THE ROLE OF COMMUNITY RADIO PROGRAMS IN ADDRESSING URBAN ENVIRONMENTAL CHALLENGES IN INFORMAL SETTLEMENTS, A CASE STUDY OF NYALENDA INFORMAL SETTLEMENT IN KISUMU CITY, KENYA

BY

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SCHOOL OF AGRICULTURE, FOOD SECURITY AND ENVIRONMENTAL SCIENCES

MASENO UNIVERSITY

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DECLARATION

Declaration by the student

I declare that this thesis has not been previously presented for a degree in Maseno University, or any other University. The work reported herein has been carried out by me and all sources have been acknowledged by means of references.

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DEDICATION

I dedicate my work to my family and staff mates: you have been there for me throughout the study period. I thank you all.

ABSTRACT

Radio initiatives as part of broader communication for development strategies have been used by international organizations such as the United Nations Children's Fund (UNICEF), the United Nations Educational Scientific and Cultural Organization (UNESCO) among others since the late 1960s. Therefore, many people continue to rely on mass media for information education and entertainment hence through this behaviour change can be achieved. One of the major challenges in urban centres and more specifically in Kisumu City is the population pressure leading to informal settlement prowl and environmental degradation. This directly leads to unsustainable environmental resource management; the situation has been heightened by limited access to the information on the integrated resource base management. Rapid population growth in Nyalenda is responsible for many physical, socio-economic and environmental changes. The purpose of this study was to determine the role of community radio programs in addressing urban environmental challenges in informal settlements with specific reference to Nyalenda Informal Settlement in Kisumu City, Kisumu County, Kenya. The specific objectives were to establish the status of community involvement in developing radio environmental programs addressing urban environmental problems in Nyalenda, to examine the relevance of the environmental programs aired by the Community-based Stations to the existing urban environmental problems in Nyalenda and finally to assess the perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations. The study used descriptive research design. The target population was approximately 10,000 households in Nyalenda Informal Settlement from which a sample size of 323 households was derived using the Fischer's formula. Household questionnaires were used to collect quantitative data from the household heads (respondents). Qualitative data was collected using focus group discussion (FGD) and Key informant (KII). Quantitative data was analysed using descriptive and inferential statistics and presented in form of texts, frequency tables, pie-charts and graphs. Qualitative data was organized into themes and sub-themes analysed through context analysis. The study established that most of the listeners are never involved in programing and content development by the stations as only 12% of the respondents had actively taken part in developing the radio programs. On the relevance of the radio programs to the existing environmental problems in Nyalenda, the study established that 39% of the environmental programs aired by the three stations focused on solid waste management, 28% were on water and sanitation while 19% addressed sewage disposal. This clearly showed the relevance between the programs and the environmental problems. The study on perception of the radio programs by Nyalenda residents established that Majority of the respondents (75%) felt that the environmental management programs were very relevant in addressing the existing challenges being witnessed in the study area. 67% of the respondents strongly agreed that the radio provided them with new information on environmental conservation. 66% of the respondents strongly agreed that the radio programs had a positive influence in their activities. The radio programs had actually influenced a number of the respondents to initiate various environmental management activities within their residential areas with 70% of the households applying water treatment methods learnt from the radio while 63% had taken up active roles in improving their waste disposal. 58% of the respondents were actively participating in clean up exercises while 28% indicated they had enhanced their rain water harvesting techniques. This study recommends the adoption of community-based radios in championing for environmental conservation across the country.

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LIST OF ABBREVATIONS AND ACRONYMS

AFEW	African Fund for Endangered Wildlife
BMU	Beach Management Unit
CCK	Communication Commission of Kenya
EAC	East Africa Community
FGD	Focus Group Discussion
GHECP	Gwassi Hills Environmental Conservation Programme
GLN	Global Lake Net
GNF	Global Nature Fund
ILEC	International Lake Environmental Community
KII	Key Informant Interview
LVCRP	Lake Victoria Conflict Resolution Programme
MCS	Monitoring Surveillance
NGO	Non-Governmental Organization
OSIENALA	Osiepe Nam Lolwe gi Aluora Mage (Friends of Lake Victoria)
RLV	Radio Lake Victoria
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
WCED	World Commission on Environment and Development

DEFINITION OF TERMS

Community based radio It is a non-profit making radio station. It is supposed to be owned and managed by a community for the benefit of that community.

Content These are facets included in a radio program.

Dissemination It is the act of spreading something, especially information widely.

Influence This is the capacity of a radio program to influence the behavior of listeners.

Interactive program This is a program that engages the radio presenters and the listeners in a discussion.

Media theory This is the multifaceted social-political-philosophical viewpoint that contribute to ideas about the relationship between media and society

Schedule This is a plan for carrying out a process or procedure, giving lists of intended events and times.

Framing Media focuses attention on certain events and then places them within a field of meaning.

Perceptions The way in which something is regarded, understood, or

 Interpreted

Media Refers to the mode of communication in both electronic and print. Media is regarded as a channel which serves as a general medium of communication in a society. Some of these mediums include television, newspapers and radio.

Environmental Awareness Refers to when people have regards for what happens to their environment. It also entails educating people on issues related

to the environment and how they can improve their environment.

Environmental programs Refers to putting a systematic effort to teach persons on how best they can protect their environment and live sustainably.

Commercial broadcasters Refers to radio stations that defines themselves as profitmaking institutions. As a communication medium; they have to show social and cultural responsibility that all good journalism have

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CHAPTER ONE
INTRODUCTION

1.1Introduction

Several studies have also shown that the mass media in Kenya especially radio have a strong influence in changing people's attitudes towards social, economic and political issues including the environment (Fallows 1996; Capella and Jamieson 1997). It is in line with these studies that this study intends to establish the role of community radio programs in addressing urban environmental challenges in informal settlements with reference to Nyalenda Informal Settlement in Kisumu City, Kenya as a case study by specifically establishing the status of community involvement in developing radio environmental programs addressing urban environmental problems in Nyalenda, Kisumu City, examining the relevance of the environmental programs aired by the Community-based Stations to the existing urban environmental problems in Nyalenda and finally assessing the perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations.

1.2 Background of the Study

The mass media constitute the backbone of democracy (McQuail 1993). The media are supplying the information that people base their decisions on. They identify problems in our society and serve as a medium for deliberation. They are also the watchdogs that the society relies on for uncovering errors and wrongdoings by those who have power. It is therefore reasonable to require that the media perform to certain standards with respect to these functions, and our society rests on the assumption that they do (McQuail, 1993). The most important functions that can be expected of the media include surveillance of socio-political developments, identifying the most relevant issues, providing a platform for debate across a diverse range of views, holding officials to account for the way they exercise power, provide incentives for citizens to learn, choose, and become involved in the political process and environmental issues, and resist efforts of forces outside the media to subvert their independence.

However, there is a growing concern that the mass media are not fulfilling these functions properly. Media critics claim that mass media are controlled by a few multinational conglomerates and have become a force supporting the status quo (Alger, 1998; McChesney, 1999). Political news, rather than environmental and cultural issues, is given more emphasis and is more about personalities than about their ideologies. People are left with political propaganda containing only meaningless slogans instead of having information that will develop socially and economically (Fallows 1996; Capella and Jamieson 1997).

Culture on the other hand, is the hallmark of a people's consciousness; it is the pillar upon which the community bases its own choices in the aspects of development and social integration. Culture derives from fauna and flora. This and quick disintegration of our environment can be directly related to a great shift in cultural values. The need therefore to resuscitate that cultural ethos through auditing the existing environmental programs in community radios is long overdue. Every Monday night between 9:15 pm till midnight there runs a cultural program known as *"Abila mar Jodongo,"* a Luo cultural program that addresses various issues including environmental conservation as was practiced by our ancestors. In the African context, Kenyans have perhaps suffered the greatest loss of a sense of self and cultural direction. They are the people who find a great shame in their culture and would like as much as possible to appropriate their identity to other communities within or without. There exists therefore a great rift between the "progressive" and the "non-progressive".

Environmental conservation is perhaps the most taken for granted issue in the country. From the time that the traditional healer and medicine man and women were demonized, the plants they used were destroyed or their ecosystems destroyed to the extent that they were irrelevant, the traditional grooves and shrines were abandoned and thus they were cleared for timber, firewood and charcoal, the environment has deteriorated with an alarming rate of desertification encroaching on the land and soil erosion becoming endemic. The proliferation of plastics has also created non-biodegradable waste that has been the bane of environmentalists. Efforts so far of holding meeting and other media activities to sensitize people on the need to preserve the environment have been challenged by a lack of conviction by the people of the relationship between that and the current money economy. The Nobel Prize winner, Prof. Wangari Maathai

launched a major tree planting exercise, but the problem is that the framework for changing the culture of our people, a culture of environmental destruction caused by a lack of believe in anything essential in it, has not been developed.

There is a need albeit an urgent one to re-engage the stakeholders, individual and communal, in matters environment. The mass media especially digital media have enormous potential in creating a change in public awareness on biodiversity conservation through environmental education. While the focus of environmental education and public awareness programs has been in the school system, the important role the media plays has often been overlooked (Capella and Jamieson, 1997). Harnessing the power of the mass media is one of the most important and critical challenges for any environmental organization that wants to effectively change the habits and behavior of a crowd, a nation, or even the world. Effective interaction with the mass media can have the following results:

- Build constituencies: By working with the community radio station and effectively getting the conservation message out into the public arena, organizations can attract allies, convert foes and win the minds and hearts of those in power.
- Multiply the message: There is no single, more effective way of taking the conservation message to the locals than through the community radio station. Moreover, by targeting different strata and hierarchy of community radio station, environmental organizations can reach the audience that is most important to them at that moment – from rural farmers to government decision makers.
- Catalyze action: The community radio station – through its power to educate, encourage and even intimidate – can induce action. A well-constructed communication strategy that catapults off the strengths of the mass media can create action and movement that result in profound changes on the ground.

There are three community radio stations whose signals traverse Nyalenda informal settlements, these stations are all based in Kisumu City and they include: Radio Lake Victoria, Dala F.M Radio and Sky Fm.

Radio Lake Victoria (RLV) is an FM station based in Kisumu City at Dunga Beach with its coverage in the entire Western Kenya and its environs. The station broadcasts mainly in Luo

while Kiswahili takes a small fraction on a daily basis mainly in sponsored programs and adverts. According to the wave 4 of the first quarter of Media Diaries (December, 2006), RLV FM has achieved 36 percent listenership in Kisumu and the larger Nyanza while the audience still remains on the rise; a clear indication of an eminent force in the media circus. The programs include News, Newspaper Reviews, Music, Drama, Comedy, Commentaries (especially on economic issues); and interactive discussion programs highlighting the day-to-day life and issues affecting our society today, among others.

Dala 98.8 FM is a community Radio Station broadcasting in Luo and is based in Kisumu City, Tom Mboya Estate. Its coverage includes the entire Nyanza province and Parts of Rift Valley. Dala FM connects its audience to a rich cross cultural mix of music, news, sports, talk shows, children programs, agricultural and environmental conservation programs, politics, comedy, lifestyle programs and advertising information. The station recently won the KUZA 2019 awards presided over by the Communication Authority of Kenya.

Sky FM is also a community based Radio Station broadcasting in Luo with its headquarters in Shauri Moyo Estate, Ramogi Road Kisumu City, Nyanza Province. The station covers Kisumu, Homabay, Siaya and Migori, parts of Western and Upper Rift Valley. According to KARF 2019 findings, the station reaches approximately 380,000 listeners daily. The station has structured programming that covers all aspects of human interest and these include: education, farming, family life, sports, environment, entrepreneurship, politics, children's programs, religious programs as well as entertainment.

The above three community Radio Station broadcasts majorly in Luo but advertisements are done in English, Swahili or any other languages, this makes them acceptable to a larger population of major towns who are not necessarily Luo's. Having diverse activities and programs, the stations targeted audience that consists of the urban and rural population who understand the Luo language remain attached to the stations as they address their interest. The stations are considered by the locals to be the voice of the people since they tackle topics that touch on day to day happenings within the society and they also give the listeners the opportunity to participate actively through calls and short text messages thereby enabling them to make informed decisions that can change their lives for the better.

1.3 Statement of the Problem

According to Communication Authority of Kenya (2019), and African Community Development Media (2018), there are 56 operating Community Radio stations in Kenya but it is not clear whether these Community Radios are effectively playing their role of providing meaningful service to the communities. This is partly evidenced by the fact that most of the areas served by the stations, according to the Kenya Open Data Initiative (www.openda.go.ke), are still afflicted with a host of challenges such as environmental pollution, high infant mortality rates, malnutrition, rising poverty levels, poor agricultural production, high school drop-out and high rate of drug abuse, among other problems. According to World Association of Community Broadcasting (AMARC) and communication scholars, Community Radio is a medium that is supposed to serve the needs of the community where it operates by contributing to its positive growth and development; this can only be achieved if the community is part and parcel of the program content development. A number of studies have been done on the role of media programs on listeners, especially with regards to government driven campaigns such as HIV-AIDS awareness, polio vaccinations, malaria campaigns, cholera outbreaks, civic education etc. However, there is little research done on community involvement in the activities of the community radios serving them right from identifying the immediate environmental problems facing them as a community that they would want the community radios to address, developing radio content that is able to address the specific environmental problems and finally analyzing how their community radios through environmental conservation programs can positively influence them to responsibly and sustainably take care of their immediate environment. There is no question that radio programs are the best means of spreading information to the poor, especially since they may not be able to get access to other sources of information such as newspapers, televisions and the internet. Nevertheless, there is little information on the role of the community as being active participants in setting agenda for the community radios serving them. Most studies conducted agree that radio is still the dominant mass medium in Africa with the widest geographical reach and the highest audiences compared with TV, newspapers and other ICTs. It is therefore the focus of this study to establish how members of the community are involved in active radio content development and how the environmental radio programs aired by the community radios help out in terms of addressing envinomntal challenges within the community, in this case being Nyalenda informal settlement.

1.3.1 Research Gap

The role of the media is very important in influencing public awareness on global climate change. Technologies such as radio, television and the media have played a more important role in increasing people's awareness about climate change and the protection of the environment than many other forms of human communication. People need credible sources of knowledge and information about how to adopt a greener lifestyle. While television is still a very popular source of news, there is increasing number of people going digital for their news. In addition, printed items, such as book magazines and brochures which helped to pass knowledge, new and up-to-date, while radio and television are main tools for transferring quick information resources due to the wide coverage (Jallov, 2012).

Mass media is indeed the educational platform for mass education, irrespective of caste, color, or geographic location it proves as an important means for the education to all (Servaes, 2008).
Poor environmental behaviors can be linked to this lack of 'ownership'. Should we conclude that the requisite environmental management information is not presented by the media and local radio stations in particular? The position of mass media is one of the most important factors driving environmental awareness: only on the condition that first, large numbers of the population have access to these technologies in Kisumu, and secondly, that people are interested in environmental knowledge.

This data can be used for development of indicators for monitoring the role of radio stations in educating the masses on environmental conservation and management. Gaps would be identified in the informal settlement and would inform policy and decision makers on appropriate mitigations or interventions to improve public health, environmental programs that can be harnessed to improve on the living conditions of inhabitants of Nyalenda or any other informal settlement in Kenya

1.4 Study Objectives

The overall objective of this study was to establish the role of community radio programs in addressing urban environmental challenges in informal settlements with reference to Nyalenda Informal Settlement in Kisumu City, Kenya as a case study.

The specific objectives were:

1. Establish status of community involvement in developing radio environmental programs addressing urban environmental problems in Nyalenda, Kisumu City.
2. To examine the relevance of the environmental programs aired by the Community-based Stations to the existing urban environmental problems in Nyalenda.
3. To assess the perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations.

1.5 Research Questions

The study was based on the following three main research questions;

1. What is the status of community involvement in the development of radio environmental programs addressing urban environmental problems in Nyalenda?
2. What is the relevance of the environmental programs aired by the three community-based radio stations to the environmental problems in Nyalenda?
3. What is the perception of the Nyalenda residents regarding the existing radio-based environmental programs aired by the three community-based radio stations in Kisumu City?

1.6 Justification of the Study

Over the past few decades, Studies have been conducted on the contribution of mass media campaigns in creating positive behavior change in mass populations. Such studies have most notably been on the impact of media campaigns in relation to issues such as health -HIV AIDS testing and counseling, cancer screening, malaria prevention, family planning, road safety as well as other issues like illicit drug use, teenage pregnancy, infant mortality etc. Currently there is no study that has been conducted on the relevance of mass media in relation to active environmental conservation and most of the time the media is normally just used to pass information about key environmental days such as World Water Day, World Environment Day, Nile Day etc. and the information is normally limited to the venue and theme of the celebration and the chief guest. There therefore exists a big knowledge gap on how the mass media has been used to impact on environmental conservation especially in informal settlements.

This study of the role of community radio in promoting environmental conservation in its area of listenership is significant in that should this channel be noted to be influential or critical in positive change of behavior pattern, then this could be harnessed to pass similar message regarding other national affairs like security and community development programs. The findings of this study will also help in identifying programs that are more relevant to the environmental conservation efforts in informal settlements such as Nyalenda.

1.7 Scope of the Study

Although other radio stations in the Lake Basin region like Radio Nam Lolwe, Ramogi, and Mayienga also air environmental programs; this study was only focusing on Radio Lake Victoria, Dala FM and Sky FM being community radios as opposed to the others which are strictly commercial. It was necessary to target the radio stations due to the viable statistics showing them as being among the stations enjoying the highest listenership rating in the Lake Basin region. The radio stations are also head quartered in Lake Basin Region. Other radio stations with equal listenership proved difficult to access vital data because they are either headquartered in Nairobi or are purely commercial hence their programing is always dictated by paid for commercial adverts. The study focused on the Nyalenda informal settlement in Kisumu City in Lake Victoria Basin. The study put emphasis to radio listeners more so to those listening to the community radio stations within the study area. This was only justified if the correspondents are true listeners of the community based radio stations and at what time they listen to them. This study hence will to some extent not be used to draw conclusion on the situation in commercial radio stations whose programing is purely based on profit making.

