Research Report 11/2

Affordability and Expenditure Patterns for Electricity and Kerosene in Urban Households in Tanzania

By Emmanuel Maliti
and Raymond Mnenwa

RESEARCH ON POVERTY
ALLEVIATION

Affordability and Expenditure Patterns for Electricity and Kerosene in Urban Households in Tanzania

By Emmanuel Maliti
and Raymond Mnenwa

Research Report 11/2

Published for: Research on Poverty Alleviation (REPOA)
P.O. Box 33223, Dar es Salaam, Tanzania
157 Mgombani Street, Regent Estate
Tel: +255(0) (22) 2700083 / 2772556
Fax: +255(0) (22) 2775738
Email: repoa@repoa.or.tz
Website: www.repoa.or.tz

Design: Total Identity Ltd.

Suggested Citation:
Emmanuel Maliti and Raymond Mnenwa, *'Affordability and Expenditure Patterns for Electricity and Kerosene in Urban Households in Tanzania'*

Research Report 11/2, Dar es Salaam, REPOA

Suggested Keywords:
Energy expenditure, electricity, household, kerosene, energy, affordability

ISBN: 978-9987-615-63-6

This Paper is dedicated to the late
Dr. Raymond Mnenwa whose contribution to
this paper was invaluable.

May His Soul Rest in Eternal Peace,
Amen

Table of Contents

List of Tables

List of Figures

List of Abbreviations

CIF	Cost, insurance and freight
EWURA	Energy and Water Utilities Regulatory Authority
HBS	Household Budget Survey
kWh	Kilowatt hour
LPG	Liquefied petroleum gas
NBS	National Bureau of Statistics
TANESCO	Tanzania Electric Supply Company
TShs	Tanzanian shillings
UNDP	United Nations Development Programme
URT	United Republic of Tanzania

Acknowledgements

We take this opportunity to recognise the efforts of various institutions and individuals who contributed to this work. Special thanks are due to the National Bureau of Statistics (NBS) for providing access to the Household Budget Survey (HBS) 2007 database. Our appreciation is also extended to REPOA for their financial support without which this research would not have been possible.

Emmanuel Maliti and Raymond Mnenwa

Abstract

Using data from the Household Budget Survey 2007, this study examines two main issues: i) the affordability of kerosene, liquefied petroleum gas (LPG) and electricity to poor urban households, i.e., households below the basic needs poverty line; and ii) energy expenditure patterns in poor and non-poor urban households in Tanzania.

Results indicate that kerosene is affordable but electricity is far too expensive for poor urban households. Based on estimates of the upfront costs of accessing different energy sources, the cost of electricity is found to be 1.2 times the cost of using LPG and 16 times the cost of using kerosene. Data on household expenditure patterns show that charcoal is the single most important source of energy in urban areas not only for poor households but also for non-poor households. Electricity accounts for the lowest share of the household energy budget, with households spending the minimum on electricity while spending more on cheaper sources of energy such as charcoal.

Furthermore, poor and non-poor households expend a similar proportion of their total income on energy needs, hence refuting the hypothesis that poor households spend a relatively larger percentage of their income on energy compared to well-off households. Evidence also indicates that as income increases, households shift to efficient sources of energy such as electricity. However, they still adopt a "mixing" strategy by maintaining charcoal as their primary source of energy for cooking, leading to wide volatility in household energy expenditures. Significant regional disparities exist for firewood and electricity, but less so in the case of charcoal. Households' dependence on charcoal in Dar es Salaam is similar to other regions.

1 Introduction

Can the urban poor afford the cost of using electricity and kerosene? This question has been consistently raised; primarily in the political arena, unfortunately less so in the academic domain. The prominence of the issue of energy affordability comes from three major factors. First and foremost is the persistent crisis in the affordability of kerosene and electricity (which are referred to in the literature as *modern sources of energy*[1]). Secondly, there is ongoing environmental concern resulting from the continued widespread dependence of households on biomass sources of energy, especially wood and charcoal. Thirdly, in recent years, there has been growing public dissatisfaction with the management of the energy sector in Tanzania coupled with the Tanzania Electric Supply Company (TANESCO), the principal supplier of power in the country, resorting to price hikes as the primary approach to bridge the gap between the company's operating costs and revenue, which has further limited the possibility for poor households to access electricity. As the African Economic Outlook 2003/04 report observed, the absence of modern sources of energy at reasonable prices is a serious poverty trap in Africa (African Development Bank (AfDB) & OECD, 2003). All of these factors have fuelled intense debate in recent years on the extent to which households in developing countries such as Tanzania can afford modern sources of energy.

In most African countries rapid urbanisation entails changes in economic and social structures and these, in turn, alter patterns of energy use in terms of amount and type (Hiemstra-van der Horst & Hovorka, 2008). For instance, the 2009 Human Development Report stresses that the proportion of urban population in Tanzania will reach 26.4 percent in 2010 compared to 18.9 percent recorded in 1990 (United Nations Development Programme (UNDP), 2009)[2]. There are several implications of this trend, one of them being the affordability of electricity and kerosene for poor and non-poor urban households. Energy is crucial in satisfying basic needs; therefore, the development process depends on the accessibility and affordability of appropriate energy services. Poverty has a direct correlation with the types and quantity of energy used, and on the extent to which a population can afford energy services (Karekezi & Majoro, 2008). Therefore, affordability becomes an unavoidable issue for public policy, particularly in light of the large differences in household incomes in urban areas.

Energy expenditure patterns also highlight whether higher economic growth, which Tanzania has experienced since 2000, supports a shift from non-modern biomass sources of energy to technologically efficient sources of energy. According to the energy transition theory, as an economy grows, households will increasingly substitute biomass sources of energy with kerosene and electricity. In particular, the transition theory stresses that increasing income coupled with the availability of kerosene, electricity and LPG will result in the substitution of charcoal and firewood as primary sources of energy.

Using data from the Household Budget Survey 2007 (URT, 2007), this study examines two main issues: i) the affordability of kerosene, LPG and electricity for poor urban households; and ii) energy expenditure patterns in urban Tanzania. In doing so, the research assesses whether the

1 Most of the literature considers modern sources of energy to include kerosene, liquefied petroleum gas and electricity, for example, Meikle & Bannister (2002) and the World Energy Council (WEC) (1999). They are referred to as modern sources because they are characterised by increased technological efficiency, decreased carbon dioxide emissions and less particles (hence less burden of disease), increased capital costs, time saving (easy to transport), and limited undesirable effects on indoor air quality and efficiency. As consumers climb the energy ladder, kerosene is usually the first modern source of energy to be used, because it is more easily transported and stored than gas.

2 Caution should be taken when discussing the "cause" of urbanisation in Tanzania, specifically with reference to migration. According to World Bank (2007), urban areas in Tanzania are growing but not primarily because of rural-to-urban migration. From 1988 to 2001, migration in Mainland Tanzania only contributed a net 17 percent of urban population growth, against an estimated 25 percent for Africa during the 1980s and 1990s. At the same time migration is more important in peri-urban areas than urban. Two movements are driving population growth in peri-urban areas – inward from rural areas and outward from urban areas.

theory of energy transition holds in Tanzania. To the authors' knowledge, this is the first study to utilise a nationally representative survey to assess household energy expenditure patterns in Tanzania and to what extent modern sources of energy are affordable to urban poor households.

The study is guided by three main research questions:

i) Can poor households in urban areas afford modern sources of energy, i.e., kerosene, LPG and electricity?

ii) What are the main patterns of energy expenditure within urban households?

iii) Do we see any shift to electricity and kerosene from the traditional inconvenient sources of energy?

To answer these questions, the research follows the methodological approach of Kebede, Bekeleb and Kedirc (2002). Two hypotheses are made: i) the purchasing power of the poor is not sufficient to cover the cost of accessing modern sources of energy; and ii) household income is positively correlated with the consumption of modern sources of energy.

The report is structured as follows: Section 2 reviews literature pertinent to the study; Section 3 describes the methodology; Section 4 presents the research results; and Section 5 discusses policy implications arising from the findings.

2 Literature Review

2.1 Theoretical background and empirical testing

Theoretical literature on household energy usage has been dominated by transition theory under which households gradually ascend an "energy ladder." The ladder begins with traditional biomass energy sources (firewood and charcoal), and, as income increases, moves upwards to commercial energy sources (kerosene and LPG), and ends with electricity. Modern sources of energy are perceived to be normal goods while traditional sources of energy are inferior goods (Hosier & Kipondya, 1993). The ascent of this ladder, though not fully understood, is thought to be associated with rising income and increasing urbanisation (Vivien, 2000). Households normally rank biomass energy at the bottom and electricity at the top based on physical characteristics such as cleanliness, ease of use, cooking speed and efficiency (Akabah, 1990; Eberhard, Dickson & Pouris, 1989; Hosier et al., 1993; Leach, 1988, 1992). While these preferences are assumed to be "non-economic" (Leach, 1988, 1992), energy-switching behaviour is seen to be regulated by household income relative to the costs of various energy sources and their appliances (Hiemstra-van der Horst et al., 2008). Hence, climbing "up the ladder" to more ideal forms of energy is "automatic" as income increases, or "down the ladder" as income decreases (Akabah, 1990; Arnold, Kohlin & Pearson, 2006; Campbell, Vermeulen, Mangono & Mabugu, 2003; Dang, 1993; Eberhard et al., 1989; Hosier and Dowd, 1987; Hosier et al., 1993; Karekezi & Majoro, 2002; Martins, 2005; Marufu, Ludwig, Andrae, Meixner & Helas, 1997)[3].

In support of the transition theory, cross-country studies have revealed a positive correlation between rising income and increasing use of modern sources of energy (Hosier & Dowd, 1987), and research in Asia confirmed that urbanisation and economic development were improving usage of modern sources of energy (Leach & Mearns, 1988). Consistent with these findings, Leach (1992) shows that replacing traditional biomass energy in Sub-Saharan Africa is a basic feature of economic growth. However, some empirical studies have found the reality to be more complex than what is suggested by transition theory. While Hiemstra-van der Horst et al. (2008) found that transition theory ignored energy-use patterns at lower levels of aggregation, that study wrongly dismissed the importance of structural factors such as relative energy prices. Barnes and Qian (1992) as well as Hosier and Kipondya (1993) found that households tend to rely on a range of energy sources that typically encompass at least two steps on the energy ladder. There are several possible explanations for this behavior. First, unreliable supplies may require households to rely on diverse sources of energy. Secondly, different energy sources are more cost-effective for some uses than others, for instance it may make economic sense to use electricity for lighting but charcoal for cooking (Barnes et al., 1992; Hosier et al., 1993).

2.2 Energy studies in Tanzania

Knowledge of urban energy use in Tanzania is of growing importance due to the country's rapid urbanisation (UNDP, 2009) in conjunction with the increasing scarcity and cost of traditional biomass energy sources (Hosier et al., 1993). However, research on household energy expenditure patterns and affordability in Tanzania has been limited. Furthermore, the existing literature is old, and may not reflect changes in energy use that have taken in recent years. Available data indicate that the household sector is the largest energy-consuming sector in Tanzania, accounting for nearly 80 percent of Tanzania's total final energy consumption (Hosier et al., 1993). In comparison, the industrial sector consumes the largest percentage of electricity (Mwandosya and Luhanga, 1985). Biomass energy in the form of firewood and charcoal is the main source of energy in rural households with firewood dominating the overall national energy balance (Hosier, 1993). For example, 90 percent of energy requirements of Kigoma inhabitants

3 Mainly obtained from Hiemstra-van der Horst et al., 2008

is derived from traditional non-commercial energy sources, including firewood, charcoal, grass and animal manure (Fergus, 1983). Firewood is generally preferred in rural areas mainly because it is free, while charcoal is preferred in urban areas due to its ease of transportation, distribution and storage (Mwandosya & Luhanga, 1993). Charcoal is not only the dominant energy source, but also the "stable" principal energy source for households in urban areas (Hosier et al., 1993). However, it important to note that it is very rare to find a household dependent on a single energy source, for example, electricity or kerosene alone (Hosier et al., 1993)[4].

Data to date indicate that household energy consumption responds to price[5] and local availability (Hosier et al., 1993). Hence in both the short and medium terms the dynamics of energy demand might be more influenced by price and availability rather than a natural process of climbing the "ladder" as income increases. However, data in Hosier et al. (1993) validate the energy ladder hypothesis in Tanzania. A "significant" shift is found to have taken place in Tanzania towards kerosene (both in terms of quantity and number of users) away from firewood and while the proportion of households using electricity has remained the same, the quantity consumed has increased. In particular, 95 percent of households in the lowest income category use kerosene and this percentage decreases with increases in income. However, for the highest income group, the average quantity of kerosene used first increases as income rises, but then decreases with higher levels of income (Hosier et al., 1993).

2.3 Energy studies in other developing countries

Consistent with evidence from Tanzania, Ouedraogo (2005) found firewood to be a "transitional source of energy" in Burkina Faso. Firewood was also the preferred source of energy for most urban Burkinabe households. In contrast, most urban households in Tanzania prefer charcoal. Similar to Tanzania, access to modern sources of energy in Burkina Faso is mainly constrained by income and accessibility.

Empirical studies have commonly concluded that lower income groups in Sub-Saharan Africa pay a much higher proportion of income to meet their energy needs compared to higher income groups; the use of modern energy sources by the poor being hampered by up-front costs, e.g., costs of connection to grid electricity (Karekezi et al., 2002; Karekezi et al., 2008; Global Network on Energy for Sustainable Development (GNESD), 2008)[6]. Evidence also shows that poor households typically use different types of energy for different purposes. For example, kerosene followed by electricity are the most commonly used energy sources for lighting in Kenya's Kabera slum, while kerosene is the predominant energy source for cooking followed by charcoal (Karekezi et al., 2008).

