

Green Scenery

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The Country's Resources Are God's Gift To Us, What We Make Of Them Are Our Gift To Posterity.

FUEL WOOD AND WOOD FUEL

CONSUMPTION ASSESSMENT

IN FREETOWN

A CASE STUDY FOR KISSY NEW SITE.^ψ

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^ψ Organisations or individuals pursuing development work or any other relevant research can use this report provided the source of the information is quoted.

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FUEL WOOD AND WOOD FUEL CONSUMPTION ASSESSMENT IN FREETOWN A CASE STUDY FOR KISSY NEW SITE. ©

INTRODUCTION:

The issue of environmental protection and management is a global concern but Sierra Leone is yet to wake up to the fast growing interest in environmental science and technology. Current and reliable information on the environment in Sierra Leone is not easily found. Research is seldom carried out, probably due to lack of support or interest on the part of indigenous scientists, policy makers and NGOs.

Green Scenery, an indigenous non-governmental agency concerned with the management of Sierra Leone's natural resources, the protection of the environment against arbitrary abuse through direct intervention and lobby, civic education, and human Right approach has under taken this research initiative as one of its numerous ways of informing the public, policy makers and the international community about the fate of Sierra Leone's environment.

The focal point in Green Scenery's approach is the effective development and utilization of the intellectual and physical capabilities of school children and the adult populace through education, civic participation, public awareness and sensitisation on the need to preserve and conserve our environment.

Green Scenery conducted this study to determine the level of fuel wood¹ and wood fuel² consumption as one of the indices of deforestation in Sierra Leone, taking the Kissy New Site community as a case study.

¹ Fuel wood here means firewood (chunks of wood burn for energy source).

² Wood fuel here means char coal.

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AIMS:

The main aim of this research is to assess the level of deforestation through the consumption of fuel wood and wood fuel, taking the Kissy New Site community³ in the eastern section of Freetown as a case study. The study further assesses the impact of cooking with fuel wood and wood fuel on the health of women and children.

OBJECTIVES:

A critical over view of the rationale behind this work has been summarized into the following objectives:

- a. To identify the type of fuel wood/wood fuel consumed by households.
- b. To determined the extent of fuel wood/wood fuel consumption by households.
- c. To determine/estimate the level of expenditure in consumption of fuel by households.
- d. To examine the attitude of consumers to fuel wood/wood fuel consumption.
- e. To investigate some of the hazards/problems associated with fuel wood/wood fuel consumption.
- f. To identify any alternative source of fuel/energy for home consumption.

JUSTIFICATION:

Sierra Leone is among the smallest countries on the African continent with a total land area of 72,000 sq. km. and the population of about 5,000,000 inhabitants.

By 1953, the atlas of Sierra Leone gave the following natural vegetation estimate within the country:⁺

Forest reserves	831 sq. miles	3.0% of total land area
Closed forest*	16,910 sq. miles	60.6%
Open Savanna woodlands	7,847sq. miles	28.1%
Swamp	2,337sq. miles	8.3%

³ The choice of the Kissy community arose from the fact that it lies in a strategic location between the less economically viable community and those of partial economic viability taking into considerations the poverty line of Sierra Leone. This community is one that lies between Bai Bureh Road (Safecon, new road) and old road on the one hand and Personage Road and the gorge/swamp towards low cost housing.

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⁺ Figures quoted by Trees of Sierra Leone: P.S. Savill and J.E.D. Fox; p8

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In this distribution is located the Tropical Rain Forest, which is found mainly in the Western Area and the Eastern province⁺ The Gola Rain Forest comprising three separated units found on the Liberian border had a total area of 580 sq. km. Of this small area it has been estimated that by the end of the 1990s a cumulative 60% of this area would have been felled.^x

In the Western Area the situation is no better. The land tenure in Sierra Leone, which poses a barricade to private land ownership in rural Sierra is putting enormous pressure on land acquisition in the Western Area where land can be owned freely. This and population pressure for housing and other development as well as wood harvesting have shrunk drastically the very small Tropical Rain Forest in the Western Area.

