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LESSONS FROM REGULATING URBAN WOODFUEL
MARKETS: THE CASE OF SENEGAL

ProLand Woodfuel Resources



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All development activities designed to increase the sustainability of national woodfuel systems must address the role of governmental regulation. One core challenge to effective regulation is the enforcement of technical standards that promote sustainable forest management, but do not disempower local communities or foster rent-seeking by government officials. While few countries have woodfuel market systems as centralized as Senegal's—controlled from the capital by the government and urban merchants—this review of Senegal's experience provides lessons and recommendations that may prove useful in all countries where governments and their partners are intent upon refining state regulatory power to mitigate the impact of woodfuel markets on forests and forest carbon, empower local resource managers, and promote economic growth that is both inclusive and sustainable.

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EXECUTIVE SUMMARY¹

Woodfuel Emissions in Senegal

Charcoal carbonization and woodfuel consumption, exclusive of uptake from regrowth and emissions from transportation, generates 10,643 kt of CO₂ emissions annually (Bailis, 2015).

Governments regulate urban woodfuel markets to achieve a variety of public objectives. Countries value the sector's economic contribution and the revenue it generates for the government. They also regulate this value chain to manage environmental impacts and control how and when trees are harvested to produce fuel. Regardless of the objectives countries select, efforts to govern this diffuse and largely informal sector often falter. Poorly conceived policies and their

incomplete and improper implementation allow for corruption, politicization, and the oligopolistic control of the market. Corruption and elite control afflict the charcoal value chain in Peru (Bennett, Cronkleton, Menton, & Malhi, 2018), while widespread illicit trading and local resistance weaken efforts to roll out new regulations in Zambia (Ziba and Grouwels, 2017). Similar challenges undermine regulations intended to reduce overharvesting and promote sustainable forest management in many countries (de Miranda, Sepp, Ceccon, Mann, & Singh, 2010; Blundo, 2011; Schure, Ingram, Sakho-Jimbira, Levang, & Wiersum, 2013; Sepp, Sepp, & Mundhenk, 2014; Liyama, et al., 2015; Faye & Ribot, 2017).

Senegal presents a well-documented example of the hurdles governments face as they regulate behavior in the woodfuel market. In recent decades, the Senegalese government has developed and implemented national policy reforms designed to transform the market system supplying charcoal to the country's urban centers. Undertaken in the context of a larger process of governmental decentralization, a suite of laws, regulations, executive orders, declarations, and donor-financed projects has sought to empower local governments to manage woodfuel harvesting and sales in their communities.

These efforts toward decentralization confront a nationally centralized woodfuel market that generates wealth and power for an oligopoly of influential elites and the Forest Service. While the new policy empowers local governments, it has not revoked the Forest Service's powers nor changed their incentives to maintain control of the woodfuel market and enrich their private sector allies. The continued power of the Forest Service, and the approach it has taken to

¹ The ProLand Woodfuel Case Studies draw on peer-reviewed research and fieldwork to illustrate design principles relevant to USAID programming in the sustainable cultivation and management of trees harvested for the commercial production of woodfuel. The Senegal Case study includes information collected through fieldwork conducted by ProLand consultants Steve Dennison and Papa Faye over three weeks in May 2019.

decentralize forest management have impeded progress towards decentralization objectives. Key barriers to the reform of Senegal's woodfuel market are:

- A regulatory process that outstrips available resources, causing the Forest Service and local governments to implement reforms incompletely, and almost exclusively in donor-financed project areas. Ongoing illicit production outside of these zones undermines charcoal production in better regulated areas.
- The Forest Service has used its enforcement powers and technical oversight responsibilities to pass regulations and promulgate declarations that disempower local governments and constrain local charcoal production and sales.
- Forest Service agents have used informal methods to exploit contradictions and ambiguity in the laws and used their stature as enforcement officers to dominate local decision-making regarding charcoal production and sales.
- Forest Service agents have also abused their authority and used extralegal tactics such as delaying implementation of their tasks and manipulating procedures; turning a blind eye; and blatantly seeking rents to capture resources generated through the charcoal market.

This study of Senegal's experience, based on peer-reviewed literature and on-the-ground interviews, provides a basis for recommendations for governments and their partners intent upon using state regulatory power to mitigate the impact of woodfuel production and use on forests and forest carbon, empower local resource management, and promote economic growth that is inclusive and sustainable. These recommendations include:

- Design reforms that can be met with current financial and human capacity and can be adopted at a national level without ongoing funding.
- Expect political and economic resistance to reform and develop a strategy to address it.
- Institutionalize procedures that foster transparency and ease of public monitoring.
- Grant specific powers to rural governments and communities to improve local forest management.

