Fuel Substitution:
Poverty Impacts on Biomass Fuel Suppliers

DFID – KaR Project Number R8019

BIOMASS FUEL SUPPLIERS PROFILE
ETHIOPIA, KENYA, UGANDA

Urban Biomass Fuel Suppliers Profile

1. Purpose and methodology of survey work

The short questionnaires were administered with the objective of clarifying the dynamics of the urban traditional fuel business. The aim was to identify

- the types of traditional fuel transported and sold;
- the categories of people involved in the business;
- the quantitative proportion of each category of suppliers and the relative importance in the business scenario;
- the links between each category of suppliers.

For a more detailed description of the field work methodology, refer to Annex 1

The quantitative analysis of the sample size interviewed is reported in the following sections of this report. Results from the interviews are reported in percentage of the total sample size, but it is rather difficult to predict how this relates to the total number of people engaged in the business. This is due to the fact that no official data is available in the three countries to account for the total number of people involved in this informal sector, which is characterised by open access.

A short interview based on semi-structured questionnaire was conducted focusing on the personal characteristics, business characteristics and problems encountered.

2. Overview of biomass energy use in the region

Biomass energy plays a vital role in the Eastern African region energy supply. For a large portion of population biomass is the primary source of energy to meet cooking and heating needs. In rural areas the dependence on biomass fuels can be as high as 95%.

On the other hand in urban areas, where people have easier access to modern energy sources (such as electricity, LPG or kerosene) and end uses, dependence on biomass fuels can be proportionally lower, especially in the medium to high income classes. This does not necessarily mean that volumes of biomass fuels consumed in urban areas are lower. Most of times the opposite is actually true, as people only tend to diversify the energy sources and use more energy as their income increases. In addition, the ever increasing number of the urban poor is most of the time solely reliant on firewood, crop residues and charcoal for their energy uses.

Kenya, Ethiopia and Uganda, although very different from one another under many aspects, have common energy consumption patterns. The following paragraphs give an outline of biomass energy use in the three countries.

2.1. Urban biomass fuel use in Ethiopia

Ethiopia has the lowest per capita energy consumption in the world at 300 kgoe/y. Biomass fuels account for 94% of the total national energy consumption. Of the total biomass energy consumption, about 86% is derived from woody biomass. 93% of woody biomass is used for meeting household energy needs for cooking and heating (especially in Addis Ababa).

Charcoal is used for meeting part of the cooking and heating energy demands of households (97%), commercial establishments (1.5%) and cottage industries (1.5%). From 1995/96 national survey data, the total volume of charcoal consumed is estimated at 230,000 tons/year. Although over 85% of the total population lives in rural areas, the urban household consumption accounts for almost 70% of the total charcoal consumption. This is due to the very large difference between average per capita consumption of charcoal: urban households consume about 17 kg per person per year, while rural households consume about 1.8 kg per person per year.

Firewood, branch leaves and twigs (BLT), agricultural residues and cow dung are the other major biomass fuel sources used in Addis Ababa both at household and small enterprise levels. Considerable amount of residue fuels (referred to as other fuel in the survey) such as saw dust, cottonseed and coffee husks, all of which are preferred fuels for commercial Injera baking, are being produced within the city boundaries.

Eucalyptus plantations from chain of mountains located North-East, North and North-West of Addis are the sole sources of supplies of firewood and BLT. The major source of cow dung is the Sululta plains (behind Entoto): well known for its suitability for livestock production. Charcoal and firewood to a very small extent, are produced in the central Rift Valley regions.

During the last decade an increasing number of construction poles and firewood depots have been opened in Addis Ababa. This is possibly due to the liberalisation of the economy, together with the consequent boom in the construction industry since early 1990s. It is important to consider that:

(a) almost all of the depots sell considerable quantities of firewood and sometimes charcoal too; and

(b) poles that are used for scaffolding and related purposes by the construction industry are converted into firewood eventually. The point is that all that wood is accounted for as poles, and not as firewood, when it enters the city. What is being transported into the city by human and donkey transport is BLT more than wood.

2.2. Urban biomass fuel use in Kenya

Biomass fuels (firewood and charcoal) provide 70% of Kenya's final national energy demand', petroleum 21%, electricity 10% and coal 1%[*]. The household sector is the largest user of primary energy, accounting overall for 59% of the total energy demand. More than 93% of rural household energy needs is covered by biomass. It is now estimated that 80% of wood fuel demand for urban households is met by charcoal.

Increased urbanisation and increasing distance of wood resources have determined a rapid increase in the demand for charcoal. Data from the Ministry of Energy estimate that between 1995 and 2000 the annual consumption of fuel wood and charcoal grew at 4.5 and 7.4% respectively. The present shortfall in wood fuel availability that Kenya is facing is expected to determine an increase in use of agricultural residues and animal dung for household energy use, especially in rural areas.

Prior to 1986, when the *shamba* system of forest plantation establishment was banned, almost 70% of the total charcoal and firewood consumption in urban areas was produced in managed plantations and woodlots. The banning directive had a profound effect on the traditional biomass business, contributing to create a considerable deficit in fuelwood and charcoal in major urban areas and the consequent increase of charcoal prices. The ban also contributed to the uprise of illegal deforestation practices.

According to the Ministry of Commerce and Industry, about 300,000 tons of charcoal per year is transported to Nairobi. The Forest Department (2000) estimates about 75% of charcoal come from outside gazetted forests (farmlands and other unknown sources) and less than 30% from natural forests. Most of Nairobi's wood fuel supply comes from North Eastern Province and the Rift Valley Province, only a small proportion from Central Province.

The best charcoal, both in terms of quality and quantity, is obtained from hardwood indigenous forest trees, such as *Acacia mearnsii, A. abyssinica, A. gerardii,* and *Combretum molle.*, Charcoal briquettes obtained from charcoal dust are also available on the market in Nairobi and other urban areas. These products are usually sold at slightly lower prices than wood charcoal and are mainly suitable for heating purposes, hotels and institutions being the major purchasers. Pilot projects exist to produce charcoal briquettes from carbonised agro-residues.

2.3. Urban biomass fuel use in Uganda

Biomass, principally fuel wood and charcoal, is in quantity terms the most important energy source in Uganda. Wood fuel (firewood and charcoal) on both non-commercial and commercial basis constitutes 88% of energy consumed in the country. Basically any dry material can be used as a source of fuel. Sources of these dry materials are mainly trees and bushes, which occur in all types of land cover use e.g. forests, woodlands, bush lands, agricultural farms etc. Wood fuels provide the energy for cooking and water boiling for most rural and many urban homes.

[*] Kenya Fact-book 2001.

Woody biomass is the main source of energy for cooking often used in the inefficient traditional three stones stove and for the provision of space heating. In Kampala the main consumers of firewood are:

- Low income households
- Institutions (schools, prisons, hospitals)
- Small and medium enterprises such as bakeries, commercial establishments (hotels, restaurants) etc.

