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Abstract

The Russia-Ukraine war disrupted global supply chains leading to higher fuel prices as well as food and fertilizer prices, exacerbating existing gender disparities in Kenya. Women, already heavily impacted by the economic challenges of the COVID-19 pandemic, faced further burdens due to rising fuel prices. During economic shocks, women are more likely to switch to cheaper, traditional cooking fuels despite their adverse effects. Switching to such fuels exposes women to spending significantly more time on fuel collection and meal preparation than men. This study investigates the gendered cooking coping strategies in Kenya following the Russia-Ukraine war. It also examines gender differences in time savings related to these strategies and assesses the effectiveness of a fuel subsidy introduced to cushion households from the adverse effects of the war. Using primary data from 995 households in rural and urban Kenya, the study uncovered significant gendered differences in cooking strategies. About two-thirds of the households that stopped using kerosene following the Russia-Ukraine war switched to LPG, a cleaner fuel. This was less in women than men. Further, only about 8% of the households switched to firewood and this was mainly in rural areas, with women being more likely to switch to this fuel than men. Additionally, women spent more time on fuel collection and meal preparation, but the adoption of cleaner fuels appears to close the gaps. The study also finds that the fuel subsidy introduced to cushion households from the adverse of the war was not convincing enough to allow households to revert to kerosene use as only 8.04% of households reverted to using kerosene. Ensuring that clean cooking energy is available and affordable, especially for women in rural areas should be a policy priority.

1. Introduction

The outbreak of the Russia-Ukraine War (RUW) in early 2022 exacerbated existing economic crises occasioned by the COVID-19 pandemic. The war triggered trade disruptions resulting in higher global commodity prices, particularly in food, fuel and fertilizers (Guenette et al., 2022). The increase in commodity prices sparked inflationary pressures in many countries in the global south. Export restrictions imposed by other countries further limited the trade supply of some commodities (Abay et al., 2023). Kenya, a net importer of fossil fuels, was particularly exposed to the surge in global fuel prices. An increase in fuel prices negatively impacted the consumer price index, imports and investments (Ndong Ntah et al., 2024). For instance, year-on-year inflation increased sharply to 7.1% in May 2022 from 5.1% in February 2022, partly due to increased fuel prices (World Bank, 2022).

In addition, the increased fuel prices led to increased market prices of consumer goods and services resulting in a decline in consumption. The decrease in consumption is likely to have been more pronounced in poor households than in richer ones as these households have fewer resources to cope with economic shocks (Schellekens and Sourrouille, 2020). This potentially led to more inequalities and greater economic poverty (Breisinger et al., 2022). The economic shocks stemming from the Russia-Ukraine War also had negative implications on the economic welfare of women due to existing discriminatory gender norms (Papadavid, 2023). These impacts compounded the challenges faced by women, who were already disproportionately affected by the COVID-19 pandemic. According to a 2020 UN Women report, 20% of women lost jobs, income, or other sources of livelihood during the pandemic, compared to 12% of men[1].

This study investigates how women coped with the multi-crisis. In particular, the study explores how women coped with increased kerosene prices in cooking following the Russia-Ukraine War. Kerosene remains a key energy source for some households in Kenya, particularly those in the low-income category. Data from Kenya's national census in 2019 shows that about 7.8% of the households in the country rely on this energy as a primary cooking fuel, especially in low-income earners in urban households (Republic of Kenya, 2020). Several studies show that households adopt various strategies to mitigate the impacts of economic shocks (Borner et al., 2014; Tran, 2015; Paumgarten et al., 2020). With increased kerosene prices, households are likely to have adopted new strategies to address their energy needs, particularly in cooking which is a daily necessity.

In Kenya, gender roles are significant in defining household responsibilities, especially in unpaid services such as cooking, food provision, shopping, and childcare. Women are traditionally responsible for collecting fuel, preparing meals and childcare. Data from the 2021 Kenya Time Use survey shows that women spent about six times more time on unpaid and domestic work than men (Republic of Kenya, 2023). With the increased kerosene prices, women are highly likely to be more exposed, especially if households cope by adopting lower fuels in the energy ladder such as firewood. Adopting such fuels implies that women take longer to collect and cook using them. Further, women would be exposed to indoor air pollution and drudgery while collecting them (Dida et al., 2020; Njenga et al., 2021; James et al., 2020). Thus, the increase in fuel prices following the Russia-Ukraine War could potentially have reversed the economic progress and gains in addressing gender inequality in Kenya.

[1] COVID-19 Gender Assessment_Kenya.pdf (unwomen.org)

Therefore, it is important to understand the gendered differences in household cooking coping strategies due to the Russia-Ukraine War for future policy design as an attempt to address gender inequalities driven by economic shocks. Further, this study sought to investigate whether a fuel subsidy introduced by the Kenyan government to cushion households from high fuel prices was successful. In particular, the study sought to understand whether the fuel subsidy made households that had stopped using kerosene for cooking due to the high prices switch back to kerosene use after the fuel subsidy. The government introduced a general flat fuel subsidy of KShs. 23 per litre of fuel across all fossil fuels at the pump prices. However, the post-subsidy fuel prices were still higher than the pre-war prices.

While some studies (Dartano, 2013; Breton and Mirzapour, 2016; Hancevic et al., 2016; Giuliano et al., 2020) have criticized fossil fuel subsidies as a measure to cushion households from economic shocks due to associated poverty and income inequality distributional effects and environmental impacts, this study sought to understand whether fuel subsidies can be a good measure to prevent the reverse of gains in gender equality, particularly in unpaid work. The study was based on Nairobi and Nyandarua counties. The two counties represent Kenya's typical urban and rural regions with a significant use of kerosene. The study aimed to explore gendered cooking coping strategies following the Russia-Ukraine War, investigate gendered differences in time savings related to these strategies, and assess the effectiveness of fuel subsidies as a policy intervention. The study is important in contributing to literature through several avenues. First, the study adds to the literature on the gendered differences in the Russia-Ukraine War impacts. It complements these studies by showing how women cope with increased fuel prices during economic crises, employing a newly collected dataset. Second, the study contributes to the literature that reviews the effectiveness of policy interventions by assessing whether fuel subsidies could be useful in addressing gender inequalities at the micro-level.

The study found that with the increased kerosene prices due to the Russia-Ukraine War, about half of kerosene-using households abandoned the fuel, with many transitioning to LPG or other cleaner alternatives and a few switching to firewood, especially in rural areas. However, the proportion of women who switched to cleaner fuels was less than that of men. For the households that switched to firewood, the proportion of female-headed households was higher than that of male-headed households. Switching to cleaner fuels reduced fuel collection and cooking time but the reduction was more in men than women. However, more time was taken to collect and cook using firewood than kerosene. This was more pronounced in women than men. Only a few households (8.04%) that had stopped using kerosene switched back to this fuel after the fuel subsidy. This indicates that a fuel subsidy is ineffective in incentivizing households to switch back to kerosene use and therefore not a suitable measure to address gender inequalities during economic shocks. We recommend targeted financial support for women to acquire clean cooking technologies, leveraging existing affirmative action programs to promote clean energy adoption, and implementing climate change mitigation strategies that prioritize women's access to clean cooking solutions. Additionally, there's a pressing need to expand the availability of clean cooking technologies in rural areas, where traditional fuels like firewood remain prevalent.

Gender Inequality in Kenya

Kenya is one of the developing countries characterized by significant gender inequalities. These inequalities are manifested in several forms including income, poverty, employment, education, asset ownership and unpaid labour among others. Women are often disproportionately represented in these avenues limiting their resilience to economic shocks. Women on average earn less than men for similar jobs. Data from the recent 2021 Kenya Continuous Household Survey (KCHS) reveals that female-headed households have higher poverty headcount rates (38.8%) than male-headed households at 32.7% (Republic of Kenya, 2023). About 7.6% of the female labour force was unemployed in 2021, which was about twice the proportion reported for men (3.9%) (World Bank, 2024). In the same year, about 58.10% of the female labour force was employed. This was about 2.65% less reported for men at 60.75%. Women are mainly employed in agriculture, retail trade, education, health and social works sectors (UN Women, 2024). These sectors are largely care sectors or sectors dominated by care workers. Men on the other hand dominate sectors with relatively higher pay. These are the manufacturing, construction and transport sectors (Un Women, 2024). Even when women and men are employed in similar jobs, gender pay gaps exist with women earning 31.3% less than men in monthly incomes. About 17.6% of women have no access to formal education compared to 14.9% of men (Republic of Kenya, 2020). On land ownership, only 24.7% of women aged 14-49 years owned land alone or jointly in 2022 which is way below ownership by men at 33.6%[2]. Women (17.3%) play a key role in unpaid domestic and care work and spend almost 6 times more time in such activities than men (3.3%). (Republic of Kenya, 2023).

[2] https://genderdata.worldbank.org/en/indicator/sg-own ld?gender=male&ownership=Own+both+alone+and+jointly

2. Literature Review

The Russia-Ukraine War had considerable consequences for the global economy. The war caused trade disruptions for food, fertilizer and fuel leading to a surge in the prices of these products (Arndt et al., 2022). The implications of the war are particularly more of a concern in sub-Saharan Africa (SSA) countries as these countries heavily depend on imports of these goods. For example, about 44% of wheat imports by African countries in the period 2018-2020 were from Russia (32%) and Ukraine (12%) (United Nations Conference on Trade and Development, 2022). Several studies (Breisinger et al., 2022; Guenette et al., 2022; Ayaz et al., 2023; Lin et al., 2023; Geda and Michael, 2023; Gurara et al., 2023; Ndong Ntah et al., 2023; Ngepah, 2023; Ozturk and Faizi; 2023) have sought to understand the economic implications of the war. These studies report the Russia-Ukraine War to have resulted in food insecurity (Ayaz et al., 2023; Geda and Michael, 2023; Ngepah, 2023), poverty and welfare loss (Breisinger et al., 2022; Ayaz et al., 2023; Geda and Michael, 2023), reduced purchasing power (Breisinger et al., 2022; Gurara et al., 2923; Ndong Ntah et al., 2023), a decline in the gross domestic product (GDP) (Breisinger et al., 2022; Gurara et al., 2023; Ndong Ntah et al., 2023; Ozturk and Faizi; 2023), inflationary pressure (Gurara et al., 2023; Ozturk and Faizi; 2023) and a decline in foreign direct investment (FDI) (Ozturk and Faizi, 2023).

Nearly all reviewed studies investigate the economic implications of the Russia-Ukraine war driven by increases in food and fertilizer prices (Geda and Michael, 2023; Ngepah, 2023) or the combined effects of wheat, fertilizer and fossil fuels (Breisinger et al., 2022; Ayaz et al., 2023; Gurara et al., 2023; Ndong Ntah et al., 2023; Ozturk and Faizi, 2023) with no study comprehensively focusing on the economic implications driven solely by increased fuel prices. This is despite fuel prices being the primary driver of GDP losses through elevated transaction costs, market prices, and depressed consumer demand (Breisinger et al., 2022). Further, these studies ignore that elevated fuel prices, particularly cooking fuel prices, could potentially exacerbate existing gender inequalities if women switch to traditional cooking fuels characterized by longer collecting and cooking time. Nearly all the existing studies focus on investigating the economic impacts of the Russia-Ukraine War at the aggregate level effectively ignoring the micro-level yet, the micro-level analysis could provide room for an in-depth investigation of how the war impacted various segments of the population, particularly the marginalized groups. A micro-level study also provides room for understanding the coping strategies and resilience mechanisms among different sections of the population. Such studies are also important in generating insights into targeted policy interventions.

