decrees, or agricultural programs, but rather, the effective combination of fossil fuel powered vehicles, the construction of roads, the extension of the railways, and the quick response of African populations to capitalize on new developments in energy infrastructure. Put simply, in constructing a basic yet effective network of dirt roads and railways through the use of forced labor and fossil fuels, the French built energy pathways that connected the farmers and fields of the Senegal Valley with the trading houses and companies in coastal urban centers.

To be sure, the multiple strategies that the French colonial state used to extend its authority over local environments, from the establishment of the *Sociétés de Prévoyance* to the establishment of a colonial forest service, were either resounding failures or exacerbated the very problems they were meant to resolve. While fears of forest decline, soil erosion, and resource scarcity motivated the colonial administration to introduce new means of environmental control, these efforts were not so much an attempt to transform how Africans managed their lands as they were a response to the colonial state's own environmentally destructive system of energy use.

CHAPTER FIVE

The Mixed Energy Economy of Senegal

In October of 2017, Macky Sall, the president of the Republic of Senegal, presided over the inauguration of Synergy 2, a solar energy plant approximately 84km from Dakar. At the inauguration ceremony, Sall declared that Senegal “has chosen to develop through a mix of energy, with the option to produce clean energy in the future at a lower cost per kilowatt hour.” The solar power plant, according to Sall, would provide the Senegalese population with “electricity in quality and quantity” and would propel Senegal into “the clean energy era and to reduce greenhouse gas emissions.”¹ In addition to Synergy 2, which is the largest solar power plant in West Africa, Sall also championed three other solar power plants that were expected to enter service in the near future.² Collectively, all four would generate enough electricity per year to account for 20 percent of Senegal’s total energy production by the end of 2017.³

Since the inauguration of Synergy 2, Macky Sall has made the “mix énergétique”—the combination of renewable energy with fossil fuels—the cornerstone of Senegal’s current energy policy. While this may seem like a relatively new and progressive concept designed to reduce greenhouse gas emissions and dependence on fossil fuels, Sall’s “mix énergétique” is merely an extension of a longstanding approach to energy use in Senegal. Since the mid-twentieth century, Senegal has supplemented its limited access to fossil fuels, which accounts for roughly thirty to forty

¹ Matteo Maillard et Amadou Ndiaye, “Ouvertures en série de centrales solaires au Sénégal,” *Le Monde*, November 30, 2016, https://www.lemonde.fr/afrique/article/2016/11/30/ouvertures-en-serie-de-centrales-solaires-au-senegal_5040992_3212.html.

² Ibid. Synergy 2 contains 75,000 photovoltaic solar panels that produce 20 megawatts of electricity per year, which is, indeed the largest solar plant in West Africa

³ While this is, undoubtedly, a lofty goal, Senegal has built four solar power plants as of 2019 and plans to open a fifth in the near future. For more details on the new solar energy plants, see: Agence Presse Africaine, “Senegal Unveils Fourth Solar Power Plant,” *APA News*, Thiès, January 16, 2018. <http://apanews.net/index.php/en/news/senegal-unveils-fourth-solar-power-plant>

percent of its energy consumption, with firewood, charcoal, and other organic and renewable sources of energy. Starting in the late 1970s, the state subsidized liquid petroleum gas for cooking; financed and constructed hydroelectric dams; and recently partnered with nongovernmental organizations to develop biofuels and solar power. Collectively, these varied forms of energy constitute nearly one-fifth of Senegal's energy consumption today.⁴

In this chapter, I examine the history of energy use in Senegal from World War II to the present, and demonstrate how both the colonial and postcolonial states developed a mixed energy economy through the use of locally produce fuels and imported fossil fuels. As will be shown, Senegal's mixed energy economy developed during a period of drastic local and global processes of change throughout the second half of the twentieth century. To endure volatile periods in the global energy market, such as fossil fuel scarcities during World War II, drought and fuel shortages during the global oil crisis of the 1970s, and in the twenty-first century, the looming threats of anthropogenic climate change, Senegal has put into place a dynamic system of energy use that straddles both the organic and fossil fuel economies.

This chapter begins with an exploration of energy use in colonial Senegal during World War II, a time when fossil fuels were overwhelming scarce in the colonies. Forced to rely entirely on local sources of fuel, the French turned to charcoal, peanuts and peanut oil, and other oleaginous plants to power blast furnaces, electrical plants, colonial households, and even vehicles. These episodes of fossil fuel scarcity, which inspired the use of both peanut shells to power factories and charcoal to power trucks known as *gazogènes*, reveals how colonial officials developed innovative strategies to cope with energy scarcity and how Africans responded to the increased demand for peanuts and

⁴ Woodfuel consumption account for 66 percent of Senegal's energy consumption in 1971 and dropped to 32 percent in 2012. See: World Bank, "Combustible Renewables and Waste: Percent of Total Energy, 197-2014," *World Bank*, 2017, <https://data.worldbank.org/indicator/EG.USE.CRNW.ZS?end=2014&locations=SN&start=1971&view=chart>

woodfuels. Though brief, the replacement of coal and petrol with organic sources of fuel during World War II transformed colonial Senegal into an early precursor for a mixed energy economy.

Investigating Senegal's mixed energy economy also sheds light on a new politics of energy that emerged during and after World War II. In drawing from both the fossil fuel and organic energy economies, colonial and postcolonial leaders attempted to regulate the flow of fossil fuels into Senegal while also managing the production of organic fuels—woodfuels, peanuts, and peanut oil—and other forms of renewable energy, such as hydroelectric and solar power. As will be shown, state actors were far more effective in controlling imported fossil fuels than they were in regulating the organic economy and the production and distribution of locally produced fuels. In contrast to fossil fuels, which the state imported and distributed with the help of private industries, the production and distribution of firewood and charcoal typically operated outside of the state's regulatory structures. As such, Senegal's mixed energy economy was, and currently is, bifurcated—fossil fuels and large energy infrastructure projects operate under state control while urban merchants, elite marabouts, and rural communities control locally produced organic fuels.

Studies of the state in Senegal have produced varied interpretations of how colonial officials, and the African leaders that followed them, consolidated and exercised power.⁵ Some scholars, such

⁵ For general background on colonialism in Senegal, see: Sheldon Gellar, *Senegal, An African Nation Between Islam and the West* (Boulder, CO: Westview Press, 1982); Babacar Fall and Mohamed Mbodj, "Forced Labour and Migration in Senegal," in *Forced Labour and Migration: Patterns of Movement within Africa*, ed. Abebe Zegey and Shubi Ishemo (London: Hans Zell Publishers, 1989), 255-269; Jean Copans, *Les Marabouts de l'arachide: la confrérie mouride et les paysans du Sénégal* (Paris: L'Harmattan, 1989); Babacar Fall, *Le travail au Sénégal au XXe siècle*. Paris: Éditions Karthala, 2011); Momar Coumba Diop, ed, *Senegal: Essays in Statecraft* (Dakar: Codesria, 1993). Donal Cruise O'Brien, Momar-Coumba, Diop Mamadou Diouf, *La Construction de l'état au Sénégal* (Paris: Karthala, 2002). Donal Cruise O'Brien, *The Mourides of Senegal: The Political and Economic Organization of an Islamic Brotherhood* (Oxford: Oxford University Press, 1971). Cheikh Anta Babou, *Fighting the Greater Jihad: Amadou Bamba and the Founding of the Muridiyya of Senegal, 1853-1913* (Athens, OH: Ohio University Press, 2007); Mamadou Diouf, "Assimilation colonial et identités religieuses de la civilité des originaires des Quatre Communes (Sénégal)," *Canadien Journal of African Studies*, 34 (1999), 565-587; C. Coquery-Vidrovitch, "Nationalité et citonneté en Afrique Occidentale Française: originaires et citoyens dans le Sénégal colonial," *Journal of African History*, 42 (2001), 285-305; Gary Wilder, *The French Imperial Nation-state: Negritude and Colonial Humanism Between the Two World Wars* (Chicago: University of Chicago Press, 2005); Alice Conklin, *A Mission to Civilize: The Republican Idea of Empire in France and West Africa, 1895-1930* (Palo Alto: Stanford University Press, 1997); Emmanuelle Saada, "La République des indégenés," in V. Duclert and C. Prochasson (eds.) *Dictionnaire Critique de la République* (Paris, 2002), 364-70.

as Mohamed Mbodj and Cheikh Anta Babou, examine how state officials developed client-patron relationships between agricultural cooperatives and religious elites to centralize power. Through the Senegalese “social contract” they show how politicians relinquished control over the organic economy, and the production of cash crops in particular, to religious elites and agricultural cooperatives.⁶ Others historians have focused on the state’s shortcomings, attributing the slow pace of economic development, the struggle to establish democratic self-rule, and the widespread corruption of African leaders to the legacies of colonial rule.⁷ In her study of merchant capital in Senegal, Catherine Boone argues that economic instability was due to “the decay of neocolonial economic structures that tied production to the international economy.”⁸ As exports in cash crops declined in the 1970s, imports also decreased and the state could no longer pay for the foreign goods—and oil and gas in particular—that it consumed.

In a comparable study, Babacar Fall, in his *longue durée* study of labor in Senegal, examines how the Senegalese state inherited colonial labor regimes based on a wage labor system. In doing so, the state positioned itself as the primary employer of the population, which made the economy less dynamic and overly dependent on public employment. In the late 1970s, Fall contends that

⁶ Mohamed Mbodj, “The Politics of Independence: 1960-1986” in *The Political Economy of Senegal Under Structural Adjustment* ed. Christopher L. Delgado and Sidi Jammeh (New York: Praeger, 1988), 119-120; Cheik Anta Babou, “The Senegalese ‘Social Contract’ Revisited: The Muridiyya Muslim Order and the State Politics in Postcolonial Senegal” in *Tolerance, Democracy, and Sufis in Senegal* ed. Mamadou Diouf (New York: Columbia University Press), 138-40.

⁷ Scholarship on the postcolonial state is extensive. For a general overview of the legacies of colonial rule, see: Crawford Young, *The African Colonial State in Comparative Perspective* (New Haven: Yale University Press, 1994); Mahmood Mamadani, *Citizen and Subject: Contemporary Africa and the Legacy of Late Colonialism* (Princeton: Princeton University Press, 1996). Scholarship on neo-colonialism is particularly rich. For insight into the political and economic processes of change in the postcolonial period, see: Nicolas van der Wall, *African Economies and the Politics of Permanent Crisis, 1979-1999* (Cambridge: Cambridge University Press, 2001). For insight into power and subjectivity in postcolonial Africa, see: Achille Mbembe, *On the Postcolony* (Berkeley: University of California Press, 2001). For a more historical perspective on post-colonialism, neocolonialism, and development see: Frederick Cooper, *Africa in the World: Capitalism, Empire, and Nation-State* (Cambridge, MA: Harvard University Press, 2014); Crawford Young, *The African Colonial State in Comparative Perspective* (New Haven: Yale University Press, 1994). James Ferguson, *Global Shadows: Africa in the Neo-liberal World Order* (Durham: Duke University Press, 2006); Jean-François Bayart, *The State in Africa* (New York: Longman, 1993); Patrick Manning, *Francophone Sub-Saharan Africa 1880-1985* (Cambridge: Cambridge University Press, 1988); Jean Comaroff and John Comaroff, *Millennial Capitalism and the Culture of Neoliberalism* (Durham: Duke University Press, 2001).

⁸ Catherine Boone, *Merchant Capital and the Roots of State Power in Senegal 1930-1985* (Cambridge; New York: Cambridge University Press, 1992), 1-3.

structural adjustment further destabilized the labor market, gave rise to unemployment, and placed workers in a challenging position to adapt to the economic changes brought on by globalization.⁹ And still others contend that historians must examine decolonization, independence, and self-rule as a continual process of political, social, and cultural transformation.¹⁰ According to Frederick Cooper, African states were a mix and match of both continuity and change. As gatekeeper states, Cooper argues that postcolonial states preside over the goods, materials, and peoples that enter and leave the country, collecting taxes, duties, and other forms of revenue as they pass through. In this way, contemporary African leaders have often used their role as gatekeepers to establish patronage, coercion, and rent seeking to reinforce their position and to stay in power.¹¹

This chapter contributes to this scholarship by offering an alternative framework to examine Africa's history from World War II to the present. It places Africa's postwar history as part of the Great Acceleration, a time of unprecedented industrial, economic, and demographic growth throughout the second half of the twentieth century. For some scholars, and John McNeill in particular, the unprecedented growth of the global economy during the Great Acceleration fundamentally changed the course of human and natural history, culminating in a new geological epoch known as the Anthropocene.¹² Indeed, humans have become active geological agents and have transformed the planet's environmental and climatic systems through the rise in greenhouse gas emissions, synthetic fertilizers, population growth, and the prolific use of plastics. The dramatic changes that have occurred during the Great Acceleration, from global population growth to increased industrial activity, required an unprecedented amount of energy. Since 1950, nearly 75 percent of all human-caused loading of carbon dioxide have been emitted into the atmosphere, and

⁹ Babacar Fall, *Le Travail au Sénégal au XXI^e siècle* (Paris: Karthala, 2011), 283-285.

¹⁰ Frederick Cooper, *Africa Since 1940: The Past of the Present* (New York: Cambridge University Press, 2002).

¹¹ *Ibid.*, 156-191.

¹² John McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (Cambridge, MA: Harvard University Press, 2014).

the amount of plastics produced with fossil fuels have reached unprecedented levels, rising from 1 million tons per year to roughly 300 million today.¹³

In general, Africa has contributed remarkably little to the economic and industrial growth of the Great Acceleration. Although Africa has increased its emissions of carbon dioxide twelve-fold since 1950, reaching 1.3 million kilotons in 2018, it accounts for only 3 percent of global emissions today. Of this small percentage, South Africa accounts for 38 percent of Africa's emissions while Egypt, Algeria, Nigeria, Libya, and Morocco release another 46 percent of the continent's carbon dioxide into the atmosphere. The outstanding 16 percent of Africa's emissions come from the remaining 50 nations on the continent.¹⁴ Senegal, which emits approximately 8,247.3 kilotons of carbon per year, accounts for just .6 percent of Africa's total carbon emissions.¹⁵

Although historians have begun to investigate the complex history of these extraordinary changes, the vast majority of their inquiries tend to focus on the industrialized nations of the global North. In doing so, scholars have overlooked the various ways that Africans have contributed to, and grappled with, the radical changes brought on by the Great Acceleration. Rather than focusing on the innovative and adaptive strategies that African populations have developed to endure the changes brought on by the Great Acceleration, scholars tend to focus on environmental decline and extreme poverty that portray Africa as a continent in peril. From publications of Africa's "resource curse" and widespread famines to narratives of deforestation and desertification, these scholars perpetuate longstanding tropes of Africa as a helpless continent in need of Western expertise and

¹³ For additional statistics on the Great Acceleration, see McNeil, *The Great Acceleration*, 1-6. Alongside plastics, the production of nitrogen synthesized fertilizer has also increased from the Green Revolution to the present, climbing from under 4 million tons in 1950 to more than 85 million tons today.

¹⁴ United States Department of Energy, Office of Science, "Fossil Fuel Emission from Africa": https://cdiac.ess-dive.lbl.gov/trends/emis/tre_afr.html

¹⁵ All of the figures cited in this paragraph can be found at the following database made available by the World Bank. See: "World Bank Open Data," The World Bank, accessed April 15, 2017, data.worldbank.org.

aid.¹⁶ Jeffrey Sachs and William Easterly, for example, offer competing perspectives on how the West should intervene in processes of economic development and growth in Africa. Sachs insists that the rich nations of the global north need only give a miniscule 0.7 percent of GDP to pull Africa out of the “poverty trap,” while Easterly argues that the West, though well intentioned, have imprisoned Africa in the trap of international aid.¹⁷ In this way, scholars have pushed Africa to the margins of the global economy and have interpreted its diverse populations as victims of neo-colonialism and the inequities of globalization.

Although the historical literature on energy use in Africa is notably thin, some historians have recently addressed the various ways that African peoples have responded to the vast economic and environmental changes of the Great Acceleration. Emily Lynn Osborn, in her study of energy use and containers in West Africa, examines how the rapid economic and industrial growth of the postwar period changed the way people stored, carried, and distributed goods.¹⁸ This shift in containerization, which introduced petroleum based containers such as canned food, plastics, automobiles, and large shipping containers to West Africa, brought the fossil fuel economy into urban centers, rural communities, and households. Once the imported containers arrived in Africa, however, local populations either repurposed them or recycled them for other goods and materials. Local artisans, for example, used locally produced woodfuels to melt down and then transform scrap aluminum (from beverage cans to scrap metal) into bowls, basins, and cooking pots.¹⁹ In this way,

¹⁶ Africa is rarely featured in discussions of the Great Acceleration. For scholars that focus on environmental decline and famine, see: Timothy Mitchell, *Rule of Experts: Egypt, Techno-Politics, and Modernity* (Berkeley: University of California Press, 2002); Jeffrey Gritzner, *The West African Sabel: Human Agency and Environmental Change* (Chicago: Committee on Geographical Studies, 1988); Alex de Waal, *Famine Crimes: Politics and the Disaster Relief Industry in Africa* (Oxford: James Curry, 1997); Lisa Cliggett, *Grains from Grass: Aging, Gender, and Famine in Rural Africa* (Ithaca: Cornell University Press, 2005); For studies of extreme poverty and international aid, see: Jeffrey Sachs, *The End of Poverty: How We Can Make It Happen in Our Lifetime* (London: Penguin, 416), 266-288; William Easterly, *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good* (London: Penguin, 2006).

¹⁷ Jeffrey Sachs, *The End of Poverty*, 266-288; William Easterly, *The White Man's Burden*, 3-37.

¹⁸ Emily Lynn Osborn, “Containers, Energy, and the Anthropocene,” in Gareth Austen, ed., *Economic Development and Environmental History in the Anthropocene*, 69-92.

¹⁹ Gareth Austen, *Economic Development and Environmental History in the Anthropocene*, 15.

Osborn shows how Africans, through the practice of recycling and repurposing containers, employed elements of energy use from both the organic and fossil fuel economies.

The history of energy in modern Senegal, therefore, is particularly useful because it offers a framework to conceptualize how impoverished nations, in sub-Saharan Africa and elsewhere, have developed diverse systems of energy use to operate on the margins of the fossil fuel economy. Since most Africans have, historically, contributed very little to the industrial output of greenhouse gas emissions, their economies and their general way of life are not wedded to fossil fuels in the same way as the energy rich nations of Europe, North America, and Asia. While their limited access to fossil fuels has, for nations like Senegal, served as a barrier to economic growth and prosperity, it has also pushed Africans to develop alternative means to power and fuel their economies. Indeed, Senegal's mixed energy economy combines the pre-industrial energy systems of the organic economy with contemporary fossil fuels, and it demonstrates how pre-modern fuels can offer a viable solution to contemporary problems, from alleviating poverty in rural areas to curbing the effects of anthropogenic climate change. The resilience of the mixed energy economy, therefore, not only demonstrates Senegal's capacity to adapt to various processes of change and transformation, but it also presents contemporary policymakers with a potential pathway forward to transition from fossil fuels to a renewable energy economy.