4 For an overview of patterns of energy use, see Mwandosya & Luhanga, 1985; for policy, institutional and strategic issues, see Mwandosya and Luhanga, 1993; and for future energy development in Tanzania see Hosier et al. (1993).

5 As discussed by Hiemstra-van der Horst et al. (2008), the role of relative price has been a subject of intense debate. Some studies have shown price as a limiting factor on the movement up the energy ladder; others have indicated that the ability of price to limit energy usage is only relevant along with other factors such as availability. Yet other studies have considered income as the most important factor rather than price volatility. However, the dominant underlying position has been that price differentials serve not to influence consumer preferences or active decision making but to reduce the range of affordable choices, preventing the poor from using "more 'decent' sources of fuel supply like LPG, biogas, kerosene, etc." (Akabah (1990) quoted in Hiemstra-van der Horst et al., 2008).

6 For a general overview of the energy sector in Africa see, for example, Karekezi (2002) and GNESD (2008).

Karekezi et al., (2002) and International Council for Science (ICSU) (2007) both provided a regional perspective by consolidating findings from various country-level studies in Africa. Some of the common characteristics of energy consumption in urban areas in Africa were as follows:

a) Per capita energy consumption in urban areas is much higher than in rural areas.

b) As major consumers of energy, urban areas either directly or indirectly contribute to energy-related environmental problems, for instance, indoor and ambient air pollution. Some of these environmental problems are specific to urban areas, for instance transport-related emissions.

c) The urban energy-consumption spectrum ranges from energy-intensive industries (formal sector) to low-income households with low-to-medium energy-consumption levels (informal sector). Furthermore, regional disparities in Africa in terms of households' energy characteristics are large. Access to electricity in Sub-Saharan Africa is low; only 53 percent and 8 percent of urban and rural households, respectively, have access to power compared with 99 percent and 88 percent of urban and rural households, respectively, in northern Africa (ICSU, 2007).

Though understanding regional disparities assists in formulating regional and international developmental policies, country-level studies such as this one are vital in revealing variations and diversity in energy usage to inform national policies.

This review of literature indicates the significance of the current study in adding to existing knowledge on energy usage in Tanzania. First, no study to date has utilised a nationally representative survey to assess household energy expenditure patterns in Tanzania and the extent to which modern sources of energy are affordable to poor urban households. Secondly, Tanzania has registered GDP growth between six and eight percent per annum since 2001 coupled with a marginal decrease in income poverty as evidenced by HBS 2007. While existing literature on household energy demand generally substantiates the transition of households to more modern energy sources as income increases, it is important to assess whether Tanzania's recent growth experience has been coupled with households switching towards more efficient sources of energy. The last study to focus on this topic – Hosier et al. (1993) – was undertaken 17 years ago, did not use a nationally representative data, and was conducted within a starkly different macroeconomic environment. The availability of HBS 2007 with disaggregated data for urban areas presents a valuable opportunity to examine recent trends in energy usage in Tanzania.

3 Regulation of the Energy Sector in Tanzania

3.0 Regulation of the energy sector in Tanzania

The Energy and Water Utilities Regulatory Authority (EWURA) is the principal regulator of the energy sector in Tanzania, responsible for the technical and economic regulation of the electricity, petroleum, natural gas and water sectors in Tanzania. It is an autonomous multi-sectoral regulatory authority established by the Energy and Water Utilities Regulatory Authority Act, Cap. 414. EWURA's powers also emanate from sector legislation. The principal laws relevant to EWURA by sector are as follows:

- in the electricity sector, the Electricity Act, Cap. 131;
- in the petroleum sector, the Petroleum (Conservation) Act, Cap. 392;
- in the water and sewerage sectors, the Water (Utilisation and Control) Act, Cap. 331, the Waterworks Act, Cap. 272 and the Dar es Salaam Water Supply and Sewerage Authority Act, Cap. 273; and
- in the natural gas sector, some of the regulated activities are governed by the Petroleum (Exploration and Production) Act, Cap. 328. The Ministry of Energy and Minerals is currently drafting the Gas Supply Bill to split the roles of EWURA from those of the sector ministry.

The functions of EWURA include licensing, tariff review, performance monitoring, and standards with regards to quality, safety, health and environment. It is also responsible for:

i) promoting effective competition and economic efficiency;

ii) safeguarding the interests of consumers;

iii protecting the financial viability of efficient suppliers;

iv) promoting the availability of regulated services to all consumers including low income, rural and disadvantaged consumers;

v) preserving the environment;

vi) enhancing public knowledge, awareness and understanding of the regulated sectors (including the rights and obligations of consumers and regulated suppliers, and the ways in which complaints and disputes may be initiated and resolved), as well as the Authority's duties, functions and activities.

4 Data and Methodology

4.1 Data

This study uses household data from the 2007 Household Budget Survey. The survey was undertaken between January and December 2007 in all 21 regions of Mainland Tanzania. A total of 10,466 households were sampled. The HBS database provides disaggregated data for Dar es Salaam region, other urban areas and rural areas. Information was collected on the following areas:

a) Household members' education, economic activities, and health status;

b) Household expenditure, consumption and income;

c) Ownership of consumer goods and assets;

d) Housing structure and materials;

e) Distance to services and facilities; and

f) Food security.

For this research, HBS data were extracted on household recurrent expenditure on kerosene, LPG and electricity as well as expenditure on appliances (fixed costs). The HBS database also provides information that can be used to compute the energy purchasing power for each household. Retail prices for electricity and kerosene were obtained from TANESCO and EWURA, while information on the lifespan of appliances (in order to compute annualised depreciation figures) were sourced from interviews with experts and from independent reviews available on the internet. The prices of appliances were obtained through a small survey of retail shops. The prices obtained were adjusted for inflation in order to approximate the actual prices prevailing in 2007.

With respect to household income, the HBS 2007 database classifies all households as poor or non-poor with reference to the basic needs poverty line. The basic needs poverty line, which is based on consumption per adult equivalent for 28 days, was set at TShs 13,998. Hence, poor households are those with per capita income less than the poverty line; non-poor households are those with per capita income above the poverty line.

The researchers encountered two data limitations. First, the analysis of LPG usage in poor households had to be dropped as no households below the poverty line used LPG. Secondly, Kebede et al. (2002) also examined the use of sawdust and dung cakes. However, the HBS 2007 dataset does not include data on these two energy sources. Hence, the current analysis of household energy expenditure patterns concentrates only on kerosene, LPG, electricity, firewood and charcoal.

4.2 Methods

4.2.1 Affordability of modern sources of energy

Following the methodology by Kebede et al. (2002), the affordability of modern sources of energy was assessed by comparing the costs of accessing electricity, LPG and kerosene against the energy purchasing power of poor households.

4.2.1.1 Cost of kerosene, LPG and electricity

To estimate the total cost of electricity and kerosene, recurrent energy costs – i.e., litres of kerosene[7] or kilowatt hours (kWh) of electricity consumed by a household multiplied by the price per litre or kWh – were added to the fixed costs of energy usage. Two costing methods were used to calculate the fixed costs. The first method is based on the upfront costs incurred by households to access kerosene, LPG and electricity, i.e., the expenditure required to purchase the fixed components necessary for using kerosene and/or electricity, for example, an electric stove, light bulbs, internal wiring and electricity (LUKU[8]) meter. Under this first method the full cost of appliances is calculated without considering depreciation.

The second costing approach applies an annualised method of depreciation to estimate the cost of fixed components. This second approach, therefore, considers the cost that arises from having capital tied up in an appliance, regardless of whether a household uses the appliance or not. The value lost each year should thus include not only the annual depreciation cost but also the interest foregone on the capital that could otherwise have been invested. With the annualisation method, the total amount of interest foregone is averaged over the life of the asset, so that the resulting figure is the same from year to year. The annualisation factor is thus given as:

$$a(r,n) = \frac{\left[r(1+r)^{n}\right]}{\left[(1+r)^{n} - 1\right]}$$

Where:

a (r, n) = Annualisation factor
r = prevailing rate of interest
n = usable life of capital asset

The figure used for annualised depreciation involves multiplying the purchase price of each appliance by an annualisation factor. Table 20 in the appendix shows how the annualisation figure was computed for each fixed component. For both costing methods – upfront costs and annualised depreciation – the costs of the fixed components are then added to the recurrent costs of electricity and kerosene.

Cost categories for kerosene

Three cost categories for kerosene were calculated based on whether households have both a stove and a lamp, or only one of these appliances:

1) Kerosene + Stove (Cheapest cost category of kerosene)

This cost category assumes that the household uses a kerosene stove for cooking and other sources of energy for lighting.

7 It is worth mentioning that the price components of kerosene differ from other fuels such as petrol and diesel. There is no value added tax (VAT) or import duty on kerosene. VAT is only charged on the transportation costs, i.e., when kerosene is transported from Dar es Salaam to other regions. The only applicable tax is the excise duty amounting to TShs 52 per litre of kerosene. Therefore the difference between the CIF value (plus excise duty) and the retail price includes operating cost and profits for suppliers. However, for this study only the retail prices (recurrent cost to households) and appliances (fixed costs) are assessed.

8 LUKU is the abbreviation for Lipa umeme kadri unavyotumia, the system used by TANESCO whereby consumers prepay for electricity. Prepaid vouchers with unique numeric codes are purchased and these codes are then entered into the LUKU meter installed in the premises

2) Kerosene + Lamp[9] (Medium cost category of kerosene)
This category assumes that the household uses a kerosene lamp for lighting but other sources of energy for cooking.

3) Kerosene + Stove + Lamp (Expensive cost category of kerosene)
This category assumes that the household uses a kerosene stove for cooking and a kerosene lamp for lighting.

For each category, the cost of the stove and/or lamp (computed using upfront costing and annualisation methods) are added to the annual cost of kerosene, i.e., the value of the total number of litres of kerosene used by households over one year, to get the total cost of using kerosene. There will be variations in the cost of kerosene due to variations in both prices and amounts consumed by households in different urban centres.

Cost of LPG
Similar to kerosene, the cost of using LPG is estimated by adding up the recurrent cost of LPG to the price of LPG stoves and cylinders, which were also computed using upfront costing and annualisation methods.

Cost categories for electricity
Assessing the cost of electricity is more complicated given the greater number of cost components related to using electricity. For simplicity, five components are included in this analysis to generate two main cost categories for electricity. The five cost components for accessing electricity are: i) connection costs; ii) internal wiring; iii) electric light bulbs; iv) electricity consumed, i.e., the recurrent cost of electricity; and v) electric stove. The two cost categories for electricity are based on the assumption that the first four cost components cannot be separated. Additional costs of using electricity will depend on whether households use an electric stove for cooking. Therefore, the two cost categories for this analysis are:

- **Cheapest cost of electricity.** This category includes connection costs, the cost of internal wiring, electricity consumed, electric light bulbs without electric stove.

- **Expensive cost of electricity.** This category includes connection costs, the cost of internal wiring, electricity consumed, electric light bulbs and electric stove.

4.2.1.2 Energy purchasing power
To assess whether modern sources of energy are affordable, household costs of accessing electricity and kerosene are compared to the household's energy purchasing power. Kadebe et al. (2002) estimated energy purchasing power by using the total energy expenditures[10] of households. Following this approach, three categories of purchasing power are computed:

- **Lowest purchasing power category:** This category is computed by adding up household recurrent expenditures on firewood, charcoal, kerosene, electricity, matches, candles, LPG, dry cell batteries and other energy sources.

9 The cost of lamps includes the costs of 'kibatari' which is the HBS 2007 database is coded as "other lighting equipment using kerosene". This is done mainly for simplification purposes to avoid multiple costs categories.

10 In micro-economic theory, household expenditures are more representative of the behavior of the household than its income, because the household standard of living can be determined by multiple factors such as remittances from outside the household (Ouedraogo, 2006). Household expenditures are therefore frequently used to represent purchasing power. In this study, household expenditure on energy is used as a proxy for energy purchasing power.

- **Medium purchasing power category:** This category includes all items under the lowest purchasing power category plus transport fuel (petrol and/or diesel). This category relates to households with automobiles.

- **Highest purchasing power category:** This category includes all items under the medium purchasing power category plus households expenditure on appliances related to energy use. Appliances include charcoal, gas and/or kerosene stoves, electric cookers, charcoal irons, electric kettles and jugs, kerosene lamps, flashlights/torches, electric bulbs, electric wire, adapters and distributors, plugs and sockets.

The advantage of this categorisation is to reveal the impact of the different components of energy use: recurrent costs, fuel for automobiles and the fixed cost of appliances. As this study focuses on poor households, these categories differentiate expenditure on basic sources of energy (category 1) from non-necessities like transport fuel (category 2).

4.2.2 Energy expenditure patterns

The energy expenditure pattern of households is examined through descriptive analysis (ratios and percentages) to assess the extent to which households mix different sources of energy, thereby indicating the rate at which electricity and kerosene are substituted for other sources of energy. In addition to the household's total energy expenditure (i.e., their energy purchasing power), this analysis examines expenditure on individual sources of energy, i.e. charcoal, kerosene, etc.

Standard deviations are first computed to check volatility in energy expenditures. Then the energy budget shares for households are calculated. Energy budget shares are computed in two ways. First, the total energy expenditure (for each of the three categories energy purchasing power categories listed under Section 4.2.1.2) as a percentage of total household expenditure is computed to determine the proportion of household income being spent on energy. This analysis is done for both poor and non-poor households. Secondly, the total expenditure on individual sources of energy are calculated as percentages of the total household energy budget to determine how the energy budget is divided between different sources of energy and to see which energy type is dominant. As households are classified between poor and non-poor, this approach will determine whether non-poor households use modern sources of energy to a greater extent compared with poor households.

5 Results and Analysis

5.1 Sources of energy for cooking and lighting in Tanzania

Main findings

- Kerosene is the prime source of energy for lighting in Tanzania and the second most common source of energy for cooking after charcoal.
- Households do not depend on one source of energy, for example, electricity or kerosene alone. They use a "mix" strategy.

