

# Forestry policy and charcoal production in Senegal

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*This paper examines the historical, social and political-economic dynamics of environmental policy implementation in Senegal's charcoal market. It explores the relationship between urban demand for charcoal and its rural environmental consequences. It focuses on the ways in which the social and political-economic relations within the market and between the market and state shape production, exchange, regulation, and ultimately the social and ecological consequences of charcoal production and use. The article begins by characterizing the patterns of woodfuel supply and use in Senegal and by recounting the historical perception and response to environmental problems associated with the woodfuel trade. It describes the social and economic organization of production and exchange, followed by an analysis of policy implementation. It also shows that where social relations dominate production and exchange, environmental policy making and implementation will be an iterative process. Sustainable resource management is not implemented once and for ever, but will come and go.*

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In West Africa, as in most of sub-Saharan Africa, urban as well as rural households depend on woodfuels (charcoal and firewood) for almost all of their energy needs.<sup>1</sup> Many urban consumers prefer charcoal to firewood for its hot and even burning characteristics, while rural populations still burn firewood directly. Charcoal consuming urban centres exert a

disproportionately large pressure on the forest resource since charcoal is produced at low conversion efficiencies from wood.<sup>2</sup> In Senegal, for example, urban preference for charcoal results in the urban 25% of the population consuming 50% of the primary woodfuels produced nationally.<sup>3</sup> On the African continent, where urbanization rates are the highest in the world, urban demand for forest resources is growing – along with its rural, social and environmental consequences.<sup>4</sup>

In this paper, I explore the relation between urban demand for charcoal and its rural environmental consequences in Senegal. I do not focus on supply and demand, endpoints of a complex process. I focus on the intervening variables between the two, and some ways in which these variables shape production, exchange, regulation, and ultimately the social and ecological consequences of charcoal production and use. But what are the mediating forces between urban demand for woodfuels and the rural impacts of woodfuel harvesting and production? They are not merely price and quantity. They rather include the social and political-economic relations among villagers, producers, merchants, *transporteurs*, state agents and officials.

Between supply and demand are the market and the state. There are the social relations within the market that shape the hierarchies and lay the foundations for the distribution of access to and control over productive resources and marketing. There are also the relations between the market and the state that shape the dynamics of policy interventions. This relationship is partly dependent on the configuration of social and political-economic relations within the market and partly shaped by the official and unofficial political-economic purposes and needs of officials and agents of the state. It is this set of relations within the market and between the market and state that shapes the rural, social and ecological consequences of urban charcoal production.

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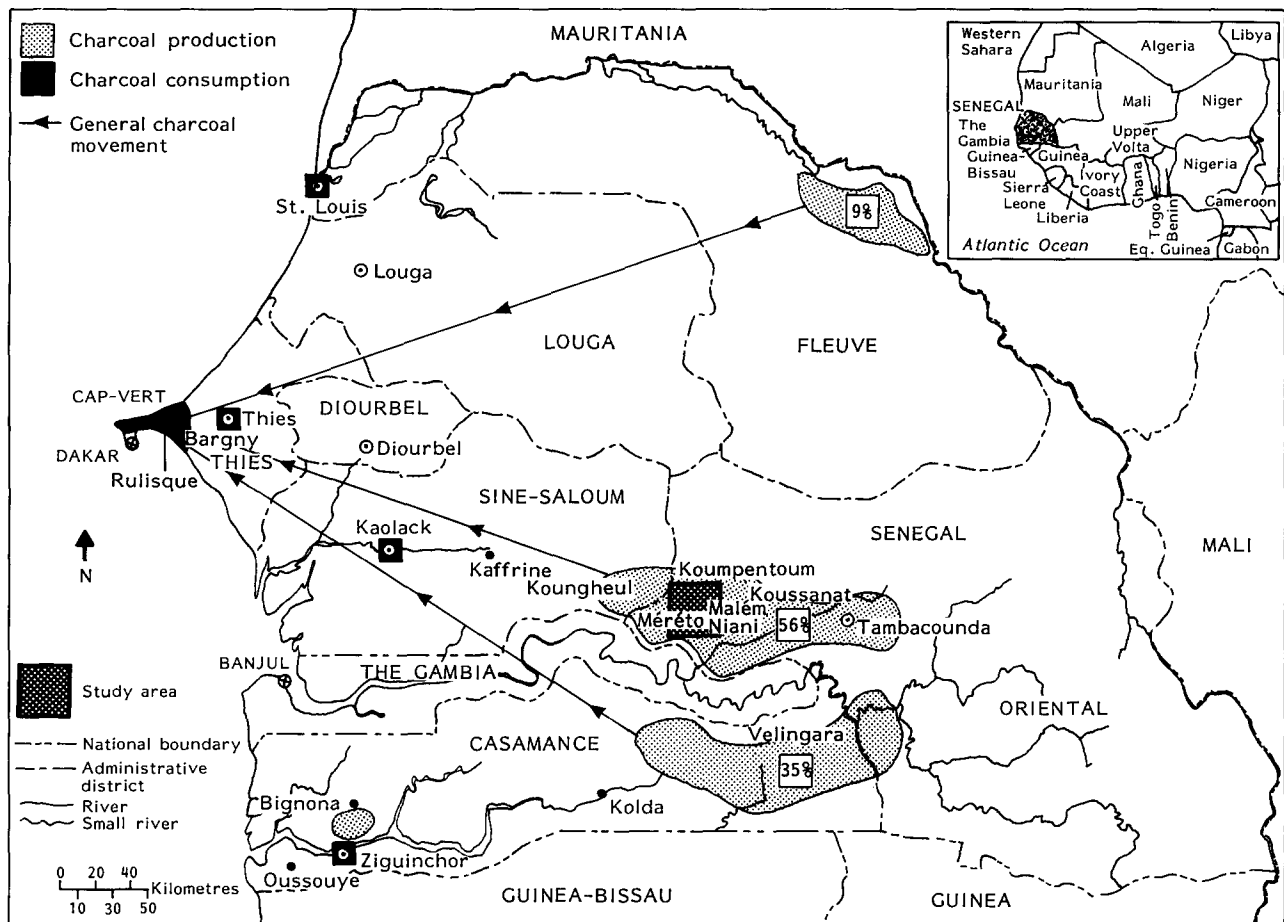


Figure 1. Map of 1987 charcoal production regions in Senegal.

Another set of intervening variables between supply and demand are the perceptions of the problems within the sector. Problems range from urban supply shortages to rural, ecological and social consequences of production. In Senegal the problems are primarily perceived as a threat to urban fuel supply and urban incomes, or a threat to a commercially productive resource base. The problem is rarely characterized as a threat to livelihoods in rural, often subsistence, villages. Policies developed to regulate the market reflect this urban and commercial orientation.<sup>5</sup>

In this paper, I sketch the dynamics of regulation in Senegal's charcoal sector. I begin by describing the sector and the policies applied to it. I then examine the ways in which production, exchange and policy implementation take place. I finish by explaining the observed policy outcomes in terms of their social and political-economic underpinnings.

The observations and analyses presented in this paper are based on fifteen months of fieldwork in Senegal during 1986, 1987 and for a short period in

1989 (see Figure 1). About half of the time in Senegal was spent living and working in the villages among the charcoal producers and merchants in the centre of Senegal's largest charcoal production region (shown in Figure 1). I also followed the charcoal trade from the forest village where production took place through small towns along the route to the final end users, located primarily in the capital city of Dakar. In the villages, the towns and in Dakar I gathered data from villagers, producers, merchants, transporters and vendors, as well as from officials and agents of Senegal's Forestry Department, Ministry for the Protection of Nature, international aid organizations and other governmental and non-governmental institutions. I used a multimethod approach including participant observation, structured and unstructured interviews, key informant interviews and considerable archival research. This paper presents an overview of the charcoal market and the policies applied to it, and shows how the social organization of the market and its relations to the state shaped outcomes of the policy process.

## Patterns of woodfuel supply and use in Senegal

Senegal is heavily dependent on woodfuels for its energy needs. Its primary energy use in 1985 was 63% woodfuels with the remaining 37% coming from imported oil.<sup>6</sup> According to the Club du Sahel, Senegal has one of the lowest percentages of woodfuel consumption in the Sahel. Most other countries in the region are closer to 90% dependent on woodfuels.<sup>7</sup>

Woodfuels in Senegal are consumed almost entirely in the household sector. Some woodfuels are burned by restaurants and charcoal is burned by blacksmiths and in rural bread ovens. In households, woodfuels are used for cooking, tea making, heating, lighting and ironing. In the urban sector,<sup>8</sup> woodfuels make up over 89% of primary household energy use. Approximately 8% of household energy is derived from electricity (used for lighting and appliances) and 2% from LPG (liquid petroleum gas – used primarily for cooking) with a negligible amount of kerosene used for lighting. In the rural sector, household energy is 99% woodfuels and 1% kerosene. Nationally, households rely on woodfuels for 93% of their energy needs.<sup>9</sup>

Firewood and charcoal consumption is split along rural–urban lines. This split has serious consequences for Senegal's forests. In urban areas woodfuel consumption is 91% charcoal and 9% firewood, while the rural mix is the inverse at 8% charcoal to 92% firewood.<sup>10</sup> In the urban sector the percentage of charcoal use is rising as more people switch from firewood to charcoal.<sup>11</sup> In the charcoal production process, between two-thirds and four-fifths of the wood energy is lost. However, since charcoal stoves are more efficient than woodstoves, cooking on charcoal takes between two and three times the wood of cooking directly with firewood. Thus, by their use of charcoal, urban dwellers who make up only 25% of Senegal's population of seven million consume well over half of the total primary wood energy. Urban bias toward charcoal combined with rapid urban growth is accelerating pressures on forest resources.

Senegal's charcoal industry operates in large zones and moves when those zones are depleted. Over the past 40 years charcoal production has moved from between 70 and 200 kilometres to between 300 and 450 kilometres radially from Dakar. Although wood is scarce for a combination of reasons, the distance now travelled reflects the growing scarcity of wood relative to demand.

Today Senegal is approximately 70% forested,

and this figure is declining at a rate of approximately 1.2% per year.<sup>12</sup> These figures imply deforestation of approximately 165 000 ha per year. If current woodfuel consumption and forest decline trends continue, woodfuel consumption has been projected to exceed forest growth before the year 2000.<sup>13</sup> The current rate of the reforestation effort, which has run into numerous obstacles, is only between 2000 and 5000 ha per year – far below the rate of deforestation.<sup>14</sup>

Urban woodfuel consumption is not the only use for forest products nor the only cause of forest decline. Forests are cleared for agriculture, destroyed in forest fires and subject to the pressures of drought, grazing and the local use of firewood and other forest products. Although the relative importance of these factors in forest decline are poorly understood, woodfuels, especially charcoal, are among the most visible and hence are often attributed disproportional weight. Charcoal production accounts for the clearing of between 18 000 and 33 000 ha per year, or between 11 and 20% of total estimated annual deforestation.<sup>15</sup> Clearing for urban firewood production represents a much smaller fraction of the annual deforestation. The commercial production of other wood products is also small compared to charcoal.<sup>16</sup>

However, forest clearing is not equivalent to deforestation. Clearing may or may not degrade the forest resource since regeneration may take place. On the other hand, deforestation implies a long-term degradation of the forest resource. Areas being cleared are compared to the deforestation rate just to give a sense of scale of these activities. But the necessity for this distinction points to the fact that few data are available on the long-term ecological consequences of charcoal production. Indeed, there are only two studies of regeneration in areas cut for charcoal, and in both instances regeneration was observed.<sup>17</sup> While species compositions were seen to have changed, and the rate of regeneration slows greatly as the northern limit of cultivation is approached, it is still unclear what the ecological or economic consequences of such clearing might be. Historically, the concern over forest decline has been reflected in the increasing scarcity of forest products by urban and commercial users.

The forest clearing and potential deforestation associated with charcoal production are of concern for several reasons. Most notable throughout the history of the region is the potential degradation of the resource base supplying commercial energy resources, lumber and other forest products. Of more recent concern, but also cited at the beginning of this

century, is the degradation of the resource base *vis-à-vis* its ecological functions, such as retaining moisture for the maintenance of the water table and river regimes, holding soil and providing habitat. Decline of both commercial and ecological production functions have implications for both rural and urban populations. However, there are also the uniquely rural social and economic effects of rural charcoal production activities, which have more to do with the struggle for access to and control over the resource than any sense of absolute destruction of the resource base. The history of regulation and concern over forests in francophone West Africa is primarily one of concern about the commercial and urban uses of forest products. Almost no attention has been paid to the broader ecological implications of forest changes or of the village-level impacts of forest use.<sup>18</sup>

I describe below the regulations that have been applied to Senegal's charcoal market. They have been aimed primarily at increasing supply and reducing demand for charcoal. Little attention has been paid to the needs of village populations whose subsistence often depends on forest resources and is severely undermined by charcoal production in their regions. Indeed, I will argue that the policies developed and applied to the market and the functions – both official and unofficial – of these policies have served urban and commercial rather than rural or ecological ends. In the following section I explore the structure of the market and of production and distribution within it. I then examine the outcomes of the policies described.

### **Efforts to mitigate the rural effects of urban charcoal demand**

At the national level, efforts have been made to stem urban demand for charcoal and to reduce pressures on forest lands. Most of these efforts have not achieved their expected goals. Woodfuel conservation, in the form of efficiency improvements and substitution away from woodfuels, has potential for reducing pressures on Senegal's forest resources.<sup>19</sup> Improved cookstoves and improved charcoal kilns have had slow diffusion rates and have not been maintained.<sup>20</sup> Domestic substitutes such as crop residues are not sufficiently abundant or centralized, or are already being used.<sup>21</sup> The only viable domestic substitute appears to be charcoal produced from domestic peat deposits.<sup>22</sup> Peat presents a temporary solution, but its use risks another set of environmental damages and social dislocations.

Imported substitutes such as kerosene or wood-

fuels from elsewhere are too expensive.<sup>23</sup> But LPG is much cheaper and shows great promise. LPG was, until recently, being used in addition to woodfuels rather than in place of them in most households using LPG. This made for little substitution.<sup>24</sup> In the last three years, however, LPG sales have begun climbing steeply. While the majority of those households using LPG are also still using as much or more charcoal than those households that consume charcoal uniquely – presumably an income effect – first analyses are now showing that LPG is making significant inroads into charcoal demand. This is the first measure that appears to be reducing demand faster than it has been growing.

Conservation and substitution can reduce Senegal's urban dependence on woodfuels. However, growing urban population and continued high charcoal use, even in those households using LPG, promise to keep urban charcoal demand high. LPG substitution will not end urban woodfuel demand in the short run. Whatever household energy strategy is followed, natural forests will continue to be a major source of household energy in Senegal for the foreseeable future. Below, I focus on the management of charcoal marketing and production and efforts to protect Senegal's declining forest resource. I begin by discussing policies as they are officially established. I then describe the market to which they are applied and the form these policies finally take.