Senegal During World War II: A Precursor for a Mixed Energy Economy



Figure 14: Photo of the “Mission de Charles Roux,” and the two vegetable oil-powered trucks, 1932. Marie-Christine et Claude Rouxel, “Les Diesels Renault a l’Epreuve du Sahara,” *Charge Utile Magazine*, No. 127 (July 2003), <http://www.3emegroupedetransport.com/DieselsRenaultSahara.htm>

In 1932, seven years before the outbreak of World War II, a group of French engineers embarked on a mission to travel by truck from Algiers to Timbuktu. Rather than using gasoline, Charles Roux, the leader of the expedition, hoped to cross the Sahara Desert by using vegetable oil as his principle source of fuel. Shortly after his arrival in Algiers, Roux outfitted two Citroen trucks with a small device that attached to the carburetor, known as the “carboy.”²⁰ The carboy allowed the trucks to consume different types of fuel, such as gasoline, vegetable oil, or even alcohol, and was designed to accommodate local alternatives to gasoline. Shortly after they departed Algiers, however, one of the trucks broke down and Roux and his team abandoned the vehicle in the desert. The carboy, apparently, filled with sand and injected it into the motor, leaving one of the trucks beyond repair. Forced to load the remaining truck with additional passengers and equipment, Roux’s team broke down again a few days later—not because of sand in the carboy—but due to the stress of

²⁰ This vignette of Charles Roux and his team draws on the scholarship of Marie-Christine et Claude Rouxel. See : Marie-Christine et Claude Rouxel, “Les Diesels Renault a l’Epreuve du Sahara,” *Charge Utile Magazine*, No. 127 (July 2003), <http://www.3emegroupedetransport.com/DieselsRenaultSahara.htm>

overloading the truck with additional weight. Defeated, Roux's team returned to Algiers and abandoned any prospect of making a similar attempt in the future.²¹

Although it may come as no surprise that this seemingly hair-brained mission failed, colonial officials in West Africa hoped that oleaginous plants could one day serve as a viable alternative to expensive fossil fuels. That day, however, would come sooner than they expected. With the onset of World War II, the need for local sources of fuel increased dramatically as imports of fossil fuels declined throughout the French Empire. In Senegal, the French could no longer rely on fossil fuels from the metropole and North America. By 1942, French imports of fossil fuels declined rapidly both at home and in the colonies. In Senegal, coal imports dropped from 138,00 tons in 1939 to 19,000 in 1941 and imports of petrol fell from 51,000 to 6,000 tons in the same period.²² Between 1940 and 1944, the British Navy blockaded all French colonies under the control of the Vichy Regime, causing severe shortages of fuel in French West Africa. Forced to rely almost entirely on local sources of fuel, the colonial state turned to charcoal, peanut shells and peanut oil, and other oleaginous plants to power blast furnaces, electrical plants, and even vehicles. Though brief, the replacement of fossil fuels with charcoal and vegetable oils transformed wartime Senegal into an early precursor for a renewable energy economy.

Initially, the idea of substituting vegetable oils for fossil fuels in the colonies was proposed by the Third Republic at the outset of colonial rule. In 1900, at the Universal Exposition in Paris, *la société Otto*, an early developer of motor vehicles in France, introduced a motor fueled by peanut oil. According to Rudolf Diesel, the famous inventor of the combustible engine, the Third Republic requested “an engine that could run on arachide oil, or peanut oil” that could be fueled by “the large quantities of peanuts that were available in its African colonies.” Even though the engine, which,

²¹ Christine et Claude Rouxel, “Les Diesels.”

²² République Française, *Statistique Générale de la France, Annuaire Statistique, Cinquante-sixième volume 140-1945* (Paris: Institut national de la statistique et des études économiques, 1945) vol. 56, 365-366.

according to Diesel, “worked so smoothly that few people were aware of it,” the concept of a motor vehicle powered by African produced fuel was, as one colonial officer lamented just a few years later, “still a dream of the future.”²³

Diesel’s vegetable oil motor failed to catch on in the colonies and elsewhere, yet some colonial officials in Senegal continued to advocate for oleaginous plants as a possible source of fuel. In 1922, Yves Henry, an officer in the *Service d’agriculture*, submitted a report to the *Congrès des Combustible Liquides* entitled, “L’huile végétale carburant colonial et l’Afrique Occidentale Française.”²⁴ In the report, Henry argued that “experiments in France...have shown proof that vegetable oils serve as an excellent fuel” and that “ongoing research” and “constant improvements” suggest that “vegetable oil will be used for automobiles” in the near future.²⁵ Due to the “birth of this new fuel, which is produced in almost all the regions of the globe,” Henry insisted that “this discovery must hold the attention of our country, a nation dependent on the power of petroleum and which possesses an African empire rich in oleaginous plants.”²⁶ This technological advancement meant that in all of the tropical and sub-tropical regions of the French Empire, colonial officials could sustain cash crop production through the development of locally produced biofuels.

For French colonial officials, the most promising advantage of locally produced biofuels was the potential to transport agricultural goods from the interior to the coast at a minimal cost. Indeed, one of the most pressing challenges of French colonialism in West Africa was the relatively high cost of fossil fuels. As Henry noted in his report on using vegetable oils as fuel, the French “can no longer deny that if colonization, in the future, will prove to be the most powerful factor in the transformation of agriculture,” the colonial state “must recognize that until now an insurmountable

²³ Jean Jalbert, “Une Réserve d’Énergie : L’Huile Végétale de l’Afrique Noire,” (Paris: Dunod, 1941), 5.

²⁴ Yves Henry, “L’huile végétale Carburant colonial et l’Afrique Occidentale Française” (Dakar: Journal Officiel de l’Afrique Occidentale Française, 1922).

²⁵ Jalbert, “Une Réserve d’Énergie,” 2.

²⁶ *Ibid*, 2-3.

obstacle has blocked the road: expensive fuel.”²⁷ Since large parts of French West Africa possessed “no fuel other than gasoline,” and since most of the agricultural production required petrol at one stage or another, the use of vegetable based fuels could “completely modify the conditions of agriculture and transportation” throughout the federation. The production of “oils and fats in all parts” of the colony, therefore, would yield large quantities of cheap and accessible fuel that would further invigorate cash crop production.²⁸

By establishing a system of locally produced fuel, the colonial state believed it could extend their energy pathways further into the interior and efficiently transport cash crops to rail stations and coastal trading centers. The most effective, affordable, and accessible vegetable oils for fuel production in Senegal, according to Henry, was peanut oil. In 1922, Senegal exported close to 250,000 tons of peanuts, and likely produced 1.6 million tons in total. Since the majority of peasant farmers cultivated and processed peanuts in the household, the French hoped to disseminate mechanized oil presses that could be used by individual families or, alternatively, as a shared press within the village.

In response to the colonial state’s effort to mechanize peanut oil production, French companies hoped to sell “modern” oil presses to peasant households in the interior. These companies often placed advertisements in official publications such as the *Journal Officiel du Sénégal*, which were presumably tailored to businessmen, traders, and merchants interested in further developing the peanut oil industry in the interior. The peanut oil press depicted below, for example, was for individual households and could press a variety of oleaginous plants. Produced by the company, *La Société des Pressoirs Colin*, the “L’huilerie Familiale” enabled the villagers to extract high quality oil from oleaginous grains.

²⁷ Henry, “L’huile végétale,” 2-3.

²⁸ Ibid.



Figure 15: The L’Huilerie Familiale. A Senegalese household pressing peanuts with a mortar and pestle (to the left) and the “modern” household peanut oil press, or the “Phuilerie familiale” (to the right), ANS, 2 G 13.

These images, which depict the French oil press on the right and the “indigenous” method of extracting oil on the left, illustrate how colonial officials hoped that “modern” technology would transform small villages and households into independent peanut oil refineries. The image to the left portrays four African women—two sorting the peanuts from their shells and two pressing the oil with a large mortar and pestle. The location and clothing of the scene underscores the “primitive” and “rudimentary” nature of pressing oleaginous grains in local African villages, which, according to the advertisement, produced “a bad product” and “extracted only a small part of the oil from the grain.”²⁹ In contrast, the French seem to present the image of the sleek metallic press—referred to as the “L’huilerie familiale”—as a more “modern” and technologically efficient way to extract oil. The grinder, on top of a four-legged stand, contained two metal rollers of high resistance, which could be adjusted for different speeds depending on the grains. On average, the press could yield 27

²⁹ ANS 1 R 376. The caption below the photograph reads: “Native installation for the treatment of oleaginous grain. Natives using a rudimentary material.”

to 30 kilograms of peanut oil an hour and could be transported from one household to another with relative ease. In this way, the French insisted that “l’huilerie familiale” had the potential to transform African households into a large network of individual peanut oil refineries which, in theory, could be used to power motor vehicles and facilitate the transportation of cash crops.

Despite their efforts to disseminate oil presses throughout the interior, the majority of peasant farmers continued to press peanut oil with a mortar and pestle. Due to the lackluster response to mechanical oil presses in the interior, the French encouraged the *Sociétés de Prevoyances* to serve as a hub for farmers to refine their peanuts into oil. Although some peanut producers used the larger peanut oil presses located at the *sociétés*, most cultivators preferred to press peanuts in the household and transport the oil to trading centers. Since peanut oil was, by volume, far easier to transport than peanuts in the shell, the majority of peanut producers maintained their preferred method of pressing peanuts by hand in the household.³⁰

For most of the colonial period, replacing fossil fuels with locally produced alternatives was speculative, and most colonial officials dismissed it as a fanciful dream. However, with the onset of World War II, the need for local sources of fuel increased dramatically as imports of fossil fuels declined throughout the French Empire. The sudden decline in fossil fuel imports, then, brought on a new level of urgency within the colonial administration. In 1941, the French colonial engineer, Jean Jalbert, drafted a report on the possibility of using peanut oil as a carburant for vehicles and local industries.³¹ In order to transform Senegal into a cash crop economy based on plant based fuels, and peanut oil in particular, Jalbert encouraged the colonial state to construct and organize its infrastructure almost exclusively around the production and transportation of vegetable oil.

³⁰ Henry, “L’huile végétale,” 24.

³¹ Jean Jalbert, “Une Réserve d’Énergie : L’Huile Végétale de l’Afrique Noire,” (Paris: Dunod, 1941).

Since the French colonial state's transportation infrastructure—namely railways and dirt roads—was already designed to consolidate and transport peanuts from the interior to the coast, Jalbert believed that the French could easily disseminate vegetable oil throughout the colony at a relatively low cost. To start, Jalbert insisted that “oil refineries should be installed throughout the entire colony,” or “at the very least in urban and cultural centers,” so as to ensure that there “is always enough fuel for *une force motrice*.”³² Furthermore, Jalbert also recommended that “a certain number of localities should be chosen for their geographical location” where the shelling, ginning, and pressing of peanuts could take place. These centers would serve as the “mother ship” for the factories and smaller oil refineries in remote areas, which, in turn, would be connected by new roads built specifically for the transport of peanuts and peanut oil.³³

To be sure, vegetable oils never reached the level of utility that Jalbert hoped, but they did serve as a resourceful alternative to fossil fuels in urban centers. In Dakar and Saint-Louis, the colonial state used vegetable oils to light street lamps and fuel hydraulic pumps to circulate water, and some factories and refineries used peanut shells as a source of combustible fuel rather than coal.³⁴ In Diourbel, one of the largest urban centers in the Peanut Basin, peanut oil refineries delivered 78,392 kW in 1938 and 81,267 Kw in 1941, which provided electricity for refrigeration, oil for street lamps, and lubricant for vehicle repair centers and other industrial needs.³⁵ Yet, in spite of these efforts, the French colonial state did not have the means or resources to reconfigure the entire colonial economy around the use of vegetable oils as a combustible source of fuel. In the end, vegetable oil served not as a panacea to wartime Senegal's energy woes but as a ready complement to another organic source of fuel: charcoal.

³² Jalbert, “Une Réserve,” 86.

³³ Ibid, 83.

³⁴ ANS 1 TP 771 ; Also in : Céline Ardurat, *L'électrification du Sénégal de la fin du XIXe siècle à la Seconde Guerre mondiale* in *Outre-Mers*, tome 89, no. 334-335, 1er semestre 2002. *L'électrification outre-mer de la fin du XIXe siècle aux premières décolonisation*, pg 439-457.

³⁵ Ardurat, *L'électrification*, 448.

In 1941, the colonial administration released a report entitled, “The Problem of Fuel and Alternative Fuel.”³⁶ The primary focus of the report was charcoal, and colonial officials complained that production “is rather minimal throughout the colony” despite the growing demand for charcoal in Dakar, Saint-Louis, and other coastal cities. The production of charcoal, according to the report, needed to reach 1,000 tons per month in order to be a viable “substitute for imported fuels.”³⁷ In response to the report, the Governor General of French West Africa encouraged all forest workers within the colonies to increase charcoal production by converting at least five percent of harvested timber into charcoal during the dry season, and then thirty percent during the wet season. In doing so, the colonial state introduced strict regulations designed to protect the colony’s forest resources by reserving charcoal production “for public services, or for enterprises of general interest designated by the governor.”³⁸ Under the new set of regulations, the French designated permits that provided forest workers with specific plots, or *coupons*, of land that they could exploit. This right, however, could be revoked if forest workers cut less than three quarters of the trees allocated to them.³⁹ The charcoal was loaded onto trains, trucks, and beasts of burden to coastal urban centers, where colonial officials distributed it to public institutions including army barracks, ports, hospitals, schools, and power plants.

³⁶ André Aubreville, “Contribution à l’étude des Charbon de Bois de l’Afrique Occidentale Française: Compte rendu des essais effectué par le Gouvernement Générale de l’Afrique Occidentale Française de novembre 1938 à aout 1939,” in *Actes et Comptes Rendus de l’Association Colonies-Sciences*, no. 232 (December 1940), 1-8.

³⁷ Aubreville, “Contribution,” 1-8. This is also referenced in Ribot’s work on the charcoal market: Jesse Ribot, “Markets, States, and Environmental Policy: The Political Economy of Charcoal in Senegal,” (PhD Dissertaton, UC-Berkeley, 1990), Pg 112.

³⁸ Ibid.

³⁹ Ibid, 113.

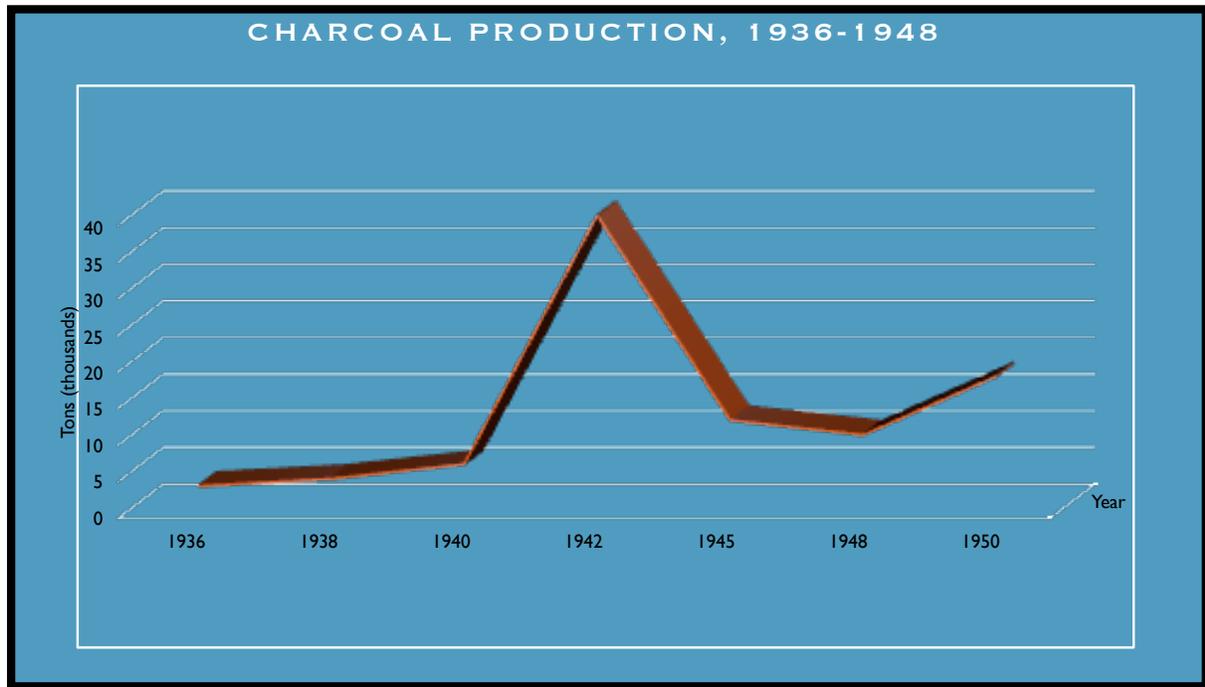


Figure 16: Charcoal Production, 1936-1948. This graph is based on one produced by Jesse Ribot, “Markets, States,” 111.

The call for an increase in production resonated with forest workers. By 1941, the total consumption of charcoal tripled in one year, climbing from an estimated 3,000 tons of charcoal per year to 9,000. A year later, production spiked, and nearly 38 thousand tons of charcoal were produced and consumed in Senegal’s urban centers—nearly double the amount required to replace fossil fuels in the colony.⁴⁰ By dramatically increasing charcoal production French colonial officials attempted to replace coal and petrol with locally produced woodfuels, which they believed could be a viable “economic substitute for imported fuels.”⁴¹

While charcoal served as a viable and accessible fuel for households, schools, administrative buildings, and some industries along the coast, the transition to a self-sustaining energy economy

⁴⁰ Aubreville, “Contribution,” 114. Since controlled charcoal did not account for charcoal consumed outside of colonial urban centers, and since colonial officials struggled to monitor and regulate the charcoal market, it is likely that production far exceeded this total.

⁴¹ André Aubreville, “Contribution à l’étude des Charbon de Bois de l’Afrique Occidentale Française: Compte rendu des essais effectué par le Gouvernement Générale de l’Afrique Occidentale Française de novembre 1938 à aout 1939,” in *Actes et Comptes Rendus de l’Association Colonies-Sciences*, no. 232 (December 1940), 1-8.

required a dramatic transformation in how the colonial state transported, refined, and exported cash crops during the war. Since petrol and coal were in short supply, colonial officials hoped to fuel trucks, cars, and trains with charcoal and woodfuels. In 1941, André Aubreville, the General Inspector of forests for AOF, conducted a detailed analysis of how the colonial state could transition from fossil fuels to charcoal. Since the colony's railways had long relied on locally produced woodfuels to transport crops from the interior to the coast, Aubreville's primary focus was on sustaining vehicle transport throughout the peanut basin. The solution, he believed, was to convert Senegal's entire fleet of vehicles to charcoal fired engines, known as *gazogènes*. Mounted on vehicles, *gazogènes* converted timber or charcoal into a woodgas—namely atmospheric nitrogen, carbon monoxide, hydrogen, and methane—which was then cooled, filtered, and used to power an internal combustion engine.⁴²

When Aubreville arrived in Senegal in February of 1941, he reported that there were only 18 *gazogènes* in the entire colony and roughly 2,300 trucks; by the end of the year, that number increased to 2,285—nearly one gazogene for every truck. To continue this trend, Aubreville encouraged the Governor General to offer tax incentives and subsidies to individuals who purchased and converted their vehicles to charcoal powered engines. In May of 1941, the Governor General implemented a new decree that reduced the import tax on *gazogènes* from twelve to one percent. This reduction, according the decree, was only applicable to “motor cars with *gazogènes* already in place or *gazogènes* intended to be placed on motor vehicles” and “covers only those vehicles powered by gas-fired internal combustion engines using forest fuels or plant-based wastes.” The law, therefore, allowed

⁴² Initially, the war-torn nations of France, Britain, and Germany used *gazogènes* as a viable alternative to fossil fuels, which were strictly rationed for the duration of the war. However, as *gazogènes* became a viable alternative to fossil fuels, the energy-starved colonies of the French Empire began to do the same in earnest.

