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INFLUENCE OF PROMOTERS INCENTIVES ON SOLAR ENERGY TECHNOLOGY UPTAKE BY REGISTERED WOMEN GROUPS IN MUMIAS WEST CONSTITUENCY, KENYA

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ABSTRACT

Focus of the study was to evaluate influence of promoters' incentives on solar energy technology uptake by registered women groups in Mumias West Constituency, Kakamega County, Kenya. The study used a descriptive survey research design on a population target of registered women groups' representatives. Data collection was done through structured questionnaires. Analysis of data was done by use of Statistical Package for Social Sciences (SPSS 23) in order to solve concerned information of descriptive and inferential content of the study based on descriptive statistics of (frequencies, percentages and means), correlation analysis, and regression analysis. The results revealed that the four promoters' incentives influenced solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County. The study concluded that capacity building, information provision, technology product variety and financial incentives have significant influence on solar energy technology by women groups in Mumias West Constituency, Kenya. This study recommended that there was need to set up solar energy centers around the country to offer information, capacity building and various products. The government should also set up a revolving fund that allows end users to pay for the technology in installments and hence increase the uptake of sustainable energy.

Key Word: *Capacity Building, Information Provision, Technology Product, Financial Incentives, Solar Energy*

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INTRODUCTION

The global development community launched the Sustainable Energy for All initiative in 2012, in order to accelerate sustainable energy access. This included sustainable energy as the 7th goal of the Sustainable Development Goals (SDGs). It is also recognized that sustainable energy access and gender equality (SDG 5) is a requirement for reaching most SDG's. These goals have multiplier effects and contribute towards reaching other SDGs, by improving livelihoods, health, education, and economic growth (Women's Entrepreneurship for Sustainable Energy, 2016). According to global gender and African alliance policy brief 2012, about 1.4 billion people worldwide lack access to electricity and about 2.7 billion people (40 % of the global population) rely on wood and charcoal as their primary source of energy. The report also claimed that women, continually face energy-related hurdles that include having to collect firewood, a practice that leads to time and labour wastage, scarcity of fuel, and health problems from burning and collecting wood.

Despite the gaps in research and evidence and the challenges of ensuring that improved energy access would ultimately benefit women, community should still advocate for increasing women's access to improved energy, while also calling for more research on the issue (Rebecca, 2017). Many surveys dealing with attitudes and values recognise high general acceptability concerning renewable energies, especially solar technologies. In the centre of current discussions about renewable energies are costs and subsidies. It was reported that for a broader implementation of renewable energy, acceptance is a crucial factor (Bernd , 2005).This is regardless of World Bank significant interests in the vitality part that is moderately of little extent, for instance, from 2000 to 2008, $164 million, or 4% of the World Bank's all out interest in energy access ventures, along these lines drawing in ladies in the supply of power and thought process vitality can expand their welfare yet the proof is rare (Gunnar *et al*, 2012). There is an unmistakable requirement for thorough examinations to distinguish key plan components to getting benefits for ladies in energy supply.

Though there exist little to no literature on women solar energy uptake in Kakamega county, it is common knowledge that women are primary household energy managers in most developing countries. A field-study from Western Kenya (IFAD/FAO, 2003) showed that women often spend two to five hours each day on collecting firewood, and that women in female-headed households in several villages' listed water and firewood collection among their most time consuming tasks. Women are responsible for providing lighting, heating and cooking in households and oversee the smaller, daily household energy transactions. Women entrepreneurs are uniquely positioned close to women to effectively reduce customer acquisition and customer repayment risks of decentralized energy projects in emerging markets (WESE, 2016). Women in Entrepreneurship for Sustainable Energy have enormous potential to manage supply chain and acquire new customers in rural areas, thus driving down the cost of customer acquisition as women are not constrained by cultural norms when interacting with other women.

Several contributing factors such as cheap technology for solar panels, a copious supply of solar panels, and the unsteady nature of both hydro and wind power generation has seen positive uptake of solar energy in Kenya. Kenya has become a world leader in the installation of solar energy technologies with more Kenyans turning to solar energy. Solar adoption in the Country is mainly for PV systems which are utilized in household lighting, water heating, drying and telecommunication. Manufacturing companies have also taken up solar energy lighting to counter the cost of power and to help mitigate the instability that comes with power outages (Nganga, Wohlert & Woods, 2013).

The Kenyan Government has played and continues to play a big role in advancement of the use of solar energy. It has waived import duty and zero-rated Value Added Tax for renewable energy equipment

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and accessories. Further, it aims to keep on increasing the factors of production. A study done by ERC in 2015, estimated the total megawatts produced in the solar sector to be over 20 with an expected growth of 15% annually. The Kenya Government aim is to have the sector producing 600 MWp by 2030 (Omondi, 2018).