THE CONTEXT: FORESTS DEGRADED BY THE DEMAND FOR CHARCOAL

Senegal depends heavily on woodfuel. Eight in ten households in the country rely on woodfuel as their primary source of energy (Niang, 2000; GIZ, 2014). Rural households depend largely on firewood, which they invest labor and time to collect, while urban households depend largely on charcoal, which they purchase. This domination of the energy sector by woodfuel creates a strong demand and a profitable market. A conservative estimate places the value of charcoal consumed in the capital city of Dakar at \$12 million annually, though the actual amount may be as high as \$40 million.²

Alternatives to Woodfuel

Almost every home in Senegal's capital, Dakar, has a Liquefied Petroleum Gas (LPG) stove. The city's residents nevertheless depend primarily on charcoal due to the unreliable supply and expense of LPG (Energypedia, 2018). Experts predict that the high relative cost of LPG, electricity, and kerosene will keep Dakar's households using charcoal for years to come.

² The conservative estimate is based on 3,000 trucks a year (Faye & Ribot, 2017) times the value of 2,400,000 FCFA per truck, while Boutinot (2001) cites a study that estimates the value chain to be worth FCFA 20 billion in 1999, or \$40 million at the exchange rate of FCFA 500/\$1.

Senegal meets its demand for commercial woodfuel primarily through targeted harvesting from the sparse, naturally grown forests that cover an estimated fifth of the country's surface (Global Forest Watch, 2019).³ Legal harvesting comes from "production" forests identified by the Senegalese Forest Service. These are largely authorized community forests, but include parks and reserves managed by the administration. Suppliers of charcoal to Senegal's cities also illicitly harvest a substantial amount from lands not authorized by the government.

Forest Service agents interviewed for this case study insisted that Senegal currently manages its production forests sustainably, yet this is unlikely. Estimates based on consumption and biomass published in 2015 suggest that Senegal unsustainably harvests close to 40 percent of its woodfuel (Bailis, 2015).⁴

While the large-scale extraction of wood for urban charcoal markets almost certainly contributes to the deterioration of the country's remaining forest cover, harvesting for domestic use by rural households may have no long-term impact on forests. Rural households collect woodfuel in a less targeted and intense pattern. Rather than relying on felling trees, they collect deadwood and branches from local forests. They also exploit wood from planted trees in small woodlots, orchards, field boundaries, and numerous relatively stable "parklands," and source woodfuel as a byproduct of forestland cleared for agriculture and other uses (Herr, Wickhorst, & Marsh, 2013; Bailis, Drigo, Ghilardi, & Masera, 2015; FAO, 2015a).

Declining Forest Cover in Senegal

Between 1975 and 2013, agricultural area in Senegal expanded by 26 percent, largely at the expense of forest (Cotillon, 2017). Tree cover loss continues in recent years, decreasing 8.7 percent since 2000 (GFW, 2019). This loss has come from dense forest as well as lighter cover. Between 2001 and 2017, dense tree cover decreased 8 percent (GFW, 2019).

REFORMING SENEGAL'S CAPTURED WOODFUEL MARKET: A CHALLENGING PROCESS

For more than twenty years, the Government of Senegal has developed, promulgated, and implemented policy to decentralize forest management and enable local-level engagement in the woodfuel value chain. The reform of the forestry sector is an element of the country's broader national decentralization process, which, in addition to other responsibilities, transfers authority over land and forest management to regional and local governments. The reform incorporates local governments into a regulatory regime designed to track and manage the production and marketing of all commercial woodfuel. The World Bank, USAID,⁵ and the German Corporation for International Cooperation GmbH (GIZ) have invested heavily in supporting this process of decentralization of forest management in Senegal, implementing projects in several regions. Reform has been challenging, producing few successes. Outside of

³ Here we follow the Global Forest Watch definition of dense canopy as trees taller than five meters with a canopy cover of 30 percent or greater, and light canopy ("sparse") as trees taller than five meters with a canopy cover of 10 percent or greater. By this definition, dense forest covers only one fifth of one percent of the country's surface area. The estimates are for 2010.

⁴ To calculate the degree to which woodfuel demand exceeds regrowth, the spatially explicit WISDOM method integrates supply and demand patterns with physical accessibility to markets. In Senegal, regional level analysis was conducted. At this level, estimated percentages of harvesting above regrowth rates ranged from near 26 percent in five regions to a high of 48 percent in Tambacounda. (Supplementary Information Table 3, column groups Low productivity plantation variant and High plantation productivity variant, NRBB1+NRBB2, EXP.)

