

BASELINE SURVEY REPORT

Background Information

The SCODE-MECS e-cook baseline survey was carried out in two communities, Mbaruk and Echariria in Nakuru County. The two communities were sampled purposively because they comprised of vulnerable communities that had been earmarked for transformation through the e-cook project that aimed at providing affordable and clean convenient source of cooking energy. To effectively achieve this, a baseline survey was conducted to understand the prevailing situation on the ground. Primary data was collected through semi-structured questionnaires administered by trained enumerators.

To effectively carry out the process, sixteen enumerators were recruited with priority given to the locals who were qualified. Training of the recruited enumerators went on for two days (on 6th and 7th August, 2019). This entailed going through the paper questionnaire on the first day and pairing the enumerators in groups of two for role play on the morning hours of the second day. After the role play, the team shared their experiences and where necessary appropriate guidance was provided by the team of trainers. In the afternoon, the team was taken to the community in the vicinity of Sustainable Community Development Services (SCODE) for pre-test to get a preamble of what could happen during the actual survey. The actual field survey began on 08/08/2019 to 13/08/2019. Since the households existed in organized residential blocks, a systematic random sampling technique was employed and data collected from 516 households (n= 244 from Mbaruk and n= 272 from Mogotio). After the completion of the household survey, a focus group discussion was then organized and conducted simultaneously in the two study areas on 16/08/2019.

Five data clerks were then recruited to assist in the entry of the data. The data clerks were trained for one day on how to enter data through Statistical Package for Social Sciences (SPSS) version 20.0. The data entry process took four days (22/08/2019 to 26/08/2019). Data was then cleaned and analyzed in SPSS (v. 20.0), Stata (v.15) and MS excel.

Results and discussion

This section presents and discusses the findings of the survey and is divided into two major sections. The first section presents the descriptive statistics for the socio-economic and

institutional characteristics of consumers based on their willingness to for the Direct Solar Electric Pressure Cooker (DSEPC) while the second section presents results of the Probit model on factors influencing consumers’ willingness to pay for the DSEPC.

Descriptive Statistics

Table 1 presents results of the household head’s main occupation, age, gender, average monthly income, group membership and distance to the source of fuel.

Table 1: Consumer’s household and institutional characteristics

Location	Variable						
	Age (years)	Gender		Schooling years	Monthly income (KES)	Group membership	Distance to source of fuel (Km)
		Male	Female				
Mbaruk	49.84	67.62%	32.38%	8.37	7896	69.67%	1.05
Mogotio	42.98	71.32%	28.68%	7.78	7415	51.47%	2.23

The average age of the household heads in Mbaruk was approximately 50 years while that of heads in Mogotio was 43 years. Majority of the households in the study areas were male headed with 67.62% and 71.32% of the households in Mbaruk and Mogotio respectfully headed by male. However, more households in Mbaruk (32.38%) were female headed as compared to those in mogotio (28.68%). On average, household heads in Mbaruk had slightly higher number of schooling years (8.37) as compared to those in Mogotio (7.78). However, depending on the level of education, majority of the household heads in the study areas had attained primary level of education while only 4.1% of the heads in Mbaruk and 2.2% in Mogotio had attained college education.as presented in Figure 1.

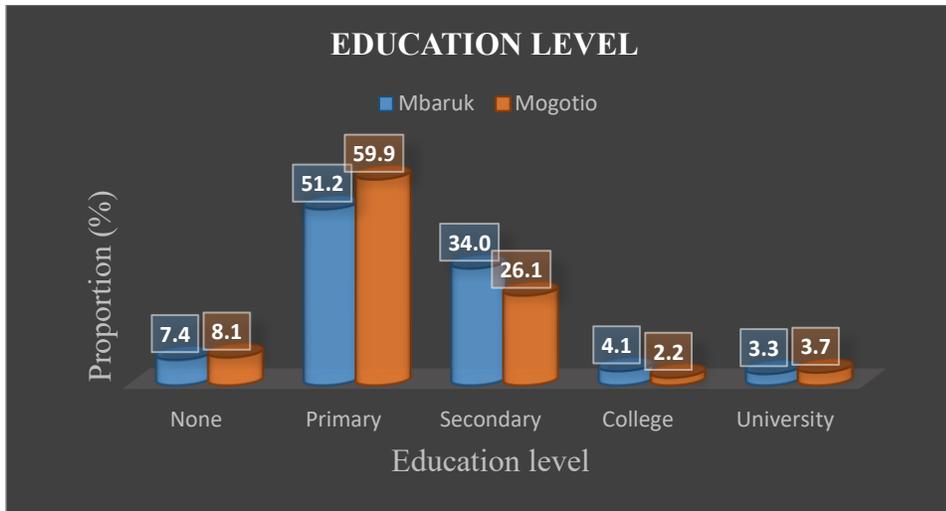


Figure 1: Education level

The average monthly income of the household heads in Mbaruk was KES 7896 and KES 7415 in Mogotio. The closeness in income could be attributed to the similarity in the main activities undertaken in the two areas with majority of the heads (47.5% in Mbaruk and 47.4% in Mogotio) relying on farming as their primary income generating activity as presented in Figure 2.