The sector has also seen the emergence of a number of innovative products. One such is the M-KOPA project to enable more and more Kenyans embrace solar energy. Its basic model is to make solar power products affordable to low income households through a 'pay-per-use' instalment plan. With the input from the government, the private sector and also the innovations being made in the sector, solar energy is indeed the next frontier in Kenya's renewable energy sector (Mehta & Becker, 2016).

Statement of the problem

Energy entrepreneur is one who supports the energy area by delivering, handling, appropriating and selling energy or vitality assets (Clancy, Oparaucha & Roehr, 2004). Batliwala *et al*, (2004) contends that women are great competitors to be effective energy business people. In country zones, women who live there, comprehend neighbourhood needs and know nearby conditions and thus can sell more viably to other women. This is upheld by Rebecca (2017), who presumes that more research on whether and how improved energy access prompts a decline in time/drudgery, well being/physical, and data/correspondence troubles, further effectiveness for money producing exercises, more opportunities in the formal economy, and an expansion in training and education for women and young women. As indicated by Rebecca (2017), the issue of fragmented data on energy entrepreneurs and group of women on solar oriented energy implies that there is a genuine requirement for the scholarly network to focus on understanding the energy needs of women and the effects on them to guarantee that energy access ventures advantage them to the furthest reaches. Based on energy related literature above, women groups or associations have limited information especially on promoters of energy production, processing, distribution and selling solar energy in Mumias West Constituency, of Kakamega County. As such many scholars admit that research on women's and girls' energy use needs, and benefits, including their energy poverty burdens, is lacking. Specifically, the role of energy in women's microenterprises and groups is not well researched. Experiences in Kenya suggest that women entrepreneurs also face greater discrimination than men in the form of delays in obtaining electrical connections and the expectation that they would pay bribes for these services making it hard for them to access energy (GGCA, 2012). Above research findings shows knowledge gap on solar energy research as such there is still room for building up empirical evidence on energy access and women and girls (The Energy and Environment Partnership Programme Southern and East Africa report, 2017). This research therefore sought to fill this knowledge gap and inform both policy and academics on the influence of promoters' incentives on solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County, Kenya.

Objectives of the Study

The general objective was to investigate the influence of promoters' incentives on solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County, Kenya. The specific objectives were;

- To examine the influence of capacity building on solar energy technology uptake by women groups in Mumias West Constituency, Kenya.
- To find out the effect of information provision on solar energy technology uptake by women groups in Mumias West Constituency, Kenya.
- To examine the influence of technology product variety on solar energy technology uptake by women groups in Mumias West Constituency, Kenya.
- To determine the influence of financial incentives on solar energy technology uptake by

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women groups in Mumias West Constituency, Kenya.

The research hypotheses were;

- $H0_1$: There is no significant relationship between capacity building and solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County, Kenya
- $H0_2$: There is no significant relationship between information provision and solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County, Kenya.
- $H0_3$: There is no significant relationship between technology product release and solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County, Kenya.
- $H0_4$: There is no significant relationship between the financial incentives and solar energy technology uptake by women groups in Mumias West Constituency, Kakamega County, Kenya.

LITERATURE REVIEW

Diffusion of Innovation Theory (Roger, 1960)

Diffusion of Innovation Theory which has been widely applied by the researchers over the years can be traced back to the epic work by Everett Roger's in 1960. The theory was based on four main elements that influence the spread of a new idea: the innovation, communication channels, time and social system. The process of diffusion was made up of five stages, namely, knowledge, persuasion, decision, implementation, and confirmation and results in six user categories namely innovators, early adopters, early majority, late majority, laggards and the leap froggers. The theory could be depicted as shown in the diffusion innovation theory provided the concept of S-shaped curve of adoption which was also called as the epidemic model of adoption (Lai, 2017).

According to the theory, rate of spread was initially slow. In the mid-range of the graph, the rate of spread accelerated upwards and finally the rate of spread tapered off resulting in an S-shaped curve. The reason behind the S-shaped curve was that the innovation has to come from outside the boundaries of the social system initially, and as such the numbers of people who are exposed to the innovation were few in the beginning. As these people in the social system started accepting the innovation, they brought it in contact with more and more people. Therefore, the rate of spread kept on increasing. Finally, the innovation was accepted by most members of society and the rate of spread decreased. With there being no more members left to accept the technology, the spread stopped completely. This study is thus anchored on this theory as it would be looking to explore incentives offered by promoters on uptake of solar energy technology by registered women groups in rural settings (Rajesh & Mishra, 2014).

Actor-Network Theory for Development

Theory of Actor-network theory rose up out of the field of science and innovation contemplates during the 1980s, especially connected to and crafted by three scholars; Michel Bruno & Law (2007). Taking the name first, this theory attempts to see how systems of entertainers' structure function. Systems unite entertainers with normal interests, and those on-screen characters would not be limited to human people. The thought of 'on-screen character' was more heterogeneous than that: it could cover collectivises of people (gatherings, associations), it could cover non-people (creatures, machines, plants, reports), and it very well might be contended to cover the elusive (establishments, thoughts). To attempt to get away from the ordinary relationship of the word 'on-screen character' with people, 'act ant' had once in a while been liked.

