

**International Masters in Environmental Studies & Sustainability Sciences
Lund University, Lund – Sweden**



Energy-Poverty and its Impacts on Peri-urban Zones of Huambo City, Angola



By Filomena S. M. Cornelio

**First Supervisor: Linley Chiwona Karlton, PhD
Dept. of Urban & Rural Development, Swedish University of Agricultural Sciences
Uppsala – Sweden**

**Second Supervisor: Michael A. Cohen, PhD
Graduate Program of International Affairs
New School University of Social Research
New York, New York - USA**

ACKNOWLEDGEMENTS

This research and Masters of Science academic education was made possible by the generous support of SIDA, The Swedish International Development Agency. Thank you for supporting my research inquiry both at sea and at land in Angola. I see the world differently now.

My Thesis Supervisors

I would like to kindly acknowledge the support of my Senior Supervisor, Linley Chiwona Karlton, PhD, whose incredible patience saw me through the process until the very end. Thank you. In addition, I am forever counting my blessings for my Second Supervisor, Michael A. Cohen, PhD whose generosity to me can not be described in words.

I would like to thank Teresa Malyshev from the International Energy Agency for her kind advice and feedback. I am extremely grateful for Caroline O. N. Moser's input, criticism and kindness.

Family and Friends

In Sweden, I am very grateful for my very dear friend, Olivia Louw – the diligent guidance. I also would like to acknowledge Aaron Thomas, who has the most helpful soul that I have ever come across especially regarding to my questions related to freedoms! I would also like to thank my brother Frederick for his never-ending kindness and patience and also Gio. I could not have accomplished my Masters of Science degree in a foreign land without the loyal and loving support of my adopted Swedish family the Svenssons. Thank you for showing the beauty of Swedish people and Skåne. In America, I would like to acknowledge Mrs. Alice Cornelio and my beloved family. I am especially grateful for the life-time support of my dear godparents Mrs. Philomena and Mr. Frederick Sawyer, who around age 7 first planted first seeds of how important ecology through camping trips in the mountains of New Hampshire, America. In addition a big thanks to my dear friends Kaveesha, Jo and Tres!

In Angola I am grateful for my family Tio Joanatao e Tia Rosaria Capamba who fed me, and gave me very warm shelter during my stay in Huambo City. In addition, a very special thanks to my Avo Joao Baptista Kussuma and Primo General Mackenzie for helping facilitate my field study in Angola.

Also in Angola, I would like to especially thank Sr. Allan Cain from NGO called Development Workshop, as well as his fellow staff in Huambo City and Luanda for their kindness and field-research support. Finally a big and warm THANK YOU to the following individuals: Sr. Francisco Talino, Sr. Joao Baptista Borges, Sr. Tomas Cateono, Sr. Bau, Sr. Moreiera Bahu, Sr. Miguel Alberto Neto, and Dr. Da Fonesca for making themselves available for my field-work interviews in Luanda and Huambo City. Muito obrigada para seu ajudar!

DEDICATION

I would like to dedicate my thesis to the loving memory of my beloved father, Sr. Aarao Meneses Cornelio born in Bunjei, married and lived in Huambo City, who at the moment is delighted that his daughter made it to the family ancestral home via education.

I miss you and felt you in the fields of Sakahala.

b.1937 – d.1996

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	2
DEDICATION	3
Abbreviations	5
Abstract	6
1. Introduction	7
1.1 Urban and Peri-urban Concept Definition	8
1.2 Research Aim.....	10
1.3 Research Questions	10
1.4 Limitations of study	10
1.5 Sustainable Development.....	10
1.6 Thesis Outline	11
1.7 Ethical Considerations	11
2. Literature Review and Theoretical Framework	12
2.1 Literature Review.....	12
2.1.1 The Re-emergence and Realization of Energy Access in Human Development.....	12
2.1.2 <i>Earlier Energy-Poverty Strategies and its Linkages to Western Liberal Assumptions</i>	13
2.1.3 <i>Reframing Rural bias to also include Cities</i>	15
2.2 Theoretical Frameworks: Amartya Sen and Caroline O. N. Moser.....	16
2.2.1 <i>Amartya Sen: Capabilities Framework</i>	16
2.2.2 <i>Caroline O. N. Moser: Triple Role Theory</i>	18
3. 1 Country Context: Angola.....	21
3.2.1 Huambo City Historical Background.....	22
3.3 Field Work Introduction.....	25
3.3.1 <i>Development Workshop</i>	27
3.3.2 <i>Field Work Area: March 11th – April 4th, 2008</i>	27
3.3.3 <i>Huambo definition of marriage and households</i>	28
3.4 Data Collection Findings	29
3.4.1 <i>Gendered Energy Needs</i>	31
3.4.2 <i>Women’s Gendered Energy Needs</i>	32
3.4.3 <i>Time Poverty</i>	33
3.4.4 <i>Hunger related to energy scarcity</i>	34
3.4.5 <i>Shelter and Indoor Air Pollution</i>	34
3.4.6 <i>Health Data Findings: Vision and Coughing</i>	36
3.5 Charcoal producers	39
4. Research Analysis	40
5. Conclusion	42
6. Future Considerations	43
7. Bibliography	45
8. APPENDIX	49

Abbreviations

Agriculture and Development's National Institute for Forestry Development.....	IDF
Gender and Development.....	GAD
Human Development.....	HD
Human Development Index.....	HDI
International Energy Agency.....	IEA
Millennium Development Goals.....	MDGs
Organization of Economic Development.....	OECD
Sub-Sahara Africa.....	SSA
United Nations Development Program.....	UNDP
World Food Program.....	WFP
Women in Development.....	WID
World Health Organization.....	WHO
World Summit on Sustainable Development.....	WSSD

Abstract

Angola currently has the world's highest economic growth rate at 21.1%, due to its vast offshore energy resources, yet the country's Human Development Index (HDI) ranking is one of the lowest in the world. Of the 177 countries measured, Angola ranks 162. Among the factors constraining human development for the mass population of Angolans, is the lack of sustainable energy services for households. This thesis argues that access to sustainable energy carriers (e.g. modern forms of biofuels) is an essential input to widening the potential combination of functionings¹ that constitute and promote human development. Specifically, the thesis examines the role of energy-poverty in inhibiting the alternative potential of functionings that women in Angola may achieve, by introducing the capability framework (of Amartya Sen) and gender and development approach triple-role theory (of Caroline O. N. Moser). The thesis seeks to understand the current situation and inform appropriate energy-interventions. By selecting Huambo City households for study areas, the thesis seeks to understand how the capability perspective can inform on the drivers of urban poverty, including how gender and energy-poverty are related. Data derived from pilot survey, key informants, survey questionnaire, semi-structured interviews with 50 households and literature review. Research completed seems to indicate that lack of sustainable energy services in Sassonde and Constantino Camoli (rural and urban settlements respectively) severely impoverishes the wellbeing of households, with energy poverty being more acute in rural than urban areas. It additionally indicates that there exists gender dimensions to energy-poverty, i.e. women's health is poor as a result of indoor air pollution. Poverty prevents many households (lack of various functionings) to move up the energy ladder independently. Hunger was also found as a correlate to energy-poverty: a direct result of the lack of woodfuel or charcoal for cooking. Energy services such as cooking are valued differently depending on gender, with different priorities placed on reproductive tasks and leisure. Additionally, poor forms of energy carriers (charcoal or woodfuel) robs women's productive time, as on average, they walk 4 kilometers to collect fuel wood spend or over 5 hours ironing a small basket of clothes, or cooking food. However, both men and women play a role in supplying and producing charcoal fuel. Deforestation is a big problem due to energy scarcity in the form of electricity. The research concludes that to address energy security issues for poorer households, solutions must be derived from a gendered analysis, reflecting on gendered needs with implications for user-end technology including identifying the key factors in order to resolve the deforestation problems.

Key Words

Engendered division of labor Sustainability; Energy Service; Energy Carriers; Traditional Biomass Fuels; Gender and Development; Capability Deprivation; Urbanization; Deforestation; Indoor Air Pollution; Time Poverty; Charcoal, and Woodfuel.

¹ This refers to a person's "...ability to do and be" (Sen, 2000).

1. Introduction

Recent figures placing Angola's economic growth rate, 21.1%, at the highest in the world have been attributed solely to the current surge in the world demand for fossil fuels (Economist 2008: 107). Angola is rich in energy resources, and thus capable of meeting some of the current global demand. Notwithstanding, this high level of economic growth does not serve as a useful indicator for measuring the well-being of the majority of Angolans.

The 2007/2008 UNDP fact sheet for Angola places the country's HDI at among the lowest in the world, ranking Angola 162 out of 177 countries. The HDI uses a set of criteria for measuring wellbeing that goes beyond income or GDP. Life expectancy, for example, is used as an indicator, and in Angola the average life expectancy is low. Another factor used in determining the HDI is the literacy rate: 67% of Angolans above age 15 are literate. Considering Angola is located in one of the world's poorest regions, compounded by decades-long civil war, this may not seem surprising. However, what is alarming is that the combined primary, secondary, and tertiary gross school enrollment is estimated at a mere 25%.² According to the World Bank, educational attainment is a vital component in a country's portfolio of intangible assets, including human capital, that contribute to wealth and long-term development (Hamilton et al, 2006: 101). Despite Angola figuratively being on top of the world in terms of current economic growth rates, the country remains close to the bottom in terms of Human Development (HD).

The thesis would like to shed light on the factors impoverishing Angolans, and attempt to elucidate human development beyond an understanding embedded solely in economic growth, by employing Amartya Sen's (2000) Capabilities Perspective and Deprivations of Essential Functions (i.e. life expectancy and literacy) as mechanisms that better informs on levels of human welfare in Angola. One dimension of this poverty is ***energy poverty***, which is the focus of this study. According to Clancy (2003: 4), energy-poverty denotes the absence of options in accessing reliable, high quality, safe, affordable and environmentally safe energy services to support economic and human development. Only between 8 to 20% of the Angolan population has access to electricity services (IEA/OECD: 2006: 43). This means that the majority of Angolans are using traditional biomass fuels³ to obtain household energy services.

The uses of traditional biomass fuels may exacerbate poverty and result in sub-optimal wellbeing. According to the IEA, the health implications of using these fuels are any of the following: respiratory diseases, blindness, heart disease, asthma and acute respiratory infections, obstetrical problems such as still birth, among others

² UNDP HDI Country Fact Sheet: Angola http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_AGO.html

³ Traditional biomass fuels are generally woodfuel, charcoal, dung or agricultural residues

(IEA,/OECD: 2006: 147). Women are the central focus of the study as they are the primary consumers of traditional biomass fuels for reproductive work in the household (Modi et al, 2005: 25). Thus, women are the main recipients of the negative socio-economic implications of traditional biomass fuels. The IEA reports that in Angola, 70% of all people living in poverty are women (IEA/OECD, 2006: 148). The research work then includes a gendered understanding of the triple-role work theory advanced by Caroline O. N. Moser in traditional biomass fuels in Angolan households.

1.1 Urban and Peri-urban Concept Definition

Many governments use an array of different geographical and non-geographical criterias to define urban and peri-urban. Many countries use a prescribed number of residential population to determine whether an area is urban. Population requirements vary throughout the world. Cohen (2006: 66) informs that there are regional variations among Sub-Saharan African (SSA) countries. For example, Benin considers a place urban if it has 10,000 or more residents, whereas in Angola a place is urban if it has 2000 or more residents (*ibid*).

Angola is experiencing high rates of urbanization. According to Cain (2007: 361) more than 50% of Angolan population currently lives in cities, and three-quarters of them live in **peri-urban** zones. Any expanse of land or region situated between the city or town edge on the outskirts of a city or town to the countryside is generally considered as a peri-urban zone.⁴ The NGO called Development Workshop (2008) estimates that Huambo City's periphery zones have 250,000 residents, and the areas that make up its city-center have 60,000 residents⁵.

Freund (2001: 529) claims that during European colonial rule many Africans migrated from their rural homesteads to cities, because of the growing urban economy, which offered better livelihood options. According to Magobjune (1990: 128) European settlers in African colonial cities welcomed the African labor, however opted for segregationist housing policies. Fredun (2001: 533) claims that European urban settlers felt that living among African settlers may make them vulnerable to disease and sickness. Coquery-Vidrovitch (1991: 69) confirms that when European colonialism began in Africa, its urban housing policy promoted the development of two different residential areas. The European settlers generally lived in the city-center and Africans in the city's periphery.

⁴ <http://www.eionet.europa.eu/gemet/concept?langcode=en&cp=11309>

⁵ Development Workshop Power Point Presentation. Workshop sobre: Descentralização e Participação: intercambio de Experiências entre Angola, Brasil e Moçambique. Intervenção da DW em áreas peri-urbanas na cidade do Huambo: projecto piloto da gestão de terra no Bairro de Fátima Development Workshop Power-point presentation. Slide number 6.

Mabogunje (1990: 126) claims that former European colonial urban planning remains present in the spatial formation of African cities. Angolan cities fall into such a category, primarily due to their long history of civil war, which hindered formal African urban planning from ensuing. In fact, there is slight departure from the spatial - urban formations of Huambo City as conceived under colonial Portuguese rule. Therefore, the geographical criteria of Huambo City's urban (center) and peri-urban zones (city edge to countryside) as established during the colonial era are considered for my study.

My second non-geographical criteria with Portuguese colonial rule urban and peri-urban sites relates to the types of materials used to construct dwellings in both areas. Cain et al (2002: 9) claims that during the Portuguese colonial administration Angolan cities were designed to have cemented and uncemented areas. Robson and Roque (2001: 73) state that cement material in Huambo City is expensive to construct homes. Cain et al (2002: 9) affirm that the cement area was mainly occupied by Portuguese, and considered the city center.