Table 1: Overall proportional estimates of wood fuel consumption

Category	% Household Use
Wood Rural	97.3%
Wood Other Urban	45.1%
Wood Kampala	11.6%
Wood Jinja	16.0%
Wood Entebbe	14.0%

Source: Final Report - A Study of Woody Biomass derived Energy Supplies in Uganda

It appears that in Uganda the percentage of population in urban areas using charcoal for cooking, space and water heating and ironing as main fuel is dependent on city population size. While in urban areas with populations greater than 30,000 (e.g. Kampala and Entebbe) it is the 85% of the households to use charcoal as their primary fuel, just a mere 40% of households use charcoal in urban areas with population between 4500 and 30,000 and even a lower percentage (10%) in urban areas with less than 4,500. Most of charcoal (70%) is produced by dedicated, itinerant charcoalers on an independent basis. Most charcoal is produced in south and west of Uganda on non-government land. Charcoalers enter into arrangements with landholders and generally pay them very nominal fees or a proportion of the charcoal produced. Nearly 80% of all producers engage in charcoal production as their sole or major economic activity

Table 2: Households using charcoal

Category	%Households use
Charcoal Rural	2.7%
Charcoal Overall urban	54.9%
Charcoal Kampala	88.4%
Charcoal Jinja	84.0%
Charcoal Entebbe	86.0%

Source: Final Report - A Study of Woody Biomass derived Energy Supplies in Uganda

The forest policy recognises that Uganda's forest resources provide energy, supplying 93% of national energy demand, on the other hand the National Energy Policy recognises the role that biomass should be included in the national energy planning. It also recognises that wood fuel harvesting contributes to degradation of forests as wood reserves are depleted at a rapid rate in many regions, and that impacts on the environment and health of the end-users can be identified. The scarcity of wood fuels in some parts of the country has been addressed through demand side management, including the use of energy efficient devices and alternative sources. In this respect, the use of improved stoves is high on the Government's agenda for promotion, whereas the use of petroleum based products, e.g. LPG and kerosene for cooking is limited.

3. Ethiopia

3.1. Description of biomass fuel business dynamics

In the context of this research, dedicated suppliers are those who specialise in the sale 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.

The biomass fuels sector in Addis Ababa is characterised by a varied multitude of players at all stages of the supply chain from production, processing, transport through marketing and delivery. In some cases the roles of each person involved in the business can be clearly identified, but quite often the definition of roles is very fluid, i.e. a woman who transports fuels could also sell it in a market stall making it difficult to group her in with transporters or vendors due to her dual role. The human factor is the most important element in production, transport and marketing of biomass fuels in Addis Ababa.

At a glance, the biomass business is very poorly organised, highly decentralised and characterised by inefficient delivery mechanism. There is no particular requirement to enter the business, unless in rare cases, therefore it is open access to all those people with no particular skills who need a source of income. The majority of those who enter the industry without specialisation are generally poor members of the society such as women head of households, landless 'farmers', widowed/divorced poor women and orphaned children.

3.1.1. Sources of fuel and supply mechanisms

Wood and charcoal - produced by farmers - are transported from as far as 300 to 400 km. Addis-based traders have middlemen who organise supplies and transport in rural areas. Usually, the traders themselves collect their supplies and transport them to Addis Ababa. There is no organised delivery mechanism particularly for charcoal.

On the other hand, BLT is produced in and supplied from peri-urban plantations within 30 to 40 km around Addis Ababa. A number of peri-urban plantations (all eucalyptus) developed in the mid 80's are the sole sources of BLT supplies to the city.[†] Rural women and children collect BLT free of charge (but bribes and favours are common to gain access), pack in sacks and transport it to either roadsides or to nearest small towns (Sendafa, Sebeta, Menagesha) where they sell it to local or Addis traders. About 200 to 300 Addis-based merchants (almost all women) go to satellite towns on market days to collect their supplies. The traders rent open spaces in the satellite towns where they store and repack the BLT.

3.1.2. Market prices and destinations in Addis Ababa

Market prices of BLT are highly variable depending on seasons and consequent availability. Availability is high during the dry season and low during rainy season. Currently, a sack of BLT is between Etb 4.0 and 5.0 (see Table 3 below). During rainy season retail prices nearly double.

[†] Discussions made with farmers during the course of this assessment indicated that the peri-urban plantations have now become the major source of livelihood (accounting for 50% to 80% annual household income) for several thousand rural agricultural families around Addis Ababa.

Table 3: BLT price build up

Item	Price Etb/Sack	Note
Rural Suppliers or producers	0.0	Free but, pay for access
Transport to nearest town or road side	0.0	Donkey transport mainly
Price at satellite towns	1.5	15 kg sack of eucal. leaves
Rent (storage and repacking)	0.07	In the form of gifts, favours
Labour (Repack, load, unload)	0.5	
Transport	1.00	
Total delivery cost: Addis Ababa	3.07	Could go up to 6 at times
Storage and Rent in Addis Ababa	NA	Some pay others don't
Supplier (wholesale) margin	0.5 to 1.00	
Retailer margin	0.5 to 1.00	
Consumer price: Addis Ababa	4.07 to 5.07	Current market price

There are several hundreds of market stalls for traditional fuels in the city. In order to avoid expensive transport within the city, suppliers tend to use market destinations that are close to the routes where supplies come from. Popular market destinations for each fuel and supply routes are presented in Table 4 below.

Table 4: Supply routes and market destinations of fuels

Supply Route (Roads)	Major Fuel(s)	Market Destinations
Asmara	BLT	Kara, Shola, Silassie
Entoto	BLT	Shiromeda, Menen
Gojam	BLT	Semen, Ras Desta
Ambo	BLT, Wood	Asko, Rufael, Kuasmeda, Markato
Jima	Wood, Charcoal	Ayertena, Mesalemia, Markato
Debre Zeit	Charcoal	Gotera, Lideta

The traditional fuels market has become increasingly competitive. The market has also expanded tremendously over the past several years. However, due to growing role of motorised transport of fuels, it is likely that either certain group of suppliers are squeezed out of the market or their roles have changed from one of transporters to the city to that of suppliers to intermediaries in rural areas. Currently, the market is dominated by urban traders who bring in supplies using motorised transport.

Given the relatively strong position (bargaining power) they have in the supply chain, possibilities of vulnerability for groups such as motorised vehicle owners, urban-based traders and drivers who are engaged in fuel transport business are rare. On the other hand, stiff competition in the market place coupled with harassment from city authorities suggests that small retailers operating from road sides and market stalls may constitute most vulnerable groups and hence, should be the focus of thorough investigation during the next phase of the research project.

3.1.3. Transporters

With regards to supply of biomass fuels, what is unique about Addis Ababa is the number of non motorised transporters involved in transporting traditional biomass fuels to the city. Despite the fact that the role of motorised transport of biomass has been steadily growing in recent years,

several thousands of women, donkeys, children and to a lesser extent men transport the bulk of firewood and cow dung to Addis Ababa on a daily basis. Most of charcoal and only a small proportion of firewood are transported from the Rift Valley areas by motorised transport.

In recent years new trends developed in the traditional fuel supply business. These changes are:

- Increasing importance of motorised transport of fuels;
- Charcoal supplies, with exception of one or two sacks transported for personal consumption, entering the city at night by motorised transport. Furthermore it was observed that small quantities of charcoal are transported by human carriers through major roads such as Ambo and Asmara Roads, which are not known for charcoal inflow traditionally.
- In the past, transport of BLT was totally the domain of human carriers and donkey transport. Although human donkey transport dominates the scene (in terms of numbers), this is one of the areas where motorised transport assumed greater and increasing significance. During the field work it was observed that close to 200 short haul public and freight transport vehicles were bringing 20 to 40 sacks of BLT each (entirely eucalyptus leaves collected from surrounding publicly owned plantations) in to the city making three to four round trips everyday.