⁵ For a review of USAID's investments in community-based natural resource management in Senegal, including a discussion of changes in charcoal production in project zones, see Dozoretz et al. (2014).

donor-supported regions, Senegal has made almost no progress empowering local governments to manage woodfuel production from the forests within their territory.

Regulation before reform. Prior to reform, regulation concentrated the power and wealth derived from the woodfuel market into the hands of government and private-sector elites. The Forest Service national headquarters set harvesting quotas; issued harvesting, transportation, and stocking permits (to enable sales); collected taxes on forest products; and fined actors for noncompliance. Under this centralized system, the Forest Service allocated a few hundred authorizations to allow urban-based merchants to harvest trees; produce charcoal; and transport, stock, and sell the charcoal in urban centers. The city-based operations brought in laborers, sometimes migrants, to do the demanding work of producing charcoal. Individuals who produced and sold charcoal without a permit issued by the Forest Service did so illegally, even if the wood came from the forests within their own communities. With the support of the Forest Service, the oligopoly of politically connected elites captured the lion's share of profits (Ribot, 1998; Larson & Ribot, 2007; Boutinot, 2014; Faye, 2015; Faye & Ribot, 2017).

Regulation prioritized the critical national objectives of economic growth and meeting urban demand for charcoal. It did not result in sustainable forest management. Years of government-centralized regulation suppressed, and progressively redirected, harvesting outward from the capital, but it did not prevent forest degradation and destruction (Gueye, 2000; Manga, Lake, & Sanga, 2012).

Reform, and its limits. Over the past two decades, Senegal has undertaken legislation and regulatory reform to grant local governments (*communes*)⁶ an array of rights and responsibilities in forest management. The 1996 decentralization law established the principle of local forest management. It gave local governments the right to formally delimit and map their forests to create restricted-use areas (*mise en défens*). This status allows them to establish formal rules for the use of forest resources by both residents and outsiders. With this authority, they may prohibit exploitation of natural resources and prevent the conversion of the area to agricultural use. The 1998 Forest Code specified the means by which local governments may manage the commercial harvesting of forests within their territories and control the marketing of the products generated (such as charcoal). Seven years later, the 2005 Forest Action Plan provided the steps for implementing the 1998 Forest Code.

The Long Process of Regulatory Reform

1996: The national decentralization law includes the principle of local forest management conditioned on prior approval by the national administration.

1998: The Forest Code allows local governments with approved Forest Management Plans (FMPs) to manage forests, approve harvesting, and establish commercial contracts.

2005: The Forest Action Plan provides steps for implementing the 1998 Forest Code.

2008: Forest Service decrees that charcoal can only be produced in forest areas with an FMP. Annual ministerial orders establish production targets based on FMPs.

Very clear limits constrain these new powers. The laws that grant rights and responsibilities to local governments also modify, but do not curtail, the role of the Forest Service, and this has impeded local governments' ability to manage their forests. The Ministry of the Environment also continues to promulgate an order that establishes the requirements for charcoal production. The order specifies the opening and closing dates of the

⁶ *Communes*, previously called *Communautés rurales* (Rural Communities), are the smallest scale of government in Senegal. We use the term "local government" here. Their jurisdiction contains small and medium villages totaling up to 20,000 inhabitants.

season, the species allowed for harvesting, the qualifications for authorized actors, and the forest blocks open for production. It also provides dates for a series of visits by Forest Service agents to production forests to delineate the plots, allocate targets (quotas)⁷ and permits, and monitor and assess harvesting practices at mid-term and at the conclusion of the season. Forest Service agents also continue to deliver permits for woodcutting and for transportation and sales of woodfuel.

At a more fundamental level, the Forest Service controls whether communities can exercise the rights they were accorded in the 1996 decentralization law. Prior to managing the commercial exploitation of their forests, communities must obtain an approved Forest Management Plan (FMP)⁸. The Forest Service assists communities in the development of FMPs and has the authority to review and approve them. Once established, the Forest Service also influences who receives permits to harvest from these forests. Urban-based operations continue to obtain permits to harvest from forests with FMPs developed by local governments.

Implementing these reforms in woodfuel regulation has been slow, and the government has

To date, all approved community FMPs have been created by donor-financed projects. Together, they cover just short of 100,000 hectares, slightly more than one percent of Senegal's forest. In 2016, under 10 percent of the charcoal sold in the country's cities came from communities with FMPs.

required considerable assistance. The Forest Service lacks sufficient resources to effectively implement the regulations nationally—instead, it has concentrated its field presence (and control) in the communities where FMPs have been developed. However, approved FMPs cover just short of 100,000 hectares, hardly more than one percent of Senegal's forest.⁹ International donors, who have encouraged and financed the reforms, have funded these activities. To date, all FMPs in the country have been created with the support of projects financed by USAID, World Bank, and GIZ.

