

Attitudes and Sustainable Urbanization: Towards Integrated Planning Model for Homa Bay Town, Homa Bay County, Kenya

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Abstract: Whereas attention is being directed towards urban infrastructure and proper urban planning by urban planners they have invariably ignored the attitudes of residents towards sustainable urbanization and sustainability yet the economic, social, and environmental planning practices of societies embodying 'urban sustainability' have been proposed as antidotes for negative urban trends. The paper reports the findings of a study involving 453 respondents drawn from urban resident population of Homa Bay town, a rapidly growing urban settlement at the shoreline of Lake Victoria in Western Kenya. The study used a descriptive survey design based on mixed methods of inquiry to examine the attitudes of residents towards sustainable urbanization. The parameter of analysis was based on carefully selected 11 domains of sustainable urbanization behaviours that represent a diversity of urban issues. Linkages between Residents Attitudes towards sustainable urbanization (RASU) and Residents Knowledge towards Sustainable urbanization (RKSU) and Practises and activities that promote sustainable Urbanization (PASU) is analysed using predefined study hypotheses. The findings are used to develop a predictor model of urban sustainability. Results show that the attitude of residents is negatively egoistic. The residents are found to have high knowledge on sustainability which does not automatically translate to practises and activities that promote sustainable urbanization. The residents mean attitude towards sustainable urbanization and activities that promote it was negatively egoistic. Residents with high knowledge of understanding of the nature and characteristics of sustainable urbanization reported better sustainable urbanization activities and practices. Additionally, those with high income report a positive biospheric attitude towards sustainable urbanization. The resident's attitude towards sustainable urbanization significantly predicted practices and activities towards sustainable urbanization. Gender and the Residents Knowledge on sustainable urbanization were found not to be significant predictors of resident's practices and activities towards sustainable urbanization. Attitudes towards ecologically conscious consumer behaviour, ecological waste management and biodiversity protection together significantly predicted 65.6% of the variation in resident attitude towards sustainable urbanization. Integration of attitudes together with focus on this domains is recommended for better sustainability of urban areas.

Keywords: Attitude, sustainable urbanization, Practices, Sustainability, Egoistic, Altruistic and Biospheric.

I. INTRODUCTION

A vision for cities has never been more important than it is today. More than half of the world's inhabitants live in cities and this migration trend is expected to continue. By 2050 more than two-thirds of the world will be urban dwellers. ^[1] Cities are the foundation of modern civilization; they are the engine room of economic growth and the centers of culture, entertainment, innovation, education, knowledge, and political power. ^[2] It is projected that if current trends continue, between 2000 and 2030 urban land cover is expected to triple, while urban populations are expected to nearly double.

Most of the growth is expected to happen in small and medium-sized cities, not in megacities.^[3] By 2050, 7 in 10 people will live in urban areas. Every year, the world's urban population increases by approximately 60 million people. Before 2020, more than half of the total population in developing countries is expected to be living in cities and towns.^[4] By the end of the current decade its urban population will have increased by 50% and the total number of urban dwellers in 2040 is expected to be five times that of 2010. It follows, therefore, that Eastern Africa will face huge challenges associated with massive urban population increases; monumental new and additional demands for the provision of adequate and affordable housing and urban services; and, perhaps most importantly, urban based income-generation opportunities. Kenya will have to accommodate 38.1 million new urban dwellers by 2050.^[5] Mounting evidence indicates that rapid urbanization, especially in developing countries like Kenya, calls for major changes in the way in which urban development is designed and managed, as well as substantial increases of public and private investments in urban infrastructure and services.^[6]

While cities are incubators of innovation and help foster increased employment and economic growth, rapid urbanization has brought with it enormous challenges, including inadequate housing, increased air pollution, and lack of access to basic services and infrastructure.^[7] Therefore, it will be under the auspices of cities where we will succeed or fail in achieving our goals of poverty eradication, equality, climate change reduction, and ensuring healthy lives. It will be the cities that determine if we achieve inclusive economic growth or yield to greater inequality. It is in cities where people will seek opportunities for higher education and employment. And, it will be cities that determine if we will continue our steadily increasing usage of the world's resources or if we can realize a more sustainable path.^[8]

Urban areas are the scene of highly complex socio-environmental developments and critical sites of the necessary transformations to sustainability. They are the locus of economic expansion and employment opportunities; provider of resources and knowledge useful to improve social wellbeing and reduce poverty; prime mover of cultural and social changes. Despite the associated benefits they concentrate poverty, social inequality, and environmental degradation. How urban areas are designed, managed and used is likely to shift substantially based on demands created by two powerful trends. One trend involves a growing awareness of a threat to the sustainability of the Earth's natural environment; the second is the rapid urbanization. Combined, these trends call for massive development of new buildings and infrastructure, along with new social and cultural institutions, to accommodate vast numbers of city dwellers without irreparably harming the natural environment.^[9] Attitudes towards sustainable urbanization has not, to date, gained a central position in national policy debate and discourses in most countries. Concerns about the costs of urbanization and the sustainability of urban areas receive relatively little comment in public discussion compared to national economic, political, and security concerns power^[10] Whereas attention is being directed towards urban infrastructure and proper urban planning by urban planners they have invariably ignored the attitudes of residents towards such initiatives yet the economic, social, and environmental planning practices of societies embodying 'urban sustainability' have been proposed as antidotes for negative urban trends.^[11]

Yet it has been mentioned that changes in human values, attitudes, and behaviours is required in order to achieve a sustainability transition that will meet human needs and reduce hunger and poverty, while maintaining the life support systems of the planet.^[12] Attitudes, beliefs and values have however been linked to natural environment degradation.^[13] Sustainable urban development needs a number of changes in attitude and approach on the part of local authorities, urban planners and the local population. It is always difficult to modify deeply rooted routines, moreover, new procedures are sometimes against the short-term interests of a part or the majority of the population (e.g. the costs of the introduction of selective waste collection). The change in behaviour cannot be decreed from above - it can only be achieved through persuasion and motivation. This in turn means that the public must have the right of participation and co-determination. There are limited survey data on public attitudes toward "sustainable development" as a holistic concept and even much less, attitudes towards sustainable urbanization. Advocates of sustainable development recognize that its realization would require changes in human values, attitudes and behaviours, yet relatively little is known about the long-term global trends in values, attitudes, and behaviours that will both help or hinder a sustainability transition.^[14] Currently there has been attempts to measure sustainable behaviour, but evidence remains anecdotal and fragmented. Additionally, the evidence base has failed to establish why some groups of people act in a more sustainable manner than other groups or whether financial and economic determinants are at the root, or there are some cultural values that lie at the base that may explain this variance in behaviour^[15] This paper presents the findings of a study based on one of the key objectives of a doctoral thesis by the author. The study examined the knowledge and attitudes of the respondents across selected six attitudinal domains and their interactions with various socio-demographic determinants. The findings are subsequently outlined in this paper.

