

DETERMINANTS FOR THE PURCHASE OF WOVEN PRODUCTS AMONG CONSUMERS IN KISUMU COUNTY, KENYA

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ABSTRACT

This research was designed to establish the determinants for the purchase of woven products among consumers in Kisumu County, Kenya. By definition, woven products are products made by interlacing fibrous materials like water hyacinth or papyrus reeds alone or incorporated with other materials like bamboo, small round tree stems and branches, used copper wires, iron/ metal rods, and tin cans. These products will restore and protect the environment by reducing pressure on natural forest via reduction in the use of timber solely and also in the amount of solid wastes generated; especially from plastic polythene bags. It will also be of great value to those involved in the cottage industry as a source of employment. The objectives of this study were: to find out the sources and raw materials used to make woven products and the products woven; to find out whether socio-economic status of consumers has an effect on the purchase of woven products; to find out the consumers' opinion concerning the purchase of woven products and to assess the consumers' environmental concerns and awareness as they purchase woven products. The study adopted a descriptive research design with a cross-sectional social survey. The study area was Kisumu County and the sample areas were two Sub-Counties, namely Kisumu Central (Nyalenda A and Nyalenda B; Dunga) and Kisumu East (Manyatta B); selected using purposive and stratified sampling methods. To gather the required data, a minimum sample of 384 participants was targeted for the study and the three manufacturing and market points within the two Sub-Counties

allocated equal sample size (128 respondents). Data collection was through administering structured questionnaires with open ended questions and using interview schedules with the help of two trained research assistants for the qualitative interviews. From the study findings, Lake Victoria was the main source (58%) of weaving materials used; with papyrus reeds (55%) being the major raw material used followed by water hyacinth (24%), sisal (18%) and (3%) Palm tree. Several products were produced from these raw materials; stools were the highest (59%) made, followed by sofa sets (54.5%) and mats (50%). Mats were the most owned product (57%), followed by baskets (39.3%). Consumers' opinions and knowledge about woven products were significant at 0.0280, 0.0372, 0.0160, 0.0001 and 0.0001 levels that woven products can reduce rate of deforestation, are biodegradable, have eco-friendly life cycle, cheap and not only for low class people respectively. Except for the availability of these products in the market was not significant at 0.8117 hence need for expanding markets for woven products. Social factors; social influence, peer conformity and self image all influenced the purchase of woven products and were all significant at p-value =0.000. Environmental awareness/ knowledge and environmental concern also positively contributed to the purchase of woven product and were significant at p-value= 0.000 and 0.037 respectively. Consumers with environmental knowledge / awareness and concerned about self-image were less (<1) likely to purchase woven products. Therefore, there is need to encourage consumers to utilize their

environmental knowledge and awareness towards promoting sustainable development; hence their concern for environment will increase as well.

Key Words: *purchase, woven products, consumers, Kisumu County, Kenya*

INTRODUCTION

Woven products are products made by interlacing fibrous materials like water hyacinth or papyrus reeds alone or incorporated with other materials like bamboo, small round tree stems and branches, used copper wires, iron/ metal rods, and tin cans. Weaving of household items from aquatic plants like papyrus reeds and water hyacinth have been in practice since 1972 (Valentine, 2012). The woven household items are baskets, shelves, flower vases, sofa sets, trays, lounge chairs, mats, caskets, tables and stools among others. The availability of woven products has been of great value to individuals who engage in the cottage industry who makes the products and in the conservation of environment (Kisumu Innovation Center-Kenya, 2005).

Woven products have minimal or no negative impacts on the environment as they are eco-friendly. Some of the benefits of using woven products include not only reduction in environmental pollution from plastic bags, packaging containers and metal cans, but also helps in conservation of energy and other natural resources like hard wood tree species which are commonly used in of making sofa sets, lounge chairs, stools, tables, shelves, baskets, trays and television stands as they replace timber massively. In addition to the ban of plastic bags in Kenya on 28th August, 2017, woven products like baskets and trays are a good alternative product. Water hyacinth and papyrus reeds have certain distinct qualities, and with creativity woven products can provide aesthetic value, for instance artistically designed wall décor (Kisumu Innovation Center-Kenya, 2005).

Most economic activities such as manufacturing, transportation and marketing of both food and non-food products have greatly impacted negatively on the environment (Ruowei, 2009), they are contributors to environmental degradation, through solid and liquid wastes release, sand harvesting, and growth of invasive species (water hyacinth). In Kisumu City the third largest city in Kenya, still lacks a proper dump site, though it is operating a temporary garbage dumping site near Moi Stadium where plastic packages form major heaps and others are still scattered all over the towns creating unappealing scenes.

The local authorities collect only about 20% of the solid wastes and 27% is done by private entrepreneurs, with the remaining 53% is uncollected and often left on the surface or burned (Nodalis, 2014). The wastes mostly the plastic clog drainage systems and as plastics are non-biodegradable pose serious environmental hazards, due to frequent blockage of sewage and drainage systems causing sewer and domestic wastes to overflow contaminating surface and underground water. Plastic waste management is a challenge in Kisumu (Kisumu County Government, 2013).

Tropical wetlands are important sources of water and habitat for large number of flora and fauna species (Ramsar Convention Secretariat, 2013). Lake Victoria Basin (LVB) has three major categories of wetlands, namely: riverine system, lacustrine system and palustrine system. They are rich in plant genetic diversity and also support quite a number of mammal, birds, fish, reptiles, amphibians and other invertebrate species (Awange & Ong'ang'a, 2006). It is evident that there is overexploitation of most LVB wetlands in areas with ready markets for key wetland products (Verhoeven & Setter, 2009). They are threatened by the increasing human population and unsustainable exploitation of these resources. This is evidenced by poverty among the riparian communities and encroachment in the wetland ecosystems and reclaimed for agricultural purpose, (Verhoeven & Setter, 2009).