1.8 Study Limitation

Geographically, the study was restricted to Nyalenda informal settlement and was conducted among households living within the study area, getting the household heads during the day posed a major challenge. This in essence affected the duration of data collection as the research assistants had to make call backs in order to interview the household heads even if it meant working past the normal hours. The respondents had high expectation on the form the research assistants. This was clarified by the research assistants explained to respondents the reason for the study and its potential future benefits hence this challenge was overcome. Nyalenda informal settlement was vast and populated which was further compounded by poor road network and

absence of adequate transport. The researcher however, sought the services of a motorcyclist who found his way even in poor terrain. The above limitations did not in any way compromise the quality of data collected.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this chapter, literature related to the role of community-based radio stations in solving urban environmental challenges in informal settlements was reviewed. The researcher considered literature related to basis and rationale of radio programming, the relevance of environmental programs aired by the community-based radio stations and the perception of the Nyalenda residents towards the environmental programs aired by the three community-based radio stations in Kisumu. Other areas highlighted include the theoretical and the conceptual frameworks.

2.2. Basis of Radio Programming in Community Based Radio Stations

Community refers to a group of people with common characteristics or interests living together within a larger society. In other word, the term 'community' can be defined as a condition in which people find themselves engaged in interwoven and meaningful relationships with their fallows (Mtimde et al. 1998). A 'community' is considered to be a group of people sharing some familiar characteristics and or traits such as sharing a common geographical area i.e. a specific city and town, village; sharing of economic and social life through business and trade, exchange of goods and services among themselves.

In relation to community radio, the term 'community' refers to a collective or a group of people sharing common characters and/or interests. The term 'community' can either be defined as: a geographically based group of persons and/or a social group or sector of the public who have common or specific interests (Mtimde et al. 1998).

Community radio, as distinct from commercial and public service broadcasting, serves to bring local level small communities together, focuses on general public's day-to-day concerns and helps in realizing local demands and aspirations. In this sense, it aims to enrich the livelihood of the local people, through the content that is created by the people and for the people of the community. Community radio is also defined as non-profit agency which is considered to serve specific local communities; thereby broadcasting programs and contents which are relevant to

the community and with organizational structures that represent the community the radio station work for.

The term 'community radio' is considered to be third-tier broadcasting besides public and private radio broadcasting. It is managed, run and controlled by a community for the benefit of the community and is supposed to serve the interests and aspirations of the community (Mupusi, 2013). In the United Kingdom, the community radio is built around concepts of access and participation. In Latin American countries, the community radio, also known as 'the peoples' radio', became the voice of the poor and the voiceless, the landless peasants, the urban shack dwellers, the impoverished indigenous nations, and the trade unions (Mupusi, 2013). In South Africa it is referred to as community or participatory broadcasting initiated and controlled by members of a community of interest, or geographical community, to express their concerns, needs and aspirations without outside interference, subject to the regulation of the Independent Broadcasting Authority (Lama, 2012). Two philosophically distinct approaches to community radio can be identified, though the models are not necessarily mutually exclusive. One stresses service or community mindedness and a focus on what the station can do for the community. The other stresses involvement and participation by the listeners (Lama, 2012).

According to (Ryerson, 2008), community radio is essentially a non-profit enterprise that is owned by the community and whose ethos remains independence and responsibility to serve the community and not the advertiser, even in the days of highly commercialized broadcasting. Rolls observe that the community actively takes part in community radio by creating news, information, entertainment and culturally relevant material with an emphasis on local issues and concerns. Rolls' definition of community radio seems valid when one considers the characteristics that differentiate community radio from other radio services, such as public and private radio. Public radio is driven by the interests of the government that owns and operates it, and understandably serves the public according to what the government thinks is best for the community. The purpose of private radio, which is owned and operated by individuals or a company, is to make money (Ryerson, 2008). According to a report by the National Endowment Democracy (NED) (2007), community radio is about the horizontal exchange of information – participatory interaction between the community and the radio station rather than vertical, one-way communication, delivering information from a medium to the public. The popularity of

these radio stations is attributed to the fact that they can be listened to at home, in offices, and in private and public places anywhere and at any time (Nyambala, 2011).

Community radio stations support community endeavors. These radio stations inform, guide, and entertain the people and provide a medium through which the most relevant educational local and developmental information is disseminated and aired (Mupusi, 2013).

Therefore these radio stations meet this need by providing a platform and a voice to mobilize communities to participate in issues that involve their political, economic, health, educational and environmental lives.Community radio stations are also considered to be a platform for dialogue. They provide an avenue for people to express themselves and take necessary actions and decisions. These radio stations play a significant role in increasing and promoting participation and opinion sharing, improving and diversifying knowledge and skills, and in catering for the health and cultural needs of the poor and deprived rural communities. Community participation in terms of content generation and program development is thus key.

Community access and participation are always considered as key pillars to the successes of any development initiatives. The lack of community's participation in the conception, design, implementation as well as monitoring and evaluation, is often blamed for the failure of many development interventions (Taylor, D & Mackenzie F, 1994;). The World Bank defined participation as "a process, through which stakeholders influence and share control over development initiatives and the decisions and resources which affect them" (World Bank, 1996). UNESCO's conception of participation gives a sense of equity and sustainability. This is to say that community members are in a well-informed position to influence decisions that have an impact on their lives and to also exercise control and ownership in development interventions so as to ensure sustainability.

Participatory communication is defined as *"that type of communication in which all the interlocutors are free and have equal access to the means to express their viewpoints, feelings and experiences"* (Buckley, 2008). This reinforces the view that ordinary people have long years of experience which, if utilized, can bring about meaningful development to them. Therefore, providing opportunities for ordinary people to participate in decision-making enables them to express their knowledge about how they view the world and interpret development. "Rather than view themselves as somehow deficient or lacking in their ability to effect social change, communities

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could, through participatory methods, reassert and reclaim their capacity to transform their daily lives" (Hallstrom, 2009). The distinguished pioneering scholarship of Professor Nora Cruz Quebral gave birth to the concept of development communication in 1971 in which he observed that participatory communication encourages the critical engagement of the beneficiaries in their own development processes. Participatory media projects are seen to "encourage individuals and groups to recognize their capacity to intervene in and redefine power relations within the local community" (Rodriguez, G, and Westtoff, F. 1993). Participatory development projects such as Community Radio employ a participatory approach to decision making processes and enable the voiceless to define their own development paths through the identification and implementation of programs that are initiated by them (Mhagama, 2015). (Mhagama, 2015) sees participatory communication projects as *"often small-scale, seeing specific bottom-up solutions as being more effective than general macro policies"*. Tapping into local knowledge is viewed as a necessary course of action if a development project is to be successful. It is what makes participatory communication projects truly unique.

Participation in media comes in a variety of forms (Hallstrom, 2009) and as a result it has proved difficult to define and implement in development initiatives (Mhagama, 2015). It is for this reason that the term assumed various definitions by various scholars. Carpentier (2011) for instance, classified ordinary people's involvement *in* the media into two interrelated forms, participation *in* the media and participation *through* the media. The difference between the two is that "participation *in* the media deals with participation in the production of media output *(programme/content-related participation)* and in media organizational decision-making *(structural/managerial participation)*" (Carpentier, 2011: 68). On the other hand, "participation *through* the media deals with the opportunities for mediated participation in public debate and for self-representation in the variety of public platforms (Carpentier, 2011). (Carpentier 2011) further distinguishes between minimalist and maximalist forms of participation. According to him, in the minimalist form of participation, "media professionals retain strong control over process and outcome, restricting participation to access and interaction, to the degree that one wonders whether the concept of participation is still appropriate" (Carpentier, 2011). The 'maximalist' form of participation however, "the consensus- oriented models of democracy *(and participation)* emphasize the importance of dialogue and deliberation and focus on collective decision-making based on rational arguments in a public sphere

While acknowledging participation as a central force to community radio programming, Community Radio Stations will only achieve its developmental objectives if the programs are well researched, produced and presented in the languages and in a manner that is comprehensible, with the listeners taking centre stage in the whole process of programming and broadcast (Jallov, 2012). In doing so, it can be claimed that the radio promotes knowledge sharing hence helping people to make informed choices on critical issues. For (Jallov, 2012), listeners become proud and grasp the message easily when local language is used. The program-content of Community Radio Broadcast addresses the people's felt needs and encompasses all key areas such as election issues, women affairs, conflict resolution, human rights and repulsive traditional beliefs. The programming team cut across all sectors of the local economy including farmers, local craftsmen, traditional and religious leaders, women groups, and youth leaders among host of others. All these are in control of content programming and broadcast. (Alumuku, 2006) notes that it is the provision of entertainment, education, the need to facilitate change, progress and improved living conditions that make community radio a special medium for social transformation. Participatory development demands that every effort be made to have everybody on board. (Alumuku, 2006). It is essential for the community radio to identify willing participants in the society and sit down with them to determine how they can work, that is, "who speaks for whom "since programs are based on a problem that is determined by situational analysis where the beneficiaries are the key players that are charged with the responsibility of identifying the development challenge and suggest remedies.

One of the specific objectives of this research was to look at the basis and rationale of radio programming in the three community-based radio stations in Kisumu City. Do they involve the community in program and content development, what is the nature of involvement, is there feedback mechanism on what works and what doesn't? Do they provide a platform for active or passive participation?

2.3 Relevance of environmental programs aired to the environmental problems in Nyalenda

Like all radio stations, community radio informs people. But in this case, it informs people about what is happening in their specific community, not in the country as a whole. People tend to care more about what is happening in their immediate environment and what can

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change their lives for the better (Dagefu, 2010) People in smaller and poorer communities would care more about their farming community that hasn't had substantial amounts of rain in months than hearing about a South African Airlines' strike. (Whaites, 2009). It is extremely important for people in these communities to be informed about what is happening in their area as it allows them to formulate informed opinions, begin to form interest groups as well as mobilize to address common issues within the community. (Whaites, 2009). "Community radio is a social process and event in which members of the community associate together to design programs and produce and air them, thus taking on the primary role of actors in their own destiny, whether this be for something as common as mending fences in the neighborhood, or a community-wide campaign on how to use clean water and keep it clean, or agitation for the election of new leader…Community radio is most relevant to a group of people who live and act as a community, and this could be several families, several neighborhood, or even several villages or communities, but the important thing is that they interact." (Whaites, 2009).

Radio Lake Victoria FM (RLV), Dala FM and Sky FM are local community radio stations based in Kisumu City broadcasting in Luo language. They operate 24 hours a day. The reach generally covers greater western region of Kenya that is the entire Nyanza, Western and parts of Rift Valley. Their western region reach also spills to the neighboring countries like Eastern Uganda and Northern Tanzania through radio receivers on the FM platform. Owing to the increased digitalization of the media industry, the signals of the three radio stations can be received internationally through the online streaming platforms. The stations enjoy wide listenership in their coverage areas as per the previous Synovate research findings. Most of the environmental programs aired by the three focus on rain water harvesting, proper farming practices, best fishing practices, solid waste management, soil conservation, eco-san toilets, urban farming, wealth creation through waste recycling, land use among others. Most of the environmental programs are scheduled during early morning hours or late in the evening when the listenership is high since most of the listeners will be at home. The programs involve studio guests or resource persons from the community, opinion leaders, NGOs, researchers and government line ministries such as environment, water, public health and education. The live programs usually run for a period of 1 hour twice to three times a week and are segmented as follows:

2 minutes' introduction of guests

2 minutes' introduction of the day's topic

27 minutes' discussion of the topic

2 minutes of music

20 minutes of call-in session and answers

3 minutes of adverts.

3 minutes of summary and way forward.

There however could be a few variations to the above format depending on the topic and/or the resource persons hence some programs can start with a short play or skit which entertains and educates the listener about the day's topic. It could be a short drama depicting a hospital scenario where the two patients are complaining about a certain illness that has befallen the village and a doctor passing by decides to invite them for tests which reveals an outbreak of cholera in the community, the area chief is called to mobilize the community to attend a chiefs baraza where community health workers led by the doctor advises the community on the causes of cholera, its symptoms, remedy and above all what needs to be done to prevent future outbreaks.

The three Community-based radio stations under study each aired environmental programs touching on different aspects of environmental conservation. The study therefore sought to identify the key environmental challenges that Nyalenda informal Settlement faced and establish the relevance between these problems and the aired programs.

2.3.1 Environmental Challenges facing informal settlements.

Slightly over half of the world's population currently lives in urban areas, with Asia and Africa urbanizing more rapidly than other regions. The annual rate of urbanization for these two regions are 1.5 and 1.1%, respectively, compared to the rate of less than 0.4% in more urbanized regions (United Nations Department of Economic and Social Affairs Population Division, 2014). While urbanization in the global north was accompanied by economic growth, the case is different in Africa where most of the urbanization is taking place during periods of inequitable resource distribution. This has led to the continued growth of informal settlements which are characterized by poor quality housing and a general lack of public services. The UN-Habitat defines a informal settlements household as one that lacks one or more of the following: improved water, improved

sanitation, sufficient living area, durable housing which considers the permanency of the structure as well as location away from hazardous areas and secure tenure that protects residents against forced evictions (UN-Habitat, 2010). The World Health Organisation (WHO) that informal settlements in cities in Low- and Middle Income Countries (LMICs) are home to a large proportion of the urban population (UNESCO,2001). In 2014, it was estimated that about 25% of Kenya's population lived in urban areas, an increase from 17% in 1990 (United Nations Department of 2 Economic and Social Affairs Population Division, 2014). The growth of informal settlements in Kisumu can be attributed to a high number of youths seeking employment and /or better life in town. This has overwhelmed government efforts to provide basic services to the large population. It is estimated that 62% of Kenyan Urban population resides in slums or informal settlements-like neighborhoods (Kenya National Bureau of Statistics, 2012). The persistence of informal settlements brings to the fore the face of 'two urban systems' within a single city. This is due to the stark differences in economic, social and health aspects of informal settlements and non-informal settlements areas of cities. Using Nairobi as a case, research has continued highlighting the differences in access to public goods including water, sanitation, health and education for city residents in informal settlements and non-informal settlements areas, leading to poorer health outcomes among the former compared to the latter and even when compared to the population in the rural areas. The advantages associated with urban living are therefore eroded or non-existent for informal settlements residents. Health research in Kisumu informal settlements has revealed a range of health issues that contribute to high morbidity and mortality. For example, acute lower respiratory illness among children below the age of five years is a leading cause of mortality. Further, high rates of maternal mortality have been reported (Yang, 2012). In addition, there is a high prevalence of HIV (Nazim et al., 2016). Further, urban areas have been found to have high levels of outdoor air pollution arising from transport-related and industrial emissions, with dire implications for residents' health (Nazim et al., 2016). Emerging health concerns for informal settlements residents also include injuries, infectious diseases such as dengue and cardiovascular disease (Nazim et al., 2016). In Africa, urban areas are also known to concentrate poverty, especially within informal settlements where incomes are unstable owing to low employment rates and the informality of most sources of livelihood (The World Bank, 2006). While urban informal settlements have been places of socio-economic advantages in the past, they also concentrate risks to both human and

environmental health. These settlements face environmental challenges owing to their proximity to the industrial zones, city dumpsites, and major highways or along riparian land where they are more prone to flooding during rainy seasons, high level of pollutants, poor air quality and other environmental hazards.

Major informal settlements in Kenya have had problems with environmental degradation. According to (Yang, 2012), outbreaks of particular diseases were associated with changes in environmental conditions brought about by pollution. Similarly, climatic changes, including increased precipitation and increased frequencies of droughts and floods in various parts of the world were the earliest indications of problems resulting from air pollution (Nazim et al., 2016). The awareness led to the major cities and towns in Kenya to take up measures of controlling garbage and wastes deposits (Singhal & Everret, 1999). In studying the environmental problems facing urban areas, Weise and Zelewski (2014) indicated that informal settlements have become more and more populated and there has been an increasing need to make the cities healthier by practicing healthy living. However, at the same time there were new pollution challenges, the wastes from the factories and industries. All these raised concern from the authorities involved as the environment was continuously getting polluted by the affluence.

Motorbikes and three-wheeled vehicles (Tuk tuk) ownership in Nyalenda has rapidly increased (Speck, 2012) something that is good for the transport industry. However, this is not good for sustainable development. Cities around the world have had to deal with environmental issues of automobiles, such as the concerns for global climate change. Besides, the increase in the numbers of Motorbikes and three-wheeled vehicles has put a lot of pressure of energy, even though energy, especially crude oil is not a limiting factor in Kenya (Obunga, 2003). The main concern of infrastructure involves transportation. Highways and streets have remained crucial for transport in Kisumu City, and therefore their improvement and maintenance have remained a major challenge (Speck, 2012). However, with the ever increasing urban population, especially in the informal settlements, the greater challenge concerns the provision of a transport system that makes mass transit and walking as efficient and easy as possible.

Most of the interventions that have been studied, documented or highlighted are those initiated by the government or non-governmental organizations. Little has been studied about what the

residents themselves view as challenges which require immediate interventions or the little things that they themselves do in a small way to contribute towards creating a sustainable environment.

2.4. The perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations.

Residents' empowerment through community-based radios is a major focus of this study. Empowerment involves sharing information and power with others so that they can make an initiative and make decisions to solve problems and improve service and performance. Community radio stations often "serve as the most trusted agent in town/villages that brings change." Community radio plays a vital role in building vibrant communities, in mobilizing groups to action by informing and empowering citizens, in giving voice to the marginalized groups of society, and in bringing community needs to the attention of local and even national governments. The power of community radio to mobilize groups and bring change to societies is well recognized. This power can, however, also be manipulated and used to spread hate and violence, as was the case in Rwanda in 1994.

The potential of community radio to bring about social change is not a matter of mere observation but an empirically proven fact based on quantifiable and statistically analysed results. Focusing on women's rights promotion, HIV rates reduction, family planning, reproductive health issues, and prevention of child trafficking, community radio has been used to produce behavioural change among large audiences in 15 countries in Africa, Asia, and Latin America, educating through entertainment, including with soap opera characters. The highly significant results of pre- and post-broadcast random-sample surveys indicated positive changes in the behaviour of those who listened to the programming. In view of the above, there is a great need to study the role of community based radios in the uptake of proper environmental conservation practices in Nyalenda, Kisumu City.