II. LITERATURE REVIEW

A. Attitudes and sustainability:

Most advocates of sustainable development recognize the need for changes in human values, attitudes, and behaviours in order to achieve a sustainability transition that will meet human needs and reduce hunger and poverty while maintaining the life support systems of the planet. *Attitudes* refer to the evaluation of a specific object, quality, or behaviour as good or bad, positive or negative. Attitudes often derive from and reflect abstract values.^[16] Several studies have linked sustainability or lack of it to attitudes. Such attitudes have been shown to differ both by the levels of education, income sources as well as whether the persons were in an urban area or rural set up. Results show that urban respondents exhibit egoistic attitudes while suburban participants who are in close contact with nature show biospheric attitudes. Significant correlations were seen between egoistic attitude and value of self-enhancement (0.73) in case of urban participants and between biospheric attitude and the value of self-transcendence (0.59) for suburban participants. Many of the variables that show some consistency with respect to environmental attitudes, display weak or inconsistent relationships to environmental behaviours. Women appear to practice more pro-environment behaviours than men only for those actions that are personal, private, and related to the household. Place of residence, either rural or urban, may serve instead, as a surrogate measure of extractive-non-extractive behaviours and occupations and increasingly has become a vague and inconsistent variable of measurement.^[17] Many studies in different regions of the globe have revealed conflicting results about the effect of gender on environmental behaviour.^[18]

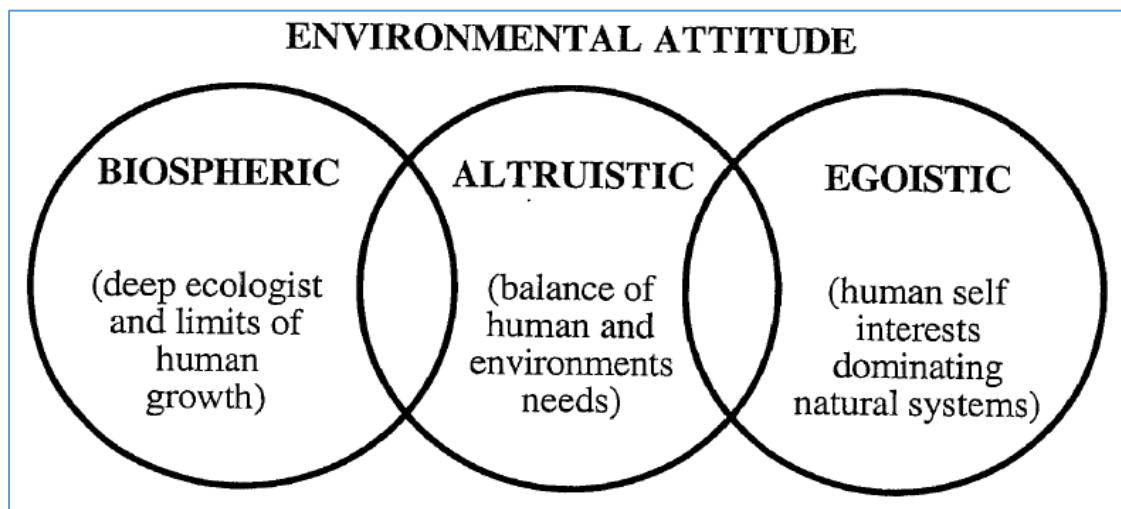
Researchers have identified a phenomenon whereby women report greater concern for the natural environment than men. Yet surprisingly little empirical work has attempted to identify potential determinants of this gender difference, leaving unanswered the question of why women seem to care more for the environment. Female are more concerned than men for the natural environment.^[19] Six (6) of 9 studies found significant gender differences in environmental concern (assessed utilizing New Environmental/Ecological Paradigm), where women expressed greater concern than men. Gender differences also exist between priorities of environmental concern, which can be described as being *egoistic* (environmental concern centred on the self), *social-altruistic* (environmental concern centred on other humans, e.g., children) and *biospheric* (environmental concern centred on the biosphere, e.g., plants, animals). Significant gender differences with women scoring higher than men on all three concerns has been recorded. It has been concluded that, "...no firm conclusions can be drawn about effects of gender on concern about general environmental issues, and more analysis and explanation clearly needs to be done in this area."^[20]

B. Environmental Attitudes:

When an individual is aware of harmful consequences to others and when that person takes responsibility for changing the offending environmental condition the environment benefits. Persons with a strong selfish and competitive orientation are less likely to act ecologically also people who have satisfied their personal needs are more likely to act ecologically because they have more resources (time, money and energy) to care about bigger, less personal social and pro-environmental issues.^[21] Three types of attitudes are thus distinguished in literature. Social altruism (concern for the welfare of others) and biospheric altruism (a concern for the non-human elements of the environment) play in influencing green behaviour. These three attitudinal values are often assumed to fall along a continuum from low (not concerned) to high (very concerned). These attitudes might reflect general concern for environmental issues, or attitudes about specific issues like recycling, energy conservation, or public transportation. However, research suggests that there are different types of attitudes, and that two people can be equally concerned about environmental problems, but for very different reasons.^[22]

Egoistic concerns are focused on the individual, and reflect a concern about environmental problems for self. These concerns include personal health, financial well-being, quality of life, and availability of resources. Altruistic concerns focus on people other than self, including friends, family, community, future generations, or humanity. Finally, biospheric concerns focus on all living things, including plants, animals, ecosystems, and the biosphere.^[23] Those with altruistic do so with moral imperatives such as the Golden Rule: "*Do unto others as you would have them do unto you*" People who apply such values judge phenomena on the basis of costs or benefits for a human group, such as community, ethnic group, nation-state, or all humanity.^[24] When biospheric attitude and altruistic attitudes towards environment are significant the value of self-transcendence or environmental consciousness is reflected while when the egoistic attitude towards environment is high the value of self-enhancement is perceived. Participants of suburban areas are more 'ecologically converted' and have a humble and loving way of thinking and manner of acting toward the Earth and are thus 'moving to higher levels' of consciousness.^[25]

Biospheric values reflect a key concern with the quality of nature and the environment for its own sake, and altruistic values that particularly reflect an interest for the well-being of other human beings. People with strong egoistic values will especially consider the consequences of environmental choices for them personally: when the perceived benefits exceed the perceived costs they have pro-environmental preferences and will act pro-environmentally and vice versa. People who strongly endorse altruistic values will base their decisions related to the environment on the perceived costs and benefits for other people. Finally, people who strongly value the biosphere and the environment will mainly base their choices on the perceived costs and benefits of actions for the ecosystem and biosphere as a whole. Often altruistic and biospheric values are positively related to environmental beliefs, norms, and actions, because such beliefs, norms, and actions generally benefit the well-being of others and the biosphere. However, in general, biospheric values are stronger predictors of environmental beliefs, norms, and behaviours than are altruistic values.^[26] has summarised these attitudes diagrammatically as shown in Fig. 1.



Source: (De Groot, 2012).

Fig 1: The environmental attitudes interphase

People scoring highly on the egoistic scale would act to safe guard the environment if the perceived benefit to them was greater than the expected cost. For example, people would act to save a burning bushland habitat if they feared the fire might damage their property. People scoring highly on the altruistic scale would safeguard and protect the environment to conserve them and /or to protect other people. For example, by acting to preserve environment for future generations or to prevent people from drinking polluted water. Thus, both people and environment benefit but neither at the expense of other people. People scoring highly on the biospheric scale would act to safeguard environments to protect, for example, other species and natural systems from human excesses, thereby limiting human exploitation of environments and development even if this increased, for example, unemployment or threats to their wellbeing. The altruists limits concern for others to that of humans. If the concern for others extend to include other species and the environment then it becomes biospheric. It is important to observe that any one individual may have an environmental attitude that is composite of more than one dimension even if one dimension dominates. There is overlaps between biospheric and altruistic but there is no commonality between biospheric and egoistic dimensions. This means a fundamentally egoistic environmental attitude is inconsistent with a biospheric component and vice versa.^[27]

III. MATERIALS AND METHODS

The study was based on a descriptive survey design utilising mixed methods and involving 453 respondents—234 (51.7%) male and 219 (48.3%) female residents randomly drawn from nine major residential estates in Homa Bay town. The mixed methods approach was adopted given its increased recognition for its strength and adequacy and ability to enhance internal validity and reliability of results^[(28); (29); (30) and (31)]. Since the study intended to examine the attitude of residents towards sustainable urbanization, a complex multifaceted phenomena and compare the trends with respect to various socio-economic characteristics such as age, gender, level of education and place of residence, this design was considered appropriate^[32] The residential estates were clustered together into high and low income residential areas and

systematic random sampling used to identify individual households whose heads were interviewed. A structured survey questionnaire was administered to the household head. The questions were tested for internal validity using the alpha Cronbach test which returned results of alpha coefficient of 0.724—0.868 which were established to be within the range of an alpha of .65 to .80 that by convention is often considered an “adequate” scale in human dimensions research^[(33), (34)].