When wetland resources are managed well and exploited sustainably, they provide good services not only to the riparian communities, but to the County as a whole. Sustainable harvesting of aquatic plants such as water hyacinth (*Eichornia crassipes*), papyrus reeds and others obnoxious weeds like hippo grass (*Vossia cuspidate*) and typha reeds (*Typha domingensis*) used in weaving products, have the potential to reduce the amount of wastes, deforestation and environmental pollution while adding aesthetic value to people's lives. According to Valentine (2012), there is an increase in the demand for woven product both locally and in hotel industries. For instance, coffin made from water hyacinth and papyrus reeds harvested from Lake Victoria have been in demand since 2011.

STATEMENT OF THE PROBLEM/ JUSTIFICATION

Information and status on the use of woven products (from water hyacinth and papyrus reeds) is scanty or totally absent. Owing to their origin from plants, they decompose rapidly and add to soil manure, than the plastic materials which are unsightly and take a lot of time to decompose. Plastics threatens both terrestrial and aquatic organisms, for example when mistakenly consumed as food or during feeding, they cause blockage in the digestive systems of livestock and sea turtles or whales respectively (Deudero & Alomar, 2015). The woven products are utilized for diverse socio-economic activities, which include household items e.g. sofa sets, stools, lounge chairs, baskets, mats and trays. Owing to the multipurpose use and their complete decomposition, it is important to find out the determinants for the purchase of woven products as the information is important as it can be used to educate the public on the importance of using woven products instead of plastic products following a ban of plastic bags in Kenya. This information would also enhance formulation of optimal management strategies for the management of wetlands. Furthermore, Aquatic weeds, especially water hyacinth have numerous environmental effects. For instance, they create conducive breeding grounds for mosquitoes which causes malaria and yellow fever (International Commission on Irrigation and Drainage, 2002). It also habits gastropods; hosts for waterborne parasites causing schistosomiasis (Masifiwa, Twongo, & Denny, 2001). Water hyacinth also affects the growth of fish and other aquatic life forms by suffocating them due to limited oxygen supply since they nearly cover the

entire water bodies reducing penetration of light into the water (Mironga, Mathooko, & Onywere, 2011). It also affects the quality of water bodies through excessive evapotranspiration and increased rate of sedimentation as a result of production of detritus and siltation (Mironga, Mathooko, & Onywere, 2011). The use of aquatic weeds; especially water hyacinth in weaving products may be beneficial in reducing evapotranspiration rate, improving aquatic ecosystem and aesthetic value for recreational purposes. It can also increase carbon sequestration (high growth rate, though depends on its population and water depth) (Sobreira, Yingying, Sanne, Leon, & Sarian, 2016)

RESEARCH HYPOTHESIS

H₀: The woven products are made from same raw materials.

H₀: Socio-economic status of the consumers does not significantly affect the purchase of woven products.

H₀: The consumers' opinion concerning woven products is not significant.

H₀: The consumers' environmental concerns and awareness have a significant purchase on the woven products.

BROAD OBJECTIVE

The general objective of the study is to establish the determinants for the purchase of woven products among consumers in Kisumu County, Kenya.

SPECIFIC OBJECTIVES

1. To find out the sources and raw materials used to make woven products and the products woven.
2. To find out whether socio-economic status of consumers has an effect on the purchase of woven products.
3. To find out the consumers' opinion concerning woven products
4. To assess the consumers' environmental concerns and awareness as they purchase woven products.

LITERATURE REVIEW

Woven Products

Woven products are products made by interlacing fibrous materials like water hyacinth or papyrus reeds alone or incorporated with other materials like bamboo, small round tree stems and branches, used copper wires, iron/ metal rods, and tin cans. They include products like sofa sets, stools, lounge chairs, baskets, mats, caskets, trays, shelves, tables, floor coverings and

flower vase. Woven products have been considered to be of economic benefit to those with traditional skills and knowledge of how to make them. They use their indigenous knowledge and skills to weave various products for sale and also train others, hence a source of income.

According to Valentine (2012), the weaving of household items using papyrus reeds and water hyacinth was already into practice by 1972. A local in Dunga area, Kisumu after completing secondary school in 2007, learnt how to weave from his father who was already into the business by the year 1972. Some of these woven products include, but are not limited to baskets, tables, mats, flower vases, shelves, stools, sofas and mats.

By the year 2011, a unique woven product was introduced; coffin made from water hyacinth and papyrus reeds harvested from Lake Victoria for the late Prof Wangari Maathai (Valentine, 2012). The coffin has been in demand since then, though factors which have contributed to this demand are still not known; whether it was because a prominent person used it, its cost, availability or because it is a sustainable product in its nature. In addition, these factors have never been studied.

Raw Materials and their Importance

Water hyacinth and papyrus reeds form the major component of woven products. Papyrus reeds are widely distributed in the Eastern, Central and Southern Africa; they are highly productive and provide important ecological services (Morrison, Upton, Odhiambo, & Harper, 2012). In Kisumu County, papyrus reeds and water hyacinth plants come from various wetland types such as lakes, ponds, and streams; especially Lake Victoria. Water hyacinth is a fast-growing plant and when compared with materials like wicker and rattan, it is lighter and less brittle as well as softer and smoother to the touch. Papyrus reeds on the other hand are also strong and flexible hence can be used in any setting (Morrison et al., 2012).

These raw materials should be promoted in the making of woven products due to their availability, ease of processing and biodegradability. Furthermore, their utilization; especially water hyacinth, can create environmental benefit by reducing evapotranspiration rate, improving aquatic ecosystem and aesthetic value for recreational purposes. It can also increase carbon sequestration (high growth rate, though depends on its population and water depth) (Sobreira, Yingying, Sanne, Leon, & Sarian, 2016). They are also potential in the making of other products like compost, fertilizers, paper and fodder supplements, or in the production of biogas (Henrylito, 2009). In addition, wastes from woven products are not similar to those generated from other products such as plastic bags and bottles; therefore they can be directly applied as green manure or composed with other organic municipal wastes, animal manure, ash and soil as done in Sri Lanka (Henrylito, 2009).

Woven products have created job opportunities to those involved in the cottage industry right from material sourcing and processing. Therefore, exploiting it commercially will help in

economic growth as well as cleaning the environment. Demand for products made from water hyacinth rose by mid-1998 and so affirming the commercial importance of water hyacinth; though still by small scale entrepreneurs (Olal, Muchilwa, & Woomer, 2001). For instance, in Bangladesh and Philippines, water hyacinth is used to make ropes used by those manufacturing furniture, weaving baskets and making mats. In India, woven products have contributed positively in the tourist sector (Henrylito, 2009).