The Russia-Ukraine War had potential implications on the lives and livelihoods of those directly and indirectly impacted necessitating coping strategies. However, existing coping studies (Chudzicka-Czupala et al., 2023; Crisan et al., 2023; Limone et al., 2022; Lopatovska et al., 2022) have majorly sought to understand mental health coping strategies. These studies have mainly focused on various populations of Ukraine, the main victim country, and neighbouring countries. There is a dearth of literature investigating coping strategies in developing countries. Yet, the majority of these countries' populations were exposed to shocks, especially economic shocks, triggered by the Russia-Ukraine War. Given the different levels of resilience across the population, the war could have potentially exacerbated existing inequalities with poorer households being more affected than richer households because of their limited resources to cope with shocks (Schellekens and Sourrouille, 2020). Women's economic welfare was also potentially disproportionately exposed to the war. African women are more discriminated against compared to other women in other parts of the world in intra-household dynamics and caregiving tasks limiting their resilience to shocks (OECD, 2021; Xu et al., 2022).

A few studies (Adelekan and Jerome, 2006; Shupler et al., 2021; Stojilvoska, 2020) investigate the cooking coping strategies following increased energy prices. These studies document that households cope with increased energy prices by switching from relatively cleaner fuels (LPG and kerosene) to polluting fuels (firewood and charcoal). However, these studies fail to consider the changes in fuel collection and cooking times following the coping strategies. Further, these studies fail to investigate the gendered differences in coping strategies. Yet, women and young girls are traditionally known to take the primary cook role of the households, especially in low-income countries thus spending more time collecting and cooking than men. Switching to fuels that take longer to collect and cook results in 'time poverty" which worsens existing gender inequalities (Shupler et al., 2021).

Many countries offer fuel subsidies whenever there are price shocks to cushion their citizens from the adverse effects of price increases. However, there has been a growing debate on the effectiveness of these subsidies. Several studies (Yusuf and Resosudarmo, 2008; Dartanto, 2013; Moshiri, 2015; Breton and Mirzapour, 2016; Li et al., 2017) document that fuel subsidies can lead to poverty and inequality distributional effects. This is because it is often not practical to differentiate customers, thus fuel subsidies are normally applied to all income groups. The result is that fuel subsidies mainly benefit large-income earners as the poor are generally less energy consumers (Li et al., 2017). Further, fuel subsidies are not fiscally sustainable and result in environmental degradation by incentivizing the consumption of fossil fuels (Moshiri, 2015; Li et al., 2017). While the reviewed studies have widely found fuel subsidies to be economically unfavourable, they mainly focus on investigating the effectiveness of fuel subsidies at the aggregate level effectively ignoring the effectiveness of such policy interventions at the micro-level. Yet, micro-level studies could be more useful in providing insights crucial for creating targeted intervention programs.

This study sought to fill the highlighted research gaps by investigating the gendered differences in household cooking coping strategies for the Russia-Ukraine War in Kenya. In addition, the study investigates the gendered time savings in cooking coping strategies and explores the effectiveness of fuel subsidies in cushioning citizens from the adverse effects of high cooking fuel prices and preventing the reversal in gains addressing gender inequalities driven by unpaid work. Kenya is particularly important because it is a net importer of fuel and gender norms largely shape gender inequalities, particularly in unpaid labour, with women spending more time in these activities than men.

3. Data and Method

This study took place in Nairobi and Nyandarua counties. The two counties represent Kenya's typical urban and rural regions with a significant use of kerosene. However, data from the 2019 Kenya National Household Population Census shows that kerosene use is more common in urban areas than rural areas (Republic of Kenya, 2020). While nationally, the use of kerosene stands at 7.8%, in Nairobi it stands at 26.5% and this mainly happens in the informal areas. The county has over 200 informal settlements which are home to about two million people and these informal settlements account for over 60% of the total population in the county (Mberu et al., 2016). However, these informal settlements only cover about 5% of the city county's land. The study focused on the largest informal settlements in Nairobi. These are in Kibra, Kasarani and Embakasi Central Sub-counties. The specific informal settlements are Laini Saba, Makina, Mukuru Kwa Njenga, Lindi and Imara. Kerosene use in Nyandarua County stands at 1.3% with leading keroese-consuming sub-counties being Kinangop and Nyandarua Central (Republic of Kenya, 2020). Nyandarua County is largely rural with 89.6% of its population living in rural areas. This study focused on rural settlements in the two leading kerosene-consuming sub-counites. The specific areas of interest were Bamboo, Gikingi, Kanguu, Karangatha, Kiburu, Kiwanja, Madaraka, Mutonyora and Rwanyambo.

Before data collection, the researchers from the African Economic Research Consortium (AERC) developed and piloted the survey tool to ensure it was appropriate for the study. A team of research assistants was recruited and trained in data collection. Data was collected on smartphones using the Kobo Collect application. It was safely transferred from the smartphones to the Kobo Collect Cloud for storage. Before enrollment, the consent of the respondent was sought. They were informed about the study objectives and that their participation was voluntary. A single survey took about 45 minutes to complete. The survey tool documented a range of information including household and respondent characteristics, main cooking energy forms, spending on different energy forms, information on the RUW, information on use kerosene use, cooking coping strategies, information on the household main cook and energy collector and time savings. The study employed a multi-stage sampling procedure. The two counties and sub-counties were first purposively selected. In the second stage, villages were randomly selected in the identified sub-counties. This involved listing all the villages in the Nairobi and Nyandarua sub-counties and drawing a sample of villages from this list. Households were then randomly selected. In the end, a total sample of 995 households were surveyed with 558 being from Nairobi County and 437 from Nyandarua County.

The study relied on descriptive statistics to investigate the gendered cooking coping mechanisms, gendered socio-economic characteristics of cooking coping mechanisms, time savings and adoption of kerosene use after the fuel subsidies. The study also employed the chi-square test of independence to investigate potential gendered differences in household cooking coping strategies.

One of the major limitations of the study is that some respondents could not easily recall some information relating to the Russia-Ukraine War as this happened a few years ago. This could potentially have implications on the accuracy and reliability of data collected, especially for questions requiring specific recollections such as prices and money spending. To mitigate this limitation, the enumerators were tasked to provide contextual cues to the respondents to trigger more accurate memories.

4. Results and Discussion

Table 1 presents the descriptive statistics of the household survey conducted in Nairobi and Nyandarua counties. The survey had 995 respondents with 81.31% (N=809) of them being from male-headed households and 18.69% (N=186) from female-headed households. However, more than half of the respondents were female at 55.48% (N=552) while male respondents were 44.52% (443). All the respondents in female-headed households were female and slightly less than half (45.24%; N=366) of respondents in male-headed households were female and 54.76% (443) were male. Almost all (93.67%; N=932) of the respondents were either household heads or spouses. The respondents who were household heads were 56.58% (N=563), 37.09% (N=369) were spouses and 6.33% (N=63) were other members including children, parents and other relatives living with the household heads. In female-headed households, 78.49(N=146) were heads while 21.51% (N=40) were other female household members. In male-headed households, 51.92% (N=420) of the respondents were household heads, 45.24% (N=366) were spouses and 2.84% (N=23) were other household members. The mean age of the respondents was 40.76 years with respondents in female-headed households being relatively older at 41.06 years compared to respondents in male-headed households at 40.69 years. However, in male-headed households, male respondents were relatively older at 42.01 years compared to female respondents at 39.09 years, potentially signaling that men are older than their spouses.

Most of the respondents were married (68.34%; N=680), 16.18% had never been married (N=161) and 15.48% (N=154) were either divorced or widowed. Most married respondents (82.20%; N=665) were in male-headed households. The other respondents in male-headed households had never married (10.55%; N=85) or divorced/widowed (7.29%; N=59). In female-headed households, only 8.06% (N=15) were married with most of the respondents being divorced or widowed (51.08; N=95) while 40.86% (N=76) had never been married.

Table 1: Descriptive Statistics

Characteristic	Overall (N=995)	Female-headed Household (N=186)	Male headed household (N=809)	Male-headed household & female respondent (N=366)	Male-headed household & male respondent (N=443)
Age (Mean (SD))	40.76(13.69)	41.06(15.56)	40.69(12.23)	39.09(12.15)	42.01(13.93)
Relationship with the household head (N (%))					
Head	563(56.58)	146(78.49)	420(51.92)	-	420(94.81)
Spouse	369(37.09)	-	366(45.24)	366(100)	-
Other	63(6.33)	40(21.51)	23(2.84)	-	23(5.192)
Marital status (N (%))					
Divorced/Widowed	154(15.48)	95(51.08)	59(7.29)	32(8.743)	27(6.095)
Married	680(68.34)	15(8.06)	665(82.20)	329(89.34)	336(75.85)
Never married	161(16.18)	76(40.86)	85(10.55)	5(1.366)	80(18.06)
Education (N (%))					
Primary	346(34.77)	84(45.16)	262(32.39)	132(36.07)	130(29.35)
Secondary	444(44.62)	74(39.78)	370(45.74)	177(48.36)	193(43.57)
Post-secondary	160(16.08)	20(10.75)	140(17.31)	42(11.48)	98(22.12)
Other	45(4.523)	8(4.30)	37(4.574)	15(4.098)	22(4.966)
Occupation (N (%))					
Wage	319(32.06)	65(34.95)	254(31.40)	95(25.96)	159(35.89)
Self-employed (farm)	207(20.80)	21(11.29)	186(22.99)	87(23.77)	99(22.35)
Self-employed (non-farm)	330(33.17)	63(33.87)	267(33.00)	113(30.87)	154(34.76)
Unemployed	79(7.940)	16(8.602)	63(7.787)	55(15.03)	8(1.806)
Other	60(6.030)	21(11.29)	39(4.821)	16(4.372)	23(5.192)
Floor-type (N (%))					
Ceramic tile	175(17.59)	30(16.13)	145(17.92)	53(14.48)	92(20.77)
Concrete	620(62.31)	112(60.22)	508(62.79)	236(64.48)	272(61.40)
Earth	164(16.48)	33(17.74)	131(16.19)	62(16.94)	69(15.58)
Wall-to-wall carpet	32(3.220)	10(5.376)	22(2.719)	14(3.825)	8(1.806)
Wood	4(0.40)	1(0.538)	3(0.371)	1(0.273)	2(0.451)
Region (N (%))					
Urban	558(56.08)	127(68.28)	431(53.28)	206(56.28)	225(50.79)
Rural	437(43.92)	59(31.72)	378(46.72)	160(43.72)	218(49.21)
Knowledge of RUW (N (%))	944(94.87)	171(91.94)	773(95.55)	346(94.54)	427(96.39)

Knowledge of RUW and aware that it resulted in higher kerosene prices (N (%))					
Own an MPESA account (N (%))	988(99.30)	185(99.46)	806(99.26)	364(99.45)	439(98.42)
MPESA Loan (N (%))	140(14.07)	21(11.29)	119(14.71)	48(13.11)	71(16.03)
Own a bank account (N (%))	580(58.29)	86(46.24)	494(61.06)	195(58.04)	299(67.49)
Main cooking energy (N (%))					
Charcoal	107(10.75)	22(11.83)	85(10.51)	45(12.30)	40(9.029)
Electricity	30(3.02)	4(2.151)	26(3.214)	13(3.552)	13(2.935)
Firewood	258(25.93)	36(19.35)	222(27.44)	98(26.78)	124(27.99)
LPG	422(42.41)	75(40.32)	347(42.89)	133(36.34)	214(48.30
Kerosene	134(13.47)	43(23.12)	91(11.25)	59(16.12)	32(7.223)
Other	44(4.42)	6(3.226)	43(5.315)	18(4.918)	20(4.515)
Main lighting energy (N (%))					
Electricity	832(83.62)	162(87.10)	670(82.82)	309(84.43)	361(81.49)
Kerosene	36(3.62)	8(4.301)	28(3.461)	12(3.279)	16(3.612)
Solar	111(11.16)	10(5.376)	101(12.48)	39(10.66)	62(14.00)
Other	16(1.61)	6(3.225)	10(1.236)	6(1.639)	4(0.903)

Notes: A column on female respondents in female-headed households was not provided because all respondents were female.