In tandem, qualitative inquiry was undertaken and involved administration of key informant interviews to 14 key informants that were purposively identified based on their roles as the Town Managers or interactions with town residents. Quantitative data from the study was subjected to quantitative analysis using SPSS V 20 and descriptive statistics including frequency counts, percentage, mean, standard deviation was used for analysis and interpretation of data. In addition, statistical tests like Correlation coefficients was used for hypothesis testing and 0.05 level of probabilities was used as the basis for exploring relationship between the concerned variables throughout the study. The Pearson Correlation test allowed investigation of the strength of the relationship between two continuous variables and showed if there was be a positive or negative linear relationship. Qualitative data from key informants was transcribed, coded and analysed using thematic/content analysis and examined for trends, associations and patterns. The verbatim citations and anecdotes have been incorporated in the discussions to corroborate the findings obtained in the survey questionnaire. For this study, a significance level of 0.05 has been used. This means that the results of the hypothesis tests (used in regression, t-test and ANOVA) are less than 5% likely to have occurred by chance. Necessary tables and categories was used to classify the data considering their nature and distribution.

Based on a careful review of literature and expert opinion on the field of sustainable urbanization and review of related studies by authors such as^[35, 36, and 37] the study identified 11 domains of sustainable urbanization behaviours that represent a diversity of urban issues. In total, 47 attitudinal questions were selected in the domain of energy conservation (2), Ecologically conscious consumer behaviour (7), Biodiversity protection (7), urban infrastructure (1), Rational automobile use (4), Ecological waste management (9), Just and equitable society (5), Urbanization effect on hinterlands (5), water conservation (2), ecological responsibility (3) and urban governance (3).

A set of 47 attitudinal questions was administered to 453 residents of Homa Bay Town for each of the domains which they were expected to either Agree, Disagree, Strongly Agree or Strongly Disagree. The attitudinal questions were both positively and negatively phrased and touched on elements key to economic, ecological and social sustainability. Economic sustainability questions considered issues of the poor and economic growth and effects of Town’s growth on wellbeing of the residents. Ecological sustainability questions tested various issues including solid waste management, pollution, role of wetlands in the ecosystem, tree planting, environmental quality, biodiversity, urban pollution, anthropogenic pollution, energy conservation, water conservation, environmental laws and regulation, clean production, role of open spaces, socio-cultural effects of urbanization among others. Three types of attitudes was recognized as discussed before, egoistic, altruistic and biospheric. Egoistic was mainly based on personal benefits and was thus seen as negative while biospheric and altruistic were seen as positive because they enhanced sustainable urbanization.

To enable analysis using parametric tests, the Likert scale was collapsed into two variables. The responses were recoded with all the correct answers that were desirable to promoting sustainable urbanisation recoded as 1 and labelled as Positive Biospheric/Altruistic while wrong answers were recoded as 0 and labelled as negative egoistic Attitude. As an illustration for the question that examined the role of wetlands in the ecosystem and phrased as “*Swampy areas within the town should be drained and converted into development projects because they are a nuisance and breeding sites for mosquitoes*” 42.5% agreed, 13.7% disagreed, 31.5% Strongly agreed while 12.3% Strongly Disagreed.

The desirable attitude that promotes sustainability of an urban area in this instance is either disagree or strongly disagree since wetlands are crucial to natural ecosystems. Disagree and strongly disagree responses were thus recoded to one (1) and labelled Positive biospheric attitude while agree and strongly agree were recoded to zero (0) and labelled negative egoistic attitude because they were based on self-interest and not welfare of others and common good of the urban environment. This action was undertaken for all the 47 attitudinal questions for all the domains as reported in the subsequent tables. Scores were then computed by taking into account the positive biospheric attitude scores. Residents that scored at least 28/47 (60%) were categorised as positively biospheric, however those that scored less than 60% were categorised as negatively egoistic. Inferential statistics including regression and correlation analysis is used to establish a model of sustainability for residents that incorporates attitudes. All the analysis are undertaken at a confidence of 0.05. Chi-square and analysis of variance (ANOVA) is used in hypothesis testing.

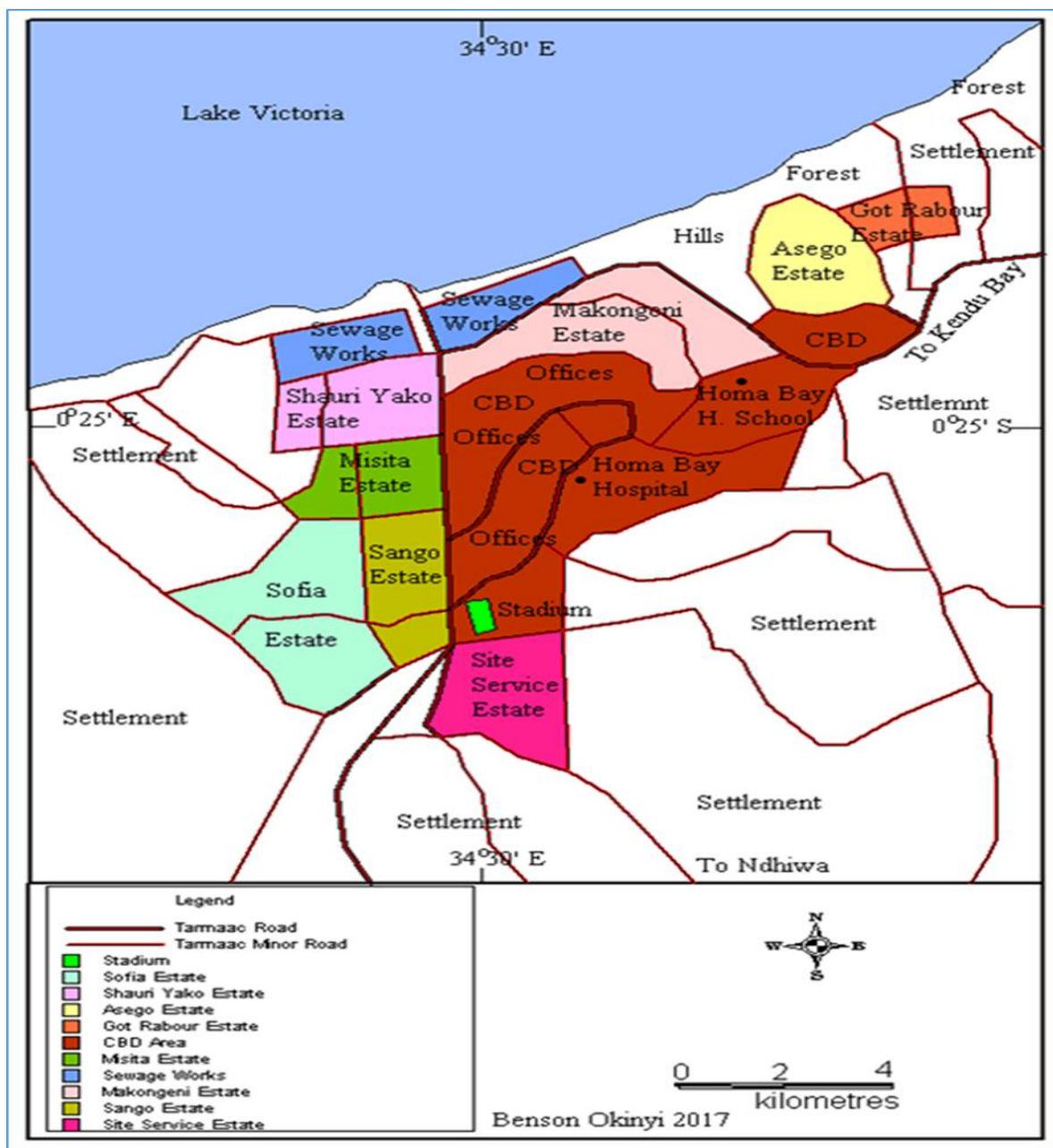
IV. ETHICAL CONSIDERATION

This study was conducted within strict confines of research ethics and was approved by the National Council for Science and Technology. It met the expected rigors of privacy and confidentiality, voluntary participation of respondents and right to withdrawal at will.