There are different manners by which various types of systems could be ordered however an especially valuable, however rather little-utilized structure from this was worldwide versus nearby systems (Law & Callon, 1992). This sees activities, for example, a task, associated with two fundamental kinds of system: a worldwide system that was

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basically outside the venture with on-screen characters that gave the space and assets (cash, mastery, and political help) for the undertaking to occur; and a nearby system of entertainers which really execute the task. This had a specific worth since it gave a clarification to direction – for example the achievement or disappointment of an undertaking – in view of the quality of the worldwide and nearby systems and the capacity to make a solid, single purpose of section between the two.

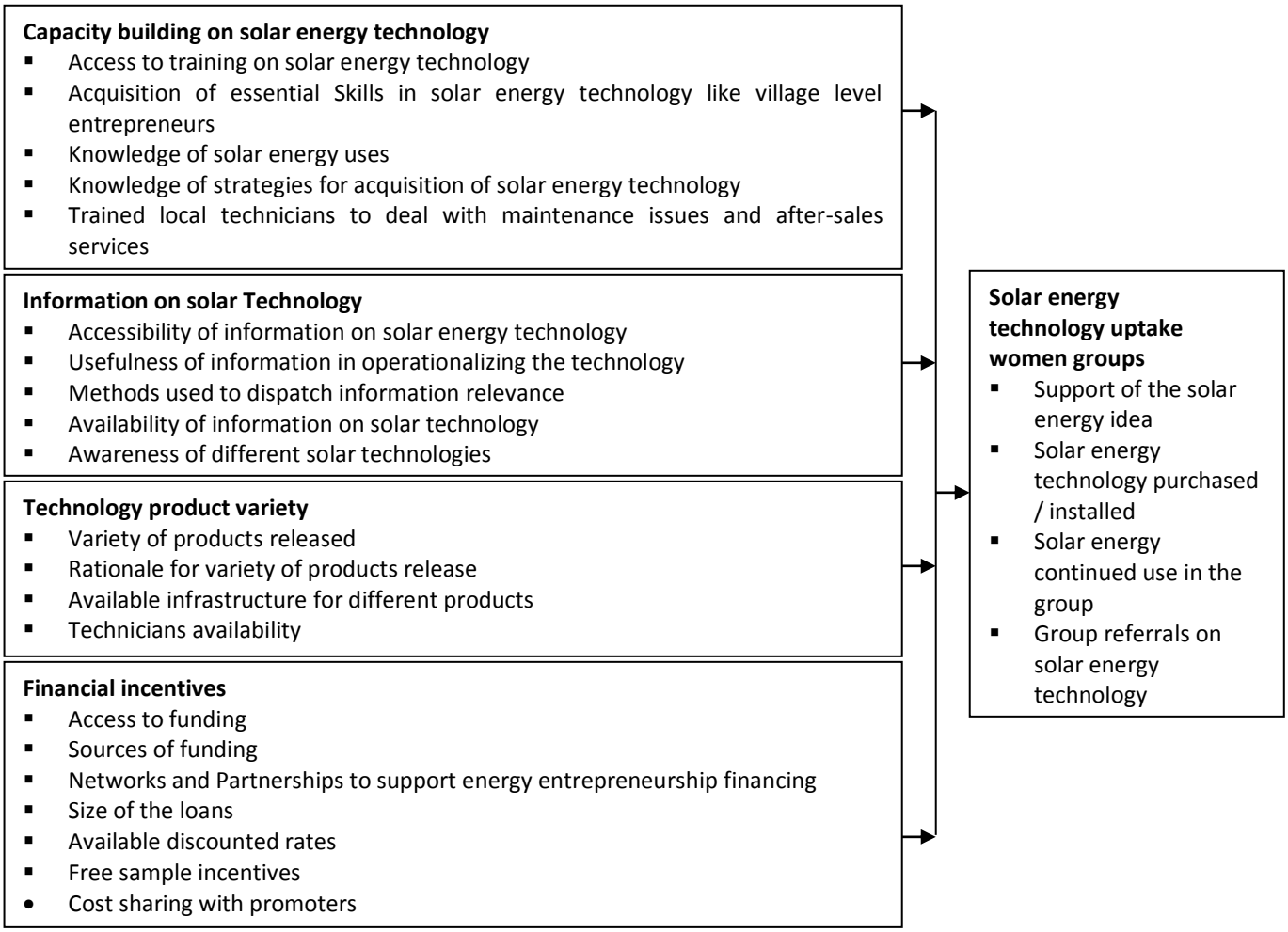

Figure 1: Conceptual Framework

Empirical Review

Capacity building along the off-grid renewable energy value chain is vital for long-term operation and sustainability of the systems, and as such it is valuable to engage local capacity and invest in skills development. These skills range from the technical (involving installation, operation and maintenance) to business-related (including accounting, bookkeeping, product design and pricing, and business plan design). Non-energy-related skills, such as leadership training and digital literacy, were also becoming crucial (IRENA, 2019). The report also informed that training opportunities were often not equally accessible by men and women with reasons related to cultural and social norms, that discourage women in the household from attending/continuing the training, or from working after completing the training (EEP, 2017).In 2015, ENERGIA and the Asian Development Bank conducted a project on improving gender inclusive access to clean and build renewable energy in Bhutan, Nepal and Sri Lanka. The data collected provided insight on how

training and capacity building for community energy programmes could empower women across different dimensions. It also showed the form of empowerment that could be taken, such as changes in women's decision-making abilities in relation to men and the amount of time spent on unremunerated domestic work (Clancy *et al*., 2016; IRENA, 2019)

Bernd *et al.*, (2016), in the research titled Study on Acceptability of Photovoltaic with Special Regard to the Role of Design, States that while renewable energies enjoy a comparatively high acceptability in general, there still appeared to be a significant lack of knowledge concerning a lot of important issues like functioning, ecological and technological aspects, their role in a future energy system and their role as climate-protecting technologies. Better knowledge about these issues could lead to an increase of acceptance. It needed to be considered that each single category of renewable energy, like solar, wind, biomass, and water had its own distinctive profile regarding acceptance. It was concluded that it was therefore obvious that lack of knowledge lead to lower acceptance and that the degree of education, information, and ultimately the individual knowledge about renewable energies influences its acceptance.