### *Regulation of the charcoal industry*

The Senegalese Forestry Department's current policies constitute a production management programme for urban charcoal and firewood. While the policies are not systematically enforced, they have a significant effect on patterns of production and the organization of the charcoal market. These management policies include specifying charcoal production zones on a national level and assigning production plots (called parcels) locally (at the village level); fixing a national quota on charcoal production; designating protected (commercially valuable) species; allowing only dead wood to be used for charcoal production; and permitting charcoal production only during the dry season. In addition, charcoal is taxed, the price is fixed by the state, charcoal producers and merchants are licensed, and permits are required for the production, storage and transport of charcoal.

There are no available documents or written analyses justifying or explaining the majority of these policies. In addition, although the charcoal market is heavily regulated on environmental grounds, there are few studies of the environmental,

economic or social effects of charcoal production. Thus, descriptions of these policies are based on interviews with policy makers and analysis of the decrees in which these policies are set out. Many of the intentions of these policies can only be surmised, while their functions can be derived from their effects. Below is a sketch of the regulations applied to Senegal's charcoal market. These regulations are presented before the market is discussed, since they are integral to current market structure.

*An abbreviated history of charcoal production and regulation.* Concentrated commercial charcoal production in Senegal probably first began in the late 1800s when steamboat traffic was heavy along the Senegal River.<sup>25</sup> Vast areas along the river were cut to supply charcoal for steamboats and for the growing city of Saint Louis at the mouth of the Senegal River, then the capital of French West Africa.<sup>26</sup> Officials at the time were concerned that the removal of riverine forests would cause siltation and hinder navigation.<sup>27</sup>

Rail travel also facilitated development of large-scale woodfuel production and marketing. In 1885 the first railroad in West Africa was built, joining Dakar and Saint Louis. The extension of a railroad from Dakar to Bamako was completed in 1923. The trains were fuelled with wood and the railroad later became a conduit for charcoal from the interior to the coastal cities.

Senegal's first forestry code was established in July 1900 by the Colonial Service of Agriculture and Forests (*Service de l'Agriculture et des Forêts*).<sup>28</sup> It was a simple code written by the French for the entire French West African colony. This and subsequent forestry codes gave forest usufruct rights to local populations, while requiring permits for commercial exploitation of all forest products.<sup>29</sup> Then in 1908, the first law directed specifically at the woodfuel trade established a tax on firewood and charcoal and required permits for their transport (in addition to the already existing production permits).<sup>30</sup>

As early as 1912 concerns about the productive capacity of Senegal's forests began being voiced. Major export firms became concerned about the effects of deforestation when drought hit West Africa between 1910 and 1914. The governor of the colony held a meeting in Bordeaux in March 1912 to discuss halting deforestation along the Senegal River. One commercial pressure group lobbying for the government to conserve forest resources wrote, 'The disappearance of forests . . . has not only deprived the colony of a valuable source of produce, it has further had the most vexatious influence on Senegal's cli-

matic regime.'<sup>31</sup>

These same concerns were reiterated in a 1916 circular put out by the Secretary General for Current Affairs. Added to these concerns were discussions of policy implementation problems. He noted that quantities of permits delivered were not limited and that production was taking place in zones where deforestation and degradation of forests were risks. He also pointed out that more charcoal was being transported than was specified on permits. The Secretary recommended stricter application of existing regulations by regulating the spatial distribution of production of firewood and charcoal. He stated that 'it is expected that rigorous application of these regulations will create difficulties in supplying wood and charcoal to the principal centres of the colony'.<sup>32</sup> Both the Secretary General for Current Affairs and the Chief of the Colonial Service of Agriculture and Forests wrote of soil erosion on slopes and along rivers, and of the lowering of water tables as a result of deforestation from woodfuel production.<sup>33</sup> In a report to the Lieutenant Governor of the Colony, the Chief of the Agriculture and Forest Service wrote:

The lack of surveillance over wood cutting has caused a waste of the country's forest resources, which is making it more and more difficult to support the country's fuel needs. Better organization of production would permit, on the contrary, making easily available to the relatively sparse population all the wood and charcoal necessary.<sup>34</sup>

He goes on to say:

We are moved by the diverse repercussions of this situation. Regulations have been decreed, but their application to date has been very weak. It is now of utmost urgency to prevent the destruction of the remaining forests, the disappearance of which will not lack in the short term to have disastrous consequences for the future of the country.<sup>35</sup>

Thus, problems of forest exploitation for woodfuels were perceived from at least the first decade of the century, and so were problems of enforcing conservation policies. Poor enforcement of forestry policy and the perception of worsening environmental problems have persisted to the present. Indeed, over time the tone became more urgent, as in the 1920 report on the 'progressive drying' of West Africa indicating that wood cutting by indigenous and European populations was one cause.<sup>36</sup> In 1933 the Governor of French West Africa wrote that forests were declining 'as victims of the immemorial abusive use by natives', and that 'The dense forest itself – if its very existence is not threatened – is senselessly being impoverished.'<sup>37</sup>

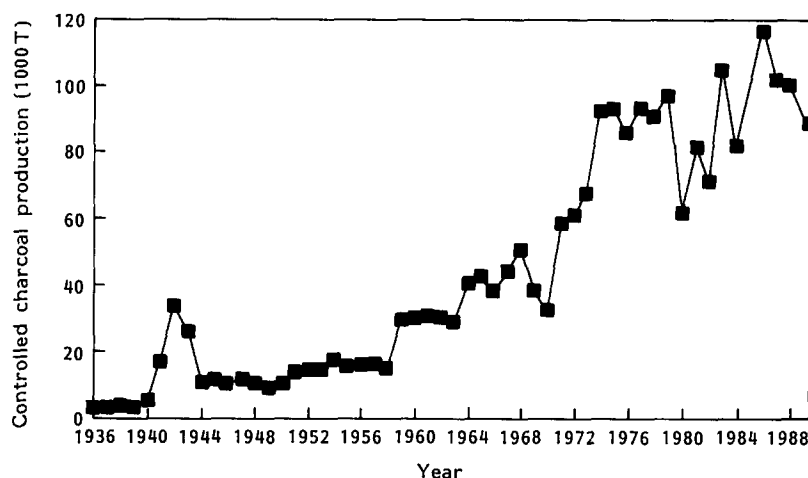


Figure 2. Controlled charcoal production 1936–89.

Although the concern over forest decline had long been expressed, it was not until 1932 that the Forest Service was established.<sup>38</sup> In 1935 the colonial government implemented a more elaborate forestry code, based on codes designed for Indochina and Madagascar. This new code gave the state ownership and complete control of the territory's forests and forest products.<sup>39</sup> The code outlined usufructuary rights for indigenous populations – requiring 'free' permits for the exercise of such rights. It also specified penalties for infractions, permits required for commercial production, and other regulations.<sup>40</sup> In February 1937 legislation was passed, detailing the application of the 1935 forestry code. In this legislation, all producers making more than 160 sacks (80 quintals) of charcoal at a time were required to carry a production permit.<sup>41</sup> Then in October 1938, to capture a greater portion of the charcoal trade, restrictions were tightened tenfold and only those producing under 16 sacks of charcoal at a time were exempt from commercial permitting.<sup>42</sup>

Figure 2 shows the evolution of controlled charcoal production in Senegal since 1936, just after the establishment of the Forest Service and the new forestry code. 'Controlled' charcoal production refers to production that has been permitted and taxed by Senegal's Forest Service. These figures generally represent charcoal consumed only in urban centres and do not cover all of the charcoal produced commercially in Senegal. They nevertheless give a rough indication of trends in urban bound charcoal production over the years.

World War 2 marked an upward surge in production from 1940 to 1944 and launched the large-scale urban charcoal commerce seen today. In 1937

production of charcoal as an 'economic substitute for imported fuels' (coal and oil) was being encouraged.<sup>43</sup> During the war years Europe could no longer provide fuel to Senegal. In early 1941, to stem fuel shortages, the governor of the colony passed several laws to encourage woodfuel production and use.<sup>44</sup> In one year, charcoal production tripled.<sup>45</sup>

In July 1941 further legislation provided a legal basis for the state to control the amount of charcoal a producer could produce and to assign the regions in which it would be produced. The 1941 decree was directed at charcoal and firewood production in a few newly created 'managed' forests not far from the major centres of consumption. Restrictions were not applied in other zones. The decree specified that the quantities of charcoal or firewood would be designated and limited on permits. Although quantities had been specified on earlier permits, these permits limited those quantities in order to mitigate impacts on the managed forests. The permits also specified plots on which producers were to cut.<sup>46</sup> The right of the state to fix the price of charcoal was also specified in this decree.<sup>47</sup> In essence, the 1941 legislation set the stage for many of the current regulations of Senegal's charcoal market, discussed later in this paper.

In 1943 the arrival of fuel in the colony caused a fall in charcoal demand. After the war fuel supplies stabilized and charcoal demand dropped drastically. Nevertheless, charcoal production remained over twice its prewar level. In 1946, the woodfuel markets were returned to their prewar status by decree. All production management was dropped. This did not mean that charcoal production would be discouraged. Indeed, in 1947, the Chief Inspector of Seneg-

al's Forestry Service, P. Bellouard, argued (as was done before the war) that increased production of charcoal saved scarce foreign exchange, and expressed his hope that charcoal production would increase.<sup>48</sup>

Return in 1946 to unmanaged charcoal production intensified woodfuel production pressures on forests near Dakar, Thiès and Kaolack. In response the government put in place a rotational system of forest management in these areas. The long rotational periods obliged producers to move out into other regions such as the Sine Saloum, between 70 and 200 kilometers outside Dakar (see Figure 1).<sup>49</sup> Since 1949 there has been a clear and steady decline in charcoal production in the closer regions and a steady increase in regions further out.<sup>50</sup>

Events in 1969 conspired to depress charcoal production, as shown in Figure 2. Labour became scarce because diplomatic problems between Senegal and Guinea forced many Guineans – who constitute the migrant work force in the charcoal market – to return to Guinea. In addition, the government closed charcoal production in the managed forests of Thiès and Diourbel, in which deforestation had reached extremes.<sup>51</sup> The forest closings pushed production into the farther regions. In 1987 well over 80% of all charcoal was produced between 300 and 450 kilometers radially from Dakar, and sometimes as far as 700 kilometers by road.<sup>52</sup> The 1987 production zones are shown in Figure 1. Along with growing distance and growing urban population, urban consumers have steadily switched from firewood toward charcoal, augmenting total primary woodfuel demand.<sup>53</sup>

In 1972 a law was passed requiring all commercial forest producers to carry a Professional Licence for Forestry Production. This 'professionalization' of forest production gave access to commercial production permits (and thus transport permits) only to professional commercial producers, making it more difficult for subsistence forest users to sell small amounts of forest products. The law also specified that each year the maximum number of licences distributed in each region would be fixed by the Director of the Forestry Department, now called the Direction des Eaux, Forêts et Chasses – DEFC (or Department of Water, Forests and Game). However, the law was not applied until 1987.<sup>54</sup>

The government of Senegal first began to discourage charcoal production in the early 1970s because of concern over the effects of the drought which began in 1968. In 1974 the respected French forester, P.L. Giffard, wrote:

Conscious of the degradation of forest vegetation in

Senegal, and of the magnitude of natural forest exploitation for the provisioning of fuels to urban centers, those responsible for the economy wish to restrain the consumption [increase end-use efficiency] of charcoal in the cities, in particular in the capital and in its suburbs where the cost of charcoal is a greater and greater constraint in the worker's budget due to the increasing distance of production sites.<sup>55</sup>

The first measure to discourage charcoal production was taken in 1974 when LPG was advertised as a substitute for charcoal. In the same year, the DEFC began to encourage firewood and charcoal merchants to organize into cooperatives, in order to facilitate regulation of the market and to bring the forestry sector into line with other rural sectors integrated into the cooperative movement – established to promote economic production.<sup>56</sup> In 1977 the use of charcoal in bakeries (the only remaining large commercial charcoal users) was banned as a move to reduce charcoal demand.<sup>57</sup> This was the first law directly restricting the quantity of charcoal production or use.

In 1980 charcoal production quotas were first systematically applied to the entire market and a limited season was created during which firewood and charcoal production were permitted.<sup>58</sup> The quotas were applied below historical demand levels, or rather below the quantities previously 'controlled' or taxed by the DEFC, in an attempt to reduce charcoal production and use.

Production seems to fluctuate up and down during the period from 1980–89 because production figures were based on the quotas. Why the fixed quotas varied so much during the 1980s is unclear. Actual production was probably continuously rising. Although the quotas are designed to specify and limit total annual production, they do not reflect actual production levels. For example, from end-use data collected on Senegal's urban household charcoal consumption in 1987, we know that urban charcoal use far exceeds the national quota. The quotas cover only about two-thirds to one-half of urban demand:<sup>59</sup> that is, actual production appears to continue the growth trend, rather than the leveling off implied by controlled production figures. This difference between the quota and demand (ie between controlled and actual charcoal production/use) renders the quota quite useless as a tool for limiting or managing charcoal production. The quota simply cannot be enforced at this low level – it is too far below demand. During the past three years the quotas have been further decreased on the grounds that such reductions are necessary to help reduce charcoal production and protect the environment.

The charcoal quota has been the most important single policy shaping Senegal's charcoal market. Quotas are integrally linked with production, storage and transport permits, taxes and producer licences, as well as the recent organization of the market into cooperatives. In 1984 individual Professional Licences for Forestry Production were eliminated, and forestry merchants were required to join or form cooperatives.<sup>60</sup> Distribution of quotas licences and permits is now through cooperatives.<sup>61</sup>

In 1983 the government of Senegal established the Ministry for the Production of Nature (Ministère de la Protection de la Nature (MPN)) under which it housed the DEFC.<sup>62</sup> The quota system put the DEFC into a new role, which it has shared with the MPN since 1983. It has given the DEFC and MPN the task of directly limiting and rationing access to resources essential to production and marketing of charcoal.

Justified by concern for maintaining urban supply, managing the environment and the nation's forests, Senegal's DEFC has implemented an elaborate programme to manage the charcoal market. It has attempted to reduce production through quotas and to manage the spatial distribution of charcoal production by assigning production plots. I will now briefly describe the current set of market regulations.

*Current regulations.* Under the current laws, commercial charcoal production is organized by an annual ministerial decree proposed by the director of the DEFC to the MPN. This decree specifies the duration of the production season – usually from December to July or August – and assigns the distribution of production quotas by regions, and between firms and cooperatives within regions.<sup>63</sup>

Specification of a charcoal production season is designed to prevent damage to the forests from exploitation during the rains. It also functions to conserve wood, since charcoal production efficiency is much higher when dry wood is used. In practice, the production season is ignored and charcoal is produced year round.

The quota system attempts to regulate the amount of charcoal produced and the spatial distribution of production by restricting quantities produced, allowing quotas by region and then monitoring the flow of those quantities. According to officials at the DEFC and the MPN, the fixing of quotas below national demand was intended as an environmental protection measure. However, there are no documents that state this intention or explain the basis of this policy. Though the quota system does not function

as intended (quotas are far surpassed), it does serve to regularize and keep track of the collection of taxes on charcoal produced for urban consumption. Although it may be effective in controlling the spatial distribution of production on a national and regional scale, the quota system has not reduced production.