Robson and Roque (2001: 73) affirm that in Huambo City most homes that are not made of cement, but are built of sun-dried blocks are primarily situated in the peri-urban areas. Since, my research seeks to highlight *wellbeing* in peri-urban zones, both study areas are situated in areas that are uncemented and dwellings are primarily constructed of sun-dried block material. I also make use of Robson and Roque (2001: 10) following parameters to define Angolan peri-urban areas:

- “the absence of communal public services: piped water, sewers, refuse collection, telephones and tarred roads;
- proliferation of informal construction, in other words outside the State's physical planning and building control systems.”

My two study areas are located in Huambo City's periphery zones, however in the following thesis sections: *Field Work Introduction, Field Work, Data Findings, Analysis and Conclusion* one periphery study area is called urban and the other periphery study area is called rural. This is because one area has more urban features and the other has more rural features. For example, the **urban**-periphery site has a high population density, more access to public facilities (schools and clinic), and its residents mostly earn wages from non-agricultural work. The **rural**-periphery site has a lower population density, less access to public facilities, and livelihoods are primarily engaged in subsistence agriculture.

1.2 Research Aim

The aim of this thesis is to explore how the use of traditional biomass at the household level impact on women's wellbeing⁶ and gender relations⁷ in the peri-urban communities of Huambo City, Angola.

1.3 Research Questions

1. How do differences in the consumption patterns of biomass fuels between urban (Constantino Camoli) and rural (Sassonde) locations manifests themselves?
2. If there are distinctions, in what ways is it reflected in household wellbeing?
3. What assumptions, if any, can be made about gendered energy needs in both study areas?

1.4 Limitations of study

Up to date statistical health data is not currently available at the Huambo City Central Hospital. Lastly, publications about Angola tend to focus on issues related to “good governance”, “resource-curse” and “resource-war”. **Those themes are not discussed**, as those areas are already widely published and accessible. Rather, the scope of this research is to contribute to an area of Angola, that has received scarce academic attention, energy-poverty in relation to gender relations in urban centers. Thus, the focus of the thesis does not deviate from energy-poverty and gender relations in household.

1.5 Sustainable Development

In order for the government of Angola to foster Sustainable Development, policies are required to integrate the social, political, economic and environmental dimensions of the country. It involves a slew of actors from State institutions, private sector (local and foreign), social factors that scale up human development (such as literacy, education and health) and create mechanisms that prevent degradation of its natural capital that its population rely upon to satisfy their basic needs (such as trees – for household fuels), including enjoying its intrinsic beauty.

This idea of sustainability being interlinked to socio-economic development made its way onto the world stage due to the widely circulated report “Our Common Future” published in 1987 by the United Nations’ Brundtland Commission Sustainable development. “The commission defined sustainability and in particular sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (Boyle et al, 2003: 6).

⁶ Well-being refers to Amartya Sen’s notion of human development, which constitutes both social evaluative (health and literacy) and agency (the ability to transform one’s own life and others) dimensions (Sen 2000).

⁷ Gender-relations refer to Caroline O. N. Moser gender and development approach which seeks to analyze how women are subordinated to men in all three of their roles (triple role): productive, reproductive and community.

It is proposed in this thesis that in order to enable sustainable development to take root in Angola, mechanisms that enable sustainable energy services should be advanced. According to UNDP sustainable development in the low-income world is impossible to achieve without addressing the fact that over 2 billion poor do not have access to sustainable energy sources (WEHAB, 2002: 7).

1.6 Thesis Outline

First, the ethical consideration taken to conduct the field study is presented. Next, the literature review and theoretical frameworks are discussed. The literature review presents themes related to energy-poverty such as development policy, using the MDGs as an entry point, and then briefly explains how the recent re-engagement with energy-interventions into the South has come about. Prior energy-interventions and its considerations of why policies may have been not effective are explored. The last section of the literature review focuses on the Rural Bias in the development discourse, and presents findings that suggest how urbanization requires a new focus that includes a focus on developing cities. Following that is a brief historical overview of Angola and Huambo City. Then the theoretical frameworks of Amartya Sen and of Caroline O. N. Moser are provided. The methods section presents the cross-sectional study that uses both qualitative and quantitative methods. Study areas where the field study took place are also presented. It is followed by research findings and data finding analysis. The thesis ends with conclusions, which makes some energy-intervention suggestions.

1.7 Ethical Considerations

Ethical consideration was given by the NGO, who is nationally recognized as contributing to the improvement of Angolan Poor's lives. Any academic research studies, and consultancies related to scaling up basic services is officially approved. Even so, an introduction and courtesy call was made to several governmental institutions located in both Luanda and Huambo in the initial phase of the fieldwork. In addition, it is customary law to gain oral consent from Sobas, traditional leaders, whom live in different communes throughout Huambo City. Therefore, at all three sites: sample site and two study sites, visits were made to the Soba's homes. The research goal was explained where I mentioned fieldwork was undertaken for partial completion of my Masters studies, and that the study was undertaken with NGO Development Workshop, who would be providing logistical support. Permission was granted at all three areas, in the form of an oral consent to pursue the field study in their local communities.

At each household visited the research goal was also explained where I mentioned fieldwork was undertaken for partial completion of my Masters studies, and that the study was undertaken with NGO Development Workshop, who would be providing logistical support. Each household approved. All questionnaires are anonymous. The

same process was followed with the focus group, visit to charcoal producers and to woman collecting woodfuel in Sakahala. Everyone at the aforementioned sites gave me oral consent. Finally, oral consent was asked and given for any photography documentation done during field study work.

2. Literature Review and Theoretical Framework

In order to gain further insight on energy-poverty, literature review covers four specific themes: the re-emergence of energy access within current human development policies; prior energy-interventions employed; and lastly the rural versus urban bias in energy-intervention policies. The Theories used to guide research and for data analysis is primarily Amartya Sen's wellbeing capability frameworks (social evaluative weights), and also Caroline O. N. Moser's triple role theory found in her gender and development approach.

2.1 Literature Review

2.1.1 The Re-emergence and Realization of Energy Access in Human Development

In the year 2000, the international community convened at the United Nations in New York City where after discussions and debates agreed to establish eight goals believed to be essential in aggressively reducing extreme world poverty. Those agreed-upon targets came to be known as the Millennium Development Goals⁸. The MDG's targets include raising literacy rates, school attendance for girls, reducing AIDS, reducing malaria rates, and child mortality.

Achieving any or all of these above-mentioned goals would result in the enhancement of human capital, which then may lead to having healthier and more learned populations capable of engaging in productive activities that raises incomes above poverty levels. However, a critique of the MDGs was its oversight in not bringing household energy access into the development equation. Scaling up clean, affordable, accessible household fuel results in generating a wide range of options that impact health and literacy variables. In addition, it also reduces the time-poverty (and drudgery) associated with the collection and use of traditional biomass fuel for reproductive work. Furthermore, once this time is freed up, individuals are free to pursue what they value whether it may be productive work or leisure (Sen 2000). This was recognized by diverse policy makers, planners and researchers working on poverty reduction. By 2002, at the World Summit on Sustainable Development (WSSD), a formal declaration was made by the International Community to not only revisit the theme of scaling up sustainable forms of energy access for the world's poor, but also make it a developmental priority. (ENERGIA/DFID, 2006: 13)

⁸ See United Nations website on MDGS <http://www.un.org/millenniumgoals/>

2.1.2 Earlier Energy-Poverty Strategies and its Linkages to Western Liberal Assumptions

The actions at the WSSD were not the first attempts to tackle on unsustainable energy use in the South⁹. Past attempts were rural and women centered (Braidotti et al, 1997: 55). The female emphasis has its links to the early 1970s, when the idea of the feminization of poverty started to take center stage in development issues in the South (Braidotti et al, 1997: 54, 55). In addition, 2 events occurred during the 1970s and into the 1980s that served as a catalyst for creating sustainable energy solutions for low-income households in Sub-Saharan Africa.

According to Barnes et al, (1994: 8) the first event was the double oil-shock crisis with its global ramifications. Political tensions in the Middle East led to OPEC raising prices so high that fossil fuel prices became too expensive and even totally inaccessible for most African households. Even though most houses in rural settlements were not immediately affected due to their tradition of biomass use, urban households that were shifting from fuel wood to modern fuels use found it impossible to climb up the energy ladder. (*ibid*) Allen and Barnes (1985: 184) affirm that the dramatic surge in oil prices resulted in the high demand for fuel wood and led to global concerns of deforestation and ecological problems in low-income countries.

Those concerns, primarily by Northern based conservationists, served as a second catalyst for energy-interventions in the South. According to Ribot (1999: 293) by the early 1980s, scenarios of fuel wood supply and demand were made by apprehensive international organizations, predicting that 20 years into the future household demand in rural settlements would surpass and destabilize the reproductive capacity of forests. In addition, rural actors began to also fell large amounts of trees in order to supply charcoal to urban and small town households, thus scaling up loss of local terrestrial biodiversity. Even so, Ribot argues that energy-poverty in cities is not entirely responsible for ecological degradation as largely advanced by the Brundtland Report (1987).

Ribot (1999: 295) is not entirely convinced that poverty in Africa and urban consumption of biomass energy sources as the sole drivers to vegetation destruction. Rather, he couples it to other factors such as land use activities. This sentiment is shared by Hosier (1988: 122) who feels that there are other factors aside household energy consumption of biomass that play more of a role in the devastation of local environment. For example, Hosier (*ibid*) cites the lack of post-harvest management as impacting the local environment. Even though Hosier (1988:122) recognizes that severe vegetation destruction results in the chemical and physical modification in the soil, and also augments erosion the effects are contingent upon factors such as whether the soil material is old or

⁹ This refers to low-income countries, which in the some literature is referred to developing countries, previously Third World.

young. Hosier (1988: 123) asserts that post-harvest management can alter the soil recovery. These factors were largely ignored by the Northern conservationists who were convinced that poverty was a driver to deforestation in many African regions.

Addressing the tree resource scarcity was countered by supply-side interventions. Thus, increasing supply, a typical focus in neoclassical economics (Dugger, 1984: 800) was emphasized rather than considering demand, which would have reflected household energy needs. One of the supply side efforts directly addressed the reversing of the deforestation process through large-scale tree plantation projects that could result in the augmentation of diminishing wood supplies. According to Braidotti et al (1997: 55) at the Nairobi Forum in 1985 many case studies were presented to a wide audience from the development field that linked women with the environment via their involvement with agriculture, energy and forestry (*ibid*)

First, cases of women being resourceful influenced their new depiction as being strong and capable of managing productive, reproductive and community responsibilities in times of stress. In addition, eco-feminists were also producing cases that illustrated women were more connected to nature than men due to similar biological processes strengthening the women-nature link (Agarwal, 1997: 69). Both ideas of resourcefulness and the biological nature of both woman and nature became potent instruments that helped advance women and natural resource management policies in low-income countries (Braidotti et al, 1997: 56).

The second strategy of energy-intervention advanced is wide-scale dissemination of improved wood stoves. According to Kammen et al (2002: 8), the most common “stove” is the traditional three-stone fire used for household energy needs. It is considered inefficient because it typically only transfers 5-15% of the fuel’s energy into the cooking utensils. Again, this illustrates how supply side solutions were seen as effective in resolving development issues. Anderson and Fishwick (1984: 5) claim that “the idea that has attracted most attention has been the introduction of wood-burning stoves, and changes in people's habits and methods of cooking in ways that would save on fuel wood”. New and modernized energy technology could advance and civilize backward peoples, it was thought (*ibid*). This does not fall too far from Morgan and Kickham’s (1997: 25) claims that embedded within modernization policies “their sometimes unstated purpose was to identify the ways by which less-developed nations might become more like the West”. According to Kammen et al (2002: 8) despite more than two decades of efforts spent on improving stove technology projects, most of the world’s poor still utilizes traditional stoves to prepare their meals. What is clear is that unless energy interventions are contextualized in order to address the demand side, efforts will not be successful.

2.1.3 Reframing Rural bias to also include Cities

Literature reviewed illustrates two important factors justified prior justification for focusing interventions in rural settlements. First, the World Bank that claims for many years most of Sub-Saharan population has traditionally lived in rural settlements. (2008: 2) Therefore, addressing energy-poverty for the poor meant directing it to rural households. The second reason relates to the accessibility problems in substituting traditional biomass fuels for modern fuels. Anderson and Fishwick (1984: 11) report that in the 1980s, even though only 10% of households used modern fuels for cooking, the users of those fuels were almost entirely limited to cities.

According to Anderson and Fishwick (1984: 12) cities contrast rural households focused on subsistence living, hence they were accustomed to non-monetized economies, and thus almost exclusively relied upon fuel wood, animal dung and agriculture residues to obtain their energy needs. Targeting rural households seemed more logical than urban households, as it was believed that traditional biomass consumption was higher there (*ibid*). Lastly, another reason for biomass interventions being nearly exclusively focused on rural households relates to the poor road networks that hindered the distribution flow of commercial fuels to rural areas. Anderson and Fishwick claims that if modern fuels were available, the high price resulting from transport costs discouraged many rural households from shifting up the energy ladder. Fuel wood was in contrast “free”, in purely monetary terms. (World Bank, 1984: 4)

The rural focus neglected the fact that during the early 1970s and onward, many families were migrating from the countryside to urban areas due to the socio-economic hardships of surviving in regions like Sub-Saharan Africa. Literature on energy-interventions in low income countries is generally located in rural settlements, rather than cities. The logic may be acceptable on the basis that the majority of the population resides in the countryside. However, development polices also need to meet urban households' energy needs. Here we find 2 key reasons to give attention to African cities. First, many urban residents continue to use traditional biomass in their households. Kammen et al (2002: 9) asserts that even though low-income urban households used a combination of different energy sources, both commercial and traditional biomass fuels, charcoal and fuel wood are often relied upon for energy services.

Another reason that urban landscapes require scaling up clean, affordable, reliable and accessible energy is due to the number of people that live in developing cities and towns. According to Cohen (2004: 1) urban development trends indicate that by 2025 developing cities will have about 2 billion additional urban dwellers. However, development assistance is not matching the rate of urban demographic growth. Cohen (*ibid*) claims

that even though a consortium of international aid organizations have made concerted efforts to boost basic urban services, the actual results will most likely be poor.