On group membership, more than half of the households in the study areas were affiliated to social groups. However, the findings as presented in Table 1 indicate that more households from Mbaruk (69.67%) had at least one member of the household belonging to a social group as compared to 51.47% in Mogotio. Groups are cardinal channels through which information on new technologies can be transferred to communities and may also facilitate the access to financial services among members which could be pertinent in subsequent adoption of innovations (Ndunda and Mungatana, 2013). Regarding the distance to the primary source of cooking fuel, households in Mbaruk on average travel for 1.05 Km while those in Mogotio travel for 2.23 Km to get their cooking fuel. Long distance to the source of fuel may translate in difficulties experienced by consumers in accessing basic amenities that could imply low social welfare of the community. Provision of alternative and convenient source(s) of cooking energy is paramount in reducing the strain that the communities are going through, hence higher willingness to pay.

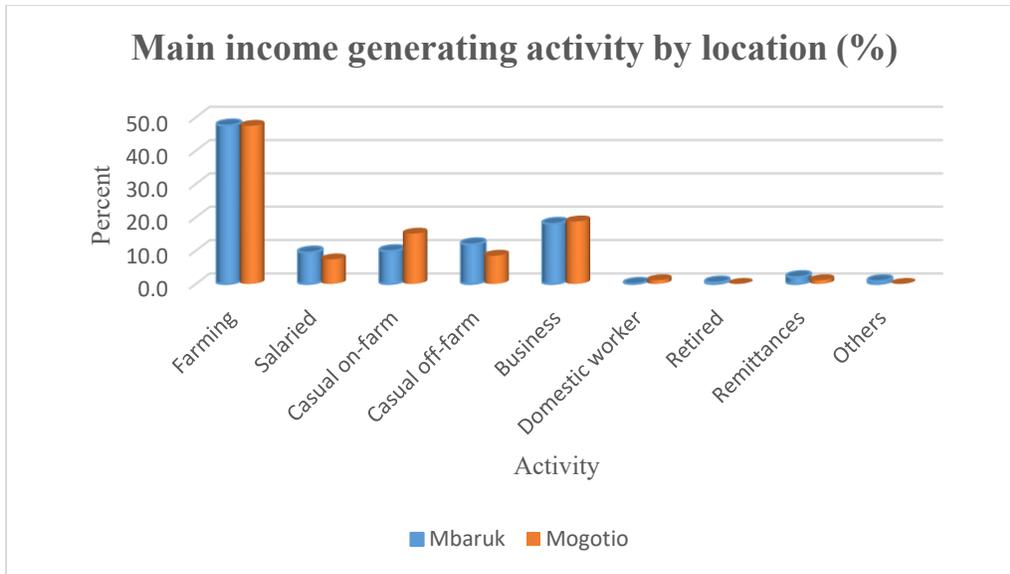


Figure 2: Consumers' main occupation

Regarding the source of information for the residents in two locations, the majority of them (87.3% in Mbaruk and 88.2% in Mogotio) reported to rely on local radio stations for updates on emerging issues in their areas and beyond as presented in Figure 3. This was followed by Television in Mbaruk at 44.3% and government officials at 21.7%. This indicates that radio, T.V and government officials are the major channels that can be utilize in passing across targeted information to the residents of Mbaruk and Mogotio.

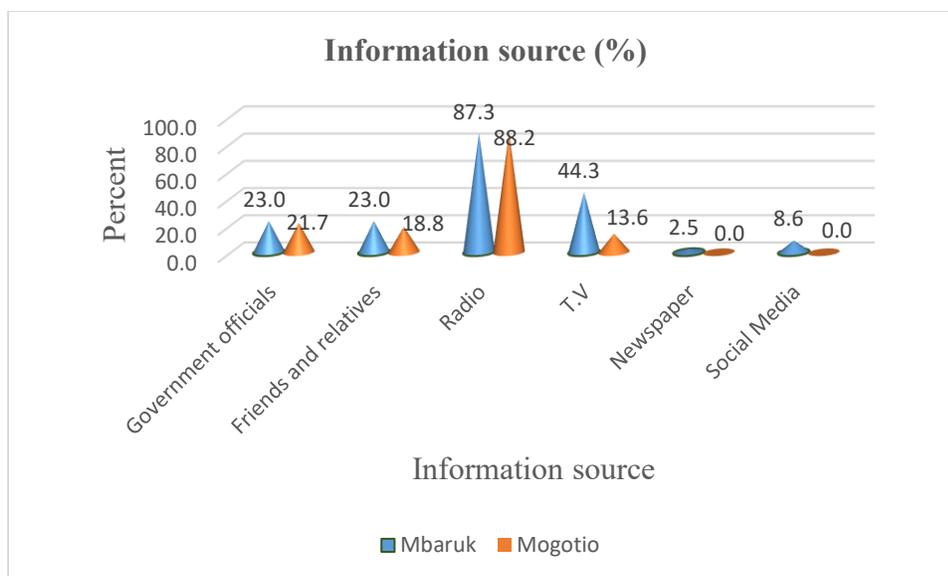


Figure 3: Information source

Table 2: Inferential statistics for categorical variables

Variable	Description	Willing to pay	Not willing to pay	<i>Chi Square</i>
Gender	Male	66.19	83.33	11.6440***
	Female	33.81	16.67	
Health Issues	No	53.33	82.29	27.0331***
	Yes	46.67	17.71	
Location	Mbaruk	51.67	28.13	17.3734***
	Mogotio	48.33	71.87	
Energy source	Electricity	22.86	12.50	9.9064**
	Solar	31.67	25.00	
	Both	1.90	2.08	
	Others	43.57	60.42	

