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# EFFECT OF ENERGY INITIATIVES ON GENDER EQUITY: AN ASSESSMENT OF HOUSEHOLDS IN HOMA BAY COUNTY, KENYA

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***Abstract****: Access to Energy plays an important role in sustainable development, preventing climate change and poverty alleviation. Women are forced to devote considerable effort and time gathering fuel, water and fodder, often culminating in lost opportunities for education, employment and self-improvement. Moreover, cooking with biomass as on open fires has exposed women to indoor air pollution leading to respiratory illnesses. The main aim of this study was to assess the effect of energy initiatives on gender equity in relation to standard of living and livelihood improvement. The study adopted Ex post facto research design where probability sampling strategy was employed to select a sample from the households and purposive sampling to choose people to participate in focus group discussions. The accessible population comprised of 389 household representatives and 4 focus group discussions. The instruments for data collection included structured questionnaire for households' interview schedules for participants in focus group discussion, and observation guide. Quantitative data analysis employed descriptive data analysis techniques while qualitative data analysis employed thematic approach. The study found that Women experienced tedious and physically exhausting cooking sessions and gathering of biomass fuels. Key family-related decisions are also male dominated. The study concluded that gender equity could be accomplished through interventions which free women's time to efficiently increase their capabilities to take part in productive activities.*

***Key words:*** *Gender, Energy Access, Livelihood, Energy Initiative and Gender Equity*

## 1.1 Introduction

Energy is strongly linked to sustainable human development goals such as the role of women in development, poverty eradication, creation of job opportunities and protecting and renewing the environment (UNDP, 2011). There is adequate documentation of women's roles and interests in energy use and production (Clancy, 2011). Approximately 2.7 billion people depend on animal dung, wood or charcoal for elementary energy requirements including cooking and heating. Given that deprived and marginalized people depend on locally obtained biomass for their day-to-day energy requirements, a little pressure on their immediate ecological unit can progressively lead to shortages. Such inadequacies significantly burden needy women living in rural areas. Women and girls who live in rural areas are the principal producers of household energy. Consequences of energy poverty include: greater burden on health care, education, career, drudgery and any other self-care (e.g. leisure) activities

## 1.2 Literature review

### *Energy Poverty has a Gender Face*

Internationally it is known that energy increases output and permits new industries to flourish, eventually contributing to enhanced social and economic outcomes for individuals. The International Energy Agency (IEA, 2010) defines access to modern energy at the level of household as "access to reliable and affordable clean cookstoves at household level, initial electricity connection, followed by rising level of electricity consumption over eventually reaching the average regional consumption. Whereas both deprived men and women suffer from energy poverty, women are extremely affected, since their access to energy resources and advantages is additionally suppressed by imbalanced power relations (Kohlin et al., 2011). Data from around the developing world shows that the needs, views and participation of women have consistently been left out from energy practice and policy. The energy needs and benefits for men are accorded precedence those of women and girls (Practical Action 2010).

Severe consequences result when women experience energy poverty and when they fail to meet their energy needs (Danielsen 2012). Time taking and labor-intensive gathering of biomass fuels result in poor state of health of women and girls, low opportunity to improve their labour productivity, minimal options to earn additional income. It may also lead to restrained opportunity for political and social interaction outside the household, limited likelihoods of benefiting from schooling and training and extension carries high additional costs, often rendering it inaccessible (Practical Action 2010, Clancy et al 2011, Kohlin et al 2011, UN 2011). Furthermore, these situations create additional obstacles to the ability of women to claim their rights and speak out their energy concerns; strengthening their exclusion and aggravating the problem (Mai et al 2011). All the household members, are affected negatively when women have restricted access to modern energy services (Clancy et al., 2011).

It is important to fully understand the precise energy needs and responsibilities of men and women especially the wider perspective of unequal gender relations whereby these are practiced as unequal gender relations determine privileges to use of energy services and subsequently the diverse benefits women draw from them (Kohlin et al 2011; Danielsen, 2012). Gender inequality in access to energy services must be explicitly addressed as a requisite for SE4ALL to accomplish its goal of guaranteeing universal access to energy services by 2030.