Most of the respondents (44.62%; N=444) had a secondary school education, 34.77%(N=346) had a primary school education, 16.08% (N=160) had post-secondary school education and 4.523% (45) had other forms of education. Respondents in female-headed households reported lower levels of education than those from male-headed households. In male-headed households, 17.31% (N=140) of the respondents had post-secondary education compared to 10.75% (N=20) respondents in female-headed households. Respondents with only secondary education in male-headed households were 45.74%(N=370) while those in female-headed households were 39.78% (N=74). Most of the respondents in female-headed households (45.16%; N=84) had only primary education and this proportion was higher than 32.39% (N=262) respondents in male-headed households having this form of education. The respondents with other forms of education in male-headed households were 4.574% (N=37) while those in female-headed households were 4.30% (N=8). In male-headed households, it appears that women were relatively less educated compared to their spouses with the majority occupying lower levels of education. Female respondents with post-secondary school education in male-headed households were almost half at 11.48% (N=42) of the male respondents in the same households at 22.12% (N=98). Most of the female and male respondents in male-headed households had secondary education but the proportion of female respondents was relatively higher at 48.36% (N=177) compared to male respondents at 43.57(N=193). Female respondents (36.07%; N=132) with only primary education were relatively higher than male respondents (29.35%; 130) in male-headed households. The difference in the proportion of female and male respondents in with other forms of education in male-headed households was not large. The proportion of female respondents with other forms of education was 4.098% (N=15) while that of male respondents was 4.966% (N=22).

Most of the respondents (33.17%; N=330) had self-employment in non-farm activities as their main occupation while a slightly lower proportion (32.06%; N=319) depended on wage employment. About 20.80% (N=207) of the respondents reported being self-employed in farm activities and 6.030% of the respondents depended on other activities for a living. Roughly 7.940% (N=79) of the respondents reported to be unemployed. Interestingly, self-employment in non-farm activities did not dominate occupations in both female and male-headed households. It only dominated occupation in male-headed households at 33.00% (N=267) but this was slightly lower than female-headed households at 33.87% (N=63). The majority of the respondents in female-headed households (34.95%; N=65) reported to depend on wage employment. This proportion was higher compared to that of respondents in male-headed households at 31.40%(N=254). Self-employment in farm activities was the third most reported occupation in female and male-headed households. However, this occupation was less popular in female-headed households than male-headed households as the proportion of female-headed households (11.29%; N=21) in this activity was about half of the respondents in male-headed households (22.99%; N=186).

Other income-generating activities attracted 11.29% (N=21) and 4.821% (N=39) of the respondents in female and male-headed households respectively. More respondents in female-headed households 8.602% (N=16) reported being unemployed compared to respondents in male-headed households (7.787%; N=63). Comparing occupations between female and male respondents in male-headed households, the findings show heterogeneity in main economic activities. The majority of the female respondents (30.87%; N=113) depended on self-employment in non-farm activities while male respondents (35.89%; N=159) depended on wage employment. Wage employment appears to be the second most popular activity at 25.96% (N=95) of female respondents while self-employment in non-farm activities was the second most popular among male respondents (34.76%; N=154). Self-employment in farm activities attracted a slightly higher proportion of female respondents (23.77%; N=87) than male respondents (22.35%; N=99). Other income activities attracted a slightly larger

proportion of male respondents (5.192%; 23) than female respondents (4.372%; 16). Women (15.03%; N=55) were about 8 times as likely to be unemployed than their husbands (1.806%; N=8), signaling great gendered inequalities in access to sources of livelihoods in male-headed households.

The majority of the households' main house (62.31%; N=620) had concrete floors followed by ceramic tiles and earth floors at 17.59% (N=175) and 16.48% (N=164) respectively. Very few households had wall-to-wall carpet and wood floors at 3.220% (N=32) and 0.40%(N=40) respectively. Male-headed households had a slightly higher proportion of concrete floors at 62.79% (N=508) than female-headed households at 60.22% (N=112). More male-headed households were reported to have ceramic floors at 17.92% compared to female-headed households at 16.13% (N=30). However, more female-headed households were reported to have earth and wall-to-wall floors at 17.74% (N=33) and 5.376% (N=10) respectively compared to male-headed households at 16.19% (N=131) and 2.719% (N=22) respectively. An investigation of the floor types in female and male respondents in male-headed households shows that in both cases, concrete floors were the most reported, but a slightly higher proportion was reported by female respondents (64.48%; N=236) compared to male respondents (61.40%; N=272). A smaller proportion of female respondents (14.48%; N=53) in male-headed households reported living in houses with concrete floors than male respondents (20.77%; N=92). Female respondents in male-headed households (16.94%; N=62) reported a slightly lower proportion of earth floors than male respondents (15.58%; N=69). Wall-to-wall carpets were more common in male-headed households with female respondents (3.825%; N=14) than male respondents (1.806%; N=8) in the same households.

More than half of the respondents interviewed were in urban areas (Nairobi) (56.08%; N=558) and 43.92% (N=437) were in rural areas (Nyandarua). Urban areas were more common to female-headed households (68.28%; N=127) than male-headed households (53.28%; N=431) while rural areas were more common to male-headed households (46.72%; N=378) than female-headed households (31.72%; N=59). Almost all respondents (99.30; N=988) reported owning MPESA accounts with respondents in female-headed households (99.46%; N=185) reporting a slightly higher proportion compared to respondents in male-headed households (99.26%; N=806). The female respondents (99.45%; N=364) in male-headed households reported almost similar MPESA ownership as those in female-headed households and higher ownership than male respondents (98.42%; N=439) in male-headed households. However, only a few respondents (14.07%; N=140) reported using MPESA accounts for loans. Despite respondents in female-headed households (11.29%; N=21) reporting relatively higher ownership of MPESA accounts, they trailed respondents in male-headed households (14.71%; N=119) in using MPESA for loans. Female respondents (13.11%; N=48) in male-headed households reported relatively higher use of MPESA accounts for loans compared to female-headed households but lower use compared to male respondents in male-headed households (16.03%; N=71) Slightly more than half of respondents (58.29%; N=580) reported having bank accounts. This was higher in male-headed households (61.06%; N=494) than female-headed households (46.24%; N=86). Female respondents (58.04%; N=195) in male-headed households also trailed male respondents (67.49%; N=299) in bank account ownership.

LPG was reported to be the most adopted main cooking energy at 42.41% (N=422) followed by firewood at 25.93% (N=258), kerosene at 13.47% (N=134) and charcoal at 10.75% (N=107). Only 3.02% (N=30) of the respondents reported using electricity as the main cooking energy and 4.42% (N=44) reported other energy forms. LPG use was also most common in the disaggregated male and female-headed households with a slightly lower proportion of respondents in female-headed households (40.32%; N=75) reporting use of this energy form compared to male-headed households (42.89%; N=347). About twice the female-headed households (23.12%; N=43) were reported to use kerosene as the main cooking energy form compared to male-headed households (11.25%; N=91). More male-headed households were reported to use firewood for cooking at 27.44% (N=222) compared to female households at 19.35%

(N=36). The use of charcoal for cooking was more common in female-headed households at 11.83% (N=22) compared to male-headed households at 10.51% (N=85).

While electricity use for cooking was low, the proportion of respondents reporting electricity use in female-headed households was lower (2.151%; N=4) than that reported in male-headed households (3.214%; N=26). Female respondents in male-headed households (36.34%; N=133) reported a relatively lower adoption of LPG use than male respondents (48.30%; N=214). The reporting of firewood use was not different between female (26.78%; N=98) and male (27.99%; N=124) respondents but a relatively higher proportion of female respondents (12.30%; N=45) reported the use of charcoal as the main cooking energy compared to male respondents (9.029%; N=40). More female respondents (3.552%; N=13) reported using electricity for cooking than male respondents (2.935%; N=13) in the male-headed households. Female respondents in male-headed households were more than twice as likely (16.12%; N=59) to report kerosene use as the main cooking energy as male respondents (7.223%; N=32).

Many of the respondents (94.87%; N=944) were aware of the Russia-Ukraine war but this information was relatively less available in female-headed households (91.94%; N=171) compared to female-headed households (95.55%; N=773). Female respondents (94.54%; N=346) in male-headed households also reported less awareness of the Russia-Ukraine war than male respondents (96.39%; N=427) potentially signaling gendered inequalities in access to information.

Cooking Coping Strategies

The Russia-Ukraine war in 2022 increased fuel prices. This study investigates the gendered cooking coping strategies adopted by kerosene users for cooking following increased kerosene prices driven by the RUW. This study focused on users who were aware of the Russia-Ukraine war, the findings of which are presented in Table 2. Results show that slightly above half of the respondents (52.33%; N=494) reported using kerosene in their households before the RUW. The majority of the respondents reported using kerosene for cooking. Kerosene use for cooking was very common in female-headed households compared to male-headed households. Nearly two-thirds of the respondents (65.50%; N=112) in female-headed households reported using kerosene compared to male-headed households (49.42%; N=382). Kerosene use for cooking was also more common in male-headed households with female respondents. Female respondents (60.40%; N=209) in male-headed households reported using kerosene 1.5 times as many male respondents (40.52%; N=173). However, female respondents (60.40%; N=209) in male-headed households reported a slightly lower use of kerosene for cooking than female-headed households (65.50%; N=112).