Community Based Radio Stations (CBRS) provide relevant and community-focused programming that address community specific issues and concerns. The local voices promote

local issues, which foster the development of community dialogue around important topics, which have the potential of creating significant impact on health and development (Walters, James & Darby, 2011). Furthermore (Jallov 2012), states that community-based radio achieves its developmental objectives only if the programs are well researched, produced and presented in local languages and in a manner that is comprehensible. Consequently, this study looks at the basis and rationale of radio programming at the three community based radio stations and if it is designed in a manner that is comprehensible with the listeners taking centre stage in the production and presentation process.

Ideally, community radio programming should be created by and for the community that it serves. Although for most community radio stations broadcasting locally, there is always some mixed programming. Music, talk, public affairs, and public information are staples of community radio stations (Tabing, 2002). A key role played by the community-based radio stations is that they act as a voice for the poor and those who rarely have a voice in commercial media. (Tabing, 2002). For this reason the study seeks to find out if the thoughts, interests and opinions of the voiceless are taken into consideration during programing in these community radio stations.

In Portland, Oregon, at KBOO Community radio, a regular program on the homeless, Hole in the Bucket‟ encourages the participation of local homeless organizations and individuals, providing training on interviewing techniques and radio production to homeless and formerly homeless volunteers. (Tabing, 2002) In Atlanta, Georgia, WRFG Community Radios "Class Chronicles" program is run by a collective of poor people. In Tanzania Radio Mampita & Magneva in Madagascar focus on community building in poor areas, with a strong emphasis on the participation of poor people in the creation of programming as cited by (Tabing, 2002). Furthermore in the Philippines, the Tambuli Radio Network calls itself the "voice of the small community for the development of the underprivileged." Its twenty radio stations serve impoverished poor people.

(Johnson-Turbes, Hall, Kamalu and Zavahir 2010) state that call-in shows and personal on-air interviews are formats unique to radio that can be effective for promoting social learning, and people reciprocally learn from each other. Messages on such shows can be tailored to target

audiences and designed to contain interactive elements customized to local community concerns. Radio provides a forum for 2-way communication via live radio shows that allows the radio program presenter to interact with the listeners through phone calls and text messages. Their views, opinions and questions can be freely expressed during this time to obtain political, governance, environmental and other relevant information.

Another example of community-based radio is found in the urban areas of the United States of America, which have radio stations that target and reach African American audiences ("black radio"). Such stations typically devote a substantial percentage of their air time to programming such as call-in shows, personal on-air interviews, and community promotions, rather than news and public affairs programming (Johnson& Birk, 2013). Community-based radio represents programming that is produced by the community with focus on local concerns and issues. Unlike the mainstream media, the local people's participation is prevalent -rather than merely talking about the community; the people themselves make suggestions about programs. This strengthens local culture and cohesion with the recognition that the station belongs to them; it becomes a forum for a wide diversity of local opinions and views (Sterling, O‟Brien, and Bennett, 2007).

Community based radio has been a new phenomenon in Kenya and continues to develop among diverse communities. There are many community-based radio stations currently in operation targeting various target groups. The regulatory and policy environment following amendments of the Kenyan Communication Act 2012 enabled the formation of more vernacular radio stations reaching more communities and groups, which were previously marginalized by mainstream commercial media to access pertinent information and participate in articulating their aspiration to the authorities.

Since May 1982 when the first Community based radio station in Kenya went on air, there have been substantial policies as well structural developments on the vernacular radio scene in the country. A recent report by Open Society Institute of Eastern Africa (OSIEA) on vernacular radio sustainability in Kenya, observed that the content of most vernacular radio stations already adheres to the important development issues such as agriculture, HIV, health matters, the environment and income generating projects. The report further pointed out that most vernacular

radio stations use newspapers, television stations and other stations as source of international, national and local news. This puts the radio station at an advantage among their targets audiences since they will get the news anyway from the mainstream media. According to the Communications Commission of Kenya (CCK), there are 47 stations broadcasting in languages other than English and Kiswahili. (Chemwaina, 2014) in his study assessing the role of community-based radio stations in enhancing rural development, found that despite some weaknesses in radio programming and the mode of interaction with the rural people, the rural communities are better off today than in the old days when FM radios were non-existent. For example, KASS FM a community based radio station broadcasting in Rift Valley, has come up with different developmental programs that have positively contributed to changing the rural people's ways of life. These programs include farming, health, marital values, environment, cultural issues, human rights, democracy, religious teachings, peace and reconciliation. Such programs feature experts, professionals and opinion leaders who address numerous topics of interest to the community. The local people participate in the production of these programs through letters to the editor, and phone-ins, among others. Programs such as political talk shows, which feature in KASS FM, have become one of the most important ways of community participation. UNESCO report upholds the view that, "the community based radio stations have a significant role to fulfil in creating and sustaining public opinion and political will to deal with the problem" (UNESCO, 2000).

Mhagama (2015) shared that it is an aspect of development, which can help, marginalized people to participate in development activities. It is extremely important for people in these communities to be informed about what is happening in their area as it allows them to formulate informed opinions, begin to form interest groups as well as mobilize to address common issues within the community. (Wagner & Greenlick, 2012). Mass media exposure to environmental conservation messages and seeing/hearing adverts on benefits of solid waste management has a significant positive effect on listeners/viewers. In Malawi, the Malawi Broadcasting Corporation (MBC) has been broadcasting several radio programs i.e. the Garbage millionaire on garbage sorting and recycling and evidence suggests that youth groups who learned about garbage recycling from the Radio program incorporated waste management as part of their objectives with an intention of generating income. (Lawrence, S. D). Positively, the issue of sorting out

solid wastes went high and grew. In 2010, almost three out of every five registered community youth groups had designed and distributed garbage collection deports to various households and market centers. According to the National Media survey Tanzania July 2010, radio scores highest at 81% as playing a pivotal role in delivering environmental conservation and awareness information to vulnerable groups among the mass media in Tanzania. In Rwanda, 36% of the population now uses the radio as their main source of environmental conservation information. As a result of using radio in promoting conservation efforts, Rwanda has achieved what no other country has done to date in eliminating the use of polythene bags.

According to the (DHS, 2010), it has increased its environmental awareness campaign more than 10-folds in less than a decade. (Andesiah, 2015) identified two models of the use of radio for slum development. The first model is the extension of the program operations of an urban centralized radio station to the informal areas as the control and direct operational powers still rests completely in the center of operation in the urban areas. The second model augments called community Responsibility Perspective in slum development. In this context, radio stations are built in affected communities; program content and operation are based on norms, socio-economic and cultural conditions of the community. Thus the whole community feels a sense of ownership because they are part and parcel of this radio. These case studies involve national governments using national radio broadcasters to push policies as well as creating awareness on issues deemed to affect the entire country such as the ban on usage of polythene in Kenya and Rwanda, ban on commercial tree logging etc. There is however a need to accept the fact that some environmental problems are unique to specific areas and these may not be a priority to the national government. Residents of informal settlements may want programs that address sewerage disposal in slums while the national government on the other hand is pushing for afforestation to arrest the drying power generating dams.

Communication has a greater role to play in promoting of use of best environmental practices. Its principal function is not merely to inform but to also educate with a view to raising aspiration of the people in the right direction, generating among them the willingness to work in order to improve on their conditions, motivating them to action and guiding and directing their activities to successful end (Moemeka, 2000). Media should understand four main relationship strategies

in social change when engaging in the promotion of sound environmental management. These relationship strategies are facilitative, persuasive and re-educative.

Mupusi (2013) argued on the weakness of media on behavior change issues. He discusses the need to review and redesign the structure and ownership of the media. In his opinion, structural areas of routine professional practices, profitability and survival have constrained majority empowerment by the media. These include time constrains and lack of adequate training facilities. Media owners also set specific priorities which would bring profit, for instance focusing on politics instead of paying attention to other issues that are affecting the society in a bad way. That is why media skew emphasis on politics instead of behavior change issues. (Lasswell, 1948) linked development to communication. He stresses that development requires change of attitude. He argues that in traditional society people exist in a state of initial or traditional settings. Lerner advocates for a powerful media that could expand the imagination of people where they appreciate reality. He argues that Mass Media is a tool for spreading new idea, new customs and new practices required for rapid change. He postulates that communication operates through mediated factors like group membership, selective exposure, and defense mechanism.

Using the above scholars' lines of thought, for a significant social and behavioral change to occur, the media have to employ a lot of participatory communication strategies by strengthening the degree of interaction among its target audience. Radio Lake Victoria FM therefore should involve its audience in designing and deciding its programs. Social change occurs when a group or community change their ways of doing and viewing things. For instance, when mobile phones arrived in the market, many people abandoned land line telephone and embraced mobile phones. The other avenue of social change is behavior and attitude formation. The pro-social campaigners activate the locals to abandon undesirable behaviors which are retrogressive and adopt the new ones. For instance, social campaigners succeed in a greater percent in fighting female circumcision and in encouraging male circumcision among Luo community.

2.5. Conceptual Framework

This study will be guided by the Cultivation theory, which assumes that there are certain repetitive and pervasive patterns of images and ideologies dominating most genres of television shows and films. If people spend several hours a day, year after year, watching television, and if every show they watch is full of violence, then people may come to believe that the world is full of violence. This is the kind of hypotheses that cultivation studies are trying to prove (Shanahan and Morgan, 1999; Signorielli and Morgan, 1990) and following the same argument, if community members are subjected to conservation agenda for some time, then they may uphold conservation measures as it become part of them. The radio will be cultivating a sense of responsibility in them, identifying with the problems facing them and seeking solution locally. A strong indication of the direction of causality has recently been obtained, however, from an improved understanding of the cognitive mechanisms underlying the cultivation effect. These mechanisms, which have been confirmed experimentally, cannot easily be accounted for if the causality is spurious or reversed. When asked to estimate, for example, the incidence of violence in society, people tend to economize their mental processing effort and give a heuristic answer based on the case with which instances of violence can be recalled. A number of testable predictions can be made from this model, and these predictions have been confirmed experimentally. Experimental conditions that induce a more systematic information processing can make test people's discount media as a reliable source of information and give more accurate answers (Sullivan, 2007). Likewise, it is known from cognitive psychology and endocrinology that concrete and emotional accounts make a stronger impression than abstract descriptions.

In accordance with this theory, it has been found by experiments that people judge the incidence of particular phenomena by the number of examples in the media rather than by statistical accounts when both examples and statistics are presented in the media.
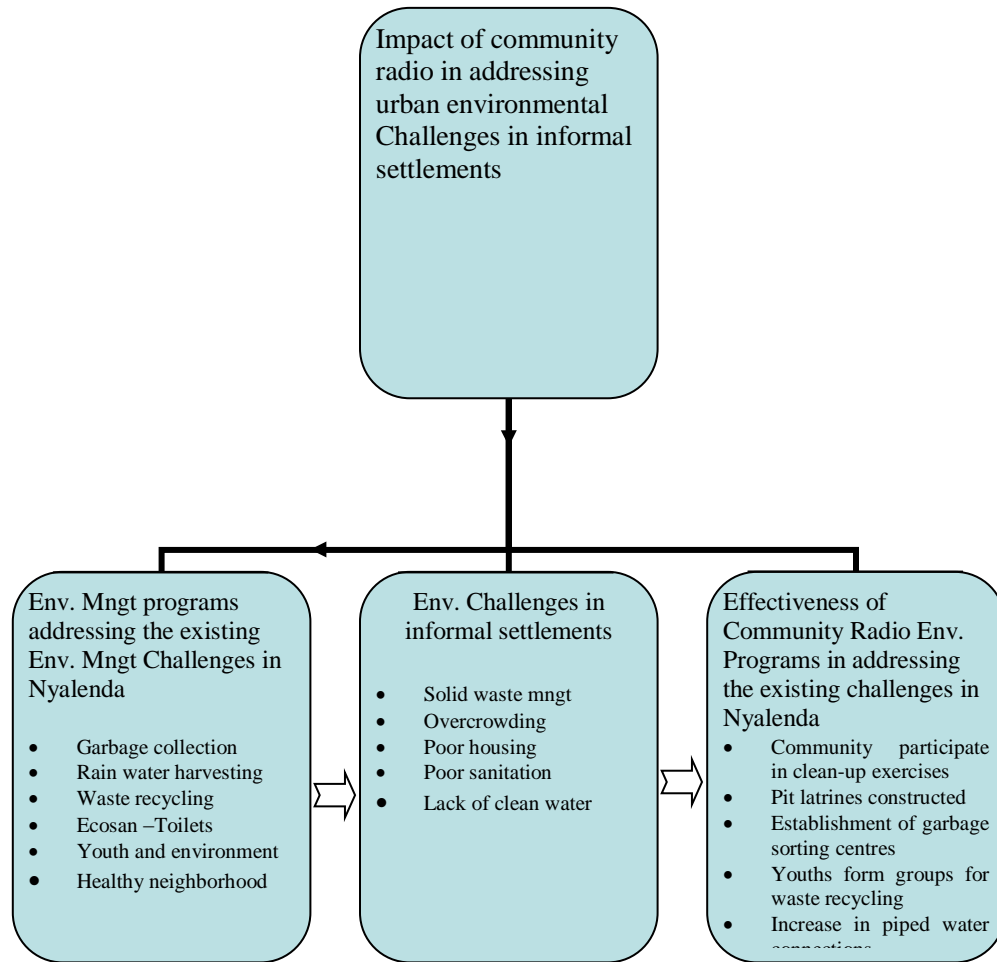
Figure. 1: Conceptual framework

Source, Author (2019)

Development of Environmental management programs could take a two dimensional approach. In the first scenario, the Radio may have programs that address general environmental concerns in informal settlements such as waste disposal, a radio listener in Nyalenda may take keen interest in such a program since he/she sees it as relevant to his/her current environment. The same listener may decide to practice/implement the recommendations of the radio program thereby improving his/her own environment. The second approach would be a radio program originated by the residents of Nyalenda themselves. Through news report of serious environmental concerns in the informal settlements such as cholera outbreak or flush floods, the radio may decide to run comprehensive environmental programs highlighting on possible causes

and solutions. A keen listener from Nyalenda may take this up and implement the recommendations thereby improving his/her own environment.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1. Introduction

This chapter presents the methodology that was used by the researcher to find answers to the research questions. In this chapter, the research methodology was presented in the following order: research design, target population, sampling procedure, data collection methods, instruments of data collection, reliability and validity and finally the data analysis. Ethical considerations were also presented.