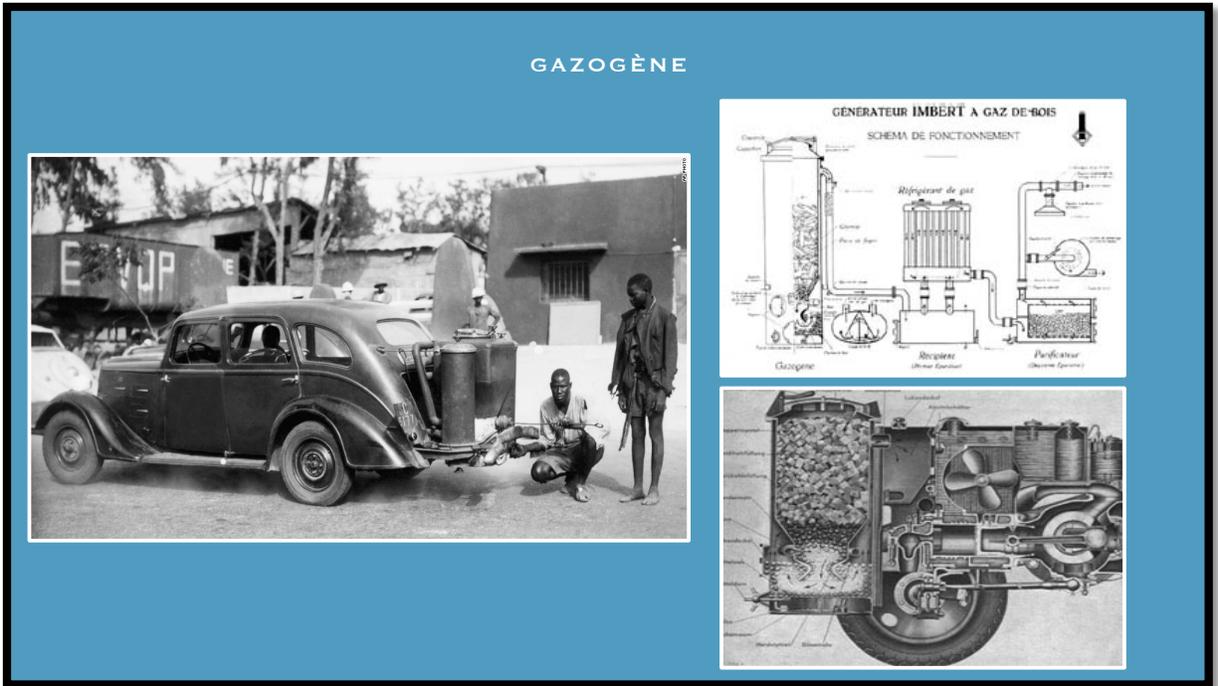


Figure 17: Two men stoking a charcoal-powered engine in Senegal, circa 1942; The images to the right show the internal combustion process of the gazogène. Images can be found here: BnF, “Gazogène au Sénégal,” Gallica, <https://gallica.bnf.fr/services/engine/search>.

tax breaks and incentives for three types of locally produced fuels: firewood, charcoal, and vegetable oils. Through tax incentives and reductions, then, the French increased the circulation of *gazogènes* in the colony and, in turn, helped sustain the transportation of cash crops and other raw materials from the interior to the coast during the war.⁴³

To demonstrate the capabilities of the *gazogène-powered* vehicle, the colonial state conducted three test runs across French West Africa. The first “mission” travelled from Dakar to Abidjan; the second traversed the colony of Guinée; and the third stretched across the colonies of Senegal and Mauritania. For all three trips, the colonial state used the same *gazogène-powered* truck, which traveled approximately 20,464 kilometers and used a wide variety of charcoal from different species of trees.⁴⁴ In his report, “Contribution à l’étude des charbons des bois de l’Afrique Occidentale

⁴³ Journal Officiel du Senegal... “Regulation and Circulation of Gazogène Automobiles and the Construction and Instillation of Gazogènes,”

⁴⁴ Aubreville, “Contribution à l’étude,” 2.

française,” Aubreville noted that the quality of charcoal used for the *gazogènes* motor was critical to its performance.⁴⁵ Over the course of its first voyage across AOF, for example, Aubreville reported that the truck was overwhelmingly susceptible to “incidents, breakdowns, and complications” due to poor quality charcoal. Since there was no way of knowing how the charcoal was produced or its chemical value and content, Aubreville noted that there was no other option but to depend on locally produced charcoal that likely contained impurities and pollutants.⁴⁶

The challenge for colonial officials, then, was to differentiate between well-made and poorly-made charcoal and to establish a uniform system of production that would provide motorists with reliably clean and efficient fuels. In an attempt to standardize the quality of charcoal for *gazogènes*, Aubreville conducted a series of experiments to identify the most efficient type of charcoal available in Senegal. In general, the quality of charcoal “depends on how it was prepared, the species of wood used in the process, and the overall humidity of the charcoal.” According to Aubreville, the process of making charcoal was the most critical factor and it often determined whether the charcoal was fit to fuel a *gazogène*. The charcoal, he argued, “must be well cooked” to ensure that all of its “volatile materials” are distilled; if the charcoal did not burn hot enough, for example, “the tars and pyroligneous acid” would fail to “burn off completely in the furnace of the *gazogène*” and would “clog the canvases of the filter.”⁴⁷ Put simply, not all types of charcoal were fit to fuel the *gazogène* and the French consistently struggled with developing, and implementing, an acceptable standard for charcoal as a reliable carburant.

⁴⁵ Aubrevill, “Contribution à l’étude,” 2.

⁴⁶ Ibid.

⁴⁷ Ibid, 3.

TABLEAU N° 1 : Essais de charbons.								Essais de charbons : TABLEAU N° 1						
Nom indigène local	Nom scientifique	Origine	Fabrication (1)	Densité de chargement	Distance parcourue	Charge utile	Vitesse moyenne	Temps de marche	Temps des arrêts	Consommation aux 100 km.	Mâchefeur	Poussières	Goudron ou pyroigneux	Observations générales
Siddem	<i>Zizyphus jujuba</i>	Bandia	F. M.	0,38	150 km.	2 t.	46 km/h.	3 h. 15	—	46 kg.	Chaux 1 kg.	—	0	Bon charbon. Consommation un peu forte en raison d'un très long arrêt.
Ie	<i>Prosopis africana</i>	Kindia (Guinée)	m. i.	0,46	152	2 t.	42,4	3 h. 35	—	49,3	Quelques grains 60 gr.	—	0	Bon charbon. Consommation élevée, en raison de la très-mauvaise route suivie.
Sourour	<i>Acacia stenocarpa</i>	Bandia	F. M.	0,22	150	2 t.	47,3	3 h. 10	—	35,3	Chaux 0,55	—	0	Bon charbon.
Kinkéliba	<i>Combretum micranthum</i>	Bandia	F. M.	0,26	150	2 t.	45,4	3 h. 18	—	36,3	Chaux 1,2	—	0	Très bon charbon.
Tamarinier	<i>Tamarindus indica</i>	Bandia	F. M.	0,25	150	2 t.	46,1	3 h. 15	—	38,8	Chaux 3,75	—	0	Médiocre charbon. Obstruction du foyer en fin d'étape par la chaux rendant les reprises difficiles.
Sinteh	<i>Dichrostachys aetensis</i>	Bandia	F. M.	0,248	151	2 t.	45,7	3 h. 18	—	36,5	Chaux 0,7	—	0	Bon charbon.
Tall	<i>Erythrophloeum guineense</i>	Casamance	F. M.	0,31	153	2 t.	47,5	3 h. 13	—	42,4	0	—	0	Excellent charbon.
Kel	<i>Grassia bicolor</i>	Bandia	F. M.	0,265	150	2 t.	47,3	3 h. 10	—	42,2	Chaux 0,7	—	0	Bon charbon.
Sandandour	<i>Acacia Sieberiana</i>	Bandia	F. M.	0,24	151	2 t.	49,5	3 h. 3	20'	49,5	Chaux 0,77	—	0	Très bon charbon.
Gueteh	<i>Anoplolepis leucocarpus</i>	Bandia	F. M.	0,293	150	2 t.	50	3 h. 8	20'	51,3	Chaux 2,2	—	0	Bon charbon, mais trop de chaux et un peu de mollesse dans les reprises en fin d'étape.
Mboul	<i>Celtis integrifolia</i>	Bandia	F. M.	0,219	150	2 t.	46,8	3 h. 12	10'	42,6	Chaux 1,08	—	0	Quelques fibres tachées. Assez bon charbon.
Koukour	<i>Acacia campylodes</i>	Bandia	F. M.	0,192	150	2 t.	45,2	3 h. 19	1 h. 56	52,2	Chaux 0,4	—	0	Fibres légèrement roussies. Bon charbon.
Rhos	<i>Mitragyna inornata</i>	Bandia	F. M.	0,24	143	1,8 t. 1/2 pare.	36,9	3 h. 52	4 h. 48	44,7	Chaux 0,9	—	0	Bon charbon, mauvaise route sur 70 km.
Sourour	<i>Acacia stenocarpa</i>	Bandia	F. M.	0,22	60	2 t.	31,3	1 h. 55	2 h.	58,6	Chaux 0,5	—	0	Essai de consommation à l'arrêt.
Ratt	<i>Combretum affinis</i>	M'Bour	F. M.	0,277	152	2 t.	45,6	3 h. 20	17'	36,5	Chaux 0,38	—	0	Quelques fibres tachées. Bon charbon.
Kossito	<i>Bauhinia guineensis</i>	Casamance	F. M.	0,296	154	variable	49,9	3 h. 5	8 h. 50	67,8	Chaux 2,15	—	0	Très bonne marche du camion en dépit du mâchefeur abondant.
Koulinkon	<i>Prosopis africana</i>	Casamance	F. M.	0,325	152	2 t.	43	3 h. 32	28'	42,4	0	7 kg.	0	Charbon médiocre. Mauvais rendement à un léger colmatage du filtre par du goudron.
Sourour	<i>Acacia stenocarpa</i>	Bandia	F. M.	0,22	151	variable	40,1	3 h. 45	6 h. 10	37	Chaux	—	0	Quelques fibres sales. Bon charbon. Consommation réduite en dépit des arrêts prolongés et d'une mauvaise route sur 70 km.

(1) F. M., four métallique, m. i., meule indigène.

Figure 18: André Aubreville, "Contribution à l'étude," 6.

Thus, Aubreville hoped to establish a uniform system of production that would enable the colonial state to provide motorists with reliably clean and efficient fuels. In experimenting with four types of charcoal from the regions of Thiès, Richard Toll in the Senegal Valley, Casamance, and the colony of Guinée, Aubreville designed a series of tests to identify the most efficient varietal of charcoal. More specifically, he measured eight different characteristics for each type of charcoal: (1) the density of charcoal; (2) the distance traveled per kilogram of charcoal; (3) the average speed of the vehicle; (4) the duration of the trip; (5) total stops need during the trip; (6) consumption of charcoal; (7) the weight and consistency of the clinker, or residue, in the foyer; (8) the weight of dust taken from the scrubber.⁴⁸

In the table above, Aubreville recorded the results of the study with the corresponding name of the charcoal used, and long with the eight data points recorded in the experiment, he provided short "observations générales" describing the quality of the charcoal and, if applicable, its potential

⁴⁸ Aubreville, "Contribution à l'étude," 7.

disadvantages. On average, the *gazogène*-powered truck traveled 150km with an average speed of 44.6 km/h, and an average time of 3 hours and 36 minutes. Although Aubreville identified many varieties of charcoal as “very good” or “excellent,” he warned that there were many variables that could have influenced the results of the experiment. While some charcoals might have produced the fastest speed—such as *Kossite* from the region of Casamance—the conditions of the road, the weather, and familiarity of the driver with the route all could have affected the outcomes. Moreover, Aubreville stressed the importance of maintaining a consistent type of fuel. Introducing too many types of charcoal, he insisted, could lead to an “excessive amount of residue in the foyer” and disrupt the process of combustion.⁴⁹ Nevertheless, Aubreville identified what he believed were the best, and most widespread, species of trees for charcoal production. The most efficient types of charcoal came from acacia trees, and more specifically, the *Gonakié*, the *Seing*, and the *Gommier*. These trees, which were widely available throughout the Senegal Valley, produced “excellent charcoal” and could be cultivated throughout the wooded savanna of the interior. In addition, he noted that several other trees found savanna, specifically the *Soump* and *Sintch* species, yielded a “good and usable” charcoal that was widely accessible to forest workers. Taken together, Aubreville noted that the ubiquity of these “proves that *gazogène* powered trucks can crisscross, without any threat or restriction the whole Sahelian zone and even penetrate, from supply centers located in this zone, into the Sahara.”⁵⁰

In order to fuel *gazogènes*, the colonial administration needed to establish distribution stations where trucks and cars could refuel with charcoal. Since the consumption of charcoal was relatively high for *gazogènes*, with the average truck burning one kilogram of charcoal per kilometer driven, vehicles traveling in rural areas needed to refuel frequently. Within a year of Aubreville’s study, the colonial state constructed approximately 130 distribution centers across AOF, which enabled trucks

⁴⁹ Aubreville, “Contribution à l’étude,” 18.

⁵⁰ Ibid, 18.

to travel along the main traffic arteries of French West Africa. Since charcoal could be produced anywhere in the wooded savanna region of West Africa, local villages were expected to provide the distribution centers with charcoal. This meant the quality of charcoal varied considerably and motorists frequently broke down or stopped to clean the *gazogènes* and remove any materials obstructing the filter.

The challenge in selecting a high-quality charcoal for *gazogène*-powered trucks was largely due to local methods of charcoal production, which varied considerably throughout the colony. In general, migrant Fula workers in Thiès and the Petite Côte, two forested regions within a short distance of Dakar, made the majority of charcoal in Senegal during the colonial period. In the region of Thiès, for instance, seasonal workers arrived after the harvest to make and sell charcoal on the black market. In a report from 1939, M. Roure, an inspector in the *Service des Eaux et Forêts* in Senegal, noted that migrant workers often settled in the forests and “installed charcoal mounds wherever they pleased.”⁵¹ Working in groups of 10 to 20, the Fula typically exploited 250 to 500 square meters of forest and selected dense hardwoods, such as *acacia senegalaise* and *khaya senegalensis*, which is also referred to as Senegal mahogany.⁵² In most cases, forest workers felled large trees, chopped and collected the branches, and then constructed several charcoal mounds nearby, as to avoid transporting heavy branches from the felled tree to the mound. For each mound, workers piled large branches on top of each other—typically one meter in length—and then used several smaller branches as kindling to ignite the fire and start the carbonization process. During the construction of the mound, they molded a small chimney with branches and mud, which, upon completion, would enable them to ignite the fire without exposing it to too much oxygen. After lighting the fire, they then closed the chimney and left the mound to burn for an extended period of

⁵¹ Aubreville, “Contribution à l’étude,” 28.

⁵² Ibid.

time. Small and large batches of charcoal burned for shorter and longer periods of time; the former could take just 12 hours while the latter could take up to three to five days.⁵³

Since charcoal production occurred in the forested regions of the interior and migrant workers lived in temporary villages for a short span of time, the colonial state failed to regulate the charcoal industry in an effective manner. According to Abdou Fall, a former officer in the *Service des Eaux et Forêts* during the late colonial period, the French were aware that migrant workers produced the majority of charcoal consumed in Dakar, but were incapable of regulating it with the service's small staff and limited resources.⁵⁴ While black market charcoal was “evidently a serious disadvantage from the point of deforestation,” as Aubreville noted in 1942, the colonial state was largely tolerant of production outside of the colony's *forêts classes* so long as locally produced fuel continued to reach urban centers.⁵⁵

In 1943, the return of fossil fuels imports to French West Africa prompted a rapid decline in the demand for charcoal.⁵⁶ As imports in petrol and coal reached Senegal toward the end of the war, fuel supplies gradually stabilized and the colonial state suspended its production obligations for charcoal producers. Yet, the return of fossil fuels did not deter some colonial officials from advocating for a sustained increase in charcoal production. Shortly after the war, Paul Bellouard, an officer in the *Service forestière*, argued that increased production and consumption of charcoal made Senegal less vulnerable to unexpected energy shortages and scarcities. Indeed, he believed that it was “better, in effect, that Senegal should devote its foreign exchange to the purchase of capital goods—machines, automobiles, tractors—rather than to import high energy which can be found on its own

⁵³ Aubreville, “Contribution à l'étude,” 28.

⁵⁴ Abdou Fall, “Interview with Abdou Fall,” interview by John Cropper, April, 21, 2015.

⁵⁵ Ibid.

⁵⁶ Ribot, “States, Markets,” 115.

soil.”⁵⁷ In spite of Bellouard’s call for a continued devotion to locally produced biofuels, the colonial state imported more fossil fuels after the war. For the most part, the French no longer needed charcoal and firewood to fuel trucks, cars, and factories and relegated the use of woodfuels to the household and small industries.

The end of World War II also marked the end of Senegal’s momentary shift to a renewable energy economy powered by vegetable oils and woodfuels. Though brief, this short period in Senegal’s history demonstrates that, even with the limited resources available, there were viable alternatives to fossil fuels. Indeed, through the use of *gazogène*-powered vehicles, the colonial state used charcoal as a means to transport people and goods throughout the colony. In the years following the war, local sources of fuel continued to play a significant role in the colony’s economy. As the next section will show, despite the colonial state’s efforts to develop and “modernize” the colony through technological and industrial advancements, Senegal’s postwar growth was continued to be fueled by a mixed energy economy—one that relied on imported fossil fuels and local organic sources of energy.

Igniting the Great Acceleration: The Mixed Energy Economy from 1945-1970

At the start of the Great Acceleration in 1945, the French colonial state implemented a new approach to their colonial empire based on a *dirigiste* brand of state intervention.⁵⁸ In need of natural resources and revenue to rebuild the metropole after World War II, the French governed its colonies through a technocratic program of developmental imperialism.⁵⁹ This program, which focused on industrialization, economic development, and a more inclusive form of imperial politics,

⁵⁷ Paul Bellouard, “La Question Forestière au Sénégal” (Saint-Louis: Office des Eaux et Forêts forêts

, 1947); This quote is also referenced in Ribot, “States, Markets,” 115.

⁵⁸ Cooper, *Africa Since 1940*, 7; Ross, *Ecology and Power*, 352.

⁵⁹ Ibid.

aimed to reinvigorate Senegal's economy through an expansion of industrial and agricultural production. Colonial officials in French West Africa, therefore, aimed to provide the services of a "modern" state—schools, transportation infrastructure, clean and piped water, and public health services—to rural and urban Africans.⁶⁰ In doing so, the French attempted to generate revenue through public and private funds, such as the *Fonds pour l'Investissement en Développement Économique et Social* (FIDES), a state-sponsored investment fund for colonial development, as well as courting wealthy businessmen and entrepreneurs in the metropole.⁶¹ By collecting public and private funds, the colonial state hoped to transform Senegal into an industrializing nation in the postwar period.

Despite a brief period of economic malaise during and after the war, Senegal experienced an economic boom that lasted for nearly twenty years. Rising prices in exports were matched by an increase in agricultural production, providing Africans with enough income to import industrial goods, to pay for the expansion in social services and health facilities, and to construct roads, harbors, and government buildings.⁶² During this time, the colonies of French West Africa also won their independence and newly elected state actors took control of the region's expanding economies.

In Senegal, the plan to develop and industrialize the colony's cash crop economy required a significant increase in colonial state intervention. In the postwar period, colonial technocrats pursued agricultural schemes through a high-modernist approach that relied on fossil fuels. The two most ambitious projects—to establish plantations of rice agriculture in the Senegal River Delta and to modernize peanut production in the Peanut Basin and Casamance—were designed to transform "traditional" agricultural practices into a system of "modern" cultivation based on fossil fuels, synthetic fertilizers, mechanization, and hydroelectric-powered irrigation.⁶³ Through these large-scale

⁶⁰ Cooper, *Africa Since 1940*, 44.

⁶¹ *Ibid.*, 45; Ross, 353.

⁶² Patrick Manning, *Francophone Sub-Saharan Africa, 1890-1995* (Cambridge: Cambridge University Press, 1998), 111.

⁶³ Ross, *Ecology and Power*, 353-360.

projects, then, the colonial state not only aimed to “modernize” Senegal’s organic economy, but to establish firm control over fertile land and its exploitation.