Even with this support, the reforms have had little impact on the charcoal oligopoly. Local entrepreneurs bring to market only a small portion of the charcoal produced under the FMPs in their communities. The ministerial order of 2016 authorized 95,941,700 kgs of charcoal to be produced from the forests under FMPs (42 at that time). This equates to approximately 4,797 trucks worth. That year, local charcoal producers reported sales of 696 trucks worth of charcoal in Dakar.¹⁰ Total production may have fallen short of the potential envisioned by the government, but it was surely many times greater than the 9 percent represented by the trucks

⁷ Technically, the Forest Service no longer assesses quotas, but rather the “production potential” of managed forests. Not only did the Forest Service use the quota system long after it was to be discontinued according to the 1998 Forest Code, but for all intents and purposes, “production potential” does not differ from quotas (Ba, 2006b). We use the term “targets,” as do Dozoretz et al. (2014).

⁸ In addition to local governments, individuals, enterprises, and cooperatives that control private land may also establish FMPs, authorizing them to use the forestland commercially.

⁹ According to FAO (2015b), Senegal has 31,930 mi² (8.3 million hectares) of forest. The FAO definition of forest includes both the dense and light forest cover noted above. The FAO defines forest as land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. The FAO derives this measure through a different methodology from that used for the GFW statistics presented earlier in the paper, which report on forest cover as of 2010.

¹⁰ Our figures here and following use a conversion factor of 400 sacks per truck.

communities brought to market.¹¹ The urban merchants produce and sell a smaller proportion of the country's charcoal than before, yet they still buy charcoal produced on community forests and send their laborers to forests now under FMPs; they continue to dominate the transport and sale of commercial charcoal.

Local producers who work in community forests face daunting competition. Over the years, the urban merchants have developed a working relationship with the Forest Service. As we describe below, the agency continues to favor production by these well-established operators. Additionally, the absence of monitoring and enforcement over much of the country allows for unregulated, illicit harvesting. The large influx of inexpensive charcoal produced in areas with less burdensome regulation undercuts local forest entrepreneurs and impedes extension of forest management to additional communities that cannot compete with lower prices (USAID, 2019; World Bank, 2019).

The government and its donor partners have not demonstrated that the new approach improves forest management. Individual forest agents and community stakeholders report that the new regime has made harvesting more sustainable. Some forests under FMPs have seen regrowth. However, the one rigorous local-scale study available concluded that the new approach makes little difference. Community forests with FMPs and government-managed forests with no plans show no differences in forest health. Forest composition and structure were comparable, and regeneration was similarly low on both (Wurster, 2010). Apparently, the harvesting practices prescribed in the FMP, such as the selective harvesting of tree species, are not followed. Despite official claims, Senegal has not created a management approach that sustainably produces woodfuel.

This one local study is not definitive. Longitudinal assessments of the composition and structure of a representative sample of the country's forests across many years would be necessary to truly measure the success of reforms to woodfuel regulation in Senegal. At this point, the national impact has not been assessed; the government is not conducting reliable inventories to assess changes in biomass associated with the implementation of reforms. However, even if communities with FMPs do sustainably manage their forests, the reform of less than 10 percent of the supply chain leaves the vast majority of Senegal's forests at risk of overharvesting.

The few positive outcomes. While achieving widescale sustainable woodfuel harvesting remains elusive in Senegal, twenty years of international donor and government investment in the decentralization of forest management have produced results in other areas. Many local governments have increased their capacity to manage and profit from their forests, and with donor funding, projects have provided training to build technical capacity and raise local community understanding and appreciation of community forest management. Forest Service staff and project area community members now master topics such as best harvesting practices, fire control, and forest monitoring.

By the conclusion of USAID investments in the Wula Nafaa project, for example, the project had strengthened the institutions managing 130,000 hectares of forest; more people in the project area were engaged in charcoal production (including establishing enterprises to produce and transport charcoal to urban markets), and the average incomes for charcoal producers rose (Dozoretz et al., 2014). In recent years, communities have officially requested that the ongoing

¹¹ While this estimate roughly aligns with Faye's finding that in 2013 urban merchants controlled 96 percent of the charcoal market (Faye, 2013), the share of the market local producers can access may be even less than the 2016 number suggests. A large proportion of the 696 trucks reported by local producers contained charcoal produced by private merchants who had purchased transportation permits originally issued to local producers by the Forest Service. Thus, even 9 percent overstates local producers' access to markets in Dakar.