3.2. Study Area

Nyalenda is the largest informal settlement in Kisumu City, the third largest City in Kenya, and is located on the shores of Lake Victoria. Kisumu is one of the fastest growing cities in Kenya. It covers an area of approximately 417 sq. km of which 297 sq. km is dry and approximately 120 sq. km is under water. Nyalenda is situated on the eastern part of the City covering a stretch of approximately 28km squared bordering Lake Victoria to the east, Nairobi road to the west, ring road to the north and Dunga wetlands to the south. The study area is further subdivided into two sections Nyalenda A and B. The choice of the study area was informed by the population density and the uniqueness of Nyalenda as being composed of both Urban, peri-urban as well as rural set-up. Nyalenda has also been identified as an environmental hotspot considering the fact that the infamous Kachok dumpsite is located in Nyalenda A. The area has also suffered a lot of flush floods which often lead to mass displacements of families in areas such as Dunga Beach, Nanga, Kapuothe, Auji and sections of Kachok. In terms of political representation, Nyalenda is divided into two constituencies with Nyalenda A being in Kisumu East while Nyalenda B is in Kisumu Central constituency.
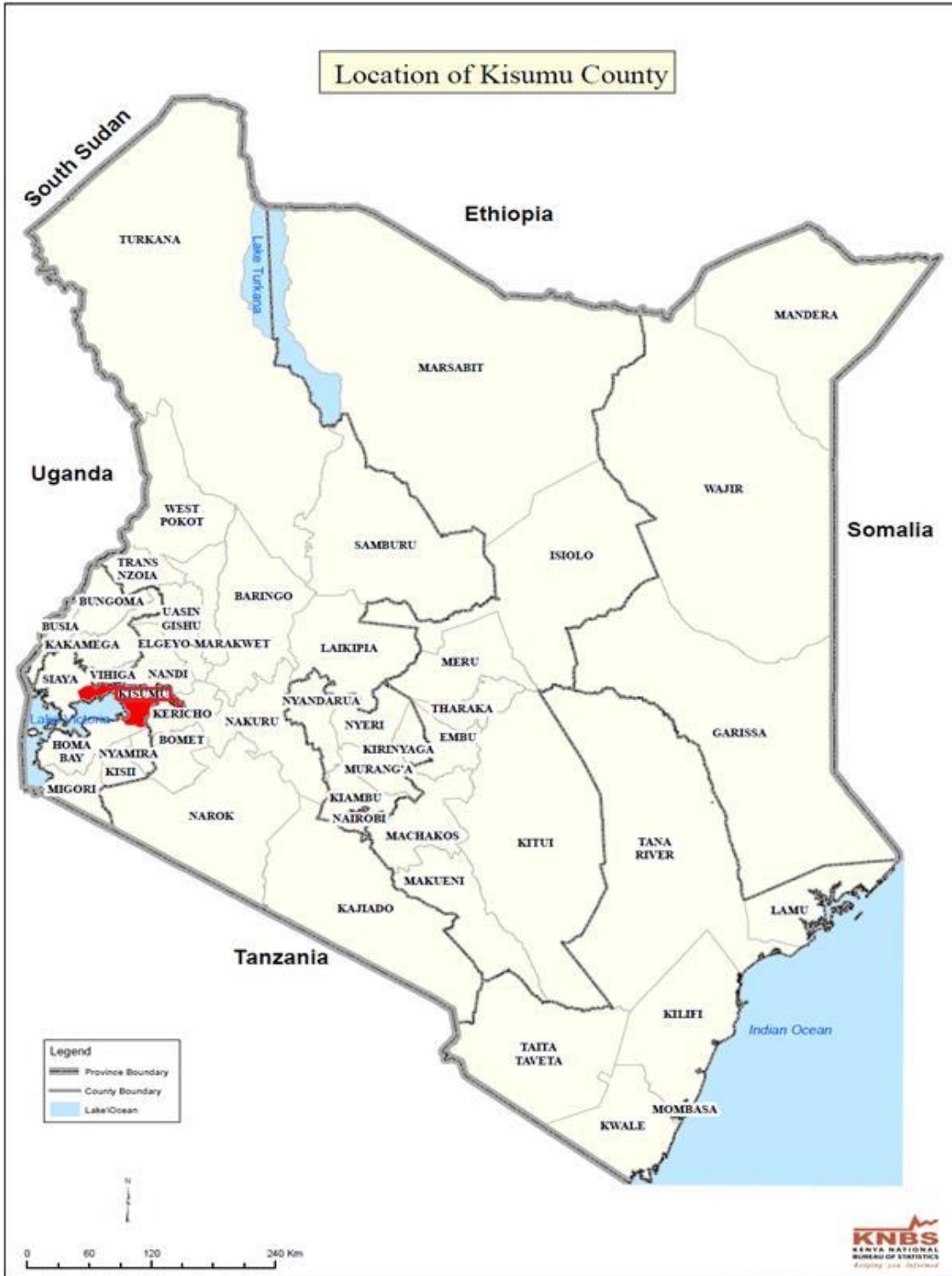
Figure 2: location of Kisumu County
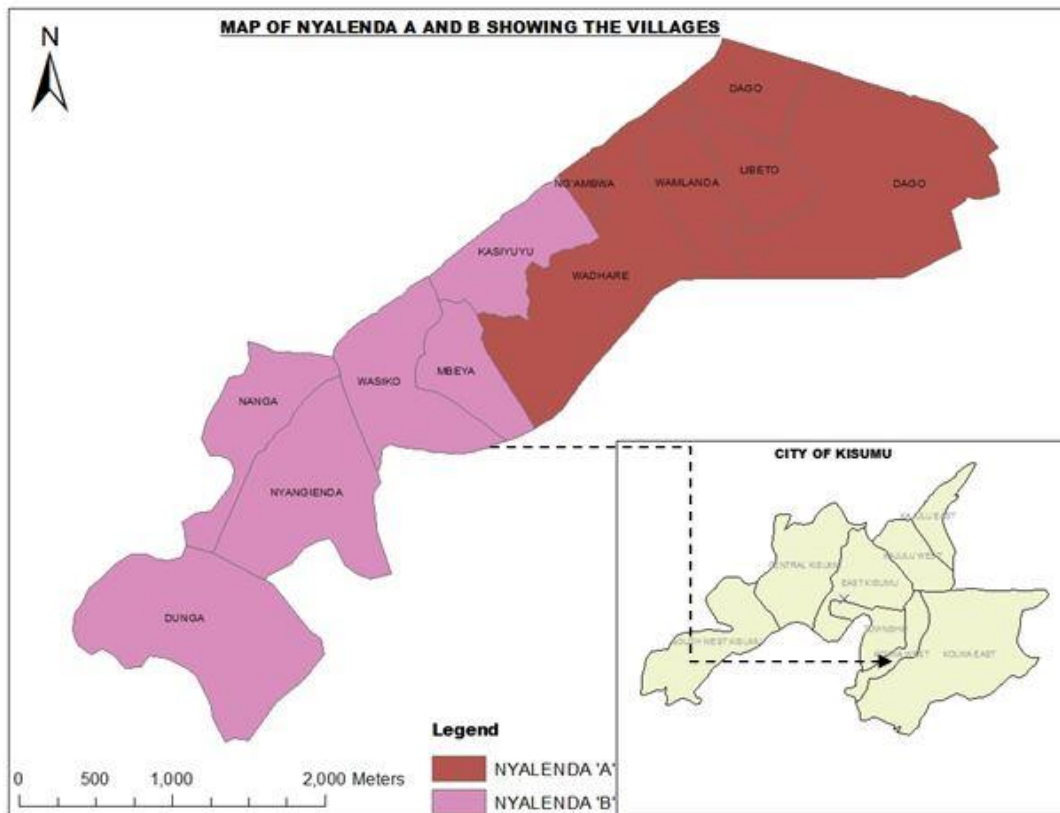
Figure. 3: Map showing Nyalenda Informal Settlement in Kisumu City

3.2.1 Study Population

Kisumu City has one of the highest urban population densities in the country, bringing with it the associated needs of infrastructural development to serve the needs of entrepreneurs wishing to invest in commercial activities in suitable locations with appropriate business premises. Kisumu City has a rapid population growth rate of 4.74% and the population is estimated at 560,000 people. Approximately 10,000 households live in Nyalenda. Administratively, Nyalenda is divided into two units namely; Nyalenda A and B. The area covered under settlements is 28km squared with the density in the area standing at approximately 580 persons per square Km. Nyalenda informal settlement is situated in both Kisumu Central and Kisumu East sub counties in Kisumu County. It traverses two wards namely; Nyalenda A is located in Kisumu East constituency in Kisumu County this is home to the famous kachok dumpsite next to the stadium.

The Kachok dumping started in around 1975 due to increased business within the Kisumu town and that the present Kibuye Market was rejected by the locals as a dumping site. The enhanced business started with the advent of the railroad that reached Kisumu (then port Florence) in 1901. In 1903 the township boundaries were gazetted and in the 1930's and 1940's, the city became a leading East African Centre for military, investment and administration. Nyalenda B on the other hand is located in Kisumu Central constituency home to the dunga wetlands and borders Lake Victoria. The total approximate number of households in Nyalenda was 10,000 as per Kisumu CIDP 2018.

3.2.2 Climatic Conditions

Kisumu has sub-humid and semi-humid tropical climate with a high mean temperature of about 23°C and rainfall that varies with altitude. The mean annual rainfall varies from 1100 mm in the south to 1500 mm in the north and potential evaporation of 2200 mm and 1900 mm respectively. The rainfall has marked peaks between March and May when half the annual rainfall may be expected. Short rains fall between November and December.

3.2.3 Hydrological Systems

Lake Victoria Basin, which measures 46.229 km^2, comprises the whole area west of the Rift valley that drains into Lake Victoria. The Basin covers an area of about 46,229 square kilometres and comprises the entire area west of the Rift valley that drains into Lake Victoria. Kisumu is situated on the edge of the Basin, and basically all storm water that passes through it drains into Lake Victoria. Groundwater table in Kisumu City and its environs is basically high with levels of less than below surfacing being encountered in some areas. Several local residents and business enterprises rely on such water sources for all or part of their water requirements. Because of such high water table levels, residents and business communities have sunk boreholes from which water is drawn to supplement the other water sources.

3.2.4 Geology and Soils

The major rock types that occur widely within Kisumu region include basalts, andesite, dacites agglomerates and rhyolites. In addition, there are some quarternary sediments in the area including clays, diatomites, shales and silts. The major soil types that occur in Kisumu and its

environs are vertisols or black cotton soils. These soils are clay and are known to be of impeded drainage. These soils are very good for rice and cotton production. Other soil types within Kisumu include cambisols, planosols, regosols, arenosols and ferrasols.

3.2.5 Economic Activities

The high rainfall regimes and soil types in Kisumu and the surrounding areas make it possible for agriculture and livestock keeping to be practiced. Currently, the main crops grown in Kisumu and neighbouring districts include maize, millet, sugarcane, beans and vegetables. Sugarcane is mainly produced for commercial purposes, while the other crops are mainly produced for subsistence purposes with surpluses being sold locally. The major livestock produced in Kisumu and surrounding areas include cattle, sheep, goats, pigs and poultry. Successful production of these classes of livestock requires the use of high quality feeds in addition to traditional feed resources. It is noteworthy that exotic poultry rely almost entirely on manufactured animal feeds for optimum production.

Fishing activities are widespread in several beaches in Lake Victoria including Dunga Beach which is located within Kisumu City. Fishing is done for both subsistence and commercial purposes. Some of the fish species caught include tilapia, *Barbus negletus* (Adel), *Barbus altanialis* (Fuani), *Proptoterus antropius* (Kamongo), *Haplochromis spp* (Fulu), *Lates niloticus* (Mbuta), *Rastrineobola argetea* (Omena), *Clarias gariepinus* (Mumi) and *Schilbe mystus* (Sire). Kisumu City is considered the commercial centre for the western region of Kenya. Owing to its huge economic potential, Kisumu has been existing to be the headquarters of the East African Community (EAC). Due to its large human population, the City provides numerous opportunities for trade at various scales. It has also been designated as the first Millennium City.

3.3. Study Design

The study adopted cross sectional descriptive research design. Descriptive survey design is a method of collecting information by interviewing or administering questionnaires to a sample of individuals hence suitable for extensive research. It is an excellent vehicle for the measurement of characteristics of large population (Orodho, 2003). It maintains a high level of confidentiality, it is convenient and enables data to be collected faster, enables questions to be asked personally in an interview or impersonal through a questionnaire about things which cannot be observed

easily. It also gives the study an opportunity to get accurate view of response to issues as well as test theories on social relationship at both the individual and group level (Kothari, 2003). Descriptive design is appropriate for the study because it enables the collection and analysis of both qualitative and quantitative data. A detailed consent form was developed for signing by all the participants that were involved in the study. The consent form was preceded by a verbal explanation of all that the research entailed such as purpose, procedure, risk, benefits and alternatives which were all put in a language that was easy to understand by the participants

3.3.1. Study Population

Kisumu, the third largest city in Kenya, is situated in the western region of the country, within Kisumu County. Over the years, Kisumu has experienced a growth in its population, with a resultant growth of informal settlements that are situated close to the city centre. Kisumu is estimated to have the highest proportion of residents living in informal settlements estimated at 47% (NCPD 2013). These settlements are Obunga, Bandani, Nyalenda A, Nyalenda B, Manyatta A, Manyatta B, Manyatta Arab, Kaloleni and Kibos. The population of Nyalenda is estimated at 10,000 households. It is estimated that 92% of the population, has access to a radio receiver and 70% of them tune in to the community Radio stations. (Steadman opinion poll, 2018) Apart from the residents of Nyalenda area, the management and staff of the three community radio stations, officials of community based environmental organizations in Nyalenda informal settlements, members of the community based organizations working in the informal settlements will also be included as part of the respondents in this study.

3.3.2. Sampling Procedure

The study sampled a total of 323 households in Nyalenda in Kisumu County. All the residents had an equal chance of being interviewed due to the manageability of the population size. The sample size was 323 households. This was arrived at using the formula as proposed by fisher et al (2003).

The sample size of a statistical sample is the number of observations that constitute it. It is typically denoted n, a positive integer (natural number).

To find the sample size we used the Fisher formula,

$$n = \frac{Z^2pq}{d^2}$$

Where:

n = the desired sample size

Z = the standard normal deviation at 95% confidence level (1.96)

p = the proportion of the target population listening to three radio stations (0.3)

q = 1- p (1-0.3)

d = the level of statistical significance 0.05

The total population is 10,000 households; 92% of which have access to radio 70% of which listen to the three radio stations.

$$n = \frac{(1.96)^2(0.3)\ (0.7)}{(0.05)^2}$$

n = 323

In densely populated areas, the researcher administered questionnaires to households in a systematic manner. The procedure for actors in environmental conservation involved a sample frame from purposive sampling which included CCK, KIWASCO, LVBWSB, NEMA, private sector such as garbage recyclers like BAMATO, relevant CBOs within Nyalenda. All the mentioned key informants were interviewed. The researcher used simple random sampling method in issuing questionnaires to household heads. The study area was divided into two, Nyalenda A and B. The researcher administered equal number of questionnaires to households living in the two parts of Nyalenda. A different set of questionnaires was administered to radio staff and management. Out of the 323 targeted household head the researcher was able only able to access 294 households' heads (a sample of the questionnaire used is attached in appendix 1) the ones used indicated a predictable trend on the kind of information that was being sought on the other hand the researcher was able to conduct six focus discussions.

Table 3.1: Study Groups and Sizes

Respondents category	Group size	Respondents	% of respondents
Household heads	323	294	91.02%
Radio Lake Victoria	3	3	100%
Dala FM	3	3	100%
SKY FM	3	3	100%
NEMA	1	1	100%
LVSWSB	1	1	100%
CBO's	3	3	100%
Garbage collecting firms	3	3	100%

3.4. Research Instruments

The study used structured questionnaires to collect household and sampled organizations as shown on the table above (quantitative data). Questionnaires were made for each and every category of respondents. The questionnaires sought to address the objectives of the study. Mugenda and Mugenda (2003) observe that questionnaires enable the person administering them to explain the purpose of the study and to give meaning of the items that may not be clear.

The qualitative data from both FGDs and KII was collected using semi structured questionnaire.

3.4.1 Primary Data

For primary data collection the researcher used both quantitative and qualitative techniques involving, household questionnaire, organization questionnaire while for qualitative the researcher conducted field observation, group discussions and informant interviews as explained below.

3.4.1.1 Household questionnaires

Questionnaires addressing each specific objective was developed and administered to 294 households in Nyalenda to gather quantitative data. The questionnaire had both closed and open ended questions to allow the respondents to fully capture the issues under investigation. The questionnaires were mainly answered by head of households. 4 research assistants were hired

after 2 days of training to administer the questionnaires to household heads for a period of three weeks during which time they identified themselves to the respondents and gave a brief background about the study including the objectives. The respondents provided the data from which the samples were drawn using simple random sampling. The research assistants also recorded the responses from the households to ensure eligibility.

3.4.1.2 Key informant interview

Interviews were held with key persons whose jurisdiction extend to or cover the study area. Key informants included the management and staff of Radio Lake Victoria, Dala FM, Sky FM, NGO's working in Nyalenda, head of Environment Department of CCK, the environment officer for NEMA in Kisumu, LVSWB officer, KIWASCO officer, leaders of community based environmental organizations, local provincial administration, directors of garbage collection firms, directors of private sector firms, religious leaders and community opinion leaders were purposely selected to give their views on the study topic. An interview guide was developed to ensure all the issues were captured during the interview.

3.4.1.3 Focus Group Discussions (FGDs)

In order to get relevant information necessary to meet the stated study objectives, this method was crucial. It focused on the listeners so as to get information, for example, on their involvement in content generation as well as program development. Mugenda and Mugenda (2012) observe that this is a technique used to elicit data from a group of people who share the same experiences and that the technique enables a researcher to gain an insight into an issue since the discussion usually focuses on one or two issues deliberated in great detail. The FGD guides contained a checklist of questions generated from the study objectives. The participants of the FGDs were randomly selected by the researcher. Every FGD had standard 6-12 participants, randomly selected among the inhabitants of the area. During the study the researcher was able to conduct four FGDs each handling a specific area. The FGDs were for plural investigation, the exercise was conducted with a broad range of representation within the community to enable triangulation of findings and incorporate wide-ranging perspectives.

The following issues were discussed in this data collection method:

1. Listener involvement in program content development.

2. Environmental problems in Nyalenda

3. Community Radio programs relevant to Nyalenda

4. Notable contributions in environmental conservation behavior change that can be attributed to the Community Radio Programs.

3.4.1.4 Photography and Participant Observation

The researcher took several pictures in different locations within the study area depicting different aspects of environmental challenges. Data was also gathered using participant observation skills on various aspects of sanitation, state 'nd perception of respondents during the interviews. All these were captured using pre-prepared observation schedule   (Appendix 7)

3.4.2. Secondary Data

This involved collection of data from already available sources, these included relevant literature collected from periodicals, Newspapers, Magazines, Reports, Newsletter articles and journals that talk about electronic mass media and environment. Libraries visited include: Maseno University Library, Institute of Post Graduate Studies, National Library Services, Kenyatta University Library, UNEP, Steadman Opinion Pollsters and other Non-Governmental Organization Libraries. A comprehensive desktop review of all the available secondary data was done while ensuring objectivity, fairness and consistency while identifying strengths and opportunities for improvement.

3.5. Data Analysis Techniques

The researcher perused completed questionnaires and interview guides to document analysis recording sheets. Quantitative data collected by using a questionnaire was analyzed by the use of descriptive statistics using the Statistical Package for Social Sciences (SPSS) and presented through percentages, means, standard deviations and frequencies. The information was displayed by use of bar charts, graphs and pie charts and in prose-form. This was done by tallying up responses, computing percentages of variations in response as well as describing and interpreting the data in line with the study objectives and assumptions through use of SPSS.

The data collected using interview guides which is qualitative in nature, was analyzed using conceptual content analysis which is the best suited method of analysis. Conceptual content analysis is defined by (Creswell, 2009) as a technique for making inferences by systematically

and objectively identifying specific characteristic of messages and using the same approach to relate trends. According to Mugenda & Mugenda (2003) the main purpose of content analysis is to study the existing information in order to determine factors that explain a specific phenomenon. Triangulation was used as a means of corroboration, which allowed the researcher to be more confident of the study conclusions.

3.6. Validity of the instruments

Validity is the degree to which a test measures what it purports to measure. Content validity of a measuring instrument is the extent to which it provides adequate coverage of the investigative questions guiding the study (Mugenda & Mugenda, 2003). In this study, content validity was determined by consulting the expertise of the supervisors. These experts looked at every question in the questionnaire and did their own analysis to ascertain that the questions answer research objectives of the area under study. Recommendations from the experts were taken into consideration in order to improve the study instruments.

3.7 Instrument Reliability

Reliability is a measure of the degree to which a research instrument yields consistent results or data after repeated trials (Mugenda and Mugenda, 2003). Pretesting of the questionaires was done to establish their reliability and validity using the test-retest technique. Ten questionaires and two interview schedules were pretested and tested within a time frame of five days and an analysis done prior to actual data collection. The reliability coefficient was then determined by the following formula:

$$R = \frac{\sigma_t^2}{\sigma_t^2 + \sigma_e^2}$$

Where R is the reliability coefficient

σ_t^2 is the variance in the data scores?