V. STUDY AREA

Homa Bay town is situated on latitude 3400 46'E and longitude 0000 40'S and it covers an area of 29 km² out of which 9 km² falls within the Central Business District (CBD) while the rest consists of peri-urban settlements. It is along the North-Eastern part of Lake Victoria, 105 kilometres South of Kisumu City and 405 kilometres southwest of Nairobi. The total area of the Town is about 197 km², of which Lake Victoria covers about 97 km². The town has several residential estates, the most populous being Sophia, Shauri Yako and Makongeni. The Map 1 shows these areas.

Map 1: The map of Homa Bay Town showing residential estates



Source: Author

V1. SOCIO DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**Table 1: Socio-demographic characteristics of the study respondents**

	Male (%)	Female (%)	Total (%)
Duration of stay in Town			
1-10 years	71.2	78.1	74.65
11-20 Years	19.7	16.7	18.20
21-30 yrs	7.0	3.8	5.40
>30 yrs	2.2	1.4	1.80
Age (yrs)			
0-18	1.3	3.7	2.50
25-35	25.0	28.6	26.80
36-60	49.6	50.7	50.15
>60	24.1	17.1	20.60
Marital Status			
Not married	14.6	7.3	10.95
Divorced	0.0	1.4	0.70
Separated	0.9	1.8	1.35
Widowed	0.4	4.6	2.50
Married	58.4	64.4	61.40
Single	25.8	20.5	23.15
Education Level			
Lower Primary	7.7	8.7	8.20
Upper Primary	16.7	22.8	19.75
O-level Secondary	33.8	33.3	33.55
University Education	29.1	28.8	28.95
Postgraduate	12.8	6.4	9.60
Employment Status			
Regular gainful employment	24.4	16.9	20.65
Informal Sector	42.7	40.2	41.45
Unemployed	32.9	42.9	37.90
Income Levels			
0-5000	33.8	42.9	38.35
5001-10000	41.0	36.1	38.55
10001-50000	23.1	20.1	21.60
>50000	2.1	0.9	1.50
ALL	234	219	453

Source: Authors' survey

The study respondents were drawn from primarily urban residents. In overall, 74.6% of the respondents had been living in the town for a period ranging between one year and ten years. Less than 2% had lived in the town for more than 30 years while 5.4% had lived in the town for a period between 21-30 years.

In regard to age, majority (50.15%) were aged between 36-60 years. Only 20.60% of the respondents were aged over 60 years. The youths aged between 25-35 years comprised 26.80% of the respondents.

As far as their marital status was concerned, 10.95% were not married, 0.70% were divorced, 1.35% were separated, 2.50% were widowed and majority (61.40%) were married. A further 23.15% were single as at the time of the study.

In reference to their education levels, 8.2% had lower primary education as the highest level attained, 19.75% had upper primary level of education, 33.55% had O-level of education, 28.95% had university level of education while 9.60% had acquired post graduate level of education.

As regards their occupational status, 20.65% had a regular gainful employment, 41.45% were employed in the informal sector, and 37.90% were unemployed. Their income levels varied with 38.35% having monthly incomes of between 0-5000, 38.55% earning between 5001-10,000, 21.60% netting between 10001 and 50000 while only 1.5% earned above 50,000 Kenya shillings.

These variations are reported in Table 1.

VII. RESULTS AND INTERPRETATION OF FINDINGS

A. Attitudes of residents towards sustainable urbanization:

The study established that 80.4% of the residents were negatively egoistic while only 19.6% were positively biospheric. Results of the T-test showed the $t(100.53) P > .01 MD = 49.58$. There was a significant difference ($P > .01$) by gender with 25.2% male being positive biospheric compared to 13.7% for female. There was also reported difference by level of income with 30.5% of those with high income being positively Biospheric ($P > .01$) compared to 16.4% low income residents. The study established that in all the domains, the residents had a negative egoistic attitude towards sustainable urbanisation except in the domain of energy conservation and sustainable urban infrastructure which had a mean of 75.43% and 63.58% respectively. The lowest rated domain was ecologically conscious consumer behaviour (36.83%) followed by ecological responsibility at 40.91%. The results of other domains are as shown in Table 1.

Table 1: Summary of domain scores

The Attitude Domain	N	M (%)	SD	Mean Attitude
Energy conservation	411	75.43	32.64	Positive Biospheric
Ecologically conscious consumer behaviour	453	36.83	25.89	Negative Egoistic
Biodiversity Protection	453	50.39	20.76	Negative Egoistic
Rational automobile use	453	55.56	32.23	Negative Egoistic
Ecological waste management	453	42.43	19.21	Negative Egoistic
Just and equitable urban area	453	54.13	22.06	Negative Egoistic
Sustainable urban infrastructure	453	63.58	48.17	Positive Biospheric
Controlled effect on urban hinterlands	453	55.59	19.23	Negative Egoistic
Water conservation	453	50.00	36.13	Negative Egoistic
Ecological responsibility	453	40.91	29.06	Negative Egoistic
Urban governance	453	59.16	25.91	Negative Egoistic

Source: Author's survey

To further test the hypothesis, that "the overall mean value of attitude of residents' towards sustainable urbanization and activities that promote it is not egoistic," a chi-square test was run comparing attitudes towards sustainable urbanization and the mean of residents on practices and activities that promote sustainable urbanization (PASU). The findings of this analysis is reported in Table 2.

Table 2: Summary of Chi-square test results on attitude and activities/practices that promote sustainable urbanization

		Practices on SU		Total	
		Unsustainable urbanisation (USU)	Sustainable urbanization (SU)		
Attitude	Negative Egoistic	86.5%	13.5%	100.0%	
	Positive Biospheric/Altruistic	66.3%	33.7%	100.0%	
Total		82.6%	17.4%	100.0%	
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	20.360(b)	1	0.000		

A. Computed only for a 2x2 table

B. 0 cells (.0%) have expected count less than 5. The minimum expected count is 15.52.

The chi-square test performed to examine the relation between sustainable urbanization and practices that promote it and the mean attitude of the residents towards sustainable urbanization (SU) established that the relation between these variables was significant, $X^2 (1, N = 453) = 20.36, p < .01$. The residents mean attitude towards sustainable urbanization and activities that promote it was *negative egoistic*. Accordingly, the null hypothesis is accepted and the alternative hypothesis rejected. What this means is that the residents will most likely be involved with activities and practices that benefit them and will be less concerned about effects to other people or other biodiversity that occupy the town. This kind of an attitude does not facilitate sustainability and requires changes in life styles and practices.

B. Knowledge and attitude on sustainability interphase:

The study investigated the influence of knowledge on sustainable urbanization on the practices and activities that promote sustainable urbanization (PASU). Such actions included identifying with the poor, engaging in cleaner production, energy conservation, adopting public transport instead of private means, changes in lifestyle to reduce waste, urban agriculture, tree planting, active participation in Town development, participation in elections, and disaster preparedness among others. The respondents were given a set of 17 questions to which they were supposed to either agree or strongly agree, disagree or strongly disagree for instance "I have replaced my cooking 'jiko' with energy saving 'jiko'" or "I have identified with the poor and shared with them part of my income to support their livelihoods." Correct responses were those that promoted sustainable urbanization were recoded as 1 and labelled "sustainable urbanization" practice (SUP) practices while those that were harmful were recoded as 0 and labelled "unsustainable Urbanization practices" (UUP). The residents were given scores out of 17 for questions responded to correctly and converted to percentages. The percentage scores based on sustainable urbanization practice responded to, constituted the respondent's PASU. Overall economic sustainability had the lowest overall score of 40.95%, followed by ecological sustainability (47.72%) while social sustainability performed better at 69.44%. A sample of the responses is reported in Table 3.