World Bank PROGEDE project help them establish their own community forests and develop FMPs to produce commercial charcoal.

Projects have not been the sole drivers of change: in isolated cases, communities have undertaken steps in the forest management process themselves. These activities, undertaken without project support, provide one indicator of the viability of the reforms thus far. The local government of Boyghel Bamba in the Region of Tambacounda paid regional Forest Service agents to develop an FMP for the forest in its jurisdiction, agreeing to pay for the services through revenue from eventual charcoal sales. Elsewhere, communities who initially received support from GIZ-funded projects now manage six forests independently. In the most successful case, nine villages jointly manage the Sambande forest in the Department and Region of Kaolack, producing and commercializing charcoal and wild fruit. In addition, one local government in Tambacounda hired former project staff to continue their technical support after the project ended (Faye, 2015; ProLand interviews). However, these isolated cases of local governments taking advantage of the new enabling conditions serve to underscore the limits of local empowerment. While proponents of recent reforms cite Sambande as a model of community forest management, its independence may be dependent on its lack of commercial viability. At 72 hectares, the Sambande forest falls far short of the 2,000 hectare average. The Forest Service and urban merchants have likely concluded that the management costs of harvesting from this forest outweigh the profit potential. Due to their small size, these communities have not confronted the barriers to managing their own forests we describe in the next section.



Local residents clean carbonized *Acacia sayel* for bagging, Sambande community forest
STEVE DENNISON / PROLAND

BARRIERS TO THE SUCCESS OF THE REFORMS

What has impeded reform? Why have the reforms taken place almost exclusively in areas with donor financing, and why have local governments not effectively asserted their authority, even in these project areas? Much of the explanation lies in resource limitations. Neither the Forest Service nor local governments have sufficient resources to complete implementation of the new regulatory framework. The approach to decentralized forest management established by the Forest Service, supported by international donors, and often justified on the basis of assuring high technical standards, demands resources far beyond those available.

Resistance has also stalled reform. The Forest Service has visibly resisted change and loss of control, yet we must assume that they receive support from elsewhere in the government and from the long-established, politically connected urban merchants who profit from the woodfuel industry. The government did not revoke the Forest Service's powers, but granted the agency oversight of local forest management. As a result, the Forest Service has been able to impede progress towards the decentralization objectives of recent legislation. Through formal and informal methods, the agency has controlled the process of reform in the woodfuel market system, ensuring that the system continues to generate revenue for the government and profits for the urban merchants.

This incomplete implementation and efforts to prevent change result in a system in which the incentives favor production, revenue, and income rather than the sustainable management of the country's forests.

INCOMPLETE IMPLEMENTATION

In overseeing the decentralization of forest management to the local level, the Forest Service has created additional responsibilities, rather than simply relinquishing existing responsibilities to the local level. The approach the agency has devised to satisfy the legal requirement of FMPs may be the best illustration of the increased size in the gap between resources available and resources required by local communities. Prior to decentralization, Forest Service agents set quotas quickly and informally, through visual estimates. In contrast, FMP development includes forest delimitation, mapping, an inventory, and a plan. Completion of the process requires substantial technical expertise, and costs an estimated \$40,000, well beyond resources available to either the Forest Service or local communities (GIZ, 2014).¹²

The rigor of the new regulatory framework has widened the gap between the resources required and resources available in other ways. Forest Service agents do not possess the resources to undertake the fieldwork to effectively plan, monitor, and enforce the new framework. The agency's budget covers little more than staff salaries. Its thin network of forest agents, equipped with a handful of vehicles and scarce essential equipment, has proven unable to execute their responsibilities efficiently and on time. Field agents rarely visit their assigned forests to assure implementation of the technical requirements of FMPs. Nor are they able to implement other tasks, such as conducting the required inventories and assessments, in a technically adequate and timely manner.

The Forest Service's national headquarters in Dakar also lacks the resources to implement its role under the current system. For example, the national forestry inventory used in estimates of

¹² This mismatch between the public service model and available resources is not limited to forest management. Administrative burdens constrain access to public services in many areas in Senegal, such as land registration and titles; registration of children's birth; obtaining identity cards, etc. (Faye, 2008).

forest potential under FMPs dates from more than 20 years ago and does not reflect the impact of recent harvesting and regrowth. The required eight-year duration of rotational harvesting incorporated into FMPs derives from research conducted in a single location in 1988; the Forest Service has not updated the requirement, nor have they adapted it to different forest types. This absence of a credible scientific foundation for decisions precludes evidence-based decision making, and opens the door to political influence. Political clout now determines outcomes as jurisdictions vie for higher targets, larger portions of the overall harvest, and the revenue production brings (Ba, 2006b; Dozoretz et al., 2014).