Buoyed by the technological advancements of agriculture in Europe and the United States, colonial officials believed that they could gradually change, and control, the agrarian energy economy of the Senegal Valley. Shortly after the war, Louis Papy, a French technocrat and professor of geography, explored the possibility of establishing rice agriculture in the Senegal River Valley. In revisiting France’s past attempts to install plantation agriculture along the Senegal River, from failures to construct sugar plantations in the 1820s to the disappointing results of rice cultivation in the 1920s, Papy insisted that this seemingly impossible task would now be possible through the aid of modern technology and fossil fuels.⁶⁴

To start, the development of agriculture in the delta required a new hydraulic system that would irrigate the fields through a mechanized system of pumps.⁶⁵ Since the Senegal River Delta has very little land variation in terms of elevation, saltwater travelled upstream as the floodwaters inundated the fields. At times, the salinity of the floodwaters destroyed the crops and left a salty residue on the topsoil after the floods, leaving approximately 18 grams of salt behind—about 13 grams more than rice could tolerate.⁶⁶ In particularly bad years, saltwater extended up the Taouey, a tributary river of the Senegal River near the small town of Richard Toll, to the fresh water lake of Guiers, which supplied much of the region with drinking water and irrigation for crops. In order to mitigate the salinity of both the Senegal River and the lake, the *Mission d’Aménagement du Sénégal* (M.A.S.), a branch of the public works service, constructed a concrete dam along the Taouey River

⁶⁴ Louis Papy, “La Vallée du Sénégal, Agriculture traditionnelle et riziculture mécanisée,” in *Problèmes Agricoles Au Sénégal* (Dakar: IFAN, 1952) 40.

⁶⁵ Ibid.

⁶⁶ Ibid, 41.

that blocked the salt water from entering the lake and regulated the circulation of water through a system of hydroelectric pumps.⁶⁷

According to Papy, the hydroelectric station, in its first year of operation, directed enough water to irrigate 120 hectares of cultivated land and, in its second year, approximately 600 hectares. After the initial success of the dam and the hydroelectric station, the M.A.S. extended the irrigation system by constructing canals throughout the region of Richard Toll. The plan was to divide four cultivation units of 1,500 hectares each, with the first unit being sown in 1952 and the other three in 1953.⁶⁸ The early success of the Richard Toll rice project, according to Papy, was due in large part to the mechanized practice of rice cultivation of the *Service d'agriculture*. In each cultivation unit, the French cleared the land and sowed the fields with mechanized tractors. With this “modern and powerful” strategy of cultivation, nearly all of the “work is, or will be, mechanized,” from “fertilizer application, harvesting, and threshing to ensiling, sowing, and bagging the rice.” In this way, the mechanization of rice cultivation would not only require minimal labor from local farmers but it would also provide them with staple grains.⁶⁹

Despite its initial success, some French colonial officials doubted whether the Richard Toll rice project would succeed over the long-term. According to René Dumont, a colonial official and agronomist, the modernization of agriculture was not transferable to all climates and regions throughout the colonies, and especially to those regions in Sahel. For Dumont, the unpredictability of the climate, the fragility of the topsoil, and the periodic plagues of locusts and other pests undermined the potential of mechanized agriculture to yield robust harvests.⁷⁰ In a similar manner, several agronomists warned that the unreliable outcome of projects like Richard Toll did not warrant

⁶⁷ Papy, “La Vallée,” 41

⁶⁸ Ibid.

⁶⁹ Ibid, 44.

⁷⁰ René Dumont, “La mise en valeur de l’Afrique tropicale,” in *Economic Contemporaine* (Paris, 1951), 304.

their considerable expense, and that the colonial state was better off investing in, and refining, the existing cultivation methods of the indigenous population.⁷¹

Nevertheless, for the supporters of large-scale agricultural projects in the postwar period, the initial success of rice cultivation in the delta underscored the transformative power of modern technology. As one of the most forceful advocates of the Richard Toll rice project, Louis Papy defended the colonial state's large-scale agricultural projects, arguing that "if one were to consider only the immediate costs instead of the long-term benefits of mechanized cultivation, it would require giving-up on benefitting Africa from the progress of modern technology and improving the living conditions of the African population."⁷² Even further, Papy urged that Senegal's future was at stake, insisting, in a somewhat poetic manner, that "the powerful pumps at the head of the delta, as well as the machines moving with a loud crash in the mud alongside the geometric fields of rice as far as the eye can see," were "images of a new Africa that would progress as quickly as the rippling of the river and the breath of the trade winds."⁷³ Papy's vision of a landscape transformed by mechanized rice agriculture not only highlights the ambitious and seemingly unrealistic expectations of French colonial technocrats, but it also portrays the French as "saviors" that would bring Africans and their environments into the "modern" world.

In spite of its early success, however, the Richard Toll rice project failed to meet the high expectations of colonial technocrats in Dakar. In the end, the French sowed just 6,000 of the planned 50,000 hectares and spent nearly 4 million francs in the process.⁷⁴ According to Dumont, the high cost of the project was due, in part, to "inadequate preliminary studies and a narrow agricultural engineering view point."⁷⁵ Indeed, some of the same challenges that undermined

⁷¹ Auguste Chevalier, *Révolution en Agriculture* (Paris: Presses Universitaires de France, 1946), 277-78. Also quoted in Ross, *Ecology and Power*, 358.

⁷² Papy, "La Vallée," 47.

⁷³ Ibid, 48.

⁷⁴ Ross, *Ecology and Power*, 359.

⁷⁵ René Dumont, *A False Start*, 304-05.

previous attempts to establish plantation agriculture in the Senegal River Delta proved to be similarly disastrous for colonial officials. In the 1820s, Colonel Schmaltz's plan to develop plantation agriculture failed due to the absence of a local labor force and the invasion of grain eating birds, known as Quelea, that destroyed entire harvest and devastated French attempts to transform the Senegal Valley into a plantation economy.⁷⁶ Over 100 years later, the Richard Toll project seemed to experience the same fate. The Quelea invaded the delta, devastated the crop, and threatened to ruin the entire project.⁷⁷

In 1957, after the disappointing results of mechanized rice cultivation, the French turned the rice fields over to local farmers recruited from nearby villages. The selection of the farmers, according to Dumont, was not based on agricultural expertise in rice cultivation but, instead, on local politics among village leaders. As such, Dumont lamented that the project ultimately failed due to the fact that the majority of the farmers had little knowledge of mechanized rice cultivation, how to operate motorized tractors, acquire advanced seeds, and maintain the canals and drains in the way the French instructed.⁷⁸ By the time Senegal achieved its independence in 1960, the Richard Toll rice project yielded a paltry 18.5 quintals, or 18,000 kilograms, of rice—just a small fraction of what colonial technocrats hoped to produce at the outset of the project.⁷⁹ The failure of the Richard Toll rice project demonstrates how mechanized agriculture, despite its alluring promise of producing large harvests and high crop yields, was inferior to local methods of agricultural production. Without adequate knowledge of the landscape, soils, foliage, and climate, the bulldozers and earth movers of the French colonial state were of little use.

⁷⁶ For more detail on Colonel Schmaltz and early attempts at plantation agriculture, see Chapter Three of this dissertation, "The Imperial Refinery: The Politics of Energy and "Legitimate Commerce" in Precolonial Senegal, 11-13. Also cited in Ross, *Ecology and Power*, 359.

⁷⁷ Even further, the French lacked the manpower to mitigate invasive species, namely wild rice, that invaded the rice fields and disrupted the harvest. See: Dumont, *A False Start*, 304.

⁷⁸ Ibid.

⁷⁹ Ibid, 305.

In addition to the Richard Toll rice project, the French colonial state hoped to modernize Senegal's organic economy through the mechanization of peanut cultivation. In the wake of World War II, the global economy experienced a shortage of vegetable oils and fats, which brought particular attention to Senegal's peanut industry.⁸⁰ According to Paul Pélissier, a French colonial agronomist and senior administrator at the *l'Institut Fondamental d'Afrique Noire* (IFAN), colonial "technicians" in the *Service d'agriculture* were concerned that the "imperfections and dangers of native agriculture, which was reflected in a strong trend toward lower yields," would not respond quickly enough to the global demand for peanuts and peanut oil. Only through a more rationalized and modern system of exploitation, he insisted, could the "virgin land be rationally exploited" and "provide a massive export" that could meet the demand of the global market.⁸¹

From the start, French agronomist in the postwar period attempted to "modernize" peanut cultivation in the Senegal Valley by transforming the small fields of local farmers into large-scale, permanent peanut plantations. In doing so, colonial officials hoped to convert "native" peanut fields, which were "all too often exhausted as a result of the shortening of cropped fallows," into organized plots of fertile land by introducing "new techniques" developed at agricultural research centers within the colony.⁸² Perhaps the most important practice of peanut cultivation, according to Pélissier, was the selection of seeds. Since most Senegalese farmers did not keep or conserve seeds from one growing season to the next, Pélissier noted that this "mentality" not only "requires an

⁸⁰ Paul Pélissier, "L'Arachide au Sénégal, Rationalisation et modernization de sa culture," in *Problèmes d'Agricoles su Sénégal* (Saint-Louis: IFAN, 1952), 4.; Dumont, 60; and Ross, 358.

⁸¹ Ibid 4. In his 1952 study of Senegal's peanut industry, Pélissier identified three aspects of the "peanut problem" that hindered peanut cultivation within the colony. First, colonial technicians needed to maintain production in the traditional regions of peanut cultivation, such as the Old and New Peanut Basins. This task, according to Pélissier, required an improvement in the quality of seeds planted as well as the stabilization of both the fields and soil. The second objective was to "control indigenous deforestation" while promoting the "use of methods and techniques to maintain the quality of the soil" and to prevent "desertification from occurring in new areas." And third, Pélissier recommended that private enterprises should be subsidized by the colonial state "to ensure, in view of the external market, that a massive and regular production" of peanuts was harvested through "the use of powerful and mechanical equipment in the hands of European technicians."

⁸² Ibid, 53.

annual distribution of seeds to peanut growers” but also an organization “charged with the production and distribution of seeds” to local populations. Although the distribution of seeds presented its own logistical challenges, it also provided colonial officials with an opportunity to control and regulate which seeds peanut farmers used. Colonial research centers, such as *le service de génétique de Bambey*, could select the best varietal of peanuts to grow in a given year and then instruct the *Sociétés de Prévoyance* to distribute the seeds to farmers. According to Pélissier, these genetically designed peanut seeds increased the yield by 28 percent in experimental field tests and could, over time, accelerate the rate of crop production within the Peanut Basin.⁸³

In addition to seed selection, the French believed that the primary obstacles to modernizing peanut cultivation were the limitations of Senegal’s growing season and the lack of mechanized agricultural equipment. Since the growing season is approximately 100 to 130 days, or just one third of the calendar year, colonial officials noted that local methods of agriculture were incapable of increasing peanut harvests by a significant percentage.⁸⁴ Even further, without mechanized agricultural equipment, the obstacles to increasing peanut production was not a question of technical ability but of human capacity. Although some Senegalese farmers used draft animals for peanut cultivation, the vast majority of peanut growers could not afford to purchase beasts of burden. To overcome these obstacles, colonial officials encouraged the *Sociétés de Prévoyances* to disseminate mechanical tools to local villages and to train farmers “a new technique in sowing their fields so that full use of the machines is possible.”⁸⁵ This new technique, according to Pélissier, would place seedlings in twin lines about twenty centimeters apart, and then separated from the next pair of twin lines by a distance four times that. In doing so, the farmers would create enough space to “allow the

⁸³ Pélissier, “L’Arachide au Sénégal,” 57.

⁸⁴ Ibid.

⁸⁵ Ibid, 58.

passage of mechanical hoes and traction units” to cultivate the land.⁸⁶ Through this mechanized and “rational” system of exploitation, the French hoped to expand peanut cultivation in the interior.

Along with the mechanization of small-scale farming in the traditional peanut growing regions of the colony, the French also advocated for a mechanized system of large-scale plantations in regions outside of the Peanut Basin. In 1950, the French established an experimental plantation in Boulel, a small village near the town of Kaolack. In using motorized farming equipment, colonial officials cleared the land using mechanized “methods to reduce soil erosion” and create “a large-scale bocage” that “imposes on the landscape the permanent imprint of man.”⁸⁷ According to Pélissier, colonial technicians used “powerful bull-dozers to assault the trees” and clear the way for the “remarkable work of the seeders, cultivators, harvesters, and threshers” that transformed the savanna into a fertile parcel of land.⁸⁸ Despite the “inherent risks in the mechanization of clearing and cultivation methods,” which were the omission of “deep roots” and “rocks” left behind in the soil, the French believed that mechanized agriculture would not only benefit cash crop production but also increase the yield of staple grains.⁸⁹

Between 1947 and 1952, the French embarked on an audacious mechanized agricultural project in the southern region of Casamance. Initially, the colonial state commissioned the *Compagnie Générale des Oléagineux Tropicaux* (CGOT) to construct a 100,000 hectare peanut plantation in a wooded savanna area depopulated by sleeping sickness.⁹⁰ Within two years, the CGOT transformed the landscape which, according to Pélissier, was “yesterday still left to the ravages of the Fulani shepherds,” but “now resonates with the noise of enormous mechanical machines...that demonstrate the massive intervention of Western techniques and their brutal and revolutionary

⁸⁶ Pélissier, “L’Arachide au Sénégal,” 62.

⁸⁷ The term bocage refers to a terrain of mixed woodland and pasture, with tall thicket hedgerows that break the wind and limit visibility.

⁸⁸ Pélissiere, “L’Arachide au Sénégal,” 62-3.

⁸⁹ Ibid, 63.

⁹⁰ Dumont, *A False Start*, 56.

upheaval of the landscape.”⁹¹ Indeed, the purpose of the project was to establish an independent peanut plantation that was “based on the most recent advances in mechanization and agricultural science.”⁹² Almost immediately, the CGOT encountered extraordinary challenges as soon as they broke ground. In their attempt to mechanize the entire process of peanut cultivation, the French imported American equipment and employed methods of agriculture originally developed for fields in the hills of Virginia, a region that had been under cultivation for decades.⁹³ As early as December 1947, the first parcels of land that were cleared by bull-dozers experienced severe soil erosion. The soil, which was inadequately prepared, eroded on any slope that was over 1.5 percent gradient. This was, in part, due the significant amount of barren subsoil brought to the surface by the scraping and hauling of felled trees with deep root systems.⁹⁴

The pace of denuding and planting the landscape was also painfully slow. After the bulldozers cleared the fields, a number of tree roots were left behind and severely damaged the smaller and more delicate planting equipment, such as mechanized plows and soil tillers. Once cleared, the subsoil, lacking in nutrients and minerals, required vast quantities of fertilizer to yield even a modest harvest of peanuts. Furthermore, in clearing the trees, the French exposed the fragile top soil to the unrelenting sun of the tropics, the punishing winds of the dry season, and the torrential downpours of the wet season. Without forest cover to provide shade or a deep root system to absorb water, the land baked during the dry season and then, during the wet season, the impenetrable layer of crusted top soil failed to absorb the rains and nearly all of the newly cleared land flooded.

Despite these early difficulties, colonial technicians continued to prepare parcels of land for peanut cultivation up until 1952. After four years of uprooting trees and clearing the lands for

⁹¹ Pélissier, “L’Arachide au Sénégal,” 70.

⁹² Ibid.

⁹³ Dumont, *A False Start*, 56.

⁹⁴ Ross, *Ecology and Power*, 356-7.

peanut cultivation, the colonial state suspended all mechanized cultivation and refashioned the CGOT as a research station for the gradual mechanization and improvement of indigenous cultivation techniques.⁹⁵ According to René Dumont, who served as a colonial agronomist for the CGOT, the total expense of the Casamance peanut project was approximately 4 billion francs. The only positive result that came from the project was “the perfecting of several local techniques of peanut cultivation,” which, he lamented, “could have been obtained at an infinitely lower cost.”⁹⁶ Indeed, Dumont noted that the “deficits could have been eliminated had local peasants cultivated the peanuts” and “had ploughs and draught animals been used instead of bull-dozers and tractors.”⁹⁷ Similar to the Richard Toll rice project, French colonial technocrats were uninformed about the ecology of the Casamance, the fragility of its soils, and the fluctuations in precipitation. Although mechanized agriculture yielded results elsewhere in the world, the most effective way to exploit and cultivate the uninhabited fields of Senegal’s interior was, according to Dumont, with draught animals and ploughs.⁹⁸

While the advancements in “modern” agriculture contributed to the rapid growth of Western economies and helped ignite the Great Acceleration in the postwar period, they failed to serve a similar purpose in the colonies. This failure, for some colonial officials, was not due to the “backwardness” or “primitive” nature of African populations, but rather, it was a failure to develop energy resources that could sustain modern methods of cultivation and continuously provide high yields. Progress in agriculture, as René Dumont noted in 1962, “should not be considered as a preliminary to industrialization” but an “indispensable corollary.”⁹⁹ Indeed, the essential components for an agricultural revolution in Africa were not only “irrigations schemes, organic and mineral

⁹⁵ Ross, *Ecology and Power*, 356-7..

⁹⁶ Dumont, *A False Start*, 70.

⁹⁷ Ibid.

⁹⁸ Ibid.

⁹⁹ Ibid, 32.

fertilizers, and effective erosion prevention,” but also the “utilization of new and economical sources of energy.”¹⁰⁰ In order to “modernize” Senegal’s organic economy, then, some French colonial officers recognized that, alongside mechanized agriculture and fossil fuel-powered farming equipment, the colonial state needed to draw on a variety of energy sources to ignite economic growth.

However, while some colonial officials believed that the best way to improve agriculture was to refine local methods of cultivation and gradually introduce mechanization, many French technocrats feared that Africans would further degrade their environments with fossil fuel guzzling bull-dozers and tractors. In one report from 1955, a colonial officer in the *Service des Eaux et Forêts* worried that the Murid Brotherhood, in adopting Western practices of mechanized cultivation, would colonize new territories outside of the Peanut Basin and place new lands at the risk of soil erosion.¹⁰¹ In a similar manner, Paul Pélissier feared what might happen if the Murids adopted mechanized agriculture to expand their stake in Senegal’s cash crop economy:

Here, in particular, the stakes are high: will they transform a religious aristocracy into enlightened despots, constituting, at the vanguard of progress, the indigenous cadres indispensable to technical education and social evolution of the peasant? Or will they use machines to enslave their followers and thus strengthen their own social supremacy? Are these mechanized machines among the hands of autocrats urged to multiply the efficiency of a labor force that is subject to subjection, or between those of great lords who are aware of the dangers of desertification which weigh on their country and have decided to reduce them by methods of rational cultivation?¹⁰²

Pélissier’s anxieties over whether the Murids would use mechanized, fossil fuel-powered agriculture for their own benefit—and to the detriment of the colony’s environment—underscores just how ineffective the colonial state’s high modernist policies were. As Pélissiere seemed to suggest, the French had very little control over how local populations, and the Murids in particular,

¹⁰⁰ Dumont, *A False Start*, 32.

¹⁰¹ ANS 2 G 55. “Service Des Eaux et Forêts, Rapport Annuel 1955.”

¹⁰² Pélissier, “L’Arachide au Sénégal,” 69.

managed and cultivated their lands. The fear that the Murids might use mechanized agriculture to further exploit and exhaust the soil also demonstrates the colonial state's inability to control and regulate the dissemination of bull-dozers, tractors, and mechanized farming equipment. In other words, the French not only failed to consolidate and control fertile lands through the use of mechanized agriculture and fossil fuels, but they also recognized that they could not control how Africans would potentially use modern agricultural equipment once it arrived in the colonies.