The presentation of results starts with findings on the general pattern of energy use for lighting and cooking. Table 1 shows kerosene to be the prime source of energy for lighting in Tanzania (83% of households) and the second most common source of energy for cooking after charcoal. Electricity is the most frequently used energy source for lighting after kerosene (12% of households). The data indicate that households tend to rely on more than one source of energy and that the different energy sources are often used for different purposes, for instance, electricity for lighting but charcoal for cooking. Hence households do not depend on one source of energy, e.g. electricity or kerosene alone.

Table 1: Sources of energy for cooking and lighting

Source	Cooking	Lighting
Electricity	0.5	12.3
Gas – Industrial	0.2	-
Gas – Biogas	-	0.1
Kerosene	3.0	83.0
Charcoal	22.8	-
Firewood	73.3	3.6
Candles	-	1.0
Other sources	0.2	-
Total	**100**	**100**

Source: URT, Household Budget Survey 2007

5.2 Costs of kerosene, LPG and electricity

Main findings

- All households using LPG are non-poor i.e., no households below the poverty line used gas.
- Using the annualised costing approach, LPG is the most expensive energy source.
- Using the upfront costing approach, electricity is more expensive than gas and kerosene. Even in the cheapest electricity cost category, the cost of kerosene is only 13% that of electricity.
- Energy costs vary between Dar es Salaam and other urban areas. Costs for kerosene in other urban areas are 18% higher than in Dar es Salaam, while electricity costs are 23% higher in Dar es Salaam than in other urban areas.

5.2.1 Cost of kerosene

Based on HBS 2007 data, on average, poor urban households use 1.4 litres of kerosene per month or 16.6 litres per year. The value of 16.6 litres of kerosene is then added to the cost of fixed components to get the total cost of using kerosene[11]. There will be variations in the cost of kerosene due to variations in price of kerosene and amounts consumed by households in different urban centres. Three cost categories for kerosene – cheapest, medium and highest – were calculated as explained under Section 4.2.1.1.

Table 2: Upfront costs of accessing kerosene (TShs)

	Cheapest cost category	Medium cost category	Highest cost category
Fixed cost	5,500	7,750	13,250
Recurrent cost	14,840	14,840	14,840
Total	**20,340**	**22,590**	**28,090**

Table 3: Annualised costs of accessing kerosene (TShs)

	Cheapest cost category	Medium cost category	Highest cost category
Annualised fixed cost	637	1,023	1,660
Recurrent cost	14,840	14,840	14,840
Total	**15,477**	**15,863**	**16,500**

5.2.2 Cost of LPG

The HBS 2007 was undertaken when the use of LPG as a source of energy for households was picking up gradually in urban centres. However, all households which were found to be using LPG were non-poor (i.e., they were above the poverty line). In other words, no household below the poverty line was found to use LPG, potentially reflecting the high recurrent and fixed costs of LPG as well as difficulties in accessibility. However, we still calculated the cost components. A standard gas cylinder in Tanzania contains 15 kg of LPG. The HBS 2007 shows that an average household uses 14.9 kg of gas per month costing on average TShs 29,800.

Table 4: Upfront costs of accessing LPG

	TShs
Fixed cost	17,333
Recurrent cost	357,600
Total	**374,933**

Table 5: Annualised costs of LPG

	TShs
Annualised fixed cost	1,426
Recurrent cost	357,600
Total	**359,026**

11 The average price per litre was 894 TShs.

5.2.3 Cost of electricity

Table 6 describes the five cost components for accessing electricity identified by this study.

Table 6: Cost components for accessing electricity

Electricity consumed	Poor urban households on average use 51.7 kWh per month or 620.4 kWh per annum depending on whether they are in Dar es Salaam or in other urban areas.
Connection costs	The LUKU meter worth TShs 200,000
Electric bulbs	Poor households on average use 18 electric bulbs per annum (averaged from the HBS 2007).
Internal wiring	Thirty metres of internal wiring estimated to cost TShs 71,947.
Electric stove	Common for households with electricity connection.

TANESCO offers different pricing categories depending on usage. According to HBS 2007, the average usage of poor households is 51.7kWh per month; hence falling under TANESCO's Domestic Low Usage Tariff (DI) charging TShs 128 per kWh. The first 50 kWh of electricity are subsidised by TANESCO and are not subjected to service charges. In this tariff category, power is supplied at a low voltage, single phase (230 volts).[12]

Table 7: Upfront costs of accessing electricity

	Cheapest Cost Category	**Expensive Cost Category**
Fixed cost	310,295	377,045
Recurrent cost	79,411	79,411
Total	**389,706**	**456,456**

Table 8: Annualised costs of accessing electricity

	Cheapest Cost Category	**Expensive Cost Category**
Annualised fixed cost	37,816	43,993
Recurrent cost	79,411	79,411
Total	**117,227**	**123,404**

Using the annualised costing approach, the cost of accessing LPG is by far the most expensive. The highest annualised costs of using kerosene and electricity are only 5 and 34 percent, respectively, of the cost of using LPG (see Table 8). However, using the upfront costing method, the cost of electricity is higher than LPG and kerosene. The cost of using electricity (the expensive cost category) is 1.2 and 16 times the costs for using LPG and kerosene (the highest cost category) respectively (see Table 7). This is due to higher fixed costs required for electricity

12 The average usage (i.e. 51.7kWh) marginally exceeds the 50kWh threshold for DI category because of few outliers in the database (i.e. a few poor households used more than 50kWh). Therefore it is still logical to assume that poor households falls under the DI category allowing us to apply TShs 128 when computing the annual electricity bill for poor households.

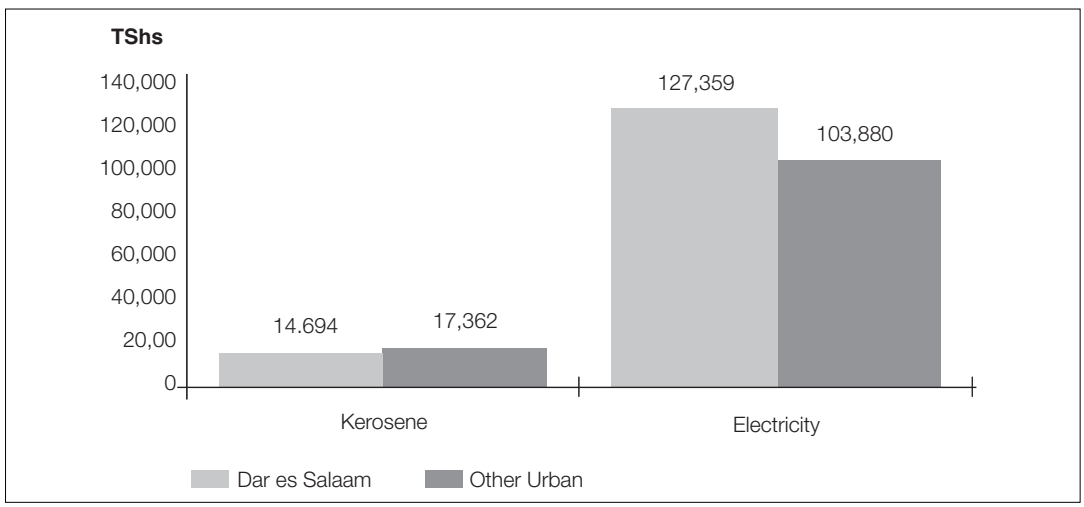
(wiring, appliances and Luku meter) while for LPG you only need to purchase the appliances and a gas cylinder.

In subsequent sections of this report, LPG usage is not analysed for two reasons. First, no poor urban households in HBS 2007 used LPG.[13] Secondly, the use of LPG for cooking is a recent phenomenon in Tanzania. It is expected that over time the costs of LPG, especially fixed costs, will fall as more suppliers enters the market contrary to the situation which prevailed in the 1990s.[14] It is also expected that the widespread perception about gas-specific risks, such as possible asphyxiation or explosive accidents, will decrease. Therefore, when LPG is excluded, the data in Table 7 and 8 indicate that electricity is a far more expensive source of energy than kerosene. Even in the cheapest scenario, the cost of kerosene is only 13 percent of the cost of electricity. In other words, the cheapest cost of electricity is more than 7 times the cost of using kerosene with stove and lamp. In all costs categories, kerosene is cheaper and electricity more expensive to use.

5.2.4 Regional disparities in energy costs between Dar es Salaam and other urban areas

Significant differences in the annualized costs of both kerosene and electricity were found between Dar es Salaam and other urban areas (see Table 13 in the appendix). The annualized cost of kerosene for other urban areas is 18 percent higher than in Dar es Salaam. The opposite situation applies to electricity. The cheapest and expensive cost categories for electricity are 23 and 22 percent higher in Dar es Salaam than in other urban areas. Given that our analysis focuses on the poor, these cost variations, in absolute terms, are large. Figure 1 shows the differences in the cost of electricity and kerosene between Dar es Salaam and other urban areas.

Figure 1: Differences in energy costs between Dar es Salaam and other urban areas



13 HBS 2007 shows that gas is effectively out of the reach of poor urban households.

14 For instance, TAOMC (2002) indicates that the Tanzanian LPG market in the 1990s was characterised by shortages and disruptions in supply, high cost of gas, and lack of investment in infrastructure, packaging and safety.

5.3 Affordability of electricity and kerosene to poor urban households

Main findings

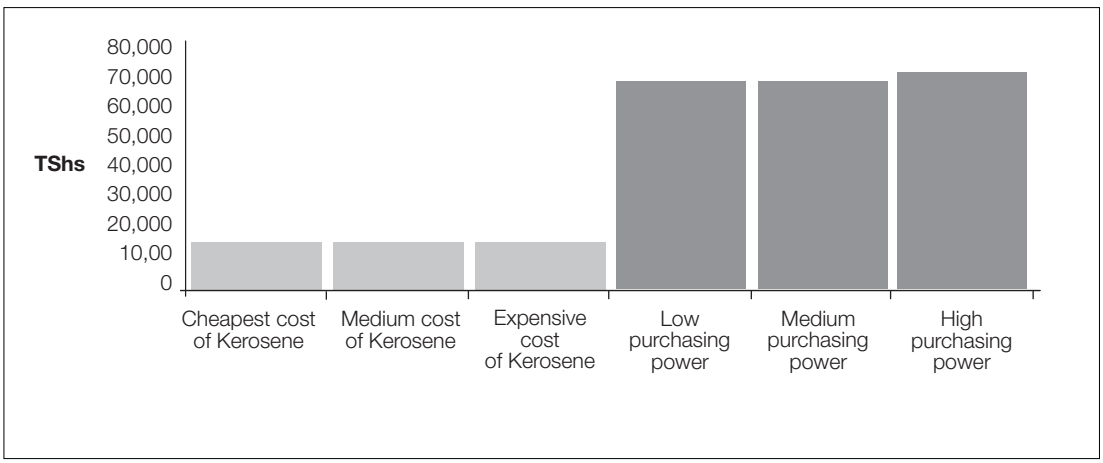
- Kerosene is affordable to poor urban households overall. The cost of using kerosene is only 23% of the energy purchasing power of poor households. By region, kerosene is affordable to poor households in all regional urban centres except in Kilimanjaro and Kagera.
- Electricity is by far too expensive for poor urban households. The highest household energy purchasing power is only 61% of the cheapest cost of using electricity.
- Poor households in smaller regions, for example, Rukwa, Iringa and Manyara, have more energy purchasing power than households in large urban centres such as Dar es Salaam.

This section seeks to answer the research question on whether the estimated costs of electricity and kerosene are affordable to poor urban households. This is done by comparing energy costs with the energy purchasing power of poor households. To reveal variations across urban areas, the purchasing power of poor households in different urban centres are also compared to the cost of energy.

5.3.1 Affordability of kerosene

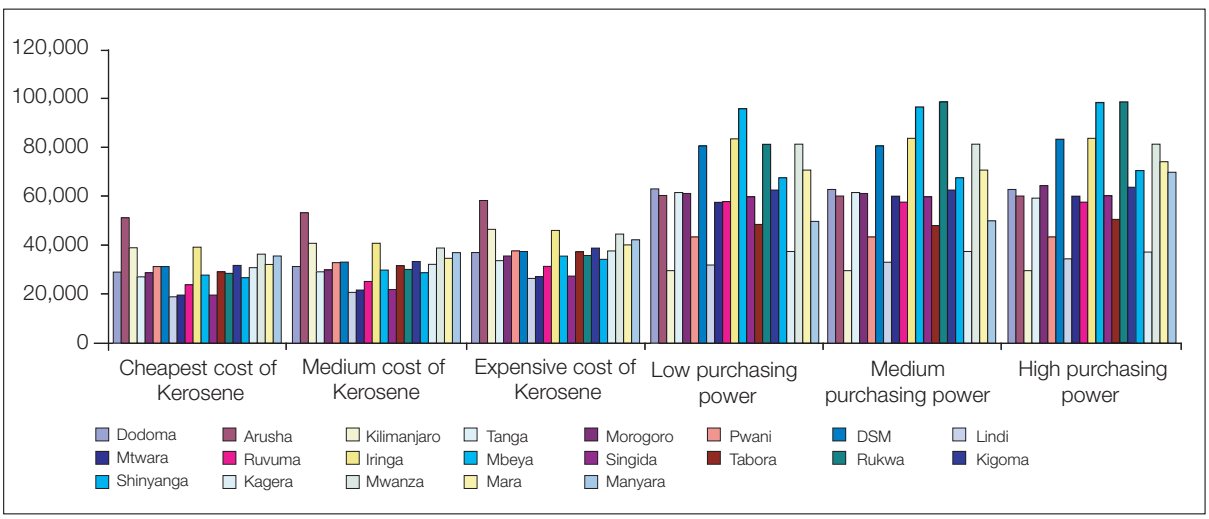
Figure 2 compares the energy purchasing power of poor urban households – i.e., the total household expenditures on energy (for each of the three household purchasing power categories, low, medium and highest) – with the three categories of costs of using kerosene – i.e., cheapest cost category (with only stove), medium cost category (with only lamp), expensive cost category (with stove and lamp). As can be seen from Figure 2, the energy purchasing power of poor households in all three categories is significantly higher than all the three costs categories of using kerosene. The cost of using kerosene is roughly 23 percent of the energy purchasing of poor households. This confirms that kerosene is affordable to poor urban households in Tanzania.