Motorised Transporters: Supply of traditional fuels using motorised means of transport in Addis Ababa was negligible before 1990s. Motorised transport of fuels assumed increasing importance since the change of government in 1991. It is believed that macro economic liberalisation undertaken by the current government has contributed to this phenomenon. Currently, traditional fuels, particularly charcoal and BLT and to a lesser extent firewood are transported by motorised vehicles, both from distant places as well as the vicinity of Addis Ababa.

In Addis Ababa the majority of motorised vehicles involved in biomass fuels transportation are passenger and freight vehicles that transport fuels as a part load. Vehicles for public transport (buses and minibuses) also transport biomass fuel as part of the load. In these instances the fuel belongs to passengers. The main vehicles used are cars, pick ups, lorries, and buses.

The majority of commercial charcoal supplies enters the city by medium trucks (4 to 5 tonnes capacity) at night to avoid detection by forestry authorities. Usually, the trucks are rented by suppliers to transport charcoal. Suppliers collect orders from their customers, who are usually Addis-based wholesale depots, and deliver the supplies to the point of sale. In addition to the supplier, the vehicle owner/driver (transporters) and the depot owner, the process also involves other people who make a living on loading and unloading charcoal.

Non-motorised Transporters: This category includes multitude of women, donkeys, children and men who carry biomass fuels from a range of up to 20 km radius from the city. While the majority of these people are members of rural farm households, urban poor women and children are also considerable. It was also observed that the number of donkeys carrying fuels was by far greater than the number of people driving them. The implication is that there could be some arrangement made by villagers whereby someone is assigned to transport and sell their fuels on their behalf against certain reward or incentives. Another important observation is that by far more men were observed transporting fuels using donkeys than women. This could be due to gender imbalance where women have little or no access to and control over resources that belong to a household.

3.1.4. Vendors

Marketing of traditional fuels in Addis Ababa is an activity that involves thousands of people with varying capacities. As it was pointed out in the previous paragraphs, generally there is no clear distinction between transporters and vendors in Addis Ababa. A growing number of urban women (and children to support their mothers) both collect and transport traditional fuels and sell them directly to end-users. Traditional fuels vendors in Addis Ababa could be categorised in to two groups: large wholesalers/depots and retailers of various categories.

- **Large Wholesalers/Depots**: These are usually located in fairly large rented publicly owned spaces. They obtain their supplies both in small and large quantities from rural suppliers (small quantities coming by donkeys and human loads) and urban-based middlemen using motorised means of transport. Depending on the types of products they deal with wholesalers/depots could be sub-divided further into three. These are: (1) those who sell construction poles and traditional fuels (firewood and or charcoal), (2) those who deal with charcoal only, and (3) those who deal with firewood only. In terms of organisation and size of business, the first group tend to be biggest of all. Although they are new entrants to the industry (last 10 years or so), this group have a more stable business. The other two groups are more or less similar in most of their characteristics except the fact that official attitude towards the charcoal group is generally negative.
- **Retailers**: This group consists of several sub groups that differ from one another in terms of size of business, sales volume, business location and levels of diversification. In terms of sheer numbers this group is the second largest next to transporters in the supply chain. Depending upon the size of business and proximity to various supply sources retailers may obtain their supplies from different sources including wholesale depots, larger retailers, self-collection, motorised transporters, intermediaries and directly from non-motorised producer/transporters. Traditionally women are more active than men in the retailing of traditional fuels (and other household consumption goods such as food items, spices and vegetables) known as *gulet* in Ethiopia. The following are sub groups of retailers group ranked in terms of size of business:
    - **Shops/Kiosks**: located in neighbourhoods, highly diversified including non-fuel consumer goods, almost always men, sometimes wholesale to smaller retailers and deliver to points of sale.
    - **Market Stalls**: located in almost all small and medium neighbourhood markets (close to 1,000), few dozens in each market, almost on a daily basis, some diversifying with non fuel commodities, regular selling place, very poor, usually urban women supported by their daughters.
    - **Side of the road vendors**: usually self-collected fuel, no regular selling place, highly vulnerable, less diversification, harassment by health and municipal authorities, sell directly to household consumers.
    - **Peddlers (Door to door vendors)**: not very many and decreasing in importance, usually charcoal packed in a few dozens of tiny plastic bags laden on donkeys.
    - **Neighbourhood vendors**: in front of residences and small roadsides (footpaths) in slum areas, smallest units sold in bundles (BLT), plastic bags (charcoal), very poor households (women), sometimes onions, potatoes and tomatoes side by side with fuels.

3.2. Results of field surveys

In Ethiopia the following three categories of traditional fuels suppliers and marketers were interviewed during the same period:

- Non motorised suppliers (122 interviews)
- Motorised suppliers (20 interviews)
- Vendors (104 interviews)

Twelve enumerators with college level of education were recruited and trained on basic data encoding and interviewing techniques. Visits to various traditional fuels supply routes and marketing locations were made to familiarise enumerators with the peculiarities of such surveys. The various survey instruments were piloted to test their suitability and capability to capture the required information. While six enumerators were doing the inflow tally, the remaining six interviewed six respondents each (two from each supplier category). The various survey instruments were finalised by incorporating comments from the pilots, which helped to account for local variations in the overall regional survey methodology. The survey was conducted between September 23rd and 28th, 2001.

Two variables are used as main parameters for cross-tabulation of the data: dedication and gender. Dedication is intended to differentiate the sample on the basis of whether traditional fuels vending is a full time occupation and sole source of livelihood.

3.2.1. Non motorised transporters

- **Dedication**

One of the key characteristics that determines the level of vulnerability to shocks in the marketplace is the degree to which a given group or individual is dedicated to his/her business. Out of a total of 122 interviews made 54% of the interviewees reported that they totally rely on transporting traditional fuels all year round to make a living. The remaining 46% claimed to have other sources of income.

Table 5: Gender and Modes of Transport

Means of Transport	Group								All			
	Non-dedicated				Dedicated							
	Gender		Sub Total	%	Gender		Sub Total	%	Gender		Total	%
	Fem	Male			Fem	Male			Fem	Male		
Donkey	16	31	47	***83.9***	5	6	11	***16.7***	21	37	58	***47.5***
Human Load	4	5	9	***16.1***	47	8	55	***83.3***	51	13	64	***52.5***
Total	**20**	**36**	**56**	***100***	**52**	**14**	**66**	***100***	**72**	**50**	**122**	***100***
%	**35.7**	**64.3**	**100**		**78.8**	**21.2**	**100**		**59**	**41**	**100**	

From gender perspective, reportedly, more men (64%) are non-dedicated transporters than women (36%). Among the group of dedicated transporters women constitute the vast majority of about 80% of the total. This has a clear impact on vulnerability as women often rely fully on traditional fuel for their daily income.

- **Type of fuel transported and modes of transport**

Non-motorised transporters were characterised by types of fuel they transport. In order of importance, the main biomass fuels transported are BLT 43%, wood 34% and charcoal 16%. Other fuels transported are dung and agro residues. The overall tendency is for women to specialise on transport of BLT and for men on charcoal and wood, which generally are sold at higher prices in a non specialised manner.

The survey highlighted that 48% of respondents utilised donkeys to transport fuel, the balance was transported by human carriers. Over 90% of dedicated women suppliers transport their fuels on their backs. The vast majority of non-dedicated men transporters used donkey to transport fuel.