Although the Murids did not fully adopt mechanized practices in agriculture, the French nonetheless feared that the *daara* system of peanut production would ultimately lead to widespread desertification and soil erosion. In 1952, Roland Portères, a French agronomist, argued that extensive peanut cultivation in Murid territories would eventually transform the groundnut basin into an impoverished dust bowl.¹⁰³ Since the “Murid peasantry” constituted nearly one-third of the population, and since they were concentrated within the densely-populated Peanut Basin, Portères insisted that the “speculative, abusive, and rapacious” system of cultivation would deplete the fragile soils of the Sahel.¹⁰⁴ Furthermore, he believed that the *daara* was an exploitative practice of cultivation that produced “a new class of serfs, or perhaps it would be better to say, ‘slaves,’ that has emerged before our eyes.”¹⁰⁵ The new “feudal” system of agriculture, according to Portères, prioritized peanut production over the cultivation of staple grains and drove the “miserable” *talibé* to depend on rice imports for sustenance. Thus, Portères concluded that agriculture in Senegal “had reached a dead-end” and that the colonial state must intervene to liberate the peasantry through land reform and better production techniques.¹⁰⁶

¹⁰³ Catherine Boone, *Merchant Capital and the Roots of State Power in Senegal, 1930-1985* (Cambridge: Cambridge University Press, 1992) 86.

¹⁰⁴ Ibid.

¹⁰⁵ Ibid, 87.

¹⁰⁶ Ibid.

Similar to colonial officers who served in 1920s and 1930s, Portères' fear that peanut cultivation would exhaust soils and deplete fertile lands for food production were ultimately misguided. In contrast to the colonial state's large agricultural projects that eroded soils and desiccated fertile land in Richard Toll and Casamance, Senegalese farmers—including the Murids—increased cash crop production through local practices of peanut cultivation. In fact, Senegal's organic economy expanded throughout the 1950s and 1960s. When Senegal gained its independence in April of 1960, nearly 80 percent of all its export revenues came from peanuts and peanut oil and represented approximately 25 percent of GDP.¹⁰⁷ Between 1960 and 1967, Senegal's GDP growth averaged 2.8 percent and private consumption of staple grains and material goods increased at an annual rate of 4.6 percent.¹⁰⁸ This growth, therefore, was not the result of mechanized and fossil fuel-powered agricultural schemes, but, rather, it was due to “traditional” practices in peanut cultivation that enabled farmers to expand into new territories and harvest larger quantities of cash crops.

A Nascent Mixed Energy Economy

France's plan to transform their African colonies into “modern” economies on par with the industrialized nations of Europe also required a steady supply of energy to fuel economic and industrial growth. Since fossil fuels were mostly imported to West Africa, the French hoped to construct an efficient infrastructural system that could distribute fossil fuels from coastal refineries to urban centers in the interior. In 1947, French officials on the *Sous commission d'énergie d'outre-mer*, a commission that administered the distribution and use of fossil fuels in the colonies, noted that the existing energy infrastructure in the colonies was woefully inadequate. In one report, the

¹⁰⁷ Prosper Youm, “The Economy Since Independence,” 21 in Christopher L. Delgado and Sidi Jammeh, eds., *The Political Economy of Senegal Under Structural Adjustment*, (New York: Praeger, 1991)

¹⁰⁸ Sheldon Gellar, *Senegal, An African Nation Between Islam and the West* (Boulder, CO: Westview Press, 1982), 50.

commission compared Senegal's infrastructure to France at the turn of the century, stating, "the distribution of petroleum products after the war was, in our overseas territories, the image of petroleum distribution in France at the beginning of the twentieth century."¹⁰⁹ Given the almost total absence of "import depots" in French West Africa, colonial officials lamented that "oil drums were the normal way of refueling the consumer" and were "transported by sea from the manufacturing site to the ports of import."¹¹⁰ Put simply, without a proper infrastructure for oil distribution in the colonies, the French understood that transforming their West African colonies into industrialized societies was all but impossible.

In an attempt to reduce the cost of foreign produced oil, which came from the United States, Venezuela, or the Middle East, the French sought to establish trade with oil-rich colonies under British control, such as Nigeria. However, while importing oil from neighboring African colonies cut down on transportation costs, colonial officials observed that "stocks of petroleum products outside of the French territories provided only a weak security of supply."¹¹¹ Despite its large oil reserves, Nigeria's oil industry was in its infancy and production from year to year was not consistently reliable. Thus, in order to supply Senegal, as well as the rest of French West Africa, with a consistent supply of fossil fuels, the French employed an "all of the above" strategy to acquire petroleum imports.¹¹² In other words, the colonial state imported cheaper crude petroleum when it was available in neighboring African colonies, and when there was a shortage in African-produced oil they imported it from the oil rich countries mentioned above.

As the largest port in West Africa, Dakar received the vast majority of fossil fuel imports, which the colonial state used for the "civil affairs" of the colony. In 1952, for example, the colonial

¹⁰⁹ ANS, 1 P 22 64, "Rapport de la Sous-Commission de l'Énergie," 1952.

¹¹⁰ Ibid.

¹¹¹ Ibid.

¹¹² Ibid.

state consumed nearly 75 percent of the 1.2 million tons of oil imported by Dakar, leaving only 296,000 tons for the civilian population. The low percentage of civilian consumption, according to colonial officials, was largely due to the absence of coastal oil refineries and a network of distribution centers. Since the majority of oil imported by the colonial state arrived in drums, the amount of oil the French could import was severely limited by both the cost of each drum and their relatively low volume. In contrast to individual oil drums, large oil tankers could transport fuel in bulk by sea and then offload it to oil refineries along the coast. From there, large oil trucks could transport the oil from the refineries to distribution centers in the interior. This system, according to the report, would decrease the cost of transporting fuel by 17 percent, as 100 liters of fuel sold in drums cost 300 francs or more while fuel sold in bulk was approximately 250 francs.¹¹³

While private oil companies, including Shell, Compagnie Française des Pétroles, and Texas Oil, operated within Senegal, the lack of infrastructure throughout the colony limited their ability to distribute gasoline to motorists outside of coastal urban centers. In order to establish filling stations in rural areas, oil companies pushed the colonial state to replace oil drums with a system of bulk distribution with large, overland fuel tankers. The replacement of oil drums with bulk fuel, they insisted, would “provide secondary depots situated within the interior or on the coast” with reliable “refueling stations” that “stored and pumped” gasoline.¹¹⁴ However, the low cost and efficiency of distributing bulk fuel to fueling stations via “tank truck transport” depended on the “volume and flow” of oil from the refineries to the distribution centers, as well as the demand for fuel in the interior. The higher the flow rate, the overall cost of constructing distribution centers decreased and the “interest in bulk fuel” would continue to rise. In contrast, with a lower flow rate, the cost of distribution centers would increase and the interest in bulk fuel would decline rapidly.¹¹⁵ Thus, the

¹¹³ ANS, 1 P 22 64, “Rapport de la Sous-Commission de l’Énergie,” 1952.

¹¹⁴ ANS, 1 P 22 64, “Annexe V, Distribution des Produits Pétroliers,” 1952.

¹¹⁵ *Ibid.*, 2.

French noted that Senegal's growth and development into a "modern" economy greatly depended on the "critically important proliferation" of fueling stations throughout the colony.¹¹⁶

Due to the cost of importing expensive fossil fuels, as well as the challenges of constructing a large network of petrol stations within the colony, the French colonial state also pursued possible alternatives to fossil fuels. While some colonial officials had long advocated for peanut oil as a cheap and easily accessible alternative to fossil fuels, the colonial state did not fully support the development of a vegetable-powered fleet of vehicles until the colony experienced severe fossil fuel shortages during World War II. Although the charcoal-powered *gazogène* served as the primary replacement for fossil fuels in Senegal, the Colonial Ministry commissioned a series of studies during the war to develop a diesel engine powered by peanut oil.¹¹⁷

The first tests took place at the *Station de Bellevue*, an agricultural research center that specialized in growing and manufacturing peanuts and peanut oil. At the station, colonial engineers conducted two series of tests on single and two cylinder engines. For both engines, the "power curve was the same for peanut oil and gas oil" and the calorific consumption "was also identical for these two fuels." However, the report also noted that peanut oil was not as dense as petrol, as the "consumption of liters of peanut oil was higher by about 15percent" and was therefore more efficient.¹¹⁸

In a separate test conducted by the French car-maker Renault, French engineers found that peanut oil was a suitable replacement for fossil fuels but required an injection of petrol to ignite the engine. In their experiments, the team of engineers from Renault powered a four-cylinder engine with peanut oil after making several adjustments. Since the temperature of the peanut oil at the

¹¹⁶ ANS, 1 P 22 64, "Annexe V, Distribution des Produits Pétroliers," 1952.

¹¹⁷ Ibid. According to Andre Nizery, "the penury of combustible fuels for diesel motors in the colonies during the occupation and the absence of official reports of vegetable oils being used for diesel motors and vehicles drove the Minister of the Colonies to ask, in 1941, for the experimentation of vegetable oils in state sponsored laboratories."

¹¹⁸ Ibid.

pump was too low, allowing the oil to thicken and block the process of combustion, Renault started the vehicle with petrol, which, in turn, reheated the peanut oil and reduced its viscosity. When the peanut oil reached 60 degrees Celsius, it passed through the injection pump and initiated the process of combustion. In contrast, a different group of engineers conducted a series of tests on a Berliet four-cylinder motor and concluded that it was possible to start a diesel engine with peanut oil. By removing the gas filter, which clogged easily when using peanut oil, the fuel could pass through the injection pump at lower temperatures and ignite the engine.¹¹⁹

Encouraged by the results of the experiments, the Colonial Ministry commissioned additional field tests of both the Berliet and Renault engines. In 1943, the Berliet engine traveled 9,000 kilometers without incident while the Renault engine, which journeyed 4,500 kilometers across the Sahara Desert, experienced only one breakdown from Bamako to Algiers.¹²⁰ Despite these promising results, the Colonial Ministry did not pursue peanut oil-powered engines further. As oil imports increased throughout French West Africa by the end of 1943, the need for local alternatives to replace fossil fuels had diminished.

Nevertheless, the allure of a local, cost-effective, and renewable source of energy continued to draw the attention of colonial officials in French West Africa. In a 1952 report, the French conducted a study of local sources of fuel within the colonies and compared the efficiency of vegetable oil-based fuels with fossil fuels. The commission tested three oleaginous plant-based fuels: peanut oil, palm oil, and shea butter. In examining the density of the oils, as well as their viscosity and calorific power, the sub-commission noted that all three types of fuels were less efficient than gasoline. Yet, in spite of this obvious assessment, they also observed that “if the combustion is well regulated” then the motor will “function normally and efficiently” without breaking down. Though

¹¹⁹ ANS, 1 P 2264, “Annexe V, Distribution des Produits Pétroliers” 7.

¹²⁰ *Ibid.*, 8. The Renault mission experienced one incident. The car broke down when the peanut oil fell to a temperature of 6 degree Celsius, which ended up clogging the fuel injection.

less powerful, the sub-commission argued that “there is a great interest in using only a pre-purified oil.” Moreover, they noted that peanut oil was, in comparison to palm oil and shea butter, “certainly the one whose use was easier” as it “is fluid at ordinary temperatures and its extraction and treatment processes are more industrialized than for the other oils.”¹²¹ Since vegetable oil contained fewer pollutants than fossil fuels, the process of refining vegetable oils for combustible engines was less labor intensive and relatively inexpensive.

A year later, in 1953, M. Gauthier, an engineer with the French navy, published a study demonstrating the efficiency of peanut oil-based fuels in military vehicles and naval ships. In one of his experiments, Gauthier used peanut oil to sustain an engine for 90 minutes turning at 400 rotations per minute. After the experiment, he noted that the long-term test on the “more powerful engines by the French Navy make it possible to say that on industrial and marine engines with a slow and high-bore speed, good results can be obtained by burning vegetable oils.”¹²² In the same year that Gauthier published his study, the sub-commission on energy also noted that some industries were already substituting vegetable oils for fossil fuels. In one report, Andre Nizery, a member of the *Sous commission d'énergie d'outre-mer*, recorded that the “engines of many customers of medium and large diesel engine manufacturers operate or have been operating normally with vegetable oil,” especially given the lack of “supply in petrol and the growing economic demands of the colony.”¹²³ To be sure, the promising results of vegetable oils as an effective carburant for motor-powered vehicles gave French colonial officials reason to be optimistic. Since Senegal was one of the most prolific producers of groundnuts on the global market, many colonial officials believed that peanuts could make a substantial contribution to fueling the colonial economy.

¹²¹ ANS, 1 P 22 64, “Annexe VI, Sur l'emploi des huiles végétales dans les moteurs Diesel,” 2.

¹²² *Ibid*, 5.

¹²³ *Ibid*, 6.

Despite its potential to replace fossil fuels, peanut oil never became a mainstream fuel in Senegal's mixed energy economy. Even though it yielded promising results, petroleum was far more efficient than peanut oil. Rather than expanding the colony's energy infrastructure to use peanut oil as a carburant, the colonial state allocated its financial resources to expanding the fossil fuel economy. Even though local households, industries, and even colonial administrators used peanut oil for cooking, heating, and at times as a combustible fuel, the majority of Senegal's organic fuel consumption came from woodfuels, and charcoal in particular.

In addition to vegetable oils, the French colonial state conducted a series of experiments on hydropower and solar energy during the late colonial period. As early as 1942, the *Centre National de la Recherche Scientifique*, under the direction of the Colonial Ministry in Paris, explored the possibility of transferring hydropower into a usable and accessible form of energy in French West Africa. The project, which hoped to transform the French West African colonies into "mixed energy economies," received funding to develop plans for a 7,000kw hydraulic station on the coast of either Dakar or Abidjan, and to conduct a study on the possibility of capturing solar energy for agricultural and industrial use.¹²⁴

Although the Colonial Ministry commissioned the study in 1942, the project did not actually launch until the early 1950s. Due to financial hardships during the war, the colonial state did not prioritize the study of hydroelectric power until the metropole allocated more funding. In the initial report, George Claude, a French engineer, recommended that the colonial state in French West Africa should "develop on the spot methods of construction" as well as plans to build "a large underwater pipe permeating in cold water" to cool the "condensers of the factory." From an economic point of view, the report also noted that "in comparison to a thermal power station," the fuel saved from hydraulic power "would make it possible to compensate for the first years of

¹²⁴ ANS, 1 P 22 64, "Annexe VIII, Sur l'état actuel des recherches sur l'énergie solaire," 1.

operation” and would ensure the “satisfactory profitability of the installation.”¹²⁵ In 1953, colonial officials estimated the cost of the power plant at 1.1 billion CFA, and the French estimated that it would take nearly two years to construct. Although the plant was expected to deliver electricity to either Dakar or Abidjan, the French also insisted that a hydropower plant could also “provide fresh water, evaporative power, and the potential to manufacture sea salt.”¹²⁶ Ultimately, the prospect of constructing a hydropower station along the coast was far too expensive, despite the fact that FIDES had already allocated a substantial percentage of the cost of the project to the colonial state.

In contrast to hydropower, which would have provided coastal urban centers with electricity, the French believed that solar energy was a viable and realistic option to deliver electricity to rural populations. In 1953, Andre Nizery reported that “research on solar has been ongoing for many years” and that French physicists in Dakar were attempting to “find the most economical method for producing large heating surfaces” to convert solar energy into electricity. The primary strategy was to “concentrate the radiation” of solar rays onto “relatively small surfaces to obtain high temperatures” that could be converted to electro-mechanical energy. Furthermore, he noted that encouraging results “have been obtained over the last two years with equipment including oil films and glass plates,” as well as “simple metal exchangers” that demonstrated promising results through a series of “systematic tests.” For Nizery, the results obtained by both methods of transferring solar energy into heat energy “were sufficiently shocking to justify a significant financial effort” to further develop solar power in the colonies.¹²⁷ Put simply, some colonial officials believed that solar power would enable the colonial state to extend electricity and water pumps to rural areas in the interior.

The potential for solar energy in Senegal was so alluring that, even after independence in 1960, the Senegalese state funded an entire institute at the University of Dakar to solar energy

¹²⁵ ANS, 1 P 22 64, “Annexe VIII, Sur l’état actuel des recherches sur l’énergie solaire,” 1.

¹²⁶ Ibid.

¹²⁷ Ibid.

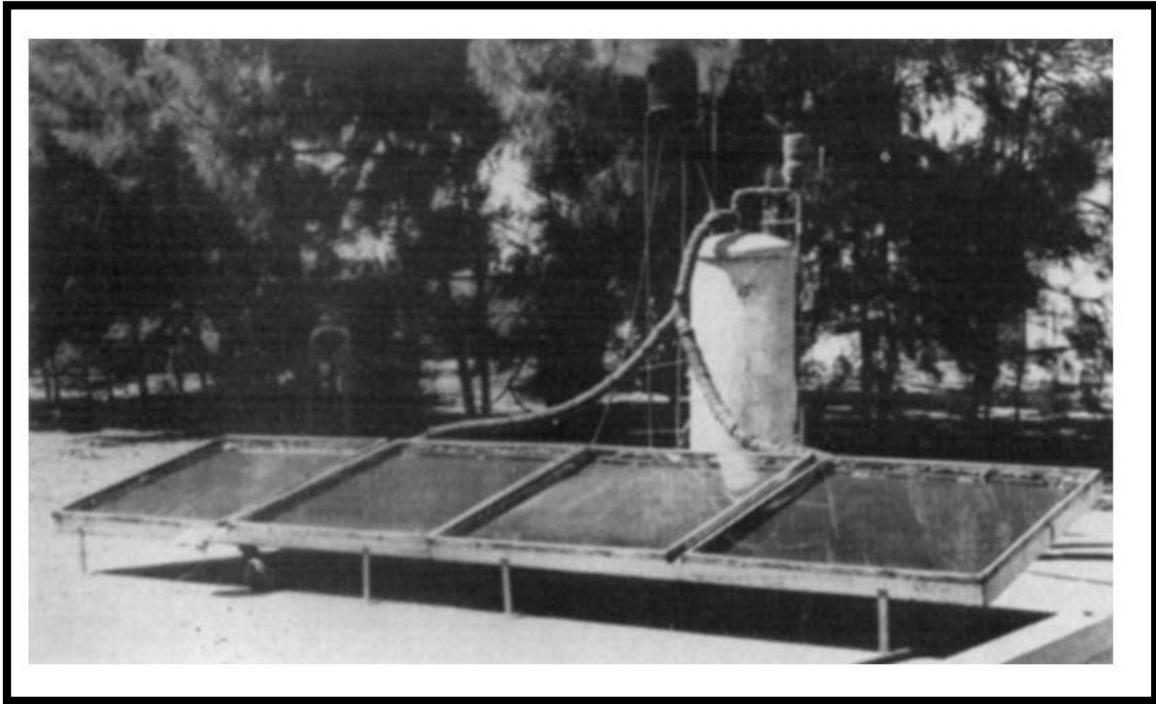


Figure 19: Henry Masson's solar pump, University of Dakar, 1968. Masson, "Solar Motors with Flat-Plate Collectors," *Solar Energy*, Vol. 10, no. 4 (1996): 165-69.

research—the Institute of Meteorological Physics. Led by Henri Masson, a French physicist, the institute hoped to develop a solar-powered motor that “could serve as a dependable and adequate source of energy” in the more remote areas of the interior. In order to be used in rural areas, Masson insisted that the solar engine “must be well constructed, sturdily built, and capable of operating for years without being serviced.” The primary objective of their research, then, was to connect remote villages and towns to an adequate supply of water by “applying solar energy to the pumping of water.” The so-called “solar pumps” would produce several horsepower and draw energy from “flat-plate collectors.”¹²⁸ In a prototype constructed in Dakar, Masson and his team successfully designed a solar pump that consistently pumped water for nearly four years without interruption. As shown in the image above, the experimental solar motor drew power from four large plates, painted black, and resting at angle toward the southwest. Behind the collectors stands a

¹²⁸ Henry Masson, “Solar Motors with Flat-Plate Collectors,” *Solar Energy*, Vol. 10, no. 4 (1996): 165-69

boiler, in which solar energy powered a pump and lifted eight to ten liters of water per minute from a depth of thirteen meters.¹²⁹

Drawing from their initial success, they then designed a collector measuring 300 square meters and constructed a solar-powered engine designed to produce an electric current by means of a turbo-alternator.¹³⁰ The electric current allowed the pump to lift 40 cubic meters of water 10 meters high for five-hours a day. According to Masson, this pump would provide water for a community of 500 persons, and would serve as a useful system for irrigation during the dry season. In order to minimize maintenance and to increase durability, Masson insisted that flat plates were the most dependable collector of solar energy. In comparison to solar concentrators, which are large metallic dishes that need to be consistently oriented in the direction of the sun, flat-plate collectors could be left in place and required little attention. In this way, Masson argued that “this engine, which is very simple and sturdily build, and necessitating no service, opens a new area in the utilization of solar energy in tropical countries.”¹³¹

In the end, Masson’s large-scale solar pumps were eventually put into practice at six pumping stations in the 1970s. Each pumping station produced 1-30kw of electricity and pumped water successfully during the initial testing stages. However, due to a lack of awareness from local villagers, as well as the high cost of maintenance and repairs, the flat-plate solar collectors were only in use for a few short years and were eventually abandoned in the late 1970s. In spite of these initial failures, however, the development of solar power in Senegal continued through the 1980s and 1990s and, as will be discussed later in the chapter, constitutes nearly twenty percent of Senegal’s energy use today.