Figure 2: Energy purchasing power of poor households compared to the costs of kerosene



Does the affordability of kerosene to poor households vary by region? Figure 3 presents data for the 21 regional urban centres of Mainland Tanzania. The results are similar to the data for poor urban households overall; the energy purchasing power of poor households in most regional urban centres are significantly higher than the costs of using kerosene. However, there are two exceptions. In Kilimanjaro, kerosene is unaffordable to the urban poor in all cost categories, and, in Kagera, the urban poor can afford the cheapest cost of kerosene and medium cost of kerosene, but cannot afford the expensive cost category which is higher than all levels of purchasing power. Furthermore, the cheapest cost of kerosene is 28 percent of the purchasing power indicating higher affordability of kerosene. However, urban centres in Kagera and Arusha face kerosene costs that are 82 percent and 84 percent of household purchasing power, respectively. Urban areas with lower costs of kerosene costs expend less and those with higher costs expend more on energy. For instance, the five regions with highest cost of kerosene spend about 19 percent more than those regions with the lowest cost.

Figure 3: Costs of kerosene compared to energy purchasing power of poor urban households, by Mainland region



5.3.2 Affordability of electricity

Figure 4 compares the two cost categories for electricity with the three categories of household energy purchasing power. Results show that all cost categories of electricity are significantly higher than the energy purchasing power of poor households. The highest energy purchasing power is only between 61 percent and 58 percent of the cheapest cost of using electricity and the expensive cost of using electricity, respectively. This indicates that electricity is far too expensive for poor urban households.

Figure 4: Energy purchasing power of poor households compared to the costs of electricity

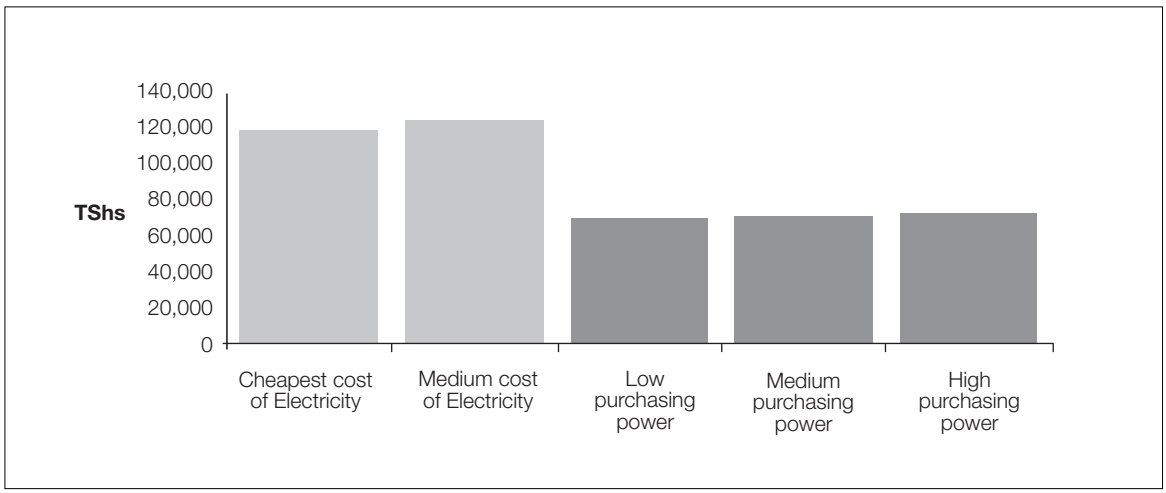
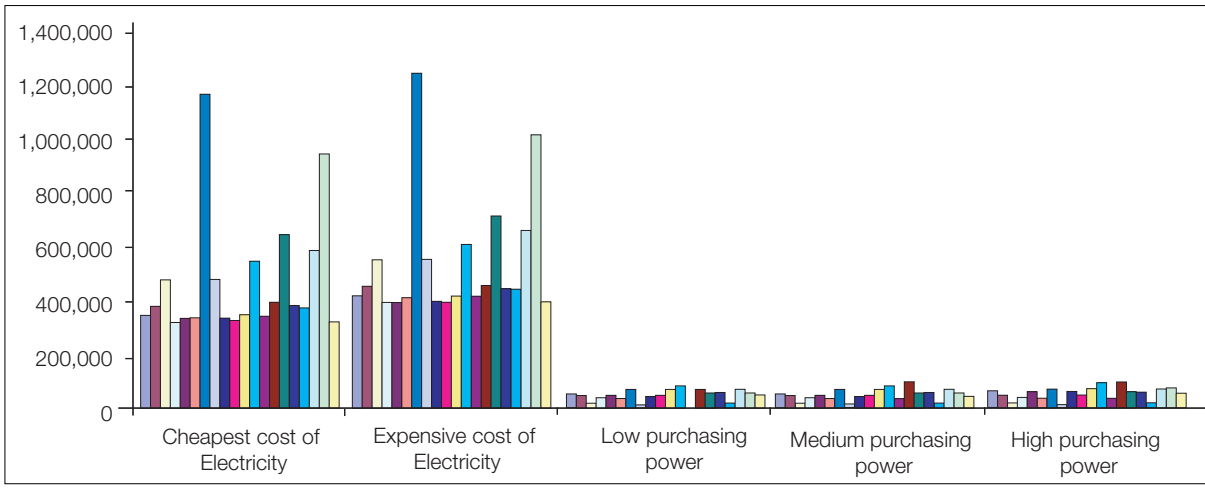


Figure 5 compares the cost of electricity and households' energy purchasing power for each regional urban centre. In all regional centres, both cost categories of electricity are significantly higher than the energy purchasing power of poor households.

Figure 5: Costs of electricity compared to energy purchasing power of poor urban households, by Mainland region



A second way of measuring affordability involves dividing household purchasing power by energy cost estimates. If the ratio calculated is equal to or greater than one then that source of energy is affordable. For this analysis, the highest purchasing power category and the cheapest cost of electricity are used to assess to what extent households with the highest energy purchasing power can afford the lowest cost of electricity. No urban centre reaches a ratio of one. Rukwa, Iringa and Manyara registered the highest ratios at 25 percent, 24 percent and 21 percent, respectively, while Kilimanjaro, Dar es Salaam and Lindi had the lowest ratios at 6, 7 and 7 percent, respectively. These results confirm that that electricity is far too expensive for poor urban households. However, the results also indicate that poor urban households in Rukwa,

Iringa and Manyara have greater energy purchasing power than households in large urban centres like Dar es Salaam.

The analysis in this section gives us a rough picture of the affordability of kerosene and electricity to poor urban households. As indicated by Kadebe et al. (2002), the comparison of households' total energy expenditure (the proxy used for purchasing power) with energy costs is a rough measure, because, among other reasons, this method assumes that the total energy budget of households is expended on the single source of energy under consideration. Whereas, in reality, households typically do not depend on only one form of energy. This underscores the need to understand the energy mix used by households in assessing the extent to which modern sources of energy are being substituted for traditional biomass sources of energy. The next section, therefore, examines the energy expenditure patterns of urban households in more detail.

5.4 Patterns of household energy expenditure

This section focuses on patterns of energy usage in order to understand the extent to which households mix different sources of energy and substitute electricity and kerosene for traditional biomass sources of energy. The analysis examines the patterns of energy usage between poor and non-poor households as well as variations between urban centres.

5.4.1 Overall energy expenditure in urban households

Main findings

- There is a wide volatility in energy expenditures, resulting from a tendency to mix different types of energy for different purposes within the same households.
- Household expenditure on transport fuel is relatively more significant than on energy appliances.
- Households spend, on average, 11.5 percent of their total expenditure on energy.
- Study data do not support the hypothesis that poor households use a higher proportion of their income on energy compared to non-poor households.

Table 9 presents data on household expenditure on different forms of energy, and Table 10 provides findings on the share of energy expenditure in the total household budget and the shares of individual sources of energy as a percentage of total household energy expenditure. The results show that standard deviations are very high, indicating wide volatility in energy expenditures. One of the reasons behind this volatility is the tendency to mix, i.e., use different energy sources for different purposes within the same households, for instance, electricity for lighting while charcoal alternates with kerosene for cooking. This is consistent with Hosier et al. (1993) who found that over 70 percent of households in Dar es Salaam utilise kerosene for cooking in combination with other sources of energy.

Table 9: Total household expenditure on energy and expenditure on individual energy sources

	Mean exp.	Standard deviation
Total household expenditure on energy		
Low energy category: Basic energy sources*	137,989	190,629
Medium energy category: Basic energy sources + transport fuel	173,144	385,398
High energy category: Basic energy sources + transport fuel + appliances	180,519	395,805
Household expenditure on individual energy sources		
Firewood	43,836	16,179
Charcoal	84,598	20,295
Electricity	333,583	685,306
Kerosene	24,408	7,390

Note: *Basic energy sources include recurrent expenditures on firewood, charcoal, kerosene, electricity, matches, candles, LPG, dry cell batteries and other sources.

Table 10: Share of energy expenditure in the total household budget (for low, medium and high expenditure categories) and the shares of individual energy sources in the total household energy budget

	Mean exp.	Standard deviation
Share of energy expenditure in total household budget		
Low energy category	0.107	0.086
Medium energy category	0.115	0.098
High energy category	0.120	0.106
Share of individual energy source in the total household energy budget		
Firewood	0.132	0.281
Charcoal	0.566	0.387
Electricity	0.040	0.162
Kerosene	0.262	0.299

To assess patterns of energy demand, data from the three energy expenditure categories in Table 9 are analysed. The results show that expenditure in the medium energy category is 25.5 percent higher than the lowest energy category, while expenditure for the highest energy category is only 4.3 percent higher than medium energy category. This indicates that household expenditures on transport fuel are more significant than on energy-related appliances. As most households do not own automobiles, then the proportion of the total income spent by those with automobiles on energy is significantly higher than those spending only on the basic energy sources. On the other hand, the small difference in expenditure between the medium and high energy categories indicates that households use a limited number of energy-related appliances. This is consistent with the low level of socio-economic development in Tanzania; household poverty is widespread even in urban centres, which is partly reflected in limited ownership of appliances.

Table 10 shows that the proportion of total household expenditure spent on energy fluctuates around 11 percent and 12 percent, i.e., on average, 11.5 percent of total household expenditure was spent on energy. Of further note, energy expenditure accounts for a similar proportion of total household expenditure in both poor and non-poor households (see Table 11). Hence, the common hypothesis that poor households use a higher proportion of their income on energy compared to non-poor households is not supported by these findings.

5.4.2 Expenditure on individual sources of energy in poor and non-poor urban households

Main findings

- Charcoal is the most important source of energy in urban areas not only for the poor but also for non-poor, absorbing 57 percent of the average household energy budget.
- Electricity has the lowest energy budget share. Households spend the minimum on electricity while spending more on cheaper sources of energy (mixing electricity with other sources).
- As income increases, households shift to efficient sources of energy such as electricity. However, they still use charcoal as the primary source of energy for cooking.

Study data confirm that charcoal is the most important source of energy in urban areas absorbing 57 percent of the average household energy budget. This is consistent with the findings of Hosier et al. (1993). Hosier (1993, pp. 519) further states that "urban settlements in Tanzania now consume more of both modern sources of energy and charcoal than their rural counterparts". Table 11 shows that the share of charcoal within total energy expenditure is higher for non-poor households (59 percent) than poor households (41 percent), implying that charcoal is an important energy source not only for the poor but also for non-poor households. This finding is contrary to the theoretical assumption that inconvenient sources of energy, such as charcoal, are the source of energy for the poor and that price differences have little effect on energy selection. The current data suggest that broad-scale structural factors such as price do influence the choice of energy sources by households.

Electricity is found to have the lowest energy budget share. It is by far the most expensive source of energy. Hence, households follow the standard demand principle by spending less on electricity and more on cheaper sources of energy (i.e. "mixing" electricity with other sources). This fact is supported by HBS 2007 which points out that "there has been a reduction in the use of electricity for lighting in urban areas, and an increase in the use of kerosene". Furthermore, data in Table 11 show that the share of electricity within the total energy budget of poor urban households is only 0.6 percent compared with 4.6 percent of the budget of non-poor urban households. These data confirm that increased income influences the transition of households towards more efficient sources of energy, such as electricity. As income increases, electricity usage increases but, at the same time, charcoal continues to be used for cooking. This mixing approach may indicate that the increase in income might be too little to permit a complete switch from traditional biomass sources of energy to modern sources such as electricity and LPG.

Table 11: Total household expenditure on energy and expenditure on individual energy sources, poor and non-poor households (TShs)

	Mean exp.	
	Poor	**Non-Poor**
Total household expenditure on energy		
Low energy category: Basic energy sources	68,853	149,991
Medium energy category: Basic energy sources + transport fuel	69,931	191,017
High energy category: Basic energy sources + transport fuel + appliances	71,284	199,442
Household expenditure on individual energy sources		
Firewood	35,187	46,669
Charcoal	44,796	89,766
Electricity	68,846	330,298
Kerosene	14,798	26,679

Table 12: Share of energy expenditure in the Total household budget (for low, medium and high expenditure categories) and the share of individual energy sources in the total household energy budget, poor and non-poor households

	Mean exp.	
	Poor	**Non-Poor**
Share of energy expenditure in total household budget		
Low energy category	0.113	0.106
Medium energy category	0.114	0.115
High energy category	0.116	0.120
Shares of individual energy sources in the total household energy budget		
Firewood	0.274	0.108
Charcoal	0.406	0.593
Electricity	0.006	0.046
Kerosene	0.313	0.253

5.4.3 Regional disparities in energy expenditure

Main findings

- Charcoal is by far the most important source of energy in 17 out of 21 urban centres. Firewood is the most important source of energy in the other 4 urban centres.
- The dependence of households in Dar es Salaam on charcoal is very similar to other regions.
- Wide regional disparities exist for firewood and electricity, but less so in the case of charcoal.
- Dar es Salaam demonstrates the lowest per capita consumption of firewood.
- Households in Mwanza spend a larger proportion of their total income on energy than other regions.
- The importance of transport fuel is much higher in Kigoma, Mwanza and Dar es Salaam compared to other urban centres.