Opinions

A person's motives influence their attitudes. Different people can have the same opinion towards an item, but with different reasons behind it. An opinion or changes in opinions can influence a person's feelings and also have a direct or indirect effect upon their behaviors in several products they purchase. For instance, consumers will not be willing to compromise on traditional product attributes, such as convenience, price, availability, quality and performance (Ginsberg & Bloom, 2004). In addition, a marketer who ventures in products that are friendly to the environment should consider some of these reasons: social ethics, cost advantage, competition advantage, policy pressure and profit venture.

Different researchers with their theories and opinions have used different criteria to come up with factors influencing the purchase of products considered friendly to the environment among consumers with positive attitudes towards conserving the environment (Hessam, Parisa, & Ghazaleh, 2013). For example, a research study on young Hong Kong consumers' green purchase behavior had used seven variables, namely: environmental concern, environmental attitude, perceived seriousness of environmental problems, perceived environmental responsibility, perceived effectiveness of environmental behavior, concern for self-image in environmental protection and social influence (Lee, 2008).

Another research study by Paco and Raposo (2009) on green segmentation of Portuguese consumers market used demographic characteristics environmental variable; such as concern, commitment, affect, activism, ecological consciousness, environmentally friendly behavior, subjective norms, green products buying behavior, information search, willingness to pay, skepticism towards environmental claims and recycling. In an empirical investigation of the influences of multiple factors on the intentions to purchase products considered friendly to the environment by customers in Australia, the following six variables were used; product labels, product dimension, corporate perception, environmental regulation, customers' past experience, price and quality perception (D'Souza, Taghian, & Lamb, 2006).

Most of these research studies done by scholars have not elaborated or discussed into details on socio-economic as a factor which has an influence in consumers' purchasing of woven products which are considered friendly to the environment. Therefore, the intended research study will only focus more on environmental issues (environmental concern and knowledge/ awareness) and socio-economic factors.

Environmental Issues

Environmental Concern: Environmental concern (EC) can be defined as the belief, stance and the degree of concern an individual holds towards the environment (Said, Ahmadun, Paim, & Masud, 2003). It can also be defined as a strong attitude towards preserving the environment (Chan, 1996). EC is also known as ecological concern; it refers to the degree of emotion, level of factual knowledge and the level of willingness as well as the extent of actual behavior on pollution-environmental issues (Cosby, 1981). EC also refers to the awareness of people about the threats posed to environment and natural resources on the planet (Ali, Khan, Ahmed, & Shahzad, 2011) According to Hartmann and Ibáñez (2006), literature reveals a few sub-scales on EC i.e. affect, knowledge, verbal commitment and actual commitment by consumers. To study EC, the following seven angles can be considered: concern for wastes, biosphere, wildlife, duties, education, health, awareness of energy and environmental technology (Said et al., 2003). Previous research studies revealed a positive correlation between environmental concern and eco-friendly behavior (Van der, Steg, & Keizer, 2013). A study conducted by Lee (2008) revealed that an environmental concern was found to have a significant relationship on green purchasing behavior. In another study, it was found that consumers were in support with environmental improvement, though they did not transform their concerns into action; especially in Portuguese (Paco & Raposo, 2009). EC put more influence on purchasing pattern of consumers; it is seen that today there is an increased proportion of consumers purchasing ecological products (Aman, Harun, & Hussein, 2012). Another study on moral obligation with 45 participants who were made to choose between two products; one sustainable but also 20% more expensive than the other, unsustainable showed that strong feelings of specific obligation and preference for environmentally friendly products were also closely related to environmental self-identity (Van der et al., 2013).

Environmental Awareness/Knowledge: Environmental awareness/ knowledge may refer to the concepts and relationships or knowledge of facts concerning the natural environment and its major ecosystems (Fryxall & Lo, 2003). In simple terms, it refers to what one knows about the environment, its relations to key environmental aspects as well as appreciating the responsibilities needed for sustainable development. A study by Mostafa (2009) revealed that environmental knowledge had a significant impact on the consumers' intention to buy green products. Therefore, this study was intended to investigate environmental concern and awareness/knowledge among consumers and how they influence their purchase on environmentally friendly products within Kisumu City.

Socio-Economic Factors

Socio-economic status (SES) is a combination of economic and social factors measuring an individual's livelihood based on occupation, income and education as well as his or her economic and social position in relation to others. SES can be categorized into three categories, namely; high SES, middle SES and low SES. Social influence is seen where one's action or

thought is influenced by third party; any change in an individual's thoughts, feelings, behaviors or attitudes results from the interactions with another individual or group (Ramayah, Lee, & Mohamad, 2010). Several sources such as family and social groups (peers, neighbors and coworkers among others) have influenced consumers purchasing decisions (Maram & Kongsompong, 2007).

A research study of purchasing behavior of Hong Kong young consumers revealed that social influence is the most important factor affecting consumer green purchases (Lee, 2008). One reason for this could be that social group consists of people with similar habits, and desires, hence a powerful cultivator of an eco-friendly culture (Zia-ur-Rehman & Muhammad, 2013).

According to most marketers, even though consumers profess strong support for the environmental protection, they are extremely price sensitive when it comes to purchasing eco-friendly products (Hans, Mohammad, & Yianna, 2012). A study showed that the perception of Washington residents that recycled-content products are more expensive created a barrier for them in purchasing these products (McKenzie-Mohr, 2000). These studies also revealed that, more often marketers usually attempt to charge excessive price for environmentally friendly products in unjustified and non-transparent way. This may discourage and lower down the morale of consumers to be involved in eco-friendly purchasing behavior. This study therefore intended to investigate the socio-economic factors of consumers as a key factor of consideration that may be influencing their intention to purchase environmentally friendly products within Kisumu City.