The Chi square statistics indicates that there was a statistical difference between household heads' gender and their willingness to pay for the DSEPC at 1% level of significance. As presented in Table 2, more male-headed households (66.19%) were willing to pay for the DSEPC as compared to the female-headed households (33.81). According to FAO (2011), the gender of the household head in Africa and other developing countries affects access to credit, land, extension services, and other productive resources, an aspect that could make male-headed households to readily adapt new innovations and technologies. Furthermore, male-headed households as asserted by Asfaw & Admassie, (2004); Temesgen *et al.* (2009), are often considered to be more likely to get

information about new technologies as compared to their counterparts, an aspect that enables that to readily take risky ventures.

There was a significant statistical difference in willingness to pay between households that reported to be affected by health issues related to cooking and those that reported no incidences of health issues at 1% significance level. In terms of location, there was a significant difference in the willingness to pay for the DSEPC between residents of Mbaruk and those Mogotio at 99% confidence interval. The residents of Mbaruk were slightly more willing to for the DSEPC (51.67%) as compared to their counterparts in Mogotio. Also, there was a significant difference between household's main source of energy and their willingness to pay for the DSEPC at 5% significance level. From the descriptive statistics, households that did not have solar or electricity energy were more willing to pay for the DSEPC at 43.57% as compared to their counterparts with solar and electricity.

Table 3: Inferential statistics for continuous variables

Variable	Willingness to pay	Mean	Std. Dev	<i>t-stat</i>
Age	No	46.92	14.17	0.5284
	Yes	46.07		
Household Size	No	5.55	2.54	0.2265
	Yes	5.49		
Schooling years	No	6.97	3.86	-3.0934***
	Yes	8.31		
Children Under 5 years	No	4.58	1.54	-4.0074***
	Yes	9.74		
Disabled members	No	0.10	0.34	-1.7847**
	Yes	0.70		
Members with Health Issues	No	0.30	0.96	-4.2454
	Yes	0.76		
lnlogIncome	No	8.51	0.81	-1.3102*
	Yes	8.63		
Time to get fuel	No	85.38	73.90	-1.9143**
	Yes	105.94		
Fuel cost	No	1543.37	1295.68	-2.0280**
	Yes	2749.59		
Main Occupation	No	2.65	1.93	-0.5156
	Yes	3.01		

Note: *, ** and *** denote significant at 10%, 5% and 1% level respectively

There was a significant association between consumers' number of schooling years and their willingness to pay for DSEPC at 1% significance level. The mean number of schooling years for those who were willing to pay was 8.31 while that of those who were not willing to pay was 6.97. A plausible explanation for this could be that, consumers with more years of schooling are likely to be aware of the problems associated with traditional fuels, hence would be committed to getting any alternative that seeks to reduce or completely abate the associated risks. As argued by Anley et al. (2007), education increases an individual's ability to obtain, process and utilize information that could be relevant in the adoption of augmented technologies.

There was a statistical difference between the number of children below the age of 5 years and their willingness to pay for the DSEPC at 1% level of significance. as presented in Table 3, households that were willing to pay for the DSEPC had a mean 9.74 while those that were not willing to pay had a mean of 4.58. This could imply that having more children under the age of 5 is demanding and therefore, having a convenient source of cooking energy would be more welcomed. Besides, having children under the age of 5 years would imply cooking special meals for children besides the normal meals and this would require relatively faster and affordable sources cooking energy like the the DSEPC.

The t-test statistics also indicated that there was an association between a household having disabled member(s) and their willingness to pay for the DSEPC at 5% level of significance. Households that were willing to pay indicated a mean of 0.70 as compared 0.10 of those who were not willing to pay with regard to disabled members of the households. This could possibly imply the straneous nature of getting the traditional sources of cooking fuels.

The average time spent before getting the current source of fuel for those who were willing to pay for the DSEPC was 105.94 minutes compared 85.38 minutes for those who were not willing to pay. More time spent on searching for cooking fuel could translate to lower economic productivity of the households as credible time that could otherwise be used in productive activities like farming and business is spent in getting cooking fuel.

The average cost spent on fuel by households that were willing to pay was KES 2749.59 compared to KES 1543.37 spent by households that were not willing to pay for the DSEPC. This could be attributed to the higher costs that residents were incurring in cooking fuel. In

comparison to the expected monthly cost of the DSEPC in the initial phases, its more affordable to pay for the DSEPC.

