

DfID-KaR Fuel Substitution – Poverty Impacts on Biomass Fuel Suppliers

Kenya

Urban Biomass Fuel Supplier Profile

Draft Report

1.0 Brief Description of Nairobi urban areas

Nairobi is linked to the rest of the country by six main roads. These are Mombasa Road which links the city to the coastal and southern regions; Thika Road that links it to the Mount Kenya region, and Naivasha road that links it to the Northwestern Rift Valley regions. Other main roads include Ngong and Ongata Rongai, Kiambu, Gigiri and Kangundo Road.

These roads are important as they are conduit for supplying charcoal and other fuel-wood to Nairobi residents from up-country.

Nairobi boasts of the Nairobi National Park to the southwest, Ngong forest to the South-east and Karura forest to the North-east. These forests are a great source of wood-fuel chiefly firewood to the lower income people and slum residents.

The city is 1.5 ° South of the Equator and hence basks in all the sun of a tropical city. Its altitude of 5,000 to 6,000 feet means that the climate is temperate. Rainfall is roughly divided between two rainy seasons: the short rains fall in November and early December, and the long rains between April and mid-June. Because it is virtually on the equator Nairobi has a constant twelve hours of daylight per day all year round.

It covers about 700 (696.1) square kilometres including the 120 square kilometres of the Nairobi Game Park and all of Jomo Kenyatta International Airport. The population of Nairobi is estimated to be more than 2.5 million as per 1999 and the number of households slightly more than 800,000. The city center covers 10.6 kilometres squared with well over 5,000 households. Households location according to income area can be grouped as shown in the table below:

REGION	POPULATION	HOUSEHOLDS	AREA IN SQ KM	DENSITY
UPPER	237591	69784	322.6	21369.1
MIDDLE	194213	56257	102.1	66160
LOWER	1328646	390699	134.9	604906
SLUM	865285	287404	77.7	788399
TOTAL	2625735	804144	637.3	1480834

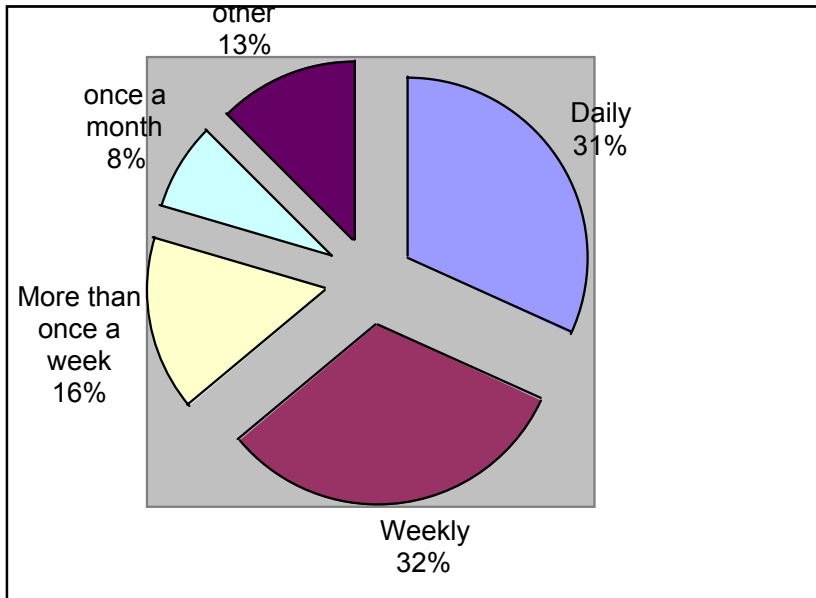
Extracted from 1999 Population and Housing Census, Republic of Kenya.