Prices of Woven Products

The presence of various types of woven products, their quantity and quality as well as the different vendors/ sellers affects the prices of these products. For instance, a water hyacinth basket in Kenya would cost between Ksh. 150 (\$1.49) to Ksh.2000 (\$19.85), while in China it would vary from \$2 (Ksh. 201.48) to \$24 (Ksh. 2,417.76); which is on the higher side when compared to Kenyan price. These prices are also affected by the variety of products made. For instance, water hyacinth baskets; which can be laundry baskets, storage baskets, picnic basket and flower baskets (New Water Hyacinth Basket Products, 2017).

RESEARCH METHODOLOGY

Study Area

Kisumu Central and Kisumu East which are Sub-Counties of Kisumu County formed the study location. These Sub-Counties are adjacent to Kisumu Municipality and lies within longitudes 34.768⁰ East and latitudes 0.09⁰ South. Kisumu covers 2009.5 square kilometers, 567 square kilometers is covered by water and it borders the following counties: Homa Bay to the South, Nandi to the North East, Kericho to the East, Vihiga to the North West and Siaya to the West

(Kisumu County Government, 2013). Climate of Kisumu is modified by Lake Victoria. Kisumu County has an annual equatorial rainfall of about 1200 mm to 1800 mm; accompanied by thunderstorm, Equatorial type of precipitation occurs in the afternoon. The County lies at an elevation of about 1,134 meters above sea level. Rainfall is bimodal, with short rains occurring in March to May and long rains in September to November. The temperature in Kisumu range between 25 and 35⁰C with a mean annual minimum temperature range of between 9 and 18⁰C. It is warm throughout the year (World Meteorological Organization, 2017). Its humidity is also relatively high throughout the year with levels of between 80 and 90 percent during morning and drops to about 40 and 50 during the evening (Kisumu,"a land of opportunity", 2012). The dominant soil type in Kisumu is the lake sediments, which are mostly composed of sand and clay. The soils have poor water drainage characteristics as shown by the presence of the Kano plains. The western part of Kano plains have dark cotton soils commonly associated with swamps. Lake Victoria is the major water body found in Kisumu with various rivers and streams. The rivers are Awach, Nyamasaria, Mayenya, Kisat, obuso, Luando, Kibos and Lielango. The dominant plants found in most wetlands bordering Lake Victoria are papyrus reeds (*Cyperus papyrus*) and water hyacinth (*Eichornia crassipes*) is an invasive aquatic plant species which is a threat to Lake Victoria and other wetlands in Kisumu County. There are also other wetland vegetation types present, like hippo grass (*Vossia cuspidate*) and typha reeds (*Typha domingensis*); though they are less dominant (Kansiime, Saunders, & Loiselle, 2007).

Research Design

A descriptive research design with a cross-sectional social survey approach using structured questionnaires with open ended questions was used. It is best for studying the general condition of people or organizations since it investigates the behavior and opinions of people (Cooper & Schindler, 2006).

Selection of Study Site

Purposive sampling and stratified sampling methods were used in the selection of the study site. Kisumu County was purposively selected because of its ecology and environmental nature and composition. The County was divided into seven Sub-Counties and two Sub-Counties (Kisumu East and Kisumu Central) closer to Lake Victoria were purposively selected due to their proximity to the source materials (water hyacinth and papyrus reeds) and potential market (Kisumu City).: In the two sub-counties, three market and manufacturing points were identified; that is Kisumu Central (Nyalenda and Dunga) and Kisumu East (Manyatta B), and all purposively included in the study since they started selling woven products for the last six years.

Target Population

The population of Kisumu East and Kisumu Central Sub-Counties is approximately 150,124 and 168,892 people respectively (Independent Electoral And Boundaries Commission (IEBC),

2009). The target population for the study was the consumers at household level and vendors within the selected study area. All the adults within the households with woven products/ items and vendors living in study were qualified for the study, since they were in a position to give first-hand information about woven products.

Determination of Sample Size

The required sample size was obtained by using the sample size formulas of infinite and finite populations (Cochran, 1963).

$$n_0 = Z^2 pq / e^2$$

Where: n_0 is the desired sample size; Z^2 is the value specifying the level of confidence required in the confidence interval during data analysis (at 95% CI, Z is set to 1.96); p is the estimated proportion of an attribute that is present in the population; q is $1-p$; e is the desired level of precision

$$n_0 = Z^2 pq / e^2 = \{(1.96)^2 \times (0.5 \times 0.5)\} / (0.05)^2 = 384$$

For a finite population, the below correction sample size formulas was used to calculate the final sample size:

$$n = \{n_0 / 1 + ((n_0 - 1) / N)\} = \{384 / (1 + (384 - 1) / 319016)\} = 383.53 = 384 \text{ participants}$$

Therefore a minimum total of 384 participants were targeted for the study and the three manufacturing and market points within the two Sub-Counties were allocated equal sample size (128 respondents).

Sampling Technique

Kisumu County was stratified into Sub-Counties (Seven administrative Sub-Counties) then two Sub-Counties (Kisumu East and Kisumu Central) were purposively sampled based on their locality: near both the lake and the market points for woven products. Within the two Sub-Counties, there were three woven product markets and production sites all of which were included in the study; one at Nyalenda next to Impala Park, another along Dunga road and Railway Estate (Manyatta). Kisumu East and Kisumu Central Sub-Counties have approximately the same population; 150,124 and 168,892 people respectively (Independent Electoral And Boundaries Commission (IEBC), 2009). Three manufacturing and market points within the two Sub-Counties were allocated equal sample size (128 respondents). The selected areas had similar housing structure characteristics as they were a mixture of permanent single units with adjacent flats and were within the city municipal boundaries. To identify the target household the interviewing process began at some random shop at the three identified marketing points making the first geographical starting point. Using Random Walk Method, the first household selected was that which was nearest to your left while facing East and the next selected systematically by

picking every 10th house walking South till approximately 2 kilometers of the area was covered or the edge of the administrative area was reached (Hoffmeyer-Zlotnik, 2003). If the 2 kilometers were covered or edge reached, the next household selected was the one nearest the interview's left hand side while facing South else if household are approximately equidistant the right hand side take priority till approximately 2 kilometers is covered or edge reached. This was done until the sample size was achieved (Mazziotta, 2016). A census was done by the researcher within the three sampling areas to know the people in the cottage industry for woven products while collecting basic information such as gender and year of work in the field. At Dunga Road; one of the largest markets for woven products, had approximately 30 vendors and the remaining two production and sales points Nyalenda and Manyatta had approximately 15 and 25 vendors. Therefore, 10 vendors per site were selected to attain a 30% threshold and required sample size for the study. The researcher then conducted the research at two levels. The first level was interviewing the adults in the households present at the time of data collection. The second level included the vendors present at the selling grounds of these woven furniture products.