***Effect of Energy Poverty on Women and Girls***

Although energy deprivation is a problem for all people living in poverty, women are extremely affected as their access to energy resources and benefits is further restricted by gender inequalities (Clancy et al., 2011; Danielsen, 2012). Women are concerned with energy in several developing countries in which energy is obtained from traditional biomass including agricultural residue, wood and charcoal (Carr and Hartl 2010). Women experience a variety of unique gender problems related to their roles in the creation and use of energy services. Cooking with solid fuels affect women and children negatively given that gathering of firewood, processing fuel (e.g. drying and cutting), cooking, and cleaning utensils after a meal are customarily feminine gender responsibilities across the developing world. Female cooks can be expected to have high exposure to harmful particulate matter emissions, respiratory illness, headaches and eye irritation (IISD, 2013). The long hours spent in cooking and impaired child health can result in decreased educational opportunities for children (WHO, 2012; WHO, 2014; Darrow et al., 2014), impaired nutrition (WHO, 2011; Dankelman, 2010; UNDP, 2011a) and a rise in poverty due to channeling of resources to purchase of fuel and undesirable aesthetic effects (e.g., poor lighting and soot-darkened home environment).

The two most challenging energy poverty issues for women are related to the forms of energy they use to accomplish everyday tasks to provide for their families. In poor households, there is over reliance on poor quality fuels, primarily woody biomass and kerosene, usually using traditional technologies such as the three stone fire for cooking and water heating and wick lamps and candles for lighting. Women also depend heavily on individual physical effort through little support by labour-saving equipment. Gathering biomass to meet energy requirement of a household is the responsibility (physically and symbolically) of women and girls. In rural areas it signifies spending a number of hours a day gathering fuelwood loads of 20kg or more ( WHO 2006; FAO, 2006). Meeting domestic fuel requirements in urban areas can involve manipulating strained household earnings in order to purchase kerosene and charcoal; increased cost of fuel means a reduction in cash for foodstuff and other vital materials therefore escalating household vulnerability. Improved access to modern forms of energy, like electricity, LPG, and technologies such as more competent wood stoves, can assist minimize women's burden and make available their time for other productive roles (Ouédraogo 2011; Alstone et al. 2011). Yet energy interventions are not reaching sufficiently large numbers of women to make major differences. It could be attributed to absence of women's influence of decision within the household and over energy policy.

Above all women are deprived of time and the related drudgery of their everyday undertakings are mostly satisfied by their own physical effort. This type of work has repercussions for their health as well as indirectly affecting the health of their children and relatives. Time poverty similarly decreases chances for income generation, and women probably get affected by this limitation than men (World Bank, 2012).

***The Gender Dimension of Energy use in Business Entrepreneurship***

Improved and sustainable energy services can increase employment and income generating opportunities for women and empower them economically. In developing countries, numerous women get employed in micro/small-scale enterprises (MSEs), an important part of their livelihoods and coping strategy. These MSEs exist mostly in the informal sector and often are based in the home to allow women to integrate income-earning activities with household chores

(Kooijman-van Dijk and Clancy, 2010). There is a gender dimension to the nature of enterprises women and men use for their livelihoods, which then lead to different requirements for energy needs (Practical Action, 2012). Women's enterprises are in sectors carefully linked to traditional female responsibilities like cooking, washing clothes, hairdressing and tailoring. These are frequently heat-intensive (processing of food), laborious, and/or light intensive (industries based in the home with work in evenings). Men have a tendency to work with heavy electric machines such as in carpentry and welding.

A shift to better energy services can contribute to increased profitability. In rural Brazil, self-employed women with access to electricity have an income double that of women who do not have access (Openshaw, (2010). However, access to natural and human resources, finance and technology are also determining factors in the establishment of enterprises. Women face an additional set of barriers as compared to men. These barriers are linked to possession and control over productive resources; exclusion as well as marginalization regarding decision-making, information, lack of exposure, illiteracy and training. The casual nature of most enterprises for women is related to complications of access to equipment, credit and other livelihood services (Alstone et al., 2011). Other examples include sale chargers for mobile phones as well as solar lights (Solar Sister in Africa and SEWA in India), sale of clean energy products in mainly women-operated Tech Kiosks and Tech Agents (by Kopernik Solutions in Indonesia) (ENERGIA, 2011), and women building biogas digesters and managing biogas construction companies (Centre for Rural Technology in Nepal) (Aguilar et al., 2009).