2.0 Dynamics of biomass fuel traders in Nairobi urban areas

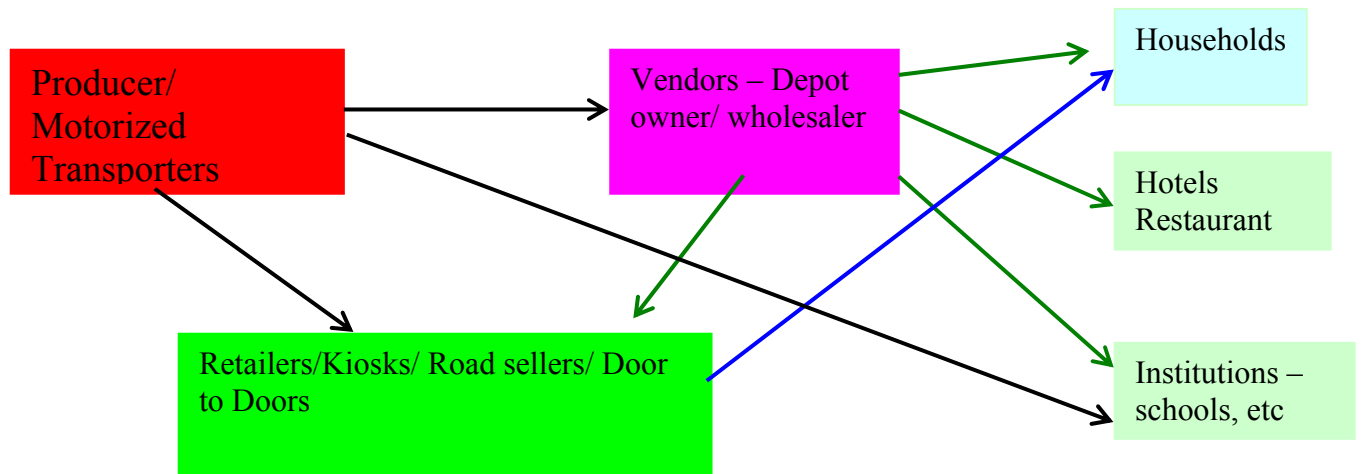
Traditional biomass fuel trading is a dynamic business that traverses the whole of the Nairobi business district as well as residential areas. It is a frustrating and rewarding business depending on what end of the scale one is involved. There is a long chain in the business represented by a number of actors. It starts with the large-scale producers, mostly based up-country but represented in the city by their agents who either operate motorized transportation of charcoal largely lorries and pickup trucks. Lorry and pick-up drivers are at the heart of the business and enjoy higher profits much more than other traders in the relatively long chain. Although transportation of charcoal/wood is bedevilled by lots of risks due to among others poor transport infrastructure and harassment by government officials, there is a lot of profit to be made once these hurdles have been overcome. This is supported by the fact that huge volumes of charcoal and fuel-wood are transported on a more or less daily or weekly basis (graph 1 below). In fact more than 60% of vendors are supplied with fuel on a daily and weekly basis. As such there are more new entrants into the transportation business than there are vendors. Dedicated depot/wholesale operators, and non-dedicated kiosks, shops and roadside vendors on the other hand represent the other suppliers of traditional fuel based in the city's residential as well as business district. Dedicated suppliers are those who specialize in the sell of traditional fuels and nothing else, whereas non-dedicated are those who beside selling charcoal and or fuelwood also engage in the trading of other products such as fruits, etc.

Non-motorized transporters (NMT), using bicycles, pushcarts or just carrying wood/charcoal on the head, link up the various traders in the chain. The recipients of the traditional fuels from non-motorized transporters are mostly non-dedicated vendors such as retail shops, door to door and the roadside sales people. NMT also supply their charcoal/fuel wood to households, commercial concerns or institutions.

Pie chart 1. Depicts frequency of supply of charcoal to vendors by motorized transporters



The diagram below shows the relationship between the various players involved in the charcoal business and how they are linked by motorized and non-motorized transporters.



Green and blue arrows mostly represent non-motorized transporters.

2.1 Trend in the Urban consumption of charcoal and wood

In 1980, charcoal was estimated as providing 8% of Kenya's overall fuel needs. Out of this, 50% was used by urban households, 37% by rural households, 12 % by the industry and 1 % by the commercial sector (O'Keefe et al, 1984). It is now estimated that 80% of urban households' wood-fuel demand is met by charcoal (Theuri, 2000). Cooking and heating are the main end-uses for wood-fuel in the domestic sector whereas the same is used by many rural and urban small-scale industries for processing their products, e.g., hotels, fish smoking, tobacco and tea leaves curing, brick making, etc.

3. Profile of Sector Players in the Tradition Fuel Chain

Traditional fuel suppliers in Nairobi can be categorized into three main broad groups:

- Motorized Transporters – those who bring charcoal and wood from as far as hundreds of miles into the city using trucks and other vehicles for the purpose of selling.
- Vendors - This is a very difficult group to categorize. It is composed of serious traditional fuel traders who are dedicated to selling only charcoal and or wood on one of the scale to roadside sellers and door-to-door traders on the other end. In between there are dedicated retailers, non-dedicated kiosks operators who beside charcoal/wood trade in other commodities
- Non-motorized transporters – This include all those traders who move charcoal from one point to the other using either human carriers, bicycles, pushcarts and wheel-barrows for the purpose of selling. In most cases they transport charcoal to very short distances always not more than ten kilometers and link up vendors with household consumers. They are no clear cut lines between this category and door to door or roadside traders as often they collect/buy their own charcoal and sell it themselves to households or by the roadside. This mostly applies to women head carriers who collect fuel-wood from Karura or Ngong forests and sell it by the roadside.