Types of Fuels used in Mbaruk and Mogotio

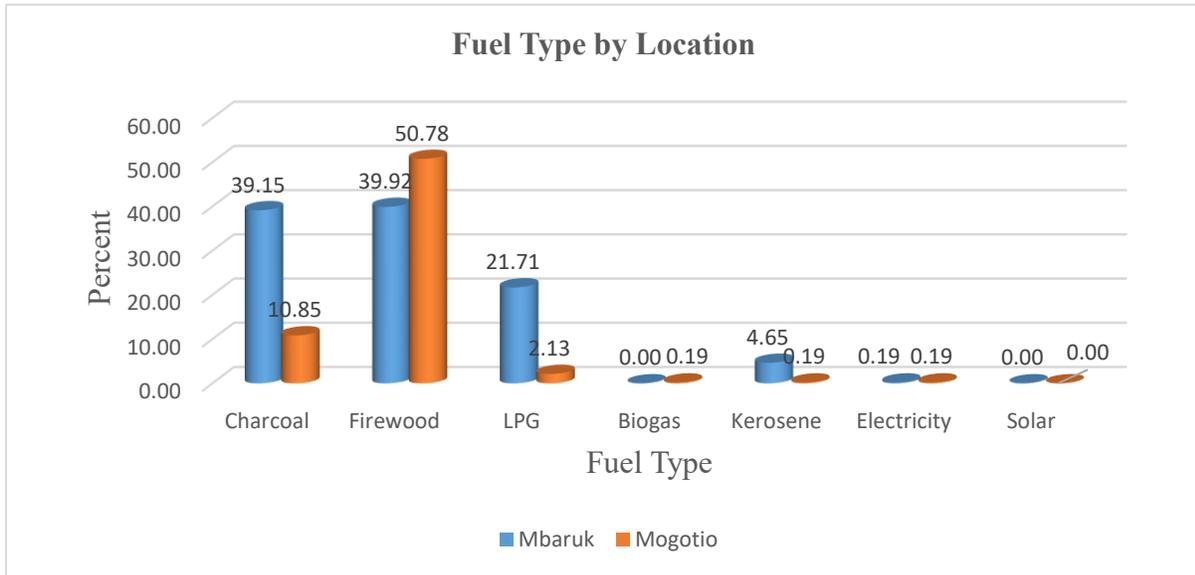


Figure 4: Types of fuel by location

As presented in Figure, firewood was the most used fuel at 50.78% in Mogotio and 39.92% in Mbaruk, followed by charcoal and Liquified Petroleum Gas (LPG) in Mbaruk at 39.15% and 21.71% respectively. In Mogotio, the second most used fuel was charcoal at 10.85% followed by LPG at 2.13%. Premised on the results, residents in Mbaruk were more diversified in terms of the number of cooking fuels as compared to their counterparts in Mogotio. The results indicate that the majority of the community members rely on traditional fuels as their primary and secondary sources of cooking energy which have been marked as significant contributors of household air pollution and degraders of the environment (Kumar & Mehta, 2016).

Monthly costs of mostly used fuels

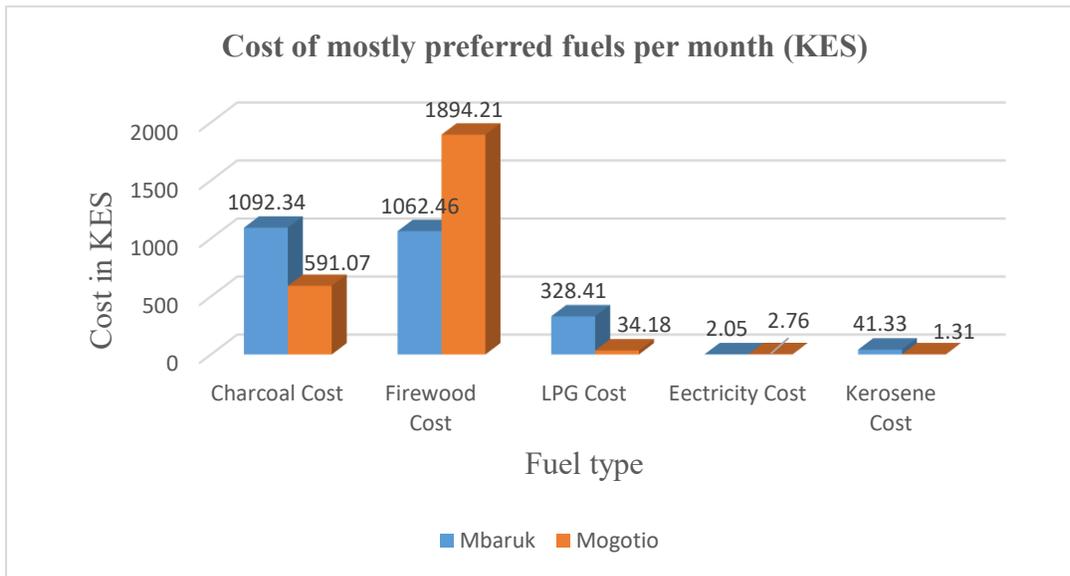


Figure 5: Monthly costs of mostly used fuels

The results presented in Figure 5 indicate that the average monthly cost of firewood alone was KES 1895 in Mogotio and KES 1063 in Mbaruk which translates to KES 473 (Mogotio) and KES 266 (Mbaruk) per week or KES 68 and KES 40 per day respectively. The average monthly cost of charcoal was KES 1093 in Mbaruk and 592 in Mogotio translating to KES 274 and KES 148 per week or KES 39 and KES 21 per day respectively. Therefore, the average total monthly fuel cost spent by residents in Mbaruk was KES 2530 and KES 2527 in Mogotio translating to weekly costs of KES 632.50 in Mbaruk and KES 631.75 in Mogotio or KES 90.36 and KES 90.25 per day respectively.