With regard to access to sustainable household energy for urban residents, improvements may result in two different positive outcomes. First, it can translate into higher levels of over-all public health, and thus engender a more productive labor force; and furthermore, the productive labor force's aggregated demand for local goods will stimulate local economies and overall urban economies. Thus, sustainable household energy sources can act as an economic multiplier in generating sustainable growth. The second outcome is that it can lead to less deforestation, preserving ecological biodiversity and enrichment of the environment. If the capability deprivation of sustainable energy services for households in cities is not addressed, urban growth will place unsustainable demands on local biomass resource areas.

2.2 Theoretical Frameworks: Amartya Sen and Caroline O. N. Moser

According to Louw (2003), approaching research that has an explorative nature, where for example, very little is known about energy-poverty in Angolan urban peripheries, can make writing up the theoretical framework process challenging. It has been established that traditional biomass use is harmful for human development. Amartya Sen's (2000) development theory capability framework enables for me to evaluate how biomass use impacts on human wellbeing. At the same time, UNDP (2005: 5) claims that women wellbeing is the most impacted. In order to gauge how, Caroline O. N. Moser's triple role work theory in her gender and development framework is also used.

2.2.1 Amartya Sen: Capabilities Framework

Amartya Sen (2000) argues that neoclassical economics model, in its use of utility and income as misleading measures for development policies in the South. Rather, Sen (2000: 15) argues that development is essentially about widening the real freedoms that people value. According to Fukuda-Parr (2005: 305) an important component of Sen's human development theory is its evaluative part, which elucidates whether development policies are in fact advancing human wellbeing (*ibid*). A primary way of making such normative assessments is by basing it on what humans are able to achieve, essentially an individual's capability (Nussbaum, 2005: 35).

According to Peter (2005: 20) Sen's capability approach concept constitutes what a person is "able to be or do", which he refers to as an individual's functionings. Functionings can be classified as basic or complex. Fukuda-Parr (2005: 311) provides the following examples of basic functionings as being well nourished and having good health, whereas complex ones or states of being may be understood as being able to engage in community affairs

or having self-respect. Not everyone has the same advantages at hand in order to ensure that their wellbeing can be achieved. For example, in many developing countries some individuals are born into destitute conditions that adversely impact their wellbeing. Moreover, the disadvantaged often lack basic functioning, and do not have enough options to have the agency that enables them to escape poverty on their own.

Sen's ideas of basic functionings for human development is parallel to what UNDP identifies as central capabilities of human development: mechanisms for individuals to lead long and fit lives; to be educated; to have access to the mean required for a decent standard of life, and the ability to partake in community life (Fukuda-Parr, 2005: 309). Sen (2000, 87) asserts that in the absence of these central capabilities, many options are unattainable, and many life opportunities remain unavailable. He refers to this as capability deprivations. In fact, he believes that deprivation of functionings is poverty. (*ibid*)

The capabilities framework is important in identifying capability deprivations of women. Robeyns (2005: 67) provides two examples of why this framework is conducive for making assessments of woman's wellbeing. First, the capabilities framework does not limit its scope of analysis to the market location, but also to non-market places such as households, where women are actively engaged. Second, this framework is individualistic in nature, which requires development planners to probe further than just the household in evaluating wellbeing. Thus, it does not make the assumption that those who share households are at equal advantage or disadvantage. In addition, it may provide insight as to types of policies may be conducive for ensuring that mechanisms for women empowerment can take place.

The second component of Sen's human development is the agency aspect. Agency is not only necessary for a person to take charge of one's life, but also for making change happen in other people's lives. If someone is healthy then the options may become available to engage in learning, or to actively take part in productive labor that contributes to enhancing individual or household wellbeing. Or if someone has agency the person can or may have desire to be part of collective community work that politically or socially enhances other lives

Sen's capability framework is able to make understanding on how traditional biomass use impacts women's wellbeing. His framework can inform on the types of essential functionings that are constrained by energy-poverty, but can not point to where energy-intervention is necessary to for ameliorating the energy-poverty conditions in Huambo City households. This is because the capability framework does not disaggregate gender data. Therefore, is incapable of fully identifying gendered energy needs, which is essential information for implementing interventions that scales down health and other problems associated with traditional biomass use.

In addition, it can not elucidate gender relations as it relates to traditional biomass fuels. Therefore, Moser's GAD approach is integrated into the theoretical framework for looking at biomass fuels impact to household wellbeing.

2.2.2 Caroline O. N. Moser: Triple Role Theory

Moser critiques earlier feminist discourses that solely focused on women as being limited, and finds GAD as conducive in furthering women's advancement in the South (1989: 1800). She claims that a gender analysis can bring forth information that determines how a woman's may be subordinate to a man (Moser, 1993: 3). Young (1997: 51, 52) highlights four basic elements in GAD. One of its features is its focuses on gender relationships. Second, while GAD regards women as having agency, it does not take for granted that women have complete knowledge or full insight of their social conditions. Third, it believes that prior feminist discourses, which solely had the objective of either promoting welfare or anti-poverty campaigns in itself as enough for women empowerment. Rather, it sees both as compulsory preconditions for achievement of equity. Fourth, it does not believe that have an essentialist viewpoint on women. In addition, supports that some men are capable of being gender sensitive. (*ibid*)

Moser's many years of urban planning work for women in low-income countries led her to conclude that women have triple-role work. Essentially, this constitutes three dimensions. The first one, reproductive, constitutes childbearing/rearing tasks and household labor done by women in order to ensure that the husband and working children and also future workforce (babies and school-going children) are cared for (Moser, 1993: 29). The second one is productive work that relates to income-generating as an exchange value or subsistence activities with an actual use-value. (Moser, 1992: 31) The last role is that of community managing--roles that are largely performed by women in most low-income countries (Moser: 1989: 1801). Women began to take on this role as a result of the Structural Adjustment Policies, which resulted in the State playing a less central role in community caring roles (REF). Moser claims that this is similar to reproductive work since it is unpaid, and relates to provisioning and safeguarding of scarce resources that the community consumes. Moser argues that only by recognizing the scale of the triple-role work can gender planning empower women.

3. Materials and Methods

The cross-sectional study integrates a dual strategy approach that constitutes both the qualitative and quantitative methods. A triangulation of methods from qualitative more specifically first started with probing questions that attempted to find answers to the question using key informant, interviews and focus group discussion. It was

then verified through questionnaire survey tested in a small sample of households, which then became basis for main survey questionnaire in study areas. The triangulation ensures scientific rigor and repeatability of findings.

This section first explains some of the good and bad issues related to qualitative methods, before reflecting on the quantitative method. According to Creswell (2003: 215) when using the dual strategy, one of the options available is that one method can take precedence. In this study, the qualitative method is given priority over the quantitative method. Since qualitative research occurs in natural surroundings, the researcher becomes more privileged to details related to study (Creswell, 2003: 181) According to Bryman (2004: 457) this approach creates an opportunity for quantitative instruments such as semi-structured interview questionnaires to be reformulated in accordingly (Bryman, 2004: 457).

In the first phase of the study, the first qualitative instrument, the rapid assessment was used in both the cities of Luanda and Huambo. Prior to arriving in Angola, a check list was compiled that was used as a discussion guide when engaging with key informants. By using the discussion guide a rapid assessment was made due to the disclosure of key issues related to energy-poverty in Huambo City, Angola. In Luanda the rapid assessment targeted 2 key informants from the Ministry of Urbanization and Agriculture and Forestry Institute. In addition, it also targeted 7 key informants from NGO Development Workshop Offices in both Luanda and Huambo City. Even though rapid assessments are useful for making better research designs, it does have its cons. One negative is that considering appraisal is fast not much reflection can be made about the knowledge received. Therefore assessments can become vulnerable to being biased.

In the second phase both the qualitative and quantitative methods were used. First, the qualitative instrument was a pilot survey that used a purposive sampling approach. According to Bryman most writers strongly suggest conducting purposive sampling. This is because the questionnaire on can test the how suitable the questions are on the study target (male or female head of household, who are energy-poor). Through test trials on respondents, the researcher can be empowered in discovering the most appropriate ways to communicate with future respondents. (Bryman, 2004: 333, 334)

One of the more common approaches used within the purposive sampling is the snowball method technique (Bryman, 2004: 334). This approach is considered a convenience sample, because of the samples of respondents are achieved through the system of referrals (Bryman, 2004: 100). In the snowball method process, the researcher finds a willing respondent for the first interview and then that respondent refers a second respondent (could be a friend, neighbor or associate) to be also interviewed. Next the second respondent will refer the

researcher to the third respondent. This process continues until the interviewee has arrived at the desired number of sample population. (Bryman, 2004: 100). So the fact that one does not have to look for willing participants but rather is referred, must this technique convenient.

Second, a quantitative instrument was used, the semi-structured (open-ended and closed) questionnaire, that was composed of 67 questions was self-administered to 5 households. This helped inform on whether the formulated questions were suitable for the study area. The pilot survey and testing instrument snowball method asked the same questions in the same way, helping to determine boundaries. Weakness of this method is that it is not statistically representative, because sample came from referrals. Therefore, there is a potential for results to have a bias. At the same time that weakness can be countered by the fact that usual through this process the first respondent may actually be far removed from the last respondent. Thus, making the information yielded from this combined process generally representative of the target of study.

The following method used was a semi- quantitative method that used a main survey questionnaire. This instrument deployed was based on the rapid assessment from the discussion guide, and also the snowball techniques used in test the 5 households. The main survey questionnaire contained 97 questions that were conducted in two study areas in the peri-urban zones of Huambo City. It was distributed to a sample size of 50 households. The main survey questionnaire was conducted at different times throughout the day. Some households were visited as early as 9:30 am and some as late 4:30 pm. These visits were contingent upon logistical support, such as available transport, and also assistant. Household sample was selected because of constraints and also logistical support.

The next method used was qualitative, a focus group in Huambo City peri-urban study area. The main instrument used to conduct the study group was a discussion guide that had a check list of different themes that emerged from the main survey and needed verified specifically by men. Since the focus group consisted of men, a male staff from NGO Development Workshop assisted in moderating the session to help moderate the session. Securing the desired number of participants for this group session was accomplished through the snowball technique. A key feature of a focus group is that it is able to capture the interaction between respondents (Louw, 2003: 106).

Conducting good focus groups requires having certain technology at hand. For example, without good recording devices, such a tape recorder, interactions may not always be so easily observable. I found myself at times too busy writing the respondents comments, rather than observing the group interactions. The last potential problem

that may emerge is that is the loss of information if a translator is needed. In most Africa regions there is generally a national language, and also many different dialects spoken. Sometimes themes may be so abstract that it is necessary for translation in local dialects through an assistant. Making use of a translator may lead to “information becoming filtered” (Louw, 2003: 135). Another point is that conducting more than one focus group helps to verify questionable results. Due to time constraints, my research study only conducted one.

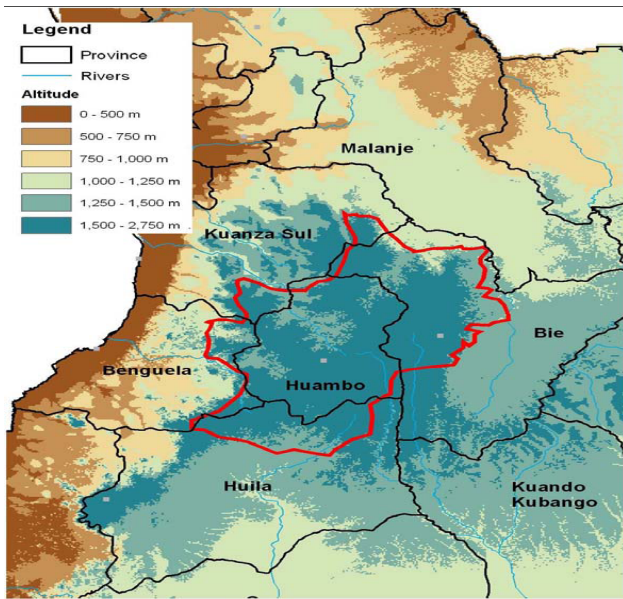
Finally four in-depth interviews took place with key informants from the following institutions: Huambo City Central Hospital, the Institute of Forestry and Agriculture (Huambo provincial executive office), the National Directorate for Energy (stakeholder from Ministry of Energy & Water), and the Empresa de Distribuição de Electricidade (EDEL –state owned electricity company). Input from these key informants would have been more useful prior to administering the main survey questionnaire. However, I was unable to make contact with key informants until after the field research in study area was completed because of their busy schedules. Even though the meetings were delayed their input was still valuable.

3. 1 Country Context: Angola

Angola is located on the South-Atlantic coast of Sub-Saharan Africa. Its geographical coordinates are: 12 30 S, 18 30 E to the North, the country shares frontiers with the Democratic Republic of the Congo, to the East with Zambia and to the South Namibia. Angola has 18 provinces; arguably it is most important one, Cabinda, is an exclave, separated from all of the other provinces by the Democratic Republic of the Congo. Angola’s total land area amounts to 1,246,700 sq km. The country is rich in natural resources such as fish, abundant forests, gold, diamonds and large oil deposits. It was once praised for its agriculture production, especially in the central highland provinces like Huambo.¹⁰ The map below in Figure 1 is of Angola, which shows some provinces largely located in the Central Highland.

¹⁰ CIA World Fact Book: Angola <https://www.cia.gov/library/publications/the-world-factbook/geos/ao.html>

Figure 1. Map of Angola¹¹



Today, there are still sisal, corn, banana, sugarcane, coffee, cotton, tapioca, tobacco plantations including different array of vegetables. Most of the population's livelihood is provided by subsistence agriculture. The total population is estimated to be 12,531,357, made up of consist of Ovimbundu (37%), Kimbundu (25%), Bakongo (13%), mixed European and indigenous African (2%), European (1%) and other (22%)¹² Angola is a hydro-resource rich country, and rivers and streams flow in all directions (Whittlesey, 1924: 115).