3.1 Lorry Transporters

Lorry charcoal transporters are of two categories:

- i) Lorry owners who hire a driver and a conductor to transport charcoal from production site, which in most cases is up-country. Our study showed that most charcoal came from the Mt. Kenya region and the Rift Valley.
- ii) Business people who hire lorries from lorry owners for the purpose of doing charcoal business.

These two category of transporters have specific sites up-country where they collect the charcoal after prior arrangement and transport it to major urban centers in the evenings and at night. They distribute charcoal to strategically positioned depot sellers (whole/sale retailers) early in the morning. Lorry loads always range from over 100 sacks to 350 sacks.

3.2 Charcoal/Wood Sellers Depot

Transporters deliver charcoal to depot/wholesellers every day. Depot owners buy charcoal from transporters depending on the amount of money they have made on previous sales. Charcoal is sourced from a number of lorries to ensure steady supply in case one lorry fails. Taking charcoal on credit is strongly discouraged, it is only given under special circumstances and where there is very good relationship. Depots normally supply charcoal to retail shops, vendors, hotels, restaurants and households. The charcoal is transported more often than not by non-motorized vehicles from depots to consumers.

3.3 Non-motorized Transporters

Bicycles, human load and handcarts are the most favourite non-motorized form of charcoal transportation within the city. Our studies showed that bicycle use is dominated by men whereas women carry their charcoal or wood on their backs or head.

4.0 Study Methodology

The survey's aim was to give a short quantitative view of suppliers involved in the traditional fuel business, paying particular attention to poverty indicators, in order to:

1. Characterise the sector of carriers (motorized and non-motorized) involved in the supply and distribution of traditional fuels (charcoal & fuel-wood) within the Nairobi urban areas, in terms of number, gender, and means of transport;

2. Characterise the sector of vendors involved in the sale of traditional fuels; and their nature of the traditional fuel businesses;
3. Assess the poverty/livelihood impacts on traditional fuel suppliers of fuel substitution and improved stoves.

Four types of questionnaires were administered:

- Vendors short questionnaire: - Targeting charcoal retailers and depot owners, etc.
- Lorry questionnaire: - Targeting charcoal/wood motorized transporters
- Non-vehicle questionnaire: - Targeting non-motorized transporters of charcoal/wood
- Tally Questionnaire: Used to take count of vehicles bringing in charcoal/wood

Twenty enumerators were selected and given short training on the purpose of the study and how to administer the questionnaires. Thereafter enumerators were familiarized with the questionnaires through a pre-test run and send out according to the parts of the city they were familiar with. Enumerators on trial run were supposed to make comments on the flow and consistency of the questionnaires. Once the test run was done, useful comments were incorporated into the questionnaire and the real survey carried out.

The city was divided into 13 sections representing Slum area, lower, middle and upper income classes. Table 1 above shows the population, number of households and the area covered by these classes.

For lorry questionnaire, six entry points into the city were identified: Thika, Mombasa, Naivasha, Ngong and Ongata Rongai, Kiambu, Gigiri and Kangundo Road.

Short vendor, non-motorized and tally questionnaires were straightforward and did not pose problems in their administration. However, enumerators administering lorry questionnaire liaised with depot owners who introduced them to lorry/truck drivers. This involved working early and late hours to catch elusive lorry drivers.

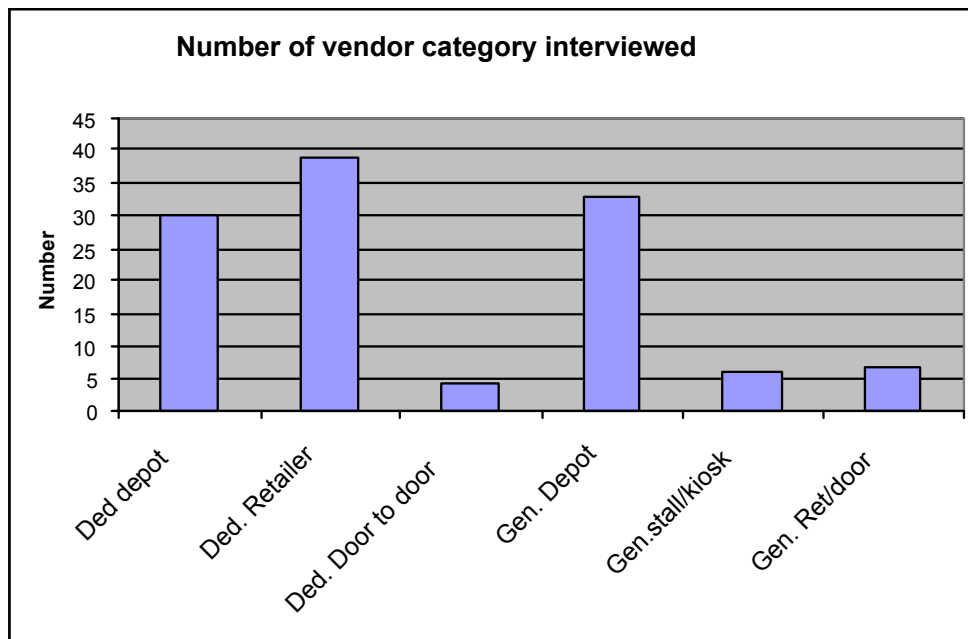
4.0 Results and Analysis of Short Questionnaires

4.1 Vendor Questionnaire

The vendor questionnaire targeted charcoal and fuel-wood traders who operated depot or wholesale stores, retail shops, kiosks, roadside sellers and door-to-door traders.