Proportion of household income spent on energy

Data on energy expenditures in the urban areas of the 21 Mainland regions reveal significant variations in energy spending between regions (see Table 14 and 15 in the appendix[15]). For example, households in Mwanza, which are the highest spenders on energy, spent 49 percent more of their total income on energy than households in Mtwara, the lowest energy spenders. Households falling under the highest expenditure category in Kigoma, Mwanza and Dar es Salaam spend a higher proportion of their income on energy compared with households in other regions, indicating the importance of transport fuel in these cities.

Expenditure on individual sources of energy

Wide regional variations were also found in expenditure of urban households on individual sources of energy. Households in Mwanza, which had the highest expenditure on firewood, spent more than three times the amount than households in Lindi, the lowest spenders on firewood. In the case of electricity, the mean expenditure of households in Dar es Salaam was 20 times that of Manyara. For charcoal, the regional variations are not as high as found for firewood and electricity. Households in Dar es Salaam which are the highest spenders on charcoal spent only two times higher than households in Ruvuma, the lowest spenders on charcoal. This strongly suggests the dominance of charcoal as the prime source of energy in urban Tanzania.

Shares of individual energy sources within households' total energy budget

The share of firewood in the total energy budget of households varies from 43 percent in Ruvuma to 2 percent in Dar es Salaam. This is consistent with results in Hosier (1993) who found that Dar es Salaam residents had the lowest per capita consumption of firewood compared to other regions. Firewood is the most important source of energy in only 4 of the 21 urban areas of Mainland Tanzania: Mtwara, Ruvuma, Iringa and Singida.

The share of charcoal in the total energy budget of households ranges from 20 percent in Kilimanjaro to 70 percent in Dar es Salaam. Charcoal is by far the most important single source of energy for 17 out of 21 urban centres considered, confirming the continued widespread reliance of households on charcoal as their prime source of energy.

When kerosene is considered, the share for kerosene in the total energy budget varies between 16 percent in Rukwa to 62 percent in Arusha and 61 percent in Kilimanjaro. The share of kerosene in the household energy budget in Dar es Salaam is 22 percent.

The peculiarity of these findings is that households in Dar es Salaam, Tanzania's primary commercial centre with modern infrastructure and establishments, have roughly similar energy expenditure patterns compared with secondary urban centres such as Mara and Mwanza. The dependence of Dar es Salaam on biomass energy is very similar to Tabora, Rukwa and Kigoma, the share of kerosene in the energy budget for households in Dar es Salaam does not differ much from the average for all urban centres, and in the case of electricity, households in Dar es Salaam are similar to those in Lindi and Mara.

15 To be consistent with the scope of study, the statistics do NOT represent "regions" but "urban areas" within regions.

5.4.4 Regional disparities on energy expenditure between poor and non-poor urban households

Main findings

- Charcoal is the most important source of energy for non-poor urban households.
- Non-poor urban households spend more on biomass energy as well as kerosene than poor urban households.
- In the case of charcoal, non-poor households in Dar es Salaam spend eight times more than poor households within the same region.
- Both poor and non-poor expend a similar proportion of their total budget on energy, hence refuting the hypothesis that poor households spend a larger percentage of their income on energy compared to well-off households.

Absolute expenditure of households on energy

Tables 16 to 19 in the appendix classify households in urban centres between poor and non-poor. The energy expenditures for non-poor households are more than twice that of poor households in absolute terms. For instance, the non-poor households in the lowest energy expenditure category in Tabora, Kilimanjaro, Lindi and Kagera spend more than three times that of poor households in the same expenditure category within the same regions. In the case of firewood, the average firewood expenditure for non-poor households is 80 percent more than poor households, in the case of charcoal the difference in average expenditure is 55 percent, and for kerosene it is 56 percent. In the case of charcoal, non-poor urban households in Dar es Salaam and Morogoro spend 8 times and 4 times more than poor households, respectively. Large disparities exist for electricity also, for example, non-poor households in Dar es Salaam and Dodoma spend 10 times and 4 times more than poor households, respectively.

Proportion of household income spent on energy

Poor and non-poor households expend similar proportions of their total income on energy; poor households spend on average 10.6 percent of their total income on energy compared to 10.3 percent for non-poor households. Again this is contrary to the hypothesis that the poor spend a higher percentage of their income on energy than non-poor households. The largest disparities between poor and non-poor households for this indicator were found in Tabora (13 percent for non-poor compared with 9 percent for poor households), in Kagera (7 percent for non-poor compared with 11 percent for poor households), in Coast region (9 percent for non-poor compared with 6 percent for the poor household). For the remaining 18 regions, the proportion of income spent on energy was roughly the same between the poor and non-poor households.

Share of individual energy sources within the total household energy budget

Except for the urban centres in Kagera and Pwani, the share of firewood within the total energy budget is higher for poor than for non-poor households. In particular, it is 34 percent for poor households compared to only 19 percent for non-poor. A similar pattern is observed for kerosene.

In contrast, with the exception of Kagera, the share of charcoal within the total energy budget for non-poor households is higher than for poor households. It is 50 percent for non-poor compared to 31 percent for the poor. This further confirms the finding that charcoal is the most important source of energy for non-poor households. It is followed by kerosene, firewood and, lastly, electricity.

On the other hand, the overall average across all regions indicates that firewood is the most important source of energy for the urban poor. However, data on individual urban centres show that charcoal not firewood is the most important source of energy for the poor in 12 out of 21 urban centres, while the reverse is true for the remaining 9 urban centres. This result confirms findings from other studies that firewood is used predominantly by low-income households (Arnold et al., 2006; Brouwer and Falcao, 2004; Fisher, 2004; Hosier and Dowd, 1987; Kersten et al., 1998; Leach, 1992; Marufu et al., 1997; Soussan et al., 1990). It was difficult to detect consistent patterns for electricity, due to the limited number of electricity users in individual urban centres.

Conclusion and Policy Implications

Three major findings emerge from this study. First, kerosene is affordable to poor urban households while electricity is not. The cost of kerosene is only 13 percent that of the cheapest cost estimate for electricity. This finding is consistent with observations in the HBS 2007 that kerosene is the second major source of energy for cooking after charcoal and the prime source of energy for lighting in Tanzania.

Secondly, charcoal is the single most important source of energy in urban areas not only for the poor but also for non-poor households. While some evidence was found that a higher proportion of non-poor households use electricity compared to poor households, non-poor homes still use charcoal as their primary source of energy for cooking. This evidence, apart from refuting the energy transition theory, is an indication that the increase in income over the past decade is too slow to permit households switching from traditional biomass energy to more technological efficiency sources of energy such as electricity and LPG. Furthermore, the dominance of charcoal by both poor and non-poor households implies a tendency to mix different types of energy sources for different purposes within the same households. Households do not depend on only one source of energy, for example, electricity or charcoal alone, leading to wide volatility in household energy expenditure.

Thirdly, it is found that both poor and non-poor expend a similar proportion of their total income on energy, refuting the hypothesis that poor households spend a larger percentage of their income on energy compared to non-poor households.

Several policy implications come out of these findings. Electricity is not affordable to the urban poor as a result of both recurrent costs as well as the costs of appliances and other fixed components necessary to access electricity. One area where the government could support access to modern sources of energy is to offer tax exceptions on fixed components associated with access to electricity. For example, on top of the standard VAT of 18 percent, an import duty of 10 percent is charged on electric cookers.

The urgent need to address the energy problem is also evidenced by HBS 2007 data that demonstrate a reduction in the use of electricity for lighting in urban areas and an increase in the use of kerosene instead. This suggests the potential for TANESCO to increase its revenue by lowering electricity tariffs. One major challenge is that only 12.1 percent of households in Tanzania are connected to the national grid (HBS, 2007). While it is not within the scope of this study to look at supply factors and operational inefficiencies, there is an obvious need for massive investment in the electricity network in residential areas as one of the means to ensure a faster transition from biomass to modern sources of energy. Currently, the expansion in electricity infrastructure is outpaced by the expansion of residential areas even in a major commercial city like Dar es Salaam.

Growth in household income has an important role to play as well. This study demonstrates that the share of electricity within the total energy budget is higher for non-poor households compared to the poor confirming that income does in part explain the transition to modern sources of energy. Hence, the importance of national policies to promote economic growth and reduce income poverty cannot be overstated. While it is not possible for the use of charcoal to end in the near future, there is scope for interventions to reduce the negative environmental consequences of producing and using charcoal. Currently, the production of charcoal is entirely based on traditional low-efficiency technologies. Therefore, there is a clear need to

improve charcoal production techniques and promote the use of efficient charcoal stoves. Additionally, recent technological progress in converting farm residuals into energy-producing materials needs government assistance such as tax relief and support for investment in research and development. Public-private partnerships would help to harness Tanzania's huge potential for efficient energy generation.

References

African Development Bank (AfDB) & OECD. (2003). *African Economic Outlook 2003/2004.*

Akabah, E.M. (1990). Real incomes and the consumption of woodfuels in Ghana: An analysis of recent trends. *Energy Economics* 12(3), 227-231.

Arnold, J.E.M., Kohlin, G., & Persson, R. (2006). *Woodfuels, livelihoods and policy interventions: Changing perspectives. World Development,* 34(3), 596-611.

Aron, J., Eberhard, A.A., & Gandar, M.V. (1991). *Fuelwood deficits in rural South Africa. Biomass and Bioenergy,* 1(2), 89-98.

Barnes, D.F., & Qian, I. (1992). *Urban interfuel substitution, energy use, and equity in developing countries: Some preliminary results.* Washington D.C.: The World Bank.

Brouwer, R., & Falcao, M.P. (2004). *Wood fuel consumption in Maputo, Mozambique. Biomass and Bioenergy,* 27, 233-245.

Campbell, B.M., Vermeulen, S.J., Mangono, J.J., & Mabugu, R. (2003). *The energy transition in action: Urban domestic fuel choices in a changing Zimbabwe.* Energy Policy, 31, 553-562.

Dang, H. (1993). *Fuel substitution in Sub-Saharan Africa. Environmental Management,* 17(3), 283-288.

Eberhard, A.A., Dickson, B.J., & Pouris, A. (1989). *Household fuel transition patterns in Bophuthutswana.* Energy Policy, 17(4), 424-425.

EWURA. (2009). *Public notice on indicative and cap petroleum products prices in the country.* REF:PPR/01-1/09.

Fergus, M. (1983). *Firewood or hydropower: A case study of rural energy markets in Tanzania.* Geographical Journal, 149(1), 29-38.

Foster, V. (2000). *Measuring the impact of energy reform: Practical options.* Note no. 210. The World Bank Group Private Sector and Infrastructure Network.

Gamtessa, S. F. (2000). *Household's consumption pattern and demand for energy in urban Ethiopia.* Department of Economics, Addis Ababa University.

Global Network on *Energy for Sustainable Development* (GNESD). (2008). Clean energy for the urban poor: An urgent issue.

Hiemstra-van der Horst, G. & Hovorka, A.J. (2008). *Reassessing the "energy ladder": Household energy use in Maun*, Botswana. Energy Policy, 36, 3333-3344.

Hosier, R. H. (1993). *Urban energy systems in Tanzania: A tale of three cities.* Energy Policy, 21(5), 510-523.

Hosier, R. H., & Kipondya, W. (1993). *Urban household energy use in Tanzania: Prices, substitutes and poverty.* Energy Policy, 21(3), 454-473.

Hosier, R.H., & Dowd, J. (1987). *Household fuel choice in Zimbabwe: An empirical test of the energy ladder hypothesis.* Resources and Energy, 9, 347-361.

International Council for Science (ICSU). (2007). *Sustainable energy in Sub-Saharan Africa.* ICSU Regional Office for Africa, Science Plan.

Karekezi, S. (2002). *Poverty and energy in Africa: A brief review.* Energy Policy, 30, 915-919.

Karekezi, S., Kimani, J., & Onguru, O. (2008). *Energy access among the urban poor in Kenya. Energy for Sustainable Development,* 12(4), 38-48.

Karekezi, S., & Majoro, L. (2002). *Improving modern energy services for Africa's urban poor.* Energy Policy, 30, 1015-1028.

Kebede, B., Bekeleb, A., & Kedirc, E. (2002). *Can the urban poor afford modern energy?* The case of Ethiopia. Energy Policy, 30, 1029-1045.

Kersten, I., Baumbach, G., Oluwole, A.F., Obioh, I.B., & Ogunsola, O.J. (1998). *Urban and rural fuelwood situation in the tropical rainforest area of southwestern* Nigeria. Energy, 23 (10), 887-898.

Leach, G. (1988). *Residential energy in the Third World.* Annual Review of Energy, 13, 47-65.

Leach, G. (1992). *The energy transition.* Energy Policy, 20(2), 116-123.

Leach, G., & Mearns, R. (1988). *Beyond the woodfuel crisis: People, land and trees in Africa. London: Earthscan.Martins, J. (2005). The impact of the use of energy sources on the quality of life of poor communities.* Social Indicators Research, 72, 373–402.

Marufu, L., Ludwig, J., Andrae, M.O., Meixner, F.X., & Helas, G. (1997). *Domestic biomass burning in rural and urban Zimbabwe* - Part A. Biomass and Bioenergy, 12(1), 53–68.