Most of the respondents (94.13%; N=465) using kerosene and were aware of the RUW acknowledged that the war resulted in higher kerosene prices. More respondents (95.55%; N=365) in male-headed households were aware of the increased prices compared to respondents in female-headed households (82.29%; N=100). Female respondents (94.74%; N=198) in male-headed households reported slightly lower awareness of the increased kerosene prices compared to male respondents (96.53%; N=167). While the level of awareness of the increased prices was high, the relatively lower level of awareness in female-headed households compared to male-headed households potentially again signals some gendered inequalities in access to information. Female respondents in male-headed households had relatively higher awareness of the increased kerosene prices compared to female respondents in female-headed households. This could in part be due to living in environments with men, given that men are more informed.

Table 2: Descriptive Statistics on Kerosene Use

	Overall (N=944)	**Female-headed Household (N=171)**	**Male-headed household (N=773)**	**Male-headed household & female respondent (N=346)**	**Male-headed household & male respondent (N=427)**
Used kerosene before RUW (N (%))	494(52.33)	112(65.50)	382(49.42)	209(60.40)	173(40.52)
Used kerosene and aware that the RUW led to an increase in prices (N (%))	465(94.13)	100(89.29)	365(95.55)	198(94.74)	167(96.53)
Kerosene use by those aware that the RUW led to an increase in prices (N (%))					
Cooking	320(68.82)	72(72.00)	248(67.95)	140(70.71)	108(64.67)
lighting	68(14.62)	10(10.00)	58(15.89)	23(11.62)	35(20.96)
Both cooking and lighting	77(16.56)	18(18.00)	59(16.16)	35(17.68)	24(14.37)
Average weekly spending on kerosene before the RUW (Mean (SD))	279.01(187.22)	273.57(179.53)	280.54(189.53)	285.71(189.35)	275.22(190.12)
Min(max)	20(910)	30(700)	20(910)	20(700)	30(910)
Average weekly spending on kerosene after the RUW (Mean (SD))	464.47(260.06)	469.15(257.78)	463.22(261.13)	482.13(263.93)	438.97(256.58)
Min(max)	30(1000)	35(1000)	30(1000)	30(1000)	50(1000)
Average weekly spending on kerosene after the fuel subsidy (Mean (SD))	419.82(257.47)	429.52(270.15)	417.02(254.43)	415.56(256.96)	419.12(252.46)
Min(max)	20(1000)	35(1000)	20(1000)	20(1000)	50(1000)
Stopped using kerosene for cooking after the RUW	199(50.13)	39(43.33)	160(52.12)	84(48.00)	76(57.58)
Household cooking coping fuels					
LPG	123(61.81)	22(56.41)	101(63.13)	47(55.95)	54(71.05)
Firewood	17(8.543)	3(7.692)	14(13.86)	12(14.29)	2(2.632)
Other cooking fuels	59(29.65)	14(35.90)	45(28.13)	25(29.76)	20(26.32)

Considering kerosene use by respondents who were aware that kerosene prices increased due to the RUW, more than two-thirds of the respondents (68.82%; N=320) used kerosene for cooking. About 14.62% (N=68) used kerosene for lighting and 16.56% (N=77) used kerosene for both cooking and lighting. More respondents in female-headed households (72%; N=72) reported using kerosene for cooking compared to respondents in male-headed households (67.95%; 248). However, fewer respondents in female-headed households (10%; N=10) reported using kerosene for lighting compared to respondents in male-headed households (15.89%; N=58). More respondents in female-headed households (18%; N=18) reported using kerosene for both cooking and lighting compared to respondents in male-headed households (16.16%; N=59). More female respondents (70.71%; N=140) in male-headed households reported using kerosene for cooking than male respondents (64.67%; N=108). However, the female respondents (70.71%; N=140) in male-headed households reported slightly lower use of kerosene for cooking than female-headed households (72%; N=72). Fewer female respondents (11.62%; N=23) in male-headed households reported using kerosene for lighting compared to male respondents (20.96%; N=35) but more female respondents (17.68%; N=35) reported using kerosene for both cooking and lighting compared to male respondents (14.37%; N=24).

The reported weekly average spending on kerosene before the RUW was KShs. 279 with the least spending household paying Kshs. 20 and the highest spending household paying Kshs. 910 for kerosene. Respondents in female-headed households (Kshs. 273.57) reported spending less on kerosene per week than male-headed households (Kshs. 280.54). However, female respondents (Kshs.285.71) in male-headed households reported spending more on kerosene than male respondents (Kshs. 275.22) in the same households. This amount was also higher than that reported by female-headed households. After the RUW, the average weekly spending on kerosene increased to Kshs. 464.67. Respondents in female-headed households (Kshs. 469.15) reported spending relatively more than male-headed households (Kshs.463.22). Female respondents (Kshs.482.13) in male-headed households reported spending relatively more on kerosene than male respondents (Kshs.438.97). This amount was also higher than that reported by respondents in female-headed households.

With the increased kerosene prices, about half of the households (50.13%; N=199) stopped using kerosene, potentially for other cooking fuels. Fewer respondents in female-headed households (43.33%; N=39) reported stopping using the fuel compared to respondents in male-headed households (52.12%; N=160). Fewer female respondents (48.00%; N=84) also reported stopping using kerosene in male-headed households compared to male respondents (57.58%; N=76). However, more female respondents in male-headed households (48.00%; N=84) reported stopping using kerosene for cooking compared to female-headed households (43.33%; N=39). This potentially signals that men have a higher ability to cope with high kerosene prices compared to women.

Almost two in three households (61.81%; N=123) shifted to using LPG while 29.65% (N=59) opted for “other” cooking fuels. These “other” fuels were largely clean and included electricity and briquettes or a few combinations of these fuels with LPG and firewood. Firewood had the least adoption at 8.543% (N=17). These findings suggest that households that stopped using kerosene for cooking largely coped with cleaner fuels. While LPG is a fossil fuel, it is considered a cleaner energy because it emits no carbon and has lower levels of fine particulate matter than polluting fuels (Shupler et al., 2024). The cleaner energies also protect households from indoor air pollution (IAP) which is responsible for respiratory diseases which can lead to premature death. The switch to LPG could potentially be explained by the increased introduction of pay-as-you-go (PAYG) models, particularly in densely populated informal urban areas. The pay-as-you-go models allow households to purchase LPG in small quantities making it appealing to many households, despite a higher price per kilogram. The features of the PAYG make it possible for existing customers to maintain the use of LPG even during periods of crisis. For instance,

Shupler et al. (2021) found that the PAYG model enabled 95% of households to maintain using LPG during COVID-19 lockdowns.

While more than half of the female-headed households (56.41%; N=22) shifted to LPG use, the extent of shifting was lesser compared to male-headed households (63.13%; N=101). Female-headed households (35.90%; N=14) dominated male-headed households (28.13%; N=45) in shifting to "other" cooking fuels and were (7.692%; N=3) nearly half as likely as male-headed households (13.86%; N=14) to shift to firewood. The results suggest that even though women had a lesser likelihood to shift to relatively highly cleaner fuels (LPG) compared to men, they were less likely to choose highly dirty fuels (firewood) compared to men. Female respondents (55.95%; N=47) in male-headed households reported a relatively lower shift to LPG compared to male respondents (71.05%' N=54). Female respondents (55.95%; N=47) in male-headed households also reported a relatively lower shift to LPG compared to female-headed households (56.41%; N=22). Female respondents (29.76%; N=25) in male-headed households also dominated male respondents (26.32%; N=20) in shifting to "other" cooking fuels. However, female respondents (14.29%; N=12) in male-headed households were about seven times as likely to report shifting to firewood as male respondents (2.632%; N=2).

Gendered Differences in Households Cooking Coping Strategies

Table 3 provides the results of the Chi-square test of independence on gendered differences in household cooking coping strategies.

Table 3: Gendered Differences in Household Cooking Coping Strategies

Energy	Female-headed household (N=39)	Male-headed household (N=160)	P-value (χ^2)	Male-headed household & female respondent (N=84)	Male-headed household & male respondent (N=76)	P-value (χ^2)
LPG	22(56.41)	101(63.13)	0.439	47(55.95)	54(71.05)	0.048^{**}
Firewood	3(7.692)	14(13.86)	0.832	12(14.29)	2(2.632)	0.009^{***}
Other	14(35.90)	45(28.13)	0.341	25(29.76)	20(26.32)	0.628

$^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01.$

The results in Table 3 show that in the male-headed households, a statistically significant lesser proportion of female respondents compared to male respondents reported shifting to LPG use following high kerosene prices occasioned by the RUW. However, a statistically significant higher proportion of female respondents compared to male respondents reported shifting to firewood.

Socioeconomic Characteristics of Households with Cooking Coping Strategies

This study compares the socio-economic characteristics between male and female with cooking coping strategies, the findings of which are presented in Table 4. The results in Table 4 show that nearly all the respondents in the survey were either household heads or spouses across all the coping energy forms, potentially indicating that to a significantly large extent, the respondents could have influenced the choice of cooking coping fuels. In female-headed LPG-adopting households, 95.45% (N=21) of the respondents were household heads while in male-headed households, 51.49% (N=52) of the respondents were heads and 46.53% (N=47) were spouses. In the female-headed households that

adopted firewood, all the respondents were household heads while in the male-headed households, 14.30% (N=2) of the respondents were heads and 85.70% (N=12) were spouses. In female-headed other energy forms adopting households, 71.43% (N=10) of the respondents were household heads and 28.57% (N=4) were other household members. In male-headed other energy forms adopting households, 37.78% (N=17) of the respondents were household heads and 55.55% (N=25) were spouses with the few other respondents (6.667%; N=3) being other members of the household.

The findings in Table 4 reveal that adopting clean cooking fuels (LPG: female=41.91 years; male=36.83 years; Other: female; 38 years; male=37.33 years) as a coping mechanism to high kerosene prices was more common in households with relatively younger respondents than adopting dirty fuels (Firewood; female=48 years; male=46.93 years). This suggests that age could have influenced fuel choice with younger fuel users being more likely to adopt clean fuels than older fuel users. Across the three fuels, respondents in female-headed households (LPG=41.91 years; Other=38 years; Firewood=48 years) were relatively older than respondents in male-headed households (LPG=36.83 years; Other=37.33 years; Firewood=46.93 years). However, female respondents (LPG=36.13 years; Other=34.96 years; Firewood=46.33 years) in male-headed households were relatively younger than male respondents (LPG=37.44 years; Other=40.30 years; Firewood=50.50 years) across the three fuels. Since the majority of the female respondents in these households are spouses, this finding suggests that on average, men marry relatively younger women. The findings of the study further show that across the three fuels, female respondents in male-headed households (LPG=36.13 years; Other=34.96 years; Firewood=46.33 years) were relatively younger compared to female respondents in female-headed households (LPG=41.91 years; Other=38 years; Firewood=48 years).