Angola has signed the following international environmental agreements: Desertification, Biodiversity, Kyoto Protocol, Ship Pollution, Law of the Sea and Marine Dumping.¹³ Following the Berlin Conference in 1884 that essentially carved up Africa by European countries, Portugal was "granted" Angola and the imposition of the Portuguese colonial administrative system was officially established (Robson and Roque, 2001: 25). What Angola is most infamous for is its long history of conflict waged on its soils; 40 years of conflict, commencing in 1961 and lasting until 2002 (Cain et al, 2002: 5).

3.2.1 Huambo City Historical Background

Huambo City, formally known under Portuguese rule as Nova Lisboa is located in the interior central highlands of Angola. There are two main reasons why the city is historically important. One reason is that in the 1960s, it became a center of industrial expansion due to, a combination of factors, primarily the influx of Portuguese

¹¹ The map is taken from World Food Program (2005), please see bibliography for full citation.

¹² CIA World Fact Book: Angola <https://www.cia.gov/library/publications/the-world-factbook/geos/ao.html>

¹³ See footnote 12 for full citation.

immigration that who were responsible for giving its famed reputation as the national agricultural region (Robson and Roque, 2001: 26). During that time period, economic growth was impressive throughout Angola, due to economic reforms that the colonial government introduced in the region (Robson and Roque, 2001: 27).

The second reason is the 55 day war that was fought between MPLA¹⁴ and UNITA¹⁵, lasting until 2002, and many battles were fought throughout in its provincial city between 1991 and 1992 (Pycroff, 1994: 249). That battle is recognized as the period in Angola's civil conflict, in which the highest loss of human lives, and also massive destruction to its infrastructure took place. (Robson and Roque, 2001: 47)

The war had many implications, and currently still adversely impacts the lives of Angolan poor. One of those is ecological devastation in and around Huambo City. According to key informants from the Institute of Forestry and Agriculture, Huambo City the 55 day war resulted in large scale deforestation. Charcoal production almost came to a halt. The scarcity of charcoal supplies as an energy carrier resulted in many households having to use woodfuel for household energy needs.¹⁶

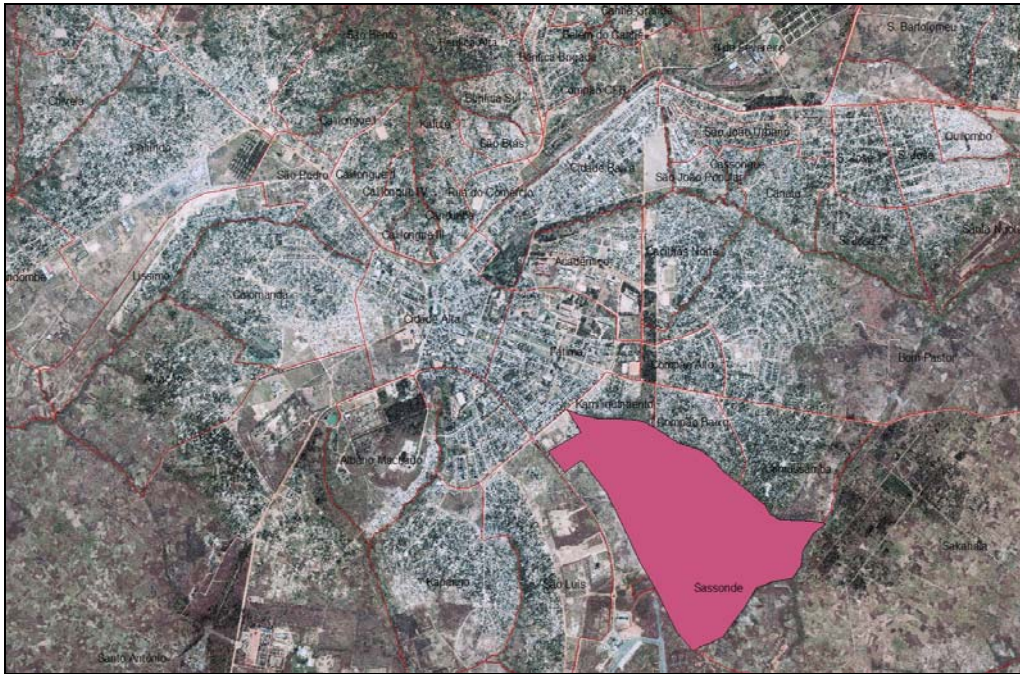
Pacheco (2001) attributes civil war battles waged throughout the province of Huambo as one contributor to the demographic shift from rural to urban settlements. Figure 2 below is a map of the Huambo City municipality. The shaded area is where both study areas are situated in the municipality of Huambo City.

¹⁴ Movimento Popular de Libertacao de Angola, the official political party of the current government of Angola. This party was initially Soviet and Cuban supported.

¹⁵ União Nacional para a Independência Total de Angola, the armed opposition forces and political party that was initially supported by USA and Apartheid Regime of South Africa.

¹⁶ This information was provided by the Institute of Forestry & Agriculture key informant interview. Please see annex for interview note.

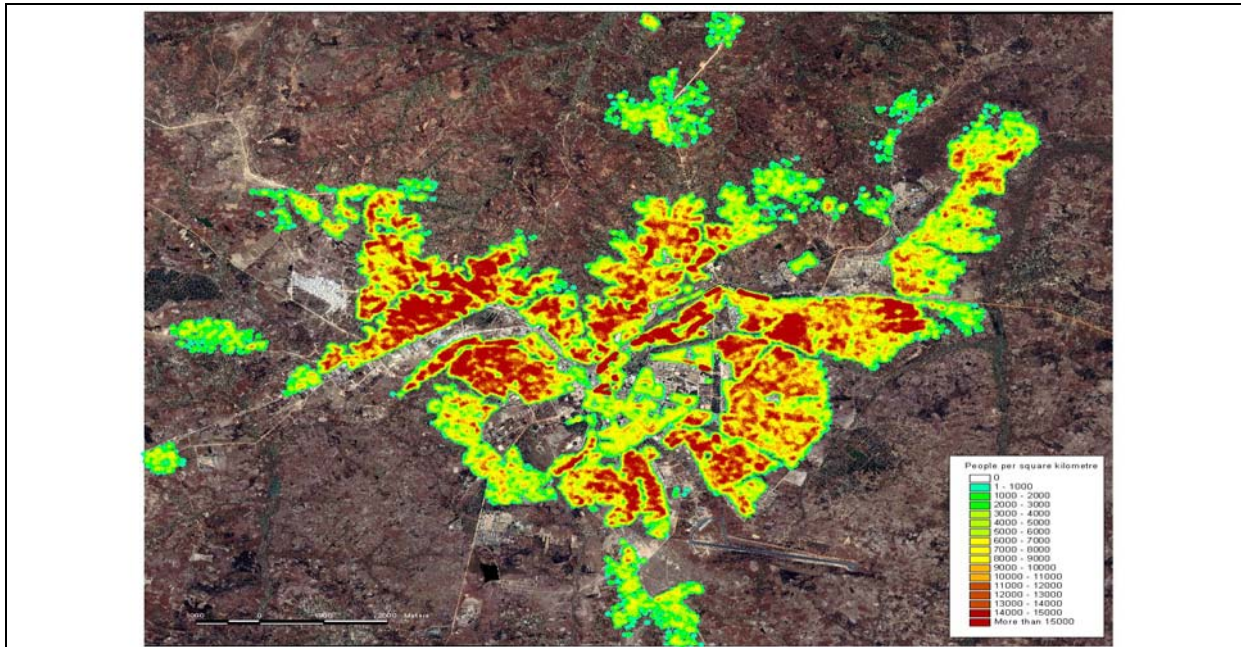
Figure 2. Huambo City Map¹⁷



Demographic growth is high and the peri-urban zones are densely populated. Figure 3 below is a density map of Huambo City, and the peri-urban zones are where density at its highest, shaded in red and orange. According to Development Workshop (2008) the study areas visited density ranges anywhere from 2000 – 15,000 or more people per square kilometer.

¹⁷ Development Workshop Power Point Presentation. Workshop sobre: Descentralização e Participação: intercambio de Experiências entre Angola, Brasil e Moçambique. Intervenção da DW em áreas peri-urbanas na cidade do Huambo: projecto piloto da gestão de terra no Bairro de Fátima, slide 18.

Figure 3. Density Map of Huambo City¹⁸



3.3 Field Work Introduction

In 2002 the government of Angola's Ministry of Energy and Water reported that the isolated grid that provides energy services for the entire province of Huambo is installed with 15.9 MW, and of that capacity only 24.5% is able to provide delivered energy (IEA/OECD, 2006: 50). These numbers reflect that the scale of energy-poverty is high in Huambo, and presumably in its provincial capital.

My time spent residing in the center of Huambo City confirms that electricity services are only delivered there. However, load shedding (black-outs) resulted in the household where I stayed to on some occasions light candles, or resort to diesel generators were relied upon for household energy services.¹⁹ The periphery is undoubtedly worse. In fact, NGO Development Workshop asserts that only a few scattered homes in Huambo's peri-urban zone have access to electricity grids (Robson and Roque, 2001:78).

¹⁸ Development Workshop Power Point Presentation. Workshop sobre: Descentralização e Participação: intercambio de Experiências entre Angola, Brasil e Moçambique. Intervenção da DW em áreas peri-urbanas na cidade do Huambo: projecto piloto da gestão de terra no Bairro de Fátima. PowerPoint slide March 2008, slide 7.

Please note that in print, the density map will show black areas which means it has more than 11,000 per square kilometer.

¹⁹ Researcher personal experience from spending almost 6 weeks time in Huambo City from Feb until April 2008.

Even with the surge in Angola's GNP, a quick fix is not possible in the short to medium term. Angola is unable to use the majority of its revenue to rehabilitate the electricity sector. This is due to the former oil-backed loan policies by the government of Angola, "effectively mortgaging a large portion of oil revenue flows". Furthermore, revenue streams derived from new deep offshore energy projects will take some time to begin accumulating, due to private investors needs to recover the high capital costs. (IEA/OECD, 2006: 16) It has been six years since the war has officially ended, but "post-conflict transitions are more complex than humanitarian emergencies, as social needs go far beyond basic survival" (Robson, 2006: 19).

As mentioned, some 80% of Angolan households use traditional biomass as their primary energy carrier (IEA/OECD, 2006: 141). This has adverse implications on wellbeing for women, specifically their health and adds to surplus of un-welcomed time to perform household work (time-poverty). Second, it leads to terrestrial biodiversity. This is because of the widespread use of charcoal requires large amounts of trees to be used to convert into it as an energy carrier. In addition, poor households that use woodfuel requires on occasion destroy trees in order to use its branches as an energy carrier.

The people that reside in Huambo City are predominantly from the Ovimbundu ethnic clan and speak Umbundu dialect as well as Portuguese. Generally most of their livelihoods are in subsistence agriculture livelihood. Although, my research findings reveals that women are mostly engaged in agriculture, and men work informally as day laborers. Women spend most of their time providing both unpaid labor at the household and also contribute to household income through informal trade at local markets. Huambo City has two very important educational centers (name them). Despite that the research findings show that women in and men in the periphery zones have low levels of literacy education is highly valued. The people that live in Huambo City are highly religious, predominately of the Christian faith as was revealed by the many Protestant and Catholic churches throughout the city.

According to a local gender specialist in Huambo City, most households in the study areas consist of married couples. She claims that cohabitation of more than two years together in the city qualifies legally and socially married unions. Couples can also get married through the church or official registry. In marriages, men are considered head of households and are primary decision-makers. According to the gender specialist, typical married households consist of both male and female being 35 years of age or younger. The gender specialist claims that female households are most prevalent in women that are between the ages of 35-60. This could be true be due to husbands who migrate for work or may even have other families with other women (polygamy).²⁰

²⁰ This information was provided by key informant interview. Please see annex for interview note.

3.3.1 Development Workshop

This field study was largely carried out with the support of Angolan based NGO Development Workshop, who provided both logistical and field assistance. The Canadian non-governmental organization (NGO) Development Workshop was created in 1973, and since then has sought to improve lives in more than 30 countries. Since 1981, Development Workshop has been in Angola, and established two major offices in Huambo City and Luanda. The NGO has collaborated with communities, grassroots organizations, NGOs, local and national government and international organizations.

Development Workshop has gained the trust of the local people due to the fact that for many years it was the only active NGO that provided humanitarian assistance to the people during the time of war. During much of the civil war and throughout its transition into post-conflict status they have been responsible for promoting human wellbeing. Development Workshop has improved human settlements and the livelihoods of poor people through slum upgrading, water provisioning programs, sanitation, microfinance and small enterprise building, capacity building and poverty related projects.²¹

3.3.2 Field Work Area: March 11th – April 4th, 2008

Fieldwork in Huambo City was undertaken from February 22nd through April 4th 2008. The main survey fieldwork took place in Constantinto Camoli and Sassonde. They both represent communities that are part of Huambo City's growing peri-urban zones. According to Development Workshop, approximately 60,000 of Huambo City residents live in the center city, compared to the 250,000 living in the peri-urban zones²². Robson and Roque (2001: 46) claim that the majority of residents in Huambo province are Ovimbundu (2001: 46). Aside from speaking Portuguese, their local dialect is Umbundu.²³ Figure 4 is a map of Huambo City, shows the location of the two study areas where the semi-quantitative main survey questionnaire was self-administered to 50 households.