Meikle, S., & Bannister, A. (2002). *Significance of energy for poor urban livelihoods: Its contribution to poverty reduction.* DPU News, 44, 2-5.

Mwandosya, M., & Luhanga, M. (1985). *Energy use patterns in Tanzania.* Energy Policy, 14 (4/5), 237-4.

Mwandosya, M., & Luhanga, M. (1993). *Energy and Development in Tanzania: Issues and perspectives, Energy Policy,* 21(5), 441-453.

Ouedraogo, B. (2006). *Household energy preferences for cooking in urban Ouagadougou,* Burkina Faso. Energy Policy, 34, 3787-3795.

Soussan, J., O'Keefe, P., & Munslow, B. (1990). *Urban fuelwood: Challenges and dilemmas.* Energy Policy, 18(6), 572-582.

TANESCO. (2010). *Electricity tariffs.* http://www.tanesco.com/applications.html. Website visited on 02 February 2010 at 1034hrs.

Tanzania Association of Oil Marketing Companies (TAOMC). (2002). *The true cost of charcoal: A rapid appraisal of the potential economic and environmental benefits of substituting LPG for charcoal as an urban fuel in Tanzania.* Dar es Salaam: Norconsult.

United Nations Development Programme (2009). *Human Development Report 2009.* New York: Palgrave Macmillan

United Republic of Tanzania. (2007). *Household Budget Survey 2007.* Dar es Salaam. National Bureau of Statistics (NBS)

Wooldridge, J. M. (2003). *Introductory econometrics: A modern approach* (2nd ed.) Ohio: Thomson South-Western.

World Energy Council. (1999). *The challenge of rural energy poverty in developing countries.* London: World Energy Council/Food and Agriculture Organization of the United Nations.

Appendix

Table 13: Cost of kerosene, LPG and electricity, by urban centre (in TShs)

	Dodoma	Arusha	Kilimanjaro	Tanga	Morogoro	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Kerosene											
Cheapest	28,931.5	50,773.7	38,673.1	26,158.7	27,933.1	30,374.5	30,418.9	18,809.7	19,395.4	22,991.3	38,337.9
Medium	31,181.5	53,023.7	40,923.1	28,408.7	30,183.1	32,624.5	32,668.9	21,059.7	21,645.4	25,241.3	40,587.9
Expensive	36,681.5	58,523.7	46,423.1	33,908.7	35,683.1	38,124.5	38,168.9	26,559.7	27,145.4	30,741.3	46,087.9
Average	32,264.8	54,107.0	42,006.5	29,492.0	31,266.5	33,707.9	33,752.3	22,143.0	22,728.7	26,324.7	41,671.3
LPG											
LPG & stove							375,486.8				
Electricity											
Cheapest	359,052.2	392,690.6	488,281.0	334,607.9	339,654.7	345,689.0	1.18m	489,524.4	339,929.0	340,313.0	353,149.6
Expensive	425,802.2	459,440.6	555,031.0	401,357.9	406,404.7	412,439.0	1.25m	556,274.4	406,679.0	407,063.0	419,899.6
Average	392,427.2	426,065.6	521,656.0	367,982.9	373,029.7	379,064.0	1.21m	522,899.4	373,304.0	373,688.0	386,524.6
Average – all	176,329.8	202,890.5	233,866.3	164,888.4	167,971.8	171,850.3	505,105.4	222,445.6	162,958.8	165,270.0	179,612.6

Table 13: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyanga	Kagera	Mwanza	Mara	Manyara
Kerosene										
Cheapest	27,273.9	19,234.8	28,728.2	28,154.4	31,204.8	26,926.8	30,270.9	36,197.6	32,299.5	34,979.3
Medium	29,523.9	21,484.8	30,978.2	30,404.4	33,454.8	29,176.8	32,520.9	38,447.6	34,549.5	37,229.3
Expensive	35,023.9	26,984.8	36,478.2	35,904.4	38,954.8	34,676.8	38,020.9	43,947.6	40,049.5	42,729.3
Average	30,607.2	22,568.2	32,061.5	31,487.8	34,538.1	30,260.2	33,604.3	39,530.9	35,632.8	38,312.7
LPG										
LPG & stove										
Electricity										
Cheapest	553,707.3	-	356,441.0	399,099.9	651,161.0	385,369.0	377,689.0	594,693.8	951,311.9	332,633.0
Expensive	620,457.3	-	423,191.0	465,849.9	717,911.0	452,119.0	444,439.0	661,443.8	1,018,061.9	399,383.0
Average	587,082.3	-	389,816.0	432,474.9	684,536.0	418,744.0	411,064.0	628,068.8	984,686.9	366,008.0
Average – all	253,197.2	-	175,163.3	191,882.6	294,537.3	185,653.7	184,588.2	274,946.1	415,254.4	169,390.8

Table 14: Energy expenditure by urban centre (in TShs)

	Dodoma	Arusha	Kilimanjaro	Tanga	Morogoro	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Exp. 1	116,605.4	108,118.6	82,859.4	107,781.2	144,196.5	121,281.1	160,943.5	82,801.2	80,113.7	83,085.8	116,749.1
Exp. 2	116605.4	111845.5	97036.45	115235.8	153109.2	185443.8	209219.7	90334.53	87765.15	92553.56	128685.5
Exp. 3	119127.5	120670.8	102335.9	117971.2	167478.1	188777.6	218205.8	95947.87	92479.01	98065.42	136023.9
Firewood exp	39,776.5	44,022.9	29,776.4	69,185.3	58,942.5	49,157.0	32,827.2	26,597.1	35,649.2	32,724.8	66,060.7
Charcoal exp	113,616.7	67,836.5	69,884.3	79,148.4	113,539.3	95,133.0	126,639.2	72,427.4	63,406.9	58,180.6	83,277.1
Electricity exp	85,632.0	106,137.6	201,728.0	52,992.0	53,101.7	59,136.0	909,247.1	202,971.4	53,376.0	53,760.0	66,596.6
Kerosene exp	23,431.4	45,273.7	33,173.1	20,658.7	22,433.1	24,874.5	24,918.9	13,309.7	13,895.4	17,491.3	32,837.9

Table 14: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyang	Kagera	Mwanza	Mara	Manyara
Exp. 1	131,731.0	83,147.0	125,144.0	139,476.2	117,015.6	118,765.0	105,353.6	163,150.5	111,831.6	88,478.5
Exp. 2	137075.7	85755.65	148543.1	159755.9	210909	136165	190553.6	236537.9	128711.1	111817.2
Exp. 3	139785.8	87829.56	154814.2	162983.2	213318.7	139227.4	194308.2	243471.9	136434.2	117575.9
Firewood exp	69,148.2	35,687.7	60,051.1	34,221.8	22,560.0	44,944.2	38,928.0	74,808.2	26,976.6	28,500.0
Charcoal exp	79,428.5	68,156.1	90,036.9	110,569.2	74,805.2	81,782.9	78,566.4	116,455.4	72,651.8	61,005.9
Electricity exp	267,154.3		69,888.0	112,546.9	395,190.8	98,816.0	91,136.0	3,081,408.0	664,758.9	46,080.0
Kerosene exp	21,773.9	13,734.8	23,228.1	22,654.4	25,704.8	21,426.8	24,770.9	30,697.6	26,799.5	29,479.3

Notes:
Exp 1 = Low energy expenditure category: basic energy sources
Exp 2 = Medium energy expenditure category: basic energy sources + transport fuel
Exp 3 = High energy expenditure category: basic energy sources + transport fuel + appliances

Table 15: Energy budget shares by urban centre

	Dodoma	Arusha	Kiliman.	Tanga	Morog.	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Bud.share of the low energy expend. cat.	0.111	0.115	0.073	0.103	0.121	0.090	0.105	0.085	0.117	0.113	0.096
Bud.share of the medium energy expd. cat	0.111	0.117	0.078	0.106	0.126	0.101	0.116	0.088	0.122	0.117	0.101
Bud.share of the low energy expend. cat.	0.113	0.124	0.082	0.108	0.136	0.103	0.121	0.093	0.127	0.124	0.106
Bud. share of firewood from energy bud.	0.269	0.060	0.097	0.254	0.260	0.270	0.016	0.328	0.423	0.430	0.316
Bud. share of charcoal from energy bud.	0.423	0.298	0.260	0.519	0.506	0.415	0.699	0.387	0.353	0.311	0.302
Bud. share of electricity from energy bud.	0.0273	0.0201	0.0314	0.0161	0.0065	0.0077	0.0609	0.0463	0.0073	0.0045	0.0375
Bud. share of kerosene from energy bud.	0.280	0.622	0.612	0.211	0.228	0.307	0.224	0.239	0.217	0.254	0.345

Table 15: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyanga	Kagera	Mwanza	Mara	Manyara
Bud.share of the low energy expend. cat	0.111	0.101	0.118	0.122	0.092	0.099	0.075	0.138	0.111	0.080
Bud.share of the medium energy expd. cat	0.113	0.102	0.123	0.131	0.116	0.102	0.087	0.146	0.115	0.091
Bud.share of the low energy expend. cat.	0.115	0.103	0.128	0.135	0.117	0.105	0.088	0.151	0.122	0.098
Bud. share of firewood from energy budget	0.287	0.478	0.181	0.213	0.093	0.207	0.175	0.177	0.162	0.088
Bud. share of charcoal from energy budget	0.487	0.324	0.566	0.591	0.618	0.577	0.568	0.516	0.478	0.547
Bud. share of electricity from energy budget	0.0223	0.0000	0.0403	0.0392	0.0259	0.0054	0.0391	0.0325	0.0490	0.0159
Bud. share of kerosene from energy budget	0.204	0.198	0.213	0.157	0.263	0.211	0.218	0.274	0.311	0.350

Note: While the budget shares of energy expenditure category 1, 2 and 3 are percentages of total household expenditure, those of individual sources of energy are percentages of total energy budget.

Table 16: Energy expenditure by urban centre – poor households (in TShs)

	Dodoma	Arusha	Kilimanjaro	Tanga	Morogoro	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Exp. 1	62,596.0	60,350.4	29,742.9	61,196.5	60,918.0	43,090.0	80,112.5	31,846.5	57,592.5	57,562.7	83,287.5
Exp. 2	62,596.0	60,350.4	29,971.4	61,196.5	60,918.0	43,090.0	81,037.0	33,394.8	60,675.8	57,789.7	83,287.5
Exp. 3	62,596.0	60,398.4	29,971.4	59,705.1	63,708.0	43,490.0	82,661.5	33,975.5	62,175.8	58,438.4	83,287.5
Firewood exp	29,842.1	37,200.0	37,824.0	40,242.9	49,453.9	24,120.0	33,913.9	24,395.0	35,323.8	33,173.8	48,050.0
Charcoal exp	109,650.0	44,953.9	40,863.2	31,733.3	29,500.0	67,771.1	14,850.0	35,145.9	28,246.2	46,050.0	109,650.0
Electricity exp	19,968.00	-	-	18,432.00	-	-	86,454.86	-	-	-	-
Kerosene exp	8,907.7	27,113.4	13,675.1	17,510.7	9,713.5	20,727.6	13,587.7	8,339.7	10,329.4	11,328.8	28,418.5

Table 16: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyang	Kagera	Mwanza	Mara	Manyara
Exp. 1	96,277.5	58,970.5	47,972.3	81,115.7	62,971.5	67,005.0	37,140.0	80,510.0	70,460.8	49,820.0
Exp. 2	96,277.5	58,970.5	47,972.3	98,258.6	62,971.5	67,005.0	37,140.0	80,510.0	70,460.8	49,820.0
Exp. 3	97,515.0	59,665.3	50,741.5	99,158.6	63,196.5	70,755.0	37,140.0	81,399.9	73,813.8	69,820.0
Firewood exp	64,625.0	25,106.3	47,280.0	41,057.1	20,093.3	41,250.0	31,600.0	37,813.3	27,552.0	9,000.0
Charcoal exp	51,040.0	53,620.0	37,608.0	62,175.0	43,214.1	40,145.5	20,500.0	53,760.0	53,283.3	31,800.0
Electricity exp	-	-	-	-	150,528.00	-	-	-	-	-
Kerosene exp	13,213.3	9,210.2	14,286.7	13,487.0	14,546.3	11,716.5	16,352.5	21,357.1	16,102.7	10,822.3

Notes:
Exp 1 = Low energy expenditure category: basic energy sources
Exp 2 = Medium energy expenditure category: basic energy sources + transport fuel
Exp 3 = High energy expenditure category: basic energy sources + transport fuel + appliances

Table 17: Energy budget shares by urban centre – poor households

	Dodoma	Arusha	Kilimanjo	Tang	Morogoro	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Bud.share of the low energy expend. cat.	0.112	0.120	0.051	0.105	0.100	0.064	0.108	0.095	0.129	0.116	0.110
Bud.share of the medium energy expd. cat	0.112	0.120	0.051	0.105	0.100	0.064	0.109	0.098	0.133	0.117	0.110
Bud.share of the low energy expend. cat.	0.112	0.120	0.051	0.103	0.103	0.067	0.110	0.099	0.136	0.119	0.110
Bud. share of firewood from energy budget	0.438	0.077	0.144	0.248	0.529	0.138	0.050	0.667	0.611	0.599	0.480
Bud. share of charcoal from energy budget	0.234	0.277	0.000	0.431	0.108	0.334	0.690	0.090	0.142	0.195	0.064
Bud. share of electricity from energy budget	0.016	0.000	0.000	0.030	0.000	0.000	0.012	0.000	0.000	0.000	0.000
Bud. share of kerosene from energy budget	0.311	0.646	0.856	0.291	0.362	0.529	0.248	0.243	0.247	0.206	0.456

Table 17: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyang	Kagera	Mwanza	Mara	Manyara
Bud.share of the low energy expend. cat.	0.134	0.103	0.086	0.107	0.110	0.094	0.110	0.157	0.126	0.095
Bud.share of the medium energy expd. cat	0.134	0.103	0.086	0.126	0.110	0.094	0.110	0.157	0.126	0.095
Bud.share of the low energy expend. cat.	0.136	0.104	0.093	0.127	0.111	0.102	0.110	0.158	0.131	0.125
Bud. share of firewood from energy budget	0.538	0.562	0.308	0.332	0.202	0.298	0.170	0.283	0.214	0.308
Bud. share of charcoal from energy budget	0.279	0.247	0.288	0.447	0.478	0.413	0.615	0.325	0.446	0.325
Bud. share of electricity from energy budget	0.000	0.000	0.000	0.000	0.026	0.000	0.000	0.000	0.000	0.000
Bud. share of kerosene from energy budget	0.183	0.191	0.405	0.221	0.294	0.289	0.214	0.391	0.340	0.368

Note: While the budget shares of energy expenditure category 1, 2 and 3 are percentages of total household expenditure, those of individual sources of energy are percentages of total energy budget.