Table 4: Gendered Socioeconomic Characteristics of Households with Cooking Coping Strategies

	LPG				Firewood				Other			
Characteristic	**Female-Headed Households (N=22)**	**Male-Headed Households (N=101)**	**Male-Headed Households & Female Respondent (N=47)**	**Male-Headed Household & Male Respondent (N=54)**	**Female-Headed Households (N=3)**	**Male-Headed Households (N=14)**	**Male-Headed Households & Female Respondent (N=12)**	**Male-Headed Household & Male Respondent (N=2)**	**Female-Headed Households (N=14)**	**Male-Headed Households (N=45)**	**Male-Headed Households & Female Respondent (N=25)**	**Male-Headed Household & Male Respondent (N=20)**
Age (Mean (SD))	41.91(13.65)	36.83(11.10)	36.13(10.17)	37.44(11.91)	48(13.11)	46.93(17.14)	46.33(18.56)	50.50(0.707)	38(10.96)	37.33(13.09)	34.96(8.149)	40.3(17.05)
Relationship with the household head (N (%))												
Head	21(95.45)	52(51.49)	-	52(96.30)	3(100)	2(14.30)	-	2(100)	10(71.43)	17(37.78)	-	17(85.00)
Spouse	-	47(46.53)	47(100)		-	12(85.71)	12(100)	-	-	25(55.55)	25(100)	-
Other	1(4.545)	2(1.980)	-	2(3.704)	-	-	-	-	4(28.57)	3(6.667)	-	3(15.00)
Region (N (%))												
Urban	22(100)	96(95.05)	46(97.87)	50(92.59)	1(33.33)	3(21.43)	2(16.67)	1(50.00)	14(100)	43(95.56)	23(92.00)	20(100)
Rural	-	5(4.95)	1(2.128)	4(7.407)	2(66.67)	11(78.57)	10(83.33)	1(50.00)	-	2(4.44)	2(8.00)	-
Occupation (N (%))												
Wage	9(40.91)	36(35.64)	14(29.79)	22(40.74)	1(33.33)	4(28.57)	4(33.33)	-	6(42.86)	18(40.00)	9(36.00)	9(45.00)
Self-employed (Farm)	-	2(1.980)	1(2.128)	1(1.852)	-	6(42.86)	5(41.67)	1(50.00)	-	1(2.222)	1(4.00)	-
Self-employed (non-farm)	11(50.00)	52(51.49)	24(51.06)	28(51.85)	1(33.33)	2(14.29)	1(8.333)	1(50.00)	6(42.86)	13(28.89)	6(24.00)	7(35.00)
unemployed	-	9(8.911)	8(17.02)	1(1.852)	1(33.33)	1(7.143)	1(8.333)	-	1(7.143)	8(17.77)	6(24.00)	2(10.00)
other	2(9.091)	2(1.980)	-	2(3.704)	-	1(7.143)	1(8.333)	-	1(7.143)	5(11.11)	3(12.00)	2(10.00)

Floor-type (N (%))												
Ceramic tile	6(27.27)	22(21.78)	10(21.28)	12(22.22)	-	-	-	-	1(7.143)	5(11.11)	3(12.00)	2(10.00)
Concrete	15(68.18)	74(73.27)	34(72.34)	40(74.07)	3(100)	10(71.43)	9(75)	1(50.00)	10(71.43)	35(77.78)	20(80.00)	15(75.00)
Earth	-	3(2.970)	2(4.255)	1(1.852)	-	3(21.43)	2(16.67)	1(50.00)	2(14.29)	4(8.89)	2(8.00)	2(10.00)
Wall-to-wall carpet	1(4.545)	2(1.980)	1(2.128)	1(1.852)	-	1(7.143	1(8.33)	-	1(7.143)	1(2.22)	-	1(5.00)
Education (N (%))												
Primary	10(45.45)	24(23.76)	9(19.15)	15(27.78)	2(66.67)	6(42.86)	6(50.00)	-	7(50.00)	21(46.67)	13(52.00)	8(40.00)
Secondary	11(50.00)	51(50.50)	28(59.57)	23(42.59)	1(33.33)	7(50.00)	5(41.67)	2(100)	6(42.86)	19(42.22)	10(40.00)	9(45.00)
Post-secondary	1(4.55)	17(16.83)	6(12.77)	11(20.37)	-	-	-	-	-	2(4.444)	1(4.00)	1(5.00)
Other	-	9(8.911)	4(8.511)	5(9.259)	-	1(7.143)	1(8.33)	-	1(7.143)	3(6.667)	1(4.00)	2(10.00)
Own a bank account (N (%))	14(63.64)	72(71.29)	29(61.70)	43(79.63)	1(33.33)	7(50.00)	6(50.00)	1(50.00)	6(42.86)	21(46.67)	12(48.00)	9(45.00)

The choice of cleaner cooking fuels as a coping mechanism to the relatively higher kerosene prices appears to have been highly common in urban regions across both male and female respondents. In contrast, the choice of dirty fuels (firewood) was common in rural areas. In female-headed households, all the LPG-adopting respondents were in urban areas while in male-headed households, 95.05% (N=96) were in these areas and only 4.95% (N=5) were in rural areas. In male-headed households, 97.87% (N=46) of the female respondents were in urban areas while 2.128%(N=1). In male-headed households, a slightly higher proportion of female respondents (97.87%; N=46) reported being in urban areas than male respondents (92.59%; N=50). However, the proportion of LPG-adopting female respondents (97.87%; N=46) in male-headed households living in urban areas was lower than the female respondents (100%) in female-headed households.

Similarly, all the respondents in female-headed households adopting other energy forms were in urban areas while 95.56% (N=43) of the male-headed households' respondents were in urban areas. However, a slightly lower proportion of female respondents (92%; N=23) in other energy-form-adopting male-headed households were in urban areas than male respondents. The proportion of female respondents (92%; N=23) in male-headed households in urban areas adopting other energy forms was also lower compared to the female respondents (100%) in female-headed households. The proportion of respondents (66.67%; N=2) in fuel-adopting female-headed households in rural areas was lower than in male-headed households (78.57%; N=11). A significantly higher proportion of female respondents (83.33%; N=10) in firewood-adopting male-headed households was in rural areas compared to male respondents who reported an equal number of those in urban and rural areas. The proportion of female respondents (83.33%) in male-headed households adopting firewood was lower compared to female respondents (66.67%) in female-headed households.

Most of the respondents surveyed across the three energy forms reported living on concrete floor houses. In addition, a significant proportion of respondents reported living on ceramic tiled floors. However, this was only in cleaner energies (LPG and other energy forms). None of the respondents in firewood-adopting households reported living on ceramic-tiled floors but a significant proportion reported living on earth floors. The finding signals that clean energy adoption has some links with relatively higher incomes and dirty fuels have some links with relatively lower incomes. The proportion of respondents in LPG-adopting female-headed households (68.18%) living on concrete floors was lower than that in male-headed households (73.27%; N=74).

The proportion of female respondents (72.34%; N=34) in male-headed households adopting LPG living on concrete floors was lower than male respondents (74.07%; N=40) in the same households. However, the proportion of female respondents (72.34%; N=34) in male-headed households adopting LPG living on such floors was higher compared to the female respondents (68.18%; N=15) in female-headed households. In contrast to the concrete floor, a larger proportion of respondents (27.27%; N=6) in female-headed households adopting LPG reported living on ceramic tiled floors compared to respondents (21.78%; N=22) in male-headed households. Nevertheless, a slightly lower proportion of female respondents (21.28%; N=10) in male-headed households reported living on ceramic-tiled floors compared to male respondents (22.22%; N=12) in the same households. The proportion of female respondents (21.28%; N=10) in male-headed households adopting LPG living on ceramic tiled floors was also compared to female respondents in female-headed households (27.27%; N=6).

The proportion of respondents in female-headed households (71.43%; N=10) adopting other energy firms living on concrete floors was lower than in male-headed households (77.78%; N=35). However, the proportion of female respondents (80%; N=20) adopting other energy forms and reporting living on concrete floors in male-headed households was higher than male respondents (75%; N=15) in similar

households. This proportion was also higher than that of female respondents in female-headed households (71.43%; N=10). A relatively lower proportion of respondents in female-headed households (7.143%; N=1) reported living on ceramic-tiled floors than in male-headed households (11.11%; N=5). The proportion of female respondents (12%; N=3) in male-headed households adopting other forms of energy living on ceramic tiled floors was slightly higher than male respondents (10%; N =2) in similar households. This proportion was also higher than that of male respondents in female-headed households (7.143%; N=1). In addition, a significantly higher proportion of respondents in female-headed households (14.29%; N=2) adopting other energy forms reported living on earth floor type of houses compared to respondents in male-headed households (8.89%; N=4). All the respondents in female-headed households adopting firewood reported living on concrete floors. About 71.43% (N= 10) of respondents in male-headed households reported living on concrete floors and 21.43% (N= 3) reported living on earth floors and in both cases, nearly all the respondents were female.

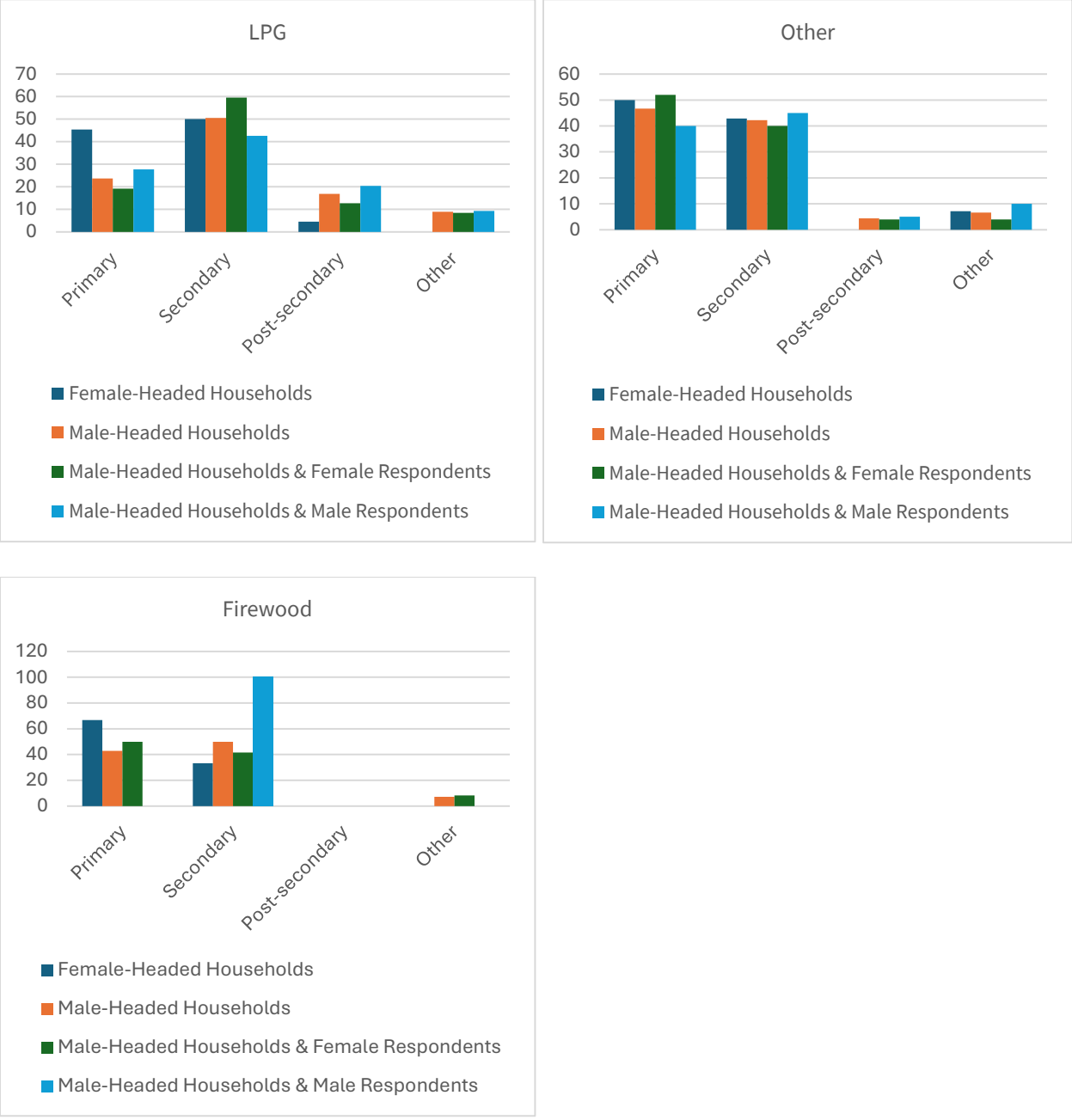
Table 4 also presents information on ownership of bank accounts across the three cooking coping energy forms. The findings show that ownership of bank accounts was more common in LPG-adopting households compared to adopters of firewood and other energy forms with nearly two-thirds of LPG-adopting households owning bank accounts across both female and male-headed households. This could imply that bank account owners could have been better placed to finance the relatively expensive LPG energy and accessories through bank financing. However, respondents in female-headed households (63.64%; N=14) reported lower ownership of bank accounts than respondents in male-headed households (71.29%; N=72). The proportion of female respondents (61.70%; N=29) owning bank accounts in male-headed households was even lower than that of male respondents (79.63%; N=43). Further, the proportion of female respondents in LPG-adopting male-headed households owning bank accounts was lower than that of female respondents in female-headed households. These findings reveal potential signals of gendered inequalities in access to formal financial facilities in LPG-adopting households with women being less likely to own bank accounts. This is particularly more pronounced in households with married families.