²¹ Development Workshop web-site. <http://www.dw.angonet.org/>

²² Development Workshop Power Point Presentation. Workshop sobre: Descentralização e Participação: intercambio de Experiências entre Angola, Brasil e Moçambique. Intervenção da DW em áreas peri-urbanas na cidade do Huambo: projecto piloto da gestão de terra no Bairro de Fátima. Slide 6

²³ Country Study: Ovimbundu. <http://www.country-studies.com/angola/ovimbundu.html>

Figure 4. Map of study areas²⁴



Bairro Constantino Camoli is the one study area in the periphery zone, which is referred to as **urban**. It is situated between 1.6 kilometers to 2.2 kilometers from the city edge. Bairro Sassonde is the second study area, which is referred to as **rural**. From the city edge, this location starts from 2.2 kilometers and extends until 2.6 kilometers.

3.3.3 Huambo definition of marriage and households

Since the research seeks to use the household as a central unit of analysis, a clarification of what it constitutes is in order. According to Ellis (2000: 18), a “household is conventionally conceived as the social group which resides in the same place, shares the same meals and makes joint or coordinated decisions over resource allocation and income pooling”. Ellis’s fluid definition of household can be applied to the study area’s context as it is inclusive to the different ways that households can be formed. However, to contextualize Ellis’s definition, I adapt it to afore-mentioned household concept provided by the Humbuo City gender specialist.

For this research, 2 inclusion criteria were included in seeking out households for main survey questionnaire. The first one is that household members are only included if they resided in the home during the past six months.

²⁴ April 4th, 2008. Created by Development Workshop GIS specialist Beat Weber for thesis project.

Child-headed households are valid because they tell us something about some of the outcome criteria.²⁵ The second one is that households that make use of biomass as a part of their energy source for cooking are included; however, fuels such as diesel or kerosene are featured because they reflect differences in capabilities, as per Sen’s theory (2000).

3.4 Data Collection Findings

The findings that results will later analyzed are from simple frequency percentage. The mostly look at averages within both study areas. Below are the data collections findings.

Table 3. Social Characteristics of the Area

	Constantino Camoli n =	Sassonde n =
Men respondents	3	5
Women respondents	22	20
Married de facto	68%	60%
School attendance years (woman)	4th Class	3rd Class
Water piping into home	0%	0%
Electricity	0%	0%

Table 3 shows the social characteristics of both areas. Of the 50 households visited, 42 of the respondents were women. Only on 8 occasions were men present. There were no childhood headed households in the sample group. In Constantino Camoli, 68% of the women were married, either by the church or registry. In Sassonde 60% of the women were married either by the church or registry. In Constantino Camoli women educational attainment is to the 4th class in primary school. Similarly, in Sassonde women have only reached up to the 3rd class in primary school.²⁶ None of the households in both study areas have electricity or piped water services delivered into their dwellings.

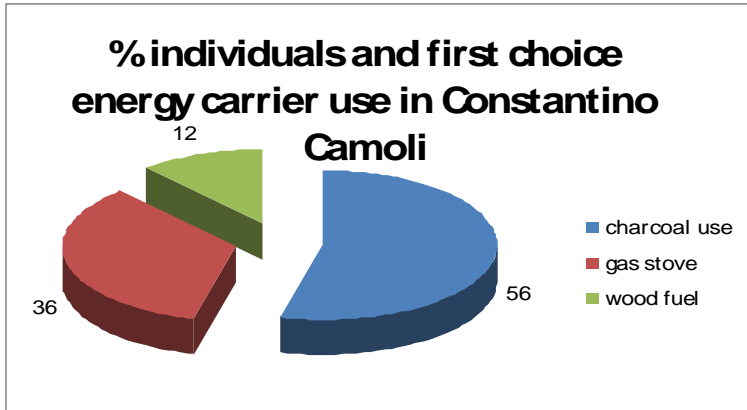
It should be noted that households use a combination of fuels, but that they have preferences. The following figures reveal what households in both study areas use if they have the finances to purchase charcoal for household fuel. My findings show that most households in both study areas prefer to purchase 50 kg sack of charcoal, which normally lasts a household ten days. The cost of 50 kg of charcoal cost ranges between 650 to

²⁵ Child-headed refers to a household where the head of it is 15 years of age and younger. This is taken from UNICEF’s Angolan study reference to women of child bearing age starts at age 15. Please see bibliography for full citation.

²⁶ In a “normal situation” in Angola when a child starts school at age appropriate age 3rd to 4th class is usually attended by youth around the age of 8.

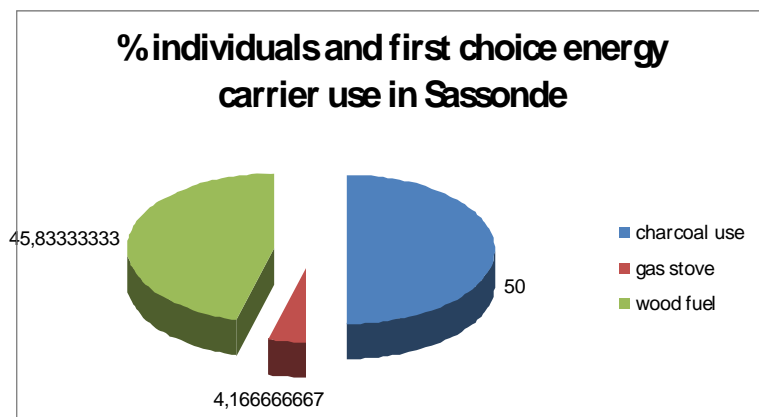
750 KWZ (Angolan currency). The conversion for that is roughly 8.70 to 10 USD. During rainy season, it costs more and during dry season it is cheaper. Woodfuel is free, but in the rainy seasonal not a good energy carrier. This is because woodfuel’s efficiency can only be optimized if it is dry. Figure 4 below shows the how many households in Constantino Camoli use gas stove, charcoal and woodfuel.

Figure 5. First Energy Choice in Constantino Camoli



In Constantino Camoli, 36 % use gas stoves, 12% use woodfuel and 56% use charcoal for household fuel. Figure 5 below reveals energy carriers that are normally used as first resort. Sassonde shows a slightly different picture than Constantino Camoli.

Figure 6. First Energy Choice in Sassonde

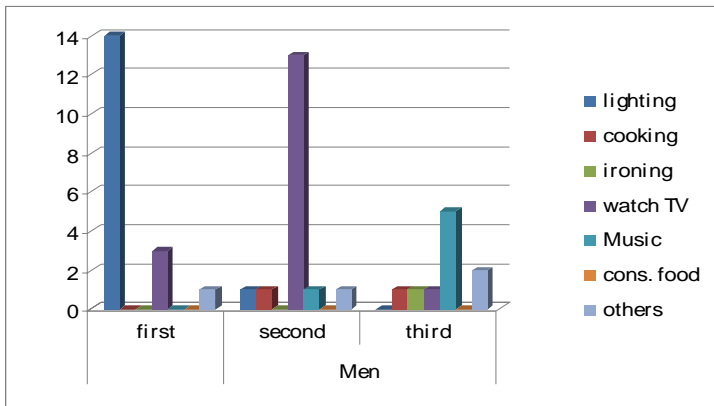


In Sassonde, only 4% of the households interviewed use a gas stove, 45% use woodfuel and 50% use charcoal.

3.4.1 Gendered Energy Needs

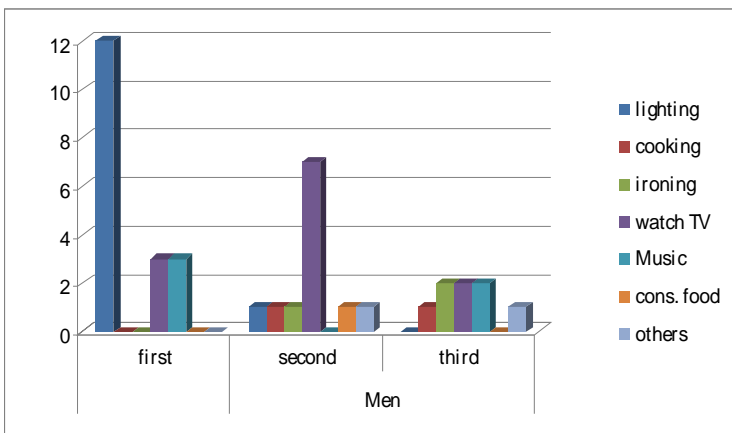
Men and women have different energy needs and make use of energy in different ways. A series of questions were asked in both Constantino Camoli and Sassonde bairros to gain a gendered understanding of the valuation of energy services as prioritized by needs. Figure 7 below reflects energy needs according to male gender that residing in Constantino Camoli.

Figure 7. Constantino Camoli Men’s Gendered Needs



The men were asked to rate the top 3 energy needs in order of importance. Men rate household illumination as the first energy service needed. Men rate watching television as the second most important energy service needed. The 3rd energy service needed is to listen to music. Figure 8 below highlights men’s energy needs in Sassonde.

Figure 8. Sassonde Men’s Gendered Needs

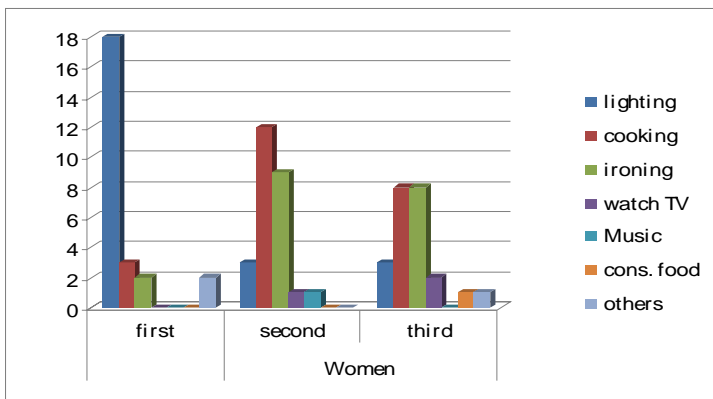


Men and women have different energy needs and make use of energy in different ways. A series of questions were asked in both Constantino Camoli and Sassonde bairros to gain a gendered understanding of the valuation of energy services as prioritized by needs. Figure 7 below reflects energy needs according to male gender that residing in Constantino Camoli.

In Sassonde the most important energy service needed by men is household illumination. The second energy need is to provide energy services to watch television. The third energy needed is to equally value the following services: ironing clothes, watching television and listening to music. The next figures provide data on women’s household energy needs in both areas.

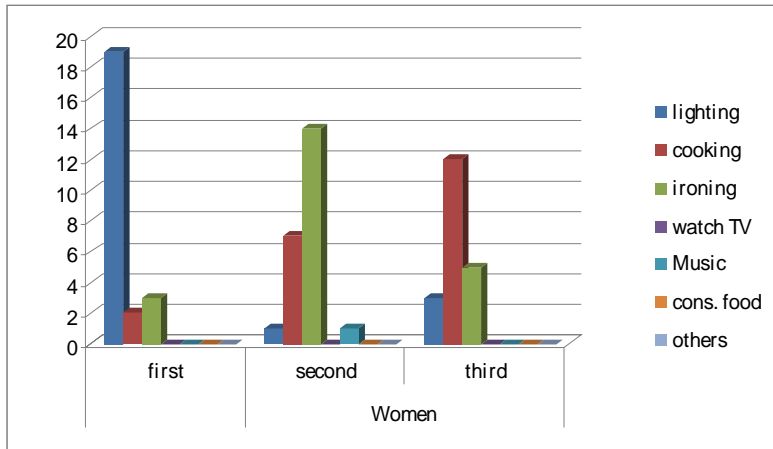
3.4.2 Women’s Gendered Energy Needs

Figure 8. Constantino Camoli



The women in Constantino Camoli rate household illumination as the most important energy service needed. They rate cooking as the second most important energy service needed. The third energy service needed is for ironing clothes.

Figure 9. Sassonde



The women in Sassonde rate household illumination as their first energy service need. The second energy service is needed for ironing. The third energy service needed is for cooking food.

3.4.3 Time Poverty

This definition uses Chambers (2005: 18) concept of time-poverty, surplus of unwelcome time in an individuals' reproductive daily roles. Cooking and ironing are such examples identified by respondents in study areas. The meal that requires the most unwelcome time is feijao (bean dish), a staple Angolan dish for their family. The time for ironing relates to a small bundle of clothes per week. The table below also includes the amount of time needed per week to collect woodfuel.

Table 4. Time poverty Table

Study Area	Ironing Clothes (average)	Cooking Feijao with charcoal	Cooking Feijao with woodfuel	Collecting Woodfuel (average)
Constantino Camoli	4 hours and 43 minutes	3 hours and 18 minutes	4 hours	8 kilometers
Sassonde	4 hours and 39 minutes	5 hours and 36 minutes	4 hours	4 kilometers

3.4.4 *Hunger related to energy scarcity*

The World Food Program (WFP) asserts that within the province of Huambo, chronic malnutrition is a severe problem for children under the age of five (WFP, 2005: 7). The table below shows collected data that attempts to link hunger to the lack of energy fuel. It shows the percentage of household fuel that has gone without fuel at least once. It also asks how many households would ask for a loan from neighbor, extended family member or even charcoal suppliers to avoid vulnerability. It indicates how many houses have had to go to bed hungry at least once due to the lack of household fuel.

Table 5. Hunger-Related Poverty

Study Area	% have gone without household fuel at least once	If so, how many would ask for a loan from neighbor, family or local market seller?	If so, how many have ever had to go to sleep hungry at least once?
Constantino Camoli	92%	76%	96%
Sassonde	92%	44%	92%

In Constantino Camoli, 96% of respondents asserted that they go to bed hungry often due to no household fuel. In Sassonde, 92% of the households often go to bed hungry due to not having any household fuel. Both study areas attributed lack of money to purchase charcoal, and inability to make use of woodfuel because of the rainy season that results in wet wood that is no good for household fuel.