RESISTANCE TO LOSS OF CONTROL

The Forest Service, in collaboration with urban charcoal merchants, has mounted a persistent, long-running, and multifaceted effort to maintain control over the commercial exploitation of production forests. To retain control, the Forest Service has used the powers explicitly granted in the 1998 Forest Code, as well as contradictions and lack of clarity in the law. The agency has used regulations, procedures, and enforcement actions under its own control, and field agents have exploited their stature and authority as enforcement officers. They have, at times, overstepped their authority and implemented regulations improperly. Through these actions, the Forest Service has undermined principles of local forest stewardship articulated in law (Ba, 2006b; Larson & Ribot, 2007; Faye, 2015).

Use of Explicitly Granted Powers

The Forest Service has used its oversight authority, and its power to shape and manage the transition to local forest management, to retain control of the charcoal market system. The 1996 decentralization law allows local governments to negotiate harvesting agreements, and the 1998 Forest Code did away with nationally determined quotas. Nevertheless, using the argument that local governments lacked the necessary expertise, the Forest Service continued to impose quotas (favoring urban merchants) for an additional decade (Dozoretz et al., 2014; Faye, 2015).

The Forest Service has also used both national and regional administrative orders to retain influence. In January of 2009 the agency declared that charcoal production no longer required authorization by presidents of local governments. By determining that authorized FMPs—which are both guided in their development and approved by the Forest Service—now suffice, the Forest Service effectively sidelined local governments (GIZ, 2014). Declarations at the subnational level also reinforced centralized control over the market system. In 2009, the Tambacounda regional Forest Service director limited the share villagers could harvest to thirty percent of the potential of their forest. In a less direct approach the next year, he decreed that the Forest Service would assess producer allotments halfway through the season. Faster producers would receive portions of the allotments of slower producers. While this may appear reasonable, urban merchants, who hire migrant labor, gained a significant advantage—especially since regulations prevented villagers from hiring labor. Because the regional Forest Service based annual allotments on the previous year's harvest, the advantage grew over time (Faye & Ribot, 2017).

Based on its technical oversight responsibilities the government, often supported by donors, justifies the extension of Forest Service powers as necessary to attain the high technical standards required for sustainable forest management (Ba, 2006b; Faye, 2015). Through their role in providing technical assistance to the development of FMPs, Forest Service agents may divert plans towards their own objectives, rather than the objectives defined by the local government. Cases have been reported in which agents cause FMPs to zone forest for

woodfuel production, rather than the objectives communities intend, such as conservation or pasture (Dozoretz et al., 2014; Faye, 2015, Faye & Ribot, 2017). Another indication that the Forest Service exploits their technical oversight authority is the fact that the standards differ by type of management. Boutinot (2014) reports that in 2014, the Forest Service managed—and urban merchants exploited—forests under simple harvesting plans contiguous to forests managed by local governments under FMPs.

These and other tactics used by the Forest Service have prevented local governments from managing their forests, despite the powers the laws grant them (Dozoretz et al., 2014). Local governments' technical capacity falls well below the requirements the national government has established. They also lack the experience, political clout, and political will to take over the process (Ba, 2006a). Conflicts and ambiguities in the law also compound the internal limitations. For example, the 1996 and 1998 laws grant different parts of local government the power to allocate licenses to harvest from forests (Ba, 2006a); such legal contradictions create imprecision in roles, which exacerbate internal skirmishes, create political tensions and further weaken the ability to act (Boutinot, 2003; Kanté, 2006). Local governments that overcome these limitations and want to formally challenge decisions made by the Forest Service have the option of legal recourse. However, the courts' inaccessibility and the improbability of an efficient and satisfactory result deter them from undertaking this option (Boutinot, 2003). Unable to successfully stand up to the Forest Service and lead the process, local governments must resort to less effective indirect tactics. In proceedings dominated by Forest Service staff, local government officials choose to delay meetings, prevent quorums from being reached, and modify committee memberships (Faye, 2015). This inability of local governments to master political and technical hurdles has allowed the Forest Service to dominate the process, and continue the role of making key decisions regarding zoning, harvesting blocks, and the allocation of operating licenses and permits.