Table 3: Responses on activities/practices that promote ecological sustainability

NO	Ecological sustainability statements	(%) SUP	(%) UUP
ES1	I have replaced all my light bulbs with energy saving bulbs	72.6	27.4
ES2	I have replaced my cooking jiko with energy saving jiko	71.7	28.3
ES3	I have changed my lifestyle to reduce waste	70.2	29.8
ES4	I carry my own basket to the supermarket to buy goods	23.2	76.8
ES5	I have been involved in sensitization of people close to me in the importance of keeping the town environment clean	45.5	54.5
ES6	I have my own dustbin that I use to collect wastes and dispose appropriately	83.7	16.3
ES7	I have always insisted on dumping my wastes in designated dustbins and County dumping sites	76.4	23.6
ES8	I have planted food crops in my urban plot to consume with my family members and supplement the food I buy in the market	28.7	71.3
ES9	I have planted a tree in my compound in the last six months	28.7	71.3
ES10	I have seen the Town development plan and I am sure it is being followed as expected	22.1	77.9
	Total Score		47.72

Source: Authors survey

The findings showed that 82.6% of the residents were engaged in unsustainable urbanization practices (UUP) as opposed to 17.4% who were engaged in sustainable urbanization activities/practices (SUP). A t-test score for this parameter was significant, $t (58.39) P > .01, MD = 46.17$. The finding was statistically significant by gender ($P = 0.00$) with a greater percentage of male (23.1%) engaged in sustainable urbanization compared to female (17.1%). There was also a statistically significant difference by level of income ($P = 0.00$) and showed that 24.8% of those with *High income* engaged in sustainable environmental practices/ activities compared to 14.7% of those with low income. To test the hypothesis that "the activities, actions and practices of urban residents' is not influenced by their knowledge and understanding of the nature and characteristics of sustainable urbanization", a Pearson's correlation test was run between scores on practices and activities of sustainable urbanization (PASU) and the resident's knowledge on sustainable urbanization (RKSU). The result of the correlation is reported in Table 4.

Table 4: Correlation between PASU and RKSU

		Total Percentage score	Percentage activities and practices
Resident's knowledge on sustainable urbanization (RKSU).	Pearson Correlation	1	.109(*)
	Sig. (2-tailed)	.	.020
	N	453	453
Practices and activities (PASU)	Pearson Correlation	.109(*)	1
	Sig. (2-tailed)	.020	.
	N	453	453

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

Four hundred and fifty three (453) residents of Homa Bay Town were surveyed about their practices and activities that promote sustainable urbanization (PASU) ($M=46.17$, $SD=16.83$) and their level of knowledge and understanding of the nature and characteristics of sustainable urbanization (RKSU) ($M=64.26$, $SD=19.12$). A Pearson's r data analysis revealed a weak positive significant correlation ($r=0.109$). Residents with *High Knowledge* of understanding of the nature and characteristics of sustainable urbanization reported better sustainable urbanization practices/activities. Based on this finding the null hypothesis is accepted while the alternative hypothesis is rejected. The results showed that among residents with *high knowledge* on sustainable urbanization, 70.8% reported a biospheric/altruistic attitude compared to 29.2% among those with *Low Knowledge* on sustainable urbanization and this was statistically significant ($P=0.01$). Chi-square analysis comparing attitude of the respondent towards sustainable urbanization and their level of knowledge on sustainable urbanization revealed that significantly larger percentage of those with *High knowledge* (70.8%) had a positive biospheric attitude compared 49.7% of those with *Low knowledge* ($\chi^2= 12.765$, $df=1$, $p < .01$).

Four hundred and fifty three (453) residents of Homa Bay Town were surveyed about their attitudes towards sustainable urbanization ($M=49.58$, $SD=10.50$) and their level of knowledge and understanding of the nature and characteristics of sustainable urbanization ($M=64.26$, $SD=19.12$). A Pearson's r data analysis revealed a weak positive significant correlation ($r=0.263$). Residents with *High Knowledge* of understanding of the nature and characteristics of sustainable urbanization reported positive biospheric/altruistic attitude towards sustainable urbanization. The important finding is that there is a correlation between knowledge on sustainable urbanization and the attitude towards sustainable urbanization and sustainability a key pointer that when adequately informed about the benefits of sustainable practices they would have an attitude shift to a more biospheric attitude. To further understand the interphase, the hypothesis that "the mean value of attitudes towards sustainable urbanization is not positive, when the mean value of knowledge levels towards sustainability is high," was subjected to a correlation test whose scores are shown in Table 5. The findings were found to be significant and accordingly the null hypothesis accepted and alternative hypothesis rejected.

Table 5: Correlation between Percentage attitude score and Knowledge on sustainable urbanization

		Percentage attitude score	Knowledge on sustainable urbanization
Percentage attitude score	Pearson Correlation	1	.263**
	Sig. (2-tailed)		.000
	N	453	453
Knowledge on sustainable urbanization	Pearson Correlation	.263**	1
	Sig. (2-tailed)	.000	
	N	453	453

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

Source: Author's survey

The findings of this study is consistent with other similar findings of related nature. Research tends to find weak or even positive association between knowledge and environmental concern (attitude).^[38] Other studies have also indicated that knowledge has influence on attitudes. It has been reported for instance that greater knowledge about manatees was positively correlated with support for manatee protection and that knowledge correlates with positive attitudes and may be used as a predictor of local attitudes. The study concluded that "Environmental attitudes were more potent than factual knowledge in promoting pro-environmental travel behaviour," that is, attitudes explained more of the variation in behaviour than knowledge did."^[39]

The study found knowledge on sustainable urbanization to be significant predictor of intention to purchase. Therefore, a positive relationship between ecological knowledge and behaviour still prevails. Individual ecological behaviour is highly dependent upon his/her ecological knowledge, affect and intention. A related study^[40] concluded that, the more knowledge people possess about environment, the less likely they are to be alarmed about potential for environmental disaster in the future. This is a near similar conclusion to the finding of this study on the relationship between knowledge and sustainable urbanization. It must however be noticed that contrary to most findings that tend to suggest that women have better knowledge on environmental conservation, this study has indicated that the male have better knowledge of sustainable urbanization than the female counterparts. This may be attributed more to gender disparities in education in the area of study and not necessarily the natural inherent knowledge on protection of the environment that a large proportion of the studies have tended to interrogate.

C. Interaction between urban resident's attitudes and their education level:

This study established no statistically significant findings on the interaction between attitudes and education level of residents. The finding showed that 36.5% of those with High education level had a negative egoistic attitude compared to 47.2% among those with Biospheric/ altruistic attitude. A total of 453 residents of Homa Bay Town were surveyed about their attitudes towards sustainable urbanization ($M=49.58$, $SD=10.50$) and the mean years they have taken in school ($M=12.8$, $SD=4.29$). A Pearson's r data analysis revealed a weak positive non-significant correlation ($r=0.070$) $P=n.s$. The alternative hypothesis that, "the mean total attitude towards sustainable urbanization is not positive, when the mean educational level is high" was thus accepted and the null hypothesis rejected. In reference to this finding it is worth noting that education should generally increase respondents' knowledge about environmental problems and should thereby also increase concern (attitude) for sustainability. Related studies have tended to clearly show that environmental concern is positively associated with education. The finding that mean years spent in school is not positively correlated to sustainable urbanization practices is thus a deviation from the expectation but sheds light on the fact that the urban environment is complex and dynamic and that other factors come into play to determine the attitude that persons have towards sustainability.^[41]

D. Interaction between Attitude and income levels:

The study considered high and low income residential areas however it was difficult to delineate the residential estate zones with respect to income levels.^[42] This is because the conventional ranking of high-income population may have the perceived 'rich' population of Homa Bay as poor or lower middle class since the income levels of Homa Bay Town is low and the relative cost of life is also low. Nonetheless, Chi-square analysis comparing attitude of the respondent towards sustainable urbanization and their income level revealed that significantly larger percentage of those with High income (30.5%) had a positive biospheric attitude compared 16.4% of those with Low income ($\chi^2= 10.154$, $df=1$, $p > .01$). Four hundred and fifty three (453) residents of Homa Bay Town were surveyed about their attitudes towards sustainable urbanization ($M=49.58$, $SD=10.50$) and the mean monthly income ($M=10583.05$, $SD=14116.23$). A Pearson's r data analysis presented in Table 6 revealed a weak positive significant correlation ($r=0.171 \leq 0.05$) $P > .01$. (See table 6). Those with high income report a positive biospheric attitude towards sustainable urbanization. Based on this analysis the null hypothesis that *the mean total attitude towards sustainable urbanization is not positive, when the mean income level is high*.is accepted.