The proportion of respondents in female-headed households (42.86%; N=6) adopting other energy forms and reporting ownership of bank accounts was lower than in male-headed households (46.67%; N=21). Nevertheless, the proportion of female respondents (48%; N=12) owning bank accounts in male-headed households adopting other energy forms was higher than male respondents (45%; N=9) in the same households. This proportion was also higher than that of female respondents in female-headed households (42.86%; N=6). Bank account ownership was also less common among respondents (33.33%; N=1) in firewood-adopting female-headed households than respondents (50.00%; N=7) in male-headed households.

Most of the respondents adopting cooking coping mechanisms had a primary education or a secondary level of education across the three cooking fuels as shown in Figure 1. Half of the respondents in LPG-adopting female-headed households had a secondary level of education but this was slightly lower compared to those in male-headed households (50.50%; N= 51). In the LPG-adopting male-headed households, the proportion of female respondents (59.57%; N=28) was bigger than that of male respondents (42.59%; N=23). The proportion of female respondents (59.57%; N=28) in male-headed households was also bigger than female respondents in female-headed households (50%; N=11). In addition, the proportion of respondents in female-headed households (45.45%; N=10) with a primary level of education was almost twice that of respondents in male-headed households (23.76%; N=24). However, the proportion of female respondents (19.15%; N= 9) in male-headed households with primary education was lower than male respondents (27.78%; 15) in the same households. The proportion of respondents in LPG-adopting female households (4.55%; N=10) with post-secondary

education was almost four times lower than in male-headed households (16.83%; N=17). The proportion of female respondents (12.77%; N=6) in LPG-adopting male-headed households was also lower than male respondents (20.37%; N=11) in the same households.

Figure 1: Level of education of adopters of cooking coping mechanisms

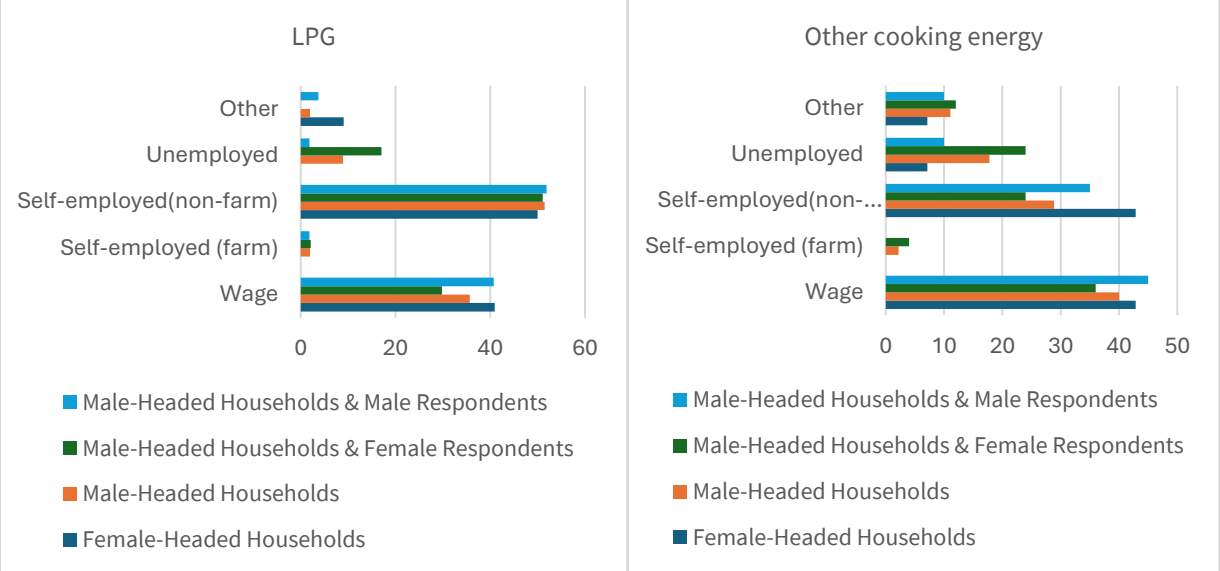


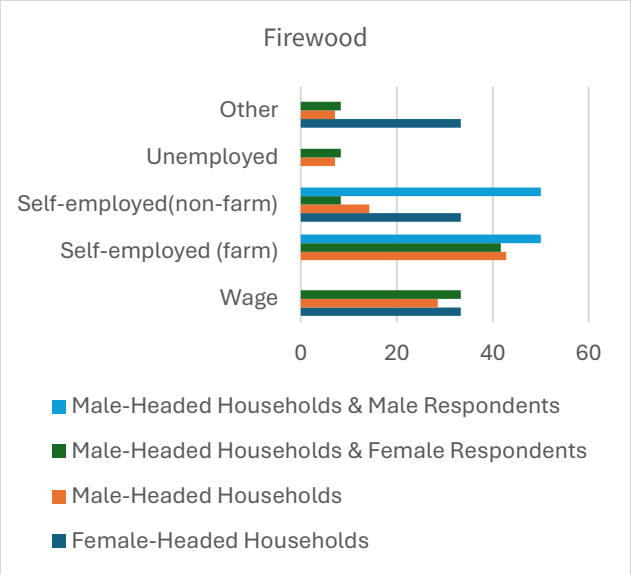
Most of the respondents in households adopting other cooking fuels had a primary level of education. Half the respondents in female-headed households adopting this energy form had a primary level of education. This proportion was higher than that of respondents (46.67%; N=21) in male-headed households choosing the same energy form. The proportion of female respondents (52%; N=13) in

male-headed households reporting a primary level of education was also higher than that of male respondents (40%; N=8). The proportion of respondents with secondary education in female-headed households (42.86%; N=6) adopting other energy forms was slightly higher than respondents in male-headed households (42.22%; N=19). In the male-headed households adopting other energy forms, the proportion of female respondents (40%; N=10) reporting secondary education was lower than that of male respondents (45%; N=9) reporting the same level of education. This proportion was also lower than female respondents in female-headed households (42.86%; N=6). Two-thirds of the respondents in female-headed households who adopted firewood reported having primary education. This proportion was higher compared to the proportion of respondents in male-headed households (42.86%; N= 6) who reported the same level of education. All the respondents in male-headed households who reported primary education were female and this proportion was higher compared to female respondents in female-headed households (66.67%; N=2). A third of the respondents in female-headed households adopting firewood had secondary education but this proportion was lower than that of respondents in male-headed households (50%; N=7).

Most of the households who adopted clean cooking coping mechanisms (LPG and other cooking energy) appear to have self-employment in non-farm activities and wage employment as their main occupation as shown in Figure 2. However, for firewood, adopters appear to mainly depend on self-employment in farm activities with others in wage and self-employment non-farm activities. More than half of LPG adopters were self-employed in non-farm activities. However, the proportion of respondents in female-headed households (50%; N=11) adopting LPG who reported this form of occupation was slightly lower than the proportion of male-headed households (51.49%; N=52) respondents. The proportion of female respondents (51.06%; N=24) in male-headed households was also slightly lower than male respondents (51.85%; N=28) in the same households. In contrast, the proportion of respondents who reported wage occupation in female-headed households (40.91%; N=9) was more than that of male-headed households (35.64%; N=36). However, the proportion of female respondents (29.79%; N=14) reporting wage occupation in male-headed households was lower than that of male respondents (40.74%; N=22) in the same households.

Figure 2: The occupation of household heads with cooking coping mechanisms





None of the LPG-adopting respondents in female-headed households reported unemployment but 8.911% (N=9) respondents in male-headed households reported unemployment. Nearly all the respondents who reported unemployment in male-headed households were female (17.02%; N=8) with only one male respondent reporting the same. This potentially signals gendered inequalities in some male-headed households with women being unemployed while their husbands have some source of livelihood. A larger proportion of respondents in female-headed households (42.86%; N=6) who adopted other energy forms reported wage employment than male-headed households (40%; N=18). However, in male-headed households, a lower proportion of female respondents (36%; N=9) reported wage employment compared to male respondents (45%; N=9) in the same households. The proportion of female respondents (36%; N=9) in male-headed households was also lower than that of respondents (42.86%; N=6) in female-headed households.

Like wage employment, the proportion of respondents reporting self-employment in non-farm activities in female-headed households (42.86%; N=6) adopting other energy forms was higher than that of respondents in male-headed households (28.89%; N=13). Nevertheless, the proportion of female respondents (24%; N=6) reporting this form of employment in male-headed respondents adopting other energy forms was lower than that of male respondents (35%; N=7) in male-headed households. The proportion of respondents (7.143%; N=1) who reported unemployment in female-headed households adopting other energy forms was less than half of the proportion of respondents (17.77%; N=8) who reported the same in male-headed households. However, the proportion of female respondents in male-headed households adopting other energy forms who reported unemployment was more than twice that of male respondents in the same households. This only reinforces the argument that gender inequalities in occupation exist in male-headed households with women being highly likely to be unemployed compared to their husbands. This appears to be more pronounced in urban areas where relatively clean energies are adopted as coping mechanisms. In households adopting firewood as a coping mechanism, very few respondents (N=3) were in female-headed households. These respondents were equally spread across wage, self-employment non-farm activities and unemployment in occupation. The largest proportion of respondents in male-headed households (42.86%; N=6) were in self-employment farm activities, 28.57% (N=4) were in wage employment and 14.29% (N=2) were in self-employment non-farm activities.