σ_t^2 is the error variance

Analysis and interpretation of pilot study's data was done to establish whether the instruments could be depended on for the study. The study used the Cronbach's Alpha test to test the reliability of the instruments reliability. According to the reliability test the Cronbach's Alpha

coefficient was 0.701. The recommended reliability coefficient is any value between 0.7 and above. The instruments were therefore considered reliable. The households used during pretesting of the questionnaires were marked to avoid repetition. The pretest participants were not included in the research.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter presents results and discussions on the role of community based radio stations in disseminating environmental conservation information to the residents of Nyalenda, to enhance their knowledge and empower them to take an active role in creating positive change. It comprises data collection details as captured from the production managers and radio presenters working in the sampled radio stations and the residents interviewed using questionnaires, interview guides and available secondary sources of data. The presentations were done based on the research questions which formed the sub-headings in the chapter. Data has been summarized and presented in the form of tables, charts, and narratives. Analysis of data and corresponding discussions are included. Feedback from interviews was analyzed using content analysis and is therefore presented in narrative form.

4.1.1 Questionnaire response rate

Questionnaire return rate is the proportion of the sample that participated as intended in all the research procedures. In this study out of 323 respondents sampled, 294(91.02. %) returned the questionnaires. This is a clear indication that the response rate was good.

4.1.2 Demographic Characteristics

This section presents the demographic information of the respondents in the study. The demographic information for the respondents focused on gender, Age, education background, years of stay in the area, and household hold income level. The findings of the study are presented in the subsequent sections.

4.1.3 The Distribution of Respondents' Age

In order to ascertain the respondents' age groups at Nyalenda, the data participants' ages were analysed. On the questionnaire forms, the respondents were asked to show their ages. This is because from the ages, and the length of stay in the study area, the level of environmental degradation can be ascertained, particularly if the respondent has stayed at the same area.

Table 4.1: Age distribution among respondents

Age	Frequency	Percentage
18 – 30	184	62.58
31 – 40	53	18.02
41– 50	31	10.54
51 – 60	18	6.12
Over 60	8	2.7
Total	**294**	**100**

The study was able to establish that, 184 (62.6%) of the study respondents fall under the 18-30 age bracket. This age group was followed by the 31-40 at 53 (18.0%) of the study respondents while age bracket 41-50 had 33 respondents (10.5%) of the study respondents, 51-60 and over 60 scored10.5%, 6.1% and 2.7% respectively. The implication was that majority of the people living in Nyalenda are between age 18 to 38 years as has been shown in the above table 4.1. Upon further probing of the respondents, it emerged that young people either from the rural areas or from school/colleges prefer to settle in Nyalenda as they begin searching for any form of employment. Some eventually leave Nyalenda for other planned estates depending on their perceived financial growth or stability.

This result compares well with a similar study conducted by (Onyango, 2015) in Kibera slums, Nairobi which noted that the biggest population in informal settlements are youth and young adults between ages 18-35 at 72%

4.1.4. The Distribution of the respondents' gender

According to the results of the study, most of the study respondents were female 180 respondents or (60 %) as indicated on figure 4.1. The findings may indicate that there are slightly more female in the respondents than male this can be explained by the fact that most male headed given that households were not found a majority were either engaged in other activities or could not be found at home.
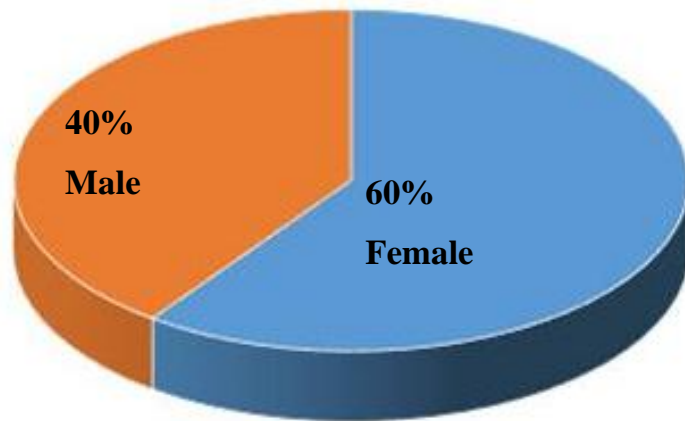
Figure 4: The Distribution of the Respondents' gender

Apparently, there were more females compared to males in the study as shown by the percentages of 60% for females and 40% for males. This implies that more females were reached in the household compared to the males. The other implication is that informal settlements that most females are left behind when the males go out looking for casual or formal jobs. The private and public divide, where men are supposed to work in formal employment and women run the affairs of the home or take up informal employment could be at play. The distinction between the public and private spheres 'has served to confine women to typically female spheres of activity like housework, reproduction, nurturance, and care for the young and sick, and the elderly' (Benhabib, 1998). Women find themselves in the domestic realm where they are expected to nurture the family whilst the husbands go out of the domestic sphere to the public sphere where they compete on the job market. Women are commonly involved in petty trading or part-time work in the domestic sphere within their community which they juggle alongside childcare, and continue to engage in these livelihood strategies into old age. A greater proportion of older men are employed in the formal sector or in relatively well-paid jobs in the informal sector, which offer better economic returns and stability (Falkingham et al., 2011)

Women and girls typically assume responsibility for domestic chores and childcare and enjoy even more limited economic opportunities than male slum dwellers that are generally tasked with the duty of working from far end areas to bring food on the table. (Hawkings et al., 2013).

A previous study conducted in Korogocho and Viwandani slums in Nairobi (Mudege et al, 2009) show the same results: Women in the slums normally take up tasks such as washing people's clothes, work that enables them to stay closer to their homes while still earning some income. For instance, the NUHDSS data show that 73% of women in Korogocho and Viwandani are engaged in petty trading compared to 50.2% of men. On the other hand, 17.4% of women in Viwandani compared to 39% of men are employed in the formal sector. In focus group discussions and individual in-depth interviews, it emerged that most of the female petty traders were involved in selling vegetables and cooked food activities that they could carry out at home or within the same community. Although some women in the informal sector sometimes work for cash payments, their work is still domestic since they perform typical domestic chores such as cooking, ironing, washing and cleaning for households or for individuals within the slum as well as neighboring non-slum communities. On the other hand, men take up formal employment or high paying informal jobs that sometimes take them away from home. (Mudege et al, 2009). This is well reflected in the study finding where by most of the respondents were of the female gender.

Another study (Khwiringira, 2014) concurs with the above findings by explaining that even within the informal settlement itself, it's easier for women to earn a living by venturing into small scale or low capital entrepreneurship such as fruit, vegetable or second hand clothes business while some even get employment as house helps within the settlements.

This school of thought is also shared by (Chiu,2018) in her article titled Stronger Together: How Female Entrepreneurs Thrive in Kenyan Slums where she states that Female entrepreneurship rates in Sub-Saharan Africa are the highest in the world since one in four adult women is engaged in early-stage entrepreneurial activity in the region for survival. In the Kenyan capital city, Nairobi, close to 60% of the city's population (2.5 million people) lives in slums. While slums are hotbed for entrepreneurial activities as women innovate out of necessity apart from spending more time than men on unpaid care responsibilities. The study was able to confirm what the other two studies had established about female entrepreneurship. This is a true confirmation that women within the study area were basically engaged on livelihood activities.

4.1.5. Respondents' level of Education

The backgrounds of the respondents' education were relevant in the study as it offered the researchers insight into how the respondents can narrate the issues they have been experiencing in their places of dwelling. From the findings, Nyalenda is home to individuals both educated and uneducated. This is well depicted on figure 5 below.
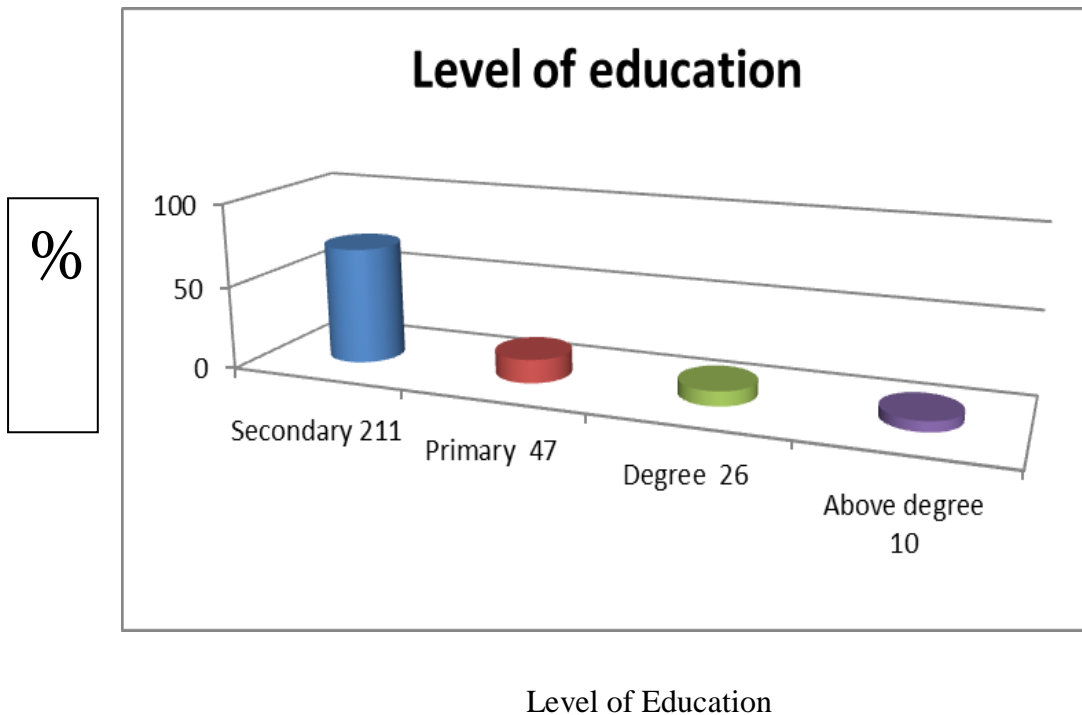
Level of Education

Figure 5: Respondents' level of Education

This study concurs with the findings of (Cameron, 2009) whose study in Dhaka, established that majority of those staying in informal settlements hardly progress beyond secondary education. He noted that although nominally richer and geographically closer to urban job markets than those in rural areas, people in the slums of Dhaka have greater difficulty progressing beyond secondary education since they had questionable rewards to look forward to at the end of it. The study draws on the theory of rates of return to education, but also looks beyond that to consider the factors that impede households from accessing the financial and other rewards that supposedly accrue from education. In particular, social connections play an important role in

getting jobs and realizing other opportunities. Another study conducted in India by (Singh, 2015) had similar results with the findings indicating that various surveys of slum areas showed that only over half the children are in school. It also showed that a high overage and dropout ratio existed among slum children. Overage was often the outcome of late admission to school. Economic problems were also a major reason leading to non-progression beyond basic education since parents had to use the limited resources to bring up other siblings as well. Various surveys of slum areas such as that done by (Shalini Singh and Kalpana Dipan, 2016) show that only over half the children are in school. It also shows that a high over-age and dropout ratio exists among slum children. Over-age is often the outcome of late admission to school. Late admission is caused both by demand side i.e. migration from rural areas to slums and by supply side i.e. lack of school capacity for all children, a short period of admission, requirement of birth certificate etc. Economic problems are one of the main reasons why children do not attend school, which leads to the reduction seen in the number of attendees at every level. The study is also supported by (Angel, 2013) who noted that most of the children in slums do not go to school or drop out because their parents need their help. The children help at home by taking care of the animals or smaller siblings or they work to earn for their family. The parents are poor with meager earnings. They are not encouraging the children to go to school especially girl children. Some of them deem secondary education as an achievement, having no reason and finance to further the education of their children. Reduced literacy level, child labor problem, early pregnancies and marriages and school dropouts are the problems that contribute majorly on reduction in the number of attendees.

4.1.6 The Respondents' Length of Stay in the Study Area

Using this variable was an important aspect of the study as it helps in ascertaining the level of awareness of environmental problems in Nyalenda and whether the environmental problems are increasing or decreasing. By knowing how long an individual has been staying in Nyalenda, it was imperative that the respondents were asked to indicate the length of their stay at the study area. The table 4.3 shows that majority (53.1%) of the study respondents had been staying in Nyalenda for the period between 1 to 5 years. This was followed by the period between 6 to 11 years which had (34.5%), for respondents who had stayed in the area for 12 to 20 years, and 21-

29 years were (7.2%) and (3.1%) in that order. Those who had stayed in Nyalenda for over 30 years were the respondents representing 2.1% as per table 4.2 below.

Table 4.2: The Respondents' Length of Stay in the Study Area

Length of stay (Yrs)	Frequency	Percentage
1 – 5	160	53.1
6 – 11	104	34.5
12 – 20	20	7.2
21 – 29	6	3.1
30 and above	4	2.1
Total	**294**	**100**

When individuals leave in one place for longer periods of time, it means that they may be satisfied with the living conditions, culture, and many other conditions making their life successful. In the Case of Nyalenda, however, it may also mean that the people are not able to afford the cost of living in other areas of Kisumu Town and Nyalenda offers the cheapest means of survival available. Considering that majority (53.1%) respondents stays in the area for less than 5 years, it means a majority are not satisfied with life in the area and move to other places that offer better life opportunities once they become financially stable.

A previous study conducted by (Amenya, 2012) on the informal sector in Kenya had similar findings. It observed that the immigrants to the urban areas first put up with relatives or friends in the informal or formal settlements as they look for jobs in the formal sector. They on the other hand help in preparing meals and other household chores. With time, they find a job such as messengers, clerks, and move out to start their own lives and rent a house preferably in slums due to affordability where they can accommodate other new-comers. However, sometimes they don't find a job in the formal sector and they end up joining the informal sector, where they sell second-hand clothes (mitumba), peas, shoes and other activities all found in the informal sector. The informal sector work may also include helping selling in the family kiosk, selling of newspapers, curios, shoe shining on the street corners. Those who eventually make progress in

their jobs or businesses and become financially stable do move to other planned settlements while those who stagnate in their employments/businesses continue residing in the slums. This pattern has previously been very common in Kenya. There used to be increased rural-urban migration especially of the school leavers who believed that the cities offered immense job opportunities and that it was far much better than the rural areas. This has however, changed in the past few years with increased unemployment and retrenchment of the formal workers.

A different study conducted in India's informal settlements, (Singh, 2015) concurred with these findings, it noted that though the average slum dweller may not manage to get out of the informal settlement, it was everyone's dream that someday they would get good jobs and move to more upmarket neighbourhoods. Those who achieve this through education, marriage or business were happy to move out of the slum life at some stage. The single most reliable way out of slum life is proper education leading to good jobs for boys and girls, for girls, marriage outside such settlements is often most welcome. (Depan, 2015)

4.1.7 The Respondents' Sources of Income to house holds

The main source of livelihood for the Nyalenda residents is the transport industry with most of the residents engaged in the boda boda transport sector. Other activities that respondents engaged on were salaried employment, casual worker, agriculture as well as fish mongering. The study was able to establish that there those who earn their living from craft, mostly mat making from the reeds found within the wetlands were the least at figure 6 below:
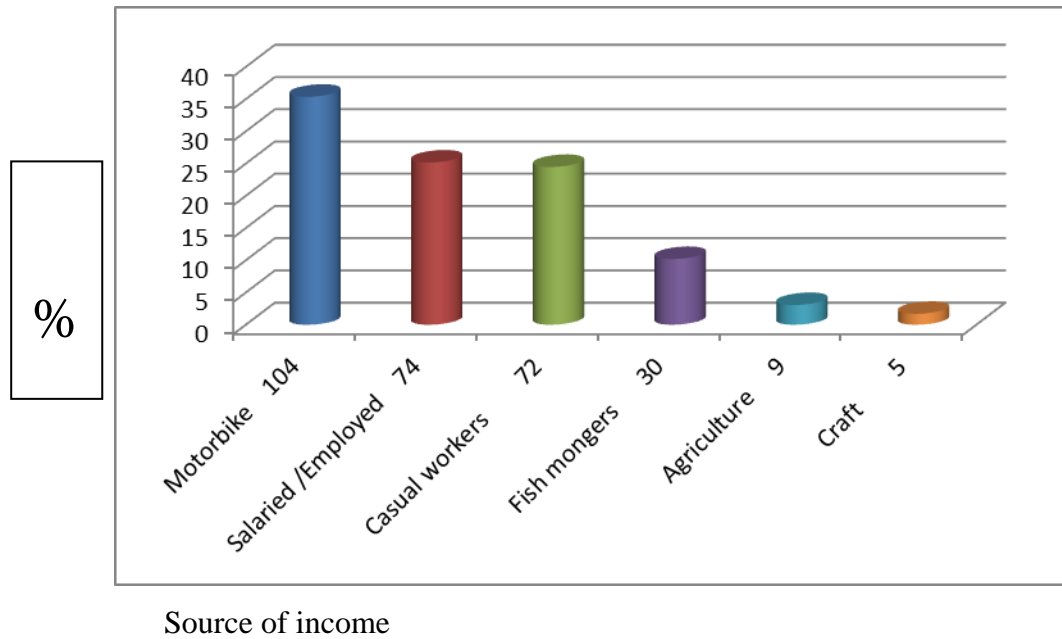
Source of income

Figure 6: Source of income

The boda boda business was the most readily available source of income to most of the respondents as it had minimal academic and/or financial requirements. Most of the riders were using motorbikes hired out to them on daily basis at a fee of Kshs 300 per day while some had purchased their motorbikes through their boda boda SACCOS. Casual employment in the informal sector was mainly in sectors that require unskilled or semi-skilled labor such as building and construction industry, hotel and bar waiters and waitresses, shop/supermarket and hardware attendants, go down off-loaders etc. Small scale trade mainly of kiosks and green groceries along the roadside was also common owing to the low startup capital requirements. Craft making was mainly practiced towards lower Nyalenda B where there was commercial mart and basket weaving due to availability of papyrus reeds in Dunga wetlands, the same area where a small section of respondents practice farming in Kapuothe". An average percentage of the respondents were on salaried employment. These findings concur with the outcome of a similar study done by Simiyu et al (2016) in which he sought to understand the living conditions and deprivation in informal settlements in Kisumu, Kenya, the results indicated that most of the respondents were employed in the transport industry locally known as "boda boda" 34%, followed by those either involved formal/informal employment at 29% and casual work at 26%.