119 vendors were interviewed; 80 of them were male and 39 female. Majority of vendors, 85% were adult of between 15 and 55 years, children (below 15 years) and people above 55 years made up about 10% of respondents.

There are two basic categories of vendors – dedicated and general. In this study dedicated vendors are those depot or wholesale traders who sell only charcoal or firewood without trading anything else. This group of traders often owns the premise or space where they work and have been in the business much longer.

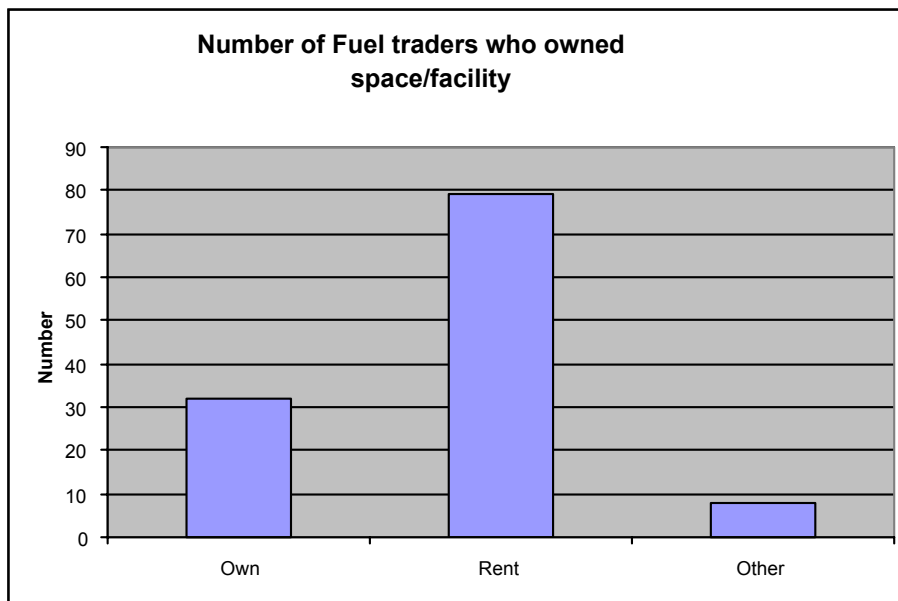


Graph above show number of various category of vendors interviewed.

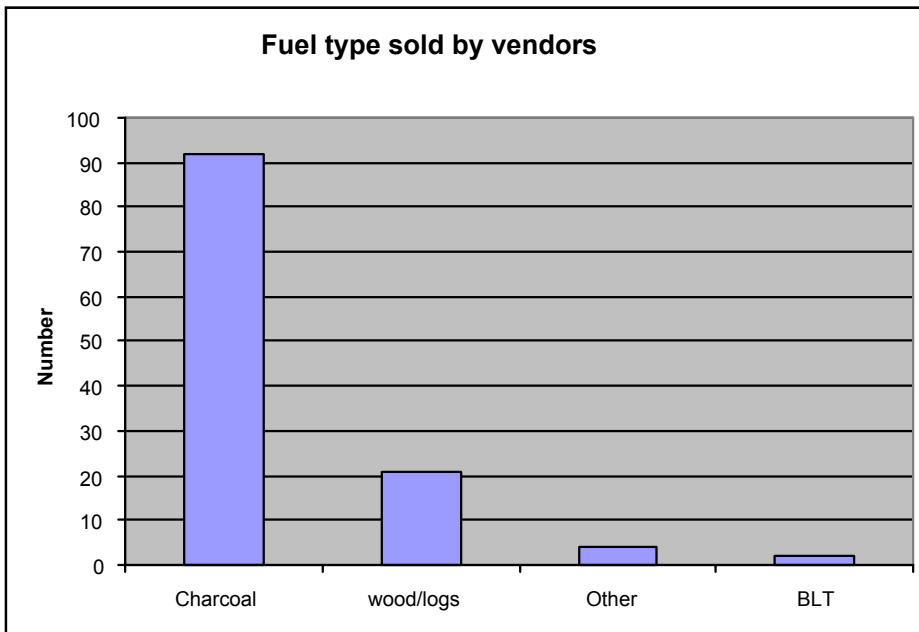
Thirty (30) out of the 119 respondents were dedicated depot owners. Depots operators sell in large quantities often in bags and not tins and operated large-scale wholesale stores, which store more than 50 bags of charcoal at any given time. Reasons for dedication ranged from having been in the business for long and also owning the space that the business belonged. In addition this category had formed a good network of suppliers and had dedicated customers that they relied on.