The national quota and its distribution by region are determined annually by a commission composed of the director of DEFC, the director of DEFC's Division of Forest Production, and the directors of Regional Forest Service offices.<sup>64</sup> For each region, a commission, presided over by the governor of the region, determines the distribution of quotas among cooperatives and firms. The quantities allocated to each cooperative and firm are decided as a function of the amount and rapidity of production of that enterprise during the previous year. If a cooperative used its quota rapidly and requested supplementary quotas, it was likely to receive a larger quota the following year. If a cooperative did not exhaust its quota one year, it was likely to receive a smaller quota the following year. Interviews with members of this committee revealed that private firms are favoured and given larger quotas since, 'as private firms, they must be able to make a profit'.

In each region, a portion of the annual quota is retained for distribution to those cooperatives that demonstrate a 'dynamism' in the production of their initial quota and the capacity to produce more charcoal before the end of the season.<sup>65</sup> This 'reserve quota' (*quota mis en réserve*) is stated in the annual decree and distributed by the Regional Forest Services with the approval of the director of DEFC's Division of Forest Production and (according to *patrons* – rural merchants – in the charcoal market) the head of NUFC. For the 1986–87 season, 10% of the total national quota was set aside as reserve quotas (in practice this amount was grossly surpassed).<sup>66</sup> Since about 1986, DEFC has favoured allocation of reserve quotas to *patrons* who participate in voluntary reforestation. Few *patrons* do this, and those who do have only reforested small plots.

Since quotas are distributed to cooperatives and firms, all *patrons* must be members of cooperatives or registered as private firms in order to receive production quotas. Members of cooperatives and firms are required to hold a Professional Card for Forest Production (*Carte Professionnelle d'Exploitation Forestière*) which is obtained from DEFC and renewed annually for a fee of FCFA3000 (the exchange rate was approximately FCFA350 per US dollar in 1987, when this research was conducted).

Authorization to commercialize charcoal can also



be obtained by the purchase of confiscated charcoal from DEFC. Charcoal confiscated by DEFC from illegal producers is sold to any interested party – mostly *patrons* and some *transporteurs* (truckers). The *patron* receives a receipt called a *quittance* (testifying that charcoal was purchased from DEFC) which authorizes him to transport and sell the charcoal in question. Charcoal obtained by *quittance* is not counted within the *patron's* quota.

At the opening of each season the *patrons* bring their *surga* (labourers) to the local Forestry Service office where the *surga* receive employee cards (*Exploitations Forestières – Carte d'Employe*) for a fee of FCFA500. The number of *surga* allowed per *patron* is theoretically limited by the *patron's* quota.

Before beginning production, each *surga* is required to have a production permit (*Permis de Coup*). A tax of FCFA75 per sack is paid for each permit (this tax is split FCFA12.5/62.5 between the state and DEFC). Production permits are valid for a period of 40 days during which time the *surga* is expected to cut the wood, build the kiln and carbonize. Once the *patron* has registered his *surga* and paid for his production permit, the Regional Forestry Service assigns a parcel to the *patron* on which his *surga* is required to cut.

The selection of these parcels is not based on any systematic environmental or social analysis of charcoal production. The selected locations have resulted in the degrading of forests surrounding villages, and have had serious consequences for village populations. The idea of assigning parcels has merit, but must be better conceptualized, researched and executed.

Once the charcoal is ready, the *patron* returns to the Forestry Service and receives a temporary transport permit (*Permis de Circulation*). (A minimum period of 15 days from the date of issue of the production permit is required before a transport permit may be issued.) The *patron* then takes the truck to the forest, loads the charcoal, and returns to the Forest Service office where for FCFA500 his transport permit is stamped. The permit is then valid for two or three days.

*En route* to Dakar, the truckload of charcoal is stopped at several checkpoints where forestry agents verify the quantity and dates on permits. Another FCFA500 is charged at one of these checkpoints. Once in Dakar, the consumer price of charcoal is fixed and enforced by the Ministry of Commerce. Within 45 days of the closing of the season each cooperative and firm is required to present a count of their activities during the season. This document is used in the allocation of quotas the following

season. In addition to transport permits, storage permits (*Permis de Dépôt*) are required for those *patrons* who wish to store their charcoal and sell off season when the price is higher.<sup>67</sup>

Although apparently in place and functioning, regulations on the charcoal industry have not worked as specified. Below we examine the organization of Senegal's charcoal market. In the next sections, I examine how and why these policies are not applied as described and some of the effects they have had.

### Organization of production in Senegal's charcoal market

Senegal's charcoal market is composed of six principal groups: *surga* (rural charcoal producers), *kontrapalaas* (rural foremen – intermediaries between *surga* and their *patrons*), *patrons charbonniers* (rural charcoal merchants, or 'charcoal bosses'), *transporteurs* (trucking companies and their drivers), *coxeurs* (urban wholesalers) and *Diallo kerin* (urban charcoal retailers). The vertical organization of the market is illustrated in Figure 3. The market is characterized by patron–client relations between the *patrons* and *surga*, the *transporteurs* and their bosses, and between the *coxeurs* and *Diallo kerin*. The market is also characterized by interlocking credit–labour relations between the *patrons* and *surga* and between the *coxeurs* and *Diallo kerin*.<sup>68</sup> These sets of relations between actors at different levels of the market reflect considerable stratification. There is also a high degree of stratification among *patrons* and among *coxeurs*. This may be true among transport enterprises as well. For this analysis, transport is considered as an exogenous factor to the charcoal market and is not examined in detail. The *patrons* and *coxeurs* are the two dominant groups within the market. The *surga* and *Diallo kerin* are their respective dependants.

We give below a summary of the charcoal market, following the production process from the engagement of the *surga* by the *patron* through the sale of charcoal to consumers in Dakar. The activities of the actors, their institutions and the relations between them are briefly discussed. Some of the relations between actors are taken up in more detail in later sections.

#### *Surga, patrons and kontrapalaas*

The *surga* are the labourers in the charcoal market. They are almost all Pulaar speaking Fulbe from the Fouta Djallon region of Guinea.<sup>69</sup> They are migrant labourers. Most came to Senegal in search of work in agriculture or small commerce. The word *surga*

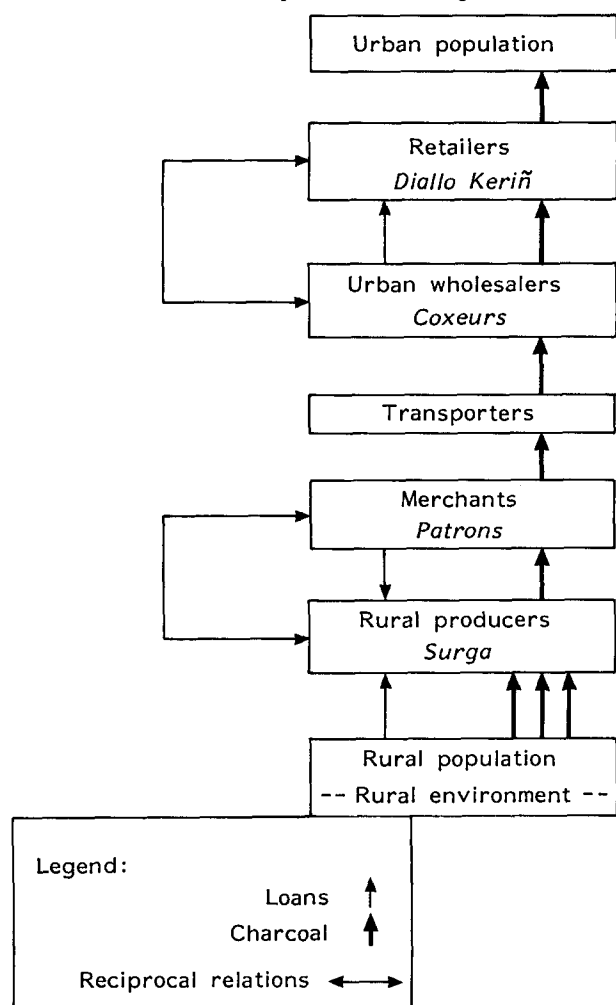


Figure 3. Senegal's charcoal market.

typically refers to a young man (no women produce charcoal) living in the compound of a peasant farmer, working in the fields for a bed, meals and a share of the crop.

Most *surga* seek work as charcoal makers only after being unable to eke out their livelihood elsewhere. Charcoal production is considered a lowly and difficult occupation; it is even taboo among most ethnic groups in Senegal. Thus, it is considered a last option and is usually entered by necessity rather than choice. The majority of *surga* are cultivators who have abandoned cultivation because of insufficient rain.

To produce charcoal legally, each *surga* must find himself a *patron*. Over half of the *patrons* are Guinean Fulbe. The rest are Wolof and Serer (both are relative newcomers to the market). Each *patron* will taken on between 0 and 40 *surga*, depending on his finances and access to production quotas (some *patrons* have no *surga* since they participate in the

charcoal market only as extra members of cooperatives or in order to buy and sell charcoal production quotas). The *patron* provides his *surga* with financial support in the form of advances in cash or kind (usually rice and/or millet) during the production process, an employee card and production permit from DEFC, basic tools and protection from forestry agents who might fine the *surga* for illegal activities or blackmail him with the threat of a fine.

*Surga* who produce illegally are called *fraudeurs*. Most *fraudeurs* have *patrons*, and depend on their *patrons* for loans and protection from forestry agents. In some regions, lepers produce charcoal illegally. They work in small groups, have no *patrons*, produce only a few dozen sacks of charcoal at a time and carry each sack on bicycle for sale in nearby towns. As we will see later, the existence and abundance of *fraudeurs* is a direct result of current policies and is overlooked by the DEFC.

Most *patrons* with more than two *surga* have a *kontrapalaas* – an intermediary who recruits new *surga*, distributes loans, schedules work parties, supervises charcoal production and often coordinates and negotiates the charcoal purchase from the *surga* and sale in the city. Purchase and sale are frequently negotiated by the *patron* himself. The *kontrapalaas* is essentially a favoured or trusted *surga* working among the *surga* he supervises.

Under the current arrangement, *surga* depend on their *patrons* for advances or zero interest loans (interest is forbidden by Islamic law). Each *surga* is obliged to sell his charcoal back to the *patron* from whom he borrowed (rather than paying him back in cash after selling the charcoal elsewhere). This arrangement functions as a form of labour tying and influences the price that *surga* receive for their charcoal. This interlocking credit-labour market clears via rationing on the loan side and via wage, or the price of charcoal, on the other. For the *patron* this arrangement ensures a supply of charcoal when the quotas are available as well as a degree of control over price.

#### Structure of cooperatives and organization of patrons

Before the establishment of the first charcoal cooperative (in 1972) a single powerful *patron* had as many as 200 *surga*.<sup>70</sup> The current structure of cooperatives follows this historical pattern. Though the average ratio of *surga* to *patrons* is around three to one, most *surga* are controlled by few *patrons*, as in the past. When the charcoal market was organized into cooperatives, the *patrons*, rather than the *surga* became members. *Patrons* became members by virtue of their social and political connections and

ability to afford the entry fees. When the quota system was implemented many cooperatives took on extra members. The extra members (who do not work but do receive quotas) enable the cooperatives to justify larger quotas. By buying the quotas from extra cooperative members the few central members (the cooperative's president always included) have been able to dominate the cooperatives and continue to work (turning over large quantities of charcoal) as *patrons* did in the past.

Furthermore, the most powerful *patrons* were never required to join cooperatives. In 1987 there were 83 cooperatives and 8 private firms working in the charcoal market.<sup>71</sup> According to policy advisers in the MPN, it was their intention to organize all firms into cooperatives several years ago. However, DEFC has allowed firms to remain. Ironically, the president of the National Union of Forestry Cooperatives is the owner of the largest firm in the market, and happens to also receive a larger quota than any other firm or cooperative. He is not a cooperative member. The firms are allocated much larger per capita quotas than are the cooperatives. The president of NUFC is also the president of the National Federation of Cooperatives of Senegal (Fédération Nationale des Coopératives du Sénégal – NFCS) and was recently appointed to Senegal's National Assembly.

Most cooperatives are highly stratified both internally and externally in terms of the access of individual members to quotas and with respect to the allocation of quotas among cooperatives. The majority of *patrons* are inactive cooperative members, participating only to justify a larger quota for the cooperative. These inactive *patrons* sell their quotas, at a considerable price (as much as FCFA 150 000 per truckload of charcoal or about FCFA 500 per sack) to the active *patrons*. In a typical cooperative of 30 to 100 *patrons*, only some will actually be involved in the business of charcoal production. The other *patrons* are solely involved in the production quota market (the sale of quotas to other *patrons*). Although, on average, cooperatives have few *surga* per *patron*, in the tradition of the market, active *patrons* have upwards of 40.

In general cooperative members are relatively well off. There are numerous steps, fees and signatures necessary in order to establish a cooperative. Like the *surga*, most peasants cannot afford the fees or bribes necessary to form or enter a cooperative. Their lack of social connections and illiteracy prevent them from negotiating with the bureaucracy. Furthermore, there is now a limit on the total number of cooperatives allowed in the market, and

new cooperatives cannot enter without considerable political leverage. Last, even with membership in a cooperative, many peasants would not have the capital to finance the work of a *surga*.

### *The production process*

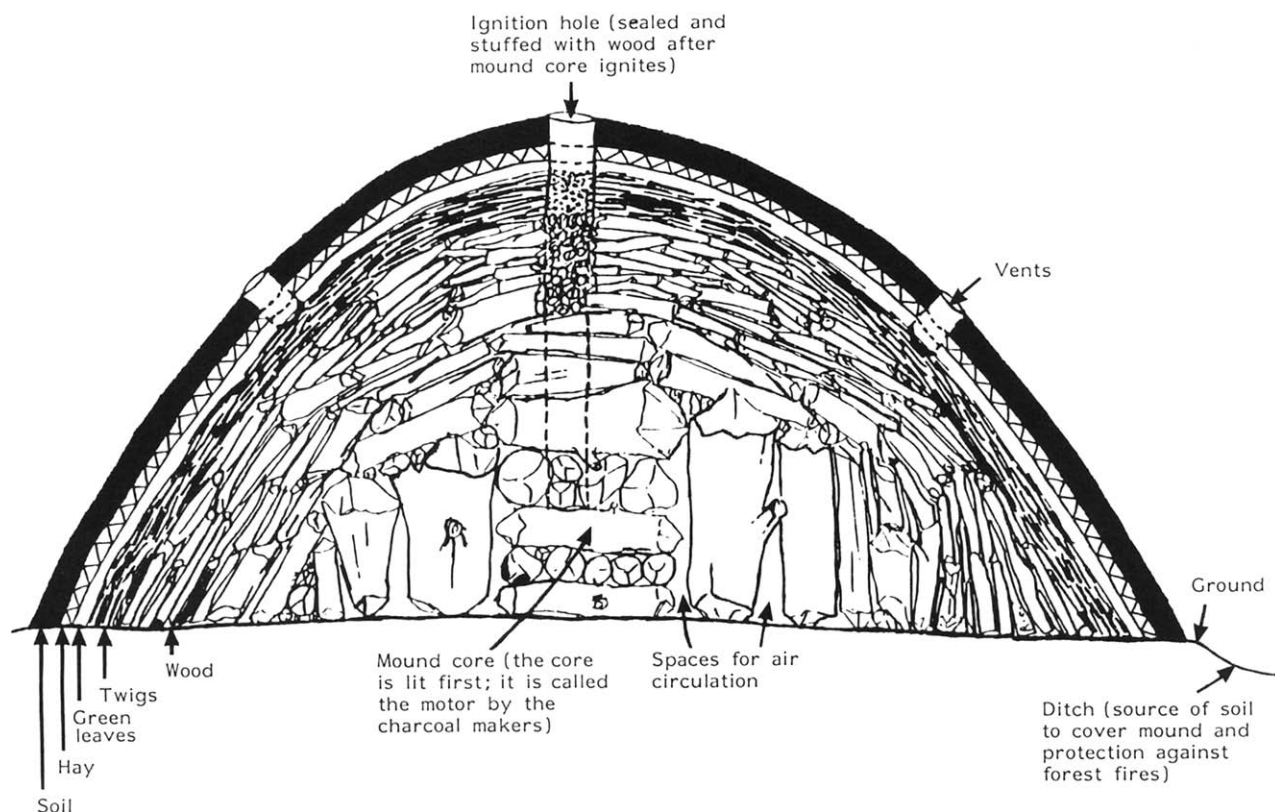
After a *surga* finds a *patron* or *kontrapalaas*, obtains an employee card, is assigned a parcel and receives an initial advance, charcoal production begins (production permits are often acquired later on in the production process). Anywhere from 5 to over 200 *surga* may be cutting in the forest around a given village. Usually all of the *surga* of the same *patron* will work in the same section of the forest, typically each with his own kiln.