Other respondents were also involved in business activities which included sale of fast moving items such as grocery, plastic ware, mats and fish baskets etc.

4.2 Basis of programming in community based radio stations in Kisumu City.

Objective one sought to examine the basis and rationale of radio programming in the three community based radio stations in Kisumu City.

4.2.1 Radio Programs Currently Aired by The three Community Based Radio Stations in Kisumu County.

A detailed analysis was done on the program schedules as well as program content for the three Radio stations, Radio Lake Victoria, Dala FM and Sky FM
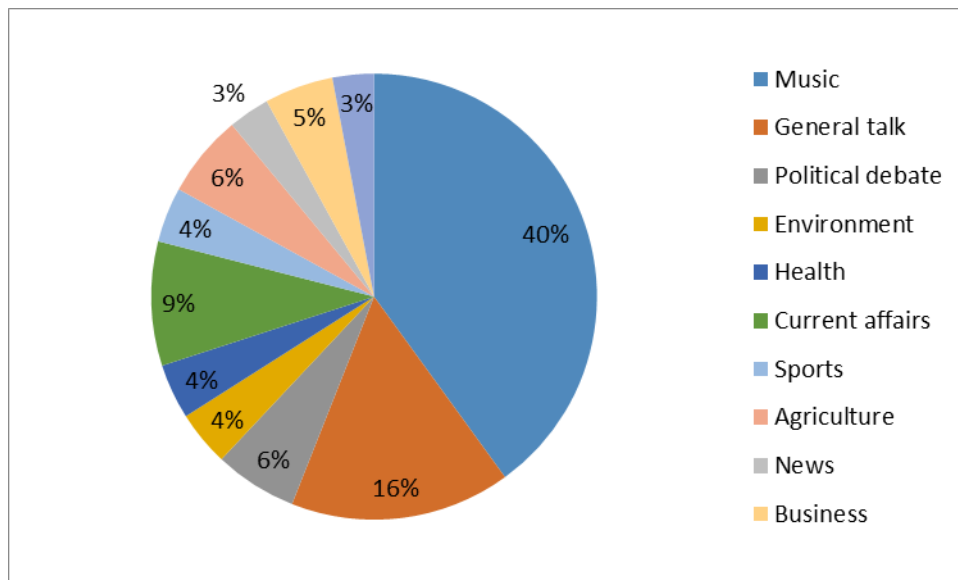
Figure 7: Radio programming at RLV: Source, RLV (2019)

At Radio Lake Victoria, music or entertainment takes a huge percentage of the total programing at 40%, followed by general talk on topical discussions at 16%. Environmental related programs take 4% of the total radio programming. (Figure 7).
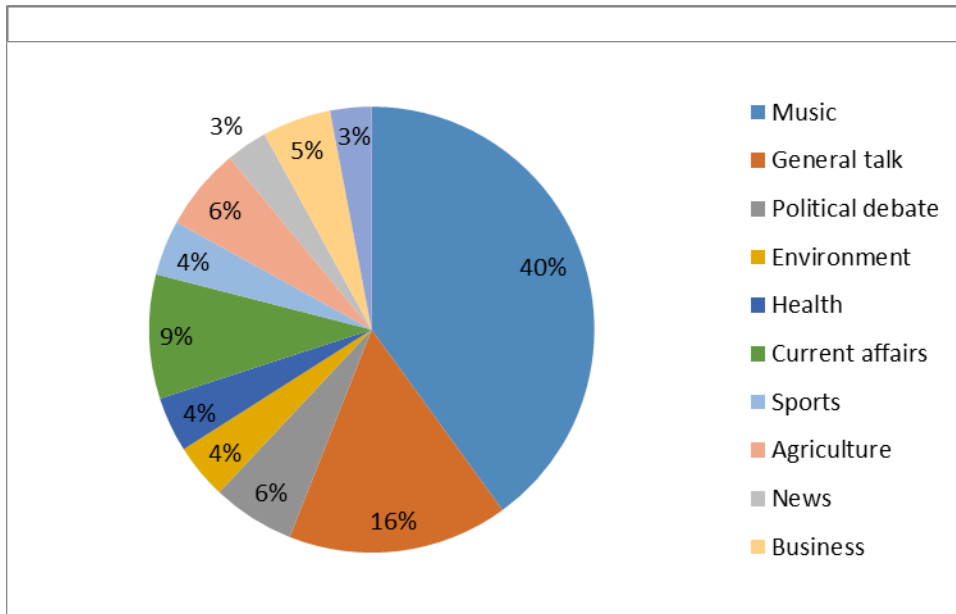
Figure 8: Radio programming at Dala FM: Source, Dala FM (2019)

Dala FM lives true to its policy on "more music, less talk". The station runs an 18-hour active programming schedule from 5 am to 12:00 midnight after which music play list runs till the following morning. As per the stations programming schedule, music takes 42% of the total programming schedule followed by general talk on topical discussions at 15%. Political debates are allocated 12% while environmental discussions take 6%. (Figure 8)
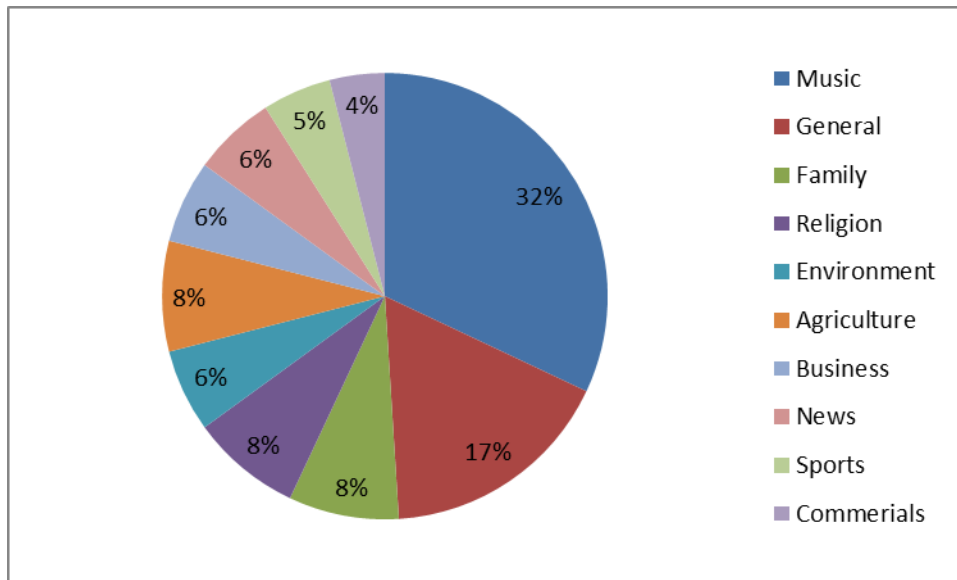
Figure 9: Radio programming at SKY FM: Source, SKY FM (2019)

 Source: Sky FM, 2019

At Sky FM, music entertainment accounts for 32% of the total programming schedule. This is followed by general discussions at 17%. News and sports take 6% and 5% respectively, Family life and Religious programs each account for 8% of the programming. Environmental conservation programs take 6%.

The above data clearly indicate that entertainment through music is given priority when developing program schedule and content for the three radio stations. The station managers justify this by indicating that in order to get radio listenership, entertainment is key. The remaining time is shared amongst other remaining programs such as political debates, agriculture, family life, news, environment, health, religious programs, children's programs and general discussions on topical issues.

4.2.2 Residents' participation in community-based radio programming

An in-depth analysis was done to establish the nature of community participation and involvement in program and content development at the four Radio stations. The residents were asked if their views were sought during content generation by the stations. Table 4.3 presents their response.

Table 4.3: Nyalenda listeners' response on whether they are consulted by the three community based radio stations in Kisumu City

.

Response	Frequency	Percent
Yes	36	12
No	235	80.2
Neutral	23	7.8
Total	**294**	**100.0**

Source: Survey data, 2019

80% of the respondents interviewed indicated that they were not consulted on the topics covered in radio programs. Only 12% of the respondents indicated that their views had been sought by the community-based radio stations. 8% of the respondents were not sure. The 8% category that were not sure indicated that their nature of engagement was non-structured as they occasionally interacted with radio presenters during roadshows and community radio listenership groups or even through radio call-in sessions during which they gave their opinion but they couldn't be sure whether such opinions were taken into consideration. Although the data shows us that the three radio stations offer diverse programs that cut across all ages and genders and represent the entire community, community involvement in programming is however minimal which implies that framing, to capture the specific needs of the target audience, which include their social demographics culture-social norms, their environmental conservation priorities, values needs preferred environmental content and communication channels is not optimally applied. Emphasis is placed on program schedule and not content which captures the needs of the target audience.

The study also sought views from the key informants of the three radio stations on the community involvement in programing and content generation. The general response was that the programming department mainly comes up with the program blocks or schedules also known as day parting which are normally in 4 to 5 hour segments. These include:

Breakfast Program: 5:00-10:00 1m

Mid-morning: 10:00-1:00 pm

Early Afternoon: 1:00-4:00pm

Evening Drive: 4:00-8:00 pm

Late Night: 8:00-12:00 Midnight

The station managers observed that these segments only provide guidelines in terms of properties to be included but the content is purely at the discretion of the program presenter who doubles up as the program producer. Due to competition in the media industry, the station managers and presenters said a lot of time has to be dedicated to music as this is what attracts a high number of listenership from the target audience.

 One manager said:

> "*Radio is about talking to people whom you are not seeing. The only way to be sure they are listening to you is by giving them what they want and as per our target audience it is latest Luo Rhumba and ohangla music as well as political discussions, once you have them glued to the radio you can then pass other messages on health, environment, agriculture etc but you have to keep it brief so as not to loose the listener*", Seth Oloo Mbaka, Station Manager Radio Lake Victoria (personal communication, 2019).

The radio presenters drawn from the three community based radio stations also observed a top-down nature of programming. They indicated that having worked in the community for long and the fact that they also live within the community, this gave them some understanding on the interests, challenges, concerns and needs of the community. The presenters who also double up as program producers or content generators indicated that they mainly use experts drawn from the local government administration, NGOs, CBOs and faith based organizations operating within the community, national and county government officials, the leadership of the radio listenership groups and popular listeners who excel in various fields such as agriculture, environment, religion, family life etc. These experts were always invited to the studios for live discussions. The listeners would then be mostly engaged through call-in session, sms, or social media platforms. The FGD guides contained a checklist of questions generated from the study objectives. A similar finding was observed during the focused group discussions on the level of community involvement in program content development. Discussants commenced the deliberations with a brief background of why it was important for the Community Radio Stations to involve listeners in program development. One group member observed:

> *"As for me, I don't think the radio presenters involve us when choosing topics for*
> *discussion, when it reaches time for the program the presenter usually gives us a topic,*

discusses it briefly together with his co-host then opens for us the forum to contribute through telephone calls, sms and facebook, Myself I don't have facebook but I usually prefer calling so that others can get to hear me on radio"

This line of thought resonated well with a large section of the discussants who noted that rarely is their input ever considered in program content development, majority indicated that they only meet the programs at the point of on-air discussion. Two participants however noted that they had been involved in content generation from their local cbo level:

"The station often invites us to go and share with listeners on the activities of our CBO within Nyalenda, when that happens, we do prepare an interview guide which the presenter will use to guide the discussion, the content is therefore entirely from us"

Generally, it was observed during the FGDs that the Community Radio Stations still need to do a lot in terms of involving the Nyalenda Community in terms of content development. The current design therefore showed a top down approach whereby the programs only became more participatory during the live broadcasts mainly through the talk shows. The general listeners' role in the design of such programs was thus minimal. The findings are in contrast with recommended practice for effective community-based radio programming. Johnson-Turbes, Hall, Kamalu and Zavahir (2010) who state that when a radio message is developed, the target audiences need to be considered. Jallo (2012) argues that "for community based radio to achieve its developmental objectives, its programs should be well researched, produced and presented in a manner that is comprehensible, with the Listeners active participation." Considering the framing theory, the community based radio stations need to organize and present their ideas and topics they cover by first being able to understand their target audience characteristics, beliefs, attitudes, values, skills, their environment, and what matters to them (HEC, 2008; Calabrese, 2016). Both the radio stations and the Nyalenda residents acknowledge the need for improvement in involving the listeners in the initial design for the programs and in the dissemination.

4.2.3 Listener engagement platforms during program presentation.

The study sought to find out the format used by the community-based radio stations to engage/ interact with the listeners during the radio programs presentation. (Figure 10) summarizes the findings
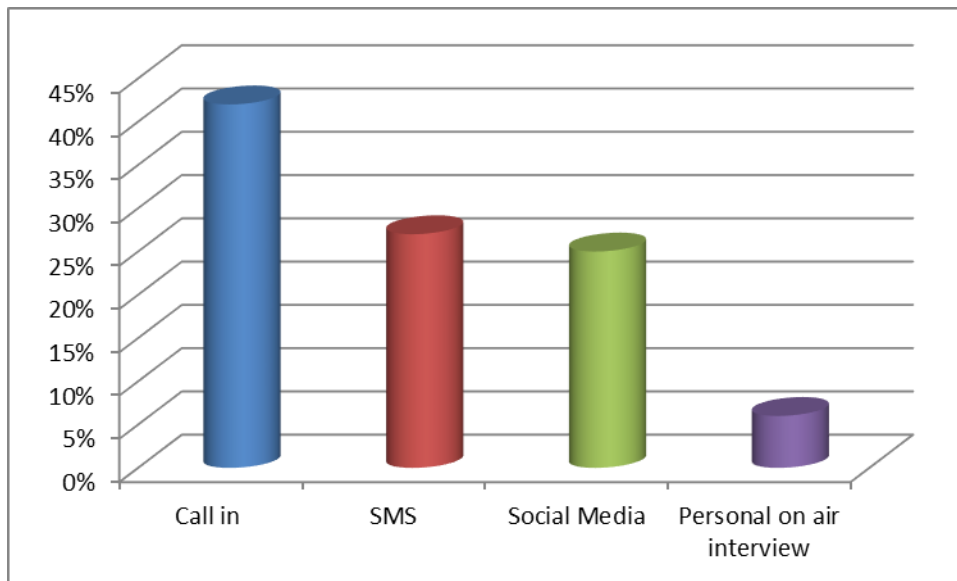
Listener engagement platforms

Figure 10: Listener engagement platforms at the three stations

Feedback received regarding the platform for listener engagement during the program presentation indicated that 42% of the listeners preferred to call-in and make their contributions on ongoing discussions-. SMS came second at 27% closely followed by social media at 25%. Those who had actually been invited to the various radio stations for personal interviews accounted to 6%. The method of listener engagement used may also contribute to the effectiveness in disseminating the intended information. This is illustrated by a study conducted by (Johnson-Turbes, Hall, Kamalu & Zavahir 2013), which established that social learning, and listener interaction through radio was effective in disseminating behavior change information. This is in line with the framing theory, which emphasizes the need to take into consideration public reaction to the aired radio messages. Through live discussions, the listeners respond to the

information, which reshapes their feelings and individual frame, and the framing process begins again (Calabrese, 2016).

During the FGDs, a member noted that his involvement in program development was often at the point of discussion since he was often invited to the studio as a resource person dealing with solid wastes:

> *Being the founder of BAMATO, a local plastic recycling plant within Nyalenda, am often invited to the studio for discussions on waste recycling, sometimes I go live in the studio for interactive sessions where I get to take and respond to questions from listeners, other times the presenters engage me through phone interviews.*

Majority of the discussants however praised the stations for what they termed as unrestricted opportunity to participate in the discussions through calls, sms and social media pages.

> *"One thing I like with Dala FM and specifically Joab Ondoro is on the way they pick our calls and read our messages, everybody is free to call and air their opinion on any topic once they open for us the phone lines"* A participant noted

The Call-in shows and personal on-air interviews are formats that are unique to radio and can be effective for promoting social learning since they promote experience sharing amongst listeners. Messages on such shows can be tailored to target audiences and designed to contain interactive elements customized to local community concerns. Radio provides a forum for 2-way communication via live radio shows, during which listeners can engage messengers and each other to obtain environmental and other information.

Sky FM's Station Manager, Miss. Jael Lieta *observed that the live radio programs give them immediate feedback since they can gauge the listener participation through calls, Sms, facebook, twitter and other social media platforms; this in turn enables the station do to a self-evaluation on the quality and relevance of their programming and content. The listeners on the other hand feel part and parcel of the program presentation since they have an opportunity to voice their concerns and opinions. In the long-term this leads to greater democratization since participation is fully open to anyone willing to do so and there's absolutely no restriction to who can call or text. This promotes inclusion of a broad spectrum of opinions in debates.*

(Baran & Davis2009) and (Goffman1974),emphasize that the way news is presented creates a frame for that information and the audience can feel a sense of rapport-of closeness with the program being aired. The basis and rationale of programming at the three community-based radio stations show that the stations play a significant role in behavior change through the provision of information, education and entertainment programs around the clock to the listeners, in areas such as music, environment, education and agriculture, among others. Through applying listener engagement formats such as the talk shows and live call-ins, the voices of the voiceless are heard and are expected to be active participants in the development process. This type of programming signifies that the radios promote participatory broadcasting, which leans towards the philosophy of involvement and participation by the listener. This conforms to the basis of framing theory, which states that the media focuses attention on certain events, and then places them within a field of meaning to the listener (Baran and Davis, 2009; Goffman, 1974). By achieving this the community based radio stations become instrumental in delivery of information on environmental conservation efforts and act as a call to action on the part of the community. (Zamawe, Banda & Dube, 2016; Davies et al. 2006).

4.3 Relevance of the environmental programs aired by the Community-based Stations to the existing urban environmental problems in Nyalenda

To examine the relevance of environmental related programs aired by the three community based radio stations to the existing environmental problems in Nyalenda, the study first sought to establish the urban environmental problems in Nyalenda informal settlement vis some vis the content of the environmental radio programs aired. The relevance of the environmental programs to the existing problems in Nyalenda was important in singling out the particular programs that were directly addressing the existing problems.