Unlike dedicated depot owners, dedicated retailers mostly rented their space, however they had also stayed in business long enough to establish strong relationship with transporters and customers.

To establish ownership of the facilities or space where charcoal/fuelwood was sold, questions were posed to the respondent to this effect. Thirty two respondents owned the facility or space they operated from. This figure more or less tallies with the number of dedicated charcoal/fuelwood traders. Seventy nine (79) of the respondents rented the facility/space. Eight (8) of the respondents either occupied spaces illegally or had been temporarily allocated space by owner or local authority and did not have to pay any rates. Graph below depicts these results.

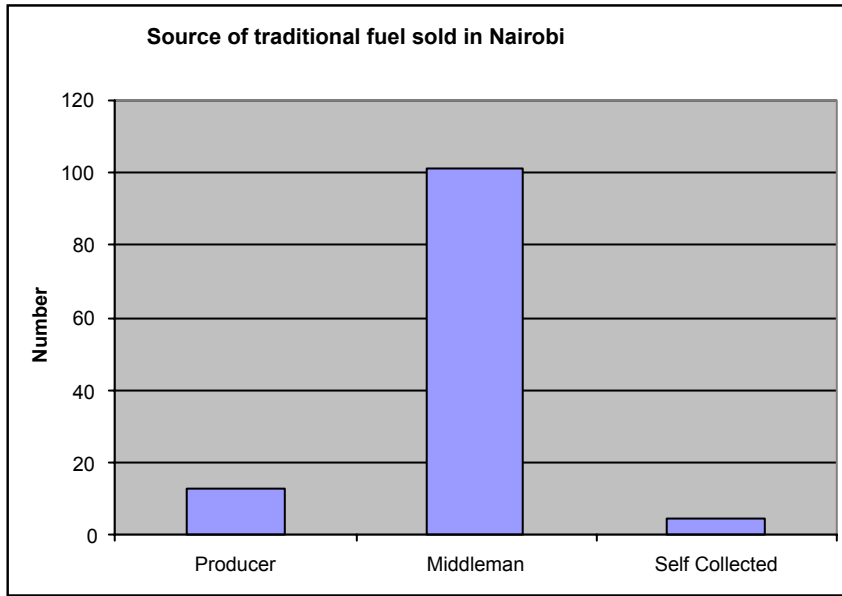


The survey also sought to know the type of fuel sold in Nairobi and its environs. Survey results showed that charcoal was sold in Nairobi more than fuel-wood. This is depicted in the graph below:



Charcoal is the preferred fuel because it does not smoke, is easier to transport and the packaging is more appealing to most customers. As such institutions and households prefer it. Moreover charcoal is more efficient than fuel-wood. Despite city council bye-laws that outlaw the use of fuel-wood in residential areas, Nairobi households' use of fuelwood is increasing. Many open space vendors in the areas neighbouring slum areas sold firewood of various sizes either as wood or branches and leaves. Other energy carriers sold in the market for cooking include agricultural residues and briquettes. Briquettes – manufactured from charcoal dust is becoming much more appealing to middle income urban residents as well as upmarket restaurants due to its environmentally friendly properties

A survey of fuel sources showed that most charcoal dealers in fact more than 80 per cent of respondents received their charcoal from middlemen. Middlemen are mostly agents of producers or transporters who buy charcoal from producers upcountry.



Respondents who admitted to producing or self-collecting their own fuel, were mostly very small-scale traders in the out-skirts of the city. The aim of producing is intended for domestic consumption but any excess is sold for income. It is suspected that most of the people still involved in self-collection of wood from the forest are doing it illegally as any collection or transportation of any type of forest products was made illegal by a Presidential decree in the year 2000. This decree has not been lifted.

4.2 Transporters

Two types of questionnaires were administered in order to capture all traders involved in the traditional fuel wood transportation. The lorry questionnaires targeted motorized transporters who use either pick-up trucks or lorries to transport fuel. Whilst the second questionnaire, dubbed non-vehicle carrier questionnaire targeted bicycles, push-carts, donkey carts and human carriers.