According to the EEP report (2017), Women are important contributors in the energy value chain, particularly in the sales force. Given that women are the target beneficiaries of sustainable energy solutions, such as clean cooking stoves and biogas solutions, women could provide valuable inputs in the design, manufacturing, sales and distribution of these products. Survey findings related to gender representation in energy projects revealed that 34% of projects had a 50% and above female workforce. Gender and Africa Climate Policy brief 2012, suggested that gender-based constraints related to access to energy, finance, training, employment and entrepreneurship needed to be better studied and addressed. As such, policies including both women and men in the development stage may help support more equitable access to electricity (grid and off-grid) and involve women in the design and production of locally appropriate energy technologies (EU, 2012).

Renewable energy solution face a number of challenges in rural markets, and particularly various budgetary boundaries repress its selection. Money related incorporation was the way toward guaranteeing access to budgetary administrations, opportunity and sufficient credit to ladies at a reasonable expense. On the interest side, low salary levels and the absence of access to formal loaning associations mean lower reasonableness and lower purchasing limits by ladies. On the supply side, ladies business visionaries, who could loan important market infiltration, think that it was difficult to set up and run a vitality based framework gainfully because of constrained or no entrance to capital or surprising expenses of raising this capital. It is profitable to empower microfinance organizations officially chipping away at reinforcing ladies' systems to give limit building inputs explicit consideration on 'sexual orientation' during gathering configuration, preparing, and support. (Bigsna *et, al*., 2015). FAO, 2006 report on energy suggested that possible solutions involved the organization of ad hoc (specialised) financing institutions, and mechanisms for aggregating demand. Micro-financing programmes were specifically targeted to women, with the aim of providing small amounts of funding for short-term working capital, flexible and longer repayment schemes and structured in small and frequent intervals.

METHODOLOGY

This study used descriptive survey design which involved collecting data of the answered questions about the respondents of the study. Target population consisted of all registered women groups' representatives in Mumias West Constituency as provided by the Department of Social Services, Ministry of Labor and Social Protection, Kakamega County. Since the target population was 283 respondents, sample of 165 respondents was used in the study based on Krejcie

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and Morgan formula for determination of sample size of research activity. The researcher used close ended (structured) questionnaires to collect primary data from leaders of women groups who are involved in solar energy technology adoption in Mumias West Constituency, Kakamega County, Kenya. Data was collected by self-administered questionnaire.

FINDINGS

The presentation of descriptive statistics was based on the frequencies, percentage, mean and standard deviation of study variables. These variables were capacity building, information provision, technology product variety and financial incentives which were independent variables while solar energy technology uptake was dependent variable. The respondents were asked to indicate their level of agreement as 1 strongly disagree, 2-Disagree, 3-undecided, 4-agree and 5 strongly agree. The findings were as follows.

Capacity building

Capacity building variable was used in the first objective which sought to examine the influence of capacity building on solar energy technology uptake by women groups in Mumias West Constituency, Kenya. The results were presented in Table 1 in which percentages are presented outside brackets while frequency in the brackets. The agreement ranged from 1 strongly disagree, 2-Disagree, 3-undecided, 4-agree and 5 strongly agree. SDV is the standard deviation.