Each *surga* works for about two months felling trees and chopping logs into kiln size pieces. The kilns, or charcoal mounds, consist of systematically stacked wood covered with a layer of green leaves (often using saplings and stripping trees and shrubs) and a layer of hay, sealed with a layer of sand (see Figure 4). *Surga* (or their *kontrapalaas*) organize work parties called *kilé* (typically referring to traditional agriculture work parties) for wood gathering, kiln building, covering of the kiln (with hay and sand), bagging charcoal and loading trucks. The firing of the kiln and the extraction of the charcoal after firing are carried out with another *surga* and take between one and three weeks (24 hours a day). An average kiln produces 206 sacks of charcoal (or approximately 10 tonnes).<sup>72</sup> Figures 5 and 6 are photos of the kiln building process.

The production process takes 60 days on average from the first cutting to the bagging of charcoal. In practice, the time constraint of 40 days on production permits forces the *patrons* to get these permits well after the *surga* begins production. Thus, the order in which production and the receipt of employee cards and production permits occurs varies depending on the style and needs of the *patron*. Most *patrons* claimed to pay their taxes and pick up production permits at the same time as their transport permits (with both the *patron* and the forestry agent ignoring the 15 day minimum between the issue of these two permits).

After the kiln is fired and the charcoal is ready, the *surga* or *kontrapalaas* alerts the *patron* who goes to the local Forestry Service Office for a transport permit. The *patron* then finds a *transporteur* and returns to the woods to pick up the charcoal.

When the truck arrives, the *surga* will call a *kilé* to fill sacks and load the truck. For this work party the host *surga* pays the other *surga* FCFA25 per sack filled and loaded into the truck. (It is worth noting



**Figure 4.** Cross-section of a *carrée* style charcoal mound.

that the sacks are tied closed with bark stripped from green trees.)

During production, *surga* take advances from their *patrons* depending on their needs, and on the generosity of their *patron*. More *surga* will take advances for their first kiln of the season, while for their second or third kiln they may already have savings from their first kilns. Those who have *kilé* will often take additional advances during the course

of production. Some *surga* will forgo *kilé* in order to save money. The average advances for a single kiln total FCFA14 100, while expenses (not including subsistence – at about FCFA6000 per month) total closer to FCFA13 000. These expenses include providing food, cigarettes, kola nuts and candy during work parties, and renting a mule cart or paying other *surga* to help carry logs to the kiln site.



**Figure 5.** *Kilé Ranso* – a kiln building work party. *Surga* are helping each other in building the core of a kiln.



**Figure 6.** *Surga* tending the firing of a kiln. The kiln must be monitored round the clock for the one to three weeks it takes to carbonize the wood.

### *Fixing the producer price of charcoal and paying the surga*

The arrangement between *surga* and *patron* in the sale of charcoal has changed considerably over time. As far back as anyone can remember exchange was based on a share cropping type of system. Exchange became more market oriented around 1980 with the *surga* selling their charcoal by the sack. In the current arrangement, the *patron* or *kontrapalaas* goes through the motions of negotiating a per sack price with the *surga*. The negotiation is only a formality since the price is fixed by the *patrons*; there is what the *surga* call a 'going price'. Most *surga* will accept this price after some discussion. *Surga* sell a sack for between FCFA350 and 750 depending on the season (the average price in 1986 was FCFA540 per sack), but no amount of bargaining will change the price more than FCFA25 to 50 from the *patron's* original offer – usually close to the 'going price'. The going price which the *surga* take is fixed in periodic meetings of the *patrons* called by the president of the NUFC. Only *patrons*, no *surga*, are members of NUFC. Producer price fixing is enforced by the DEFC upon request by the NUFC. This type of collusion would tend to move prices closer to monopsony prices for the *patrons*.

In addition to paying the *surga*, the *patron* pays the *kontrapalaas* FCFA5000 per truckload for his work. Depending on the circumstance, the *patron* may also pay FCFA5000 as a gratuity to the chief of the village near which the charcoal was produced, and some amount ranging from FCFA2000 to 10 000 to the local forestry agent if his *surga's* activities are not entirely within regulation – which they rarely are. These pay offs are very common and are known in Pulaar as *cogo goro*, 'the price of kola nuts'.

The average *surga* produces between 1.6 and 1.8 kilns per season, making an annual net income of FCFA176 000. *Surga* are rarely left in debt to the *patron* after completion of a kiln load. Debts did occur more frequently in the past, but are now usually incurred only when the *surga* falls sick, a kiln accidentally burns up or when a *surga* borrows for a dowry. The mere receipt of a loan does, however, tie the *surga* to his *patron* during the production process. After production the *surga* is obliged to sell back to the *patron* from whom he took advances. *Patrons* usually will not buy the charcoal of another *patron's surga*.

A *surga's* average net monthly income from charcoal production is FCFA14 600 (double the cost of rural subsistence). About half of the *surga* also cultivate or work other jobs. Adding gross monthly income from other work, the average *surga* makes

approximately FCFA17 500 per month.

Income in the urban sector is much higher than that of a *surga*, while on average, income in the rural sector (cultivators) is lower.<sup>73</sup> This is consistent with the complaint of many villagers that the charcoal makers made much more money than they do.

### *Transport and sale in Dakar—coxeurs and Diallo kerin*

Transport to Dakar costs between FCFA600 and 700 per sack. In Dakar the truck is met by a *coxeur*, or wholesaler. *Coxeurs* are the wealthiest group within the market (they are the only group in the market who have not been regulated). The *coxeurs* buy charcoal from the *patrons* by the truckload (in 1986 the average price paid was 2170 per sack) and dispatch the truck to several of Dakar's 1530 charcoal retail outlets where the charcoal is sold on credit to retailers called *Diallo kerin* who sell the charcoal by the kilogram.<sup>74</sup> It is interesting to note that Diallo is the most common family name among the Guinean Falbe and *kerin* means charcoal in Wolof; almost all of the *coxeurs* and *Diallo kerin* are Guinean Fulbe while the majority of urban dwellers are Wolof.

The relation between the *coxeurs* and their *Diallo kerin* is also an interlocking credit-labour market. *Coxeurs* maintain control over the market through credit obligations and knowledge of the market. The *Diallo kerin* cannot afford to buy a whole truckload of charcoal at a time, so they take the charcoal on credit from the *coxeurs*, paying them back bit by bit. Because *Diallo kerin* depend on their *coxeurs* for credit they tend to buy consistently from the same *coxeurs*. The *patrons* cannot sell directly to the *Diallo kerin* since *Diallo kerin* cannot afford to buy for cash, and the *patrons* cannot spend the time coming back to the city to collect debts, and the *patrons* do not know where the charcoal is needed and cannot easily find buyers. Hence, *patrons* sell to the *coxeurs*.

When sold by the kilogram, a 48 kg sack sells for between FCFA2500 and 2600 on average. Although the final price of charcoal is fixed at FCFA40 per kilogram, the average 'kilogram' weighs of the order of 740 to 770 grams and fluctuates with supply.<sup>75</sup>

### *Price structure and margins*

Table 2 shows average prices and gross income margins for actors at each level of the market for a single sack of charcoal. Table 3 presents an estimate of the cost composition for a single sack of charcoal, including estimates of the net per sack incomes for all of the actors in the market.

Table 1. Regional distribution of commercialized woodfuels (%).

	Region – in order of increasing distance from Dakar						
	Thiès	Diourbel	Louga	Sine-Saloum	Sénégal Oriental	Casamance	Fleuve <sup>a</sup>
<b>Firewood</b>							
1949	34.1	4.7	0	22.7	4.9	13.2	20.4
1960	10.2	3.6	0	64.9	1.7	10.7	8.9
1969	6.6	9.7	0	51.4	3.9	12.0	16.4
1972	6.7	12.0	0	36.8	11.9	15.3	17.3
1978	4.1	0.5	28.5	30.4	5.5	10.6	20.3
1984 <sup>b</sup>	0	0	18.2	21.9	21.9	23.7	14.6
1987	0	0	11.5	38.5	26.9	11.5	11.5
<b>Charcoal</b>							
1949	72.4	1.2	0	9.6	0.1	4.5	12.2
1960	27.0	1.4	0	65.6	0.1	0.4	5.2
1969	4.9	2.0	0	72.1	13.0	1.5	6.5
1972	2.3	1.4	0	36.4	45.5	6.4	8.0
1975	2.5	3.9	0	17.7	48.1	6.2	22.0
1978	2.7	0	8.5	21.7	15.4	22.0	29.7
1984 <sup>b</sup>	0	0	3.6	21.5	16.5	29.2	29.2
1987	0	0	2.1	21.5	34.7	34.8	6.9

Sources: P.E.L. Giffard, *L'Arbre dans le paysage Sénégalais: sylviculture en zone tropicale sèche*, CTFT, Dakar, 1974, p 211; République du Sénégal, *Plan Directeur de Développement Forestier, Diagnostique*, Ministère du Développement Rural, CTFT, 1981; République du Sénégal, *Analyse: Avis du Comité Régional de Prix*, Direction des Eaux, Forêts et Chasse, MPN, 1984; République du Sénégal, *Arrête portant organisation de la Compagne d'Exploitation Forestiere pour l'année 1986, 1987*, MPN, Dakar, 1987.

<sup>a</sup> Woodfuels from the region of Fleuve were primarily used in the city of Saint Louis, while all of the other regions supplied Dakar.

<sup>b</sup> Figures from 1984 on are based on quotas rather than on quantities controlled.

It is clear that the *patrons* have the largest margins in the market. This does not, however, mean that they profit the most. First, *patrons* have the expense of purchasing quotas on *quittance* which is not included in the estimate. Second, there are many more *patrons* than *coxeurs*. Table 4 shows estimated average net income for actors at each level of the market. It can be seen that the hierarchy of average incomes, from top to bottom, starts with the *coxeurs* followed by *patrons*, *Diallo keriñ*, *kontrapalaas*, and then *surga*.

But this distribution does not tell the whole story. The *Diallo keriñ*, *kontrapalaas*, and *surga* tend to have relatively even income distribution among them. The *patrons* and *coxeurs*, on the other hand tend to be much more stratified. A few *patrons* control most of the commerce. The World Bank's survey on the quota control system found that over 50% of the charcoal truckloads registered at each of three main forestry checkpoints (*en route* to Dakar) surveyed represented only three or four different *patrons*.<sup>76</sup> These figures indicate that over 50% of the commerce is concentrated in the hands of at most 15 to 20 *patrons* (out of a total around 4000 – ie 0.5%);<sup>77</sup> roughly calculated, each of these *patrons* has access to the production of between 225 and 300

*surga*. *Coxeurs* too appear to be highly stratified. It is quite difficult, however, to get an indication of how much income is distributed among them.<sup>78</sup>

In the following section I describe how regulatory policies applied to Senegal's charcoal market have been implemented, circumvented and only partially applied. I then discuss some of the underlying reasons for the outcomes described below.

Table 2. 1986 average prices and gross margins in Senegal's charcoal market.

Average prices and gross margins (FCFA/sack) <sup>a</sup>	
Producer price	512
Producer margin	512
Patron price	1798
Patron margin	1286
Coxeur price	1940
Coxeur margin	142
Retail price	2329 <sup>b</sup>
<i>Diallo keriñ</i> plus outlet owner margin	389

Source: J. Ribot, *Markets, States and Environmental Policy: The Political Economy of Charcoal in Senegal*, PhD thesis, University of California, Berkeley, 1990, p 260.

<sup>a</sup> The rate of exchange in 1986 was FCFA350 per US\$1.

<sup>b</sup> Derived from a series of weighings of charcoal purchased in six *quartiers* of Dakar. This retail price is based on the assumed weight of 42 kg per sack.

Table 3. Cost composition for a sack of charcoal sold in Dakar.

	Expenses (FCFA/sack)	Labour and profit or net income (FCFA/sack)	Percent of final price (%)
<i>Surga</i>			
Net income		470	20.2
Expenses:	67		2.9
Tools	(10) <sup>a</sup>		(0.4)
Bicycles	(4)		(0.2)
Work parties ( <i>kilé</i> )	(53)		(2.3)
<i>Patrons</i>			
Net income		365	15.7
Expenses	841		36.1
Transport	(663)		(28.5)
Taxes	(75)		(3.2)
Cards	(5)		(0.2)
Cooperative costs	(9)		(0.4)
Payoffs			
Village chiefs	(5)		(0.2)
Forest agents	(2)		(0.1)
Lost advances	(2)		(0.1)
Additional quota fee	(80)		(3.4)
Paying <i>kontrapalaas</i>		20	0.9
Unloading in Dakar		35	1.5
<i>Coxeurs</i>			
Net income		142	6.1
Expenses	0		0.0
<i>Diallo Keriñ</i>			
Net income		332	14.3
Expenses	57		2.4
Taxes and duty	(29)		(1.2)
Rent on outlet	(25)		(1.1)
Scales	(3)		(0.1)
Total	965	1364	
Percent of total	41	59	
Total cost of sack in Dakar		2329	100

Source: J. Ribot, *Markets, States and Environmental Policy: The Political Economy of Charcoal in Senegal*, PhD thesis, University of California, Berkeley, 1990, p 270.

## Implementation of controls in the charcoal market

### Production off season

The official charcoal production season lasts from December to July or August, spanning much of Senegal's dry season. However, *surga* cut trees and build charcoal mounds everywhere in the forests off season, with scarcely no attempt to hide what they are doing. Charcoal production proceeds year round.

Charcoal production continues year round because forestry field agents do not enforce the charcoal production season, and because permits to transport charcoal produced off season can be obtained easily.