Environmental degradation emanating from human activities and the consequential population explosion are clearly the most peril threat to the survival of Sierra Leone's flora and fauna.

This assessment survey is conducted with a view to establish not only our candid desire to identify and explore all possible ways of protecting our environment but also to augment the little information available on the country's environment. Our forest reserves are on the verge of extinction as a consequence of man's activities. The massive deforestation within and around the Freetown peninsula stems from farming and fuel wood collection but more so to fuel wood collection. In other parts of the country, logging in addition to fuel wood harvest is a common feature in Sierra Leone's deforestation.

The once beautiful rain forest that gave ecstatic value to and the correct shape to our "Lion Mountain" is now a derived savannah. The annual rate of deforestation in Sierra Leone is estimated to be 10%.⁴ The harsh climatic conditions that characterize Africa coupled with the impact of global warming are gradually becoming high points on our local environment. Until this act of arbitrary misuse of our forest is checked, erosion, (of any kind) heat waves, tornados etc. will have a devastating effect on not only our lives but also on the country's natural resources, including species of flora and fauna.

* This includes a very large portion of secondary forest due to shifting cultivation: P.S. Savill & J.E.D Fox

⁺ Figures quoted by Trees of Sierra Leone: P.S. Savill and J.E.D. Fox; p8

^x ZOONOOZ: Geza Teleki and Lori Balwin.

⁴ Sierra Leone in figures: Accessed at <http://www.sierra-leone.org/cso.html>

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This research we believe is very timely as it gives an insight to the problems that plague our environment and will inform the new government and policy makers to take appropriate action on the issues that have been highlighted herein.

Green Scenery views the unchecked act of deforestation especially through fuel wood collection, logging and "farce farming"⁵ with grave concern and appeal to all Sierra Leoneans to rise and protect our environment before it is too late. We must realise that "our environment is God's gift to us, what we make of it is our gift to posterity."

METHODOLOGY SPECIFIC METHODOLOGY:

A questionnaire comprising twenty (20) questions was designed to elicit the required information pertaining to all issues on fuel wood and wood fuel consumption. The questionnaire was administered to four hundred and twenty households with each household entitled to only one set of questionnaire.

SAMPLE SIZE :

The survey conducted targeted 420 households, which is an estimate of the households in that community. Each household is estimated to contain between 8 – 12 occupants. The estimate of 420 households was arrived at from a quick census that was conducted to give an insight of the housing density of that community.

Four people were thoroughly orientated on how to administer an "on the spot questionnaire". They were then dispatched into the Kissy New Site community. The questionnaires they carried bore questions that required answers with a simple "tick the correct answer" to a "one or two answer word."

ANALYSIS:

A systematic analysis of the data collected from a sample size of 420 households revealed the following: Out of a total 420 respondent; 275 respondents (65%) consume fuel wood obtained from the forests only. 4 respondents (less than 1%) consume mangrove fuel

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wood only 19 respondents (less than 5%) consume both forest and mangrove fuel wood 111 respondents (26%) consume wood fuel (charcoal) as the alternative to fuel wood, and 11 respondents (3%) consume non-wood fuel such as kerosene and gas.

In summary therefore, 409 respondents (97%) consume wood fuel (i.e. fuel wood and wood fuel) while the remaining 11 respondents (3%) consume non- wood fuel. The study also revealed that the following were the main activities in which wood fuel is used: a) Cooking/preparing food; b) Boiling water; c) Drying fish; d) Baking; e) Roasting/grilling; f) Ironing (pressing clothes).