Table 1: Capacity building

	1	2	3	4	5	Mean	SDV
Capacity building and Training in solar energy technology assist in adoption of solar energy technology	9.4(13)	13(18)	35.5(49)	36.2(50)	5.8(8)	3.16	1.041
Group has been trained in solar energy technology.	9.4(13)	13(18)	40.6(56)	29(40)	8(11)	3.13	1.052
Group members have acquired entrepreneurial skills in solar energy technology	5.8(8)	15.2(21)	31.9(44)	34.1(47)	13(18)	3.33	1.069
Group members have knowledge of different solar energy providers	7.2(10)	26.8(37)	39.1(54)	23.9(33)	2.9(4)	2.88	.952
Group members understand the legal framework for acquisition of solar energy	4.3(6)	20.3(28)	24.6(34)	40.6(56)	10.1(14)	3.32	1.046
The groups have local technicians to deal with maintenance and installation issues	10.1(14)	16.7(23)	15.9(22)	47.1(65)	10.1(14)	3.30	1.169
Overall mean						**3.19**	

From Table 1, it was clear that 36.2% of the respondents agreed that Training and capacity building in solar energy technology assist in adoption of solar energy technology and additional 5.8% of the respondents strongly agreed. A mean of 3.16 suggested that Training and Capacity building in solar energy technology is essential in adoption of solar energy technology. From the results 29.0% of the respondents agreed that their groups had been trained in solar energy technology while additional 13.0% strongly agreed having a mean of 3.13. Significant standard deviation implied that some groups did not train in solar energy technology.

In regard to entrepreneurial skills, 31.9% of the respondents were undecided. However, 34.1% of the respondents agreed to be having entrepreneurial skills and 13.0% strongly agreed that they have knowledge of different solar energy providers. Furthermore, 47.1% of the respondents agreed and 10.1% strongly agreed that groups have local technicians to deal with maintenance and installation issues. Lastly, 40.6% of the respondents agreed that they understand the legal framework

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for acquisition of solar energy while 10.1% of the respondents strongly agreed although 24.6% of the respondents were undecided with a mean of 3.32 with significant standard deviation of 1.046. A mean of 3.30 with a standard deviation of 1.169 indicated that not all groups have local technicians to deal with maintenance and installation issues.

Information provision

The second objective, which had the variable Information provision sought to find out the effect of information provision on solar energy technology uptake by women groups in Mumias West Constituency, Kenya. The results were presented in Table 2 in which percentages were presented outside brackets while frequency in the brackets. The agreement ranged from 1 strongly disagree, 2-Disagree, 3-undecided, 4-agree and 5 strongly agree. SDV means the standard deviation.

Table 2: Information provision

Statement	1	2	3	4	5	Mean	SDV
Promoters give women group access to information on solar energy technology	1.4(2)	2.2(3)	0(0)	23.9(33)	72.5(100)	4.64	0.734
Promoters information on solar energy is useful to group members when using the technology	2.9(4)	26.8(37)	31.2(43)	30.4(42)	8.7(12)	3.15	1.010
The method used to disseminate information is excellent as most members of women group are reached.	2.2(3)	13.8(19)	39.9(55)	32.6(45)	11.6(16)	3.38	0.937
The information is readily available and easy to access by group members	2.9(4)	23.2(32)	35.5(49)	26.8(37)	11.6(16)	3.21	1.021
Promoters inform group members of different solar technology available in the market currently	7.2(10)	13(18)	19.6(27)	50.7(70)	9.4(13)	3.44	1.107
Overall mean						**3.56**	

The finding in Table 2 meant that 72.5% of the respondents agreed that Promoters give their group access to information on solar energy technology and 23.9% of the respondents strongly agreed. With a mean of 4.64 meant that respondents agreed that promoters gave their group access to information on solar energy technology. However, 30.4% of the respondents agreed that promoters' information on solar energy was useful to group members when using the technology and 8.7% strongly agreed on the same. A mean of 3.15 indicated that some promoters' information on solar energy is useful to group members when using the technology. It was also revealed that 32.6% of the respondents agreed that the method used to disseminate information is excellent as most members of women groups are reached while 11.6% strongly agreed. A mean of 3.38 showed that the method used in disseminating information is not uniformly excellent as most members of their groups are not reached.

The results further revealed that 26.8% and 11.6% of the respondents agreed and strongly agreed respectively that the information is readily available and easy to reach. A mean of 3.21 implied that the information was not always readily available and easy to reach. Lastly, 50.7% and 9.4% of the respondents agreed and strongly agreed respectively that the promoters inform them of different solar technology available in the market currently. A mean of 3.44 implies that some of Promoters inform them of different solar technology available in the market currently.