Table 18: Energy expenditures by urban centre – non-poor households (in TShs)

	Dodoma	Arusha	Kilimanj.	Tanga	Morogoro	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Exp. 1	135,017.7	119,492.0	89,270.0	117,043.6	154,260.4	129,165.9	170,263.4	109,574.0	92,586.9	94,744.5	120,225.6
Exp. 2	135,017.7	124,106.3	105,038.5	125,980.5	164,250.1	199,561.5	223,956.5	120,252.0	102,768.5	108,433.3	133,402.2
Exp. 3	138,399.5	134,953.4	110,970.3	129,897.0	180,018.3	203,186.3	233,772.1	128,509.6	109,262.3	116,166.7	141,503.0
Firewood exp	45,675.0	46,044.5	28,744.6	75,419.1	60,632.3	50,330.6	32,493.5	29,533.3	35,955.2	32,441.7	69,104.8
Charcoal exp	114,154.6	72,713.1	69,884.3	85,210.2	116,449.4	100,454.6	133,182.8	77,783.5	68,866.4	66,122.5	85,162.0
Electricity exp	72,499.2	106,137.6	201,728.0	48,054.9	53,101.7	59,136.0	892,207.0	202,971.4	53,376.0	53,760.0	66,596.6
Kerosene exp	29,198.2	49,635.7	35,672.9	21,256.1	24,193.6	25,230.0	26,221.8	15,484.1	15,996.8	20,177.6	33,390.4

Table 18: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyang	Kagera	Mwanza	Mara	Manyara
Exp. 1	135,841.6	100,160.0	143,551.9	155,341.2	128,494.0	124,039.9	114,762.4	188,957.6	128,508.2	91,175.6
Exp. 2	141,805.9	104,604.4	172,532.5	176,312.9	242,329.4	143,213.1	211,714.1	285,092.0	152,191.9	116,142.6
Exp. 3	144,686.8	107,648.9	179,638.9	180,166.7	245,203.0	146,205.5	215,986.5	293,906.9	161,676.6	120,907.7
Firewood exp	69,989.8	45,093.3	63,502.7	31,887.8	23,448.0	45,413.3	39,927.3	96,428.6	26,700.0	31,285.7
Charcoal exp	81,409.1	75,189.7	95,614.5	119,787.1	79,920.0	85,252.7	86,484.6	129,669.2	79,421.4	62,353.9
Electricity exp	267,154.3		69,888.0	112,546.9	364,608.0	98,816.0	91,136.0	3,081,408.0	664,758.9	46,080.0
Kerosene exp	22,905.2	16,952.4	25,491.8	25,323.5	28,231.2	22,586.3	26,033.7	33,955.0	31,328.7	30,983.9

Notes:

Exp 1 = Low energy expenditure category: basic energy sources

Exp 2 = Medium energy expenditure category: basic energy sources + transport fuel

Exp 3 = High energy expenditure category: basic energy sources + transport fuel + appliances

Table 19: Energy budget shares by urban centre – non-poor households

	Dodoma	Arusha	Kilimanj.	Tanga	Morog.	Pwani	DSM	Lindi	Mtwara	Ruvuma	Iringa
Bud. share of the low energy expend. cat.	0.111	0.114	0.076	0.103	0.124	0.092	0.105	0.080	0.111	0.111	0.094
Bud. share of the medium energy expd. cat	0.111	0.116	0.081	0.106	0.129	0.104	0.117	0.083	0.116	0.117	0.101
Bud. share of the low energy expend. cat.	0.113	0.124	0.085	0.109	0.140	0.106	0.122	0.090	0.121	0.126	0.106
Bud. share of firewood from energy budget	0.211	0.056	0.091	0.256	0.227	0.282	0.012	0.156	0.321	0.353	0.299
Bud. share of charcoal from energy budget	0.488	0.303	0.290	0.536	0.554	0.423	0.700	0.538	0.467	0.364	0.327
Bud. share of electricity from energy budget	0.031	0.025	0.035	0.013	0.007	0.008	0.066	0.070	0.011	0.007	0.041
Bud. share of kerosene from energy budget	0.270	0.616	0.583	0.195	0.211	0.286	0.221	0.236	0.201	0.276	0.333

Table 19: continued

	Mbeya	Singida	Tabora	Rukwa	Kigoma	Shinyang	Kagera	Mwanza	Mara	Manyara
Bud. share of the low energy expend. cat.	0.108	0.100	0.126	0.126	0.088	0.099	0.071	0.132	0.105	0.079
Bud. share of the medium energy expd. cat	0.111	0.101	0.132	0.133	0.117	0.103	0.084	0.145	0.111	0.091
Bud. share of the low energy expend. cat.	0.113	0.103	0.136	0.137	0.119	0.105	0.085	0.149	0.118	0.096
Bud. share of firewood from energy budget	0.258	0.420	0.151	0.181	0.070	0.198	0.176	0.144	0.141	0.072
Bud. share of charcoal from energy budget	0.511	0.376	0.632	0.630	0.647	0.593	0.561	0.577	0.491	0.562
Bud. share of electricity from energy budget	0.025	0.000	0.050	0.050	0.026	0.006	0.045	0.043	0.069	0.017
Bud. share of kerosene from energy budget	0.206	0.203	0.168	0.139	0.256	0.203	0.219	0.236	0.299	0.348

Note: While the budget shares of energy expenditure category 1, 2 and 3 are percentages of total household expenditure, those of individual sources of energy are percentages of total energy budget.

Table 20: Calculation of depreciation for fixed components

		Value TShs	Life span (in years)	Interest rate	Annualisation factor	Annualised depreciation
	Kerosene					
1	Lamp	6,500	10	2.75%	0.116	752.31
2	Other Light. Equip. using kerosene	1,250	5	2.75%	0.217	271.00
3	Stove	5,500	10	2.75%	0.116	636.57
	Electricity					
1	Electric stove	66,750	13	2.75%	0.093	6,176.55
2	Bulbs	14,606	1	2.75%	1.028	15,007.67
3	Internal wiring	95,690	20	2.75%	0.066	6,284.10
4	Connection costs (Luku machine)	200,000	15	2.75%	0.083	16,524.19
	LPG					
1	Stove	17,333	15	2.75%	0.082	1,425.80

Table 21: Costs of kerosene, LPG and electricity by urban centres (recurrent and fixed) (in TShs)

		Dar es Salaam	Other Urban	All Urban
	Kerosene			
1	Kerosene + Stove (Cost A)	14,223.97	16,891.67	15,476.07
2	Kerosene + Lamp (Cost B)	14,610.71	17,278.41	15,862.81
3	Kerosene + Stove + Lamp (Cost C)	15,247.28	17,914.98	16,499.38
	Average	**14,693.99**	**17,361.69**	**15,946.09**
	LPG			
1	LPG and stove	376,358.80		
	Electricity			
1	Internal wiring, conn, electric bill & bulbs without stove (A)	124,270.85	100,791.95	117,227.15
2	Internal wiring, conn, electric bill & bulbs with stove (B)	130,447.40	106,968.50	123,403.70
	Average	**127,359.12**	**103,880.22**	**120,315.42**

Publications by REPOA

Books

"*Researching Poverty in Tanzania: problems, policies and perspectives*"
Edited by Idris Kikula, Jonas Kipokola, Issa Shivji, Joseph Semboja and Ben Tarimo

"Local Perspectives on Globalisation: The African Case"
Edited by Joseph Semboja, Juma Mwapachu and Eduard Jansen

"Poverty Alleviation in Tanzania: Recent Research Issues" Edited by M.S.D. Bagachwa

Research Reports

11/2 *'Affordability and Expenditure Patterns for Electricity and Kerosene in Urban Households in Tanzania'*
Emmanuel Maliti and Raymond Mnenwa

11/1 *"Creating Space for Child Participation in Local Governmence in Tanzania: Save the Children and Children's Councils*
Meda Couzens and Koshuma Mtengeti

10/5 *"Widowhood and Vulnerability to HIV and AIDS-related Shocks: Exploring Resilience Avenues"*
Flora Kessy, Iddy Mayumana and Yoswe Msongwe

10/4 *"Determinants of Rural Income in Tanzania: An Empirical Approach"*
Jehovaness Aikaeli

10/3 *"Poverty and the Rights of Children at Household Level: Findings from Same and Kisarawe Districts, Tanzania"*
Ophelia Mascarenhas and Huruma Sigalla

10/2 *"Children's Involvement in Small Business: Does if Build youth Entrepreneurship?"*
Raymond Mnenwa and Emmanuel Maliti

10/1 *"Coping Strategies Used by Street Children in the Event of Illness"*
Zena Amury and Aneth Komba

08.6 *"Assessing the Institutional Framework for Promoting the Growth of MSEs in Tanzania; The Case of Dar es Salaam"*
Raymond Mnenwa and Emmanuel Maliti

08.5 *"Negotiating Safe Sex among Young Women: the Fight against HIV/AIDS in Tanzania"*
John R.M. Philemon and Severine S.A. Kessy

08.4 *"Establishing Indicators for Urban Poverty-Environment Interaction in Tanzania: The Case of Bonde la Mpunga, Kinondoni, Dar es Salaam"*
Matern A.M. Victor, Albinus M.P. Makalle and Neema Ngware

08.3 *"Bamboo Trade and Poverty Alleviation in Ileje District, Tanzania"*
Milline Jethro Mbonile

08.2 *"The Role of Small Businesses in Poverty Alleviation: The Case of Dar es Salaam, Tanzania"*
Raymond Mnenwa and Emmanuel Maliti

08.1 *"Improving the Quality of Human Resources for Growth and Poverty Reduction: The Case of Primary Education in Tanzania"*
Amon V.Y. Mbelle

07.2 *"Financing Public Heath Care: Insurance, User Fees or Taxes? Welfare Comparisons in Tanzania"*
Deograsias P. Mushi

07.1 *"Rice Production in the Maswa District, Tanzania and its Contribution to Poverty Alleviation"*
Jerry A. Ngailo, Abiud L. Kaswamila and Catherine J. Senkoro

06.3 *"The Contribution of Microfinance Institutions to Poverty Reduction in Tanzania"*
Severine S.A. Kessy and Fratern M Urio

06.2 *"The Role of Indigenous Knowledge in Combating Soil Infertility and Poverty in the Usambara Mountains, Tanzania*"
Juma M. Wickama and Stephen T. Mwihomeke

06.1 *"Assessing Market Distortions Affecting Poverty Reduction Efforts on Smallholder Tobacco Production in Tanzania"*
Dennis Rweyemamu and Monica Kimaro

05.1 *"Changes in the Upland Irrigation System and Implications for Rural Poverty Alleviation. A Case of the Ndiwa Irrigation System, West Usambara Mountains, Tanzania"*
Cosmas H. Sokoni and Tamilwai C. Shechambo

04.3 "*The Role of Traditional Irrigation Systems in Poverty Alleviation in Semi-Arid Areas: The Case of Chamazi in Lushoto District, Tanzania*"
Abiud L. Kaswamila and Baker M. Masuruli

04.2 "*Assessing the Relative Poverty of Clients and Non-clients of Non-bank Micro-finance Institutions. The case of the Dar es Salaam and Coast Regions*"
Hugh K. Fraser and Vivian Kazi

04.1 "*The Use of Sustainable Irrigation for Poverty Alleviation in Tanzania. The Case of Smallholder Irrigation Schemes in Igurusi, Mbarali District"*
Shadrack Mwakalila and Christine Noe

03.7 *"Poverty and Environment: Impact analysis of Sustainable Dar es Salaam Project on "Sustainable Livelihoods" of Urban Poor"*
M.A.M. Victor and A.M.P. Makalle

03.6 *"Access to Formal and Quasi-Formal Credit by Smallholder Farmers and Artisanal Fishermen: A Case of Zanzibar"*
Khalid Mohamed

03.5 *"Poverty and Changing Livelihoods of Migrant Maasai Pastoralists in Morogoro and Kilosa Districts"*
C. Mung'ong'o and D. Mwamfupe

03.4 *"The Role of Tourism in Poverty Alleviation in Tanzania"*
Nathanael Luvanga and Joseph Shitundu

03.3 *"Natural Resources Use Patterns and Poverty Alleviation Strategies in the Highlands and Lowlands of Karatu and Monduli Districts – A Study on Linkages and Environmental Implications"*
Pius Zebbe Yanda and Ndalahwa Faustin Madulu

03.2 *"Shortcomings of Linkages Between Environmental Conservation and Poverty Alleviation in Tanzania"*
Idris S. Kikula, E.Z. Mnzava and Claude Mung'ong'o

03.1 *"School Enrolment, Performance, Gender and Poverty (Access to Education) in Mainland Tanzania"*
A.V.Y. Mbelle and J. Katabaro

02.3 *"Poverty and Deforestation around the Gazetted Forests of the Coastal Belt of Tanzania"*
Godius Kahyarara, Wilfred Mbowe and Omari Kimweri