FUEL WOOD:

Since a total of 298 households consume fuel wood only, the average daily consumption is 718 bundles⁶ and an average cost of Le300.00 per bundle. Translating this into monetary value per household indicates that each household in the 298 households spends Le804.00 (eight hundred and four Leones) to purchase 2.41 bundles of fuel wood. This amounts to a daily total expenditure of Le239, 650.00 (two hundred and thirty-nine thousand, six hundred and fifty Leones) for the 298 households. The annual total fuel wood consumption for the 298 households amount to 262,070 bundles and is represented in monetary value by Le87, 472,250.00 (eighty-seven million, four hundred and seventy-two thousand, two hundred and fifty Leones).

Series of problems were highlighted by the respondents as being their major constraints in the use of fuel wood. Out of a total of 298 respondents, the following were the complaints. 209 respondents complained about too much smoke from the wood. Twenty-one respondents indicated heat as their major problem. Forty-six respondents reported of wet wood as their main constrain. Twenty-two respondents stated no problems.

⁵ Way of farming where in the land is cleared of forest to get wood and the soil is hypocritically ploughed and few seeds of whatever is sown to give an impression of some farming. In actual sense, the land is cleared to collect wood.

⁶ A bundle consist of 4-5sticks of approx. length 0.6-0.65m.

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A lot of health hazards are associated with using fuel wood as the principal domestic energy source, the 298 respondents using fuel wood reported of headache, eye irritation, sneezing, coughing, pain in the chest as their main health problems.

The analysis revealed that the principal exercise in the home that consume fuel wood greatly is preparing food as 280 respondents said they use fuel wood predominantly for that. Further more the following were the major sources of fuel wood consumption in the home. Out of a total of 298 respondents: 124 respondents (42%) obtain fuel wood from the market. 113 respondents (38%) obtain fuel wood from the hawkers in the community. 60 respondents (20%) get their fuel wood from heavy trucks that convey and sell fuel wood. 1 respondent (0%) obtain fuel wood directly from near by bush.

WOOD FUEL (CHARCOAL):

A total of 111 households out of 420 household consumed wood fuel. The daily total consumption of wood fuel by 111 households amount to 157 measures (a measure approximates to 0.681kg at an average cost of Le550.00). Translating this into monetary value indicates that the 111 households spend on average the sum of Le87,350.00 (eighty-seven thousand, three hundred and fifty Leones) to purchase 157 measures of wood fuel (charcoal) per day. It implies the annual total wood fuel consumption per 111 households amount to 57,305 measures and the monetary value is estimated at Le31, 882,750:00 (thirty-one million, eight hundred and eighty-two thousand, seven hundred and fifty Leones).

Like the fuel wood consumers, wood fuel (charcoal) consumers highlighted similar problems. Out of a total of 111 households/respondents 16 respondents reported of too much smoke from the burning of coal. 22 respondents reported of too much heat from the burning coal, 32 respondents complained of wet charcoal as their main problem and 41 respondents did not state any problem.

Like the fuel wood consumers, wood fuel consumers again reported health hazards. All of the 111 respondents reported of headache; eye irritation; sneezing; coughing; pains in the chest and burns to be their major health hazards. It is further revealed that children

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who help in the kitchen often complain of fever in addition to the highlighted health problems.

The principal exercise in the home that greatly consume wood fuel as the analysis indicates is preparation of food, 102 wood fuel consumers said they predominantly use wood fuel for preparation of food. In terms of the sources of wood fuel for consumption the following were the responses. Out of 111 respondents 50 respondents (45%) obtain their products from the nearby market. Ten respondents (9%) get their products from heavy trucks that convey them to market centres. 32 respondents (29%) get wood fuel from hawkers in the community. 19 respondents (17%) obtain their products from charcoal stores within and out of the community.