Frequently prepared meals

The frequently prepared meals were as presented in figure 6 with Ugali being cooked by everyone while indigenous vegetables (Managu) being frequently by only 9.6 of the residents in Mogotio and 4.9% of the residents in Mbaruk.

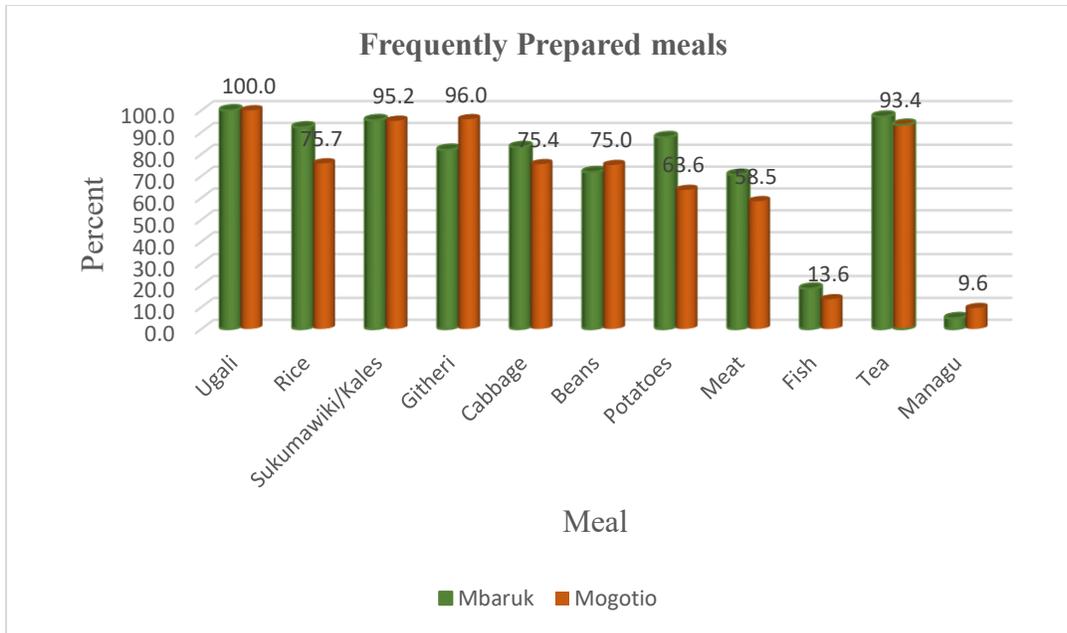


Figure 6: Frequently prepared meals

Source of cooking fuel

Majority of the residents in Mbaruk (67.21%) got their primary cooking fuel from timber yards or timber shops while those from Mogotio (59.56%) relied on Fetching from the forests or neighborhood farmlands. Only 9.43% of residents and 15.44% in Mogotio relied on hawkers for supply of the primary source of cooking fuel. This could be one of the plausible reasons why the average time spent in collecting cooking fuel was almost two hours as presented in Figure 8.