In India, Barefoot College offer education to rural women on solar engineering as well as how to construct, mount and sustain solar panels. These solar engineers can subsequently fix solar power systems in rural community which formerly had no access (Lal, 2008). A similar initiative in Bangladesh, poor women are trained by Grameen Technology centres as solar engineers in an enterprise to increase Solar Home Systems across the country. Once licensed, female engineers sign yearly contracts with Solar Home Systems' customers for continuing repairs. Additionally, in India the EmPower Project shapes women's ability to sustain small energy service units and related skills and services like briquette machines and planting of trees. In Rwanda, women who formed a group of garbage collectors began generating biogas from the trash they collected by compressing and trading briquettes. This enterprise created a cooperative which currently employs 110 members to gather the garbage from 3000 households then convert it into a source of energy (ENERGIA, 2011; UNCTAD, 2011).

***Engendering Energy Policy***

Men and women experience energy scarcity and effect of climate change in diverse ways linked to their gender roles. Regarding energy policy interventions, policy makers have no general knowledge of the presence of gender needs in regard to energy services, resulting in th tendency to marginalize energy needs of women in policy documents (Mensah-Kutin, 2006). Climate change initiatives where funds are available to promote energy access present a similar situation. A review of the Clean Development Mechanism concluded that only 5 of the 3864 projects listed in 2012 included gender considerations (UNFCCC, 2015). The assumption that men and women experience equal advantage of energy policies lead to a gender-neutral way of implementing energy planning. It is true that energy planning is gender-blind, as it does not recognize that men and women require different services (Clancy and Feenstra, 2008).

Gender relations indicate that men are likely to control decision making in organizations, inside households and the in community. Those who formulate policy are likely to be men and energy organizations and institutions, both in the public and private sector, and civil society (together with NGOs who deal with energy), tend to be dominated by men, especially in the professional posts. Women are generally less-represented in organizations that make political decisions at the local, national and international level. As a result, energy-forums where issues are identified and possible solutions recommended usually has unintended male bias. (Clancy, 2011; ENERGIA 2011).

## 1.3 Research Methodology

The study adopted *ex post facto* research design because it was appropriate for investigating plausible cause-and-effect associations by observing prevailing condition or state of affairs and probing back in time for possible causal factors. Furthermore, it permits researchers to explore answers to questions such as what issues are likely to be connected with certain events, or conditions, or traits of behavior (Cohen et al., 2007). Mixed method research was used as it allowed collection and analysis of both quantitative (closed-ended) and qualitative (open-ended) data to respond to research questions since the study incorporated both forms of data (Creswell, 2014). Mixed method research was used in order to draw on the strengths of both quantitative and qualitative methods together in a single study. The main assumption of this method of examination was that a blend of quantitative and qualitative approaches provided a more comprehensive understanding of the research problem than either approach alone (Creswell, 2014).

## 1.4 Results and Discussion

### *Effect of Energy Initiatives on Health*

Respondents reported chesty cough, eye irritation and high heat. An assessment of the relationship between health problems and the people who cooked revealed that women were the most affected in all the three cases. This agrees with the findings of a study that reviewed classified and summarized studies piloted on the association between indoor air pollution and health which showed strong association between indoor air pollution health related illnesses. The study revealed increased health risk for lung cancer, acute lower respiratory infection (ALRI), cardiovascular disease, cataract and chronic obstructive pulmonary disease (COPD). The likelihood of contracting such diseases ranged from 78% for (ALRI) in children below 5 years to above 150% for COPD in women over 15 years (Smith, Bruce, and Mehta, 2010).