It could therefore be inferred from the above-stipulated figures that since 298 households consume exclusively fuel wood (wood) and 111 households consume wood fuel (charcoal) this means that the total number of households that consume wood (i.e. both fuel wood and wood fuel (charcoal)) will be 409. The daily total expenditure by 409 households in that community on both fuel wood (wood) and wood fuel (charcoal) could be estimated to be Le327,000.00 (three hundred and twenty-seven thousand leones). Therefore the annual total expenditure on those products by the 409 households could stand at a colossal sum Le119, 355,000 (one hundred and nineteen million, three hundred and fifty-five thousand leones).

Furthermore out of a total of 409 households that consume both products, only 94 respondents claimed to have planted trees at least once in their lives, 308 respondents have never planted trees in their lives. However, 281 respondents claimed they want to plant trees if given the chance.

The 298 fuel wood consumers claimed they predominantly use the out door "three-stone stove" for cooking. Similarly the 111 wood fuel (charcoal) consumers said they use the simple metal stove (coal pot).

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NON-WOOD FUEL PRODUCTS:

In spite of the fact that the Kissy New Site community is heavily dependent on wood fuel as their main domestic source of energy, the analysis further revealed that out of the total 420 households, 11 households claimed they use non-wood fuels as an alternative domestic source of energy. Ten out of the 11 households consume kerosene while only one respondent uses butane gas as a source of energy predominantly for cooking. All 10 households claimed to be using kerosene consume a total of 21.5 pints⁷ of kerosene. The daily total expenditure by all 10 households on 21.5 pints⁷ of kerosene is Le7, 750.00 (seven thousand, seven hundred and fifty Leones) with an average cost of Le350.00 (three hundred and fifty Leones). It implies that the annual total expenditure by the 10 households for 7,847.5 pints of kerosene consumed amount to Le.2, 828,750 (two million, eight hundred and twenty thousand Leones, seven hundred and fifty leones). However, the problem highlighted by the users of kerosene in the 10 households included eye irritation and blazing of flame from the stove.

⁷ Pint here implies one equivalent to 330ml i.e. a “Guinness” or “Star” bottles.

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DISCUSSION

This study is set with the background that about 84.7% of the 72,000sq. Km is forest and woodland. That in 1996/97 the rate of deforestation was set at 3,000 hectare per year, giving an annual deforestation rate of 10%.⁸ In the same year fuel wood production/year increased to 5,160,200cu. Metre from 5,064,000cu. Metre in 1995/96. Charcoal or wood fuel production was up in 1996/97 to 160,000 tons from 156,000 tons in 1995/97.⁹

The study reveals the multitude of people/households who are solely dependent on fuel wood and wood fuel as domestic source of energy. The figure (97%) is expectedly but alarmingly too high. Because cooking and other kitchen activities are a daily occurrence, fuel wood and wood fuel are purchased everyday. This implies that there is monumental pressure exerted on the natural forests that bear the trees, which are cut down and/or processed and sold as fuel wood or wood fuel. The nightmarish figure of 262,070 bundles of fuel wood consumed only by 298 households sharply put in focus that a very huge quantity of fuel wood is consumed in the whole of Freetown now host to an estimated 1,500,000 people.

The figure 262, 070 bundles of fuel wood can be estimated to the cutting down of 2620 trees with average girth size of 13cm and total height (branches inclusive) of 61m. Equally, the annual volume of wood fuel (56,520 measure/ 38,000kg) consumed by 111 households can be of significant number of trees considering that the wood fuel or charcoal is a compressed version of fuel wood. It can be inferred that many more trees than 2620 will need to be cut down to satisfy the demand on an annual basis of just 409 households.

In terms of forested area to be cleared; an approximate 2.35 hectares of tropical forested land with tree-stands 3m apart (allowing for 1111 trees/HA) will need to be cleared to acquire 2620 trees. It therefore concludes that more than 2.35 hectares of

⁸ Sierra Leone in figures. Accessed at <http://www.sierra-leone.org/cso.html>

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forested land is required to be cleared annually to supply fuel wood and wood fuel to just 409 households.