4.2.1 Lorry Transporters

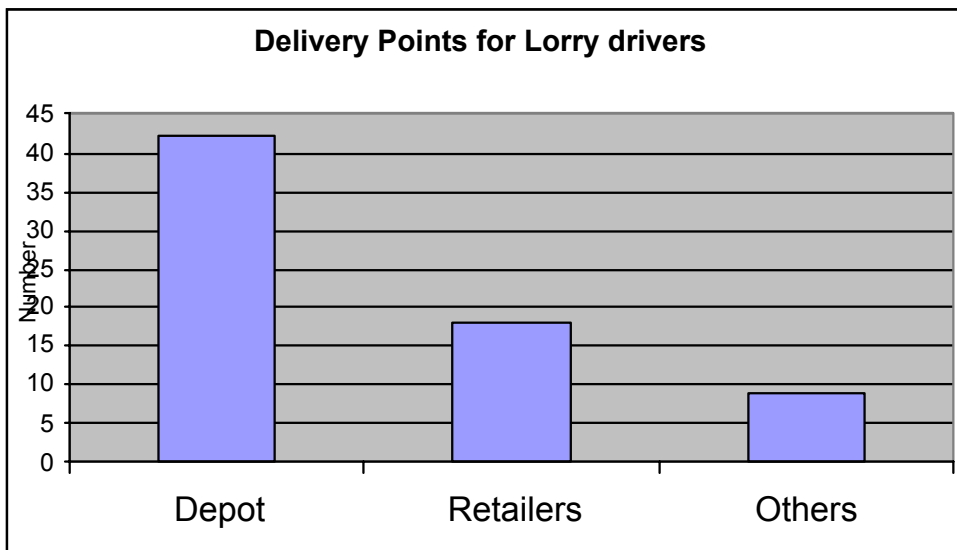
69 lorry drivers were interviewed, their mean age was 35 years and they were all male. Majority of lorry drivers (66) were transporting charcoal whilst only three transported wood in form of logs.

Fifty (50) of the lorry drivers said that transporting charcoal was their main activity, whilst nineteen (19) engaged in charcoal transportation when their other main activities had slowed down. 14 of the drivers owned the

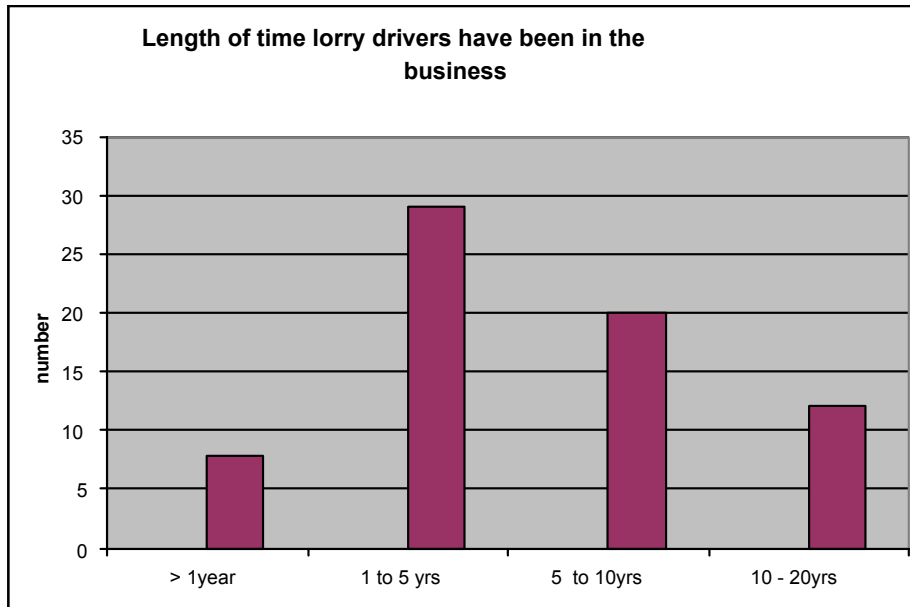
charcoal, whilst 55 had been hired to transport the charcoal. The charcoal either belonged to the employer, a charcoal dealer or a passenger within the vehicle.

Lorry drivers often deliver their fuel to many vendor category. However their first port of call are the dedicated depot and or wholesalers. When and if any of the charcoal remains, it is delivered to other vendors.

Graph below depicts the percentage amount of charcoal/wood sold or delivered to various vendor category. Almost 60% of the lorry driver forty two of them to be exact had their first port of call at the charcoal depot/wholesalers. Eighteen delivered to retailers and nine delivered to other outlets.



Thus most lorries first port of call is the dedicated depot owner and or retailer followed by other small-scale dealers who buy in small quantities.