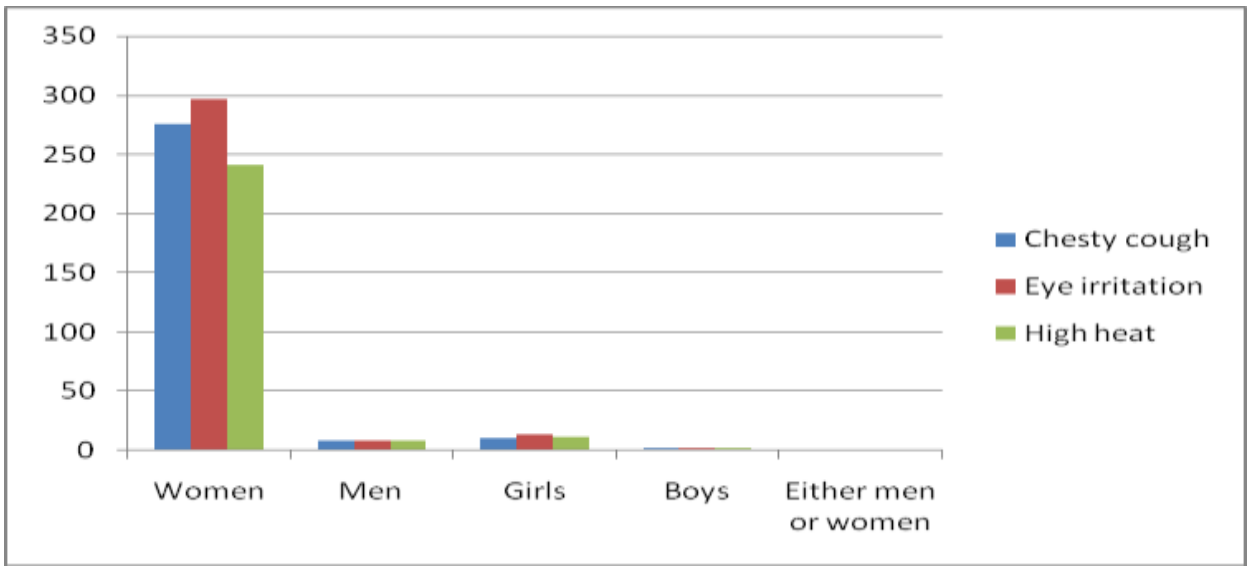


**Figure 1: Effect of Energy Initiative on Health**
**Source: Field data 2017**

***Problem of Smoke***

The findings show that majority of the households felt that smoke was a problem and women were the most affected. Previous studies have reported numerous health issues are smoke related; eye disease, chronic obstructive pulmonary disease (COPD), lung cancer, tuberculosis and low birth weight (Bruce et al., 2006; Pope et al., 2010 and Practical Action, 2012). Lim et al., (2010) states that globally, about three billion people depend on biomass for cooking and the exposure to IAP contributes to nearly four million deaths per annum. The link to cook stoves according to WHO (2012) is that while an ICS or Advanced cooking stove would need 1-2 kg to prepare one meal, a traditional cook stove would need twice the quantity because of its low efficiency. This in turn worsens the impact on the environment.

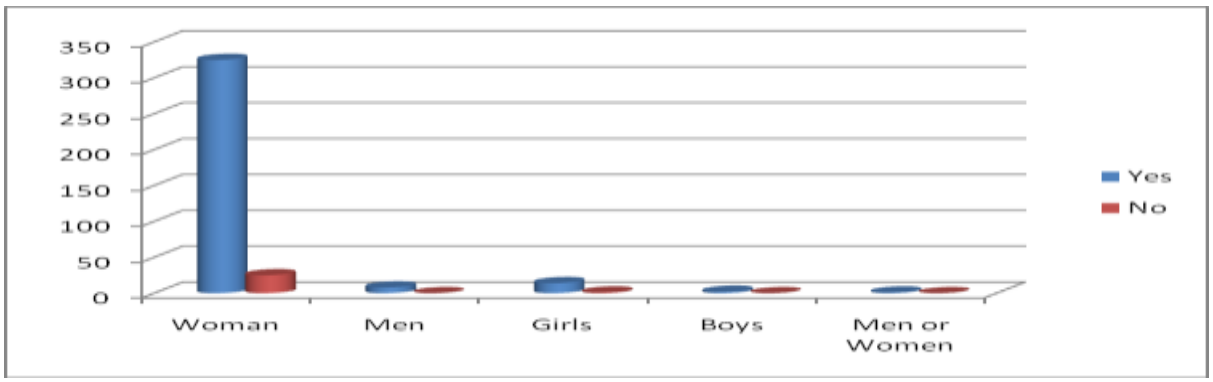


**Figure 2: Presence of Smoke in the cooking area**
**Source: Field data 2017**

***Gender Wise Roles and Responsibilities***

The study shows that there is significant involvement of women in cooking, gathering and processing fuel and going to purchase fuel. Men on the other hand are more involved in attending