Table 6: Correlation between Percentage Attitude and income of residents

		Percentage Attitude score	Monthly income
Percentage Attitude score	Pearson Correlation	1	.171(**)
	Sig. (2-tailed)	.	.000
	N	453	453
Monthly income	Pearson Correlation	.171(**)	1
	Sig. (2-tailed)	.000	.
	N	453	453

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

Source: Author

In trying to understand this finding several contextual analyses is posited. Related studies have indicated that more affluent individuals are more concerned about environmental problems than the less affluent. This is due to two mechanisms. On one hand, wealthier individuals have less economic problems to worry about and are therefore freer to turn to other concerns. On the other hand, individuals with higher incomes generally consume more private goods and demand more public goods. Their willingness (and ability) to pay for better public goods is higher. The import of this finding is that attention on sustainability should be focused on the poor marginalized groups in the urban areas that have a potential to erode the gains of sustainability in the urban areas. Studies of the link between income and environmental behaviour have led to diverse conclusions. While some investigations have shown that income is negatively related to environmental concern^[44] others have concluded that concern grows as income rises^[45, 46]

E. Attitude and gender:

Chi-square analysis comparing attitude of the respondent's attitude towards sustainable urbanization (RASU) and their gender revealed that significantly larger percentage of male respondents (25.2%) had a *positive biospheric attitude* compared to 13.7% of female respondents ($\chi^2 = 10.154, df = 1, p < .005$). Four hundred and fifty three (453) residents of Homa Bay Town were surveyed about their attitudes towards sustainable urbanization ($M = 49.58, SD = 10.50$) and their gender. A Pearson's r data analysis revealed a weak negative significant positive correlation ($r = 0.181 \leq 0.05, P > .01$). It is concluded that male respondents report a positive biospheric attitude towards sustainable urbanization. Based on the finding, the null hypothesis posited that, "*the mean total attitude towards sustainability does not differ between genders*" is accepted and alternative is rejected. The findings of this study showing that male respondents report a positive biospheric attitude towards sustainable urbanization is inconsistent with related findings by other researchers. In a review of 32 published studies,^[41] reported that women tend to express more concern for environmental issues and to report engaging in pro-environmental behaviour and activism than men. From the three hypothesis tested, it was established that there are three principal predictors of attitude towards sustainable urbanization being the respondent's level of income, respondent's Knowledge on sustainable urbanization (RKSU) and respondent gender. To further determine the contribution of these predictor parameters, the Mean Resident's Attitude towards sustainable urbanization (RASU) ($M = 49.58, SD = 10.50$) was regressed first by Knowledge on sustainable urbanization (RKSU) ($M = 64.26, SD = 19.12$) and then by the other two predictors (gender and income levels). The results showed that in the first instance, Knowledge on sustainable urbanization (RKSU) significantly predicted 6.9% of the variation in attitudes towards sustainable urbanization while gender and income predicted 4.1%. In total, the three predictor parameters explained 11% of the variation in attitude towards sustainable urbanization meaning there are other factors that could explain variation in attitude towards sustainable urbanization.

An analysis of variance (ANOVA) on the model showed that it was significantly better at predicting the outcome than using the mean. Specifically, the F -ratio showed improvement on prediction than results from fitting the model (regression) relative to the residuals. The F -ratio for step 1 was 33.52 $P > .01$ and the second was 18.58 $P > .01$ which was far greater than 1 thus showing it was much greater than the inaccuracy. Based on this finding, the study concludes that the model significantly improves the ability to predict the resident's attitudes towards sustainable urbanization however there are far other factors that could explain the variation in attitudes towards sustainable urbanization other than the three parameters. The model summary is presented in Table 7 while Fig. 1, Fig. 2, and Fig. 3. Shows the various scatter grams of the regression models.

Table 7: Predictors of sustainable urbanization

		<i>b</i>	<i>SE b</i>	β
Step 1				
	Constant	11.58	3.45	
	Resident knowledge on sustainable urbanization (RKSU)	.69	.07	.435****
Step 2				
	Resident knowledge on sustainable urbanization (RKSU)	45.36	2.11	
	Resident knowledge on sustainable urbanization (RKSU)	.128	.025	.234***
	Respondent gender	-3.34	.938	-.16**
	Respondent income (Ksh)	8.705	.000	.117*

Note: $R^2 = .069$ for step 1 Δ in $R^2 = .041$, for step 2 $P = > .01^*$, $P > .01^{**}$, $P > .01^{***}$, $P > .01^{****}$