In order to sell charcoal off season, *patrons* are permitted to stock charcoal by obtaining a storage permit. With a storage permit they can stockpile charcoal produced before the end of the production season and obtain a transport permit when they are

ready to sell. However, the *patrons* use storage permits as a way of circumventing the ban on carbonizing off season. At the end of the production season they obtain storage permits without storing any charcoal or just storing a minimal amount. When charcoal is needed, they can take it directly from the forests, claiming that the charcoal is from their storage depot. In this way they are able to obtain transport permits for charcoal produced off season.

Forestry agents do not systematically enforce the ban on off season production. They allow carbonization to take place in the woods and deliver transport permits in circumstances where charcoal could only have been produced off season. For example, from the first day the production season opens, numerous truckloads of charcoal are issued transport permits and head for Dakar. Issuing these permits violates the 15 day minimum time between issuing of production and transport permits.<sup>79</sup> Because it would take a minimum of one month (with a well coordinated

effort) to produce any significant quantity of charcoal, such early granting of transport permits both acknowledges and condones production prior to the opening of the season. This reflects the minimal enforcement of the production season.

The primary effect of removing charcoal off season is that the trucks destroy dirt roads. Because the off season includes the rainy season, charcoal trucks entering villages and forest areas sink into the mud, leaving road surfaces so rutted that cars and mule carts are often unable to negotiate them. It becomes difficult for villagers to bring their products to market or get supplies. The trucks also leave rutted paths through the forests. In addition, carbonization is less efficient during the rains, thus more trees are cut and burned to produce less charcoal.

#### *Location of charcoal production*

Under the 1964 Law of National Domain, DEFC is responsible for the management of Senegal's forests. As part of the management of charcoal production, the forestry agents of each Regional Forestry Service choose plots, called parcels, where charcoal production will be allowed. They assign each *surga* a parcel. According to forestry officials, zones and parcels are chosen based on the availability of wood and the ecological sensitivity of the forest and soil.<sup>80</sup> Although the ultimate decision is the responsibility of forests, the *patrons* also influence where these parcels are located. *Patrons* prefer them to be close to a village for easy access to roads and so that their *surga* can have a place to live and get provisions. Parcels are usually placed just outside of a village in a wooded area.

While contradictions between village and national or commercial resource use have their roots in land-tenure policies, they are exacerbated by forestry policies.<sup>81</sup> The story of Daru Fall illustrates this point.

In Daru Fall, a village of 570 inhabitants, there were of the order of 150 *surga* producing charcoal in the vicinity and living in the village. Though there may have been a high percentage of dead wood and sturdy soils (the criterion used by Forestry Agents for locating production plots) in the vicinity of the village of Daru Fall, the concentration of *surga* was a tremendous pressure on the forests normally used exclusively by villagers. Such concentration is commonplace.

The villagers of Daru Fall were pleased when the charcoal producers first arrived in the dry season of 1984–85. They saw them as a source of extra income. Charcoal producers rented huts in village compounds and paid for meals cooked on a monthly

contract. However, the villagers later learned that the cost of this commerce was the decline of their forest resources.<sup>82</sup> The *surga* drew down their wells and villagers felt that charcoal production degraded the forests in which they hunted and gathered firewood, fruit and herbs. But even with this recognition, they could not evict their tenants, whom, villagers complained, often left after selling their charcoal without paying debts incurred for rent and food.

In the five villages visited and surveyed, villagers consistently blamed charcoal producers for the decline of their forests and disappearance of products which had previously been abundant, especially firewood and honey. The disappearance of other forest products was also observed only 50 km away in a study of nutritional trees and shrubs.<sup>83</sup> Villagers also perceived charcoal production to be a primary cause of forest decline.<sup>84</sup> In addition, although charcoal producers are not permitted to cut live trees or protected (commercially valuable) species, it is well documented that they cut both with impunity.<sup>85</sup>

Numerous conflicts have been recounted between villagers and charcoal producers. Some of these conflicts have been violent.<sup>86</sup> In most cases, the villagers wanted the charcoal makers to leave or to pay debts they had incurred, and fights broke out. In other instances, underlying tensions have emerged over other issues such as theft and adultery. In the early 1970s, due to the frequency of conflicts between charcoal makers and villagers, the DEFC adopted an informal policy obliging charcoal *patrons* to gain the consent of the village chief before carbonizing in the area surrounding a village.<sup>87</sup> This policy is no longer practised – probably due to the recent role of the foresters in assigning parcels. The choice of location is now considered a professional decision for the forestry agents to make. The agents do not generally ask the village chief for his consent. The location of charcoal producers is now decided upon by foresters.

There is a disparity between the ability of the charcoal market to enter a zone and the ability of the villagers to resist. In the past, conflicts between *surga* and villagers had a chance of pushing charcoal production out of a village forest. Assigning of parcels by DEFC now tends to justify the presence of the charcoal market. Conflicts still arise between villagers and charcoal makers. Some are settled by pay offs to the village chief and some by the forestry agents. Unfortunately, now that charcoal producers have official sanction, villagers have little if any recourse when foresters are behind the charcoal makers. Charcoal producers carry out their task and



move on to the next village.

In the long run, only the *patrons* and *surga* benefit. Charcoal production is justified and protected by the DEFC. In essence, foresters protect *surga* (or urban) access to village forests. Villagers are left with forest resources degraded by charcoal production. This degradation is due to the spatial organization of production around their villages and the officially backed powerlessness of villagers to determine the use of their forests.

The practice of situating charcoal producers in areas surrounding villages reveals a lack of social environmental analysis of charcoal production. It also reflects a bias toward commercial and urban over village concerns. Even if other measures to reduce urban demand through increased kiln and stove efficiency and fuel substitution are successful, and even if plantations increase supply, the village-level impacts of charcoal production in natural forests will not change. The number of villages affected will be reduced, but the impacts in affected villages will be the same. To change these impacts, the allocation of parcels would have to be based on both ecological characteristics and social uses of the forests: forest management would have to encompass the social system. Transferring to villagers the right to protect and access village forests, currently under national domain, may be an option for improving resource conservation and use. However, such an option is very complex and requires evaluation beyond the scope of this analysis. Nevertheless, the basic idea is that policies that shift control among groups with different relations to the resource in question may result in different patterns of resource management and use. Evaluating whether those differences constitute improvement requires further analysis of the situation in question.

#### *Alternative channels of access to quotas*

When the charcoal season opens, the initial quotas distributed by DEFC are quickly exhausted by those *patrons* with the financial means to hire *surga* or to buy charcoal from *fraudeurs* (*surga* producing without licence or permit). After the initial quota is exhausted, the *patron* seeks to obtain reserve quotas (a portion of the national quota, usually 10%, set aside for discretionary distribution by MPN and DEFC). For example, the *patron* allocated the largest quota in the market (the president of the largest firm) used up his entire initial quota for the region of Koumpentoum (1500 tonnes, approximately 30 000 sacks), during the first three weeks of the season.<sup>88</sup> This *patron* received reserve quotas of 2000 tonnes shortly thereafter – a reward for rapid

exploitation.<sup>89</sup> *Patrons* who voluntarily participate in reforestation are also favoured. For example, one cooperative with a quota of 400 tonnes of charcoal, requiring approximately 50 hectares of forest, replanted only 6 hectares. This cooperative was awarded a supplementary quota of 200 tonnes, representing another 25 hectares of clearing. The cooperative's president called his reforestation effort 'my kola'. Small bribes are called 'the price of kola nuts'. These policies tend to favour those who can afford to hire more *surga* and who can pay for a token amount of reforestation.

Reserve quotas are also used up. However, the number of reserve quotas issued is much greater than the quota actually reserved. In one region, a World Bank survey showed that the reserve quotas issued were equal to over 170% of the initial quotas (or 1700% of the actual reserve quota) allocated to that region.<sup>90</sup> For another region reserve quotas were equal to 80% of the initial quota (or 800% of the actual reserve quota). The excess in this latter region alone is considerably higher than the total national reserve quota initially set aside.<sup>91</sup>

Most *patrons* claim that reserve quotas are given only to *patrons* with connections to ministers, members of UNCF, officials in DEFC or forestry agents in the field. Many of the *patrons* interviewed complained that they could not obtain any reserve quotas, since all of the reserve quotas went to the presidents of cooperatives. In fact, the World Bank report shows that distribution of reserve quotas is quite skewed. Some *patrons* will exploit between 10 and 17 times their original quota in reserve quotas during the course of the season.<sup>92</sup> The vast majority of *patrons* will receive none.

In past years agricultural land clearing quotas were used extensively when other quotas were exhausted. Clearing quotas were said to be obtainable through connections to people within DEFC. Even one high official in DEFC complained that he could not stop ministers from requesting quotas for their clients. This pathway to quotas was restricted in an attempt to control fraud.<sup>93</sup> Evidently, with fewer clearing quotas, other loopholes opened. These include the overuse of reserve quotas, the purchase of quotas from other *patrons* and the use of what are called *quittances*.

A *quittance* (the French word for receipt) is a receipt given to a *patron* upon purchase of charcoal from DEFC that has been confiscated from fraudulent producers – ie *surga* producing without permits, cutting live wood or producing outside the designated area or off season. The *patron* exchanges this *quittance* for a transport permit. In effect, a *patron*

with no quota can come to a Regional Forest Service Office and purchase confiscated charcoal (which is sold at the official price of FCFA500 per sack – it was sold for much less in the past).<sup>94</sup> With his *quittance*, the *patron* then obtains a transport permit and brings the charcoal for sale in Dakar.

The *quittance* functions as a loophole. A *patron* with no more (or no access to) normal or reserve quotas, sends his *surga* into the forest to carbonize without a permit. The *surga* will produce charcoal outside the designated area. When the charcoal is ready, the *patron* will go to the Forest Service Office and tell them that he knows of some illegally produced charcoal. The charcoal will then be confiscated on paper and sold to the *patron*. The forestry agent issues a *quittance* and allows the *patron* to enter the woods and pick up the charcoal. He then returns to the Forest Service Office and exchanges his *quittance* for a transport permit. Off to Dakar he goes with all of his papers in order. In this way, the *patron* is effectively purchasing his quota for FCFA 500 per sack. The *patron* still has to pay the *surga* for his charcoal and thus, the *patron's* margin is severely squeezed. Though *quittances* are extensively used they are the pathway less preferred to quotas since they are expensive. In actuality, the *quittances* are sold for less than their official price of FCFA500. During most of the year, FCFA500 would be prohibitive for it exceeds the *patrons'* profit margin. Although registering the sale of charcoal is required by DEFC, *quittances* are not kept good track of.<sup>95</sup> Thus forest agents can sell them at any price they wish and report that less charcoal was sold than is specified on the permit.

There is also a black market in quotas between active and inactive *patrons*.<sup>96</sup> As mentioned above, many cooperative members are members only to justify a greater quota for the cooperative as a whole. The degree to which this occurs depends on the cooperative. In some, quotas are sold, while in others in which the president or other members of the cooperative have paid the membership for a dummy member, the quotas are just taken by the *patron* who paid the membership. The price at which a quota is sold varies depending on the demand for quotas, demand being a function of season, the availability of reserve quotas and probably the price of *quittances*. Quotas can sell for as much as FCFA 500 per sack. This sale of quotas does not increase the total number of quotas in circulation, as *quittances* and the distribution of extra reserve quotas do.

The process of stratification is accentuated because those who have favoured or selective access to reserve quotas do not have to buy quotas from other

*patrons* or to pay for *quittances*. Since these two latter choices cost on the order of FCFA250 to 500 extra per sack, the *patron* with access to reserve quotas has a much greater profit margin.

In sum, additional quotas are easily obtained by those who have the means and connections. Initially, those with influence can obtain reserve quotas, then there are quotas to be purchased from other *patrons*. Once these quotas are exhausted, *patrons* move on to *quittances*. In this way, the original national quota is exceeded.

It is difficult to know the distribution of types of quotas issued without carrying out an analysis of transport permits at the entrance to Dakar. In 1987 a World Bank study found that few of the records required of the Regional Forest Service offices are actually kept. Only 60% of the permits issued are logged in the regional record books. For records of charcoal sold on *quittance*, only 30% of the actual sales and permits are recorded.<sup>97</sup> Indeed, the director of DEFC sent a letter to all of the regional Forest Service offices informing them that a team of researchers would be coming to examine their books. When the team arrived at several of the offices, they were told that the books were missing, or that they had been taken elsewhere for the day. Poor record keeping indicates bureaucratic inefficiency, and leaves room for a high degree of fraud among forestry agents and officials. It also suggests that much of the proceeds from *quittances*, and from fines, may not make it to the DEFC or state treasury.

The discrepancy between the official quota of 102 000 tonnes and the actual urban consumption of about 130 000 to 180 000 tonnes is not the result of a simple inability to control the flow of charcoal into Dakar on the part of the DEFC; it arises from systematic permission granted by DEFC officials and agents. Dakar is on a peninsula, and there is only one paved road, one sand road and two beaches by which trucks can enter the city. Charcoal can also come into the city on the train or by boat. In fact, almost no charcoal enters by sea.<sup>98</sup> Indeed, I contend that little charcoal enters Dakar without being surveyed by DEFC agents. First, *patrons* claimed that it was not worth the risk (fines or confiscation of charcoal). *Patrons* saw no reason to take risks when obtaining quotas and circulation permits was relatively easy and less risky than the alternatives. Nor did *transporteurs* want to do it for fear that their trucks would be confiscated. Given the few entry routes to Dakar, it is a very easy city for DEFC to monitor, and the DEFC does monitor it.

In the face of the large and known discrepancy

between the quota and demand, the Minister for the Protection of Nature and the Director of DEFC have repeatedly called for a reduction of the quota. They do this in the name of environmental protection. They also work hard to ensure that all trucks enter Dakar with permits, and that loopholes such as *quittances* are not abused.<sup>99</sup> Reducing a quota that is already well under national demand, however, is contradictory if its ulterior functions are not taken into account. Reducing the quota increases the gap between actual and official production, increasing the pool of resources to be allocated by the state and its agents. Enforcing controls increases state command over market resources, keeping resource allocation in the hands of members higher within the state. This system increases the opportunities for officials and powerful agents to collect rent on quota distribution. These policies create conditions for rent collection. They create the premium – the excess demand – which officials, agents and merchants eventually capture.

The struggle to capture this rent begins high within the state. Much of the benefit of quota distribution for ministers and officials is purely political. By providing quotas to select merchant clients they can cultivate networks of political support. Whether they collect monetary rents, in addition to the political benefits that quota distribution affords, is difficult to establish. However, monetary rents do accrue to those merchants receiving reserve quotas and those agents selling *quittances* and levying fines. Whether any of the reserve quotas are sold by agents or officials for cash is not known. Although some probably are, it is just as likely that they are bartered for the social and political support so integral to the workings of the Senegalese state.

In short, the larger the gap between official and actual production levels, the more quotas that can be distributed, and the more political and economic benefits accrue. The beneficiaries range from merchants and agents all the way up the line to the Minister for the Protection of Nature. The low quota is not simply a relic of environmental concern, but also serves as a mechanism for the redistribution of society's resources.