community/NGO/group meetings, getting update information radio and TV and issues to do with banking and MFIs. This agrees with the finding that in many countries women are in charge of collection, processing, transportation and storing of fuel, including cooking activities; while men normally make financial decision and hence support the deduction that the health problems linked to cooking with traditional biomass are extremely felt by women due to customary participation in cooking given that women are more exposure than Men (Anaemi et al 2012; Clancy et al., 2011). Several studies have reported that women lose opportunities whenever they spend numerous hours weekly as they labor for energy (Practical Action, 2010). These studies suggest that adoption of ICS could release 2-8 hours per day per family that could be spent on more satisfying activities. Several studies report that access to positive stories and images have changed the way women (and to some extent men's) perceive gender roles and associations (Kooijman-van Dijk and Clancy, 2010). Access to electricity results in men getting more involved in domestic chores. Nevertheless, there is no report of parallel switches in relation to kerosene or LPG (ETC-ENERGIA 2011). It can therefore be concluded that electricity (via television) often plays a vital role as a chief source of this knowledge. Furthermore, if gender equality can be achieved through watching television and given that gender equality among the MDGs (MDG 3), then using energy for television is energy used efficiently.

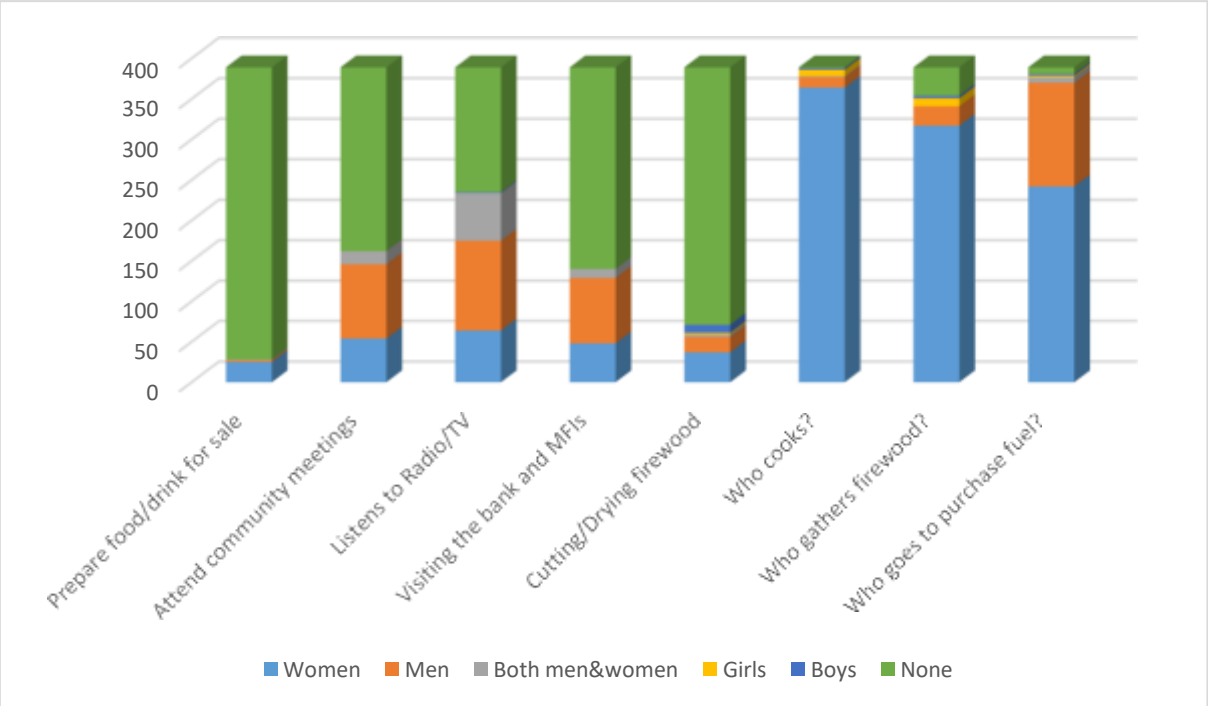


**Figure 3: Gender Roles and Responsibilities**
**Source: Field data 2017**

***Decision Making in the Family***

Women ranked high in decision on purchasing fuel, health check, and purchasing utensils. Figure 4.4 shows men ranked higher than women on decision to purchasing assets and land and taking loans. The responsibilities of different members of the family in various decisions made in households provide a general idea of the relative bargaining power inside the family and how power is shared and determined within any family or household setting. Danielsen (2012) explains

that women should comprehend the right to use energy services at the household level. Thus decision-making within the household is crucial to understanding the obstacles and opportunities for women to access the energy they need. Households are places of bargaining, cooperation and conflict.