Overall gender differential for use of donkeys to transport fuels is remarkable, with a higher proportion of men using donkeys as means of transport of fuel. On the contrary, transport of fuels using head/backloads involved very few men as opposed to women.

- **Mode and frequency of acquisition and time in business**

Irrespective of gender and group, the two most important means of obtaining supplies are production and free collection. Suppliers who purchased fuels from middlemen were only 6% of the total. With respect to gender, the majority of women self collect fuel, whereas the majority of men reported to produce the fuel transported (Table 6 abelow).

Table 6: Modes of Fuel Acquisition

Group	Gender	Mode of Acquisition			Total	%
		Freely Coll.	Produced	Purch.		
Non-dedicated	Female	2	18		20	35.7
	Male	4	28	4	36	64.3
	Sub Total	**6**	**46**	**4**	**56**	**100**
	%	10.7	82.1	7.1	**100**	
Dedicated	Female	42	7	3	52	78.8
	Male	5	9		14	21.2
	Sub Total	**47**	**16**	**3**	**66**	**100**
	%	71.2	24.2	4.5	**100**	
All	Female	44	25	3	72	59.0
	Male	9	37	4	50	41.0
	Total	**53**	**62**	**7**	**122**	**100**
	%	43.4	50.8	5.7	**100**	

Results of the survey also showed that close to 60% of the suppliers are relatively new entrants (less than 5 years), which might mean high turn over due to various reasons including vulnerability issues. A larger proportion of dedicated suppliers have been in business for longer period of time. In the group of dedicated suppliers more women tend to have stayed longer in business than men.

Results of the survey did not show any preferential relationship with customers. Non motorised suppliers tend to meet their customers in the marketplace, with the exception of very few, who reported to have hotels as regular customers.

3.2.2. Motorised transporters

In Ethiopia, the fact that the fuel does not belong to the drivers/owners of the vehicles coupled with the inconvenience of stopping the vehicles for an interview made obtaining data through this survey particularly difficult. This is reflected in the low sample size. Moreover, as the bulk of charcoal is supplied by trucks at night and no interviews were undertaken after dusk, data is missing to characterise this important part of suppliers.

In order to compensate for the lack of direct data, case studies were carried out to provide insights of this group of suppliers.

- **Quantitative Interviews**

The survey consisted of a sample of 20 motorised transporters. All the respondents were male. This reflects the nature of motorised transport business in the Ethiopian context where women rarely engage in motorised transportation of fuel. The majority of the respondents were below forty years of age and reported transportation of traditional fuel as their main employment and source of income. Regarding ownership of vehicles only half of the respondents owned the vehicles used. A significant aspect is that out of the 11 respondents reporting fuel transportation to be the main occupation the majority (8 out of 11) also reported ownership of the vehicles used.

The majority of the respondents were engaged in the business of transporting fuel for less than 5 years. Although the small size of the sample does not allow a firm conclusion, it appears that those who stayed in the business for longer periods also reported transportations of fuel as their main employment.

- **Qualitative Assessment: Case Studies**

A total of six case studies were carried out to help identify and map out likely levels of vulnerability and vulnerable groups among those engaged in motorised transport of traditional fuels. This assessment was made on three most important roads (Debre Zeit, Asmara and Ambo) with vehicle owners/drivers and traders over a period of one week. Key players among this group include rural suppliers (farmers), middlemen in satellite towns, labourers (loading/unloading), Addis-based traders, vehicle owners/drivers.

About 200 to 300 public passenger vans and small trucks transport the fuel to various market destinations in Addis Ababa. There are only six trucks that are dedicated to transporting fuels (BLT and wood) to the city. Usually a van transports 40 to 50 sacks of BLT, each weighing about 15 kg, at a time; and makes 3 to 4 round trips per day. On the average, a trader brings 40 to 50 sacks of BLT each market day. The majority of the BLT is transported in to Addis during the two market days, i.e. Saturdays and Wednesdays. There is no organised delivery mechanism for charcoal.

3.2.3. Vendors

This section of the report provides the results of the short survey conducted to gather data on the profile of a sample of traditional fuels vendors in Addis Ababa. Of the various categories of vendors interviewed, retailers and market stall vendors formed the majority of the sample (49 and 30% respectively), while wholesalers/depot owners represented 17% of the sample.

- **Dedication and gender**

Data reported in Table 7 show that the majority of vendors are dedicated in that traditional fuels vending is their sole occupation and source of livelihood. The majority of vendors interviewed were women (65%). This reflects the predominant role women play in the supply of traditional

fuels to Addis Ababa. Sales of charcoal, wood and a combination of traditional fuels represent the majority of traditional fuels trades.

Table 7: Distribution of TFVs by status, category and gender

	Gender			
Dedicated	**Male**	**Female**	**Total**	**%**
Wholesale/Depot	14	3	17	16
Kiosk	2	1	3	3
Market Stall	10	20	30	29
Peddler	0	1	1	1
Retailer	11	32	43	41
Total Dedicated	**37**	**57**	**94**	**90**
Non-dedicated				
Wholesale/Depot	0	1	**1**	1
Kiosk	0	0	**0**	0
Market Stall	0	1	**1**	1
Peddler	0	0	**0**	0
Retailer	2	6	**8**	8
Total Non-dedicated	**2**	**8**	**10**	**10**
Grand Total	**39**	**65**	**104**	**100**
%	37.5	62.5	**100**	

- **Business characteristics**

The majority of vendors in the sample have been in the business for a period of less than 5 years. This reflects the fact that the traditional fuels business is a volatile sector which is subject to seasonal fluctuations in demand and to supply constraints due to various factors. For the vast majority of respondents (82%), the main reasons for entering the traditional fuels business was lack of better employment alternatives. Only a small proportion of respondents reported to have other sources of income through trading of other products. It is not uncommon for vendors, especially women in "gullet", to sell other items such as vegetables and spices alongside with traditional fuels such as charcoal.

With regards to modes of supply merchants and producers are the two most important sources of supply. A low proportion of respondents (less than 5%) reported engaging in both collection and vending of fuels.

Table 8: Modes of Fuel Supply

Status	**Mode of Supply**				
	Merchant	**Producer**	**Self Collected**	**Other**	**Total**
Dedicated	48	41	4	1	**94**
Non-dedicated	6	3	1		**10**
Total	**54**	**44**	**5**	**1**	**104**
%	52	42	5	1	**100**

Regarding the frequency of acquisition of fuel supplies, the largest proportion of the vendors acquire their fuel supplies either less than once in a week or on a weekly basis. Gulet-based fuel retailers tend to acquire their supplies on smaller quantities on a daily basis due to shortage of working capital and the need to use the small profit margins for daily subsistence needs of households. As far as customers are concerned, the majority of the vendors reported selling to any buyer.

Table 9: Frequency of Fuel Supplies

	Frequency					
Status	**>once/week**	**>once/month**	**Daily**	**Weekly**	**Other***	**Total**
Dedicated	26	8	12	29	19	**94**
Non-dedicated	2		1	3	4	**10**
Total	**28**	**8**	**13**	**32**	**23**	**104**
%	26.9	7.7	12.5	30.8	22.1	**100**

* Vendors who could not report a clear regular pattern in the acquisition of supplies

3.3. Vulnerability

The problems mentioned by traditional biomass fuel suppliers were classified for the purpose of analysis under three main categories, namely:

- institutional (relates to policy framework, legislative environment etc.);
- power (relates to relationship with police, local authorities, forestry department representatives etc.); and
- vulnerability (relates to any external factors over which suppliers have little control).