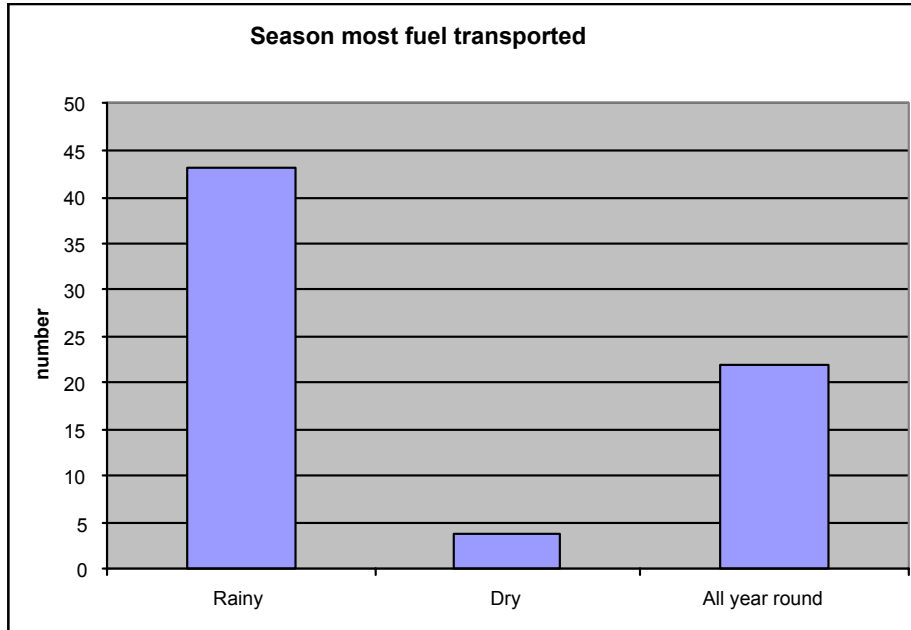


To find out how dedicated lorry drivers were we asked them how long they had been in the business. The graph above depicts this. About 7 drivers had been in the business for over one year, and more significantly about 29 of the lorry drivers had been in the business for between one to five years, whereas 20 had been in the business for five to ten years and twelve over ten years.

New entrants to the business accounted for over 10 per cent. Given that this is an “illegal” business, the only motivation for joining the business could be the high returns. When confronted with this question, most of the drivers could not provide straight answers.

Lorry drivers generally carried over 50 bags of charcoal, with the average being in the range of 250 to 350 bags.

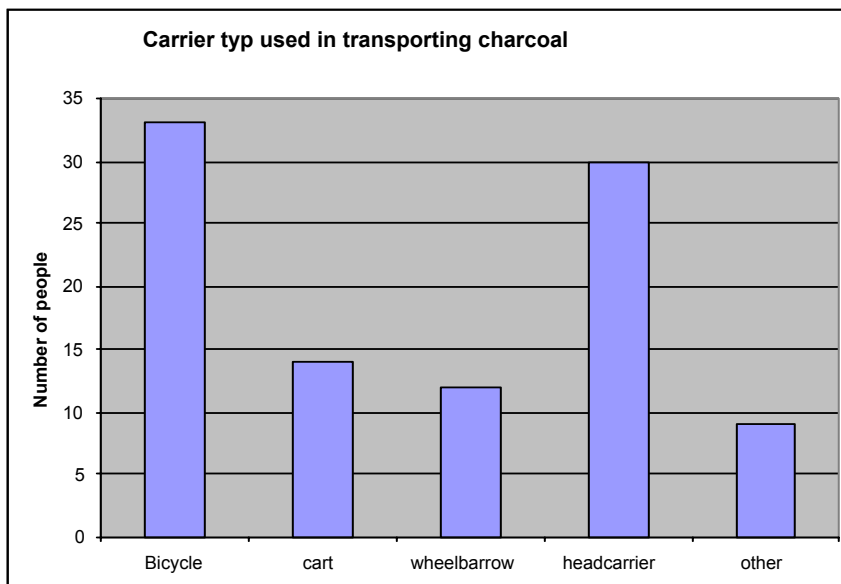
The study was also interested in the season that most charcoal was transported, surprisingly the rainy season emerged to be the period most charcoal is transported. The reason being that the demand for charcoal is higher during the rainy season. 60 percent of the drivers said that they transported more charcoal during rainy season whilst, about thirty per cent said they transported constant amount of charcoal during all year round. The rest were either non-comittal or transported more charcoal during dry season.