In general, the only way in which the quota system appears to have reduced consumption is by increasing the price of charcoal. This increase is due to the purchase of *quittances*, the purchase of quotas on the *interpatron* black market and the numerous small bribes that now enter into charcoal commerce. It is not directly due to scarcity produced by a quota set below demand, but arises from the rents charged on control exercised by the state over charcoal com-

merce. This increase is probably on the order of FCFA50 to 200 per sack, or between 2.4% and 10% of the final price of charcoal in Dakar.<sup>100</sup>

## Analysis

While a contradictory set of policies and mandates sets the stage for incomplete implementation and for policy circumvention, the social structure of the market and the market-state relations spell out who is affected and how. In this section, I begin by discussing the contradictions that necessitate policy shortfalls and then discuss the social and political-economic patterns that shape access and control over resources and ultimately the ways in which policies are circumvented and often undermined.

In addition to a national quota set far below demand, the official retail price of charcoal – which is fixed by the government – is set below the market price (or, at least, below the price at which charcoal is actually sold).<sup>101</sup> *Ceteris paribus*, a quota set below demand, combined with a low fixed retail price, would naturally lead to charcoal shortages in the cities. But, the operation of the system, however contradictory, does not lead to shortages, since neither the fixed price nor the quota are respected. Evidently, *ceteris* are not *paribus*. Shortages are politically unacceptable and the DEFC is held responsible. During past shortages, politicians have protested to the directors of the DEFC. One way to resolve the resulting contradiction is to exceed the national quota and/or to allow the price to climb – both of which have taken place. Stated simply, the combined national quota and fixed retail price on charcoal are unenforceable. Their contradictory nature necessitates circumvention or non-implementation. Why, then, is such an untenable policy maintained?

It could be explained as the result of countervailing pressures to which the DEFC must respond. The DEFC is charged with protecting the forests and faced with pressures, from MPN and international aid groups, to reduce the impacts of urban woodfuel demand. The DEFC is simultaneously responsible for maintaining a steady supply of woodfuel for Senegal's cities. The quota system reflects their response to managing the conservation of the forest resource. However, given high urban demand and the pressures on the DEFC to provide urban dwellers with woodfuels, quotas are impossible to enforce. In essence, the DEFC is responding to both pressures with the more immediate and more politically charged urban supply issues winning out. The revenue function of taxes on charcoal production

Table 4. Income from charcoal in Senegal's charcoal market (1986–87).

	Prices paid to actor (FCFA)	Gross margin (FCFA/sack)	Expenses (FCFA/sack)	Net income/profit margin (FCFA/sack)	Approximate number of actors	Annual production per actor (sacks)	Net annual income (1000 FCFA)	(\$US)
<i>Surga</i>	512	537 <sup>a</sup>	67	470	11 000	350	165 <sup>b</sup>	470
<i>Kontrapalaas</i>		20	0	20	450	4 728	260 <sup>c</sup>	740
<i>Patrons</i>	1798	1286	921 <sup>d</sup>	365	2 829 <sup>e</sup>	1 273	465	1330
<i>Coxeurs</i>	1940	142	0	142	300	12 000	1704 <sup>f</sup>	4870
Owner <sup>g</sup> plus <i>Diallo kerin</i>	2329	389	57	332	1 850	1 946	646 <sup>g</sup>	1845
Average per capita GDP (1987)							145	420

Source: J. Ribot, *Markets, States and Environmental Policy: The Political Economy of Charcoal in Senegal*, PhD thesis, University of California, Berkeley, CA, 1990, p 271.

<sup>a</sup> This figure includes the FCFA25 paid to *surga* for loading trucks.

<sup>b</sup> The income of *surga* is calculated based on the number of sacks produced by those *surga* surveyed, rather than from the number of sacks on average produced within the market. The difference in results is insignificant.

<sup>c</sup> The *kontrapalaas*' net income of FCFA20/sack is only his additional income from his work as a *kontrapalaas*. The net annual of FCFA 260 000 is derived by adding this income as a *kontrapalaas* to the income of a *surga*.

<sup>d</sup> *Patron* expenses may be slightly overestimated.

<sup>e</sup> Averaging over 69% of all *patrons* since 31% of the *patrons* are inactive (ie they function only to justify higher quotas for their cooperatives).

<sup>f</sup> The income of the *coxeurs* and *Diallo kerin* are highly uncertain. In both cases, there is uncertainty in their profit margins and in their numbers. The uncertainty in their numbers is greater than that in their profit margins.

<sup>g</sup> The income in this row is the income of both the owner of the charcoal outlet and that of the *Diallo kerin*.

could also contribute to the pressures to keep production up.

Another complementary interpretation of the policy outcomes arises from examining who benefits and loses from policies as they are now applied. While policies have official functions and uses, they also provide opportunities for unofficial resource use by officials and agents of the state and market.<sup>102</sup> By their nature, pricing and allocative policies shift *legal* authority over resources, and hence influence resource access and control.<sup>103</sup> When the state adds to (in the form of subsidies), takes from (in the form of taxes or fees), or controls (as with licences, permits, quotas, price fixing, health and safety regulations, and the regulation of resource management) resources within the market, these become levers by which individuals in the government can influence resource distribution.<sup>104</sup> Whether or not or to what degree these levers are accessible or are used depends on the needs of members of the market and the state and the configuration of social and political-economic ties among them.

I will now sketch out the relations within the charcoal market and between the market and the state as they shape access to the state controlled resources necessary for the process of charcoal production and marketing. Historical social relations within the market structure who within the market has the power to influence and access the state, and with whom within the market state officials and

agents are interested in dealing. After discussing the social structure within the market, I will outline the channels through which resources are transferred between members of the market and of the state.

#### *Historical power of patrons over surga*

In the charcoal market, powerful *patrons* have gained their influence through their historically privileged position over their *surga*. The *patrons*, coming largely from the land owning Fulbe nobles, have managed to maintain a system of domination over their *surga* charcoal producers, who come largely from the first group's stock of former serfs. Throughout the transition from an agriculturally based system of serfdom, rooted in the noble-captive economies of Guinea's Futa Jalon region, to the current set of productive relations found in the charcoal market, many characteristics of nobility, captivity and mutual dependence have been maintained.

The Fulbe noble-captive system has its roots in the Islamic *jihads* (or Islamic holy wars) of the mid-1700s, when Islamic Fulbe took Diallonké populations as their captive serfs. Under this productive system, the captives or serfs (women, men and children) depended upon their relations with noble families for access to productive resources. Serfs worked five days a week in the homes of their nobles and gave 10% to 50% of their harvest in return for religious services, medicine, protection,

food and land.<sup>105</sup> Although this system has changed over time, many of its characteristics persist in Guinean agriculture today.<sup>106</sup> Indeed, similar productive systems are currently found throughout West Africa,<sup>107</sup> including Senegal's charcoal market, which is dominated by Fulbe merchants and producers who have brought these types of productive arrangements with them from Guinea and have integrated them with similar dependent productive relations found in Senegalese agriculture.

Before the late 1970s charcoal *surga* in the charcoal market were dependent on *patrons* for subsistence advances, tools, religious and medical services and protection from harassment by foresters. In return, *surga* were obliged to give half of their charcoal production to the *patron*, with subsistence advances and other expenses subtracted from the *surga's* remaining earnings. As a result, *surga* often wound up in debt after the production cycle, and were obligated to continue working for the *patron* to pay off their debt.

Following some isolated and inconclusive protests by charcoal *surga* over very poor returns to their labour, one forestry agent catalysed the abandonment of the sharecropping system in 1979. On his own accord, Forester Amadou Mbaye Ndiaye of the Regional Forestry Service of Tambacounda called a meeting of *patrons* and *surga*, demanding that exchange be altered to a negotiated price per sack basis, and calling this his 'free market' policy. This unofficial 'policy' (or pronouncement) took root and, within two years, *surga* were being paid by the sack. Under the new system, *patrons* provided subsistence loans to *surga* while the charcoal season was under way and purchased the charcoal from them at the end of the production cycle. The loans, of course, were still subtracted from the *surga's* final income. For a while, the market appeared to be moving toward more competitive exchange, but the *patrons* lost little time in regaining control over trade.

In particular, the quota system (in which I include quotas, licences, permits and cooperatives, since they are integrally linked) provided *patrons* with significant advantages in this situation, since it gave them a monopoly over official charcoal marketing channels. The *patrons* were able to take control of cooperatives because *surgas* were unable to overcome the financial and social entry barriers. The distribution of production quotas, licences and permits through cooperatives gave *patrons* ultimate control over commerce. The collective organization of *patrons* into cooperatives, exclusive of *surga*, provided a forum for collusive fixing of the *surga*

price. And so this unique access for *patrons* strengthened their oligopsonistic position, weakening the bargaining position of *surga*.

Whereas *surga* were previously tied to their *patrons* through labour tying debts and extra-economic obligations, and for access to land and credit, they are now obliged to the *patrons* for access to permits and marketing in addition to protection from foresters and (albeit less important) subsistence loans. Indeed, it may be that the position of the *surga* is weaker under this new arrangement. With the advent of price fixing, subsistence advances to *surga* have become smaller and more difficult to obtain, indicating a shift away from debt and interlocking credit-labour markets as a way of maintaining control over price.

In brief, market regulations made the *surga* legally dependent upon *patrons*, but this new system of production and exchange is not so different from the old. *Surga* are still dependent on relations of social status for access to *patron* controlled productive resources. This time round, instead of seed, land, religious services and protection from other nobles, the relevant resources are marketing and protection from the state. The regulations within the charcoal market have replaced the mechanism by which dependency was maintained, but they have not supplanted the system of dependency.

State interventions in the market thus give the state a handle on the flow of productive resources, making access to the state an essential productive ingredient.<sup>108</sup> The necessity of state access to productive resources, in combination with its selective nature, makes government intervention a mechanism for building political clientele and for maintaining dependent productive relations. Thus, the relation between the market and state takes on a function for the *patron* as well as for the state. While resource control is a means for members of the state to cultivate alliances and to partake in the market, it is also a means for *patrons* to maintain the dependence of labour. By having exclusive access to marketing, *patrons* can maintain control over the market. The cost of that maintenance is the investment (as in political loyalty or possibly payments) *patrons* must make in social relation to members of the state. Members of the state benefit, both politically and economically, from the social investments they receive while *patrons* benefit from their exclusive access to the state.

Resource access for *patrons* now requires investment in social relations. Whereas, prior to intervention by the state, the investment ran from the *surga* to the *patron*, it now also runs from the *patron* to the

state. In effect, the system has gone from being two tier (nobles and serfs) to being three tier (state, *patrons* and *surga*). In this latter system it is now the *patrons* who invest in social relations with the state – they invest resources attracted directly from *surga*, whose dependence these relations help to maintain.

In the charcoal market, superimposition of state regulatory policy on historical social relations has articulated peasant productive relations up into the state. It has helped shape the *patron-surga* relation and has strengthened the position of the historically already powerful *patrons*. In turn, these *patrons* use their relations with the state to gain access to resources not otherwise available through ordinary market channels. But it is not only the *patrons* who benefit. The state, too, benefits from this relation with the charcoal merchants. State officials and agents reap whatever political, social and economic benefits can be associated with the unofficial allocation of state controlled resources.<sup>109</sup>

#### *Patrons' access to the state*

Powerful actors in the market gain leverage great enough to circumvent and influence policy at the levels of formulation and implementation. *Patrons* are the most politically powerful members of Senegal's charcoal market. Not only are they powerful within the market, but they have influence within the ministries, within DEFC and among religious leaders.

The influence of *patrons*, which is rooted in social and economic relations discussed above, is exercised upon the DEFC through numerous channels. While the circumvention of policies takes place at the local level using small bribes and social or political connections, at national or regional levels, policy formation and implementation are influenced through various social and political channels.

Small bribes can account for much of the lack of policy implementation or enforcement at the local level. This includes carbonizing year round, cutting green trees, allowing *patrons* to determine the location of parcels, giving out transport permits prior to 15 days after issuing a production permit and the issuance of *quittances*.

Higher level social and political relations can help explain the distribution of the initial quotas, clearing quotas, reserve quotas, and in some cases, *quittances*. There are channels of access through the NUFC, *marabouts*,<sup>110</sup> ministers and direct relations with officials and agents of the DEFC. The pathways by which *patrons* can obtain quotas, and presumably other types of influence, include:

- direct contact with Regional Forestry Service agents;
- direct contact with officials of the DEFC;
- contact with ministers (who will contact DEFC);
- contact with *marabouts* (who can influence ministers and DEFC officials); and
- contact with NUFC (which has influence among ministers and the DEFC).

These pathways are illustrated in Figure 7.

In sum, past and present market structures have allowed *patrons* to use policies to strengthen existing social, political and economic relations. This strengthening of the more powerful *patrons* has, in turn, increased the ability of the *patrons* (individually and as a group) to influence policy formation and policy implementation. Policies are shaped partly by their own role in supporting the ability of the *patrons* to influence and circumvent them. By supporting concentration and stratification they undermine the ability of DEFC to regulate, and eventually even encourage rather than prevent, practices deleterious to the environment (such as carbonizing in protected forests to obtain *quittances*). These policies also serve the political and economic functions of unofficial allocation – selective allocation of state controlled resources along social, political and economic lines. In the complementary relation between state agents and the market's powerful merchants, numerous purposes are served, in addition to or other than the official aims of the policies described. Given the outcomes and processes observed, it becomes unclear whether environmental management is a policy justification or goal. In the complex political-economic context of Senegal's charcoal market, it is and will remain unclear to what degree policies are coopted into these alternative roles and to what degree such roles are planned. Unlike Robert Bates who argues that policies of this type are set up for the express purposes of generating and then allocating 'administrative rents', I think that these outcomes evolve out of intentions to address perceived problems. The alternative uses and functions of the policies emerge from the web of forces controlling and shaping production and exchange.