Data Collection

Data collection tools used for the study was a structured questionnaires with open ended questions. The method of data collection was preferred because is less expensive. The researcher with the help of three trained research assistants administered the questionnaires to the 387 respondents (consumers and vendors) at home and at their work stations within Kisumu East and Kisumu Central. And before participation, the respondents were informed about the research. All the information gathered from the participants was treated with high level of confidentiality and were used only for the purpose of academic research.

Data Analysis and Presentation

The data collected from the respondents was coded, tabulated and analyzed into logical statements using factor analysis using Excel 2007 for data entry and STATA 12.1 for statistical analysis. In finding the sources and raw materials used to make woven products and the products woven, the data was analyzed using frequency distribution tables including percentages. Factor analysis due to Principal Component Analysis and logistic regression was used in analyzing whether socio-economic status of consumers had an effect on the purchase of woven products. Factor analysis shows the relationships among the variables which concentrate those inter-related variables into fewer factors (Rovai, Bakar, & Ponton, 2013). PCA is a mathematical procedure that transforms a number of (possibly) correlated variables into a (smaller) number of uncorrelated variables known as principal components. Likert scale using Kruskal-Wallis rank test was used to analyze consumers' opinion concerning woven products. For consumers' environmental concerns and knowledge/ awareness during the purchase of woven products, Factor analysis due to PCA and logistic regression were used to analyze the data. PCA was used to identify the components likely to explain the factors affecting environmental concern, knowledge/ awareness and social factors as determinants in purchasing woven products. From

the components identified (based on Eigen values greater than one), new variables were generated by linearly combining variables (whose loadings equal to or larger than 0.4) from each PC. Logistic regression was conducted with the newly made variables for inferential statistics. Data was presented in statistical tables, pie-charts and bar graphs, with descriptive statistical text also used to present the results.

RESEARCH RESULTS

Demographic and Socio-Economic Characteristic of the Respondents

A total of 387 respondents were interviewed; 321 were adults interviewed at household level while 66 were vendors at their work station. The number of females constituted 53.49% while males 46.51%. This high percentage of females was because most females were housewives and stayed at home. The majority of the respondents 72.09% were married, 22.48% single, and 1.55% divorced while 3.88% were widows/ widowers. The dominant age group was 30-39 years; this could be attributed to the parental responsibilities. The respondents 41.9% had post-secondary education, while 25.6% had secondary education and 8.53% non-formal education. This could be due to the increase in the number of schools and institutions.

In terms of socio-economic status, 34.11% were formally employed, 54.26% self-employed and 11.63% unemployed. The majority were self-employed due to the existence of business opportunities ranging from groceries, crafting, farming, hotels, salons/ barber shops, fishing and boat riding to bodaboda services. Those formally employed were teachers, managing directors, administrators, research assistants, civil servants, nurses, controller, mechanics and accountants among others. Students and housewives constituted the unemployed, this was attributed to the fact that the students were from day schools while others had completed their studies and were waiting for graduation. The respondents 37.38% had a monthly income of less than Ksh. 10,000, followed by 31.78% who earned between Ksh. 10,001- 20,000, and 15% with income between Ksh 20,001- 30,000, while the least (5.6%) earned above Ksh. 40,001.

The Sources and Raw Materials Used to Make Woven Products and Types of Woven Products

The study revealed that the source of raw materials used to weave is varied. According to 58% of the respondents, their raw materials for weaving is from Lake Victoria (Nyakach and Seme areas), 22% of the respondents obtained the raw materials from swampy area of Yala, Saf Komolo and Mauna Primary while 20% obtained the raw materials from River Nzoia. According to Research & Devt (2012), raw materials for weaving is obtained from large water bodies, swampy areas and macrophytes on the riparian shores as these places are rich in nutrients. In Nigeria, water hyacinth is found in almost all river bodies, though large bodies of water such as Owode Onirin waterways were preferred because of their population. They also obtained it from Ogun River, Ibadan (Research & Devt: Water Hyacinth: From pest to wealth, 2012). In Vietnam,

weaving materials especially dried water hyacinth are sold by households who do not weave to the cooperative which has employed some craftsmen and women (Water Hyacinth Products, 2016). Lake Victoria was the major source of raw materials due to its location; near to craftsmen and availability hence ease of acquisition and delivery to craftsmen. Swamps were the second source followed by Rivers but the craftsmen had to travel all the way to Yala, Saf Komolo, Mauna Primary areas and Nzoia respectively to buy raw materials from those specialized in processing papyrus and water hyacinth stems for weaving.

The study showed that papyrus reed (55%) was the major raw materials used, followed by water hyacinth (24%) and sisal (18%) and (3%) Palm tree. Papyrus reeds were widely used because they were easy to harvest and process as they often grow along the shoreline of Lake Vitoria, river banks and swamps. Water hyacinth on the other side were more expensive (right from their harvesting, processing and final use) and sometimes difficult to get as their location is influenced by wind; it is blown into the lake during morning hours and later in the day blown back to the shores. In addition, their preparation from plant to final raw material for weaving is complex and tedious, thus more costly than papyrus reeds. They are also habit snakes which pose high risk to those harvesting these aquatic plants. If water hyacinth or papyrus reeds are not well processed, the resulting products will be of poor quality both in strength and durability. Water hyacinth must be properly dried before use to prevent rotting of the products usually caused by poorly dried stalks containing moisture (Henrylito, 2009). In addition, when water hyacinth is over dried, it becomes fragile and breaks, thus not suitable for weaving. Therefore, during drying, it is recommended to continuously monitor its texture until it dries well (Research & Devt: Water Hyacinth: From pest to wealth, 2012).