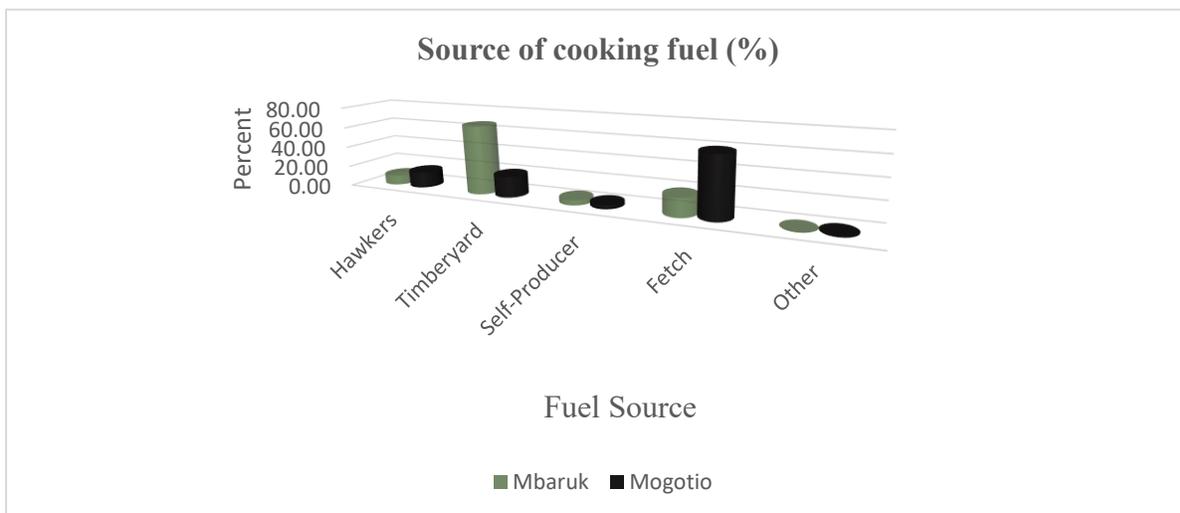


Figure 7: Source of cooking fuel

Average time spent getting cooking fuels

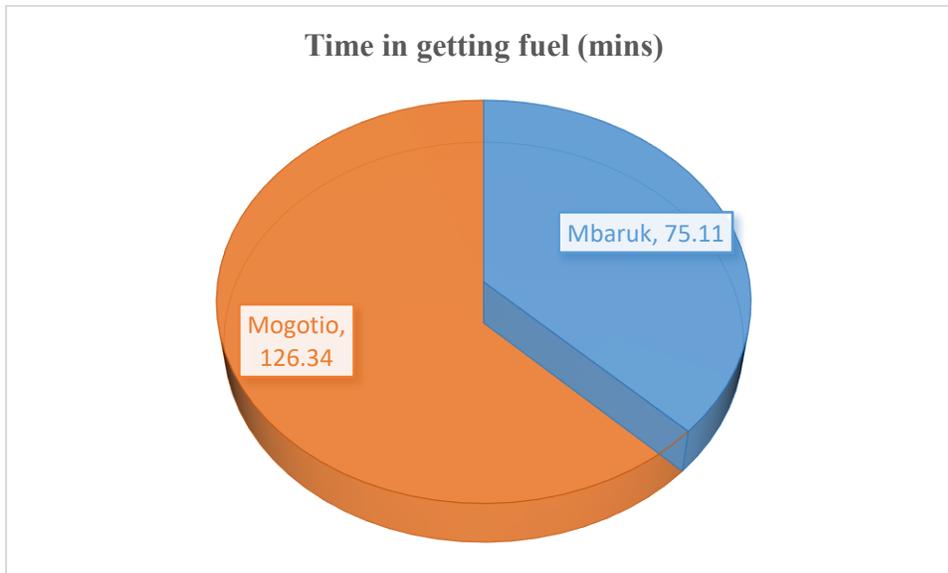


Figure 8: Average time spent getting cooking fuels

On average, residents in Mogotio approximately 126.34 minutes to get their main cooking fuel while those in Mbaruk spent approximately 75.11 minutes.

Average cooking time

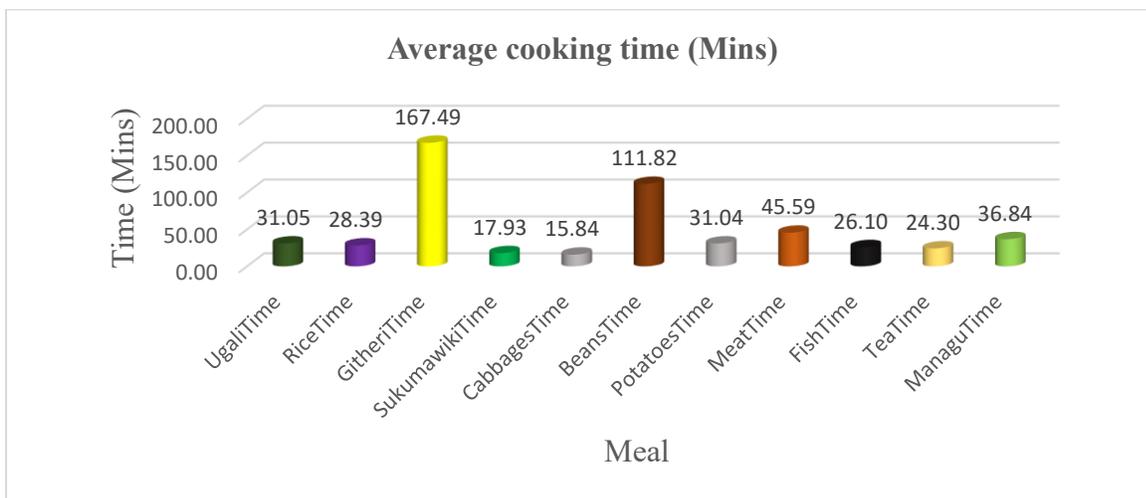


Figure 9: Average cooking time

The average time spent in cooking the mostly preferred meals in Mbaruk and Mogotio is as presented in Figure 9.

Direct Solar Electric Pressure Cooker (DSEPCU)