Source: Author

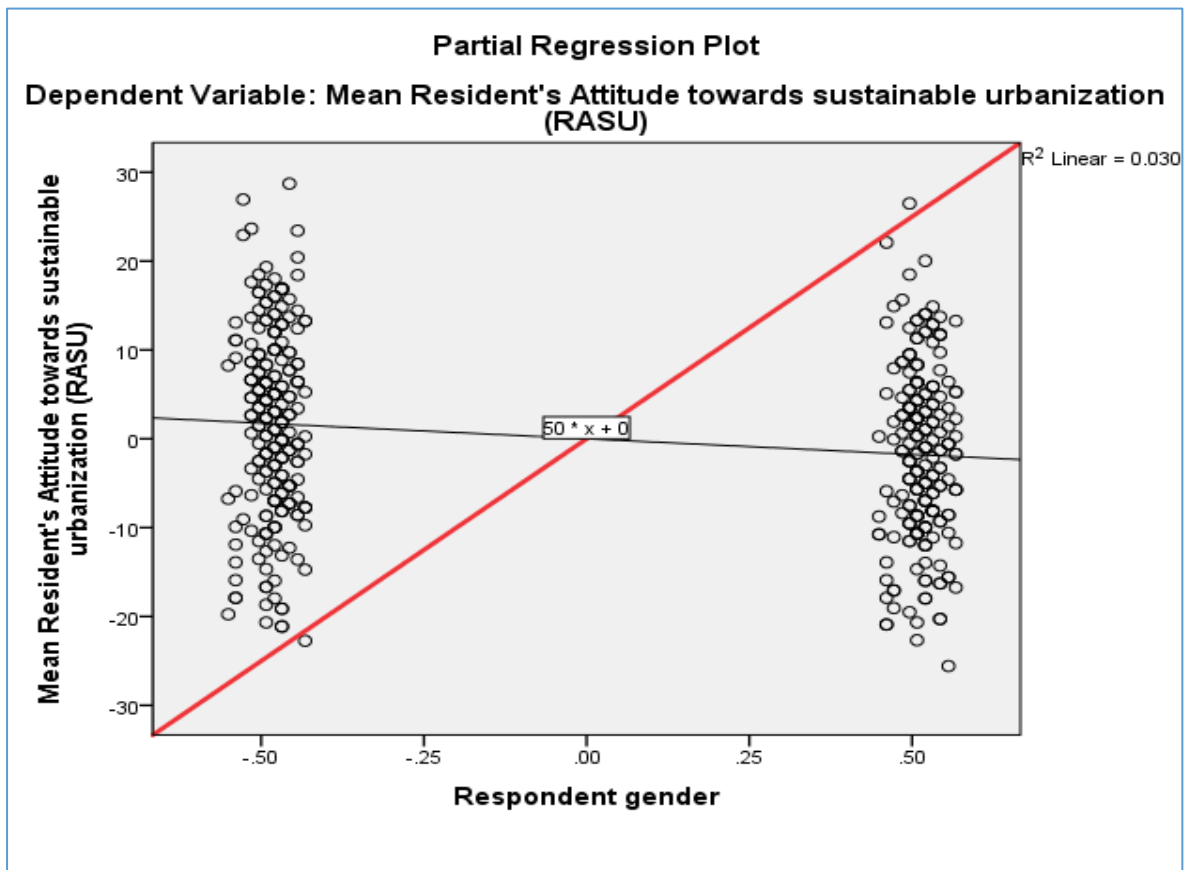


Fig 1: Scatter gram on respondent gender and RASU

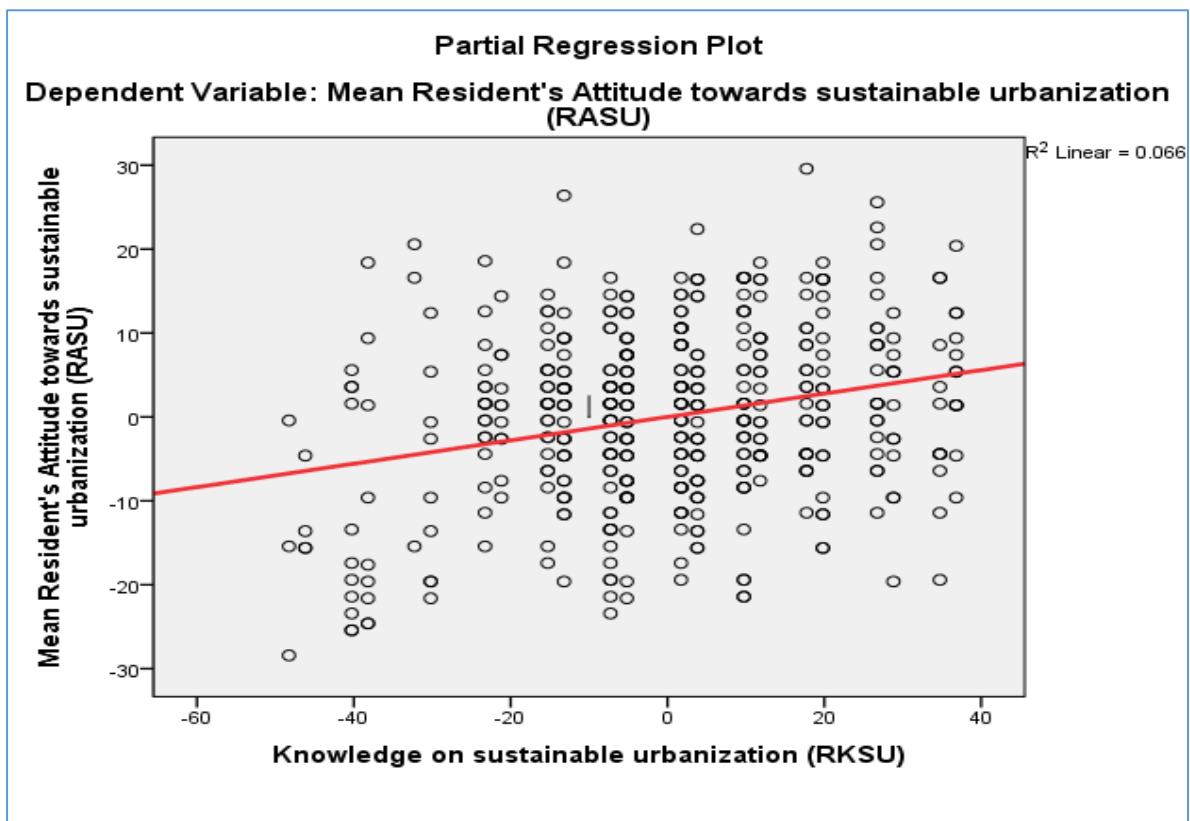


Fig 2: Regression scatter plot for RKSU against RASU

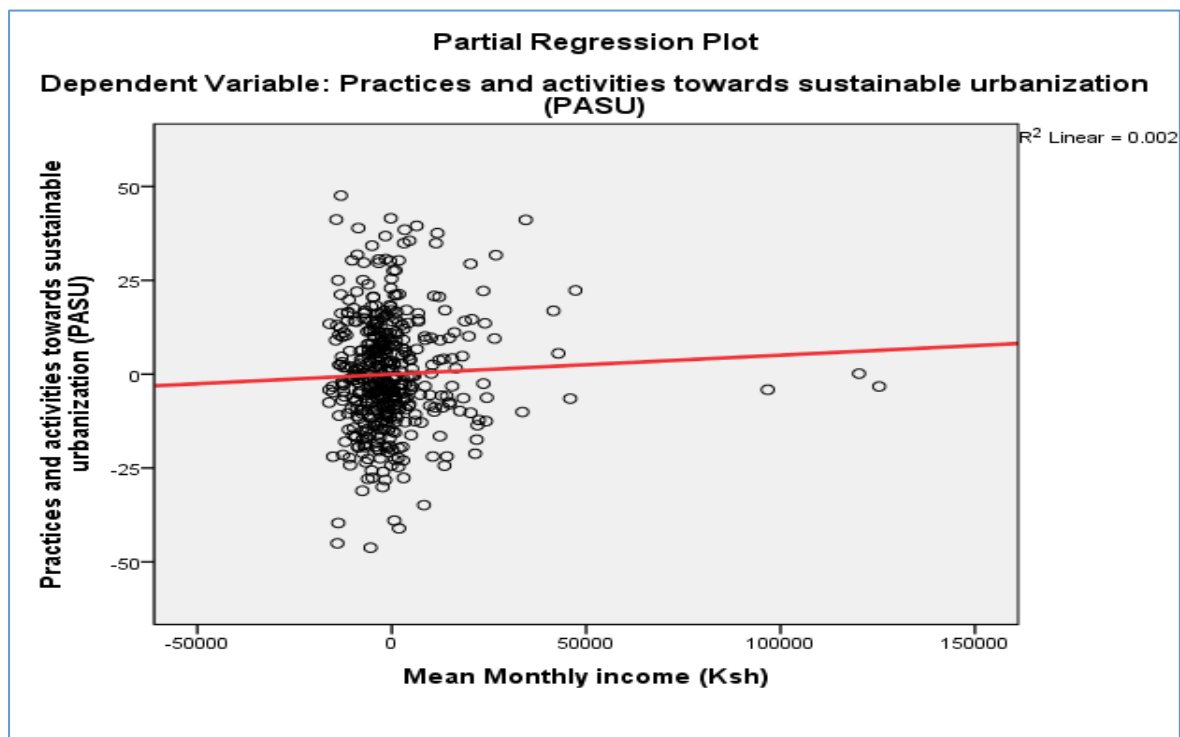


Fig 3: Regression scatter plot for income (Ksh) against RASU

VIII. INTEGRATING ATTITUDE ON SUSTAINABLE URBANIZATION INTO URBAN PLANNING

That attitude on sustainable urbanization is an important element in ensuring urban sustainability is not in doubt based on the findings of this study. The study has shown correlation between socio-demographic variables and attitude and a linkage between attitude and practices and activities that promote sustainable urbanization. In order to determine an integrated model for sustainable urban area that incorporates attitude, multiple regression was conducted on the various predictor parameters to isolate the nonsignificant predictors from the significant predictors and then make a suggestion on how they could be incorporated in the management and planning of urban area (study area) to make it much more sustainable. Multiple regression analysis was used to test if the resident's attitude towards sustainable urbanization (RASU), Residents Knowledge on sustainable urbanization (RKSU) and socio-demographic variables of residents (gender, mean years in school, age and level of income) significantly predicted the outcome of their practices and activities towards sustainable urbanization (PASU). The descriptive statistics for the 6 predictors is outlined in Table 8.