In countries like India, Philippines, Vietnam, Nigeria and Thailand, water hyacinth is widely used (Water Hyacinth Products, 2016). Sisal was mainly used as binding materials especially in the weaving of mats and in some cases as a weaving material for hats and lamp shades. Though sisal materials could also be used to make other good products like beds, sacks and chairs, they were not preferred as they were scarce and difficult to get; mostly found on a small scale in the following counties: Migori, Homa-Bay and Kisumu. In addition, their cultivation has reduced drastically (Water Hyacinth Products, 2016).

How the Raw Materials are Processed

Papyrus Reeds: Processing papyrus involves clipping the papyrus plant stalk at the base, then sun drying before use in the manufacturing/ making of mats. They can as well be split into required sizes and dried before use for making other crafts or further split into smaller slices and twisted or braided to produce ropes of different thickness for weaving baskets, making chairs and tables among others

Water Hyacinth: Water hyacinth is prepared by harvesting mature plants (at least when its stem is at least 50 centimeters long). It is the split lengthwise into slices of at least 2.5centimeters

diameter and sun dried for a day and the pith removed by rubbing. Later they are air dried in direct sun for approximately 4 to 6 hours or more, further drying is recommended if dye has been used. Once ready, they are treated by submerging them (5 kilograms of dried slices) for an hour in a solution of 250 grams Sodium meta-bisulphite in 10 liters water. The sliced stems are then twisted or braided into ropes of different diameters depending on the woven material to be made.

Sisal: Sisal fiber on the other is prepared manually by first stripping the sisal leaves in between two squeezed parts of a used machete and a wood rod, cleaned and dried and later spun by hand into different sizes depending on the usage.

Types of Woven Products

The study revealed that several products were produced from the raw materials of papyrus reeds, water hyacinth and sisal. The highest produced products were stools (59%), followed by sofa sets (54.5%) and mats (50%). Stools being the highest produced products were easier to make and required less time due to their size as compared to sofa sets which were large in size. There was also high number of craftsmen and women who could knit these products as well as the high demands. In addition, it earned them a good profit when sold, though their sales were not often. Beds, Trays and TV stands were the least made products with only 4.5% as most of them were made on order as informed by one of the vendors. Just like chairs and sofas, beds could also be used as they are without mattress or cushions/ mattress added for more comfort.

The demand of mats was high (57%) because they were affordable and of different types and were used as drying cereals, fish and omena, wall hangings, table mats, roofing, ceiling, floor carpeting, walling and fencing. Baskets (39.3%) were the second most owned products; this could also be due to affordable prices, different types and sizes and of many uses in fishing industry, groceries as well as at homes to store and carry goods, or ornamental. About 36.4% of consumers owned sofa sets and only 25.2% had stools, despite stools being the highest in production, this could be due to their personal interests that sofa sets were spacious and could accommodate many visitors. Puff-Mushrooms were used by children as seats while adults used them as a resting place for their feet. The quality also played an important role as some were made with small round tree stems and branches while others made with metal/ iron frames.

Similar products such as chairs, sofa sets, beds, cabinet furniture, trays, boxes, baskets and other products like slippers and bags of all kinds were also made in Vietnam and Thailand (Diversity of products woven from water hyacinth, 2015). In Nigeria, water hyacinth was also used to make products like wristwatch strap, baskets, earrings and bangles. In Bangladesh, it was used to manufacture furniture products like dining and center tables, sofas, arm chairs and beds (Henrylito, 2009). In India, other unique products such as disposable plates, toys, file boards, multi-purpose boards, egg and fruit trays, and ready-to-plant biodegradable nursery pots were made from water hyacinth pulp mixed with small amounts of used newspaper and appropriate binders (Mongabay-India, 2018).

The craftsmen and women were not specialized in making one item. This is why there was a variation in the number of products made. In addition, some products were not made/ available in the market, though the craftsmen claimed they could make them. For instance caskets/ coffin; this could be a way of marketing themselves. According to one vendor, he mentioned that some of the sofa sets and chairs made from water hyacinth were exported to individuals in USA and UK. No one had purchased TV stands although they were being made. This could be attributed to the fact that tables and stools could provide the same function. In addition, sofa sets made from water hyacinth were costly compared to those made from papyrus reeds. In Nigeria, most of the handcraft products such as multi-purpose storage, pens, baskets, vases, lampshades and furniture among others are sold in Lagos where the customers have appreciation for these products as well as the purchasing power (Adie, 2015). According to Adie (2015), woven souvenir items such as vases, multipurpose storage, lampshades, pens, baskets and mirrors among other home décor were the high in demand.

Prices of Woven Products

The study showed that the prices of woven products varied. The products woven from water hyacinth raw materials were higher in prize than those made from papyrus raw materials and sisal. The prices of woven products made from water hyacinth raw material ranged from Ksh 300 (\$2.98) (baskets) to a maximum of Ksh 90,000 (\$893.39) (sofa sets and lounge chairs) (Table 4.3). Prices of woven products from papyrus ranged from Ksh 150 (\$1.49) (mats) to Ksh 87,000 (\$863.61) (lounge chairs). Only hats and lampshades were made from sisal (Table 4.3). The prices of woven products is influenced by the durability and processing or availability of raw materials (Research & Devt: Water Hyacinth: From pest to wealth, 2012). The high price of woven products made from water hyacinth could be attributed to the long process of preparing the raw water hyacinth fibers for weaving. It involves harvesting and drying, considers that water hyacinth is 95% water. It is also difficult to harvest as the water hyacinth mat is infested with snakes, crocodiles, and hippos. Water hyacinth is also blown by the wind and sometimes it is not available. Papyrus products are cheaper as it is available throughout the year and does not require a long processing time. The significant difference between the price of water hyacinth and papyrus products was that water hyacinth products were more attractive, durable and scarce in the market as compared to those made from papyrus reeds. According to Alibaba (2018), the prices of water hyacinth products were also high and ranged from \$3 (Ksh 302.22) (basket from Vietnam) to \$1,262 (Ksh 127,133.88) (Natural indoor water hyacinth sofa set). For papyrus products, there prices ranged from \$0.31 (Ksh. 31.23) (round papyrus table mats) to \$680 (Ksh. 68,503.20) (Lounge chairs)