Tree planting is less evident in the psyche of respondents as is revealed by the study; only 23% of 409 respondents have ever planted trees. A total of 308 out of 402 say they have never planted trees. This is a pointer that enough public awareness and sensitisation are not being done to promote a culture of tree planting. The willingness is amply there as is demonstrated by 70% respondents saying that they would like to plant trees if given the opportunity. This means that if tree-planting programs are directed at community levels, successes are likely going to be high and the possibility of cultivating a culture of tree planting will emerge.

The whopping Le 119,355,000 annual expenditure from just 409 households is worryingly directly benefiting the individual wood sellers with nothing going to the state as taxes. It is now abundantly clear that wood selling is a major economic activity for which the state needs to acquire benefit as it does in other areas of economic activities. We no doubt want to believe that a huge wood selling industry is guzzling a very substantial amount of revenue to individuals involved in the trade.

The 409 respondents consuming both fuel wood and wood fuel complain of headache; eye irritation; sneezing; coughing; pains in the chest and burns as health hazards they encounter from using these products. These health risks should be taken seriously, especially if considered in the context of cumulative effect. Years of cooking in such environment are bound to cause devastating effect on women and the children who help them.

As it has been revealed by the study, the average daily expenditure per household for fuel wood is Le. 804. For wood fuel, it is Le. 787 and for kerosene it is Le. 775. It would

⁹ Sierra Leone in figures.

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imply that the more efficient the fuel is the lesser the expenditure incurred. True to say, kerosene would appear to be more cheaper than the other two, but it would cost nothing but three stones to start a fire to prepare a meal and it would also cost much lesser to acquire a charcoal stove (coal pot). In the case of kerosene stove, it is by Sierra Leonean standard very expensive to acquire one.

It will also cost nothing to maintain a three-stone-stove, just as it cost nothing to maintain a charcoal stove but there is definite cost for maintaining kerosene stove. Further more, kerosene stove depreciates like charcoal stove and will need to be replaced with time. Three stones could endure forever and even where they don't, their replacement cannot be a problem.

Some Advantages of the kerosene stove

After considering the disadvantages of the kerosene stove, are their advantages too and can they be seen as overcast to the disadvantages? These advantages are:

- Kerosene and kerosene stove can conveniently be used indoors while the three-stone-stove and fuel wood is very inconvenient in this regard. The use of wood fuel and charcoal stove is also mildly inconvenient.
- Kerosene is readily ignitable at all times. Rainy seasons are not the best times to use fuel wood or wood fuel.
- Kerosene stoves can be adjusted to produce desired flame heights (that ensures optimum use of the product) whereas it is impossible to regulate the three-stone-stove or the charcoal stove.
- Kerosene stores in a small space, fuel wood and wood fuel stores in relatively larger space.
- Kerosene stove and its fuel produce hotter and well-directed flame. Cannot be said for the others.
- Kerosene stove or its fuel does not produce smoke and thick black soot that makes cooking utensils unsightly.

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- Use of kerosene stove and its fuel is relatively healthier than both the other fuels and their stoves.

It would be conventional wisdom from the facts available to recommend the use of kerosene and kerosene stoves. Although this is not the best available option, it can be referred to as one option that would be relatively convenient and one that would have the potential of releasing pressure off the country's forest resources. Green Scenery believes that a popular use of kerosene in homes will remarkably reduce the current monumental pressure on Sierra Leone's tropical forest a forest that is reclining so fast.

RECOMMENDATIONS

The one problem that will be associated with the use of kerosene in homes especially considering the poverty level of Sierra Leoneans, will be the initial purchasing cost of the stoves, which in every sense is expensive by Sierra Leone standard. Nonetheless, there are ways we in Green Scenery believe that the situation can be ameliorated and this will call for the intervention of the government.

It is Green Scenery's belief that for homes to be able to acquire kerosene stoves the cost of the stoves must be cheap enough to be purchased. This can partly happen if government imposes zero customs duty and other taxes on kerosene stoves.