Table 8: Descriptive Statistics for the regression analysis predictors

Predictors	Mean	Std. Deviation	N
Practices and activities towards sustainable urbanization (PASU)	46.17	16.831	453
Mean Resident's Attitude towards sustainable urbanization (RASU)	49.58	10.496	453
Respondent gender	1.48	.500	453
Mean number of years in School	12.18	4.289	453
Age of in years	30.81	10.538	453
Mean Monthly income (Ksh)	10583.05	14116.232	453
Estate of residence	4.77	2.237	453

A pairwise regression analysis was undertaken. In the first step (*step 1*), Practices and activities towards sustainable urbanization (PASU) was regressed with the resident's attitude towards sustainable urbanization ($M=49.58$, $SD=10.50$) (RASU). In the second step (*step 2*) of the model, PASU was regressed with the five other predictors (gender, mean years in school, age and level of income) and RKSU.

The results of the regression indicated that the six predictors explained 19.8% of the variance ($R^2=.198$, $F(1,450) = .009$, $p=0.25$). The resident's attitude towards sustainable urbanization ($M=49.58$, $SD=10.50$) (RASU) significantly predicted practices and activities towards sustainable urbanization (PASU) ($M=46.17$, $SD=16.83$) ($R^2=.189$, $F(1,451) = .189$, $p<.01$). RASU explained 18.9% of the variance in the model with the rest of the variables explaining 0.9% of the variance. Apart from gender, the other socio-demographic variables (gender, mean years in school, age, level of income) and RKSU were found not to be significant predictors of PASU. An analysis of variance (ANOVA) on the model showed that it was significantly better at predicting the outcome than using the mean. Specifically, the F -ratio showed improvement on prediction than results from fitting the model (regression) relative to the residuals. The F -ratio for step 1 was 105.34 $P>.01$ and the second was 55.65 $P>.01$ which was far greater than 1 thus showing it was much greater than the inaccuracy. Based on this finding the study concludes that the model significantly improves the ability to predict the PASU. The Table 9 summarises the model results for regression of practices and activities towards sustainable urbanization (PASU) and socio-demographic characteristics of residents.

Table 9: Model summary for regression of practices and activities towards sustainable urbanization (PASU) and socio-demographic characteristics of residents

		<i>b</i>	<i>SE b</i>	β	<i>P-Value</i>
Step 1					
	Constant	11.58	3.45		
	Mean Resident's Attitude towards sustainable urbanization (RASU)	.69	.07	.435***	.00
Step 2	Constant	17.77	4.40		
	Mean Resident's Attitude towards sustainable urbanization (RASU)	.67	.07	.42**	.00
	Respondent gender	-3.24	1.44	-.10*	0.03
	Respondent Age	.038	0.71	0.24	.587
	Mean years in school	.307	.181	.078	.091
	Income in Ksh	4.956E	.000	.042	.357
	Estate of residence	.162	.323	.022	.615
	Residents Knowledge on sustainable urbanization	.040	.002	.959	.959

Note: $R^2=.19$ for step 1 Δ in $R^2=.01$, for step 2 $P=.03^*$, $P>.01^{**}$, $P>0.01^{***}$

Having established that attitude is the single most important predictor parameter for practices and activities towards sustainable urbanization, the study sought to model how the individual domains explain the variation in the mean resident attitude towards sustainable urbanization (RASU). A twostep process was undertaken involving the 11 domains. In the first instance, the mean attitude towards sustainable urbanization (RASU) was regressed with the domain of consumer behaviour, waste management and biodiversity protection. In the second model, the mean attitude towards sustainable urbanization was regressed with the remaining 8 predictor parameters. The results of the regression indicated that in total, the 11 predictor domains explained 87.4% of the variation in attitude towards sustainable urbanization (RASU) ($R^2=.874$, $F(3,407) = 261.16$, $p=>.01$). The three predictor variables of ecologically conscious consumer behaviour, ecological waste management and biodiversity protection together significantly predicted 65.6% of the variation in RASU ($M=49.58$, $SD=10.50$). This is a change of 21.6% on the model (R square change). All the other predictors significantly predicted the attitude towards sustainable urbanization except the domain of energy conservation. The summary is in Table 10.

An analysis of variance (ANOVA) on the model showed that it was significantly better at predicting the outcome than using the mean. Specifically, the F -ratio showed improvement on prediction than results from fitting the model (regression) relative to the residuals. The F -ratio for step 1 was 261.161 $P>.01$ and the second was 251.867 $P>.01$ which was far greater than 1 thus showing it was much greater than the inaccuracy. Based on this finding the study concludes that the model significantly improves the ability to predict the resident's attitudes towards sustainable urbanization and that attitudes towards ecological waste management, biodiversity protection and ecologically conscious consumer behaviour are by far greater predictors of RASU in comparison to the other domains.

Table 10: summary of the predictor model for the attitude domains

		<i>b</i>	<i>SE b</i>	β	<i>t</i>	<i>sig</i>
1	(Constant)	25.623	.970		26.402	.000
	Ecologically conscious consumer behaviour	.164	.012	.416	13.152	.000
	Ecological waste management	.162	.017	.298	9.276	.000
	Biodiversity protection	.224	.015	.445	14.989	.000
2	(Constant)	6.666	1.065		6.258	.000
	Ecologically conscious consumer behaviour	.136	.008	.345	16.972	.000
	Ecological waste management	.140	.011	.258	12.601	.000
	Biodiversity protection	.165	.010	.328	16.872	.000
	Ecological responsibility	.050	.007	.140	7.186	.000
	Rational Automobile use	.067	.006	.202	10.756	.000
	Just and equitable urban area	.096	.009	.202	10.871	.000
	Water conservation	.025	.006	.087	4.433	.000
	Urban governance	.099	.009	.210	11.466	.000
	Controlled effect on hinterlands	.092	.010	.172	9.199	.000
	Sustainable urban infrastructure	.018	.004	.086	4.654	.000
	Energy conservation	-.009	.006	-.028*	-1.554	.121

Note: $R^2 = .656$ for step 1 Δ in $R^2 = .216$, for step 2 $P = n.s^*$

IX. CONCLUSION AND RECOMMENDATIONS

Despite missing in public discourses, attitudes towards sustainable urbanization and sustainability is established to be an important factor in predicting the behaviour of individuals and the practices they engage in. Individuals that have a positive biospheric attitude have a better chance of participating in sustainable urbanization initiatives and engaging in activities that will promote the initiatives. The study has shown that this attitude is partly influenced by knowledge on sustainable urbanization an important indicator that with proper environmental education residents are able to adopt a biospheric and altruistic attitude as opposed to the egoistic attitude. The study has further singled out three important domains to be considered for effective sustainable urbanization being attitudes towards ecological waste management, biodiversity protection and ecologically conscious consumer behaviour which have been established to be better predictors of resident attitudes on sustainable urbanisation in comparison to the other domains. It is concluded that attitudes towards sustainable urbanization has been identified as a critical factor in ensuring sustainability of urban areas. The attitudes towards ecological waste management, biodiversity protection and ecologically conscious consumer behaviour are by far greater predictors of residents' attitudes towards sustainable urbanization in comparison to the other domains. The study recommends that urban governance should focus on attitudes alongside infrastructural developments to ensue sustainability. The Homa Bay County government can benefit by transforming the residents attitudes to better realize the success of initiatives that may be undertaken to ensure sustainability of the town.

ACKNOWLEDGEMENT

This work is a part of the Ph.D. thesis presented to the School of Arts and Social Science of Moi University. We thank all the respondents, University staff, research teams and all persons that in ways enumerable participated in the processes that led to successful design, execution, writing and reporting of the thesis findings. We are indebted to all of you.

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