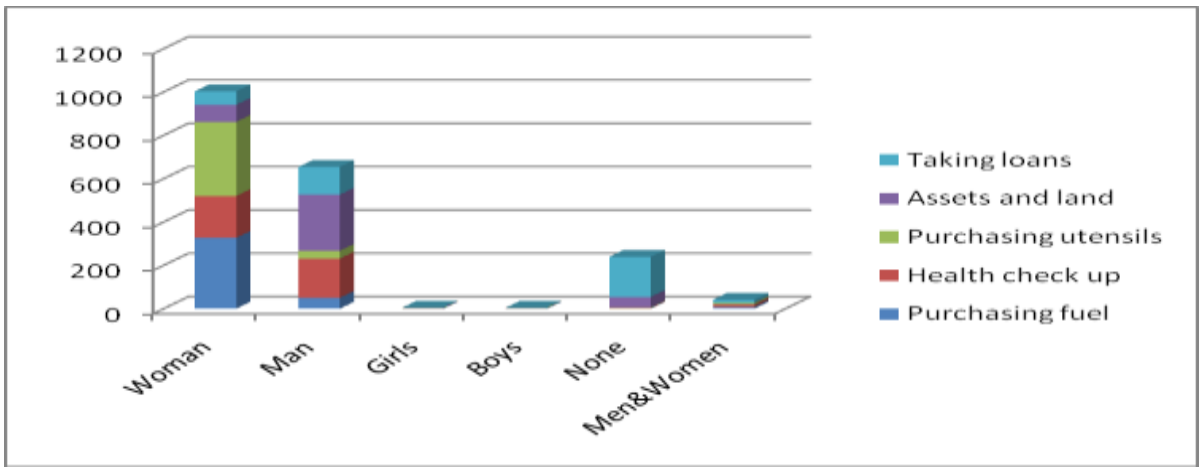


**Figure 4: Decision Making in the Family**
**Source: Field data 2017**

***Time for Fuel Collection***

Respondents were asked to state the amount of time spent gathering fuel. Majority of those who gather firewood are women. Majority spent between 1-2 hours gathering and processing firewood. However, the number of women who spent three hours and above was high. Participation of men in gathering or processing firewood was very low. Clancy, et al., (2011) reported that time poverty caused by the burden of biomass fuel collection has received more attention in the energy sector which can vary from one to greater than eight hours per household per week in fuel-scarce areas. The burden of collecting and transporting fuel is the responsibility of women and girls, who carry 20 kg or more head loads and often cover up to 12 km. Data collected by World Bank (2012) shows 51 points where time of fuel collection varies from 0.8 to five hours per household per day. FAO (2010) adds that collection of biomass places considerable burden on women and the children preventing children from attending school and studying at home, reducing time spent by parents on childcare, and denying grownups other industrious activities, including generation of income.