3.4.5 *Shelter and Indoor Air Pollution*

As already established, traditional biomass fuels emit a lot of smoke. In addition, the smoke has been linked many human health ailments, and that the most vulnerable are women often including stay home children (IEA/OECD: 2006: 147). The photograph below is an Angolan woman from the Constantino Camoli area in her kitchen. The objective of this photograph which I took is to illustrate the poor system of ventilation found in most household kitchens in the study areas. Each time a woman cooks food she must be exposed to indoor air pollution. Most households have very one or no windows. As shown below there is an entrance into the kitchen area, which is how smoke generally leaves. However, Huambo City is known to be a windy city that also for many months has medium to heavy precipitation. So on rainy days, the biomass stove is cooked further away from this entrance area shown below and the woman in charge of cooking puts herself at a higher risk to indoor air pollution.

²⁷Sassonde kitchen and smoke



Table 6 that is placed below presents data findings on indoor air pollution from biomass cooking fuels. First, the table shows the percentage of households in both study areas that have identified Indoor Air Pollution (IAP) as a problem in the areas where they cook. Second, data findings are presented on what age the Dona (mother/wife of the household) started cooking. Next, it shows the percentage of the households that have a chimney in for ventilation to get rid of biomass smoke emissions on some scale. Last, it presents findings on how many households have a window within the cooking area to allow the smoke emissions to leave.

Table 6. Shelter, Indoor Air Pollution Table

Study Area	% of households have IAP problem	Age Dona started cooking	% of households have chimney	How many have window in cooking area
Constantino Camoli (urban)	76%	9 years old	4%	40%
Sassonde (rural)	92%	10 years old	13%	50%

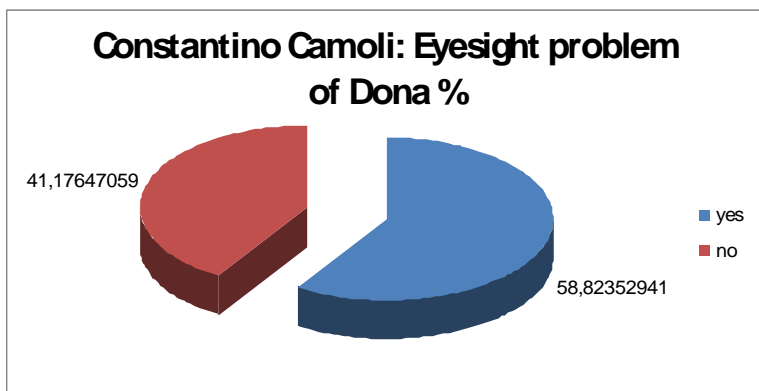
²⁷ Constantino Camoli, a peri-urban zone located in Huambo City. The photograph is taken by Filomena S. M. Cornelio in March 2008.

Table 6 shows that over 76% of respondents whose households are situated in both study areas find indoor air pollution to be a problem. It is more of a problem for rural households than urban households. Table 6 also confirms that households in both study areas have poor ventilation systems. Only 4% of urban household respondents have a chimney, and 60% of the urban household respondents do not have a window in the indoor areas where cooking of food takes place. Rural household respondents are at a slight advantage. Only 13% of rural household respondents have a chimney, and half of 50% do not have a window where cooking of food takes place. The next section provides findings of the health implication associated with indoor air pollution from cooking fuels used in Huambo City study areas.

3.4.6 Health Data Findings: Vision and Coughing

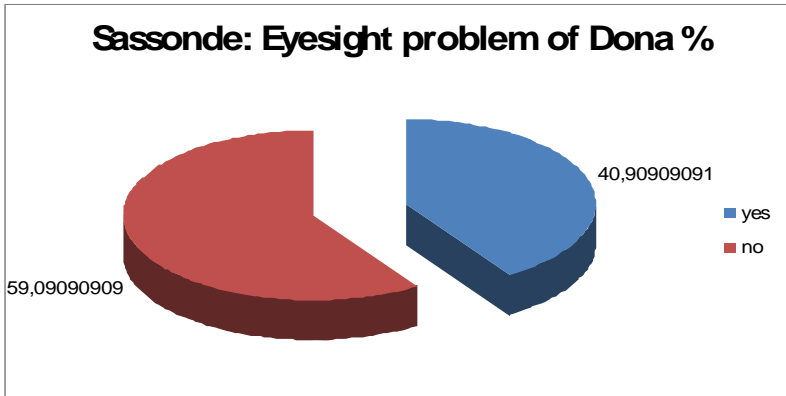
The World Health Organization (WHO) links the use of traditional biomass fuel emission of IAP with eye problems. Figure 10 below reveals on average how women respondents have problems in Constantino Camoli.

Figure 10. Eye problems in Constantino Camoli



The findings show 59% of the women respondents in urban households suffer from eyesight problems. Forty-one percent do not. Figure 11 below provides findings on women experiencing eyesight problems in Sassonde.

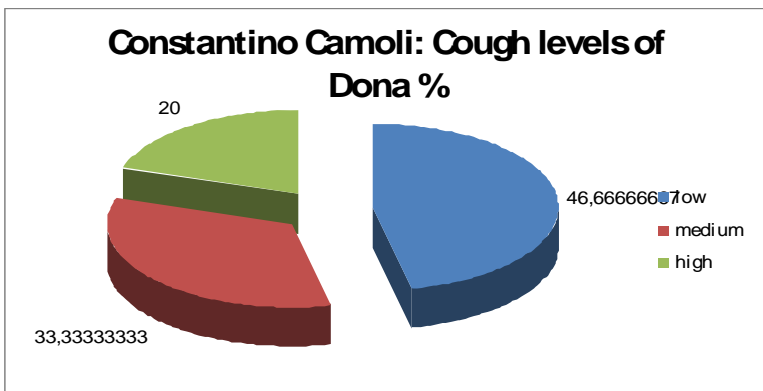
Figure 11. Eye problems in Sassonde



Rural household respondents are at a slight advantage to urban households. The findings show that 40% of rural households have eyesight problems. Fifty-nine percent of women do not have any eye-sight problems. The next section looks at health findings as indicated by level of coughing problems.

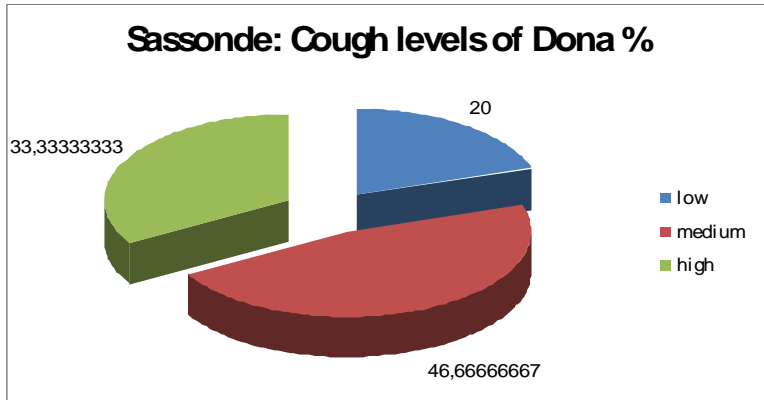
WHO (2006: 17) claims that people that live in low-income countries, and experience an unexplained cough that persists for two to three weeks or more should be examined for tuberculosis. Therefore, coughing related questions associated to biomass fuel use were asked in both study areas. Figure 12, which is placed below shows whether women respondents in Constantino Camoli are experiencing coughing problems. If respondents found it to be an issue they ranked the problem as either low, medium or high.

Figure 12. Coughing Problems in Constantino Camoli



In this urban study area, forty-seven percent of the household respondents rank coughing as a low problem. Thirty-three percent rank their coughing problem on a medium scale. Lastly, 20% of the respondents rank their coughing problem on a high scale.

Figure 13: Coughing Problems in Sassonde



The findings show that in the rural study area, 20% of the Dona’s have a low level of coughing. In addition, 47% of the respondents rank their coughing problems on a medium scale. Lastly, 33% of the respondents reported their coughing problems to be acute.

The next semi-structured interviews that took place with randomly selected respondents in Sakahala, where I was informed by local community of study areas that woodfuel can be obtained free of charge. I arrived at 9:30 am and stayed until 12:30 noon, and during that time observed 5 women who were looking for woodfuel. Of that number, only three of them gave me oral consent to interview them. The goal was to find out how often a week women go to collect woodfuel; the distance traveled; how long they have been going there; who helps her collect woodfuel and in their opinion the rate of deforestation. Below in table 7 are some of the important findings.

Table 7. Sakahala Interviews

AGE and other observations	Frequency travel to Sakahala per week	Distance traveled from home	Years using Sakahala to collect woodfuel	Who helps collect woodfuel from home	Level of Deforestation
>60 years old	1 x per week	4 kilometers	All her life 32 years	No one	Rapid
30 years old, 5 months pregnant	5-7 x per week	3 kilometers	3 years	No one	Rapid
28 years old, was with 2 young children	5-7 x per week	5 kilometers	2 years	Her children, who were also carrying woodfuel	Rapid

The above-placed table 7 reveals that people from a wide range of age group are responsible for collecting woodfuel. Furthermore, it shows that women are may be the main actors. The table also shows that people travel as far as 3 to 5 kilometers to collect woodfuel. The respondents claimed that the rate of deforestation is rapid. The oldest respondent has been traveling to Sakahala for over 30 years. Therefore her observation of deforestation is valuable since she had observed ecological change over a longer period of time.

3.5 Charcoal producers

By the time I had nearly finished administering the main survey questionnaire in Huambo City`s selected study areas, it became clear that charcoal is the main energy carrier used in most households. Charcoal supplies are not produced locally. This it because it is made from trees, a natural resource which in the local vicinity is not so abundant. The Angolan Ministry of Agriculture and Development`s National Institute for Forestry Development (IDF) confirmed that there is acute deforestation within Huambo City. IDF attributes local deforestation to household consumption of both woodfuel and charcoal.²⁸ According to the IEA (2006: 144) the carbonization process changes wood stock in charcoal.

Deforestation in Huambo City makes much stock is unavailable for local charcoal production. Therefore, I travelled to an area located 80 kilometres outside of Huambo City, which is noted for supplying high levels of charcoal sales to households in Huambo City. The IDF staff claimed that in order to engage in charcoal production, suppliers and producers need a license, which can only be obtained from their offices. Furthermore, IDF asserts that charcoal producers must also stipulate what types of trees are cut, and also the area in which they come from.²⁹

At the above-mentioned site, I found a local male charcoal producer, who is licensed and authorized to trade charcoal, who gave me oral consent to interview him for my study respondent claims that around 300 to 500 families live in area. He also established that only men are involved in producing charcoal. Each month my respondent produces 12 sacks of 50 kg charcoal. The respondent said that amount of charcoal supply requires felling about 3 to 4 trees that are about 5 to 6 meter long. The cut up wood piles are deposited into earthen pits, covered with soil and fired up. Over a period of time wood is converted into charcoal that is sold as household fuel. My respondent said that the local charcoal production supplies biomass fuel to both Huambo City (80%) and Luanda (20%).³⁰

²⁸ See appendix for IDF interviews.

²⁹ See footnote 27.

³⁰ See appendix for interview. It should be noted that the respondent claims that the rainy and dry seasons play a role on the rate of carbonization.

The important findings are concretized here. First, that charcoal production is a primary livelihood in the province Huambo. Second, it is plausible that deforestation extends beyond urban settlements. This is because it was not clear whether the charcoal producers in this area actively engage in any local afforestation programs. Third, males are the primary producers of charcoal that supplies households in Huambo City.

4. Research Analysis

The aim of this thesis is to explore how the use of traditional biomass at the household level impacts on women's wellbeing, and also gender relations related to energy – use in the peri-urban communities of Huambo City. Some of the data findings are able to help answer the research question that asks how differences in the consumption patterns of biomass fuels between urban (Constantino Camoli) and rural (Sassonde) locations manifests themselves. Sen and Moser's theoretical frameworks are used to interpret the data findings.

Sen's social evaluative measures of health and literacy attainment are variables that I used in evaluating wellbeing as related to household biomass use. In the Huambo City context health is a more relevant variable to measure than educational attainment. This is because the current educational attainment is not a reflection of energy-use, but rather the result of 40 years of conflict which made learning irregular. Even though not explored, one may speculate that war resulted in teacher scarcity. Therefore, the majority of analysis made is drawn from health findings.

Moser's GAD approach, which disaggregates data by gender is helpful in reaching some conclusions about gendered wellbeing as linked to household biomass use, and also allows for assumptions to be made about gendered energy needs in both study areas. First, Moser's triple-role work theory shows that women's reproductive work (cooking, collecting resources) puts them at a disadvantage to men as far as wellbeing that is impacted by biomass fuel use. Second, the findings that show even though both women and men rate lighting services as the top priority for energy needs, their second and third priorities by gender are different. Women are concerned about reproductive work and men are concerned about leisure.

Sen (2000) claims that wellbeing is about being able to be and do as one may desires. Therefore, men should be able to prioritize energy needs for leisure because they desire those services for their wellbeing. However, the findings illustrate that men's energy needs do not contribute to the achievement of basic functionings essential for human development. Sen (2000) asserts that capabilities are important in advancing wellbeing, and the energy needs and services such as cooking are prioritized by women. Cooking food is essential for helping families stay well-nourished.

According to Sen (200), being well nourished is essential to achieving wellbeing. One of the research questions asked is whether any distinctions can be made about the overall household wellbeing in both study areas. Both the urban and rural study areas have capability deprivation of being well-nourished. The research findings confirm that over 90% of households in both study areas have at least on one occasion gone to bed hungry due to lack of access to fuels. If wage-earners and future wage-earners (school children) do not have nutritional meals on a daily basis then they are not strong enough to engage in productive work (income-generating and fully participate in learning because of hunger) that can currently in the future reduce their chances of emerging from poverty.

One important finding is the valuation of energy services for ironing clothes. Even though this task is not performed by men in Huambo City, male respondents in Sassonde claimed it as one of their energy service priorities. This is due to the fact that culturally Angolans in the study areas place value how they present themselves to the community. According to many households in the study area wearing ironed clothes when attending social events (church) and reflects that individuals have self-respect and dignity. Fukuda-Parr (2005: 309) claims that Sen also defines wellbeing by individuals being able to live in dignity and participate in community life.