4.3.1 Environmental Problems in Nyalenda

Informal settlements are characterized by a gross deficiency of basic services such as proper housing, provision and supply of safe potable water, sanitation facilities such as latrines and disposal of human excreta and other solid wastes, drainage of sewerage water, paved roads including accessibility etc. Often, even rain water does not get drained off from their regions.

These problems affect the quality of water and air. This in turn impacts the health of the people in such areas.

Environmental problems
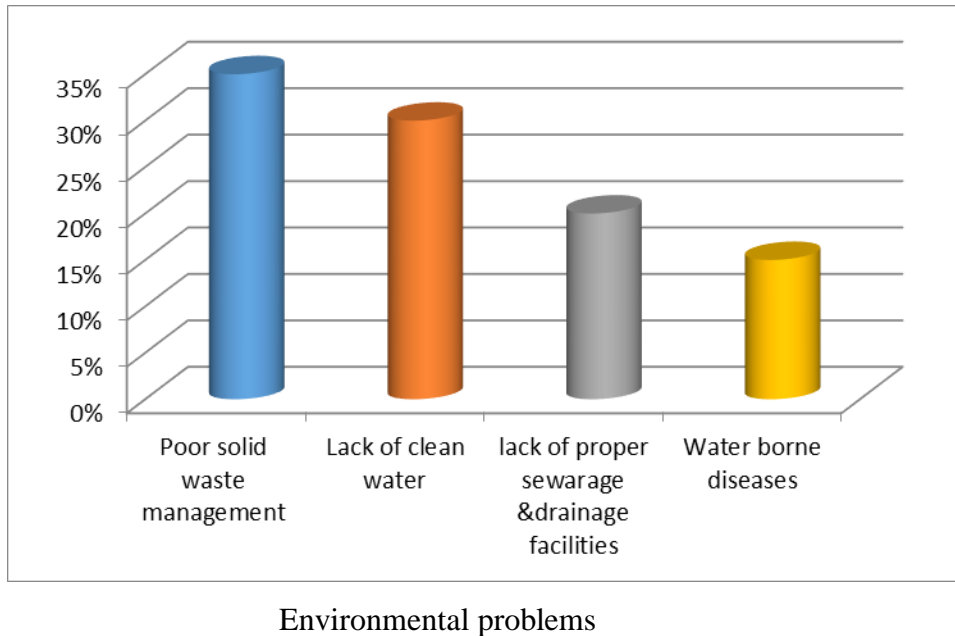
Figure 11; Environmental problems in Nyalenda

The study established solid waste management as a major environmental problem (33%) followed by lack of clean water (27%). Lack of proper sewage and drainage facilities was third (17%) and lastly the prevalence of waterborne diseases (13 **%.**)

4.3.1.1 Solid waste management

The composition and generation rates of solid waste are important for effective management of solid waste. This information is necessary for planners and policy makers to determine the mode of disposal and also the possibility of adoption of waste management hierarchy of minimization, re-use and recycling. The analysis of the waste was carried out from the samples obtained from the two areas of Nyalenda (Nyaori and Pand-Pieri). The findings revealed that organic waste constituted the highest portion of the solid waste gotten from the study area, other wastes included plastic waste, paper waste, metallic waste, glass waste and textile waste as represented in the figure 12 below
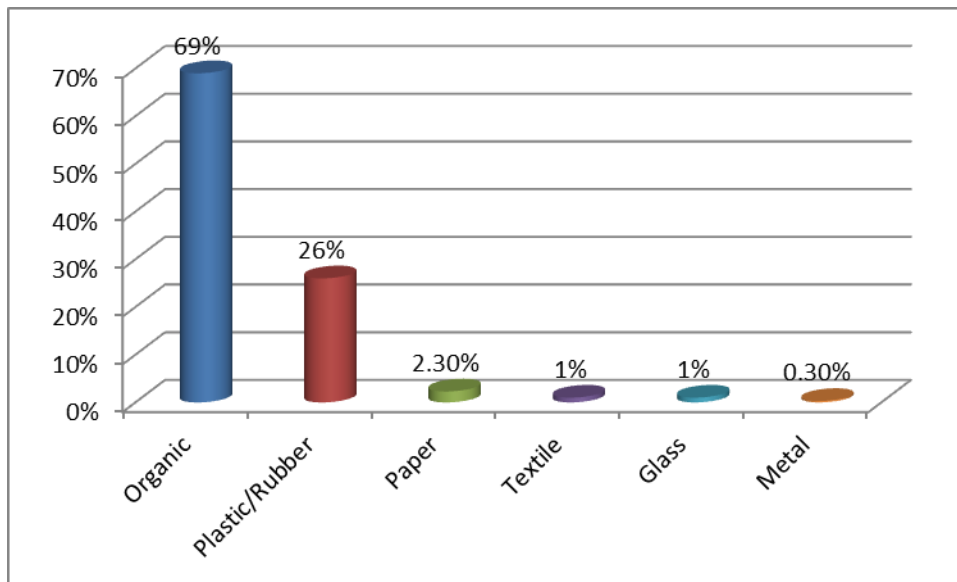
Composition of solid wastes

Figure 12: Composition of solid waste in Nyalenda

The organic fraction comprised mainly of kitchen waste including food, rotten fruits, vegetables, leaves, crop residue, animal excreta and bones. Plastics, glass, metals and paper account for less than one fourth of the total solid waste components due to the fact that these components are often re-usable and/or recyclable and therefore rag pickers segregate and collect these components at sources, collection points and disposal sites. The low percentage of glass and metals in Nyalenda can be explained by the high recycling rate at the area where the house workers sell these items to middlemen to supplement their income and therefore could not be found on the trucks ferrying the wastes for disposal. High organic content and moisture content (Figure 7) reinforced by high temperatures increases the decomposition of these wastes releasing odors and attracting vermin which can create environmental disasters. This therefore necessitates the need for frequent removal or there should be alternative disposal mechanisms such as compositing which will minimize the quantity of waste to be landfilled. Studies by Sharholy, et al., (2008) indicate that aerobic composting and vermin-composting are one of the leading disposal methods in India because the solid waste is composed mainly of organic components (about 40-60 percent).

Plate 1: A photo of Kachok dumpsite in Nyalenda. Source: Field Data

Solid waste handling and disposal in households and collection

The findings were that disposal in open areas and in roadsides were increased by inadequate disposal containers and longer distances to these few containers. Dumping of solid wastes by the roadside or in open spaces between buildings is the most common method of waste disposal in Nyalenda at 73% followed by 15% who sought the services of garbage collectors.7% of the respondents preferred burning a section of the wastes generated while another 5% indicated that they sort and sell wastes to commercial waste recyclers. These findings are illustrated in (figure 13) below.
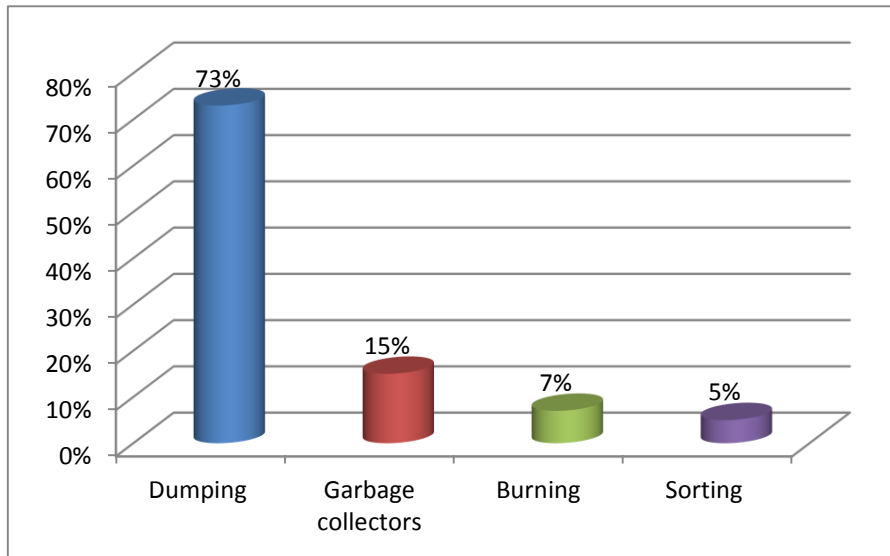
Solid wastes disposal methods

Figure 13: Solid waste disposal methods in Nyalenda

Tadesse et al, (2007) carried out a study on household waste disposal in Mekelle city in Ethiopia. The authors collected data on effects of demographic factors, social status, and waste and environmental attributes on household solid waste disposal options. The authors used multinomial logit model to estimate the optimal waste disposal choice on each alternative disposal attributes and demographic features (Bundhoo, 2018). The results of the model were used to show the probability of a specific disposal activity.

Plate 2: Solid wastes dumped by the roadside in Nyalenda, Source: Field Data

In many households in Nyalenda, solid waste is thrown haphazardly to open spaces within the vicinity of their dwellings. In some cases, there are open tins and/or polythene bags which are provided for those that have subscribed to private waste collection services. Due to the fact that most of these wastes have high organic fractions coupled with high temperatures, there is rapid decay of the waste releasing bad odors besides attracting flies and other rodents (Onanuga & Odunsi, 2018). Much of the land in these settlements is freehold whose owners obtained through inheritance (Huchzermeyer 2009; UN-Habitat 2005). Over time, some owners have constructed rental housing and continued to live within their pieces of land, while others have constructed rental housing and moved to live in other areas. Consequently, there are resident landlords who live within their premises as well as absentee landlords who do not live within their premises. Housing structures are either constructed in the traditional style, with mud walls and iron sheet roofing, or in more modern styles (UN- Habitat 2005) that include storey buildings with walls of brick/concrete. These houses are located in plots/compounds, with a compound comprising several families under a landlord, who would normally be responsible for provision of basic services. Many compounds, however, lack electricity, water and sanitation facilities (Karanja 2010).

Niringiye et al., (2010) assessed determinants of willingness to pay for improved household solid waste management in Kampala City. The model used to elicit willingness to pay for improved household solid waste management was a dichotomous choice contingent valuation technique. The authors used logistic model to establish the determinants of willingness to pay for solid waste management. The study found out that the age of the household head was negatively associated with the willingness to pay for solid waste management and that there was little chance of success if household solid waste collection service charges were introduced. The gap of this study was the cost issue introduced in solid waste management in Kampala City (Niringiye et al, 2010). It made waste management to appear as a practice for the high income earners targeting private waste collectors as their only single option of waste management.

In Nyalenda, majority of the households do not have collection services with very few having their wastes collected twice in a week. In general, the amount waste generated far exceeds the volume collected. When the waste is left unattended, it emanates foul smells especially in this low income area where the waste is often mixed with human waste due to inadequate sanitation facilities (Macias & Piniarski, 2016). This is a serious problem in all slums in Kenya which makes the slum population in Kenya vulnerable to disease outbreaks related to sanitation and hygiene. Solid waste disposal by dumping by the roadside or any available open spaces in between the buildings is common practice in Nyalenda, 73%, due to lack of access to waste disposal facilities. Xavier et al., (2010) identified the key factors in increasing recycling and reducing residual household waste in Flemish region of Belgium. The authors used binary logistic regression model which covered a number of variables such as household characteristics, provision of recycling services, frequency of waste collection and charging for waste services. Analysis of these variables produced results that were meant to reduce and maintain the amount of residual household waste to the recommended amount per capita (Bundhoo, 2018). The authors found out that income per capita, cost of residual waste collection, collection frequency and separate curbside collection of organic waste contributed significantly to waste recycling and residual reduction. During the dry seasons, the estate caretakers may occasionally burn the accumulated wastes to create space for new ones. Some households, 15% have however embraced the services of commercial garbage collectors who charge an average of 200 shillings weekly to dispose the wastes on their behalf.

A small percentage of the respondents, 7% prefer burning their wastes every evening or over the weekends while 5% sort and sell the wastes to recyclers within and outside the estate. This uncontrolled dumping is a recipe for environmental disaster. Plastics and metal tins if not properly disposed can retain water and act as breeding grounds for insects such as mosquitoes (Mathur, 2018). Plastics due to their non-biodegradable nature can be eaten by domestic animals leading to deteriorating health and therefore ruining the economic base of those depending on them. The finding of this research reflects that done in India by Gowda (2013) which stated that:

> "Solid Waste Management (SWM) in the expanding cities is affected by all kinds of problems associated with a constant population influx from surrounding rural communities, uncontrolled sprawl dominated by illegal settlements, extensive slums in the central and other areas, and traffic and population congestion in and around all major access points to the city".

This was supported by the fact that household solid waste management in developing countries is characterized by a myriad of technical, financial, institutional, economic and social constraints Zhuang et al., (2007). Both financially and physically, a city finds it difficult to provide facilities for waste collection, especially with regard to the urban poor. The urban poor are often left to contend with waste disposal on their own. Support given to the urban poor in slums and squatter settlements has serious deficiencies adversely affecting their health and generally the urban environment itself. Thus, the management of solid waste is an issue of vital importance to urban sustainability" Gowda, (2013). This study contrasted with that by Wasonga et al. (2014) that observed that 37% of the respondents owned dumpsite within their homestead. Another study by Karija and Shihua (2007) linked the high prevalence of typhoid, cholera and diarrhea in Juba, South Sudan to solid wastes carried off by run-off during the rainy seasons. Despite the high level of household waste management observed in the study area, 11% of the unmanaged household solid waste can cause serious health problems during the rainy season, as the waste are carried off by run-off to the water pans, thus increasing the level of microbial contamination. Haphazard disposal of solid wastes provides breeding sites for disease vectors such as mosquitoes and flies.

The study also wanted to find out the method of house-hold waste disposal. An observation of the presence of rubbish/garbage pit as well as dish rack was done. Across the entire community under study, only 37.1% rubbish pits were observed while only 59.6% dish racks were observed in the households visited.

Even with the availability of various waste collection and disposal methods, solid waste management is still a major problem in Nyalenda. It is likely that the lack of the involvements of the community on waste management is the cause of the problem. Participation of the community in the process of waste disposal can trigger community development work owing to the fact that it guarantees the residents a sense of self-esteem Hope, (1998). The study found out Similar, to what Vrijheid (2000) reported, it is difficult to conclude whether these symptoms are an effect of direct toxicological action of heavy metals present in dumpsite, an effect of stress and fears related to the dumpsite, or an effect of reporting bias.

4.3.1.2 Lack of clean Water in Nyalenda

The leading source of water in Nyalenda is shallow wells at 37% followed by water vendors using handcarts. Tap water as well as rain water used mainly for drinking at 25% and 12% respectively.

Common water sources

65
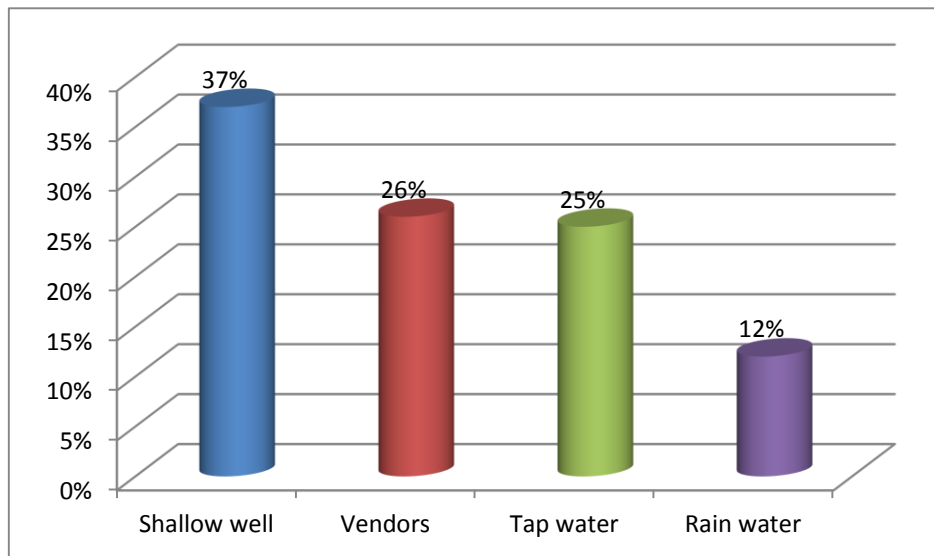
Figure 14: Common Water sources in Nyalenda.

The study was able to establish that 111 respondents representing 37 % of the study participants use water from shallow wells for their   daily household water needs such as bathing, washing clothes and utensils, cooking etc.78or 26% of the study respondents got water from water vendors for their daily use, 75 or 25% of the participants got water from tap water is used mainly for drinking. Rain water constitutes less than 12% of water use due to its unpredictable nature and the poor condition of the roof catchments coupled with the fear of thieves who steal the water containers if left unattended at night. From the results, almost every plot has a well; the wells are shallow owing to the fact that Nyalenda estate is adjacent to a huge chunk of wetland that connects to Lake Victoria hence the high water table. This study concurs with a similar study conducted by Kimani, (2007) in Langas, Eldoret that established that most people (91%) in the Langas slum used wells as the main source of domestic water, whereas the rest used tap water and rain water.

World over, there are increasing concerns of the future availability of fresh water resource. A lot of these concerns come about because of the realization that pollution of fresh water and fresh water sources is rampant (Bundhoo, 2018). It has been identified that point sources, mining, urban runoff and agricultural sources are the main sources of fresh water pollution. Water contaminants coming from these sources include solvents, agricultural chemicals, and mining residues. Various chemical constituents have been identified to pollute underground and surface waters. Most sources of drinking water in urban areas are open sources (such as rivers and lakes) as well as ground water sources. But even as water pollution increase, water is one of the most important resources that sustain the life of animal and humans Taylor et al., (2015).