Abuse of Authority and Use of Illegal Methods¹³

As noted above, it is unlikely that all the woodfuel sold in Senegal's urban centers derives from forests under FMPs, despite current law stating that it must. These few forests cannot provide all of the charcoal consumed in the country's urban centers. To meet demand, urban merchants buy charcoal from producers who have harvested wood on non-managed forests, possibly under fraudulent permits. It is also likely that merchants pay laborers to harvest illegally or under fraudulent permits. Some Forest Service agents are complicit in this questionable process. Forest Service agents have been able to maintain control over woodfuel production and sales by simply imposing their authority. The agency and its agents draw on a long tradition of wielding police powers and governmental resources (albeit limited ones) to manage the market. Perceptions of their old roles persist (Kanté, 2006). Forest Service tactics include delaying implementation of their tasks, manipulating the process to their advantage, turning a blind eye or blatantly seeking rents. One agent interviewed for this study reported that the Forest Service has, so far, simply "ignored" the 2018 Forest Code.

Manipulation of assessments. The Forest Service regularly conducts its annual forest assessments, which determine the season's woodfuel harvest, much later than decreed in the ministerial order. At the time of the ProLand fieldwork, national and regional assessments were three months behind schedule. Interviews suggest that such delays open significant opportunities for rent-seeking and create incentives for overharvesting. To maximize profits,

¹³ While many studies and reports describe the abuses of the system listed in this section, ProLand fieldwork serves as our main source.

producers do not wait for the assessments and the allocation of permits. The village members and workers hired by urban merchants work seasonally—they must finish before the rainy season impedes harvesting, carbonization, and transport. This harvesting prior to the allocation of permits prevents the creation of accurate baselines and undermines the quality of forest assessments. Further, because assessments occur after harvesting has begun, the targets eventually established do not include the charcoal produced prior to assessments. Operators thus have an incentive to begin work before the assessments and harvest as much as possible, unmonitored, during that period.

Incentives to produce over quota. At the end of the season, Forest Service agents assess production against the targets. The Forest Service fines all producers who surpass targets, and their surplus is confiscated. Then, the agency divides the fines collected among the forest agents (30 percent); the national conservation and land heritage fund (30 percent); and the local government with jurisdiction over the forest (40 percent). Forest Service agents then sell the confiscated production to urban charcoal merchants for an official price higher than market rate. These purchases do not count against merchants' targets, and there is no legal limit to the amount one merchant can purchase and resell. Although they purchase confiscated charcoal at an elevated price, the merchants are still able to sell at a profit. Thus, the resale of over-target charcoal creates an incentive for merchants to encourage their network of woodcutters to overproduce, while at the same time, the allocation of revenues from fines creates an incentive for field agents to be less vigilant, as overharvesting allows them to assess fines later.

Resale of permits. Once they have carbonized wood, producers require permits to transport the charcoal produced. Forest Service staff, merchants, and villagers all have opportunities to abuse this system (Ba, 2006b). Producers may sell the use of their harvesting permits to authorized or informal forest merchants along with the charcoal they have already produced. Some frontline Forest Service agents may draw up and sell fraudulent permits to allow the transportation of illegally produced charcoal to markets. Merchants who have ceased producing charcoal have also been known to sell their permits to operating merchants.

Abuse of special permits. Special permits provide another opportunity for rent-seeking. Forestry legislation allows Forest Service staff to issue special permits authorizing transportation in extenuating circumstances, which may include transport of woodfuel produced in areas other than those with an FMP. Reportedly, some officials will issue such special permits for a price.

Incentives to create deadwood. While the collection of deadwood from non-managed forests for domestic use by individuals does not require a permit, the law requires permits for the organized collection and distribution of deadwood. To this end, the Forest Service regularly issues tax-free permits to powerful religious leaders for use during religious events. The absence of a method of assessing available deadwood, and no established quotas, opens the process to political pressure. The process also creates an incentive to kill trees to produce deadwood.

LESSONS LEARNED AND RECOMMENDATIONS

While few countries regulating woodfuel face a market system as centralized as Senegal's, all development activities in the woodfuel sector must deal with the question of the role of governmental regulation in sustainable forest management. How can we create and enforce technical standards that promote sustainable forest use without disempowering local communities and enabling governmental rent-seeking? This review of Senegal's experience provides a basis for lessons and recommendations for governments and their partners intent upon refining the use of state regulatory power to mitigate the impact of woodfuel on forests and

forest carbon, empower local resource management, and promote economic growth that is both inclusive and sustainable.

LESSONS LEARNED

National-scale policy reform will take many years to implement, especially if it requires significant investment. In Senegal, after decades of revising texts and regulations, donor projects created only islands of reform the size of their zones of influence; local governments manage a very small portion of the country's forest.