Adoption of DSEPC

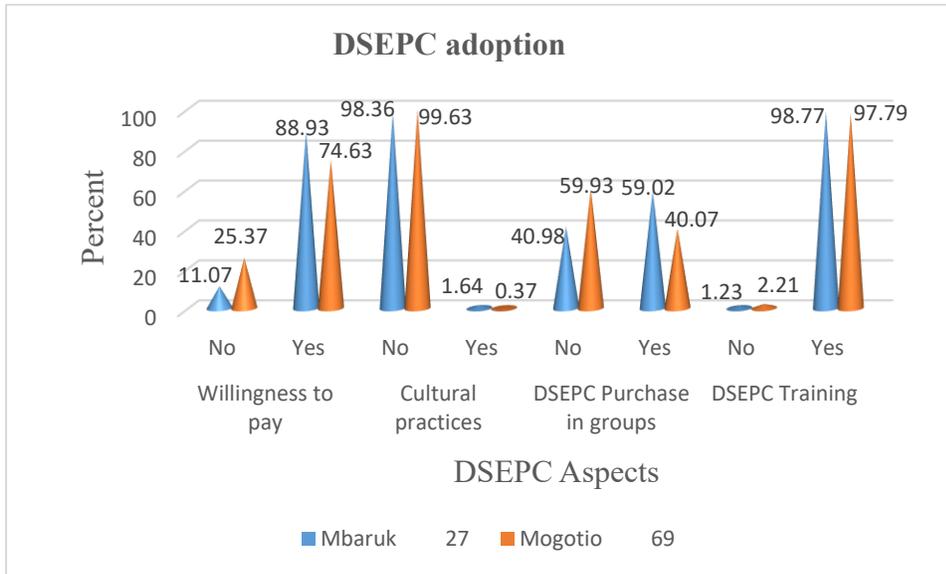


Figure 10: Adoption of DSEPC

Majority of the households were willing to pay for the DSEPC (88.93% from Mbaruk and 74.63% from Mogotio). With regard to DSEPC, only 1.64% in Mbaruk and 0.37% pointed out cultural practices that could hinder the adoption of the electric pressure cookers. They attributed this to the fact that they believed that certain meals like chapati and ugali could preferably be cooked on Jiko and three stones/rocket/chebukube cooking stoves for normal taste and texture for ugali and chapatti respectively. Majority of the households in Mogotio (59.93%) preferred to buy the DSEPC individually while those in Mbaruk (59.02%) preferred to buy the unit through groups. On DSEPC training, majority of households from both areas (98.77% in Mbaruk and 97.79% in Mogotio) indicated that it was important for them to be trained on how to use or operate the unit and its safety measures.

Expected price for the DSEPC

After explaining attributes of the DSEPC to the respondents, households in Mbaruk indicated that they were willing to pay KES 9138 while those from Mogotio were willing to pay KES 6992.

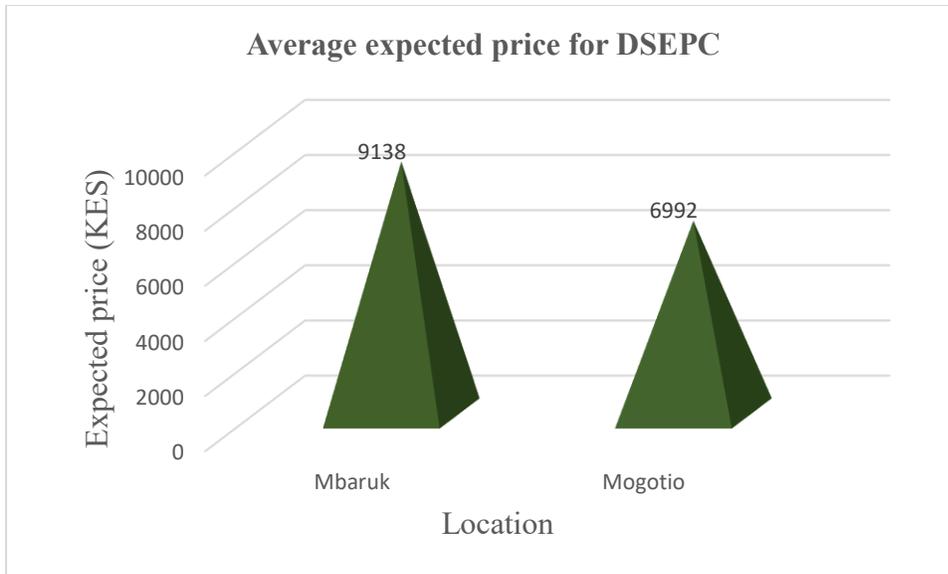


Figure 11: DSEPC expected price

Preferred attributes of the DSEPC

Majority of the households (64.9%) indicated that the most important they would consider before purchasing the DSEPC was its price, followed by durability of the DSEPC (63.7%), then the capacity of the pressure cooker (59.4%) especially those that had larger families and safety of the electric pressure cooker at 49.7% of the households.