Socio-Economic Factors Which Influence the Purchase of Woven Products

Level of Education: There was a relationship between the level of education and the percentage of woven products own in the study. The higher percentage of products 48.6% were owned by respondents with university/ college education, followed by those with secondary 26.2% and

lowest among those with non-formal education. Using chi-square test, the relationship was significant at (p-value=0.010). According to Young, Hwang, McDonald, & Oates (2010), level of knowledge especially on environmental issues is an important factor in the purchase of products as they know or consider them eco-friendly. In addition, consumers with adequate knowledge are able to make sustainable and informed decisions on eco-friendly products (Nilsson, Tuncer, & Thidell, 2004). The high percentage of respondents with high level of education owning more products could be attributed to the fact that they are aware about the durability of the products and their impact on the environment. They said it is also easy to move and no breakage when one is relocating as when they are transferred; mostly the ministry officials. The low percentage of ownership by those with non-formal education is that they do not have space in their homes where they can place them since most of them live in slums. They are also unable to properly maintain them.

Level of Income: The study revealed that level of income influence the number of woven product owned by the respondents. Most woven products 37.4% were owned by those whose monthly income was less than Ksh 10,000 (\$99.27) and those who had monthly income above Ksh 40,001 (\$397.07) had the least woven products. Using chi-square test, the relationship was significant at (p-value=0.000). According to Devinney, Auger, & Eckhardt (2011), the price of the product was more considered by consumers and they would not sacrifice product function for ethics. It also revealed that most people were economic conservative when it comes to purchasing products (Devinney et al., 2011). Thøgersen & Ölander (2006), in their study also confirmed that price affected the purchase of eco-friendly product and were for the idea that large price gap between eco-friendly and conventional products should be avoided. The high percentage of respondents with low income level owning more products could be attributed to the fact that they were cheap, comfortable, light and easy to handle during general house cleaning and tidying, compared to those made from timber since the houses are also small, hence no room for wooden furniture which are made to size. The low percentage of ownership by those with high level of income was that they opted for the alternative products as a result of lifestyle and fashion.

Occupation: The study showed that the occupation and products owned varied (Table 4.6). Those in business had the highest woven products 45.8% followed by housewives 9.4% and managers and teachers 7.5%. Technicians and pastors had the least 0.9%. There was a significant difference in occupation and products owned (p-value= 0.001). The high number of products owned by those in business could be attributed to the fact that they heavily depended on woven products in their daily lives as well as their tendency of sharing business ideas. For housewives, it was due to the aesthetic value of the products as well as their frequent use at home. The least were technicians and pastors because most of the time technicians use hammers, nails and pliers among other tools, a technology to produce equipment, while pastors on the other hand are often traveling preaching the gospel, hence experience hospitality among congregation which reduce their tendency to purchase woven products.

Consumers' Opinion on the Woven Products

According to the null hypothesis that the consumers had the same opinion concerning woven products, with the use of Kruskal-Wallis Analysis of variance test, the study revealed that consumers' opinions and knowledge about woven products to be significant at p-value= 0.0280, 0.0372, 0.0160, 0.0001 and 0.0001 levels that woven products can reduce rate of deforestation, are biodegradable, have eco-friendly life cycle, cheap and not only for low class people respectively (Table 4.9). This could be attributed to the fact that most of the respondents were knowledgeable (Table 4.4), water hyacinth and papyrus reeds were biodegradable materials and also locally available as well as the varied prices of woven products in the market. Except for their availability in the market, it was not significant at 0.8117. This is also true according to the findings of Adie (2015), where woven souvenir items were on high though were not available until Idachaba's company, MitiMeth started making them due to this demand. This could be attributed to the fact that some woven products were made on order, thus consumers in hurry always miss them. In addition many consumers are not well conversant with the locations to purchase these products.

Social Influence and Environmental Issues

Factor analysis due to Principal Component Analysis (PCA) and logistic regression was used to analyze social influence (peer conformity and self-image) and environmental issues (environmental concern and knowledge/awareness) as some of the determinants influencing the purchase of woven products. PCA on social influence revealed a total of 7 components and only 2 components were significant to Kaiser-Meyer-Olkin (KMO) Criterion (KMO is an index used to examine the appropriateness of factor analysis) of Eigen values greater than one (Table 1). The total variance of these 2 components was 67.1%. For environmental issues, PCA obtained a total of 9 components and only 2 were significant with a total variance of 58.3% (Table 2).

Table 1: Principal Component Analysis Table for social influence

Components	Eigenvalue	Difference	Proportion	Cumulative
Component 1	3.6691	2.6400	0.5242	0.5242
Component 2	1.0291	0.2933	0.1470	0.6712
Component 3	0.7358	0.1456	0.1051	0.7763
Component 4	0.5902	0.1601	0.0843	0.8606
Component 5	0.4301	0.1061	0.0614	0.9220
Component 6	0.3241	0.1025	0.0463	0.9683
Component 7	0.2216	0.0000	0.0317	1.0000
Chi-squared= 948.00 df= 21 p-value= 0.0000				

Table 2: Principal Component Analysis Table for environmental issues

Components	Eigenvalue	Difference	Proportion	Cumulative
Component 1	4.09345	2.93349	0.4548	0.4548
Component 2	1.15996	0.28435	0.1289	0.5837
Component 3	0.87561	0.16081	0.0973	0.6810
Component 4	0.71480	0.11549	0.0794	0.7604
Component 5	0.59931	0.04808	0.0666	0.8270
Component 6	0.55123	0.09132	0.0612	0.8883
Component 7	0.45991	0.13447	0.0511	0.9394
Component 8	0.32544	0.10516	0.0362	0.9755
Component 9	0.22028	0.00000	0.0245	1.0000
Chi-squared= 1314.47 df=36 p-value = 0.0000				

From the components identified (based on Eigen values greater than one), new variables were generated by linearly combining variables (whose loadings equal to or larger than 0.4) from each PC (Table 3) and logistic regression was conducted with these newly generated variables for inferential statistics (Table 4).