Technology product variety

Technology product variety variable was used in the third objective which sought to examine the influence of technology product variety on solar energy technology uptake by women groups in Mumias West Constituency, Kenya. The results were presented in Table 3 in which percentage were presented outside brackets while frequency in the brackets. The agreement ranged from 1 strongly

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disagree, 2-Disagree, 3-undecided, 4-agree and 5 strongly agree. SDV is the standard deviation.

Table 3: Technology product variety

Statement	1	2	3	4	5	Mean	SDV
Women group members are aware of different varieties of products released	6.5(9)	15.2(21)	25.4(35)	37(51)	15.9(22)	3.41	1.125
Different products released to our members incorporate needs and designs of different members	4.3(6)	18.1(25)	8.7(12)	37.7(52)	31.2(43)	3.73	1.205
Promoters provide technical infrastructure that enable the use of different products they release	11.6(16)	18.1(25)	13.8(19)	42(58)	14.5(20)	3.30	1.252
We have technicians on solar energy technology	12.3(17)	23.9(33)	20.3(28)	36.2(50)	7.2(10)	3.02	1.181
Overall Mean						**3.37**	

From Table 3, 37.0% and 15.9% of the respondents agreed and strongly agreed that their group members were aware of different varieties of products released. A mean of 3.41 implied that respondents were undecided that their group members were aware of different varieties of products released. However, 37.7% of the respondents agreed that different products released to our members incorporate needs and designs of different members while 31.2% strongly agreed on the same with a mean of 3.73. This implies that there are different products released to our members incorporate needs and designs of different members.

On the other hand, 42.0% of the respondents agreed and 14.5% strongly agreed that promoters provide technical infrastructure that enable the use of different products they release. A mean of 3.30 suggested that some promoters provide technical infrastructure that enable the use of different products they release. Lastly, 36.2% and 7.2% of the respondents agreed and strongly agreed respectively that they have technicians on solar energy technology. A mean of 3.02 implied that not all groups have technicians on solar energy technology.

Financial incentives

Financial incentives variable was used in the fourth objective which sought to determine the influence of financial incentives on solar energy technology uptake by women groups in Mumias West Constituency, Kenya. The results were presented in Table 4 in which percentage were presented outside brackets while frequency in the brackets. The agreement ranged from 1 strongly disagree, 2-Disagree, 3-undecided, 4-agree and 5 strongly agree. SDV is the standard deviation.

Table 4: Financial incentives

Statement	1	2	3	4	5	Mean	SDV
Group members easily access funding for solar technology purchase	2.2(3)	22.5(31)	31.2(43)	38.4(53)	5.8(8)	3.23	0.938
Promoters are involved in sourcing for funds to purchase this products	5.8(8)	8.7(12)	15.9(22)	45.7(63)	23.9(33)	3.73	1.098
Group is exposed to different financial partners and networks for solar project funding	13.8(19)	13(18)	29.7(41)	27.5(38)	15.9(22)	3.19	1.253
Size of loans is always capable of purchasing the solar energy technology a member needs.	9.4(13)	13(18)	32.6(45)	36.2(50)	8.7(12)	3.22	1.086
Promoters offer solar energy products at a discounted rate	10.1(14)	15.2(21)	23.9(33)	39.9(55)	10.9(15)	3.26	1.155
Women Group has access to free sample incentives		2.2(3)	8.7(12)	42.8(59)	46.4(64)	4.33	0.728
Women group benefits from cost sharing on solar energy products with promoters	10.1(14)	10.9(15)	27.5(38)	37(51)	14.5(20)	3.35	1.163
Overall mean						**3.47**	

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Table 4 showed that 38.4% and 5.8% of the respondents agreed and strongly agreed respectively that there group members easily access funding for solar technology purchase. A mean of 3.23 implied that some group members easily access funding for solar technology purchase. On the other hand, 45.7% of the respondents agreed that promoters were involved in sourcing for funds to purchase these products while 23.9% strongly agreed with a mean 3.23. This implied that to a great extent, promoters were involved in sourcing for funds to purchase these products.

The results also revealed that 27.5% and 15.9% of the sampled respondents agreed and strongly agreed respectively that their group is exposed to different financial partners and networks for solar project funding. However, small number of the respondents were undecided that there group is exposed to different financial partners and networks for solar project funding as shown by 29.7% with a mean of 3.19. Similarly, 36.2% and 8.7% of the sampled respondents agreed and strongly agreed respectively that Size of loans is always capable of purchasing the solar energy technology a member needs. However, 32.6% of the respondents were undecided whether size of loans was always capable of purchasing the solar energy technology a member needs with a mean of 3.22.