Reforms in the charcoal value chain are likely to encounter resistance from the private sector and from the agency responsible for managing the country's forests. In Senegal, entrenched interests persistently, creatively, and vigorously resist measures to weaken their control over the market and empower local governments to manage their forests and market the charcoal they produce.

Neither the Forest Service nor local governments have the resources to fulfill their roles. A regulatory framework that cannot be implemented well allows for abuse. Inherently unrealistic administrative, financial, and technical requirements, and an absence of accurate and trusted decision-making, create opportunities for rent seeking and decision-making driven by politics and power. The resulting incomplete and improperly implemented regulatory regime may undermine forest management and foster practices that drive overharvesting.

Stakeholders who benefit from the status quo may advocate for strict technical standards to retain control over the sector. In Senegal, the Forest Service justified the extension of their authority with a promise to assure technical soundness. With donor support, their control expanded in the local forests through the use of FMPs; harvest quotas; and production, transport, and sales permits for charcoal production.

Uneven adoption of new policy across a country may undermine progress, especially when conforming to new regulations incurs management costs. The financed implementation of reforms in project zones provides a rationale for not implementing them elsewhere. In Senegal, open-access charcoal outside of FMPs undercuts charcoal sourced from managed forests.

Local decision-makers will struggle to increase and retain power. In the face of the Forest Service's persistent assertion of authority, local government authorities in Senegal have continued efforts to manage their forests.

RECOMMENDATIONS

Incomplete Implementation

Promote scalable policy reforms that 1) pose achievable resource demands on the national government; 2) can be adopted at the local level without ongoing financial support; and 3) depend on local knowledge and expertise or persons hired by local communities.

Forest management protocols and technical standards need to 1) correspond to the capacity of local governments managing forests; and 2) be adaptable to the local context. The *mise en défens* status is an example from the Senegal experience. Local governments can widely adopt this first step towards local natural management and the reduction of resource mining by external parties. Dramatically simplified requirements for FMPs would be another step in this direction. Local governments should be able to adapt FMPs to the size and type of their forest, their management and monitoring capacity, and their forest stewardship objectives.

Even the most scalable new national policy may take many years to implement, with some areas adopting reforms well after others. Over this period, production costs will likely be higher in regulated areas than less regulated areas. Explore building national capacity to use accessible, low cost remote sensing tools to identify deforestation hot spots and track change. Consider use of differential regulatory measures—taxes, fees, or subsidies—and the protection of “harvesting hot spots” to address the imbalance between regulated and less regulated areas.

Improper Implementation

Assess existing incentives diligently before investing. Expect political and economic resistance to reform and develop a strategy to address it.

Institutionalize transparency and ease of public monitoring through such measures as campaigns to increase awareness of laws and regulations; support for transparent decision-making through public posting of assessment results and permits; and the creation of accessible procedures for all seeking recourse.

Identify, and support the empowerment of, rural governments that act in favor of improved forest management. Support the institutionalization of procedures used by local governments to assert or maintain their authority to manage local forests. Local governments should create incentives for sustainable harvesting (by allotting quotas, for example), and limit overharvesting through measures such as fines, taxes, and fees.

CONCLUSION

Twenty-two years after Senegal promulgated the 1998 Forest Code, corruption, politicization, and oligopolistic control continue to afflict the country’s woodfuel market system. The administration and an elite group of merchants still exploit the regulatory system to generate revenue, and incentives continue to push Forest Service staff to prioritize the collection of funds over sustainable forest management. Completely and properly implemented, decentralized forest management would turn the Forest Service role from one of control to one of support. It would enable local institutions to manage their forests sustainably, not hinder them.

The country remains far from its commitment to decentralize forest management and manage its forests sustainably. Senegal’s journey towards sustainable forest management provides few examples of best practices in woodfuel regulation. However, this country is not alone; research revealed no examples of developing countries transparently and effectively regulating woodfuel markets. For governments and their partners, much remains to be learned about effective regulation, yet several things are clear. A transition of this magnitude is beyond the reach of forest services; it requires the commitment and resources of national and local governments. Civil society and the private sector will also have a role to play.

We also know that, in most countries, meeting urban demand for woodfuel sustainably will require more than transparent, efficient, and equitable regulation. Increased tree cultivation will also be necessary to reduce pressure on natural forests. Governments and their partners will need to provide the incentives and create the enabling environment for individual, community and private sector tree cultivation within forests, and in fields, woodlots, orchards, and other common and private spaces outside of forests. Complimentary approaches are necessary because, in the end, regulation alone will not suffice to reach the elusive goal of sustainable woodfuel harvesting.

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