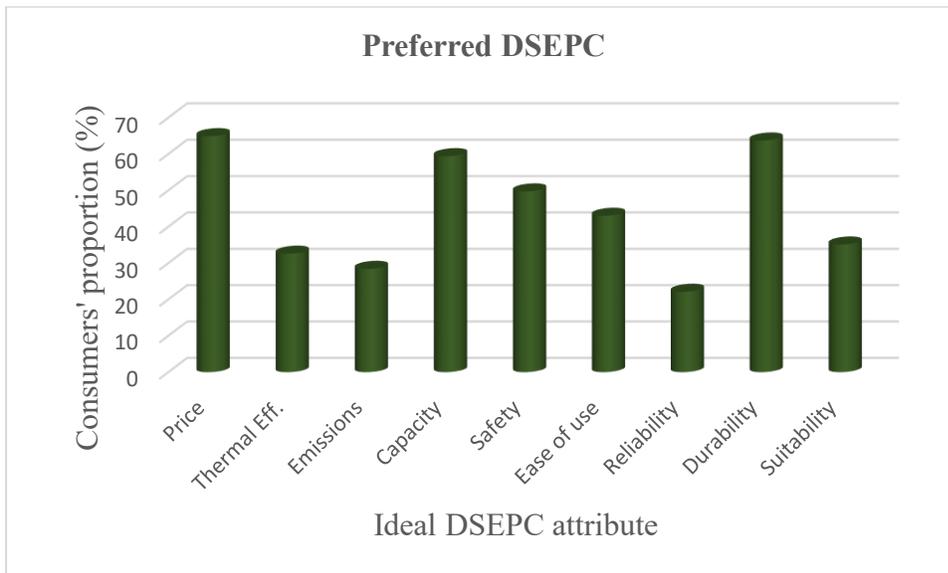


Figure 12: Preferred attributes of the DSEPC

Mode of payment for the DSEPC

The majority of the households indicated that their preferred mode of payment (82.8% in Mbaruk and 90.1% in Mogotio) was paying for the DSEPC through equal monthly installments. However, 7.8% and 3.7% of the households in Mbaruk and Mogotio respectively preferred to pay cash on delivery while 9.4% in Mbaruk and 6.3% in Mogotio preferred to pay for the DSEPC any time they had cash as presented in Figure 13.

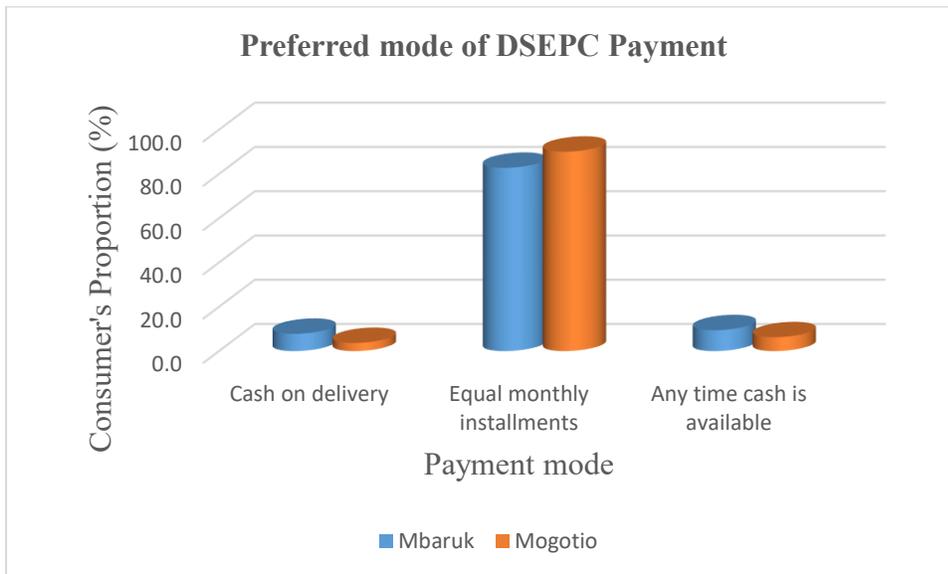


Figure 13: Mode of payment for the DSEPC

DSEPC ownership options

Majority of the households 61.48% in Mbaruk and 66.91% in Mogotio preferred the option of renting to own the DSEPC where they would be paying a given amount money for regular specified time intervals. This was followed by the buy and own option at 34.84% in Mbaruk and 23.16% in Mogotio where they would make payments either in installments or cash to have exclusive rights over the DSEPC unit. However, 3.69% of the households in Mbaruk and 9.93% in Mogotio preferred the option of paying a regular fee to use the DSEPC while it remains at the custody of SCODE until the final payment is made as presented in Figure 14.

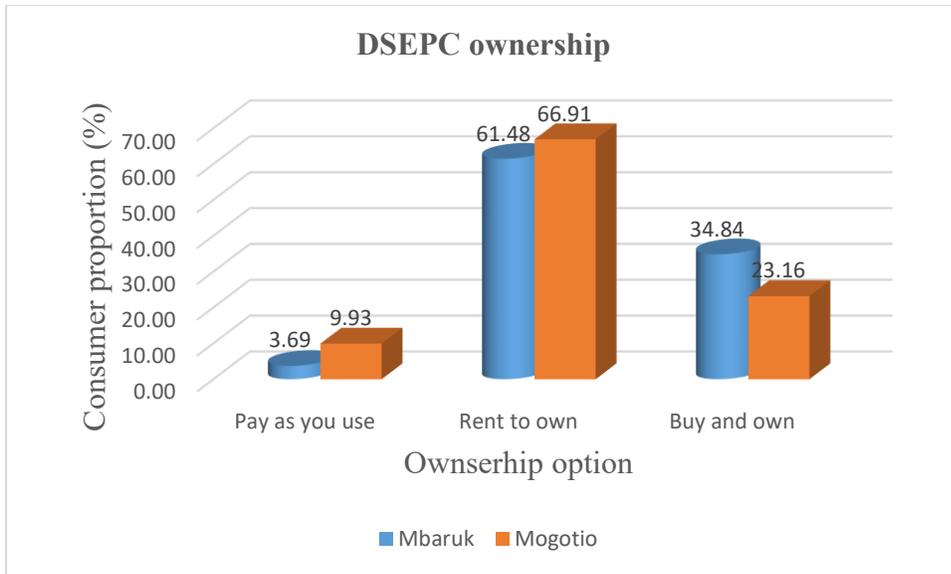


Figure 14: DSEPC ownership options

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