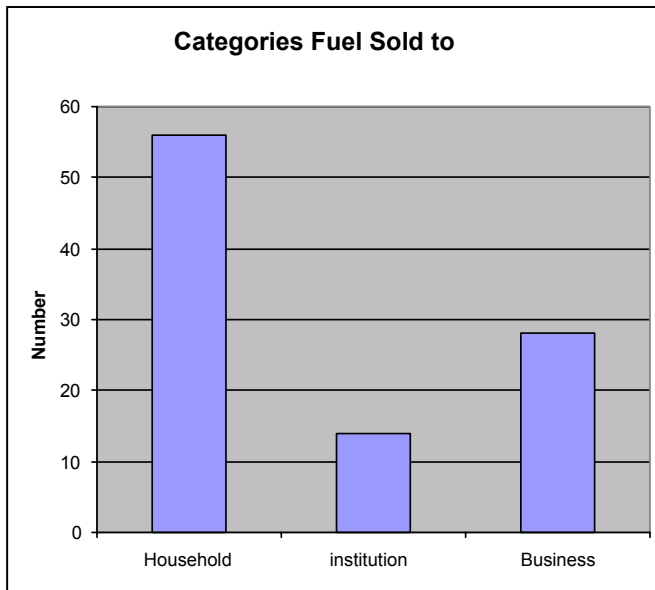


4.3 Non-Motorized Transporters

98 respondents were interviewed, unlike motorized transport, the participation of women in this category of business was high. There were 54 men and 44 women. The category was however dominated by adults of between 15 to 55 years who made up 77 percent, children under 15 years and adults of above 55 years made up 10 and 13 percent respectively

Male used either a bicycle or cart to transport the fuel whereas women mostly head carried the charcoal. Graph below shows this percentage carrier type.





Charcoal dominated the fuel type carried, followed by fuelwood in form of logs and BLT (Branches, leaves and twigs)

FUEL TYPE

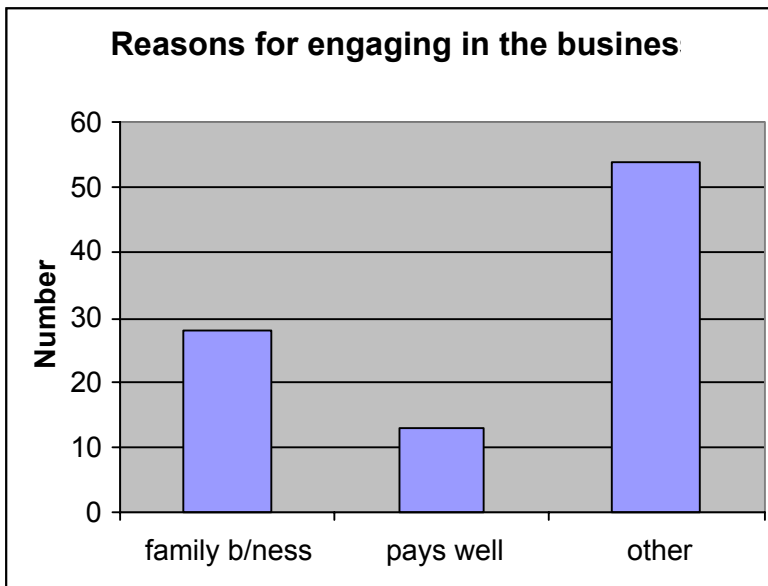
TYPE	charcoal	wood/logs	BLT	other	total
Number	56	33	6	3	98

As to the source of fuel, sixty four of the respondents had bought their charcoal/fuelwood from either a depot vendor or from lorry drivers. Thirty of the women who were head carrying the charcoal had self-collected or gathered from either Ngong or Karura forest. This is despite the presidential ban in the collection and or movement of forest products from government forests.

Non-motorized transporters supply charcoal to mostly households, followed by businesses and institutions.

In addition the fuel was also used for self-consumption especially the logs and BLT head-carried by women. Twenty nine of the respondents were transporting charcoal for personal consumption, whilst 69 were transporting for sell.

Various reasons were given for being engaged in the job ranging from family business, pays well, lack of other sources of income, etc. The graph below depicts this response.



5.0 Pressing Problems encountered by the various categories of respondents

5.1 Vendors

Vendors mostly encountered problems were of **institutional nature** and **power relations** i.e. lack of recognition by the local authority, harassment by police and city council askaris, lack of capital and credit to expand stock or restock, low quality charcoal, unreliable suppliers, harassment by environmentalist and conservationists, price fluctuations, high rental of the facilities and unhealthy competition

5.2 Motorized Transporters

Lorry drivers, on the other hand, encountered more of **power relations** problem as most of them though licensed to carry out the business still encountered harassment by police, forest guards, local authorities-chiefs and city council authorities, bureaucracy in obtaining transportation permits and licences, stiff competition from fellow suppliers and higher operational costs occasioned by bad roads, demand for bribery by police and restriction in sourcing forest products from government forest hence long distance travel to source the charcoal.

Other problems include shortage of charcoal during rainy season, increased fossil fuel costs for the vehicle and customers abusing credit given to them.

5.3 Non-Motorized Transporters.

This category of supplier experience mostly problems associated with **vulnerability** i.e easy entry into market, but susceptible to fluctuations, competition, seasonal element, lack of alternatives, dealing with uncredit worth customers, lack of capital, exploitation by fuel vendors, low carrying capacity of bicycles and charcoal of questionable quality.