



Informal urban fuelwood markets in South Africa in the context of socio-economic change

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ABSTRACT

In developing countries, fuelwood is important to livelihoods and energy security because it is used for heating, cooking and can provide additional income to households through trade. The global trade in fuelwood is valued between USD 4–26 billion per annum. In South Africa, fuelwood is a widely used domestic energy source; but how that has changed with rapid urbanisation and socio-economic development over the last two decades is unknown. This study examined the presence and nature of urban fuelwood markets in 39 urban areas of the Eastern Cape and Limpopo provinces. Data were collected from 170 informal fuelwood sellers regarding the prevalence, structure, characteristics, and changes over time of the informal fuelwood markets. Over 80% of the sampled towns had an informal fuelwood market and there was a positive relationship between the number of sellers and town population size. For most sellers, the fuelwood trade was their primary occupation and the income earned was supplemented by government social grants. Sellers earned, on average, over US\$9 per day. These results show that despite rapid urbanisation and socio-economic development, fuelwood remains an important domestic fuel in towns and cities of South Africa, and an income source for the urban poor.

1. Introduction

Fuelwood is the oldest energy resource used and the majority of the world's energy was supplied by biomass up until the 19th century. A decade ago the FAO (Food and Agriculture Organisation, 2007) estimated that globally 3.3 billion m³ of fuelwood are harvested annually and that approximately 73% of Africa's urban population relied on fuelwood as their primary energy source (Bailis et al., 2007). The International Energy Agency (IEA, 2004) estimated that in sub-Saharan Africa, the number of people reliant on fuelwood as an energy resource would increase from 575 million people in 2004 to 918 million by 2030. With increasing economic development, the demand for energy also increases which is usually associated with consumers using a broader range of energy forms (Sander et al., 2011). Twenty years ago it was estimated by Williams and Eberhard (1996) that 13 million m³ of fuelwood was used annually in South Africa. Since then, the population has grown from 42 million to 56 million people, along with an increase in urbanisation and socio-economic development (StatsSA, 2011). For example, South Africa had the world's largest national housing development programme in the first decade of the 21st century, providing over four million units (Hendler, 2010), whilst simultaneously more than doubling the proportion of households with electricity (Bekker et al., 2008). Yet the implications of these large, national changes for

fuelwood demand and preferences have never been examined. Any reliance on fuelwood is overlooked in national policy because it is regarded as an inferior energy source for domestic use (Williams and Shackleton, 2002; Shackleton et al., 2007a), and consequently there are no programmes to promote urban fuelwood supply or sustainability, an issue similarly overlooked in many other developing countries (Soussan et al., 1990)

Use of fuelwood is not solely by rural households. There is widespread use of fuelwood or charcoal by urban populations throughout sub-Saharan Africa, including southern Africa. For example, Schlesinger et al. (2015) found that 69% of households surveyed in six towns in five countries regularly used fuelwood, ranging from 30% in Queenstown (South Africa) to over 90% in Bamenda (Cameroon). In the Democratic Republic of Congo, 87% of households in the capital city, Kinshasa, use fuelwood, being slightly less than in Kisangani, where it is 95% (Schure et al., 2014). In South Africa, Kaoma and Shackleton (2014) reported that just under half of all households in the poorer suburbs of three mid-sized towns collected fuelwood from their own plots and open lands in and on the periphery of the town. They calculated that such self-collection saved user households approximately US\$504 per year (Kaoma and Shackleton, 2015). Over two decades ago, Soussan et al. (1990) presented findings from several countries showing that fuelwood use was higher among poorer urban households than wealthier ones.

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In towns and cities of the developing world, fuelwood is important not only for domestic energy but also for the income earned by those involved in its harvesting, distribution and sale (Dasappa, 2011; Baker et al., 2014; Atyi et al., 2016). The IEA (2004) stated that informal fuelwood markets employ a significant workforce providing a regular income to hundreds of thousands of people across sub-Saharan African countries. In many regions, predominantly in urban ones, the distance to wood stocks has increased as wooded lands are converted to infrastructure (Schlesinger et al., 2015), catalysing the creation of fuelwood markets to supply the demand (Kituyi, 2004; Madubansi and Shackleton, 2006; Atyi et al., 2016). With the high populations of urban poor in South and southern Africa the need to meet necessities has underpinned a large informal sector in fuelwood sales (Shackleton et al., 2006; Schure et al., 2014; Atyi et al., 2016). However, the number of people involved in the informal fuelwood sector in South Africa and the financial benefits accruing are unknown. Indeed, profiles of urban fuelwood use, sources and markets are dated and have hardly been considered since the democratic transition that ushered in significant socio-economic changes in the country. This included massive investments in the provision of housing and electricity to millions of citizens previously without, as well as marked increases in mean household incomes, all of which would suggest decreased reliance on fuelwood as a significant domestic energy source. However, unemployment has remained stubbornly high (> 25%) and therefore many households earn cash incomes from government social grants or by participating in the informal sector, including fuelwood sales. It is estimated that the informal sector generally contributes approximately 7–12% of South Africa's economy (Braude, 2005). The informal sector is defined as cash income generating activities by a single individual or one that employs fewer than five employees, who do not deduct tax from their salaries, and employers, workers, and persons helping the unemployed in their households or businesses who aren't registered for either income tax or value added tax (StatsSA, 2015).