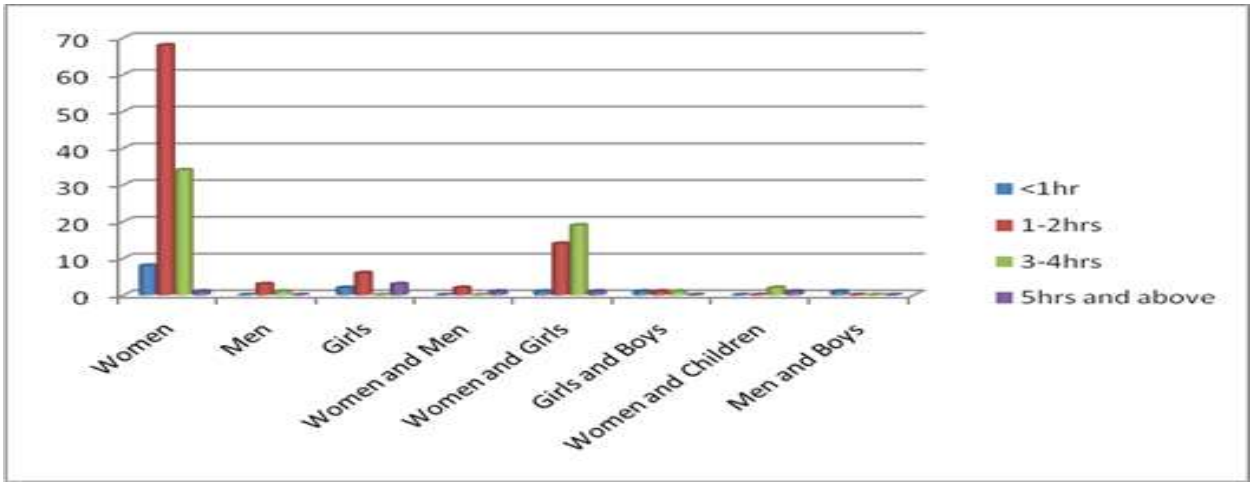


**Figure 5: Time for Fuel Collection and Drudgery Reduction**
**Source: Field data 2017**

***Time for Cooking and Drudgery Reduction***

The data shows that supper was majorly cooked by women. Majority spent between 3-4 hours and four and above hours. ESMAP (2010) reports that the total time lost during fuel collection, cooking on open fires, and similar activities involving preparation of fuel and processing of food across most of Sub-Saharan Africa and large portions of Asia, translates into 2–8 hours of work daily, almost averaging to 5 hours per day. The time drain is the main contributor to women's already extremely constrained time budgets, or "time poverty" as the phenomenon is referred to by researchers (Blackden and Wodon 2006; Kohlin et ai., 2011; Clancy et al., 2011). By reducing chances for women's self-actualization and economic autonomy, the time effect of cooking with solid fuel also strengthens current biased gender power relationships within the family unit and broader society.

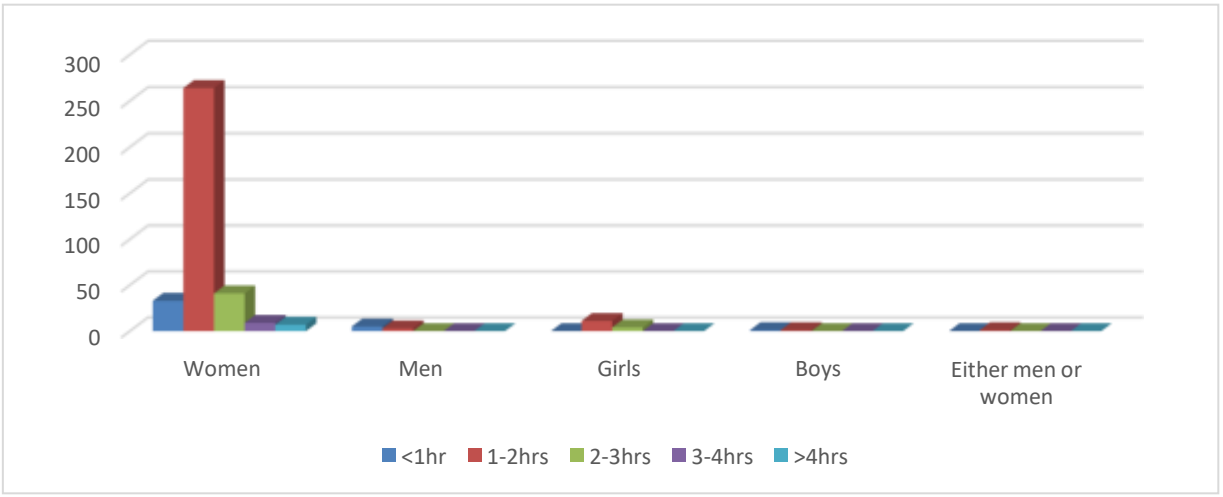


**Figure 6: Time Spent on Cooking**
**Source: Field Data 2017**

## 1.5 Conclusion and recommendations

Numerous women and girls undergo health challenges related to collecting and cooking with

biomass. They also get exposed to different health hazards from cooking indoors with poorly ventilated fires, comprising respiratory infections, and cataract. The study found that distinct segregation of gender roles are more in the acquisition, use and control of fuel. The study also revealed that women took the leading role either biomass or clean energy is purchased thereby showing gender bias.

Reducing drudgery and increasing access to clean power for cooking, lighting and other household and fruitful purposes can have dramatic impact on the level of women empowerment, health, education, nutrition, literacy, economic opportunities, and participation in community activities. Developing women's lives result in significant helpful consequences for their families and communities.

It is vital to address varied barriers faced by women in profiting from and getting involved in sustainable energy solutions. This includes making sure equal participation in decision-making processes linked to energy; guaranteeing equal land ownership rights, access to finance and make economic decisions; increase awareness and training of women on business administration and sustainable energy technology; and encouraging equal power relations inside communities and households.

Gender equity could be attained through interventions that create time for women to efficiently advance their capabilities and participate in fruitful, activities that earn revenue in which women can make real tradeoffs towards effective time management between low and high-value added tasks and decide between low and high technology energy sources.

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