¹²⁹ Masson “Solar Motors,” 166.

¹³⁰ Ibid.

¹³¹ Ibid.

While the colonial state ultimately failed in its efforts to transform Senegal into an industrialized economy based on a broad range of fuels and energy, the French provided an early schematic of what a mixed energy economy in Senegal might look like. As will be shown later in the chapter, postcolonial leaders embraced the technological advancements that have not only made solar, wind, and hydroelectric power more efficient, but also more affordable.

Independence and the Organic Economy

Between 1957 and 1962, Senegal endured a volatile political struggle that ultimately culminated in decolonization and independence, which they won from France in April of 1960.¹³² A central component to the establishment of self-rule was the reorganization of the organic economy under a new and independent state. In 1958, Charles de Gaulle, the president of France, called for a referendum in French West Africa that would allow each colony to obtain limited political autonomy as self-governing republics within a larger political and economic community, known as the *Communauté Française*. A rejection of the proposal, however, would mean “total and immediate independence.”¹³³ Led by Leopold Senghor, a representative in the National Assembly of France who would become the first elected president of Senegal, the majority of the population initially voted against independence and remained within the *Communauté Française*. This decision, in large part, was motivated by the elite marabouts of the Murid Brotherhood who worried that independence would both undermine their social and economic position within Senegal and bring an end to groundnut subsidies in France.¹³⁴ In September of 1958, an overwhelming majority of urban

¹³² Gellar, *Senegal*, 17-21

¹³³ Boone, *Merchant Capital*, 88.

¹³⁴ The French subsidized peanut cultivation in Senegal by offering higher prices for peanuts and peanut oil in France compared to world market prices.

Africans voted for independence while the majority of the population, who lived in rural areas, voted against it.

In seeking the support of the Murids, Senghor abandoned urban intellectuals and political elites in Dakar and sided with the marabouts. Since peanut production accounted for nearly two-thirds of the economy, and since the Murids were the most powerful group of peanut growers, Senghor understood that the “key to the national economy” was the control over the groundnut market.¹³⁵ Senghor’s decision to support the position of the marabouts underscores the critical relationship between the organic economy and the consolidation of political power in Senegal. In the years leading up to independence, Senghor and Mamadou Dia, the first prime minister of Senegal, introduced an agricultural plan based on a grassroots cooperative movement. This “socialist option” of cultivation would ultimately give peasants a direct role in improving agricultural techniques and a further stake in the distribution and trade of their crops. Between 1958 and 1960, Dia and Senghor traveled throughout the Peanut Basin to convince the elite marabouts in the Murid Brotherhood that cooperatives and the *daara* system were mutually reinforcing.¹³⁶ Through a program known as *Animation Rurale*, Senghor and Dia argued that a more socialist brand of cultivation would offer better returns on peanuts.¹³⁷

Through *Animation Rurale*, Senghor and Dia hoped to construct a socialist society based on communitarian values and modern economic planning.¹³⁸ Through the development of the cooperative movement, they wanted to transform rural villages into a network of self-governing communes based on democratic institutions. To start, the state would assist villages in developing cooperatives and provide technical assistance in agriculture, marketing, credit, and distribution.¹³⁹

¹³⁵ Boone, *Merchant Capital*, 90.

¹³⁶ *Ibid.*, 88.

¹³⁷ *Ibid.*

¹³⁸ Gellar, *Senegal*, 57.

¹³⁹ *Ibid.*

Once the cooperatives were self-sustainable, villages would regroup into larger and more efficient unions that would galvanize economic activity within rural communities. The cooperatives, therefore, were the “linchpins” of rural reform because they mediated the economic relationship between the state and rural populations.¹⁴⁰ The cooperative system, then, would enable the state to bypass the middlemen in agricultural production—merchants, brokers, and patrons—and establish direct contact with local villagers. This, in theory, would allow state technocrats to respond directly to the needs of the farmers while also drawing in rural communities to the political process. In other words, the *Animation Rurale* was a mechanism for Senghor and Dia to consolidate land, agricultural production, and people under the authority of the Senegalese state.

In 1962, two years after the establishment of self-rule, the *Animation Rurale* plan crumbled as Senghor and Dia became bitter political rivals. Dia, who hoped to use state power to create a more viable and dynamic economy through socialist agricultural policies, conflicted with the elite marabouts who understood *Animation Rurale* as an effort to undermine their dominant position in the peanut market. Senghor, as before, ultimately sided with the Murids and recruited party leaders in the *Union Progressiste Sénégalaise* (UPS) to force Dia out of office. Accused of attempting a *coup d'état* in 1962, Dia and his top political advisors were sentenced to prison. With Dia in prison, Senghor established one-party rule through constitutional reforms and dogmatic laws banning opposing political parties. Dia remained in prison until 1974, when Senghor pardoned them in a show of political unity. With the majority of his supporters in the peanut growing regions of the Senegal Valley, Senghor consolidated political power by establishing a patron-client relationship, commonly referred to as the Senegalese “social contract,” with wealthy marabouts and merchants throughout

¹⁴⁰ Boone, *Merchant Capital*, 92.

the Peanut Basin.¹⁴¹ By drawing local powerholders under his authority, Senghor developed a large network of political clients that helped him consolidate power over Senegal's organic economy.

Despite the failure of *Animation Rurale*, Senghor promised the state would continue with the cooperative system of rural development. In 1964, Senghor's new political party, the Parti Démocratique Sénégalaise instituted the *Loi sur la domaine national*, which nationalized all public lands not registered or occupied prior to the establishment of the law.¹⁴² Similar to previous decrees under colonial rule, this law centralized control of fertile land and forests under state authority and offered usufruct rights to villagers. In doing so, the state hoped this law would both unify colonial, traditional, and Islamic systems of land tenure and to contribute to a new economic development strategy based on a network of cooperatives.

In the mid-1960s, Senghor oversaw the creation of 1,600 cooperatives, which were primarily based on marketing and regulating the peanut industry. In theory, the cooperatives managed two basic components of the peanut market: first, they regulated the extension of land under groundnut cultivation, and second, they facilitated the distribution of agricultural equipment to producers.¹⁴³ In practice, however, the cooperatives came under the control of local party bosses, rural elites, and wealthy marabouts who used the cooperatives for their own benefit. By controlling the flow of cash crops between the rural periphery and the postcolonial state, the power brokers of the rural cooperatives controlled the allocation of land, labor, and the distribution of agricultural goods after the harvest.¹⁴⁴

In the Peanut Basin, wealthy marabouts in the Murid Brotherhood used their influence and control over the cooperatives to funnel profits from peanut harvests into their own holdings.

¹⁴¹ Mbodj, "The Politics," 119; Babou, "The Senegalese," 138-140.

¹⁴² Ribot, "Markets, States", 117. The Law of National Domain brought nearly 97 percent of all land under the Senegalese state.

¹⁴³ Boone, *Merchant Capital*, 106. Also in Donal Cruise O'Brien, 1971; and Jean Copans, 1988: 210-212.

¹⁴⁴ Gellar, *Senegal*, 57.

Through the accumulation of wealth, lands, and religious followers, the Murids also formed an effective strategy to lobby Senghor and his advisors for political and economic favors. Even though the 1964 law prohibited the expansion of peanut cultivation into new territories, the Senegalese state frequently granted new land use concessions to elite marabouts in regions where peanut cultivation was supposed to be prohibited.¹⁴⁵ By the end of the 1960s, the rate of expansion among the Murids was so aggressive that 90 percent of Senegal's largest landholders were marabouts within the brotherhood.¹⁴⁶ Through state concessions and favors, as well as annual donations from the *daara*, elite marabouts within the brotherhood acquired some of the largest personal fortunes in Senegal in the postcolonial period.¹⁴⁷

Despite the growth in peanut cultivation and exports, Senghor's agricultural policies failed to establish control over Senegal's organic economy. Rather than consolidating Senegal's agrarian energy systems under state authority, Senghor relinquished control of the organic economy, and peanut cultivation in particular, to the Murid Brotherhood. In this way, the Senegalese "social contract" between the state and the religious elite bifurcated Senegal's energy economy. With little authority over agricultural production, the Senegalese state managed the fossil fuel economy, which included imported oil, coal, and gas, while wealthy marabouts and urban merchants coerced and exploited the agricultural cooperatives to accumulate wealth and power. To be sure, the *Office National de Coopération et d'Assistance pour le Développement*—the government branch charged with dealing with the cooperatives—soon became exploitative.¹⁴⁸ As Mohamed Mbodj demonstrates in his study of politics in the post-independence period, the cooperatives merely served as crop collections points and distribution centers.¹⁴⁹ With little support from the government, peasant

¹⁴⁵ Boone, *Merchant Capital*, 108. Mbodj, "The Politics," 120; Babou, "The Senegalese," 140.

¹⁴⁶ *Ibid.*, 108.

¹⁴⁷ *Ibid.*

¹⁴⁸ Mbodj, "The Politics," 120.

¹⁴⁹ *Ibid.*

farmers, who had recently been liberated from the coercive policies of the colonial state, were now subjected to new exploitation by the state and wholesale producers that consisted primarily of elite marabouts within the Murid Brotherhood.¹⁵⁰

Although groundnut production increased during the first decade of self-rule by four percent annually, most of this growth was due to the clandestine or illegal expansion of peanut production in new territories. Rather than increasing productivity per acre of land, as the cooperative system intended, Senghor's "social contract" with the marabouts further entrenched a patron-client system that enriched already powerful religious elites and merchants. In this way, Senghor maintained political power by developing mutually beneficial alliances with religious elites by trading state concessions in land use and agriculture for political support, yet the material and economic base of the organic economy resided under the control of the Murid Brotherhood.¹⁵¹ As a result, the growth in peanut production during the 1960s funneled nearly all of the wealth to the elites while local farmers struggled to maintain production on already exhausted soils.¹⁵²

The concentration of wealth under a group of elite marabouts and merchants, combined with an economy based entirely on peanuts, made it particularly difficult for the postcolonial state to weather fluctuations in the global peanut market and to adjust to unexpected climactic change. In 1968, France withdrew its subsidies for peanut exports in Senegal, sparking a rapid decline in the economy. From 1968 to 1973, GDP grew at an average of one percent per year and the share of peanuts exported from Senegal to external markets fell from 80 percent to 40 percent. In addition to the economic downturn, drought struck the Sahel and devastated harvests of peanuts and staple grains. The severity of the drought pushed some rural populations to starvation, while others escaped famine by migrating to urban areas where they could find water and food. While millet and

¹⁵⁰ Mbodj, "The Politics," 120.

¹⁵¹ Boone, *Merchant Capital*, 108.

¹⁵² *Ibid*, 121.

sorghum served as valuable food staples during the drought, the Senegalese state imported rice, wheat, and maize in order to combat famine.¹⁵³

In response to the drought, Senghor aimed to tighten the state's grip on the organic economy by developing new strategies to protect fertile lands and slow the detrimental effects of desertification and deforestation. As the following section will show, Senghor hoped to reduce environmental degradation by changing the way people used energy within the household. By increasing imports of fossil fuels and establishing strict regulations on woodfuels and charcoal, the postcolonial state hoped to reduce environmental degradation by diversifying Senegal's mixed energy economy.

The Postcolonial Mixed Energy Economy: Charcoal and Liquid Petroleum Gas, 1960-2000

Between 1970 and 2000, the consumption of woodfuels constituted roughly 65 percent of total energy consumption in Senegal, while oil and gas represented roughly 35 percent. Since fossil fuels represented less than half of total energy use, Senegal attempted to sustain population growth, which climbed from 4.2 million to 10 million between 1970 and 2000, by drawing on fuels from the organic and fossil fuel economies, and charcoal and Liquid Petroleum Gas (LPG) in particular.

Although the Senegalese state depended on charcoal as a readily-available supplement to the fossil fuel economy, government officials cautioned that an over-dependence on woodfuels would have devastating consequences for Senegal's forests and farmlands. In recognizing the dangers of forest decline to Senegal's economy, the state introduced a variety of policies designed to control how people produced and consumed energy, from implementing strict forestry laws to curb the rate of

¹⁵³ The Sahelian drought was far more severe among Sahelian nations within the interior. Senegal's proximity to the coast, and its temperate climate, enabled the government to receive food aid easily and to endure the harsh conditions of drought. For a more detailed account of the Sahelian drought, see: Michael Mortimore, *Adapting to Drought: Farmers, Famines, and Desertification in West Africa* (Cambridge: Cambridge University Press, 1989).

charcoal production to introducing LPG subsidies to decrease the amount of woodfuels used in Senegalese households.

In 1969, President Senghor, in his address to the National Assembly of Senegal, declared that “by the year 2000, we want to achieve the status of an industrial society” and that “all our efforts will be aimed at this objective.”¹⁵⁴ Through a series of *grands projets*, from constructing a large oil refinery along the coast to establishing a major tourism industry and exploring for oil and gas, Senghor aimed to transform Senegal into a dynamic economy that was no longer dependent on the peanut industry.

Throughout the 1970s, however, Senegal’s pathway to industrialization faced immediate challenges at home and abroad. Drought conditions returned to Senegal in 1973 and again in 1977,¹⁵⁵ which desiccated farmlands and created an unpredictable and volatile cash crop economy.¹⁵⁶ In addition to drought, Senegal’s state-owned utility, SENELEC, failed to meet the increasing annual demand of energy, resulting in power fluctuations and outages throughout urban centers. In more rural areas, only four percent of households had access to electricity and the majority of the population relied almost entirely on woodfuels for domestic needs.¹⁵⁷ Although Senghor intended to increase imports of oil and gas to kick start industrialization and extend access to electricity, the

¹⁵⁴ Ediafric, “La Documentation Africaine,” in *Momento de l’economie africaine sud de Sabara, 1969* (Paris: La Documentation Francaise, 1969), 438.

¹⁵⁵ For a more detailed account of the drought in the 1970s, see: Jean Copans, “Droughts, Famines and the Evolution of Senegal 1966-1978” *Mass Emergencies* 4 (1979) 87-93; Jonathan Derrick, “The Great West African Drought” *African Affairs*, Vol. 76 (1977) 537-586; Jeremy Swift, “Sahelian Pastoralists: Underdevelopment, Desertification, and Famine” *Annual Review of Anthropology*, Vol. 6 (1977) 457-478; Michael H. Glantz, “The Sahelian Drought: No Victory for Anyone” *Africa Today*, Vol. 22 (Apr. – Jun, 1975) 57-61.

¹⁵⁶ In 1976, for example, the peanut industry produced an unprecedented crop of 1.1 million tons for export, while the following year it yielded just 500,000 tons—one of the weakest harvests since World War II. The instability of the peanut industry prompted a steady decline of peanut exports, which dropped to just 36 percent of Senegal’s total exports in the late 1970s, a full 50 percent less than a decade earlier. Rather than producing peanuts, many peasant farmers used the little arable land unaffected by the drought to grow food crops and staple grains. And for some families in the rural interior, consistent drought conditions forced them to abandon farming altogether and to relocate to urban centers. See: Christopher L. Delgado and Sidi Jammeh, *The Political Economy of Senegal Under Structural Adjustment* (New York: Praeger, 1988), 1-21 and 31-47.

¹⁵⁷ Fatma Denton, “Reducing the gap between projects and policies: a comparative analysis of the “butanisation” programme in Senegal and the Multifunctional Platform (MFP) experience in Mali,” in *Energy for Sustainable Development*, Vol. 8, no. 2 (June 2004), 19.

Yom Kippur War ignited a global energy crisis that increased oil prices and decreased supply.¹⁵⁸ In Senegal, the price of imported oil spiked from 7,081 CFA per ton in 1972 to 24,394 CFA per ton in 1976, forcing the government to devote a large percentage of its budget to imported petroleum, which emptied the state's coffers, increased payment deficits, and diverted spending away from critical development projects.¹⁵⁹ To sustain fossil fuel imports, the Senegalese government turned to foreign borrowing. Funded by the World Bank, the African Development Bank, and the United States Agency for International Development, which loaned a collective \$55 million dollars to Senegal, the government increased fossil fuel energy consumption from 32.05 percent in 1970 to 43.26 percent in 1980.¹⁶⁰

Despite the increase in petroleum imports, the commercial and industrial sectors in Senegal's coastal urban centers consumed the vast majority of the nation's fossil fuels. In Dakar, Senegalese and French industries consumed 90 percent of all imported fossil fuels in the 1970s and 1980s. Although some urban households had access to electricity and could afford to purchase gas-guzzling cars and trucks, most residents in Dakar relied on charcoal for cooking, lighting, heating, ironing, and variety of other domestic chores. Since urban populations consumed the vast majority of fossil fuels, rural populations relied almost entirely on organic fuels. Indeed, charcoal and firewood served

¹⁵⁸ In 1973, the United States provided financial and military assistance for Israel during the Yom Kippur War. In response, OPEC, the governing body of the oil market in Middle East, implemented an embargo on the United States and its Western allies. The embargo sent shockwaves throughout the world and the price of oil increased dramatically as global supplies declined. The ripple effects of the embargo hit developing nations particularly hard, especially those that depended on the West for oil and gas. For more detail on the oil crisis, see: Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (New York, New York: Verso, 2011).

¹⁵⁹ Denton, "Reducing the gap," 16.

¹⁶⁰ In addition to increasing imports of fossil fuels, the influx of foreign capital and aid enabled Senghor's administration to construct an energy infrastructure that would help facilitate industrialization. During the 1970s, Senghor oversaw the construction of an oil refinery on the Cap Vert peninsula, as well as the construction of two phosphate mines in Thiès and Taïba. While these infrastructure projects experienced some success, and the phosphate mines in particular, the revenue they generated was just a small percentage of the money that Senegal borrowed to expand their fossil fuel economy. For a more detailed analysis of the *grands projets*, see Gellar, *Senegal*, 57-66; and Boone, *Merchant Capital*, 173-175.

as the primary source of energy for the majority of rural households and accounted for 99 percent of all energy consumed in the interior.¹⁶¹

The Struggle to Regulate the Charcoal Market

Since charcoal and firewood accounted for roughly 60 percent of Senegal's total energy consumption, and since they were the primary sources of fuel in Senegal's mixed energy economy, forest officers in the *Direction des Eaux, Forêts et Chasses* (DEFC) urged the state to enforce strict regulations on the woodfuel industry. According to Abdou Fall, a retired officer within the DEFC, the progressive exploitation of Senegal's forests pushed the charcoal market further into the interior. In the 1960s and 1970s, Fall noted that the majority of charcoal workers operated in the forests of Thiès and Bandia, about 45 miles from the capital. By the 1970s and 1980s, however, charcoal production gradually moved southeast to the forested region of Tambacounda, roughly 250 miles from Dakar.¹⁶² In a similar manner, Paul Giffard, a French Forester, noted that the "provisioning of fuels to urban centers" prompted an increase in the "degradation of forest vegetation in Senegal."¹⁶³ Although it is difficult to attain exact data on deforestation rates, the World Bank estimated that during the 1970s and 1980s Senegal lost an average 200,000 hectares a year, with charcoal production accounting for roughly 12,000 to 22,000 of that annual total.¹⁶⁴

In an effort to reduce the rate of deforestation in the 1970s, Senghor introduced a new regulatory structure to centralize forestlands under the DEFC. However, the new policy, which hoped to rationalize the exploitation of charcoal by implementing production quotas, strict land allocation schemes, and an increase in the license fee for wood-cutting, facilitated the growth of the

¹⁶¹ Ribot, *States, Markets*, 123.