Where there is a market, it is useful to know who are the actors involved and the varying steps from production to sale; this is known as a market- or value-chain analysis (Te Velde et al., 2006; Belcher and Schreckenber, 2007). Analysis of fuelwood market chains reveals the economic flow between actors, making it possible to gauge and interpret the importance of fuelwood to the economy, and its contribution to job creation and income (Sepp and Mann, 2009). It also reveals potential bottlenecks or disproportionate capture of value at specific points along the chain. Market chain analysis considers the type and number of actors, the length of the chain, value addition activities and the distribution of value along the chain (Belcher and Schreckenber, 2007; Bolwig et al., 2011). In comparison to the market chains for other natural products, urban fuelwood market chains tend to be short because there is little or no value addition along the chain. For example, in Cameroon, most sales are from collector direct to the consumer, although at times there is need for a transporter, who may be the same person as the collector (Atyi et al., 2016). In some markets there is splitting of the wood into different sizes, and in some regions a preference for charcoal rather than fuelwood (Atyi et al., 2016). A similarly short value-chain was reported by Shackleton et al. (2006) for one city in South Africa.

Despite widespread use of fuelwood in South Africa (Shackleton et al., 2007b; Chirwa et al., 2010; Matsika et al., 2013; Uhunamure et al., 2017) and increasing urbanisation there has never been any systematic study of the prevalence of urban fuelwood markets, the numbers of people involved, and the trends in this regard. Most of the few studies on urban use of fuelwood are over two decades old (Williams and Eberhard, 1996) and hence more or less pre-date the substantial changes in urbanisation, housing, electricity provision and household incomes since the mid-1990s. This means that Africa's largest economy has very little understanding of urban fuelwood supply and use dynamics, and the implications for urban household energy security, poverty alleviation and environmental integrity. Within this

Table 1
General characteristics of the Eastern Cape and Limpopo provinces, South Africa (StatsSA, 2015).

	Eastern Cape	Limpopo
Area (km ²)	168 966	125 755
% Wooded biomes	26.0	96.4
Population	6 562 053	5 404 868
% Urban	36.6	70.0
% Poverty level	35.7	48.5
% Adult illiteracy level	10.5	17.3
% Unemployment	42.5	48.8

context, the aim of this study was to assess the prevalence and characterise the nature of the informal, urban fuelwood markets within South African towns. This included assessing the structure of the value chain, the actors involved, the benefits they received and the perceived changes within the fuelwood markets over the last decade.

2. Methods

2.1. Study Area

This study was conducted in the Eastern Cape and Limpopo provinces in South Africa (Table 1). These are the two the poorest provinces in the country (Wills, 2009), which we assumed would make the informal sector more visible. Imprecise estimates suggest that approximately 306 000 people in the Eastern Cape and 340 000 people in Limpopo Province are involved in the non-agricultural, informal sector (StatsSA, 2015). Most (96%) of the Limpopo Province is situated in the savanna biome and is extensively wooded, which may make the use of and trade in fuelwood easier, in contrast to the Eastern Cape which is largely grassland, with only 26% being either forest, savanna or thicket (Mucina and Rutherford, 2006).

2.2. Data Collection

The sampling design followed that of Chishaleshale et al. (2015). Firstly, the two poorest provinces were selected. Secondly, within both of these provinces three district municipalities were randomly selected and, thirdly, within each of these, three local municipalities were randomly selected. In the nine local municipalities in each province, all urban centres (39 in total) were visited and fuelwood markets assessed. Interviews were conducted with all informal fuelwood sellers (170) encountered and willing to be interviewed. The fuelwood sellers were found by snowball sampling from other fuelwood sellers and locals in the area. Sampling within a specific town ceased when references to other sellers to interview started to include people already interviewed. However, a large number declined to be interviewed because they were concerned that they would get into trouble with the authorities. Additionally, some were reluctant to provide information on other fuelwood sellers in the area because they thought they might lose business. Thus, whilst we did not interview all sellers in all the towns, adopting a snowball approach until saturation suggests that we did get the majority.

Each interview took between 20 and 45 min and was conducted in either isiXhosa or English in the Eastern Cape province and Northern Sotho, Tsonga or English in the Limpopo Province. Interviews covered three sections; one dealing with the details of their fuelwood trading activities (amounts of fuelwood sold, location, price, customer base), the second considered their sentiments about the trade and how it had changed over the last decade, and the last captured the characteristics of the respondent (age, gender, education). The amount of fuelwood sold per week was converted to kilogrammes by weighing a sample of traded units, such as bundles or wheel-barrow loads.

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