Time Spent on Cooking Coping Mechanisms

This study sought to establish the time spent on cooking coping mechanisms. Specifically, this study intended to establish whether there were gendered time savings in collecting the coping fuels and cooking meals. The study begins this section by identifying the main fuel collectors and cooks in the surveyed households, the results of which are provided in Table 5.

Table 5: Main Energy Collector and Cook

		LPG		Kerosene		Other fuel	
		Female-Headed Households (N=22)	**Male-Headed Households (N=101)**	**Female-Headed Households (N=3)**	**Male-Headed Households (N=14)**	**Female-Headed Households (N=14)**	**Male-Headed Households (N=45)**
Collecting	Female	22 (100)	52(51.49)	2(66.67)	12(85.71)	13(92.86)	28(62.22)
	Male	-	49(48.51)	1(33.33)	2(14.29)	1(7.14)	17(37.78)
Cooking	Female	22(100)	83(82.18)	3(100)	12(85.71)	12(85.71)	37(82.22)
	Male	-	18(17.82)	-	2(14.29)	2(14.29)	8(17.78)

The results in Table 5 reveal that women were the main energy collectors and cooks in the surveyed households. All the collectors of LPG in female-headed households were women and more than half of the LPG collectors in male-headed households were women (51.49%; N=52) with male collectors being 48.51% (N=49). Two in three kerosene collectors in female-headed households were women and one was male. In male-headed households, the proportion of female (85.71%; N=12) kerosene collectors were even higher than that of male collectors (14.29%; N=2). About 9 in 10 other fuel collectors in female-headed households were women (92.86%; N=13). In male-headed households, the proportion of women who collected (62.22%; N=28) other energy forms were also higher than that of male collectors (37.78%; N=17). In the LPG-adopting female-headed households, all the cooking was done by women. In male-headed households adopting the same energy form, women were the main cooks at 82.18% (N=83) with the proportion of male cooks being 17.82%(N=18). In kerosene-adopting households, all cooking was also done by women. In male-headed households, women dominated cooking at 85.71% (N=12) and only 14.29% (N=2) were male. Women also dominated cooking in both female and male-headed households adopting other energy forms at 85.71% (N=12) and 82.22% (N=37) respectively with the rest of the cooks being male (14.29% and 17.89% respectively). These findings reveal gendered inequalities in unpaid labour with women mainly shouldering the burden of unpaid domestic work.

Table 6 presents findings on the average time spent collecting coping fuel and cooking by the main household fuel collectors and cooks. The table also presents the average time taken by household members to collect kerosene and cook using it before shifting to other energy forms due to increased kerosene prices.

Table 6: Average Fuel Collecting and Cooking Time

	Kerosene		LPG		Firewood		Other fuel	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Collecting (N)	135	98	74	49	14	3	41	18
Mean (SD)	22.23(18.16)	18.84(17.51)	12.03 (10.71)	11.53(8.163)	37.86(44.06)	23.33(11.55)	10(11.45)	7.889(6.790)
Minimum	5	5	5	5	15	10	5	5
Maximum	90	60	50	30	180	30	60	20
Cooking (N)	182	51	91	32	15	2	46	13
Mean (SD)	30.60(17.98)	25.66(17.38)	26.75(13.73)	22.09(11.04)	45(21.21)	38(21.71)	28.22(14.22)	24.37(12.58)
Minimum	5	5	5	5	10	10	10	5
Maximum	90	60	90	60	90	60	90	90

The study findings show that women were not only the main fuel collectors and cooks but also spent more time collecting fuel and cooking. Before the RUW women on average (22.23 minutes) spent more time collecting kerosene than men (18.84 minutes). The study results show that among the three coping fuels, more time was spent collecting firewood than kerosene across men and women. Women spent a 15-minute longer average travel time (37.86 minutes) to obtain firewood than collecting kerosene (22.23 minutes). Men spent a 5-minute longer average time (23.33 minutes) collecting firewood than collecting kerosene (18.84 minutes). This finding implies that more time was spent on unpaid services in the form of firewood collection. Potentially, the additional time to collect this fuel could have been obtained by reducing time on productive activities making the households poorer. This is likely to be more pronounced in rural areas given that more than three-quarters of firewood adopters were in these areas. Adopting firewood created even more gendered inequalities in this activity with women spending more time than men than was the case in kerosene. Women spent about a quarter of an hour more time (37.86 minutes) collecting firewood than men (23.33 minutes). In the 17 households that adopted firewood, about 530.04 minutes were spent by women collecting firewood compared to 70 minutes spent by men. This implies that women sacrificed about seven times more productive time for unpaid services than men.

Less time was spent collecting LPG and other fuels than kerosene. Women on average spent 10 minutes less time (11.53 minutes) to collect LPG than kerosene (22.23 minutes). Men spent a 7-minute lesser average time (11.53 minutes) to collect LPG than kerosene (18.84 minutes). Women (10 minutes) spent 12 fewer minutes collecting other energy forms than kerosene (22.23 minutes). Men spent 11 minutes less average time collecting other energy forms than kerosene (18.84 minutes). These findings reveal that adopting these energy forms released some time for productive activities from unpaid services among main energy collectors. The findings further show that women still dominated men in collecting these fuels. Women spent about 12.03 minutes collecting LPG compared to men who spent 11.53 minutes in the same activity. The slight difference in time to collect LPG between women and men

reveals that there could be potential reductions in gendered inequalities in time to collect LPG, one of the cleaner fuels. However, these reductions are likely to benefit urban areas given that nearly all adopters of this fuel were from these areas. On other energy forms, women spent about 10 minutes collecting this form of fuel while men spent about 7.889 minutes. These findings also reveal that adopting this energy form partly closed the gap in inequalities in unpaid services between men and women.

The results in Table 6 further reveal that women on average spent more time (30.60 minutes) cooking a typical meal using kerosene than men (25.06 minutes) before the RUW. Using firewood to cook a typical meal took the longest among the three coping fuels. It also took longer to cook a typical meal using firewood than kerosene. Women took a quarter of an hour longer (45 minutes) cooking using firewood than kerosene (30.60 minutes). Men spent 13 more minutes cooking (38 minutes) using firewood than kerosene (25.66 minutes). This indicates that more productive time was released to unpaid services by adopting firewood as a coping energy, potentially making households poorer, especially in rural areas. The study findings also reveal that gendered inequalities were present in cooking time using firewood. Women (45 minutes) took longer to cook using firewood than men (38 minutes). The difference in time taken to cook using firewood between men and women was bigger than that of kerosene signaling more gendered inequalities in adopting this energy form as a coping energy than kerosene. Women in the surveyed households spent 630 minutes cooking a typical meal compared to 76 minutes spent by men. This implies that women sacrificed eight times more productive time in unpaid cooking services than men.

The time taken to cook using LPG and other energy forms was less than that spent using kerosene. Women spent 4 minutes less cooking using LPG (26.75 minutes) than kerosene (30.60 minutes). Men took 3 minutes less to cook using LPG (22.09 minutes) than kerosene (25.66). On other energy forms, women on average took two minutes less to cook using these energy forms (28.22 minutes) than kerosene (30.60 minutes). Men on average spent 1 minute less cooking using other energy forms (24.37 minutes) than kerosene (25. 66 minutes). These findings indicate that adopting these energy forms as coping energies releases some cooking time for the main cook for productive activities. Women (26.75 minutes) took longer to cook using LPG than men (22.09 minutes). Women (28.22 minutes) also took longer to cook using other energy forms than men (24.37 minutes). These findings reveal that gendered inequalities still existed in cooking using the two energy forms, albeit to lower extents. This also signals that adopting the two energy forms partly closed the gaps in gendered inequalities in unpaid cooking services.

Kerosene Use after the Fuel Subsidy

This study sought to investigate whether the households that had stopped using kerosene for cooking due to increased fuel prices resumed using the fuel after the subsidy, the results of which are provided in Table 7.

Table 7: Kerosene use after the fuel subsidy

	Overall (N=199)	**Female-headed (N=39)**	**Male-headed (N=160)**	**Male-headed and female respondent (N=84)**	**Male-headed and male respondent (N=76)**
N (%)	16(8.040)	3(7.692)	13(8.125)	7(8.333)	6(7.895)
Region Rural	1(6.250)	-	1(7.692)	1(14.29)	
Urban	15(93.75)	3(100)	12(92.31)	6(85.71)	6(100)

Results in Table 7 show that only 8.04% (N=16) of the households that had stopped using kerosene resumed using the fuel after the fuel subsidy. These findings could partly imply that the fuel subsidy was not big enough to convince the households to resume cooking using kerosene. It could also imply that the households got accustomed to the new means of cooking and found no need to resume kerosene use. It could also be that the households learned the benefits of clean energies given that cleaner energies were the main coping energies and thus found no need to resume kerosene use. A slightly lower proportion of respondents in female-headed households (7.692%; N=3) reported resuming kerosene use than those in male-headed households (8.125%; N=13). In the male-headed households, a slightly higher proportion of female respondents (8.333%; N=7) reported resuming kerosene use than male respondents (7.895%; N=6). Nearly all the households (93.75%; N=15) that were reported to resume kerosene use were in the urban region with only one being in the rural region. This could be because most of the kerosene-using respondents who had stopped using the fuel for cooking were in urban areas. All the respondents in the female-headed households were in urban areas and 92.31% (N=12) of the respondents in male-headed households were in similar areas.

5. Conclusion

This study sought to investigate the gendered differences in household cooking coping strategies due to increased fuel prices following the RUW. More specifically, the study sought to investigate the gendered cooking coping energies, gendered socio-economic characteristics of households with cooking coping strategies, and gendered time savings due to cooking coping strategies. The study also sought to investigate the adoption of kerosene for cooking by households that had stopped using the fuel due to increased prices. The study applied descriptive analysis on 995 observations collected from Nairobi and Nyandarua counties. Results of the study show that about half of the households that were kerosene-using stopped using the fuel following higher fuel prices. Fewer respondents in female-headed households reported stopping using the fuel than male-headed households. Fewer respondents in male-headed households also reported stopping using the fuel than male respondents. Almost two in three households shifted to using LPG, while about 29.65% opted "other" cooking fuels and 8.54% opted for firewood. The proportion of respondents reporting shifting to LPG was lower in female-headed households than in male-headed households. However, respondents in female-headed households reported a lower likelihood of selecting kerosene than male-headed households.