## Conclusion

A market is a social structure. It is not merely a construct of supply and demand. Hence, it must be treated as a social entity for the purposes of policy design. This implies evaluating the historical roots of social structures within the market as well as the current needs of members of the market and state

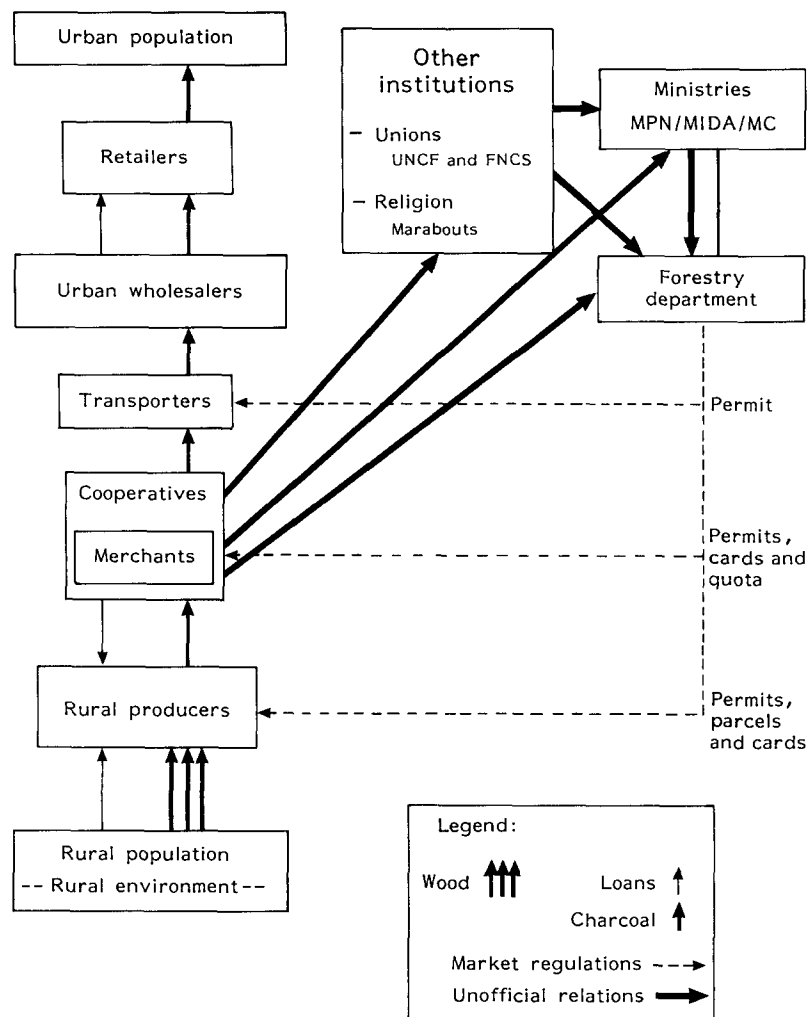


Figure 7. Market-state relations.

and how policies are formed and function to meet those needs. Understanding the basis of social stratification and the nature of the market-state relation are critical to policy making and implementation, because these are the factors shaping the *access* to the resources on which society depends. It is also critical to acknowledge that the policy circumvention and non-implementation found in this market are not just criminality or fraud. Rather, these outcomes reflect the struggle between the state and civil society over who within society should make and implement policies, or control and use natural and other productive resources.<sup>111</sup>

Understanding the political-economic dynamics between the market and the state may permit the design of policies and measures that address root causes of environmental decline and environmental policy limits. However, in the final analysis, contradictions and conflicts over resource ownership, ac-

cess, and interests will continuously arise. The state will often have difficulties when it must simultaneously protect and exploit resources on which it depends both materially and politically. In the face of these contradictions it is the task of the energy or environmental analyst or policy maker to redesign and reimplement policies in what is fundamentally an iterative process. Environmentally sound or 'sustainable' development and resource management policies will not be implemented once and for ever. They will come and go.

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tion (Fulbright-Hays grants), the National Science Foundation, and the Institute for the Study of World Politics.

<sup>1</sup>The term woodfuel includes both firewood and charcoal.

<sup>2</sup>Alain Bertrand, 'Les nouvelles politiques de foresterie en milieu rural au Sahel: réglementations foncières et forestières et gestion des ressources ligneuses naturelles dans les pays de la zone Soudano Sahélienne', *Bois et Forêts de Tropiques*, No 207, 1985, p 24; Jean Gorse, *Fuelwood and Domestic Energy: The Fuelwood Crisis in Tropical West Africa*, World Bank, West Africa Agricultural Projects Department, 1985; Gerald Leach and Robin Mearns, *Beyond the Woodfuel Crisis: People, Land and Trees in Africa*, Earthscan, London, 1988, pp 178–179; Phil O'Keefe and R.H. Hosier, 'The Kenyan fuelwood cycle study: a summary', *Geo-Journal*, Vol 7, No 1, 1983, pp 25–28; Asif M. Shaikh and Edward Karch, 'Will wood work: the future of wood energy in the West African Sahel', E/DI, unpublished, 1985.

<sup>3</sup>Gérard Madon, *Note sur le contrôle des flux de charbon de bois*, Report ENERDOM/SEN/87, DE-MIDA/World Bank, DEFC-MPN, 1987; Youba Sokona, *Statistiques et bilans énergétiques du Sénégal*, ENDA-MIDA, July 1987.

<sup>4</sup>World Bank, *World Development Report 1987*, New York, Oxford University Press, 1987. Because urban growth is so much greater than rural growth (due largely to rural–urban migration), and because per capita urban woodfuel consumption is much higher than rural consumption (due to urban use of charcoal), urban centres are consuming a growing portion of the primary woodfuels produced. Because much of the urban growth is due to rural–urban migration and because migrants switch from firewood to charcoal, growth of total woodfuel demand in some countries, such as Senegal, is outpacing population growth.

<sup>5</sup>Jesse C. Ribot, *Markets, States and Environmental Policy: The Political Economy of Charcoal in Senegal*, Doctoral Dissertation, University of California at Berkeley, Berkeley, California, 1990.

<sup>6</sup>*Op cit*, Ref 3, Sokona.

<sup>7</sup>Club du Sahel, *Fuelwood: The Main Source of Energy in the Sahel, and Fuelwood Research Needs*, Document Sahel D(83)199, OECD/CILSS, 1983.

<sup>8</sup>Including semiurban as defined by the World Bank; see *op cit*, Ref 3, Madon.

<sup>9</sup>Josef Leitmann, Draft report on household energy strategies for Senegal, unpublished, 1987.

<sup>10</sup>*Op cit*, Ref 3, Madon.

<sup>11</sup>CTS, *Rapport de Synthèse des Groupes de Travail Interministériels: Définition d'une Politique des Prix de l'Ensemble des Combustibles Domestiques, et Integration de la Tourbe dans le Circuit Traditionnel de Commercialisation du Charbon de Bois*, République du Sénégal, Comité National de l'Energie, Dakar, April 1987, p 10.

<sup>12</sup>World Bank, 1983; *Senegal: Issues and Options in the Energy Sector*, Report No 4182–SE, 1983, p 22.

<sup>13</sup>*Ibid*; République du Sénégal, *Plan Directeur de Développement Forestier, Phase de Diagnostique: Economie de bois, 1ere et 2eme parties*, Ministère du Développement Rural, Secrétariat d'Etat aux Eaux et Forêts, Paris, CTFT/SCET-International, 1981.

<sup>14</sup>Chun K. Lai, *Reforestation in the Republic of Senegal: Framework, Description and Analysis*, Report of Consulting Forester, New Haven: USAID, 1984; *op cit*, Refs 9 and 12.

<sup>15</sup>These figures are based on the following estimates: 75 m radius cut for a kiln producing 10 tonnes (200 sacks – the average kiln produces only 206 sacks) of charcoal. National demand for charcoal production is equal to the 1986–87 national quota of 102 000 tonnes for the low estimate and 180 000 tonnes (urban demand) for the high estimate: see *op cit*, Ref 3, Madon and Ref 11. This results in 0.12 ha of cleared forest per tonne of charcoal produced. This figure does not account for rural woodfuel or urban firewood use.

<sup>16</sup>République du Sénégal, *Arrête portant organisation de la Campagne d'Exploitation Forestière pour l'année 1986–1987*, No 00054/MPN/DEF/DPF, Dakar: Eaux et Forêts, 3 January 1987.

<sup>17</sup>*Op cit*, Ref 5, pp 78–87.

<sup>18</sup>*Ibid*; Mark Schoonmaker Freudenberger, *A Planning Perspective on Environmental Degradation in Northern Senegal: The Political Economy of the Gum Arabic Tree Crop Economy*, PhD Dissertation, Graduate School of Architecture and Urban Planning, UCLA, 1990, pp 101–144.

<sup>19</sup>*Op cit*, Ref 11; Daby Diallo, *Rapport de Suivi du Projet d'Energies Renouvelables – Voleet Carbonisation*, Project No 685–0937.7, submitted to John Balis, Chef du Bureau de Développement Agricole, USAID, Dakar, July 1983; G. Madon, C.M. Diop and Lagandre, *Les Consommations de combustibles domestiques au Sénégal sur fours traditionnels et sur foyers améliorés*, Dakar, CERER and USAID, March 1982; Theodore Ouedraogo, *Rapport d'étude: Projet de diffusion des foyers améliorés en Casamance*, ENDA-TM, 1986; Timothy S. Wood, *Rapport Final de l'évaluation du Projet Energies Renouvelables – Programme d'Impact Accelere (AIP)*, Projet No. 685-0937.7, USAID, Dakar, November 1983.

<sup>20</sup>Michel Matly, *Enquête consommateur et substitution: Dakar, 450 menages*, République du Sénégal, Ministère du Développement Industriel et de l'Artisanat, Direction de l'Energie, SEED/World Bank, February 1987.

<sup>21</sup>John W. Tatom, Fred Boadu and Cheikh M. Diop, *Charcoal Production From Rice Husks in Senegal*, by Atlanta University, USAID contract 685-0285-G-00-5120-00, Dakar, 10 October 1986; *op cit*, Ref 12.

<sup>22</sup>*Op cit*, Refs 9 and 11.

<sup>23</sup>*Op cit*, Ref 9.

<sup>24</sup>*Op cit*, Ref 3, Madon.

<sup>25</sup>*Op cit*, Ref 5, for a more complete history of Senegal's charcoal market.

<sup>26</sup>*Op cit*, Ref 18, Chapter 7, 1990; Jeffrey A. Gritzner, *The West African Sahel: Human Agency and Environmental Change*, Geography Research Paper No 226, University of Chicago, Chicago, IL. The Committee on Geographical Studies, 1988, p 80, asserts that the woodfuel requirements of the steamboat traffic caused deforestation along the river bank.

<sup>27</sup>*Op cit*, Ref 18, Chapter 7. Similar concerns were expressed in 1916 by the Secretary General for the Expedition of Current Affairs. Gouvernement Général de l'Afrique Occidentale Française (GGAOF), *Règlementation forestière*, Colonie du Sénégal, Service de l'agriculture et des forêts, Imprimerie du Gouvernement, Saint Louis, 1916, p 12.

<sup>28</sup>For a listing of the major policies and historical events in Senegal's charcoal market, see *op cit*, Ref 5.

<sup>29</sup>*Op cit*, Ref 27, GGAOF, pp 3–7.

<sup>30</sup>The tax on charcoal was originally set at 0.80 francs per quintal and that on firewood at 2.50 francs per stere, in February 1908. In October of the same year, the tax was lowered to 0.75 francs per quintal for the charcoal and 0.75 francs per stere for the firewood. The tax was raised back up to the initial values on 1 January 1917: *ibid*, Vols 17–22, p 8.

<sup>31</sup>Quotation from a letter from the Union Coloniale Française to Governor General William Ponty, 5 October 1912, as quoted by Mark Freudenberger: *op cit*, Ref 18, Chapters 7 and 3. Translation from French into English is my own.

<sup>32</sup>*Op cit*, Ref 27, pp 10–13 (my translation).

<sup>33</sup>*Ibid*.

<sup>34</sup>*Ibid*.

<sup>35</sup>*Ibid*, p 16.

<sup>36</sup>Michael Moritmore, *Adapting to Drought: Farmers, Famines and Desertification in West Africa*, Cambridge University Press, Cambridge, 1989, p 12.

<sup>37</sup>Gouvernement Général d'Afrique Occidentale Française (GGAOF), 'No. 26 S.E.-Circulaire sur la régime forestière', *Journal Officiel du Sénégal*, 16 February 1933, p 143 (my translation).

<sup>38</sup>Auguste Aubreville, *Le Service des Eaux et Forêts en Afrique Occidentale Française, 1937*, Annual Report to the Forestry Department, Centre Technique des Forêts Tropicales, Nogent-Sur-Marne, France, 1938; p 1; and P. Foury, 'Politique forestière au Sénégal', *Revue Bois et Forêts des Tropiques*, No 30, July/August 1953, pp 8–31 (see p 14).



<sup>39</sup>Many of the regulations in this code did not apply to forests on private property. For a more complete discussion of land-tenure issues affecting the forestry sector, see *op cit*, Ref 5.

<sup>40</sup>Gouvernement Général de l'Afrique Occidentale Française 1935, 'No. 1704 A.P.-Arrete promulguant en Afrique occidentale française le decret du juillet 1935, sur le régime forestier de l'Afrique occidentale française', *Journal Officiel du Sénégal*, 24 July 1935, pp 599–606. The code was further elaborated in a subsequent decree, Gouvernement Général de l'Afrique Occidentale Française, 'No. 2195 S.E.-Arrete Définissant la limite sud de la zone sahélienne et réglementant l'exploitation des forêts', *Journal Officiel du Sénégal*, 28 September 1935, pp 791–793.

<sup>41</sup>Gouvernement Général de l'Afrique Occidentale Française, 'No. 295 AGR.-Arrete fixant certaines conditions d'application du Decret du Juillet 1935, sur le régime forestier en Afrique occidentale française et réglementant l'exploitation et la circulation des produits des forêts dans la colonie du Sénégal', *Journal Officiel du Sénégal*, 1 February 1937, pp 114–120, see p 116.

<sup>42</sup>Gouvernement Général de l'Afrique Occidentale Française, 'No. 3151 FOR.-Arrete modifiant l'Arrete No. 295 AGR du 1 Février 1937. Fixant certaines conditions d'application du Decret du Juillet 1935 sur le regime forestier en Afrique occidentale française et réglementant l'exploitation des produits des forêts dans la colonie du Sénégal', *Journal Officiel du Sénégal*, 19 October 1938, p 883.

<sup>43</sup>*Op cit*, Ref 38, Aubreville, p 5.

<sup>44</sup>Gouvernement Général de l'Afrique Occidentale Française, 'No. 2092 FOR.-Arrete fixant les modalités d'application dans la colonie du Sénégal de l'arrete general no. 3782 du 15 novembre 1938, règlementant les exploitations industrielles de bois de feu et de charbon, Saint-Louis le 28 juillet 1941', *Journal Officiel du Sénégal*, 7 August 1941, pp 443–445; Gouvernement Général de l'Afrique Occidentale Française, *Rapport du Service des Eaux et Forêts pour l'année 1939*, Direction Générale des Services Economiques, Inspection Générale des Forêts de l'Afrique Occidentale Française, pp 1–2; Gouvernement Général de l'Afrique Occidentale Française, *Rapport Annuel des Eaux et Forêts pour l'année 1940*, Direction Générale des Services Economiques, Inspection Générale des Forêts de l'Afrique Occidentale Française, 1940, pp 30–34, 56–60; and Mamadou Saliou Baldé, *Changement Sociaux et Migration au Fuuta Jalon: Les Peul du Fuuta dans le milieu rural senegalaise*, Doctoral Thesis University of Paris V, 1973–74, pp 289–291.

<sup>45</sup>*Ibid*, 1939, GGAOF, pp 1, 12; 1940, pp 30–34, 50–60.

<sup>46</sup>République du Sénégal, 1941, Ref 44, pp 143–144, 444.

<sup>47</sup>*Ibid*, pp 443–445.

<sup>48</sup>P. Bellouard, *La Question Forestière au Sénégal*, Colonie du Sénégal, Office des Eaux et Forêts, Saint-Louis, 15 September 1947, p 41 (my translation).

<sup>49</sup>*Ibid*, p 42; and *op cit*, Ref 13, République du Sénégal.

<sup>50</sup>*Ibid*.