All respondents reported a multiple variety of problems. A brief analysis of vulnerability is presented in the following section.

3.3.1. Non Motorised transporters

The Ethiopian biomass industry in general and non-motorised transport in particular could best be characterised by its vulnerability rather than security. It is easier to enumerate conditions that have been, and still are, unfavourable to the industry and players within it rather than those in its favour. Various historical, environmental, political, socio-economic, cultural, institutional and organisational factors are believed to have contributed to the development of a vulnerability context for the traditional biomass suppliers and other problems the industry might be facing today.

Supply of traditional fuels is an area of business that is left to near-destitute people who had no or very limited opportunities to secure sustainable livelihood. For instance, results of the survey revealed that over half of the respondents are engaged in supplying traditional fuels due to absence of other alternative employment. A quarter of the respondents (almost entirely non-dedicated suppliers) reported that they engage in the business because it helps them meet domestic expenses. Only 18% of respondents claimed that the business pays well relative to other alternatives. From gender perspective, the majority of those who reported 'lack of alternatives' as the main reason were dedicated women suppliers, which also indicates their disadvantageous position in the supply chain.

Another aspect that was looked into as an indicator of level of vulnerability was type of problems that were reported to have been faced by suppliers. The two most important problems reported were those related to vulnerability (19%) and those related to power (16%).

The majority of dedicated suppliers who reported to have experienced problems of vulnerability and power were women. The gender dimensions of problems reported are very clear in that 44% of against 66% of men suppliers claimed not to have faced problems. Problems associated to vulnerability and power were the highest among women who collect fuels freely. Similarly, women who collect BLT freely reported to have experienced more problems than those who deal in other fuels.

3.3.2. Vendors

The vendors' survey also attempted to identify the main problems vendors face in relation to their activities. Only a minority of the vendors reported facing problems in relation to their business activities. This may seem an unrealistically low figure but it must be placed in the context of the whole chain of traditional fuels business involving production, transportation, supply and retailing. The vending activity represents only the tail end of this chain. In the Ethiopian context the policy on the production, supply and marketing of traditional fuels is surrounded by ambiguity. Official restrictions mainly focus on the production (e.g. charcoal) and transport aspects of the chain than on the retailing end (an activity which takes place once the fuels reach the urban centres). This partly explains the low percentage of vendors reporting problems in relation to the business.

Due to these reasons people engaged in the sector may not view it as a secure and long- term source of livelihood, but rather as a transitional occupation it can be subject to rapid turnover, characteristic of the informal sector in developing countries. Problems related to the business activities faced by the respondents are of different nature including:

- confiscation,
- high costs of unloading and parking,
- night driving, and
- fluctuating market demand.

Confiscation is the most frequently mentioned problem indicating the persistence of the policy legacy inherited from the communist regime, which relegates traditional fuels supply and marketing to a non legalised position. The majority of problems reported by the vendors fall under the category of vulnerability, most of them being market related such as low and fluctuating demand followed by competition, lack of proper selling place as well the hard nature of the work it self. Two cases categorised under institutional and power related problems referred to harassment by health inspectors and confiscation.

4. Kenya

4.1. Description of biomass fuel business dynamics

Traditional biomass fuel trading in Nairobi is a very dynamic business that takes place in the whole of Nairobi business district as well as in residential areas. The biomass supply chain is long and generally ramified. At times it is difficult to identify all the players and their roles, as they are often interchangeable.

In most cases charcoal and wood logs producers are based in rural areas and are represented by agents in Nairobi, who generally operate motorised transportation, either lorries or pickup trucks. Dedicated depot/wholesale operators, and non-dedicated kiosks, shops and roadside vendors are involved in selling traditional fuels both in the residential and business districts.

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

4.1.1. Fuel supply mechanisms

Transporters deliver charcoal to depot/wholesalers every day. Depot owners buy charcoal 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. Charcoal and woodfuel are often transported by non-motorised vehicles from depots to consumers.

It is interesting to notice that charcoal is mostly transported during rainy season because demand for charcoal and prices are higher during rainy season.

4.1.2. Transporters

Motorised transporters: The category of motorised transporters comprises lorry and pick-up drivers, who bring charcoal and fuelwood to Nairobi. Although transportation of charcoal and fuelwood is bedevilled by many risks, mainly due to poor transport infrastructures and potential harassment by government officials, it is an activity that allows high profits. This is due to the large volumes of charcoal and fuel-wood that are transported on a daily basis into Nairobi.

Lorry charcoal transporters can be divided in two categories:

i) Lorry owners who hire a driver to transport charcoal from production sites, which in most cases is up-country. Most charcoal comes from the Mt. Kenya region and the Rift Valley.

ii) Business people or charcoal owners who hire lorries from lorry owners transport charcoal.

These two category of transporters have specific sites up-country where they collect the charcoal and transport it to major urban centres 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.

Non-motorised transporters: This category comprises all those traders who move charcoal or fuelwood 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 10 km and link up vendors with household consumers. There are no clear cut lines between this category and door to door or roadside traders as often they collect or buy their own charcoal and sell it themselves to households or by the roadside. To this category belong women head carriers who collect fuel-wood from Karura or Ngong forests and sell it by the roadside.

4.1.3. Vendors

The category of vendors is very difficult to categorise. It ranges from traditional wholesalers/depot owners who are dedicated to selling only charcoal and/or wood on one end of the scale to roadside sellers and door-to-door traders on the other end. The following are sub groups of retailers group ranked in terms of size of business:

- **Depot/wholesalers**
- **Kiosks**: located in neighbourhoods and/or at the side of roads, highly diversified including non-fuel consumer goods, sometimes wholesale to smaller retailers.
- **Market Stalls**: located in almost all small and medium markets, some diversifying with non fuel commodities, regular selling place.
- **Side of the road vendors**: usually sell self-collected fuel, no regular selling place, highly vulnerable, less diversification, sell directly to household consumers.
- **Door to door vendors**: usually sell charcoal.

4.2. Results of field surveys

In Kenya the following three categories of traditional fuels suppliers and marketers were interviewed:

- Non motorised suppliers (98 interviews)
- Motorised suppliers (69 interviews)
- Vendors (119 interviews)

Twenty enumerators were selected and trained on the purpose of the study and how to administer the questionnaires. A pre-test was run to familiarise with the questionnaires and comments were incorporated into the final questionnaire for the full survey.

The city was divided into 13 sections representing slum area, lower, middle and upper income classes. For lorry questionnaire, six entry points into the city were identified: Thika, Mombasa, Naivasha, Ngong, Kiambu, Gigiri and Kangundo Road.

Vendor, non-motorized and tally questionnaires did not pose problems in their administration. On the other hand enumerators administering lorry questionnaire had to liaise with depot owners to be introduced to the lorry/truck drivers.

4.2.1. Non Motorised transporters

Men and women are almost represented evenly across this sector of the business. The category is dominated by adults and the main modes of transport are either bicycle or wheelbarrow/cart for men, while women mainly transport back or head loads.

Charcoal represents in Nairobi the main fuel traded, followed by wood and logs. The source of fuel is for the majority either a depot vendor or lorry drivers. On the other hand women transporting firewood had mainly self collected the fuel from either Ngong or Karura forest (both forests belong to the government of Kenya); this despite the presidential ban on collection and movement of forestry products from government forests.