The valuation of ironing clothes in both study areas implies that women's wellbeing is at a disadvantage to men. This is because it is their job to make use of this energy service. The data findings show that in both study areas women spend more than four hours per week to iron a small bundle of clothes. Ironing clothes in the study areas entails women having to continuously heat up charcoal bits to heat up a cold iron to iron a pair of shirt or pants. Since charcoal as an energy carrier is not efficient, this task requires women having to spend large amounts of time to iron clothes. Many women in the study areas mentioned that they suffer back problems. If they had more sustainable energy services such as electricity ironing clothes would not be so physically exhausting.

By disaggregating gendered energy needs, it is clear that women's wellbeing as it relates to energy use is at a disadvantage to men in both study areas. The energy needs that men largely value for leisure can not deliver the energy services required to watch television or listen to the radio. Those services are generally delivered by electricity that is absent in all households in both study areas. Traditional biomass as an energy carrier can only heat up areas and cook food. Since cooking is often conducted in indoor kitchen areas the biomass combustion from cooking food exposes women to indoor air pollution. Indoor air pollution results in poor health conditions for women. The consumption of traditional biomass fuels reveals that women are at a disadvantage to men in achieving the basic functioning of health that Sen claims essential for human development.

Indoor air pollution is a serious hazard to wellbeing. According to WHO (2006: 17) biomass consumption in low-income countries leads to high levels of tuberculosis and also blindness. Therefore, a series of questions were asked to see if any health symptoms associated with traditional biomass fuel use are being experienced by women in the study areas. A senior health official respondent from the Huambo City Central Hospital (a free hospital) claims that one of the primary pulmonary diseases is in fact tuberculosis³¹. His claim was confirmed by the fact that Huambo City has a Sanatorium that treats many of residents for tuberculosis.

A key finding is that people are not keen to admit that they are not physically well, especially as it relates to tuberculosis. Only between 20 – 33% female respondents in urban study area and 33-46% of female respondents in the rural study area reported a mid to high level of coughing problems. This finding was hard to believe due to the fact that both study areas primarily use dirty cooking fuels that emits high levels of indoor air pollution. It was not clear to me how a woman can cook in enclosed spaces with charcoal and woodfuel and not have coughing problems. As many as 76% of the respondents in Constantino Camoli claims to have indoor air pollution from biomass fuels when they cook food, whereas a startling 92% in Sassonde report it as problematic in their kitchens. Ventilation is poor in both study areas. More than 40% of respondents in both study areas claim that they have poor systems of ventilation³². The high rates of respondents claiming to have indoor air pollution, and also poor ventilation illustrates that women's health is impacted by using traditional biomass fuel.

5. Conclusion

Achieving sustainable growth is not an easy or fast process for a country emerging out of a post-conflict situation. Human development is not matching Angola's current levels of strong economic growth. Scaling up sustainable energy services at the household is essential in advancing human development. Amartya Sen's capability perspective illustrates that the lack of sustainable energy services for Huambo City households is constraining people from achieving human development.

The research shows that not only is energy-poverty is an acute human development problem, but women's wellbeing is most affected by the use of traditional biomass use. The main research study shows localized differences not necessarily between urban and peri-urban locations, but by gender. Men prefer energy services for illumination and also leisure activities, whereas women prefer energy services to ease the burden of reproductive work that is essential in sustaining their families' health and sense of self-esteem. Both gendered

³¹ Information provided by interview with health official. Please see annex for interview note.

³² Poor ventilation in this aspect refers to not having a chimney for smoke to go out. Please see main questionnaire for interview note

preferences of energy services are important to contributing to wellbeing, because as it relates to the reproductive work it contributes to wellbeing and self-esteem that enables people to feel good enough to engage with their community.

Moser's gender and development approach disaggregated energy use by gender. Moser's approach shows in what ways energy-intervention may empower women. Energy planning can lessen the burden of women's work specifically the household labor of cooking and ironing clothes. In addition, sustainable energy planning requires recognizing the different roles that gender plays in the supply and production of traditional biomass fuels used at the household. Therefore, men are also an important target since they cut down trees for biomass fuels (charcoal) used in study areas. Men should be integrated into countering deforestation. In sum, implementing a sustainable energy planning for households in Huambo city that help achieve wellbeing and counter deforestation gender roles and gender needs should be considered. Those features are essential for achieving human development.

6. Future Considerations

Rather than making claims, this section poses a few questions related to gendered energy needs, energy scarcity and deforestation to for future policy makers, local NGOs and researchers that may be interested and committed to addressing energy-poverty and biodiversity harm in Huambo City and its adjacent localities. These questions are based on the claim of IEA/OECD (2006: 141) that sustainable biomass as an energy carrier is the most suitable energy-intervention for Angolan households.

Energy-Provisioning – Afforestation

1). What tree species (that require less time to grow) are locally appropriate, and also can be planted on homeowner's property for household fuel consumption?

As established, conservationist make claims that deforestation causes ecological harm. The finding shows that many households in both study areas are engaged in subsistence agriculture as a form of livelihood strategy.

Livelihoods and Post-harvest Management

1). How have the different types of post-harvest (of trees) management impacted subsistence agricultural yields?

Indoor Air Pollution

My findings establish that over 40% of households have poor forms of ventilation. At the same time, many households claim that windows are unsafe due to high occurrences of burglary in their communities.

1). How can sustainable shelter address security fears so that households are encouraged to install windows that can help with ventilation issues related to biomass fuel use?

7. Bibliography

- Agarwal, B. (1997). The Gender and Environment Debate: Lessons from India. i N. Visvanathan, N. Visvanathan, L. Duggan, & N. Wiegiersma (Red.), *The Woman, Gender and Development Reader* (ss. 68 - 75). London.
- Allen, J. C., & Barnes, D. F. (1985). The Causes of Deforestation in Developing Countries. *Annals of the Association of American Geographers* , 163-184.
- Anderson, D., & Barnes, D. F. (1984). *Fuelwood Consumption and Deforestation in African Countries*. Hämtat från World Bank. den 20 March 2008
- Author, U. (den 17 April 2008). *The Woman's Rights Movement*. Hämtat från <http://www.iath.virginia.edu/utc/abolitn/whmp.html> den 11 April 2008
- Barnes, K., Openshaw, K., Smith, K., & Van de Plas, R. (1994). Hämtat från <http://ehs.sph.berkeley.edu/krsmith/publications/94barnes1.pdf> den 30 January 2008
- Bryman, A. (2004). *Social Research Methods*. Oxford: Oxford University Press.
- Cain, A. (2007). Housing microfinance in post-conflict in Angola. Overcoming socioeconomic exclusion through land tenure and .access to credit. *Environment and Urbanization* 2007; 19; 361
<http://eau.sagepub.com/cgi/content/abstract/19/2/361>
- Cain, A., Daly, M., & Robson, P. (2002). Poverty Reduction in Urban Areas: Basic Service Provision for the Urban Poor, The Experience of Development Workshop. *IIED Human Settlement Program* .
- Central Intelligence Agency. (u.d.). *World Fact Book: Angola*. Hämtat från <http://www.cia.gov/library/publications/the-world-factbook/geos/ao.html> den 8 April 2008
- Chambers, R. (2005). *Participation, Pluralism and Perceptions of Poverty*. Hämtat från International Conference - The Many Dimensions of Poverty: <http://64.233.183.104/search?cache:VW3MAo0wVMJ:www.undp-povertycentre.org/md-poverty/papers/Robert.pdf+Robert+Chambers+Brasil+Time+Poverty+pdf&hl=sv&ct=clnk&cd=2&gl=se> den 23 April 2008.
- Coquery-Vidrovitch, C. (1991). The Process of Urbanization in Africa (From the Origins to the Beginning of Independence) *African Studies Review*, Vol. 34, No. 1, pp. 1-98.
- Cohen, M. A. (2008). *Reframing Urban Assistance: Scale, Ambition, and Possibility*. Hämtat från Comparative Studies Project Policy Brief: <http://wilsoncenter.org/topics/pubs/urbanbrief05.pdf> den 25 January 2008
- Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (2 uppl.). Sage: Thousand Oaks.
- Development Workshop. (2008) Power Point Presentation. (burned on submitted cd).

- Dugger, W. M. (1984). The Nature of Capital Accumulation and Technological Progress in the Modern Economy. *Journal of Economic Issues* , 18.
- EllisF. (2000). *Rural Livelihoods and Diversity in Developing Countries*. Oxford: Oxford University Press.
- Energia/DFID. (March 2006). From the Millennium Development Goals Towards A Gender-Sensitive Energy Policy Research and Practice: Empirical Evidence and Case Studies. Energia/DFID.
- (2004). Energy Systems and Sustainability: Power for a Sustainable Future. i G. Boyle, B. Everett, & J. Ramage (Red.). Oxford: Oxford University Press.
- Freund, B. (2001). Contrasts in Urban Segregation: A Tale of Two African Cities, Durban (South Africa) and Abidjan (Cote d'Ivoire). *Journal of Southern African Studies*, Vol. 27, No. 3, pp. 527-546.
- Fukuda-Parr, S. (2005). *The Human Development Paradigm: Operationalizing Sen's Ideas on Capabilities*. (B. Agarawal, J. Humphries, & I. Robeyns, Red.) London: Routledge.
- Hamilton, K., Ruta, G., Bolt, K., Markandy, A., Pedroso-Galinato, S., Silva, P., o.a. (2006). Where is the Wealth of Nations? Washington DC.
- Hosier, R. H. (1988). The Economics of Deforestation in Eastern Africa. *Economic Geography* , 64 (2), 121-136.
- International Energy Agency/OECD. (2006). Angola Towards an Energy Strategy: The Executive Summary. Paris: IEA.
- International Labour Organization. (u.d.). *Exercise: Gender Needs Assessment*. Hämtat den 24 April 2008.
- Iversen, V. (2005). Intra-household Inequality: A Challenge for the Capability Approach. i B. Agarawal, J. Humphries, & I. Robeyns (Red.), *Amartya Sen's Work and Ideas*. London: Routledge.
- Kammen, D., Bailis, R., & Herzog, A. (2001). *Clean Energy for Development and Economic Growth: Biomass and other of the Parties to the UN Framework Convention on Climate Change*. Marrakech.
- Kickman, & Morgan. (1997). Modernization among the U.S. States: Change and Continuity from 1960 to 1990. *Publius* , 27, 22-39.
- Louw, O. (2003). *Exploring the Culture of Non-Payment in the Post-Apartheid South Africa*. Lund: Lund University.
- Mabogunje, A. L. (1990). Urban Planning and the Post-Colonial State in Africa: A Research Overview. *African Studies Review*, Vol. 33, No. 2 (Sep., 1990), pp. 121-203.
- Modi, V., McCade, S., Lallement, D., & Saghir, J. (2005). *Energy Services for the Millennium Development Goals Achieving the Millennium Development Goals*. Washington DC: World Bank/ESMAP.
- Moser, C. O. (1989). Gender Planning in the Third World: Meeting Practical and Strategic Gender Needs. *World Development* , 17 (11), 1799-1825.
- Moser, C. O. (1993). *Woman Human Settlement and Housing*. London: Tavistock.

- Pacheco, Fernando. (2001). "A Sociedade Rural na Angola dos Anos 60: O Caso de Malanje." In II Coloquio Internacional em Ciencias Sociais Sobre a Africa de Lingua Oficial Portuguesa.
- Pycroft, C. (1994). Angola - The Forgotten Tragedy. *Journal of Southern African Studies* , 241-262.
- Regional Fact Sheet from the World Development Indicators: Sub-Sahara Africa 2008*. (u.d.). Hämtat från Regional Data from the WDI database: http://siteresources.worldbank.org/DATASTATISTICS/Resources/ssa_wdi.pdf den 29 March 2008
- Ribot, J. (1999). A History of Fear: Imagining Deforestation in the West African Dryland Forests. *Global Ecology and Biogeography* , 291-300.
- Robeyns, I. (2005). Sen's Capability Approach and Gender Inequality: A Challenge for the Capability Approach? i B. Agarawal, J. Humphries, & I. Robeyns (Red.), *Amartya Sen's Works and Ideas* (ss. 63-95). London: Routledge.
- Robson, P. (Red.). (2006). *What to do when the Fighting Stops: Challenges for Post-Conflict Reconstruction in Angola*. Luanda: Development Workshop.
- Robson, P., & Roque, S. (Red.). (2001). *Here in the City there is Nothing Left Over for a Lending a Hand*. Luanda: Development Workshop.
- Sen, A. (2000). *Development as Freedom*. New York City: Anchor Books.
- Unknown. (den 20 April 2008). *Ovimbundu*. Hämtat från <http://www.countrystudies.com/angola/ovimbundu.html> den 15 March 2008
- United Nations Competition in Energy Markets. Competition in Energy Markets, Intergovernmental Groups of Experts on Competition of Law & Policy. Geneva.
- United Nations Development Program. (2007/2008) HDI Report: Angola-Going Beyond Income. http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_AGO.html.
- United Nations Population Fund. (2007). UNFPA State of the World Population: Unleashing the Potential of Urban Growth. Online Report. http://www.unfpa.org/swp/2007/english/chapter_4/periurbanization.html
- United Nations. *United Nations Millennium Development Goals*. Hämtat från United Nations Millennium Development Goals. <http://www.un.org/millenniumgoals/> den 9 April 2008.
- Visavanathan, N. (1997). i *The Woman, Gender & Development Reader* (N. Visvanathan, L. Duggan, L. Nisonoff, & N. Wiegiersma, Övers., ss. 17-33). London: Zed Books.
- WEHAB Group. (2002). *Framework for Action on Energy*. Hämtat från Johannesburg Summit 2002: www.un.org/summit/html/documents/summit_docs/wehab_papers/wehab_energy.pdf den 15 March 2008.
- Whittlesey, D. S. (1924). Geographic Provinces of Angola: An Outline Based on Recent Sources. *Geographical Review* , 14 (1), 113-126.