<sup>51</sup>Siriff Tall, *L'Economie du charbon de bois a Dakar*, Memoire presente pour l'obtention du Diplome d'Etudes Approfondies, DEA, Departement de Geographie, University of Dakar, Dakar, October 1974, p 29.

<sup>52</sup>Based on production quota distribution discussed below; République du Sénégal, *Arrete portant organisation de la Campagne d'Exploitation Forestière pour l'année 1986–1987*, No. 000054/MPN/DEF/DPF, Dakar: Eaux et Forêts, 3 January 1987.

<sup>53</sup>*Op cit*, Ref 13, p 12.

<sup>54</sup>République du Sénégal, 'Arrete interministeriel no. 10003 du 4 septembre 1972 creant la carte professionnelle d'exploitation forestière', *Journal Officiel de la Republique du sénégal*, 23 September 1972, p 1539. Personal communication, Forestry Inspector, Thiès, 1989.

<sup>55</sup>P.E.L. Giffard, *L'Arbre dans le paysage Sénégalais: sylviculture en zone tropicale sèche*, CTFT, Dakar, 1974, p 216.

<sup>56</sup>*Op cit*, Ref 11, pp 12–13.

<sup>57</sup>*Ibid*, p 9.

<sup>58</sup>République du Sénégal, *Arrete portant organisation de la Campagne d'exploitation forestière pour l'année 1980/81*, Decree No

2277 of 4 November 1980, Secretariat d'Etat aux Eaux, Forêts, Direction des Eaux et Forêts et Chasses, 1980. Legislation in which quotas were established existed prior to 1981. Quantities may also have been specified on production permits which were established in 1900: see *op cit*, Ref 27, p 3. The quantity and location of charcoal production was specified on production permits since 1908, when the first formal permits were printed (*ibid*, p 21). In 1908, quantities of charcoal produced were specified on receipts required for transportation. These receipts were used to verify that a producer had paid the charcoal production tax. The basis for establishing a quota is clearly spelled out in the 1935 code. In 1941, quantities on permits were first formally limited, however, only for production in managed forests (*op cit*, Ref 44, 1941, pp 433–435 and 443–445). In 1981, the quotas began to be used to reduce the total amount of charcoal being produced nationally. Before that, it appears that the quantities were specified simply to track taxes.

<sup>59</sup>The exact amount by which urban demand exceeds the quota is unclear: see *op cit*, Ref 3.

<sup>60</sup>Birane Ndao and Alain Ruche, *Approche économique du développement forestier au Sénégal*, Ministère de la Protection de la Nature, Direction des Eaux, Forêts et Chasses, Cellule de Planification, Suivi et d'Etudes Economiques (Projet PARCE), Dakar, July 1985, p 15. Due to the number of forestry cooperatives by the early 1980s, Senegal's National Union of Forest Cooperatives (l'Union Nationale des Coopératives Forestières du Sénégal – UNCF) was founded in 1982: see *ibid* and *op cit*, Ref 11, p 23. Despite the policy of eliminating private producers, private firms were allowed to remain in the market.

<sup>61</sup>Quotas are also distributed to the handful of private firms remaining in the market. One high forestry official explained that he simply did not have the authority to force these firms to join or form cooperatives.

<sup>62</sup>Rodney White, 'Environmental legislation and enforcement: case studies from Senegal and Malawi', Paper presented at the 86th Annual Meeting of the Association of American Geographers, Toronto, 19–22 April 1990, pp 6–8. The MPN was dissolved in the spring of 1990. The Forestry Department was placed within the Ministry of Rural Development and Hydrology.

<sup>63</sup>*Op cit*, Ref 16.

<sup>64</sup>*Ibid*.

<sup>65</sup>*Op cit*, Ref 3, Madon.

<sup>66</sup>*Op cit*, Ref 16.

<sup>67</sup>*Ibid*.

<sup>68</sup>An interlocking credit-labour factor market is a market in which members enter into multiple simultaneous relations, such as wage labour hiring, production credit and consumption credit: see Pranab K. Bardhan, 'Interlocking factor markets and agrarian development: a review of issues', *Oxford Economic Papers*, Vol 32, No 1, March 1980, pp 82–98.

<sup>69</sup>In the literature the Fulbe are also commonly referred to as Peul or Fulani. Their language, Pulaar, is often called Fulfulde. This paper refers to them as Pulaar speaking Fulbe, as they refer to their language and themselves: see William Derman, *Serfs, Peasants and Socialists: A Former Serf Village in the Republic of Guinea*, Berkeley, University of California Press, 1973.

<sup>70</sup>The first charcoal cooperative was established in 1972. The railroad wanted patrons to form into a cooperative to facilitate coordinating the transport of charcoal by rail to Dakar.

<sup>71</sup>*Op cit*, Ref 16.

<sup>72</sup>Average weight per sack of 48 kg is based on weighings carried out by Ibrihima N'diaye at the Regional Forest Service of Ziguinchor in 1986.

<sup>73</sup>PARCE, *Sénégal Etude des prix des combustibles ligneux (Version provisoire)*, Project d'Amenagement et de Reboisement des Forêts du Centre-Est, Dakar, Ministère de la Protection de la Nature, 1983; République du Sénégal, *Etude du Plan Directeur d'Urbanisme de Dakar: Synthèse des données urbaines 1980–81*, 2 *Etudes socio-economiques*, SONED Afrique and BCEOM, January 1982; and République du Sénégal, *Situation Economique 1984*, Direction de la Statistique, Dakar, 1985, p 446.

<sup>74</sup>Samil Khennas, Libasse Ba, Masse Lo and Youba Sokona, *Le*

*Circuit de distribution des combustibles ligneux dans la région urbaine du Cap-Vert: Enquête exhaustive*, Dakar, ENDA, December 1986.

<sup>75</sup>This range of weights and prices is based on the average weights in the wet and dry seasons respectively, assuming a weight of 48 kg per sack. See Smail Khennas, 'Circuit de distribution, prix du charbon de bois, substitutions: le cas sénégalais', ENDA-TM, *Programme Energie, Annual Meeting of the CEC*, Brighton, 25–29 May 1987. One could conceivably calculate the weight elasticity of supply.

<sup>76</sup>This survey was designed by the author and carried out by the World Bank; see *op cit*, Ref 3, Madon.

<sup>77</sup>*Ibid*.

<sup>78</sup>*Op cit*, Ref 5.

<sup>79</sup>Similarly, production permits and transport permits are frequently issued simultaneously in mid-season as well as at the beginning of the season. Because the maximum duration on the production permits is less than the average production time, *patrons* have their *surga* produce charcoal prior to obtaining charcoal production permits. They obtain permits when the charcoal is ready.

<sup>80</sup>Forest potentials in Senegal, however, are very poorly understood. Only recently has there been a rigorous study of regeneration after charcoal production: see M. Arbonnier and B. Faye, *Etude de la forêt classée de Koumpentoum*, Projet d'Amenagement et de Reboisement des Forêts du Centre Est, République du Sénégal, Ministère de la Nature, Direction de la Conservation des Sols, December 1989.

<sup>81</sup>See J. Chaumié, 'La gestion de l'environnement dans les pays Sahéliens', *Les Cahiers de la Recherche-Développement*, No 8, 1985, pp 17–24; and Alain Bertrand, 'Les nouvelles politiques de foresterie en milieu rural au Sahel: réglementations foncières et forestières et gestion des ressources ligneuses naturelles dans les pays de la zone Soudano-Sahélienne', *Bois et Forêts des Tropiques*, No 207, 1985, pp 23–39.

<sup>82</sup>*Op cit*, Ref 5.

<sup>83</sup>Anne Bergeret, 'Nourritures de cueillette en pays Sahélien', *Journal d'Agriculture Traditionnelle et de Botanique Appliquée*, Vol 33, Paris, 1986; and Anne Bergeret, 'Rôle alimentaire des arbres et arbustes et de quelques plantes herbacées, Communauté Rurale de Sali (Kumbija), Sénégal', Montpellier, France, 15–19 September 1986; and Anne Bergeret and Jesse C. Ribot, *L'Arbre nourricier en Pays Sahélien*, Editions de la Maison des Sciences de l'Homme, Paris, 1990.

<sup>84</sup>Also see Ibrahima Dia, *Des Hommes et leurs forêts: Le Cas de Sare Lamine en Moyenne Casamance*, Memoire presente pour l'obtention du Diplome d'Etudes Approfondies en Sciences de l'Environnement, Institut des Sciences de l'Environnement, University of Dakar, July 1985, p 43.

<sup>85</sup>*Ibid*, p 49; Seydou Niang, *Regeneration naturelle après exploitation forestière pour le charbon de bois et le bois de chauffe dans la Zone de Dialinkine (Moyenne Casamance)*, Memoire presente pour l'obtention du Diplome d'Etudes Approfondies, DEA, en Sciences de l'Environnement, University of Dakar, Dakar, July 1985, p 83; Tall, *op cit*, Ref 51, p 68.

<sup>86</sup>*Op cit*, Ref 73, PARCE, p 17.

<sup>87</sup>This policy was described by a high forestry official.

<sup>88</sup>Note that it would be difficult to accomplish such rapid exploitation legally. To produce any significant quantity of charcoal takes at least three weeks. The fact that *patrons* begin evacuating charcoal from the forests the first day of the season implies that they were producing before the season opened. Although this is obvious, circulation permits are given out starting the first day of the season without question as to when the charcoal in question was produced.

<sup>89</sup>*Op cit*, Ref 3, Madon.

<sup>90</sup>This survey was developed by the author and carried out by the World Bank; see *op cit*, Ref 3, Madon.

<sup>91</sup>*Ibid*, *op cit*, Ref 60, p 53, also cite the arbitrary distribution of reserve quotas as a forestry sector problem.

<sup>92</sup>*Op cit*, Ref 3, Madon.

<sup>93</sup>In 1990, after the field work for this research was completed,

agricultural clearing quotas were re-established by the DEFC: see *op cit*, Ref 3, Madon.

<sup>94</sup>Note that this is the same price at which *patrons* can sell their quotas to other *patrons*. The FCFA 75 per sack tax on charcoal is not charged on confiscated charcoal.

<sup>95</sup>*Op cit*, Ref 3, Madon.

<sup>96</sup>*Op cit*, Ref 84, p 48.

<sup>97</sup>*Op cit*, Ref 3, Madon.

<sup>98</sup>I spoke to a number of *patrons*, *surga* and civilians about the entry of charcoal by the waterfront. None had ever witnessed charcoal coming to Dakar by boat. I believe this to be true, since my informants did tell me of the beach and sand road routes into Dakar.

<sup>99</sup>Take, for example, the elimination of the agricultural quota. Agricultural clearing was an allocation of quotas which probably had a net positive environmental effect.

<sup>100</sup>Charcoal purchased on *quittance*, and quotas bought on the black market sell for FCFA 500 per sack. In addition there are all of the small bribes which are not counted. These added costs may cover a quarter to half of the 'unofficially' produced charcoal (or under one-eighth to one-fourth of all charcoal, since 'unofficial' production is about half of the total). Hence, the estimate of FCFA50 to 200 per sack. The word *unofficial* is in quotes since it is difficult to distinguish official from unofficial when it is the officials and agents of government who are surpassing the national quota.

<sup>101</sup>There is pressure to keep the urban price of charcoal down since charcoal is a necessity good. As a necessity, low charcoal prices represent a subsidy of wages. There is also fear that if charcoal prices are raised, there may be a popular reaction.

<sup>102</sup>Anne O. Krueger, 'The political economy of the rent-seeking society', *The American Economic Review*, Vol 64, No 3, June 1974; David Collander, *Neoclassical Political Economy: The Analysis of Rent-Seeking and DUP Activities*, Ballinger, Cambridge, 1984.

<sup>103</sup>See Catherine Boone, 'The making of a rentier class: wealth accumulation and political control in Senegal', *The Journal of Development Studies*, Vol 26, No 3, April 1990, pp 425–449, esp. p 427, for a precise definition and discussion of such rents and rentier activities.

<sup>104</sup>Indeed, the government is always, at least indirectly, such a lever since it defines laws which in turn define resources – laws that define ownership and access; see Warren J. Samuels and Nicholas Mercurio, 'A critique of rent-seeking theory', in David C. Collander, ed, *Neoclassical Political Economy: The Analysis of Rent-Seeking and DUP Activities*, Ballinger, Cambridge, 1984, pp 57–60. Access to the state is paramount to access to leverage over laws (changing or circumventing them) and therefore, over resource use and distribution. Environmental policies, which often restrict quantities of resources used, the zones in which resources can be extracted, or the prices at which resources can be sold, provide ideal opportunities for extracting rents: see *op cit*, Ref 102, pp 291–293. Environmental policies are particularly vulnerable to being used for rent extraction since their formulation and enforcement costs are high, while their constituencies are diffuse and their opportunities are fighting for concrete, short-term economic gains: see Douglas North, 'Three approaches to the study of institutions', in David C. Collander, ed, *Neoclassical Political Economy: The Analysis of Rent-Seeking and DUP activities*, Ballinger, Cambridge, MA, 1984. Environmental policies are aimed at protecting or managing diffuse resources, making enforcement costly. This is compounded in Africa by lack of sufficient environmental information (research) and trained personnel.

<sup>105</sup>*Op cit*, Ref 74; Victor Azarya, *Aristocrats Facing Change: The Fulbe in Guinea, Nigeria, and Cameroon*, Chicago, University of Chicago Press, 1978; Philippe David, *Les Navetanes: Histoire des migrants saisonniers de l'Arachide en Ségambie des origines à nos jours*, Dakar, Les Nouvelles Editions Africaines, 1980.

<sup>106</sup>Andrée M. Wynkoop, 'Migration and social change; the social origins of rural inequality in the Fouta Djallon', paper presented at the *Canadian Association of African Studies Annual Meetings*,

University of Alberta, 7 May 1987.

<sup>107</sup>*Op cit*, Ref 105, David; Marguerite Dupire, *Organisation Sociale des Peul: Etude d'Ethnographie Comparée*, Paris, Librairie Plon, 1970.

<sup>108</sup>Berry argues that as state control of resources increased in Africa after independence, and social relations between the market and state were cultivated for access to state controlled productive resources, 'access to the state became a precondition for doing business successfully'. See Sara Berry, 'Access, control and use of resources in African agriculture: an introduction' and 'Social institutions and access to resources', *Africa*, Vol 59, No 1, 1989, p 44.

<sup>109</sup>See Jesse C. Ribot, 'Market-state relations and environmental

policy: limits of state capacity in Senegal', in Ronnie D. Lipschutz and Ken Conca, eds, *The State and Social Power in Global Environmental Politics*, Columbia University Press, New York, forthcoming.

<sup>110</sup>*Marabouts* are very influential Muslim leaders: see Jean Copans, *Les Marabouts de l'Arachide: La Confrérie Mouride et les Paysans du Senegal*, Le Sycomore, Paris, 1980 and C. Cruise O'Brien, *The Mourides of Senegal: The Political Economic Organization of an Islamic Brotherhood*, Clarendon, Oxford, 1971, for detailed discussions.

<sup>111</sup>See Joel S. Migdal, *Strong Societies and Weak States: State-Society Relations and State Capabilities in the Third World*, Princeton University Press, 1988.