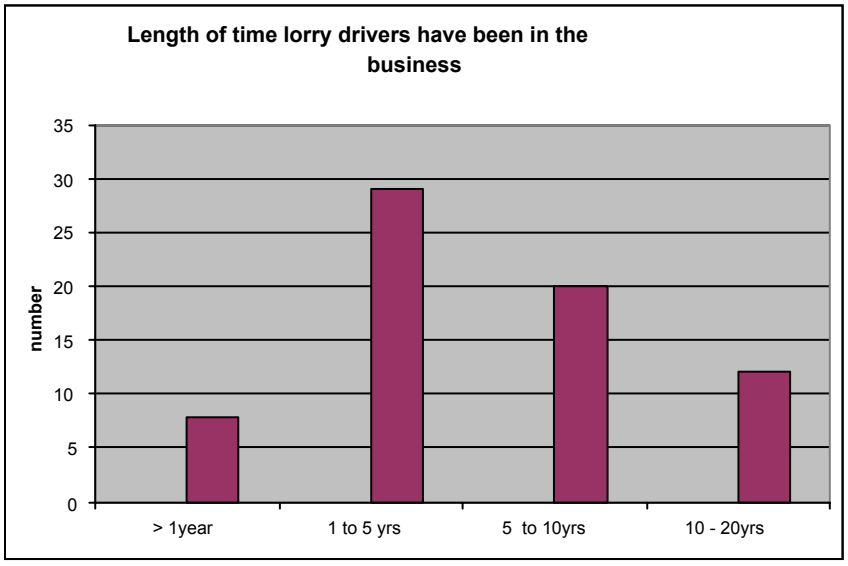
Non-motorised transporters supply charcoal to mostly households, followed by businesses and institutions. On the other hand most part of logs and BLT head-carried by women were destined to self-consumption. Twenty nine of the respondents were transporting charcoal for personal consumption, whilst 69 were transporting for sell.

4.2.2. Motorised transporters

All lorry drivers interviewed were males; the majority of them transported charcoal whilst only three transported wood in form of logs. Transporting charcoal is the main activity for the majority of drivers, although some transport charcoal opportunistically when their other main activities experience a transition period. About 20% of the drivers owned the charcoal, whilst the remaining had been hired to transport it. In these cases the charcoal either belonged to the employer, a charcoal dealer or a passenger within the vehicle.

Lorry drivers often deliver their fuel to several different vendor categories. They begin delivering to dedicated depot owner and wholesalers who buy in bulk; and if any of the charcoal remains, it is delivered to other vendors that buy in smaller quantities. On average lorry drivers carry an average of 250 to 350 bags.

Figure 1: Time spent in business – motorised transporters



New entrants to the business accounted for over 10 per cent (see Figure 1). 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.

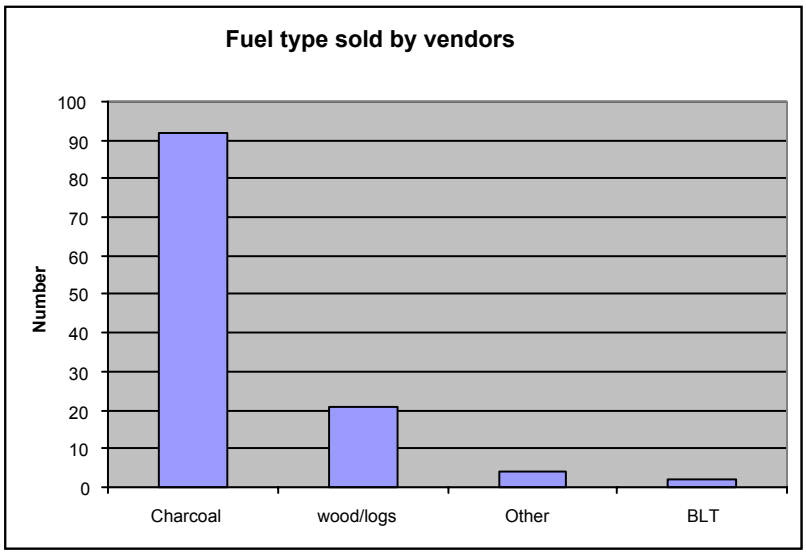
4.2.3. Vendors

The vendor questionnaire was administered to 119 charcoal and fuel-wood traders who operate in depots or wholesale stores, retail shops, kiosks, or as roadside sellers and door-to-door traders. Two thirds of the respondents were male (80 males, 39 females) and the majority (95%) were adults.

Dedicated vendors are those, mainly depot or wholesale traders, who sell only charcoal or firewood without trading anything else. This group of traders in Kenya often owns the premise or space where they work and have been in the business for a longer period of time than non dedicated vendors. Depots operators sell charcoal in large quantities, often in bags, and operated large-scale wholesale stores, which can store more than 50 bags of charcoal at any given time. This category usually has a good network of suppliers to rely on and has preferential customers to whom they sell. Another category of dedicated vendors is that of retailers. These mostly rent their space, and usually have stayed in business long enough to establish strong relationship with suppliers and customers. Among the suppliers, a few either occupy vending spaces illegally or have been temporarily allocated spaces by owners or the local authority without having to pay any rent.

Charcoal is the most commonly sold fuel in Nairobi. The graph below (Figure 2) shows the results of the survey (some respondents sell more than one type of fuel, this explains why the final sum of interviews is higher than 119):

Figure 2: Type of fuel sold by vendors



Charcoal is the preferred fuel because it is relatively smokeless compared to firewood, is easier to transport and the packaging is more appealing to most customers. Both institutions and households prefer using it, although it appears that Nairobi households' use of fuelwood is increasing. It was found that many open space vendors in the areas neighbouring slum areas sold firewood of various sizes (wood or branches and leaves).

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 outskirts of the city. In general people producing their own fuel do so for domestic consumption, nonetheless 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.

4.3. Vulnerability

The problems mentioned by traditional biomass fuel suppliers were classified for the purpose of analysis under three main categories, namely:

- institutional (relates to policy framework, legislative environment etc.);
- power (relates to relationship with police, local authorities, forestry department representatives etc.); and
- vulnerability (relates to any external factors over which suppliers have little control).

All respondents reported a multiple variety of problems that can be categorised as follow:

4.3.1. Non Motorised transporters

This category of supplier experience mostly problems associated with *vulnerability* i.e. market susceptible to fluctuations, competition, seasonal element, lack of alternatives, dealing with non solvent customers, lack of capital, exploitation by fuel vendors and charcoal of questionable quality.

4.3.2. Motorised transporters

Lorry drivers, on the other hand, encountered more of power related 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 caused 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.

4.3.3. 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 representatives, 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. Uganda

5.1. Description of biomass fuel business dynamics

5.1.1. Sources of fuel and supply mechanisms

Most of the fuelwood used in the urban areas, is produced from clearing for agricultural development and on-farm plantations on islands and main land near the towns. It is then transported to the urban areas by road (lorries, pick-ups) or boat. Trucks are usually owned by registered transporters. Pick-up owners are not necessarily registered transporters. Wood transporters tend to be more closely tied to promoters, although many transporters also search for their suppliers and move round a catchment area on average between 50 –100km. Most transporters hire out their vehicles.