¹⁶² Abdou Fall, "Interview with Abdou Fall," interviewed by John Cropper in Dakar, April 21, 2015.

¹⁶³ P.L. Giffard, "L'Arbre dans les paysages sénégalais: sylviculture en zone tropicale sèche," (Dakar: CTFT, 1974), 216; Also quoted in Ribot, "*States, Markets*," 122-23.

¹⁶⁴ Ribot, "*States, Markets*," 76. Ribot considered this estimate to be fairly conservative, as it is extremely difficult to obtain precise figures of deforestation in the interior.

charcoal industry rather than slowing it down.¹⁶⁵ In 1972, the government passed a law that required all commercial forest producers to carry a professional license for forestry production. This legislation, which was highly controversial among rural communities, required local charcoal producers to purchase a license to access their own forests. Since most rural charcoal makers could not afford to pay the license fee, the law gave urban merchants nearly exclusive access to forest resources and made it almost impossible for local charcoal producers to compete.¹⁶⁶

Two years later in 1974, the state encouraged woodfuel and charcoal merchants to organize into cooperatives to simplify the regulation of the market. While the cooperatives were meant to facilitate a more manageable and productive system of exploitation, they became powerful organizations that quickly seized control of the market.¹⁶⁷ Similar to the peanut industry, the charcoal cooperatives were intended to streamline production by guaranteeing provision of credit, supply of forestry materials and tools, and the marketing of forest resources in urban centers. As was the case with the peanut industry, however, the charcoal cooperatives failed to serve the interests of the average forest worker. Almost immediately, powerful urban merchants, or *patrons*, establish a patron-client relationship that exploited forest workers and consolidated wealth among the elite. As Jesse Ribot demonstrates in his exhaustive work on the Senegalese charcoal market, elite charcoal merchants used the cooperative system to manipulate both charcoal quotas and permits, which, in turn, enabled them to increase the amount of charcoal they could produce, transport, and then sell in urban centers.¹⁶⁸

In an attempt to reduce the use of charcoal and to halt deforestation, the DEFC introduced a quota system that, in theory, would regulate the amount of charcoal that each *patron* could

¹⁶⁵ Ribot, "States, Markets," 76.

¹⁶⁶ Ibid, 127.

¹⁶⁷ Ribot, "States, Markets," 123. As Ribot states, this law was so controversial that its implementation was delayed until 1987, along with some significant revisions.

¹⁶⁸ This paragraph draws on the scholarship of Jesse Ribot. For a more detailed account, see: Ribot, "States, Markets," "Chapter Six: Producers, Merchants, and Vendors," 145-198.

produce.¹⁶⁹ Yet, in practice, the quota system became a mechanism for rent-seeking elites. According to Ribot, corrupt urban merchants and state officials organized new schemes and methods to manipulate the quota system and produce increasing amounts of legal and illegal charcoal. In the 1980s, for example, the charcoal industry was composed of six principle groups: the *surga* (rural charcoal producers); the *kontrapalaas* (rural foremen/intermediaries between *surga* and their *patrons*); *patrons* (merchants or charcoal bosses); *transporteurs* (trucking companies and their drivers); *coxeurs* (urban wholesalers); and *Diallo kerin* (urban charcoal retailers).¹⁷⁰ The charcoal market, then, was characterized by patron-client relations between the *patrons* and *surga*, the *transporteurs* and their bosses, and between the *coxeurs* and *Diallo kerin*. The *patrons* and the *coxeurs* were the two dominant groups within the market and the *surga* and the *Diallo kerin* were their respective dependents.¹⁷¹ The *patrons* were the face of the charcoal industry and regularly negotiated with the DEFC over state policies and regulations on the market. Through favors and bribes with the DEFC, the *patrons* were the most influential players in the market and amassed great wealth through the consistent exploitation of cheap labor in Senegal's forested regions.¹⁷²

Despite the state's efforts to control the charcoal market, the *surga*, *patrons*, and the *coxeurs* established effective methods to circumvent regulatory policies. For example, the *surga* produced charcoal well after the end of the official charcoal season, which spans from December to August, with no attempt at concealment.¹⁷³ Field agents in the DEFC, who were responsible for enforcing penalties of illegal charcoal production, often failed to write citations for the groups of *surga* that violated the law. In the rare case that illegally produced charcoal was confiscated, the *patron* approached the DEFC and purchased a *quittance*—a receipt to validate the purchase of confiscated

¹⁶⁹ Ribot, "States, Markets," 145-198.

¹⁷⁰ Ribot, "Forestry Policy and Charcoal Production in Senegal," *Energy Policy* (1993) 559-585. Ribot's detailed analysis of the charcoal market can also be found here: Ribot, "States, Markets," 134.

¹⁷¹ *Ibid*, 567.

¹⁷² Ribot, "States, Markets," 127

¹⁷³ The *surga* who illegally cut trees for charcoal are known as *fraudeurs*, and are typically paid by *patrons*: *Ibid*, 134.

charcoal—and could then transport it to a *coxneur* in Dakar.¹⁷⁴ In some regions of Senegal it was typical for *patrons* to use the *quittance* as a loophole. When *patrons* met their charcoal quota, they sent *surga* into the forest to carbonize without a permit. The *surga* then produced the charcoal illegally, and when it was ready the *patron* reported the illegal activity to the DEFC. The field agents then confiscated the charcoal and then sold it (back) to the *patron* for a *quittance*. With the receipt in hand, the *patron* took possession of the confiscated charcoal, acquired a permit, and then transported the truckload to Dakar.¹⁷⁵

The centralized forestry approach of the 1970s and 1980s gave way to a focus on decentralized forestry, which introduced new policies tailored to the basic needs of rural communities. In an effort to promote a more sustainable use of natural resources, the state passed a new forestry law that gave rural councils the rights to manage the forests.¹⁷⁶ Based on the assumption that local communities are the best guardians of the environment, the state empowered rural councils to draft and then submit forest management proposals to the Forest Service.¹⁷⁷ However, news of the dramatic changes to forestry policy was slow to arrive in the periphery. In the rare instances that villagers received word of the new forestry law, the rural councils were often the pawns of powerful village elders with ties to urban charcoal merchants.¹⁷⁸ As a result, decentralization failed to change the social and political structures that enabled urban merchants to dominate charcoal production.

In the 1990s, the Senegalese state, under pressure from the World Bank and other international donors, eliminated the quota system and required all commercial producers of charcoal

¹⁷⁴ Ribot, “States, Markets,” 134.

¹⁷⁵ This paragraph draws on: Ribot, “States, Markets,” 134.

¹⁷⁶ Papa Faye, “Choice and Power: Resistance to Technical Domination in Senegal’s Forest Decentralization,” *Forest Policy and Economics*, vol. 60, issue C (2014): 19-26.

¹⁷⁷ Johan Post and Maaïke Snel, “The Impact of Decentralized Forest Management on Charcoal Production Practices in Eastern Senegal,” *Geoforum*, 24 (2003), 89.

¹⁷⁸ *Ibid*, 94.

to seek the consent of rural councils before they could enter the forests.¹⁷⁹ Even further, the law gave rural councils the power to exclude urban merchants in the process of production by hiring the *surga* directly.¹⁸⁰ In theory, the decentralized forestry code gave control of the forests to local communities and limited the role of state authorities and commercial interests. Yet, in practice, the decentralized forestry policies created a conflict of interests between villagers and forestry officials. While “participatory forestry” required rural villagers to engage in charcoal production, many locals did not support the exploitation of their forests. To resolve this issue, the state gave rural communities incentives by offering them one of two options. The first option offered villagers the opportunity to work as unremunerated laborers, requiring them to implement the state’s forest management plans and to produce charcoal for subsistence incomes.¹⁸¹ The second option gave licensed merchants the right to hire migrant charcoal producers to exploit the forests.¹⁸² The new system instituted an arrangement in which villagers could “choose” to work for free by implementing forest service management plans and gain subsistence income from charcoal or, alternatively, they could give urban merchants the rights to their forests.¹⁸³

In the same way that state officials established an unofficial “social contract” with religious elites and urban merchants to garner political support in exchange for land concessions, charcoal cooperatives used government channels to establish control of Senegal’s forest resources and to accumulate wealth. This meant that Senegal’s forests, as well as its arable lands, remained outside the regulatory structures of the postcolonial state. As the principle source of energy for the vast majority of Senegalese households, urban merchants and corrupt state officials controlled an instrumental piece of Senegal’s mixed energy economy. As Jesse Ribot and Papa Faye have shown in their

¹⁷⁹ Papa Faye, “Choice and Power,” 3.

¹⁸⁰ Ibid, 3.

¹⁸¹ Ribot, “Farce of the Commons,” 3.

¹⁸² Ibid, 3.

¹⁸³ Ibid, 3.

detailed analyses of the charcoal market, the woodfuel cooperatives operated as a coercive cabal that profited from exploiting the resources of rural populations.¹⁸⁴ To that end, the concentration of forest resources under the charcoal cooperatives further bifurcated Senegal's mixed energy economy—urban merchants and religious elites maintained control over the organic economy while the state regulated the flow of fossil fuels into Senegal's ports and refineries.

Undercutting Woodfuels with Liquid Petroleum Gas

Although the Senegalese state struggled to regulate the charcoal market effectively, and even though some of its laws and decrees likely increased the rate of deforestation, some of their policies experienced long-term success. In the early 1970s, the Senegalese state launched a “butanization” program to reduce the use of woodfuels within households and to protect Senegal's woodlands. From the start, the government pursued an ambitious plan to replace 50 percent of charcoal and woodfuels with LPG. In order to incentivize urban dwellers to abandon charcoal and replace it with butane, the government subsidized the LPG market by adjusting price structures, taxes, port duties, and distribution costs.¹⁸⁵ The main objective, then, was to make butane a cheaper alternative for Senegalese women, who typically did all of the domestic cooking and household chores. However, in their first attempts to roll-out butane gas to urban markets, the government subsidies did not cover the initial cost of acquiring the necessary equipment to use the stoves, such as the cooking stove that attaches to the 2.75 kilogram and 6 kilogram cylinders of gas. To cover these costs, then, the government increased taxes on oil and other petroleum products to offset the cost of subsidizing both the equipment and the LPG.¹⁸⁶

¹⁸⁴ Ribot, “Farce of the Commons,” 3; Papa Faye, “Choice and Power,” 3-9.

¹⁸⁵ Y. Sokona and A. Deme, “LPG Introduction in Senegal,” paper presented to the Global Forum on Sustainable Energy, 11-13.

¹⁸⁶ Denton, “Reducing the gap,” 22.

Importing and distributing cylinders of butane gas also posed a serious challenge. Although Dakar possessed an oil refinery that had the capacity to refine 2 million tons of butane gas per year, it lacked the technical ability and infrastructure to fill, and refill, cylinders of gas at an efficient rate.¹⁸⁷ In order to address the bottleneck of LPG distribution, the government partnered with private oil companies to invest in the installation and storage of packaging infrastructures.¹⁸⁸ Despite these initial challenges, the Senegalese state, with the help of oil companies such as Shell, Total, and Mobil, eventually developed the capacity to deliver butane gas to urban merchants and refilling stations in Dakar, Thiès, and Mbour.¹⁸⁹ For most Senegalese households, however, the butane stoves were not big enough to accommodate the needs of large extended families. In her study of Senegal's butanization program, Fatima Denton, a coordinator for the Africa Climate Policy Center, noted that most women found the 2.75kg stove to be "incompatible and ill-suited to an average extended family, which could comprise up to 10 people."¹⁹⁰ The second model, however, proved to be a success. As Denton observed, the majority of families preferred the 6kg version of the cooking stove, which became known in Wolof as "Nopale," or "restful" stove.¹⁹¹

The butanization program yielded modest results in its first ten years of operation, with consumption of LPG climbing from 3,000 tons in 1974 to 15,000 tons in 1987. While the use of LPG increased throughout the 1970s and 1980s, government officials observed that poor households in urban centers could not afford butane and continued to use charcoal. To provide low-income families with LPG, the government increased subsidies for butane and slashed the prices by 38 percent. The price of the 6kg cylinder, or the "Nopale," dropped from 1183 CFA to 725 CFA

¹⁸⁷ Y. Sokona and A. Deme, "LPG Introduction in Senegal," 11-13 Also quoted in Denton, 22.

¹⁸⁸ Denton, "Reducing the gap," 22.

¹⁸⁹ Totalgaz was the leader in the LPG market in Senegal, with more than 70 percent of stocked bottles. Total developed facilities for bottling LPG, storing the filled bottles and delivering them. For more detail, see: United Nations Energy Program, *The Oil Industry Experience: Technology Cooperation and Capacity Building: Contribution to Agenda 21* (New York: United Nations Publications, 1995), 56.

¹⁹⁰ *Ibid*, 23.

¹⁹¹ *Ibid*.

while the smaller 2.75kg cylinder fell from 522 CFA to 325 CFA.¹⁹² The increased subsidies seemed to have an immediate effect, as the demand for refills in 6kg cylinders rose 4,013 tons to 7,145 tons and the demand for 2.75kg cylinders climbed from 10,932 to 20,308.¹⁹³

For the most part, the Senegalese government regarded the butanization program as a successful attempt to curb deforestation and introduce a relatively clean-burning fossil fuel into Senegal's mixed energy economy. In 1995, Mamadou Dianko, the Director of Energy at the Ministry of Energy and Mines, described the program as a resounding success, noting that "the scale of these stoves has allowed much of the population to benefit from gas" and has "helped the government reduce wood energy consumption."¹⁹⁴ In a similar manner, Abdoulaye Kane, the Director of the DEFC, observed that butane allowed "Senegal to diversify energy sources," which "has also served as a means of protecting the environment." Through the use of multiple fuels, Kane argued that "LPG, used today as a domestic fuel, is being used in place of charcoal and is reducing deforestation" throughout Senegal.¹⁹⁵ According to the Ministry of Energy and Mines, nearly 85 percent of urban and peri-urban households transitioned from charcoal to LPG stoves by 1998, and the consumption of LPG reached 100,000 tons and accounted for an annual saving of 70,000 tons of firewood and 90,000 tons of charcoal.¹⁹⁶ Collectively, the use of butane saved the equivalent of 700,000 cubic meters of wood, which constitutes roughly 15 percent of woodfuel collected per year.¹⁹⁷

Nevertheless, the program largely catered to middle and upper income families that lived in Dakar and other urban centers along the coast. Even though the government subsidized the LPG

¹⁹² In US Dollars, the cost of a 6kg cylinder of butane is roughly \$5.00, while the 2.75kg is roughly \$2.50.

¹⁹³ Abdoulaye Fall, Sécou Sarr, Touria Dafralla, and Abdou Ndour, "Modern Energy Access in Peri-Urban Areas of West Africa: The case of Dakar, Senegal," *Énergie, Environnement et Développement* (Dakar: ENDA Programme, 2008), 32.

¹⁹⁴ United Nations Energy Program, *The Oil Industry Experience: Technology Cooperation and Capacity Building: Contribution to Agenda 21* (New York: United Nations Publications, 1995), 56.

¹⁹⁵ Ibid, 56.

¹⁹⁶ Denton, "Reducing the gap," 33.

¹⁹⁷ United Nations Energy Program, *The Oil Industry*, 25.

program, lower income families in the interior could not afford to purchase butane from merchants and oil companies. Since the main oil refinery in Senegal is on the Cap Vert peninsula, the cost of transporting the cylinders of LPG, along with the necessary equipment to store and use the gas, increased the cost of butane in the interior and outweighed the very subsidies that were designed to make it affordable.¹⁹⁸ In other words, the program, though well-intentioned, further concentrated the consumption of fossil fuels among well-to-do households in coastal cities and left rural populations to consume firewood and charcoal for their domestic energy needs. In this way, the LPG program further bifurcated Senegal's mixed energy economy by concentrating the use of fossil fuels in urban centers while rural households were relegated to collecting firewood and other forms of biomass.

Taken together, Senegal's attempt to regulate the charcoal market, as well as its program to subsidize LPG use in urban households, experienced varying degrees of failure and success. For the most part, the postcolonial state's forestry decrees and regulations struggled to establish control of the charcoal market. Rather than decreasing charcoal use in urban centers, the policies designed to limit charcoal production—from increasing the cost of commercial licenses to establishing cooperatives and enforcing quotas—enriched urban merchants and did little to change the rate of deforestation in the rural periphery. Similar to other industries within the organic economy, and the peanut industry in particular, the Senegalese state could not establish authority over how local populations managed and exploited their lands. As forest officers advanced new approaches to regulate charcoal production and protect Senegal's forests, merchants moved in step with the state by developing their own strategies to produce, distribute, and sell charcoal in urban centers. Through a network of patron-client relationships, as well as circumventing laws and bribing

¹⁹⁸ For a more detailed study of butanization and its failures in rural areas, see: Denton, "Reducing the gap," 33.

government officials, urban charcoal merchants established a monopoly of the woodfuel market that frequently operated outside the regulatory constraints of the postcolonial state.

In contrast, Senegal's butanization program was a surprising success. Since butane was an imported fuel, the state immediately controlled nearly all facets of the butane market, from offering subsidies and setting the price of LPG to establishing partnerships with foreign oil companies and local distributors throughout urban centers. By undercutting the price of charcoal and partnering with private oil companies, the state created a competitive market for LPG by offering cheap, clean, and reliable fuel to Senegalese households.

Taken together, the failures of the DEFC to regulate the charcoal market effectively, as well as the success of the LPG program, underscores the challenges of regulating Senegal's mixed energy economy in the late twentieth century. In the same way as the colonial state, the Senegalese government was able to control and regulate the distribution and use of fossil fuels, yet it similarly struggled to establish authority over the agrarian energy systems of the organic economy. To be sure, the postcolonial state developed the necessary regulatory infrastructure to manage the charcoal market, yet the deeply entrenched interests of urban merchants, religious elites, and corrupt government officials manipulated Senegal's forestry policies and effectively maintained control over both the forests and the woodfuel industry. However, as the success of the LPG program demonstrates, the Senegalese state was not entirely powerless to challenge the charcoal market. Rather than controlling the production and distribution of charcoal, the butanization program showed that the state could change energy consumption in Senegal by bypassing the charcoal market and targeting the consumer directly. In offering alternative, subsidized energy to urban households, the state created a new demand for LPG that drew consumers away from the charcoal market and slowed the rate of deforestation in the interior.

Despite its overwhelming success, the Senegalese state removed the LPG subsidy and restored butane to its market price in 2009. The reason behind the elimination of the subsidy was to reduce the impact of the fluctuating oil market on public finances and transfer the cost directly to the customers.¹⁹⁹ Since the removal of the subsidy, the rate of LPG use in the capital has fallen from 97 percent to 85 percent, while the consumption of woodfuels has increased from 77 percent to 90 percent.²⁰⁰ The reduction of LPG use, then, has rekindled fears that urban charcoal consumption will rapidly increase the rate of deforestation. As the conclusion to this dissertation will demonstrate, the Senegalese state, along with local NGOs and non-profit organizations, are racing to replace the LPG program with alternative and renewable sources of energy. The hope, therefore, is to reduce both the dependency on charcoal as the staple fuel for Senegalese households and to increase the consumption of local and renewable energy to one-fifth of Senegal's total energy consumption.