World Food Program. (2005.) Food Security and Livelihood Survey in the Central Highlands of Rural Angola. (burned copy onto submitted cd).

World Bank. (2008). Regional Fact Sheet from the World Development Indicators: Sub-Saharan Africa. Regional Data from the WDI database. Washington DC. Pg 2.

http://siteresources.worldbank.org/DATASTATISTICS/Resources/ssa_wdi.pdf

World Health Organization. (2006). International Standards for Tuberculosis Care (ISTC). The Tuberculosis Coalition for Technical Assistance. The Hague. http://www.who.int/tbpublications/2006/istc_report.pdf

8. APPENDIX

Interview 1. IDF- Huambo City Household Energy & Deforestation Study/ Development Workshop, Huambo-Angola

1. Is deforestation a problem in Huambo City?
2. What is the deforestation rate in periphery of the city of Huambo (e.g. Sakahala)?
3. What are the key areas sited as high in deforestation?
4. What kind of mechanisms have been put in place to stop deforestation
5. How is the government involved in charcoal production? What is the government's role?
6. Do charcoal sellers have to have licenses to supply from outside regions? Yes or No,
7. Do Charcoal sellers have to have licenses to sell in local city markets?
8. What efforts are in place to guarantee a sustainable forestry management?
9. Fuel wood Plantations?
10. Is there up to date Data about Huambo province and City forest resources and land-use patterns?
11. What is the legal framework in relation to charcoal production?
12. Is forest policy, energy policy, fiscal policy and land use policy streamlined? (Cross-sectoral approach)?

Empresa de Distribuicao de Electricidade, EP National Distribution of Electricity Company Luanda, Angola

Theme: Electricity and Distribution

1. What are the current challenges of distributing electricity throughout Angola?
2. How is electricity generated in Angolan cities like Huambo?
3. What are the future plans for scaling up energy distribution in Huambo?
4. Why are peri-urban areas not connected to national electricity grids?
5. What are your ideas on sustainability and economic development?

**Gender Specialist
NGO Development Workshop
Huambo, Angola**

Theme: Gender relations in Huambo

1. What are gender roles in relation to household labor?
2. What is the definition of marriage?
3. Are woman generally married, single or widows?
4. Generally, who makes the decision at the household?
5. For women, is there a social stigma associated with being poor?
6. Are women embarrassed to admit that they use woodfuel as household fuel?
7. Are women embarrassed to admit that they have coughing problems?

**National Director of Energy
Angolan Ministry of Energy & Water Affairs
Luanda, Angola**

1. What are your thoughts on Angola current energy use at the household level?
2. The International Energy Agency reports that 80% of households use traditional biomass for energy needs, what is the long terms national strategy to change this for the better?
3. In what areas of distribution is investment necessary?
4. What are some of the current challenges that prevent foreign investment from entering this area?
5. The International Energy Agency promotes a sustainable biomass strategy for household energy, what is your opinion on that?
6. What are the National Directory of Energy's priority areas for energy distribution within the province of Humbug?

**Institution: Angolan National Institute for Forestry Development (IDF)
Huambo, Angola**

1. Is deforestation a problem within Humbug City?
2. What is the rate of deforestation in Sakahala?
3. When did the problem begin?
4. What are the areas most affected with deforestation near Huambo City?
5. What mechanisms is the provincial government doing para evitar deforestation?
6. What are the principal species in Huambo's biodiversity?
7. How is the provincial government involved in charcoal production?
8. What is the role of the provincial government?
9. Does charcoal sellers outside of Huambo City need license to supply charcoal to peri-urban markets of Huambo?
10. What efforts are in place to guarantee a sustainable forestry management?
11. Are there tree plantations for charcoal production in Huambo province?
12. Is there up to date Data about Huambo province and City forest resources and land-use patterns?
12. What is the legal framework in relation to charcoal production?
13. Is forest policy, energy policy, fiscal policy and land use policy streamlined? (Cross-sectoral approach?)

MAIN SURVEY FOR STUDY AREA

ANALISE DE GÉNERO DO COMBUSTIVEL DOMÉSTICO HUAMBO

Questionário nº _____

Data:

LOCALIDADE

1. Provincia _____

2. Município _____

3. Comuna _____

4. Administração de Bairros _____

5. Bairro _____

6. Zonas _____

7. Tipo de Habitação
- A. Apartamento³³
 - B. Habitação formal³⁴
 - C. Habitação informal³⁵
 - D. Habitação semi-formal³⁶

PERFIL DE ENTREVISTADO

8. Sexo M F

9. Relação que entrevistado tem com Chefe de Família _____

10. Ano de nascimento ___/___/___

HABITACAO

Quando cozinhas faz muito fumo? 1 Sim
2 Não

O sito aonde faz comida tem chaminé?

Se não, tem alguma janela para o fumo sair?

Tiveram algum incêndio, em casa?

Qual foi a causa do incêndio?

Os incêndios são frequentes na vizinhança?

Tem energia eléctrica ligada a rede?

Se não, como é feita a iluminação de casa?

13. AGREGADO FAMILIAR

7. Chefe de Casa M F

8. Idade do Chefe de Casa _____

9. Se não saber escolhe uma das opções abaixo

A. <60

³³ Apartamento
³⁴ Casas da zona urbanizada com serviços básicos
³⁵ Casas nas zonas peri-urbanas, com muito fracos serviços básicos
³⁶ Casas na zona peri-urbana certas serviços básicos

B. 40 - 60

C. 18 - 40

D. 14 - 18

9. Estado civil de Chefe de Casa

A = Solteiro

B = Casado

C = Uniao de facto (mas de um ano)

C = Estao juntos mas o marido outro localidade / de jure de facto

D = Viuva (o)

E = Divorciado

Idade de Dona de casa _____

Nível de educação _____

Principal ocupação _____

Quantos filhos vivem em casa _____

Nível de educação (dos filhos) _____

Que classes frequentam os filhos _____

Quem mais vive em casa

1. Avós

2. Sobrinhos

3. Tios

4. Cunhados

5. Outros/ Especificar _____

Nos últimos seis meses alguém veio viver em sua casa?

1. Sim

2. Não

	Pessoa 1	Pessoa 2	Pessoa 3
Proveniência desta pessoa? ³⁷			
Motivos da proveniência?			
Qual é a relação familiar?			

15. Quantas pessoas saíram de casa nos últimos 6 meses?

16. O que motivou a sair de casa?

Trabalho

Escola

Negócio

Outro_____

Se motivo foi trabalho, ele manda dinheiro? _____

Se sim, quanto é que manda? _____

Com que frequência essa pessoa envia dinheiro? _____

ATIVIDADES DE RENDIMENTO

16. Qual e a principal fonte de rendimento da casa?

1. Formal ³⁸

³⁷ _____
Província de proveniência

³⁸ (Formal) Governo 2= ONGs 3= Empresa 4= Campones

2. Informal³⁹

Qual e o segunda fonte de rendimento de casa mais importante?

SOBRE ENERGIA

Quem toma as decisões para compra de equipamentos domésticos ligados a energia? (ex. fogao)

SECCÇÃO DE EMERGIA MECÂNICA

Quais são os produtos que transformam usando energia mecânica, em casa? _____

Precisa da moer a comida? (ex. Ser ela pisa o milho)

- 1. Sim
- 2. Não

Busca agua na uma manivela?

- 1. Sim
- 2. Não

Atividades Domésticas (ex. trabalho de casa que não recebi dinheiro como prepara comida, lavando roupas e depois passar fero)

Porque a mama precisa de combustível em casa?	Porque a Pai precisa combustível em casa?	Qual é o tipo de combustível utilizado para os serviços?

Se tem actividades produtivas (tarefas com rendimento), se não vai para próxima pergunta.

³⁹ (Informal) 5 = Campones 6 = Negocios 7= Biscatos

Tarefas com rendimento esta feito em cozinha	Qual tipo de energia e utilizas?
Bolo	
Pao	
Gelado	
Yogurte	
Pasteis	

Que tipo de combustíveis utilizam em casa?

(O Mama) Qual são os combustíveis de preferência (B). liste os vantagem e (C) desvantagem

Combustivel	Vantagem	Desvantagem
A.1	B.1	C.1
A.2	B.2	C.2
A.3	B.3	C.3

(O Papa) Qual são os combustíveis de preferência (B). liste os vantagem e (C) desvantagem

Combustivel	Vantagem	Desvantagem
A.1	B.1	C.1
A.2	B.2	C.2
A.3	B.3	C.3

INFORMACAO SOBRE OS PRATOS (Reproductive work)

Quantas os pessoas comem em casa por dia?

1. Mata-bicho a. _____ b. Comida frio ou quente?
2. Almoço a. _____ b. Comida frio ou quente?
3. Jantar a. _____ b. Comida frio ou quente?

PRATO	Tempo precisa para cozer?	Qual combustivel	Qual e quantidade de combustivel preciso

		usado?	para prepara o prato?
		Lenha (L)	
		Carvao (C)	
		Outro (O)	
Feijao			
Arroz			
Bata doce			
Peixe			
Verdures			
Funji			

Actividade	Tempo preciso para realizar	Tipo de combustivel usado	Quantidade de combustivel utilizado
		Lenha (L)	
		Carvao (C)	
		Outro (O)	
Passar ferro uma troche de roupa			
Ferver agua			
Tomar banho			

Bio-Combustíveis

Carvão

Usam carvão? Sim ou não? _____

Aonde alguém pode achar carvão? _____

Quem vende carvão _____

Quanto gastar a sua família por semana para obter carvão para os trabalhos domésticos?

KWZ _____

Quanto gasta a sua família por semana para obter carvão para as actividades produtivas (tarefas com rendimento)

KWZ _____

Lenha Usam lenha? Sim ou não

A que distancia compram a lenha?

Estimativa em KM ____

Aonde recolhem a lenha que usa em casa?

- A. Terreno próprio
- B. Terreno comunatario
- C. No Mercado
- D. Outro, especificar _____

Quanto tempo precisar para recolher a lenha? _____

O sitio aonde recolhe lenha tem, a muito desmatamento (desflorestação) de arvores?

Qual e nível: lento, médio ou rápido?

Quantos custa a lenha que usam em casa por dia? Estimativa em KWZ ____

Quanto gasta a sua família por semana para obter lenha para os trabalhos domésticos?

Em KWZ _____

Quanto gasta a sua família por semana par obter lenhas para os trabalhos caseiros que geram rendimentos para família?

Em KWZ _____

Já ficou alguma vez sem combustível para cozinhar? _____

Porquê? _____

Ser não tiver dinheiro para compra lenha ou carvão, faz que? _____

Qual e o trabalho domestico que ficaria mas fácil se tivesse melhor acesso ou melhor sistema de combustível?

SAUDE de CHEFE DE FAMILIA

	Como descreverias o sua condição de saúde ?	1. Saudável 2. frequentemente doente

		3. Mais ou menos
Qual são as principais doenças? Indique qual		1. Reumatismo 2. Dores da coluna 3. Malaria 4. Diarreia 5. Respiratory a. tosse b. pneumonia c. dores de pulmonares
Qual foi a sua doença mais recente? Apenas uma resposta		1. Reumatismo 2. Dores da coluna 3. Malaria 4. Diarreia 5. Respiratory a. Tosse b. Pneumonia c. Dores de pulmonares
Aonde recebeu o tratamento medico?		0. Não recebeu tratamento 1. Centro medico 2. hospital de governo 3. Clinica privada 4. Curandeiro/ medico tradicional 5. medicamentos caseiros 6. comprou medicamentos na farmacia 7. Outro_____

SAUDE de Dona de Casa

Como descreverias o sua condição de saúde ?		4. Saudável 5. frequentemente doente 6. Mais ou menos

	<p>Qual são as principais doenças?</p> <p>Indique qual</p>	<p>6. Reumatismo 7. Dores da coluna 8. Malaria 9. Diarreia 10. Respiratory</p> <p>d. tosse e. pneumonia</p> <p>f. dores de pulmonares</p>
	<p>Qual foi a sua doença mais recente?</p> <p>Apenas uma resposta</p>	<p>6. Reumatismo 7. Dores da coluna 8. Malaria 9. Diarreia 10. Respiratory</p> <p>a. Tosse b. Pneumonia</p> <p>c. Dores de pulmonares</p>
	<p>Aonde recebeu o tratamento medico?</p>	<p>1. Não recebeu tratamento</p> <p>8. Centro medico 9. hospital de governo 10. Clinica privada 11. Curandeiro/ medico tradicional 12. medicamentos caseiros 13. comprou medicamentos na farmacia</p> <p>14. Outro_____</p>

SAUDE de Quem Cozinha ser não e Dona de Casa (Filha ou Empregada)

	<p>Como descreverias o sua condição de saúde ?</p>	<p>7. Saudável 8. frequentemente doente 9. Mais ou menos</p>
	<p>Qual são as principais doenças?</p> <p>Indique qual</p>	<p>11. Reumatismo 12. Dores da coluna 13. Malaria 14. Diarreia 15. Respiratory</p>

		g. tosse h. pneumonia i. dores de pulmonares
	Qual foi a sua doença mais recente? Apenas uma resposta	11. Reumatismo 12. Dores da coluna 13. Malaria 14. Diarreia 15. Respiratory a. Tosse b. Pneumonia c. Dores de pulmonares
	Aonde recebeu o tratamento medico?	2. Não recebeu tratamento 15. Centro medico 16. hospital de governo 17. Clinica privada 18. Curandeiro/ medico tradicional 19. medicamentos caseiros 20. comprou medicamentos na farmacia 21. Outro _____

Saude de filho

Tem filhos? Sim ou nao?

Quantos filhos teve na sua vida?

Quantos filhos estão vivos?

Qual e doença mais comum que afecta os filhos? _____

Se morreu-lhe algum filho, qual foi a razão da morte do último?

- A. Doença prolongada
- B. Doença pouca duração
- C. Acidente

D. Outro, _____