Table 10: Kampala fuel wood inflows by carrier type (based on February 1995 inflow survey)

Carrier	Weight (t/y)	%Total
Dedicated Lorry	111,756	77
Dedicated Pickup	17,136	12
Dedicated Boat	6,666	5
Bicycle	3,005	2
All Others	6,780	6
Total	**145,342**	100

Nearly a third of Kampala's fuel wood comes from Luweero and northern Mpigi within 100–150 km radius from Kampala. However considerable amounts also come from the east and lake Victoria Islands within 50–75 km radius.

As for charcoal, Luweero, Nakasongola and Masindi districts produce a bulk of charcoal for Kampala market (this represents over half of Uganda's charcoal demand) with lesser amounts from Mpigi and Mukono districts. Table 11 below shows the provenience of charcoal sold in Kampala (and neighbouring towns).

Table 11: Markets for ten sites of charcoal production

Production Site	Markets in Uganda	Other Markets
Buvuma Island	Kampala/Jinia	
Mpigi	Kampala/Entebbe	
Mukono/Baale	Kampala/Entebbe/Jinja	
Nakasongola/Lwampaga	Kampala/Entebbe	
Luweero	Kampala/Entebbe	
Kamuli	Kampala/Jinja/Tororor	
Iganga	Kampala/Jinja/Tororor	Kenya Kisumu
Kiboga	Kampala	
Mubende	Kampala/Entebbe	

Source: Final Report - A Study of Woody Biomass derived Energy Supplies in Uganda

5.1.2. Markets and prices

In virtually all rural households, fuelwood is considered a free good. In urban areas it is difficult to identify a final price for firewood as bundles differ in weight from 2.5kg to 6kg and prices by weight can vary between UGS[‡] 100 and UGS 300 per kg in the market place. Each bundle contains 4 to 6 pieces. For bulk sales, a 10 tonnes lorry of fuelwood delivered in Kampala can be sold in between UGS 200,000 to 350,000, depending upon the supplier, the source of supply, the time of the year and the buyer.

With regards to charcoal, The weight of the Bags vary between 40kg and 60 kg and market prices in Kampala range between UGS 7,500–10,000; whereas in Jinja and Entebbe market prices range between UGS 5,500–7,000. Market prices for charcoal in smaller urban areas vary more considerably from UGS 3000 to UGS. 5,500.

5.1.3. Transporters

In Uganda biomass fuel transporters to Kampala and within the city borders include among the motorised: lorry, pickup trucks, boats; and within the non motorised category:

- Bicycles / Boda-Boda (motorbike taxis), rapidly becoming an acceptable means of transport of fuel for low income persons, and
- Head load although this means of transport does not feature significantly in Uganda's commercial wood fuel scene.

5.1.4. Vendors

Among the vendors the following categories are represented in Kampala:

- Large wholesalers / depots – Market based who represent bulk sellers of wood fuel;
- Market stall vendors;
- Kiosk / shop vendors;
- Door to door vendors;
- Side of the road traders.

5.2. Results of field surveys

In Uganda the following three categories of traditional fuels suppliers and marketers were interviewed:

- Motorised suppliers (64 interviews)
- Vendors (437 interviews)

In Uganda the survey was conducted at two different times, the first targeting the charcoal business, the second targeting the woodfuel one.

During the charcoal survey, a team of 19 enumerators covered 5 divisions in Kampala trying to identify the charcoal distribution patterns within and around the city, the different categories of charcoal vendors and to determine the number of persons engaged in charcoal trade in the city. The enumerators boarded a charcoal truck, interviewed its driver, mapped out his fuel supply itinerary and then administered the questionnaire to the vendors as each delivery was being made.

[‡] 100 UGS = 6 US cents

For the firewood vendors survey, a team of 5 enumerators who had previously participated in the transporters and vendors surveys was dedicated to study the location and characteristics of firewood vendors operating in the 5 different divisions of the city. An attempt at a complete census was made, therefore each enumerator was facilitated to hire a motorbike taxi (boda-boda) whose rider was familiar with the locations of all the firewood traders in each of the parishes. Each of these vendors was visited and interviewed.

5.2.1. Motorised transporters

Lorries are used to import both charcoal and firewood to Kampala and to mobilise the traditional fuel among vendors within the city. The majority of charcoal truck drivers 84% are employed by the truck owner, only 16% drive their own trucks. Most of the time individual charcoal wholesalers hire the trucks, while the rest of the time it is a group of wholesalers that jointly hires a truck. 78% of the truck drivers interviewed claimed that driving is the main activity, but only 42% of the transporters are dedicated to transporting charcoal, while all the rest switch to other goods whenever the opportunity arises. About 16% of the transporters reportedly engage in other activities such as other businesses and small-scale farming.

About 80% of the transporters ferried between more than 50 sacs of charcoal. The remaining 20% transported in between 20 to 50 bags. The majority of transporters argued that the volume of charcoal transported varies seasonally according to changing production levels and demand. A number of studies confirms that more charcoal is produced during the wet season. However, 71% of the transporters claimed that they transport more charcoal in the dry season. This situation reflects what occurs in Kenya. 77% of the transporters purchase their stock directly from charcoal burners while the rest deals with middlemen. The transported charcoal is sold mainly to depots, kiosks, markets and retailers. Rarely charcoal transporters make direct sales to individual consumers.

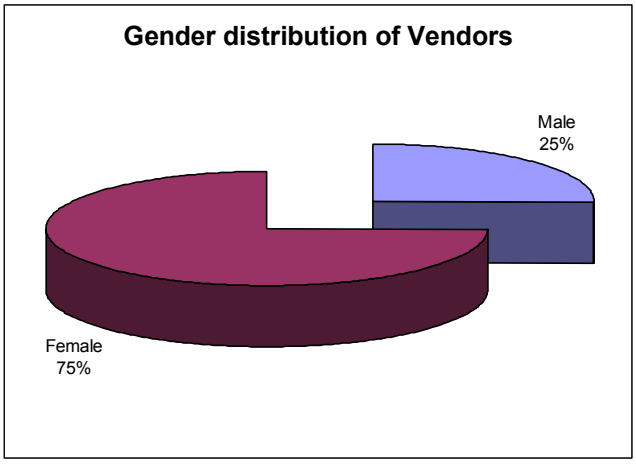
Non-dedicated lorries, pick-ups and bicycles contribute largely to transporting firewood for personal use and family distribution as opposed to selling purposes.

5.2.2. Vendors

- **Dedication and gender**

Charcoal vending is a female dominated activity. Women constitute 75% of the group as shown in Figure 3 below.

Fig 3: Gender distribution of vendors



The majority of vendors visited by the charcoal transporters are kiosk vendors (62%) and market stall vendors (23%), the rest are wholesalers. Although in smaller numbers compared to kiosks and market stalls, the wholesalers/deport owners handle about 75% of the stock. The kiosk and market stall owners at times buy a single sac of charcoal from the transporters, whereas it is common to find a single wholesaler offloading an entire truck. Transporters usually exact a premium for having to travel long distances along poorly maintained roads to supply small stockists.

It was found that 75% of the vendors sell wood fuel as main occupation. Among both dedicated and non dedicated vendors, it was found that the majority of women in the business trades in both charcoal and firewood, whereas men tend to be more specialised in one type of fuel. With regards to non dedicated vendors, the most common additional activity among the non-dedicated vendors is selling groceries and local foodstuff. Many others sell cooked food in eating houses/restaurants. People selling charcoal outside their small single-room retail shops is a common scene in Kampala. In the latter case trading in wood fuel is not the main activity, but helps supplement income.