The results further revealed that 39.9% and 10.9% of the respondents agreed and strongly agreed respectively that promoters offer solar energy products at a discounted rate. A mean of 3.26 implies that some promoters offer solar energy products at a discounted rate. Majority of the respondents represented by 46.4% strongly agreed that their groups had access to free sample incentives while additional 42.8% of the respondents agreed with a mean of 4.33. This implied that, groups have access to free sample incentives. Finally, 37.0% of the respondents agreed that group benefits from cost sharing of solar energy products with promoters while 14.5% of the respondents strongly agreed on the same. A mean of 3.35 implied that respondents some respondents confirmed that their group benefits from cost sharing on solar energy products with promoters.

Solar energy technology uptake

Solar energy technology uptake variable was as dependent variable. The results were presented in Table 5 in which percentage were presented outside brackets while frequency in the brackets. The agreement ranged from 1 strongly disagree, 2-Disagree, 3-undecided, 4-agree and 5 strongly agree. SDV is the standard deviation.

Table 5: Solar energy technology uptake

	1	2	3	4	5	Mean	SDV
Women in the group support uptake of solar energy idea	9.4(13)	12.3(17)	12.3(17)	32.6(45)	33.3(46)	3.86	1.122
Women in the group have purchase/installed solar technology	19.6(27)	21.7(30)	26.8(37)	14.5(20)	17.4(24)	2.88	1.357
Most women in the group continue using solar energy	7.2(10)	7.2(10)	18.1(25)	41.3(57)	26.1(36)	3.83	1.062
There are different varieties of solar products in households belonging to women in the group	0.7(1)	17.4(24)	26.1(36)	52.2(72)	3.6(5)	3.41	.843
Women group members refer solar energy technology to other groups		13.8(19)	39.1(54)	41.3(57)	5.8(8)	3.57	0.793
Overall						**3.51**	

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The results in Table 5 showed that 32.6% of the respondents agreed and 33.3% also strongly agreed that women in my group support uptake of solar energy idea. However, 12.3% of the respondents were undecided on whether women in their group support uptake of solar energy idea with a mean of 3.86. On the other hand, 14.5% and 17.4% of the respondents agreed and strongly agreed respectively that women in their group have purchase/installed solar technology. A mean of 2.88 implies that not all Women in the groups have purchase/installed solar technology. The results also revealed that 52.2% of the respondents agreed that there are different varieties of solar products in households belonging to women in women group while 3.6% strongly agreed. A mean of 3.41 indicate that there are different varieties of solar products in households belonging to women in women group to a moderate extent. Similarly, 5.8% and 41.3% of the respondents agreed and strongly agreed respectively that group members refer solar energy technology to other groups. With mean of 3.57, it implied that women group members refer solar energy technology to other groups. Finally, 41.3% of the respondents agreed that most women in the group continue using solar energy and 26.1% of them strongly agreed. A mean of 3.83 implied that most women in my group continue using solar energy.

Inferential Statistics

Correlation Analysis

The results in Table 6 showed that there is significant linear relation between independent and dependent variables as well as among independent variables themselves. The results indicated that the relationship between capacity building and solar energy technology uptake is positive and significant (R=0.511, P=.0000). This implied that the capacity building influences solar energy technology uptake. The results also revealed that the relationship between information provision and solar energy technology uptake is positive and significant (R=0.563, P=.0000). This implied that the solar energy technology uptake in rural Kenya significantly influenced by information provision. The results indicated that the relationship between technology product variety and solar energy technology uptake is positive and significant (R=0.658, P=.0000). This implied that the technology product variety influence their solar energy technology uptake. The results also revealed that the relationship between financial incentives and solar energy technology uptake is positive and significant (R=0.669, P=.0000). This implied that the solar energy technology uptake amongst women group is significantly influenced by financial incentives.

Table 6: Pearson Correlation Analysis

		CB	IP	TPV	FI
Capacity building	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	138			
Information provision	Pearson Correlation	.296**	1		
	Sig. (2-tailed)	.000			
	N	138	138		
Technology product variety	Pearson Correlation	.448**	.545**	1	
	Sig. (2-tailed)	.000	.000		
	N	138	138	138	
Financial incentives	Pearson Correlation	.404**	.454**	.642**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	138	138	138	138
Solar energy technology uptake	Pearson Correlation	.511**	.563**	.658**	.669**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	138	138	138	138

**. Correlation is significant at the 0.01 level (2-tailed).

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*. Correlation is significant at the 0.05 level (2-tailed).

Multiple Regression Analysis

The results from the model summary in Table 7 gave information on the overall summary of the model. The R square value indicated that promoters' incentives accounts for 60.7% significant variance in solar energy technology uptake (R square =.607) implying that 39.3% of the variance in solar energy technology uptake is not accounted for by other variables not captured in this model.