Similarly, there must be a drive from all sectors that deal with the public to encourage the use of kerosene and kerosene stove and discourage the indiscriminate and irresponsible utilisation of the natural resources. One such method of achieving this is for the various line ministries (Lands Housing and the Environment, Agriculture, Forestry and Marine resources and Development and Economic Planning) be involved in the promotion and protection of the environment to revisit their the policies of felling trees for any purpose. They should review especially licenses issued for the felling of not only logs but also trees meant for energy. This should encompass farmers for being the producers of the wood product; bulk/wholesale buyers; Truck owners for conveying the product; store owners for storing the product; community wood hawkers; and special license for vehicles including carts that sell wood product in traffic.

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The ministries should also look at penalties for the violation of these regulations with the view of improving on them as well as enhancing their implementation.

A reduction in the prize of kerosene by a minimum of Le.500 will also serve as an incentive for people to maintain the purchase of this energy source. It will also further reduce the daily expenditure on fuel per household, which savings can be used to cater for other household expenditure. The minimum discount will equally not be lost by the fuel companies because it is Green Scenery's view that the Le. 500 should be spread over other fuel products such as diesel and petrol.

Green Scenery strongly hold the view that these product users should be willing to absorb this cost as a way of contributing to the preservation of the country's tropical forest as well as indirectly improving on the quality of our environment.

Environmental NGOs should be supported to embark on public education and sensitisation drive on the need for households to embrace the use of kerosene stoves. They should also give technical support regarding maintenance of kerosene stoves to households.

Government should encourage and support local environmental NGOs to initiate and implement programmes in tree planting not only by using fast growing trees but also to hone on indigenous tropical trees.

There should exist interactive relationship (NGO forum/tripartite forum etc.) between environmental NGOs and the various line ministries (including others not mentioned above) as well as donors to put in proper perspective an environmental protection agenda for the country as well as regularly review of environmental action programmes.

The health sector should plan programs that should take on board the health issues raised by this study. Also, other organisations engaged in health delivery should deploy services planned for addressing these problems in poor communities that are exposed to these hazards. Meanwhile further research is necessary in this area to properly study the impact (especially on a long term) of the exposure to heat and smoke coming from fuel wood and wood fuel.

ABOUT GREEN SCENERY

Green Scenery is a Sierra Leonean non-governmental organisation established in 1989 with the aim of promoting and protecting the country's environment. Over the years Green Scenery has realised that an overall holistic approach was necessary in ensuring the goal of the organisation effectively contribute to the overall development of Sierra Leone. To meet this goal Green Scenery is now actively engaged in:

- *Education and training*
- *Public awareness*
- *Researching*
- *Consultancy services*
- *Intervention projects*
- *Advocacy and lobbying*
- *Production of resource materials*
- *Policy formulation*

In the following areas

- *Environment*
- *Human rights*
- *Conflict management and resolution*
- *Transition and transformation*
- *Reconciliation*

For the following sectors

- *Schools*
- *Community organisations*
- *NGOS*
- *Women*
- *Youth*
- *Government departments*
- *The Forces: Police, Prison, Military*
- *Business community*

Finally, Green Scenery is a member of The National Forum for Human Rights in Sierra Leone.

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Green Scenery wishes to express its profound appreciation for the support granted by NC-IUCN, which support resurrected our failing hope to pursue our objectives. Today NC-IUCN's support has transformed Green Scenery into a dedicated and objective oriented NGO.

Green Scenery also wishes to acknowledge the Ministry of Agriculture, Forestry and Marine Resources for its continued support in providing technical and other crucial assistance to the organisation through the forestry department. The co-operation of all forestry official from the Director of Forestry to the Nursery workers is highly appreciated.

Finally, we also acknowledge the support of all the line ministries, the Secretariat and sister organisations of the National Forum as well as the school communities we are working with.