02.2 *"The Role of Privatisation in Providing the Urban Poor Access to Social Services: the Case of Solid Waste Collection Services in Dar es Salaam"* Suma Kaare

02.1 *"Economic Policy and Rural Poverty in Tanzania: A Survey of Three Regions"*
Longinus Rutasitara

01.5 *"Demographic Factors, Household Composition, Employment and Household Welfare"*
S.T. Mwisomba and B.H.R. Kiilu

01.4 *"Assessment of Village Level Sugar Processing Technology in Tanzania"*
A.S. Chungu, C.Z.M. Kimambo and T.A.L. Bali

01.3 *"Poverty and Family Size Patterns: Comparison Across African Countries"*
C. Lwechungura Kamuzora

01.2 *"The Role of Traditional Irrigation Systems (Vinyungu) in Alleviating Poverty in Iringa Rural District"*
Tenge Mkavidanda and Abiud Kaswamila

01.1 *"Improving Farm Management Skills for Poverty Alleviation: The Case of Njombe District"*
Aida Isinika and Ntengua Mdoe

00.5 *"Conservation and Poverty: The Case of Amani Nature Reserve"*
George Jambiya and Hussein Sosovele

00.4 *"Poverty and Family Size in Tanzania: Multiple Responses to Population Pressure?"*
C.L. Kamuzora and W. Mkanta

00.3 *"Survival and Accumulation Strategies at the Rural-Urban Interface: A Study of Ifakara Town, Tanzania"*
Anthony Chamwali

00.2 *"Poverty, Environment and Livelihood along the Gradients of the Usambaras on Tanzania"*
Adolfo Mascarenhas

00.1 *"Foreign Aid, Grassroots Participation and Poverty Alleviation in Tanzania: The HESAWA Fiasco"* S. Rugumamu

99.1 *"Credit Schemes and Women's Empowerment for Poverty Alleviation: The Case of Tanga Region, Tanzania"*
I.A.M. Makombe, E.I. Temba and A.R.M. Kihombo

98.5 *"Youth Migration and Poverty Alleviation: A Case Study of Petty Traders (Wamachinga) in Dar es Salaam"*
A.J. Liviga and R.D.K Mekacha

98.4 *"Labour Constraints, Population Dynamics and the AIDS Epidemic: The Case of Rural Bukoba District, Tanzania"*
C.L. Kamuzora and S. Gwalema

98.3 *"The Use of Labour-Intensive Irrigation Technologies in Alleviating Poverty in Majengo, Mbeya Rural District"*
J. Shitundu and N. Luvanga

98.2 *"Poverty and Diffusion of Technological Innovations to Rural Women: The Role of Entrepreneurship"*
B.D. Diyamett, R.S. Mabala and R. Mandara

98.1 *"The Role of Informal and Semi-Formal Finance in Poverty Alleviation in Tanzania: Results of a Field Study in Two Regions"*
A.K. Kashuliza, J.P. Hella, F.T. Magayane and Z.S.K. Mvena

97.3 *"Educational Background, Training and Their Influence on Female-Operated Informal Sector Enterprises"*
J. O'Riordan. F. Swai and A. Rugumyamheto

97.2 *"The Impact of Technology on Poverty Alleviation: The Case of Artisanal Mining in Tanzania"*
B W. Mutagwaba, R. Mwaipopo Ako and A. Mlaki

97.1 *"Poverty and the Environment: The Case of Informal Sandmining, Quarrying and Lime-Making Activities in Dar es Salaam, Tanzania"*
George Jambiya, Kassim Kulindwa and Hussein Sosovele

Special Papers

11/1 *"Tracer Study on two Repoa Training Courses: Budget Analysis and Public Expenditure Tracking System"*
Ophelia Mascarenhas

10/5 *"Social Protection of the Elderly in Tanzania: Current Status and Future Possibilities"*
Thadeus Mboghoina and Lars Osberg

10/4 *"A Comparative Analysis of Poverty Incidence in Farming Systems of Tanzania"*
Raymond Mnenwa and Emmanuel Maliti

10/3 *"The Tanzania Energy Sector: The Potential for Job Creation and Productivity Gains Through Expanded Electrification"*
Arthur Mwakapugi, Waheeda Samji and Sean Smith

10/2 *"Local Government Finances and Financial Management in Tanzania: Empirical Evidence of Trends 2000 - 2007' Reforms in Tanzania"*
Odd-Helge Fjeldstad, Lucas Katera, Jamai sami and Erasto Ngalewa

10/1 *"The Impact of Local Government Reforms in Tanzania"*
Per Tidemand and Jamal Msami

09.32 *"Energy Sector: Supply and Demand for Labour in Mtwara Region"*
Waheeda Samji, K.Nsa-Kaisi and Alana Albee

09.31 *"Institutional Analysis of Nutrition in Tanzania"*
Valerie Leach and Blandina Kilama

09.30 *"Influencing Policy for Children in Tanzania: Lessons from Education, Legislation and Social Protection"*
Masuma Mamdani, Rakesh Rajani and Valerie Leach with Zubeida Tumbo-Masabo and Francis Omondi

09.29 *"Maybe We Should Pay Tax After All? Citizens' Views of Taxation in Tanzania"*
Odd-Helge Fjeldstad, Lucas Katera and Erasto Ngalewa

09.28 *"Outsourcing Revenue Collection to Private Agents: Experiences from Local Authorities in Tanzania"*
Odd-Helge Fjeldstad, Lucas Katera and Erasto Ngalewa

08.27 *"The Growth – Poverty Nexus in Tanzania: From a Developmental Perspective"*
Marc Wuyts

08.26 *"Local Autonomy and Citizen Participation In Tanzania - From a Local Government Reform Perspective."*
Amon Chaligha

07.25 *"Children and Vulnerability In Tanzania: A Brief Synthesis"*
Valerie Leach

07.24 *"Common Mistakes and Problems in Research Proposal Writing: An Assessment of Proposals for Research Grants Submitted to Research on Poverty Alleviation REPOA (Tanzania)."*
Idris S. Kikula and Martha A. S. Qorro

07.23 *"Guidelines on Preparing Concept Notes and Proposals for Research on Pro-Poor Growth and Poverty in Tanzania"*

07.22 *"Local Governance in Tanzania: Observations From Six Councils 2002-2003"*
Amon Chaligha, Florida Henjewele, Ambrose Kessy and Geoffrey Mwambe

07.21 *"Tanzanian Non-Governmental Organisations – Their Perceptions of Their Relationship with the Government of Tanzania and Donors, and Their Role and Impact on Poverty Reduction and Development"*

06.20 *"Service Delivery in Tanzania: Findings from Six Councils 2002-2003"*
Einar Braathen and Geoffrey Mwambe

06.19 *"Developing Social Protection in Tanzania Within a Context of Generalised Insecurity"*
Marc Wuyts

06.18 *"To Pay or Not to Pay? Citizens' Views on Taxation by Local Authorities in Tanzania"*
Odd-Helge Fjeldstad

17 *"When Bottom-Up Meets Top-Down: The Limits of Local Participation in Local Government Planning in Tanzania"*
Brian Cooksey and Idris Kikula

16 *"Local Government Finances and Financial Management in Tanzania: Observations from Six Councils 2002 – 2003"*
Odd-Helge Fjeldstad, Florida Henjewele, Geoffrey Mwambe, Erasto Ngalewa and Knut Nygaard

15 *"Poverty Research in Tanzania: Guidelines for Preparing Research Proposals"*
Brian Cooksey and Servacius Likwelile

14 *"Guidelines for Monitoring and Evaluation of REPOA Activities"*
A. Chungu and S. Muller-Maige

13 *"Capacity Building for Research"*
M.S.D. Bagachwa

12 *"Some Practical Research Guidelines"*
Brian Cooksey and Alfred Lokuji

11 *"A Bibliography on Poverty in Tanzania"*
B. Mutagwaba

10 *"An Inventory of Potential Researchers and Institutions of Relevance to Research on Poverty in Tanzania"*
A.F. Lwaitama

9 *"Guidelines for Preparing and Assessing REPOA Research Proposals"*
REPOA Secretariat and Brian Cooksey

8 *"Social and Cultural Factors Influencing Poverty in Tanzania"*
C.K. Omari

7 *"Gender and Poverty Alleviation in Tanzania: Issues from and for Research"*
Patricia Mbughuni

6 *"The Use of Technology in Alleviating Poverty in Tanzania"*
A.S. Chungu and G.R.R. Mandara

5 *"Environmental Issues and Poverty Alleviation in Tanzania"*
Adolfo Mascarenhas

4 *"Implications of Public Policies on Poverty and Poverty Alleviation: The Case of Tanzania"*
Fidelis Mtatifikolo

3 *"Who's Poor in Tanzania? A Review of Recent Poverty Research"*
Brian Cooksey

2 *"Poverty Assessment in Tanzania: Theoretical, Conceptual and Methodological Issues"*
J. Semboja

1 *"Changing Perceptions of Poverty and the Emerging Research Issues"*
M.S.D. Bagachwa

Project Briefs

Brief 26 Tracer Study on REPOA Training Courses for Research Users: Budget Analysis and Public Expenditure Tracking System

Brief 25 Transparency in Local Finances in Tanzania. 2003-2009

Brief 24 Social Protection of the Elderly in Tanzania: Current Status and Future Possibilities

Brief 23 Children's Involvement in Small Business: Does it Build Youth Entrepreneurship?

Brief 22 Challenges in data collection, consolidation and reporting for local government authorities in Tanzania

Brief 21 Children's Involvement in Small Business: Does it Build Youth Entrepreneurship?

Brief 20 Widowhood and Vulnerability to HIV and AIDS Related Shocks: Exploring Resilience Avenues

Brief 19 Energy, Jobs and Skills: A Rapid Assessment in Mtwara, Tanzania

Brief 18 Planning in Local Government Authorities in Tanzania: Bottom-up Meets Top-down

Brief 17 The Investment Climate in Tanzania: Views of Business Executives

Brief 16 Assessing the Institutional Framework for Promoting the Growth of Micro and Small Enterprises (MSEs) in Tanzania: The Case of Dar es Salaam

Brief 15 Preventing Malnutrition in Tanzania: A Focused Strategy to Improve Nutrition in Young Children

Brief 14 Influencing Policy for Children in Tanzania: Lessons from Education, Legislation and Social Protection

Brief 13 Disparities Exist in Citizens' Perceptions of Service Delivery by Local Government Authorities in Tanzania

Brief 12 Changes in Citizens' Perceptions of the Local Taxation System in Tanzania

Brief 11 Citizens Demand Tougher Action on Corruption in Tanzania

Brief 10 Outsourcing Revenue Collection: Experiences from Local Government Authorities in Tanzania

Brief 9 Children and Vulnerability in Tanzania: A Brief Overview

Brief 8 Mawazo ya AZISE za Tanzania Kuhusu Uhusiano Wao na Wafadhili

Brief 7 Mawazo ya AZISE za Tanzania Kuhusu Uhusiano Wao na Serikali

Brief 6 Local Government Reform in Tanzania 2002 - 2005: Summary of Research Findings on Governance, Finance and Service Delivery

Brief 5 Children Participating in Research

Brief 4 Changes in Household Non-Income Welfare Indicators - Can poverty mapping be used to predict a change in per capita consumption over time?

Brief 3 Participatory Approaches to Local Government Planning in Tanzania, the Limits to Local Participation

Brief 2 Improving Transparency of Financial Affairs at the Local Government Level in Tanzania

Brief 1 Governance Indicators on the Tanzania Governance Noticeboard Website

TGN1 What is the Tanzania Governance Noticeboard?

LGR 12 Trust in Public Finance: Citizens' Views on taxation by Local Authorities in Tanzania

LGR 11 Domestic Water Supply: The Need for a Big Push

LGR10 Is the community health fund better than user fees for financing public health care?

LGR 9 Are fees the major barrier to accessing public health care?

LGR 8 Primary education since the introduction of the Primary Education Development Plan

LGR 7 Citizens' access to information on local government finances

LGR 6 Low awareness amongst citizens of local government reforms

LGR 5 Fees at the dispensary level: Is universal access being compromised?

LGR 4 TASAF – a support or an obstacle to local government reform

LGR 3 Councillors and community leaders – partnership or conflict of interest? Lessons from the Sustainable Mwanza Project

LGR 2 New challenges for local government revenue enhancement

LGR 1 About the Local Government Reform Project

Research on Poverty Alleviation, REPOA, is an independent, non-profit organization concerned with poverty and related policy issues in Tanzania. REPOA undertakes and facilitates research, enables monitoring, and promotes capacity building, dialogue and knowledge sharing.

REPOA's research agenda is concerned with poverty and its alleviation. Our objectives are to:

- develop the research capacity in Tanzania;
- enhance stakeholders' knowledge of poverty issues and empower them to act;
- contribute to policy dialogue;
- support the monitoring of the implementation of poverty related policy;
- strengthen national and international poverty research networks, and forge linkages between research(ers) and users.

It is our conviction that research provides the means for the acquisition of knowledge necessary for improving the quality of welfare in Tanzanian society.

REPOA's Research Reports contain the result of research financed by REPOA. Our Special Papers contain the findings of commissioned studies conducted under our programmers of research, training and capacity building. The authors of these research reports and special papers are entitled to use their material in other publications; with acknowledgement to REPOA.

REPOA has published the results from this research as part of our mandate to disseminate information. Any views expressed are those of the authors alone and should not be attributed to REPOA.

Research on Poverty Alleviation (REPOA)
P.O. Box 33223, Dar es Salaam, Tanzania
157 Mgombani Street, Regent Estate
Tel: +255(0) (22) 270 00 83 / 277 25 56
Fax: +255(0) (22) 277 57 38
Email: repoa@repoa.or.tz
Website: www.repoa.or.tz

ISBN: 978 - 9987 - 615 - 63 - 6