The findings revealed heterogeneity in the socio-economic characteristics of households with cooking coping strategies. The findings of the study revealed that nearly all respondents in households with cooking coping mechanisms were either household heads or spouses potentially signaling that the respondents influenced making cooking coping energy decisions. Adopting clean cooking energies (LPG and "other" energy forms) was more common in younger respondents than firewood across both genders. However, female respondents choosing cleaner energy were relatively older than male respondents. The choice of clean coking energies was more common in urban areas while that of firewood was common in rural areas across both genders. The choice of cleaner cooking energies was more common in households with relatively higher incomes as indicated by ceramic and concrete floors. However, the proportion of respondents in the cleaner energy forms that reported living on such floors was lower than that of male respondents. The majority of the households adopting clean cooking coping mechanisms appeared to have self-employment in non-farm activities and wage employment as the main occupation across both gender while firewood adopters mainly relied on self-employment in farm activities.

The study results revealed that women were the main energy collectors and cooks in the households with cooking coping strategies. There were time savings in collecting LPG and other cooking energy forms, but more time was spent collecting firewood than kerosene. Women took longer to collect firewood than men. There were time savings in cooking using LPG and other energy fuels, but it took longer to cook using firewood than kerosene. Women also took longer to cook using firewood compared to men. The results of the study further show that only a small proportion of the households that had stopped using kerosene resumed using this energy form. A slightly lower proportion of respondents in female-headed households reported resuming kerosene use than those in male-headed households.

Several policy recommendations can be made in this study. First, the study results show that clean energies were the most chosen coking coping energies but the likelihood of adopting these energy forms was lower in women than men. This means that men are likely to enjoy the potential benefits of clean energy than women deepening existing inequalities. There is a need to empower women to enable them to increase the uptake of clean energy. Through social women groups, the Ministry of Labour and Social Protection, development partners and private financial institutions could provide low-interest financing for the purchase of clean technologies. Second, there is a need for people's

elected representatives to use existing affirmative action platforms to advance the uptake of clean energy. For instance, women representatives elected in parliament could use the existing National Government Affirmative Action Fund (NGAF) to provide clean cooking technologies to women, particularly those from poor households. Third, county governments could distribute clean cooking technologies to women as part of their climate change mitigation measures. Lastly, the study findings reveal that the adoption of firewood is more common in rural areas, casting doubt on the availability of clean cooking technologies in these areas. The National Treasury in collaboration with the Ministry of Energy and Petroleum Development could use the result-based financing model to increase the supply of clean cooking technologies to women in rural areas.

References

Abay, K. A., Breisinger, C., Glauber, J., Kurdi, S., Laborde, D., & Siddig, K. (2023). The Russia-Ukraine war: Implications for global and regional food security and potential policy responses. *Global Food Security*, 36, 100675.

Adelekan, I. O., & Jerome, A. T. (2006). Dynamics of household energy consumption in a traditional African city, Ibadan. *Environmentalist*, 26, 99-110.

Arndt, C., Diao, X., Dorosh, P. A., Pauw, K., & Thurlow, J. (2022). *Russia-Ukraine War and the global crisis: Impacts on poverty and food security in developing countries.* International Food Policy Research Institute, Washington, DC.

Ayaz, M., Fontan-Sers, C., Maisonnave, H., Mughal, M. Y. (2023). Collateral damage? Welfare effects of the Ukraine war on Pakistan. *World Development Sustainability*, 3, 100082.

Borner, J., Shively, G., Wunder, S., & Wyman, M. (2015). How do rural households cope with economic shocks? Insights from global data using hierarchical analysis. *Journal of Agricultural Economics*, 66(2), 392-414.

Breisinger, C., Diao, X., Dorosh, P. A., Mbuthia, J., Omune, L., Oseko, E. O., … & Thurlow, J. (2022). *Kenya: Impacts of the Ukraine and global crises on poverty and food security* (Vol.1). Intl Food Res Inst.

Breton, M., & Mirzapour, H. (2016). Welfare implication of reforming energy consumption subsidies. *Energy policy*, 98, 232-240.

Chudzicka-Czupala, A., Hapon, N., Man, R. H. C., Li, D. J., Zywiolek-Szeja, M., Karamushka, L., … & Yen, C. F. (2023). Associations between coping strategies and psychological distress among people living in Ukraine, Poland, and Taiwan during the initial stage of the 2022 War in Ukraine. *European Journal of Psychotraumatology*, 14(1), 2163129.

Crisan, C. A., Milhem, Z., Stretea, R., Hossu, R. M., Florean, I. S., & Chereches, R. M. (2023). Coping mechanisms during the war in Ukraine: a cross-sectional assessment among Romanian population. In *Healthcare* (Vol. 11, No. 10, p. 1412). MDPI.

Dartanto, T. (2013). Reducing fuel subsidies and the implication of fiscal balance and poverty in Indonesia. A simulation analysis. *Energy policy*, 58, 117-134.

Dida, G. O., Lutta, P. O., Abuom, P. O., Mestrovic, T., & Anyona, D. N. (2022). Factors predisposing women and children to indoor air pollution in rural villages, Western Kenya. *Archives of Public Health*, *80*(1), 46.

Geda, A., & Michael, M. P. (2023). *Impacts of the Ukraine crises on food security in Kenya and Ethiopia: Options for Regional Trade Collaboration.* AERC Working Paper IWU-CC-002.

Giuliano, F., Lugo, M. A., Masut, A., & Puig, J. (2020). Distributional effects of reducing energy subsidies: Evidence from recent policy reform in Argentina. *Energy Economics*, 92, 104980.

Guenette, J. D., Kenworthy, P. G., & Wheeler, C. M. (2022). Implications of the War in Ukraine for the Global Economy.

Gurara, D., M'bouke, S., Muchai, D. N., Shimeles, A. (2023). *The Echoes of Conflict: Analyzing the Potential Impacts of the Russia-Ukraine War on Africa*. AERC Working Paper.

Hancevic, P., Cont, W., & Navajas, F. (2016). Energy populism and household welfare. *Energy Economics*, 56, 464-474.

International Monetary Fund (2023). Regional economic outlook. Sub-Saharan Africa: the big funding squeeze. Washington, DC: International Monetary Fund, 2023. | World economic and financial surveys. https://www.imf.org/en/Publications/REO/SSA/Issues/2023/04/14/regional-economic-outlook-for-sub-saharan-africa-april-2023

James, B. S., Shetty, R. S., Kamath, A., & Shetty, A. (2020). Household cooking fuel use and its health effects among rural women in southern India—A cross-sectional study. *PloS one*, *15*(4), e0231757.

Li, Y., Shi, X., & Su, B. (2017). Economic, social and environmental impacts of fuel subsidies: A revisit of Malaysia. *Energy Policy*, 110, 51-61.

Limone, P., Toto, G. A., & Messina, G. (2022). Impact of the COVID-19 pandemic and the Russia-Ukraine war on stress and anxiety in students: A systematic review. *Frontiers in Psychiatry*, 13, 1081013.

Lin, F., Li, X., Jia, N., Feng, F., Huang, J., …& Song, X. P. (2023). The impact of Russia-Ukraine conflict on global food security. *Global Food Security*, 36, 100661.

Lopatovska, I., Arora, K., Fernandes, F. V., Rao, A., Sivkoff-Livneh, S., & Stamm, B. (2022). Experiences of the Ukrainian adolescents during the Russia-Ukraine 2022 War. *Information and Learning Sciences*, 123(11/12), 666-704.

Mberu, B. U., Haregu, T. N., Kyobutungi, C., Ezeh. (2016). Health and health-related indicators in slum, rural and urban communities: a comparative analysis. *Global Health Action*, 9(1), 33163.

Moshiri, S. (2022). The effects of the energy price reform on households' consumption in Iran. *Energy Policy*, 79, 177-188.

Ndong Ntah, M., Nechifor, V., Ferrari, E., Nandelenga, M. W., & Yalew, A. W. (2024). The impacts of Russia's invasion of Ukraine on the Kenyan economy: Evidence from an economy-wide model. *African Development Review*.

Ngepah, N. (2023). *Food security effects of food and agricultural inputs trade shocks from the Russia-Ukraine region in South Africa and Mozambique: Exploring the roles of the Maputo Corridor, SADC, and Continental Sources*. AERC Working Paper IWU-CC-003.

Njenga, M., Gitau, J. K., & Mendum, R. (2021). Women's work is never done: Lifting the gendered burden of firewood collection and household energy use in Kenya. *Energy Research & Social Science*, *77*, 102071.

OECD. (2021). *SIGI 2021 regional report for Africa*. Paris: OECD.

Ozturk, O., & Faizi, B. (2023). The Russia-Ukraine war, soaring food prices, and the Turkish economy: insights from computable general equilibrium. *Frontiers in Environmental Science*, 11, 1233233.

Paumgarten, F., Locatelli, B., Witkowski, E. T., & Vogel, C. (2020). Prepare for the unanticipated: Portfolios of coping strategies of rural households facing diverse shocks. *Journal of Rural Studies*, 80, 91-100.

Papadavid, P. (2023). The Russia–Ukraine war: selected economic impacts on African women.

Republic of Kenya. (2020). 2019 Kenya Population and Housing Census. Nairobi: Government Printer.

Republic of Kenya. (2023). *Kenya Time Use Report: Based on 2021 Kenya Continuous Household Survey*. Nairobi: Government Printer.

Sabarwal, S., Sinha, N., & Buvinic, M. (2010). How do women weather economic shocks? A review of the evidence. A Review of the Evidence (December 1, 2010). World Bank Policy Research Working Paper, (5496).

Schellekens, P., & Sourrouille, D. M. (2020). COVID-19 mortality in rich and poor countries: a tale of two pandemics? *World Bank Policy Research Working Paper*, (9260).

Shupler, M., Mwitari, J., Gohole, A., de Cuevas, R. A., Puzzolo, E., Cukic, I., … & Pope, D. (2021). COVID-19 impacts on household energy & food security in a Kenyan informal settlement: The need for integrated approaches to the SGDs. *Renewable and Sustainable Energy Reviews*, 144, 111018.

Shupler, M., O'Keefe, M., Puzzolo, E., Nix, E., de Cuevas, R. A., Mwitari, J., … & Pope, D. (2021). Pay-as-you-go liquefied petroleum gas supports sustainable clean cooking in Kenyan informal urban settlement during COVID-19 lockdown. Applied Energy, 292, 116769.

Stojilovska, A. (2020). Energy poverty in a subsistence-like economy: The case of North Macedonia. *In Perspectives on energy poverty in post-communist Europe* (pp. 99-116). Routledge.

Tran, V. Q. (2015). Household's coping strategies and recoveries from shocks in Vietnam. *The Quarterly Review of Economics and Finance*, 56, 15-29.

United Nations Conference on Trade and Development. (2022). *The impact of trade and development of the war in Ukraine*. UNCTAD rapid assessment.

UN Women. (2024). *Gender Pay Gap and Labour-Market Inequalities in Kenya*. United Nations

World Bank. (2024). *World Development Indicators 2024*. Washington, DC: The World Bank. Retrieved from https://datacatalog.worldbank.org/dataset/world-development-indicators

Xu, Y., Delius, A. J. S., & Pape, U. J. (2022). *Gender Differences in Household Coping Strategies for COVID-19 in Kenya.* World Bank.

Yusuf, A. A., & Resosudarmo. B. P. (2008). Mitigating distributional impact of fossil pricing reform: The Indonesian experience. *ASEAN Economic Bulletin*, 25(1), 32-47.

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