Conclusion:

Throughout the Great Acceleration, Senegal gradually transitioned from an economy based almost entirely on the “traditional” fuels of the organic economy to one based on a mix of energy including fossil fuels, butane gas, charcoal, and firewood. In examining how Senegal responded to the regional and global transformations brought on by the Great Acceleration, from the *dirigiste* brand of late colonialism to the “oil shocks” of the 1970s, this chapter has demonstrated how a new politics of energy emerged in the postcolonial period. In the post-independence era, state officials, religious elites, and urban merchants bifurcated Senegal's mixed energy economy by establishing client-patron relationships. By exchanging agricultural and woodfuel concessions for political support, state actors enabled elite marabouts and urban merchants to manipulate, and exploit, the

¹⁹⁹ Abdoulaye Fall et al, “Modern Energy,” 33.

²⁰⁰ Djimingue Nanasta, “Impact of the Removal of Subsidy on LPG, The Case of Dakar in Households, Small Production Companies, and Market Services,” ENDA, 2016.

agriculture and charcoal cooperatives that were designed to invigorate growth in rural areas and provide the state with agricultural and forestry resources. In doing so, the state was far more effective in regulating and managing the flow of fossil fuels, and LPG in particular, than they were in dealing with the special interest groups of the organic economy. Ultimately, the bifurcation in the mixed energy economy concentrated the vast majority of Senegal's energy resources in urban centers and in middle-income and elite households.

While the limited quantity and high cost of fossil fuels has constrained economic growth and delayed industrialization, Senegal is not wedded to fossil fuels in the same way as the Global North. As the conclusion to this dissertation will demonstrate, the limited use of fossil fuels in Senegal has created space for renewable energy to emerge as viable, and necessary, alternatives to oil and gas. As solar, wind, and hydroelectric power have become more efficient and more affordable, current government officials are pursuing an aggressive strategy to reduce fossil fuel consumption and increase renewable energy use to one-fifth of total energy consumption. Through the development of locally produced biofuels, such as green charcoal and peanut shell briquettes, the Senegalese are also working to reduce woodfuel consumption by making "traditional" organic fuels more modern and more sustainable. In using affordable, clean, and sustainable sources of household energy, government officials hope to alleviate poverty in rural communities and reduce the rate of deforestation in Senegal's woodlands.

CONCLUSION

The Mixed Energy Economy of the Twenty-First Century

In December of 2010, the government passed Senegal's first "Renewable Energy Law," which regulates the nation's renewable energy sector. In general, the law aimed to create a suitable legal framework for sustainable energy development, decrease reliance on fossil fuels, reduce greenhouse gas emissions, diversify the country's energy mix, and increase the use of renewable energy to twenty percent of total energy consumption. In order to spur the growth of the renewable energy sector, the Senegalese government also provided tax exemptions for "the purchase of material and equipment necessary for the production of renewable energy for domestic consumption."¹ Since the law went into effect, Senegal has witnessed a flurry of renewable energy projects, from solar power plants and windfarms to new ventures in green charcoal, peanut shell briquettes, and other forms biofuels.

As of 2018, solar power has played the most significant role in diversifying Senegal's mixed energy economy. In addition to Synergy 2, the largest solar power plant in West Africa, Senegal has constructed four more solar power plants and will build another by the end of 2019. At the inauguration of the latest solar power facility, located in Merina Ndakhar approximately 90 miles from Dakar, Mahammad Boun Abdallah Dionne, the Prime Minister of Senegal, proudly announced that, "Today, Senegal has a fourth solar power station," and within a year, "a fifth will be installed in the central town of Kahone." With the addition of these two facilities, he asserted that solar energy "will strengthen our energy mix and free us from the dependence on fossil fuels."² The rapid

¹ Republique du Senegal, *Journal Officiel*, No. 6581, April 2011.

² Agence Presse Africaine, "Senegal Unveils Fourth Solar Power Plant," Thiès, January 16, 2018. Available online at: <http://apanews.net/index.php/en/news/senegal-unveils-fourth-solar-power-plant>

development of solar power stations throughout the coast and the interior, according to Prime Minister Dionne, has dramatically increased the potential of renewable energy to account for thirty percent of total energy consumption in Senegal.³

Along with solar energy, Senegal has initiated the construction of a large wind farm in Taiba Ndiaye, a small town just north of Dakar, as well as a new hydroelectric station on the Senegal River at Gouina Falls. Upon completion, the wind farm is projected to produce 158 MW of electricity while the hydroelectric station, which is located near the border of Senegal and Mali, will produce 140 MW of electricity.⁴ Due to the rapid development of Senegal's mixed energy sector, the United States Agency for International Development (USAID) reported that Senegal has expanded the extension of electricity to both rural and urban households.⁵ Nearly 30 years ago, in 1990, only 50 percent of the urban population and eight percent of the rural population had access to electricity. Today, however, approximately 90 percent of urban households and 43.5 percent of rural households can access electricity.⁶

In addition to large scale renewable energy projects, the Senegalese state has also targeted locally made biofuels as a viable alternative to charcoal, firewood, and LPG for household energy use. Since woodfuels have, historically, accounted for nearly two-thirds of Senegal's total energy consumption, government officials have struggled to wean rural and urban populations off of charcoal and firewood. Although the LPG program demonstrated to great effect that Senegalese households could—given the right incentives—change their consumption habits to a cheaper and

³ As Dionne noted in his speech, “With new plants planned in the region of Thiès, Senegal will be the solar energy hub of West Africa and will bring the energy mix to 23 percent by the end of 2010 and, eventually to 30 percent by 2020.” Agence Presse Africaine, “Senegal Unveils.”

⁴ For a more detailed account of the Taiba Ndiaye wind farm, see: “Taiba Ndiaye Wind Power Development in Senegal Reached Financial Close,” *Reve*, August 13, 2018, <https://www.evwind.es/2018/08/13/taiba-ndiaye-wind-power-development-in-senegal-reached-financial-close/64215> and for a more in-depth analysis of the hydroelectric dam at Gouina Falls, see: Alexei Kireyev and Ali Mansoor, *Making Senegal a Hub For West Africa* (Washington, DC: International Monetary Fund African Department, 2015), 65-69.

⁵ USAID, “Senegal: Power Africa Fact Sheet.” 2017, <https://www.usaid.gov/powerafrica/senegal>

⁶ Ibid.

cleaner alternative to woodfuels, the end of government subsidies for LPG has reinvigorated the charcoal market. In an attempt to replace the LPG program with locally made biofuels, the state has partnered with NGOs and nonprofits to develop biofuels that are not only cheaper than charcoal, but also burn cleaner and hotter. In 2009, ProNatura, an environmental NGO working in northern Senegal, launched an energy initiative known as “Green Charcoal Senegal.”⁷ In partnership with the Senegalese government, ProNatura aimed to produce approximately 800 tons of green charcoal briquettes a year—a renewable source of energy made from compressed agricultural waste—to sell in the urban markets of Saint-Louis and Dakar.⁸ The effort to replace traditional woodfuels with green charcoal, according to Ibrahima Niang, a specialist in alternative fuels in the Ministry of Energy and Mines, was an attempt to dissuade Senegalese households from using an environmentally destructive source of energy.⁹

The transition from woodfuels to green charcoal, according to Niang, would not only decrease the rate of deforestation throughout Senegal’s rural areas but would also provide urban residents with cheaper alternatives to charcoal. Based in Ross-Bethio, a small town approximately 300km north of Dakar, the director of the green charcoal project, Guy Reinaud, contends that the “technology is efficient, effective, and economical because we can produce a substitute for charcoal at half the price.”¹⁰ The challenge, however, is “to penetrate the charcoal market in urban areas” and to convince local households that “green charcoal is not only environmentally sustainable, but also a more efficient cooking fuel.” Despite these challenges, Reinaud has some reason to be optimistic. Fatou Camara, a woman from Ross-Bethio, recently made the switch from conventional charcoal to green charcoal. Since one kilogram of green charcoal sells for 20 cents, whereas traditional charcoal

⁷ Pierre Holtz, “Can Green Charcoal Help Save the Trees ?” April 20, 2009, <http://www.irinnews.org/report/84015/senegal-can-green-charcoal-help-save-trees>.

⁸ Holtz, “Green Charcoal.”

⁹ Ibid.

¹⁰ Ibid.

costs three times that, Fatou noted that she can “use one kilogram of green charcoal that will cook the dinner” which, she observed, “is far cheaper than normal charcoal.”¹¹ While many households are hesitant to make the transition to green charcoal, ProNatura remains confident that the switch to green charcoal will occur once they realize its attractive price and efficiency as a fuel.

The state has also developed partnerships with local businesses and foreign aid agencies to develop peanut shells into efficient charcoal briquettes. In partnering with the *Nouvelle Valorisation d’Arachide du Sénégal* (NOVASEN), a local peanut processing business in Kaolack, and GIZ, a German international development organization, the government facilitated the construction of a new groundnut processing plant that produces peanut shell briquettes.¹² Since NOVASEN processes approximately 125,000 tons of peanuts per year, it also produces about 15,000 tons of groundnut shells annually. In using screw extruders, NOVASEN presses, molds, and hollows out the briquettes and then prepares them for carbonization at 500 to 600 degrees Celsius. When finished, the briquettes are distributed to local vendors in Kaolack and surrounding cities where they are sold at half the price of a kilo of traditional charcoal.¹³ As of 2013, the NOVASEN plant produces approximately 1,800 tons of peanut shell briquettes that burn hotter, cleaner, and longer than traditional charcoal.¹⁴

Although large-scale renewable energy projects and biofuels are critical to Senegal’s transition to an advanced mixed energy economy, the government also plans to incorporate coal and natural gas into the energy mix. Since Senegal has, historically, relied on petroleum imports to power its electrical grid and transportation sector, the Senegalese government suffers from one of the

¹¹ Holtz, “Green Charcoal.”

¹² Ministère de l’Énergie et l’Hydraulique, République du Sénégal and GTZ, “Biocoal from Groundnut Shells-Project Summary” 2013, <http://www.novator.se/bioint/NOVASEN.PDF>.

¹³ Ibid.

¹⁴ Ibid.

highest production costs of electricity in sub-Saharan Africa—about \$0.30 a kWh.¹⁵ In contrast to other West African nations, which average \$0.13 a kWh, Senegal allocates a significant portion of its budget to support the electricity sector, averaging 2.5 percent of GDP.¹⁶ In order to reduce petroleum imports and decrease overall spending on fossil fuels, the Senegalese state aims to diversify its fossil fuel consumption by replacing petroleum with coal and, eventually, natural gas. In 2018, Senegal opened a coal-fired power plant at Siendou, a coastal town on the outskirts of Dakar. According to Senegal’s long-term development plan, referred to as the *Plan Emergent Sénégal* (PES), the government hopes to expand the power plant’s capacity to account for nearly 40 percent of Senegal’s total energy consumption.¹⁷

In spite of Senegal’s efforts to diversify energy use by reducing its dependence on imported oil and developing a robust renewable energy sector, the discovery of massive deposits of crude oil and natural gas off the Senegalese coast has reconfigured the landscape of the energy economy. In 2014, Cairn Energy, an oil and gas company in the United Kingdom, discovered the biggest offshore oil discovery anywhere in the world that year.¹⁸ And then, a year later, a Texas-based energy company, Kosmos Energy, found the largest offshore gas deposits in West Africa, which straddle the international water boundaries of Senegal and Mauritania. Starting from scratch, the Senegalese government has been scrambling to develop an oil and gas infrastructure that could handle the volume of oil and gas that is expected to be produced.¹⁹

Leading the charge for oil and gas development, President Macky Sall, the former director of Petrosen, Senegal’s oil company, projected that total revenue from the discovery of fossil fuel will

¹⁵ Oliver Basdevant et al. “Senegal: Country Report” (Washington D.C: International Monetary Fund: The African Department, 2014), 56.

¹⁶ Basevant, “Senegal,” 56-7.

¹⁷ Neil Munshi, “Infrastructure at the heart of Senegal government’s plan,” *Financial Times*, April 18, 2018, <https://www.ft.com/content/c6ae1c64-2ea6-11e8-97ec-4bd3494d5f14>.

¹⁸ Andrew Ward, “Discoveries in Senegal Focus Attention on Avoiding the ‘Oil Curse,’” *Financial Times*, April 18, 2018. <https://www.ft.com/content/d979a1e0-2ea8-11e8-97ec-4bd3494d5f14>.

¹⁹ Ibid.

total \$150 billion with an expense of nearly \$60 billion.²⁰ While many officials in the Senegalese government are optimistic about the discoveries, the majority of the Senegalese population have been tepid in response to the news. Concerned that Senegal will be the next victim of the “oil curse,” which has befallen other energy-rich African nations, citizens in Dakar have already staged rallies and protests against the early stages of oil and gas development. In 2016, for example, Macky Sall awarded offshore permits to a company once linked with his brother, Aliou Sall. Leary of the connection between Sall and the oil industry, the Dakarais took to the streets and demanded for more transparency between the government’s dealings with both domestic and foreign oil companies.²¹

As of 2019, the extraction of oil and gas from the offshore wells has yet to begin, and it has not seemed to change Senegal’s commitment to developing a diverse and mixed energy economy. While Senegal, like other oil-producing nations in Africa, may experience the same fate of the “oil curse,” the rapid development of solar, wind, and hydroelectric power will undoubtedly reduce fossil fuel consumption and diversify the energy sector. Indeed, with large oil and gas reserves, as well as a burgeoning renewable energy industry, Senegal has the potential to become the archetype of an advanced mixed energy economy.

Concluding Remarks

By examining the history of energy use in Senegal over the *longue durée*, this dissertation has chronicled Senegal’s transition from an organic to mixed energy economy. In doing so, it has explored the way Africans produced, stored, and deployed energy to centralize and consolidate power over time and space. By tracing continuities and change in energy use from the precolonial

²⁰ Ibid.

²¹ Ward, “Discoveries.”

period to present day, it has argued that control over energy was not only central to maintaining state authority in Senegal, but it was also synonymous with political power.

In doing so, this dissertation has examined the close relationship between power in its political form, as well as power in its physical form, also referred to as energy. As Corey Ross noted in his work on ecology and power in modern global history, historians have often examined political power and energy separately. This omission, he argues, ignores how “harnessing energy” is fundamental to the consolidation of political and social power over time.²² In this way, historians of Africa have drawn connections between political authority and various forms of trade—from trading slaves and horses to exporting cash crops and natural resources. While this approach has offered insight into the way states governed their populations and accumulated wealth, it is less attentive to the way that slaves, grains, charcoal, and animals served as concentrated sources of energy.²³ As this dissertation has shown, political power in Senegal was not simply the product of commercial exchange and various forms of governance, but it was intricately tied to systems of energy use.

As such, this dissertation has made three main contributions to the field of African history. First, this study has revived the debate over the political importance of land. In general, Africanist historians often associate state-making with the consolidation of people rather than land. Instead of placing value in land, which was central to state-making in the West, they argue that African elites extended political power by broadcasting authority over people.²⁴ Yet, as this study has shown,

²² Corey Ross, *Ecology and Power in the Age of Empire: Europe and the Transformation of the Tropical World* (Oxford: Oxford University Press, 2017), 199.

²³ This framework draws on Timothy Mitchell’s work on oil and democracy. By examining oil and democracy as intricately tied together, he argues understand contemporary democracy “as oil.” See: Timothy Mitchell, *Carbon Democracy: Political Power in the Age of Oil* (London: Verso, 2011), 1-5.

²⁴ As mentioned in previous citations, the concept of “broadcasting” power over populations in West Africa is presented, and examined, in detail in: Jeffrey Herbst, *States and Power in Africa: Comparative Lessons in Authority and Control* (Princeton, N.J.: Princeton University Press, 2000), 11-33.

control of fertile land, and the organic energy sources extracted from it, played an overlooked but critically important role in the consolidation of political power. By studying what I refer to as the “politics of energy,” that is, how people concentrate, govern, and deploy energy, this dissertation has demonstrated how control over, and access to, arable land was critical to maintaining political authority. In the eighteenth century, for example, the limitations of the organic economy were exceptionally severe in the Senegal Valley, as its arid climate and dry soils placed additional constraints on fertile lands. As the climate changed and arable lands contracted, rival kingdoms competed for food, slave labor, and access to the narrow strips of well-watered land bordering the Senegal River and Atlantic coast. As this dissertation revealed, this fierce competition meant that fertile lands—and the basic sources of energy they produced—became valuable political assets and were critical to the consolidation of power.

Second, the history of energy in Senegal over the *longue durée* brings further attention to the relationship between the environment and the consolidation of political power. By incorporating how ecological and climatic constraints shaped the way people used, stored, and distributed energy, this study has shown that energy use was closely tied to narratives of environmental and climactic changes. By exploring social and political change with shifts in climate and ecology, this dissertation has shown that power and authority in Senegal changed in step with how people understood, manipulated, and exploited their natural and human environments. In doing so, it has argued that narratives of resource scarcity and environmental decline prompted new strategies to regulate and control how people managed and exploited their local environments. In other words, whether they were warranted or not, this dissertation has demonstrated that narratives of environmental decline, deforestation, and energy scarcity introduced new means of control that attempted to place Senegal’s diverse environments, and the organic energy sources they produced, under state authority.

And third, this study has addressed a significant lacuna in the field of African history and the history of energy. In general, studies of pre-industrial states and their various pathways to fossil fuel economies have focused overwhelmingly on Europe and North America. By examining the history of energy use in Senegal over the *longue durée*, this dissertation has offered an alternative framework to the way historians have studied the history of energy. Rather than focusing on transformations in energy use as a linear, or evolutionary, process, it has explored continuity and change in how populations in Senegal produced, stored, and deployed energy. In doing so, this dissertation has investigated the multiple ways that Africans adapted to, and exploited, new forms of energy over time while also maintaining longstanding systems of energy use. Throughout the colonial period, for example, religious elites and peasant farmers tailored their agrarian energy systems, from the land they settled and cultivated to the manner in which they recruited labor, to the capitalize on the “energy pathways” of the colonial state. By the 1930s, the technological advancements that enabled the French to expand and profit from peanut cultivation—roads, railways, trucks, and petrol—were also used by traders, elite marabouts, and peanut-producing peasant communities. In this way, this dissertation has emphasized the resilience of Senegal’s population to respond to regional and global processes of change in energy use, from the transatlantic slave trade and colonialism to the introduction of fossil fuels and renewable energy.

In exploring how the states and polities of Senegal developed flexible and adaptive strategies of energy use over time, this dissertation has also chartered Senegal’s pathway from an organic to mixed energy economy. While Senegal, along with the vast majority of African nations, has yet to fully break free from what E.A. Wrigley refers to as the “production horizon” of the organic economy, the recent discovery of oil off the Senegalese coast, as well as the installation of new solar

plants and windfarms, have increased access to power and electricity for many rural households.²⁵

These recent developments, then, have placed Senegal in an advantageous position to build a mixed energy economy that is not entirely beholden to oil and gas. By “leapfrogging,” or perhaps bypassing, the aging industrial infrastructure of the oil-rich economies of the West, Senegal’s path from an organic to mixed energy economy presents new possibilities for economic growth and prosperity.²⁶

²⁵ USAID, “Senegal: Power Africa Fact Sheet,” last accessed May 2019: <https://www.usaid.gov/powerafrica/senegal>. According to USAID, current access to electricity is 64 percent nationwide, 43.5 percent in rural areas, and 90 percent in urban areas.

²⁶ José Goldember, “Technological Leapfrogging in the Developing World” in *Technological Leapfrogging in the Developing World*, Vol. 12, No. 1 (Winter/Spring 2011), 135-141

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