Table 3: Rotated Factor loadings (pattern matrix) and unique variances- environmental issues

Variables	Factor 1	Factor 2	Uniqueness
Concerned about the state of environment	0.3406	0.6196	0.5001
The balance of nature is very delicate and easily upset	0.5843	0.1235	0.6434
Human beings are severely abusing the environment	0.7742	0.2546	0.3358
Human interference to nature has disastrous consequences	0.8308	0.3027	0.2181
To survive, Human must live in harmony with nature	0.2554	0.7572	0.3614
Environmental issues are emergency issues	0.2242	0.7744	0.35
Environmental issues are consumers' responsibility	0.6045	0.4398	0.4412
Wish to see more people buy woven products	0.6924	0.0196	0.5202
Worried about how my activities affects environment	0.1095	0.7820	0.3764

Table 4: Logistic regression for Social influence and Environmental Issues

Log likelihood = -181.56084				
Covariates	Odds Ratio	Std. Err	[95% CI]	P-Value
Social influence and peer conformity	1.3	0.08	(1.13 - 1.44)	0.000
Self image	0.4	0.06	(0.31 - 0.53)	0.000
Environmental Awareness/ Knowledge	0.8	0.05	(0.71 - 0.89)	0.000
Environmental Concern	1.1	0.07	(1.28 - 1.97)	0.037
Constant	51.4	33.86	(14.11 - 86.99)	0.000

Social factors; social influence, peer conformity and self image all influenced the purchase of woven products and were all significant at p-value =0.000. Environmental awareness/ knowledge and environmental concern also positively contributed to the purchase of woven product and were significant at p-value= 0.000 and 0.037 respectively. Consumers who are affected by social influence and peer conformity on eco-friendly products are 1.3 times likely to be influenced to purchase woven products by friends, family members and product cost than those not affected by social influence and peer conformity on eco-friendly products.

Consumers who are concerned for the environment were 1.1 times (Table 4.10) purchasing woven products than those who were not concerned due to the concern about the current and future state of the environment, how their activities affects the environment as well as the need to live in harmony with nature. Those who had environmental knowledge / awareness and concerned about self-image were less (<1) likely to purchase woven products (Table 4.10). This could be attributed to the fact that consumers with environmental knowledge and awareness still do not adequately translate their knowledge into action. This also reveals how the wastes are currently handled with limited recycling and reuse techniques.

The findings were consistent with other related studies done by Baker and Ozaki (2008) which found social influence to be a significant factor in the purchase of eco-friendly products. Another study by Lee K. (2009) and Abdul and Tan (2011) also revealed social influence as the highest predictor towards green purchase behavior. According to Maram and Kongsompong (2007), families and social groups played significantly influenced consumer's purchasing decisions, which is also consistent with the study done by Chen-Yu and Seock (2002) which revealed that peer conformity was also a significant factor in the purchase of certain items. Furthermore, people with the same behavior, belief and thought tend to share and communicate among themselves; hence peer can be considered a significant influencing factor (Ryan, 2001)

According to Kim and Choi (2005), environmental concern directly influences green buying behavior. So to Mostafa (2009), environmental awareness/ knowledge had a significant positive effect on the consumers' intention to buy green products. While Van der, Steg and Keizer (2013), environmental concern was positively correlated to eco-friendly behavior.

CONCLUSION

Lake Victoria (Nyakach and Seme areas) (58%) was the main source of raw materials, followed by swampy areas of Yala, Saf Komolo and Mauna Primary 22% and River Nzoia 20%. Papyrus reed 55% were widely used because of their ease to harvest and process as compared to water hyacinth raw material 24% which are expensive and sometimes difficult to get. Other raw materials included sisal 18% and palm tree 3%. From these raw materials, various products were made such as stools 59%, sofa sets 54.5% and mats 50% among others. Mats and baskets were the cheapest.

Socio-economic factors significantly influenced the purchase of woven products at p-value= 0.000; especially through peer-conformity/ social influence and self-image. Consumers' level of education, monthly income and occupation were also significant at p-value= 0.010, 0.000, and 0.001 respectively. Majority of the respondents; especially those with low level of income considered woven products affordable; especially those made from papyrus reeds.

Environmental concern and environmental awareness/ knowledge also significantly influenced the purchase of woven products at p-value= 0.000. Consumers who were environmental concerned were more likely 1.1 times to purchase woven products than those who had environmental knowledge/ awareness; 0.8 times. This finding shows the need of encouraging consumers to utilize their environmental knowledge and awareness towards promoting sustainable development; hence their concern for environment will increase as well.

Consumers' opinions and knowledge about woven products were significant at 0.0280, 0.0372, 0.0160, 0.0001 and 0.0001 levels that woven products can reduce rate of deforestation, are biodegradable, have eco-friendly life cycle, cheap and not only for low class people respectively. This reveals that there were some environmental benefits through the use of both water hyacinth and papyrus reeds in making products. Except for the availability of these products in the market was not significant at 0.8117 since some of the products were made on order, an issue which made customers who were in a hurry to miss these products.

RECOMMENDATIONS

1. Water hyacinth should be sourced everywhere and utilized extensively as they pose adverse effects on the aquatic ecosystems. Papyrus reeds on the other hand are often found along the shorelines protecting them from soil erosion and siltation; especially in Lake Victoria and River Nzoia, hence they should be sourced sustainably.
2. Formal education should be encouraged as it is found that consumers with adequate knowledge are able to make sustainable and informed decisions on products considered being eco-friendly. Social groups among peers, co-workers, families and friends among others should also be used as a platform to share information on environmental protection and conservation. In order to attract consumers with high level of income, more woven products should be customized by incorporating or blending them with cushions, leather or even glass materials to suite their lifestyle and fashion.
3. The market for woven products should be expanded in order to promote their availability while considering the quality of the products in order not to lose consumers' trust on these products by ensuring raw materials are well processed.
4. The outcome of the study should be used by environmental organizations as well as other parties concerned with conservation and protection of the environment to encourage people to not only look at the social and economic gains during their purchases, but also consider and view their purchase activities as one of the steps that an individual can take towards protecting and conserving the environment.

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