- **Business characteristics**

In Kampala charcoal is the most commonly sold fuel. Almost 70% of charcoal vendors stock once a week or less frequently while just 27% of vendors stock daily or several times a week. The latter group normally purchases a single sac off the transporters. This reflects the financial capacity of the vendor. Save for the roadside vendors, who mostly deal with other vendors, most of the charcoal is sold to households (83%). This fact can be attributed to the frequency of purchase of households, which tend to purchase charcoal on a daily basis, and at times more than once day, and in small quantities. 68% of the vendors operate in rented facilities.

Across all vendor categories, save for the female wholesalers, the larger proportion of vendors has been in business for less than 2 years. The wood fuel trade has registered many new entrants in the past year or so, reflecting a growth in the sector.
Institutions, market vendors, and kiosk vendors have depot owners as their main suppliers. It was however noted that recently transporters do direct deliveries to all the categories of vendors. This reflects increased competition in the trade therefore increased consumption.

5.3. Vulnerability

The problems mentioned by traditional biomass fuel suppliers were classified for the purpose of analysis under three main categories, namely:

- institutional (relates to policy framework, legislative environment etc.);
- power (relates to relationship with police, local authorities, forestry department representatives etc.); and
- vulnerability (relates to any external factors over which suppliers have little control).

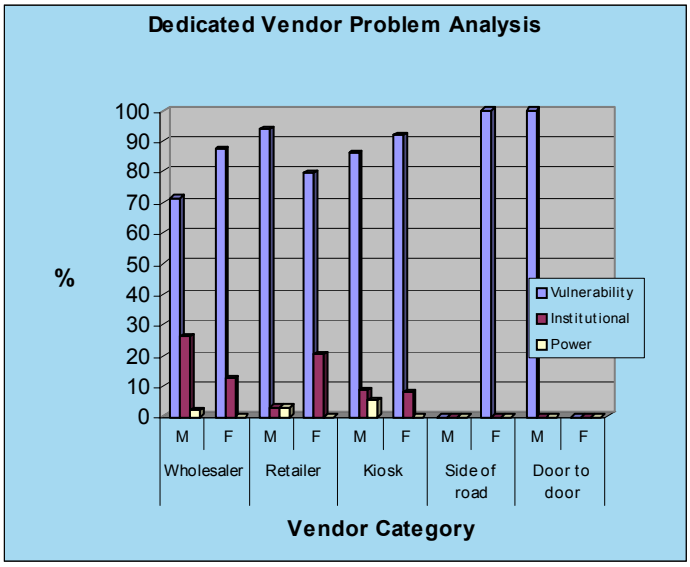
5.3.1. Motorised transporters

The majority of transporters reported problems associated relationship with authorities, notably extortion of bribes by authorities i.e. traffic police and local governments. This induces transporters of charcoal to travel mainly by night or in the early hours of the morning in order to avoid road blocks. Firewood transporters suffer less from harassment; this could be due to an historical association of charcoal with illegality and the need for licensing. High taxes levied too posed a major problem affecting incomes.

5.3.2. Vendors

The most common problems mentioned by fuelwood vendors included poor sales and therefore low profitability. Turnover too, constitutes a big problem. Low quality charcoal cuts into profitability; especially when close to 25% of the content of a sac is charcoal fines. In addition, the species of wood burned influences the density and quality of charcoal. The customers are quality sensitive and vendors suffer largely from this. The graph below (Figure 4) shows that problems linked to vulnerability in the business constituted the majority of responses from all categories of vendors.

Figure 4: Analysis of problems encountered by Ugandan vendors



ANNEX 1

Purpose of surveys: The project is NOT aiming at quantifying the business, the tally, short and universe questionnaires should give a qualitative view of suppliers involved in the traditional fuel business, paying particular attention to poverty indicators, in order to:

- characterise the sector of carriers involved in the supply and distribution of traditional fuels (charcoal, woodfuel, branches, twigs etc…) within the project boundaries, in terms of number, gender, and means of transport;
- characterise the sector of vendors involved in the sale of traditional fuels;
- characterise the nature of the traditional fuels business;
- assess the poverty/livelihood impacts on traditional fuel suppliers of fuel substitution and improved stoves.

Questionnaire type	Sample	Location	Purpose	Preparation / other notes
Inflow tally	Carriers of traditional fuels travelling into city	Main routes into town	To characterise fuel carriers. To identify categories in terms of: - gender (male - female) - means of transport used - type of fuel transported (fuel combination) - number of people engaged - any seasonal change….	• Identify the most important routes into Kampala, Nairobi and Addis, try to include some of the secondary roads as well – budget dependent; • Identify the most important days, e.g. market days, and have tally on these days and on non-market days as well for a representative sample; • Try to capture the seasonal variations – possibly do 1 day tally in a different season • Capture night inflow if important with one night tally
Non motorised carriers short questionnaire	Non-motorised carriers of traditional fuels travelling into city, during the tallies. Non-motorised carriers connecting depots to markets and customers.	Routes into town and within different parts of town	to define CARRIERS in terms of: - age - gender - destination (where the fuel will finally be sold) - quantity carried - source of fuel & dynamics of supply - customers and their location - fuel combination - carrier main occupation - time of engagement in business - frequency of fuel carrying - to map out location of vendors	• Carry out the short interviews on a random stratified sample of non-vehicle fuel carriers, trying to profile as many categories as possible;

Lorry questionnaire	Motorised vehicle drivers/owners	In lorries, pick ups…	To identify the location of depots and customers as well as to define: - drop off points - customers - quantities sold - ownership of vehicles - driver main occupation - membership to some association - frequency of fuel carrying to map out the spatial aspects of supply (i.e. where the markets are)	• The enumerator to go on the lorry; • Verify whether this is feasible during the test phase;
Vendors short questionnaire	Vendors	on lorry route and in town	To gain an overview knowledge of the nature of the business. To characterise VENDORS in terms of: - vending location - customers - quantities sold - supplier - frequency of supply - costs - gender - age - other income - historical business trends - future trends	• At the drop off points, while the driver is downloading, brief interview to the vendors (kiosk owners, retailers….) • In market places and on the road
Detailed vendors and carriers questionnaire	To the identified vulnerable categories of vendors and carriers	On route and at sale points	To give indication of the livelihood and to identify the targets for the case studies. To characterise SUPPLIERS in terms of: - Level of dedication - Security of business - Vulnerability context - Adaptation strategies to risk (competitions, problems…) - Livelihood assets and access to capital - Institutional structures and processes - Historical trends	• The questionnaire will explore the livelihood of traditional fuel suppliers • Sample size decided according to vulnerability as identified in short questionnaires - ratio 1:2:3=least vulnerable: vulnerable: more vulnerable

Key informants	To people who left the business and those who have been in business for a long time To authorities (e.g.: forestry authority etc.)	By telephone or using focus groups methods	To gather information about - Tax and licences required to be in business - To identify any clear impact of fuel substitution policies on traditional fuel business - To identify any coping strategies with business changes - To clarify any issue arising from the short questionnaires	
Suppliers case studies	To identified most vulnerable carriers and vendors		To characterise the poverty impacts of fuel substitution on traditional fuel suppliers	• Define how many case studies need to be done.
Consumers case studies and questionnaires	To identified classes of HH: low middle and high income	Purpose sampling to segment of the HH consumers	To characterise CONSUMERS in terms of: - Fuel used for HH consumption - Impacts of fuel substitution on HH	

Notes
1. Uniformity of questionnaires across all 3 countries.