In order to assess the significance of the model, simply whether the study model is a better significant predictor of the solar energy technology uptake, the study resorted to F statistic. From the findings, the F value is more than one, as indicated by a value of 51.401. The large F value is very unlikely to exist by chance (99.0%), thus implying that the final study model has significant improvement in it is prediction ability of Solar energy technology by women groups in Mumias West Constituency, Kenya (F (4,76) = 51.401, P=0.000). Therefore, promoters' incentives are a significant predicator of solar energy technology uptake.

Table 7: Multiple Regression Analysis

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.779[a]	.607	.595	.3756979

a. Predictors: (Constant), Financial incentives, Capacity building, Information provision, Technology product variety

b. Dependent Variable: Solar energy technology uptake

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	29.021	4	7.255	51.401.000[b]	
	Residual	18.773	133	.141		
	Total	47.794	137			

a. Dependent Variable: Solar energy technology uptake

b. Predictors: (Constant), Financial incentives, Capacity building, Information provision, Technology product variety

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.506	.227		2.230	.027
	Capacity building	.218	.065	.208	3.363	.001
	Information provision	.207	.060	.226	3.435	.001
	Technology product variety	.167	.059	.224	2.852	.005
	Financial incentives	.262	.056	.339	4.653	.000

a. Dependent Variable: Solar energy technology uptake

Regression Coefficients

From the regression coefficient, the study utilized unstandardized regression coefficient in the formulation of study model. A regression of the four predictor variables against solar energy technology uptake established the multiple linear regression models as indicated:

Solar energy technology uptake =0.506 + $0.218X_1+0.207X_2+0.167X_3+0.262X_4$

Where;

X_1=Capacity building

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X_2= Information provision
X_3= Technology product variety
X_4= Financial incentives
ε = the error of term

It's clear that all factors had significant positive influence on the solar energy technology uptake as shown by B coefficients. If the four factors are held at zero or it is absent, the solar energy technology uptake would be 0.506, p=0.027.

CONCLUSIONS AND RECOMMENDATIONS

The findings of this study indicated that capacity building had significant influence on solar energy technology by women groups in Mumias West Constituency, Kenya. Therefore, from the study, it could be concluded that capacity building influenced solar energy technology uptake. Improvement in capacity building would result to increase in solar energy technology. Women groups in Mumias West Constituency had little knowledge of different solar energy providers as few of them had undergone training in solar energy technology. This had affected the uptake of solar energy technology.

The findings indicated that information provision which translates to one being knowledgeable had significant influence on solar energy technology by women groups in Mumias West Constituency, Kenya. From this study there was adequate evidence to conclude that information provision influences solar energy technology uptake by women groups. It could be deduced that Promoters gave women group access to information on solar energy technology however; the information on solar energy technology was not always readily available and easy to reach.

From the findings, we could comfortably conclude that technology product variety had significant influence on solar energy technology by women groups in Mumias West Constituency, Kenya. Therefore, the study rejected the third null hypothesis as technology product variety influence solar energy technology uptake. It was important to establish that women groups were not fully aware of different varieties of products released and there were limited technicians to support uptake of solar energy technology in Mumias West Constituency, Kenya.

Finally, this study concluded that financial incentives had significant influence on the solar energy technology by women groups in Mumias West Constituency, Kenya. Consequently, the fourth hypothesis was therefore rejected. One of the impending factors on solar energy uptake was funds and this was demonstrated by limited financial resources to women group. This implied that, fewer women were able to access funds for uptake of solar energy technology.

Since most of women group lacked required knowledge, the study recommended that there was need for increased training and capacity building for group members so as to enable them acquire knowledge and skills in utilization of solar energy technology. This would also enable them to install and maintain solar energy equipment. This can be achieved by setting up of solar energy centers around the country.

Therefore the study recommended that there was need to make information on solar energy technology available not only to women groups but also to other stakeholders. This could be achieved by using various way of disseminating information not limited to one form media. The information would enable women groups to utilize different solar energy technologies in the market.

Thus the study recommends that there is need for solar energy technology promoters to come up with variety of solar energy products which incorporate various designs and needs of different member in the society. This would ensure that, women group members are given opportunity to select solar technology that best suits their individual needs.

The study therefore recommended that promoters of solar energy technology should enable uptake through offering of various avenues to access funds. This could be done through collaboration between

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promoters and financial institutions especially microfinance institutions. The promoters should also come up with innovative financial package/tariffs which would allow members to finance solar energy technology with ease. The government should also set up a revolving fund that allows end users to pay for the technology in installments.

Areas for Further Research

This study sought to establish influence of promoters' incentives on the solar energy technology by women groups in Mumias West Constituency, Kakamega County, Kenya. The study was limited to Mumias West Constituency; however, there was need for further studies to consider other constituencies in Kenya so as to have great contribution to the economy in terms of energy consumption. Financial incentives were found to influence uptake of solar energy technology greatly, it was fundamentally important to consider how financial institutions could be used as vehicles to catalyze the solar lighting uptake by women as consumers and entrepreneurs as well as other variables not used in this study.

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