Plate 3: A picture of a well in Dunga, Nyalenda B, Source: Field Data

From the data on sources of water in Nyalenda, it is clear that population living in the area are facing water scarcity. Nazim Uddin et al. (2016) examined the economic impacts of improvements of water access, sanitation and hygiene from their study, they realized that for every shilling invested in improving water access, sanitation and hygiene, the national economy benefits since more than 4 dollars is returned into the economy (Grimes & Templeton, 2016). Basically, with improved access to safe water, improved sanitation and high standards of hygiene, most people will remain healthy and contribute to the economy. Findings from related studies indicated that 51% of the respondents in Kakamega obtained their water from open sources that are prone to contamination. In Central and South Baringo resident communities reported using the water pans for sourcing their household water for use, since it was the only available water source within their reach. In Tanzania, a study documented that only 49.7% of the studied population had access to improved water sources, with the remaining portion dependent on unimproved water sources. Use of unimproved water sources for cooking and drinking at the household exposes the household members to consumption of fecal contaminated water causing water related diseases.

4.3.1.3 Waterborne diseases in Nyalenda

The study established that within the study area, usage of unsafe water in Nyalenda often resulted to the frequent outbreaks of water related diseases such; as typhoid, cholera, dysentery and Malaria the study respondents indicated that cases of Typhoid were on the rise at 51%, outbreak of cholera as water borne diseases was mentioned by respondents representing 28% while Dysentery was mentioned by respondents representing 13% of the study respondent , the other disease that was mentioned was Malaria representing 8% of the study respondents as indicated in figure 15 below .
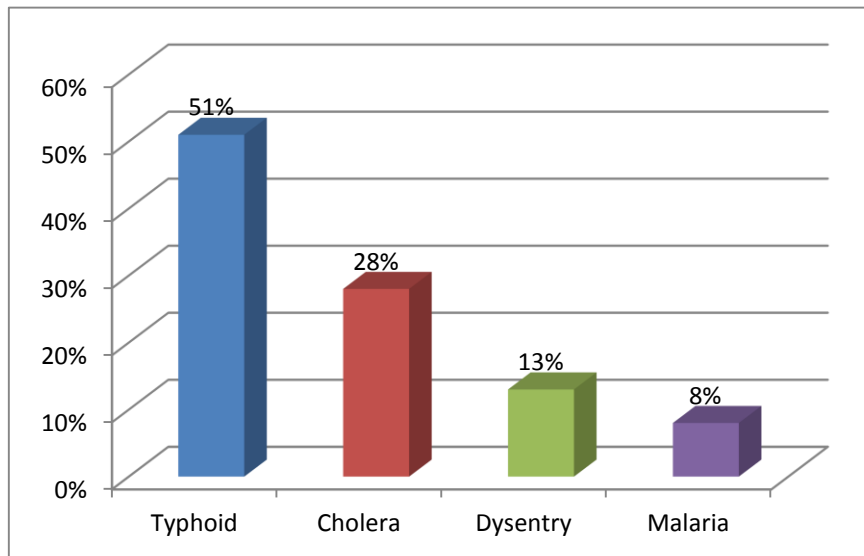
Common water related diseases

Figure 15: Common water related diseases in Nyalenda

This study was comparable to other studies by Onyango and Angienda (2008) in Western Kenya found out domestic water treatment practices to include boiling and use of sodium hypochlorite. Wasonga et al. (2014) in their study found out that commonly used water treatment options in Nyakach, Kisumu County included use of chlorine. Household water treatment is significant in the reduction of water related diseases such as diarrhea. Onyango and Angienda (2008) study in Western Kenya deduced that diarrhea cases were significantly reduced as a result of domestic water treatment. A systematic review and Meta-analysis by Struntz et al. (2013) revealed a reduced prevalence of soil transmitted helminths infection as a result of using treated water from a pre-intervention prevalence rates of 68.3% to the post intervention prevalence rates of 43.95%.

A study by Kipyegen et al. (2012) revealed that high parasitic infections in Baringo County were associated with inadequate water availability, poor sanitation and lack of water treatment practices in the households.

The high prevalence of water related diseases can be attributed to the seepage of solid wastes including fecal matter from the shallow pit latrines into the shallow wells which is the main source of water. This study corroborates a similar one conducted by Kimani,(2007) in Langas, Eldoret which established that Whereas most people used pit latrines for excreta disposal, a substantial percentage (30%) of children excreted in the open field. The estimated distance between the pit latrines and the wells was generally short with about 40% of the pit latrines being less than 15 m from the wells. The main domestic water sources were found to be highly contaminated with fecal matter. Total coliforms were found in 100% of water samples from shallow wells, while 97% of these samples from shallow wells were positive for thermo tolerant coliforms. Three out of the four samples from deep wells were positive for total coliforms, while two of the four samples were positive for thermo tolerant coliforms. None of the samples from taps were positive for either total or thermo tolerant coliforms. Because the presence of thermo tolerant coliforms in water indicates fecal contamination, facilitated by the proximity between the wells and pit latrines, the study suggests that the pit latrines were a major source of contamination of the wells with fecal matter.

From the data on waterborne diseases in Nyalenda, it is clear that much is needed to be done to combat water borne and water-related diseases. A majority of the diseases listed as common in Nyalenda can be prevented if access to clean water is improved. Lack of access to safe drinking water, sanitation and hygiene is one of the leading causes of death in children in the developing world Devries & Rizo,(2015). While child mortality might be the direct impacts of lack of access to water, sanitation and hygiene, lack of access to water and sanitations impacts negatively on other areas of human life and development. Our study findings showed similarities with those of Sibiya and Gambi (2010). A study in Northern Pakistan revealed that health was not a householder's areas of concern, since they had other pressing needs and that people were not concerned about the poor quality of drinking water as a result of floods .Another study conducted in Nepal revealed that there was lack of knowledge and practices in rural areas regarding water source and sanitary facilities maintenance.

4.3.1.4 Lack of proper Sewerage and Drainage Facilities

The findings indicated that most of the households within Nyalenda use pit latrines (74%) while 26% use flash toilets.

Most of the households within Nyalenda use pit latrines (74%) while 26% use flash toilets. This could be due to the fact that KIWASCO which is charged with the responsibility of providing water and sewerage services in the area does not have a proper functional sewer line traversing the Estate. Most of the buildings are also low cost without adequate water supply hence the usage of flash toilets is quite minimal.

This then implies that the probability of ground water contamination arising from these wells is significantly high, more so if they are not well designed, sited or operated as observed by (Jorgnsen 1989) in his study. Septic system employed in most commercial and industrial buildings also poses a major setback to the quality of the nearby ground water. These systems are not fitted with the mechanisms that enable them to treat the toxic wastes. In more extreme cases, the toxic wastes may act as an impediment to human waste decomposition in the septic tanks. Moreover; these septic substances find their way out of the septic tanks, are not absorbed by the soil and eventually infiltrate into the ground water aquifers.

In Indonesia, regulations state that areas with over 250 persons per hectare shall be classified as 22 densely populated and shall not use on-plot excreta disposal Alaerts et al., (1991). A manual prepared for Habitat states that the pit latrine system (except VIPs) is 'unsuitable for use in even low-density urban developments' (Roberts, 1987). The smallest plot size recommended for twin pit pour-flush latrines in India is 26m2 (Riberio, 1985). None of the criteria used appear to be based on reasoned argument or on evidence of performance. This study therefore looked beyond latrine availability to the provision of garbage or refuse pits for waste disposal at the household level and availability of dish rack as a measure of good hygiene practice. Provision of these two facilities ensures that the health of the household members is preserved since they deny domesticated animals such as dogs from accessing wastes or utensils, thereby contaminating them. This may also help in preventing zoonotic and other vector borne related diseases. Lack of such facilities, therefore, may expose the inhabitants to diseases and encourages poor waste disposal methods or management as well as hygiene practices. A common method of domestic

waste disposal in rural areas is by use of a garbage or rubbish pit, the presence of which can be used as a proxy indicator for positive health behavior.

4.3.1.5 Number of Households Sharing Sanitary Facilities

The findings revealed that majority of households share the available sanitary facilities within Nyalenda. The study was able to establish that % of households consisting 4 and 5 units were at 27% representing 81 of the study respondents and 25% respectively. 3 households sharing a facility were at 18% while 2 households sharing a facility were 15% representing 45 of the study respondents. On the other hand 45 of the study respondents, representing 15% of the households had their own sanitary facility (Table 4.4).

Table 4.4: Sharing of sanitary facilities

No. of households	Frequency	Percentage
1 household	45	15
2 households	45	15
3 households	53	18
4 households	79	27
5 and more households	72	25
Total	**294**	**100**

Pit latrines are mostly shared by up to 5 households at 25% and the biggest problem being experienced was congestion with some pit latrines serving as many as 12 households. The findings of this study is similar to that conducted by Tumwebaze, (2010) in informal settlements in Kampala, Uganda where they assessed the access to sanitation facilities and users' satisfaction in 50 randomly selected slums of Kampala through a cross-sectional survey conducted in 2010. A total of 1500 household respondents were interviewed. Sixty-eight per cent of the respondents used shared toilets, 20% private, 11% public toilets and less than 1% reported using flying toilets or practicing open defecation. From the research, it emerges that Nyalenda does not have an existing sewerage system traversing the estate. Majority of the residents rely on pit latrines with

a few tenants having flash toilets with own septic tanks which they occasionally pay private waste exhausters to drain. During the rainy seasons, most of the septic tanks in the area get flooded due to the high water table thus posing a risk of seepage of the wasters into the shallow wells.

A study conducted by Amnesty International (2011), each pit latrine in Nairobi's slums is shared by between 50 and 150 people. For women, attempting to use the latrines at night exacerbates the risk of rape. A resident of Kibera slums in Nairobi interviewed in a publication by IRIN (2014) says:

> *"These toilets they are building are few, and Kibera has so many people in it. People still relieve themselves in the open air and in polythene bags inside their houses and throw them away. At times, they just land on other people's roofs,"*

This concurs and confirms the findings of the study.

A small number of households (29%) were aware of KIWASCO as being in charge of sewerage and drainage services provision while 71% responded in the negative. Majority of Nyalenda residents only know KISWASCO as a water provider and not for sewerage and drainage.

During the focused group discussions on the environmental Problems prevalent in Nyalenda. Majority of the discussants noted that Nyalenda is faced with a number of environmental issues. One participant mentioned that

> *'Here it is survival for the fittest, If you want good life go to Milimani, as for us we have no proper toilets, garbage everywhere, our children are always sick, we have to wake up and bathe at 3am so as to avoid long quesus to the bathroom in the morning, the situation is just pathetic"*

Plate 4: A picture of a Pit latrine in Nyalenda A. Source: Field Data

The most common environmental problems noted during the FGDs were poor solid waste management, Lack of proper sanitation, lack of clean potable water as well as prevalence of waterborne diseases.

> *"Everything is dirty around us, the compound, the environment, the estate, everything is smelling bad, as a result my children are always in and out of hospital with typhoid and running nose"* A member said.

Another discussant noted that

> *"our biggest problem here is clean water, we have a small compound of ten households and in the same compound we have a one door toilet, one door bathroom and a shallow well from which we draw water for domestic use, at times the water smells of raw sewage, those of us who can afford tap water from the vendors are lucky, the rest of us have to contend with the water from the shallow wells"*

This is majorly due to the fact that there is no functional sewerage infrastructure put up in the estate. The Estates are thus characterized by open sewers that pass through trenches dug by landlords in between the estates. The outcome from the FGDs was clearly reflected in the findings of objective two that sought to identify the relevance between the aired environmental programs and the existing environmental problems in Nyalenda. The study established solid waste management as a major environmental problem (33%) followed by lack of clean water (27%). Lack of proper sewage and drainage facilities was third (17%) and lastly the prevalence of waterborne diseases (13 **%.**)

KIWASCO began its operations in July 2003 and have a customer service chatter highlighting the duration for repairs of burst pipes and leakages for water and sewerage but from the study it does not seem to so. The consumer service chatter has not been implemented to the latter and probably the reason why customer satisfaction is low. The households that were interviewed noted a number of disease carrying organism present in the area with some of the most common being flies, mosquitoes, cockroaches and rodents such as rats. From the survey, it emerged that 91% of Nyalenda households say the estate is not properly planned while 6% say it is planned. 3% were not sure. Those who noted that the estate is not properly planned observed that due to the high number of Kisumu residents seeking cheap housing within the estate, most of the landlords have to squeeze in as many housing units in whatever available space there is including road reserves. This has resulted into a number of demolitions especially along the roadside whenever the county government wants to do some road repairs. Another challenge associated with this was lack of essential services such as piped water and electricity supply since there are no clear lines through which the service providers can use to lay their pipes and electricity lines. The net result is numerous illegal connections from one house to the other which was noted to be very risky to the residents themselves. In a study by Jain et al. (2015) suggested the delivery of 'essential services' for the urban poor, and Parikh et al. (2015) showed the importance of water, sanitation and electricity as avenues for improvement of living conditions. The aforementioned studies are in concurrence with the findings of this study.

4.3.2 Environmental Programs at the three Community Based Radio Stations

A detailed program outline on the environmental conservation programs aired by the three radio stations was availed by the station Managers drawn from each of the three radio stations as per (Figure 16) below:

Environmental programs
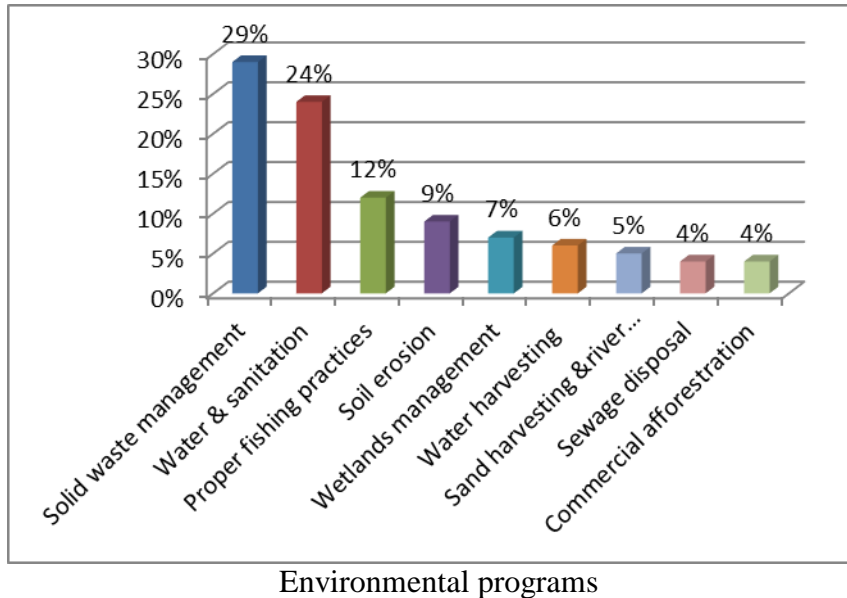
Figure 16: Environmental programs aired by the three radio stations

The three radio stations aired out solid waste management programs at 29%, water & sanitation at 24%, proper fishing practices 12%, soil erosion at 9% wetlands management 7% water harvesting at 6%, issues of sand harvesting and riverbank protection at 5% ,while sewerage disposal and commercial afforestation both were aired at 4%.

4.3.2.1 Content analysis of the environmental programs aired by Radio Lake Victoria, Dala FM and Sky FM

Focus was put on the environmental programs that were relevant to Nyalenda residents based on the environmental problems earlier identified within the study area. An in-depth analysis was done on radio recordings provided by the radio production managers of the three stations. These covered programs on solid waste management, water and sanitation, and sewage disposal.
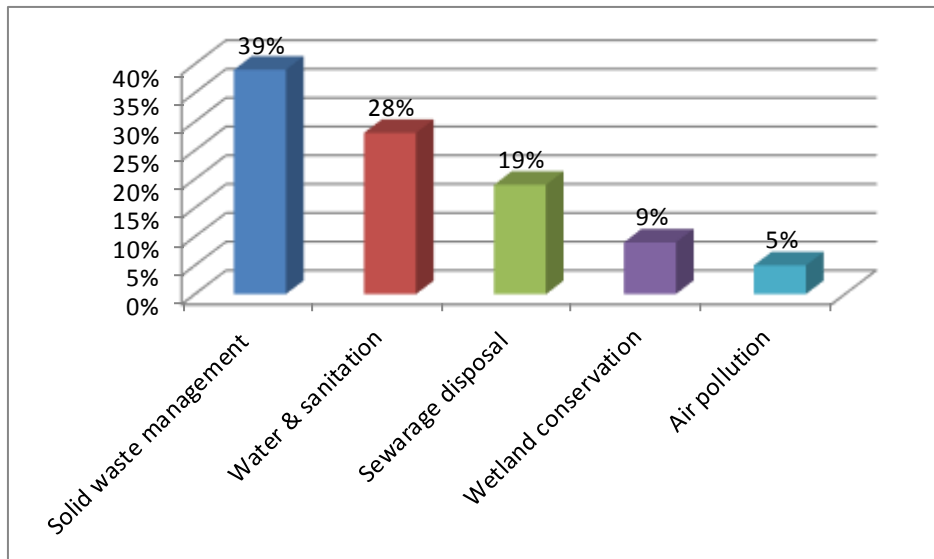
Environmental programs relevant to Nyalenda

Figure 17: Environmental programs relevant to Nyalenda

4.3.2.2 Solid waste management

This program was aired by the three stations on different days of the week .Radio Lake Victoria aired the program every Sunday evening from 6:30-7:00 pm while Dala FM had a similar program airing on Saturday 7:30-8:00pm. Sky FM had the solid waste management program running on Wednesday after the 7:00pm news that's from 7:20-7:40pm. The program content for solid waste was broken down into segments for ease of understanding by the listeners and several sub-topics were covered under this which included:

1. Types of Solid Waste such as:
   - o Municipal Solid Waste (MSW):
   - o Hazardous Wastes:
   - o Industrial Wastes:
   - o Agricultural Wastes:
   - o Bio-Medical Wastes:
2. Composition of solid wastes
3. Solid waste sorting and recycling
4. Solid waste handling and disposal etc.

Plate 5: Sky FM Radio Presenter Engaging listeners in a discussion. Source: Studio File

4.3.2.3 Water and sanitation

Safe drinking-water, sanitation and hygiene are crucial to human health and well-being. Safe WASH is not only a prerequisite to health, but contributes to livelihoods, school attendance and dignity and helps to create resilient communities living in healthy environments. Sanitation refers to the safe collection, transportation, treatment and disposal of human wastes. Drinking unsafe water impairs health through illnesses such as diarrhea, and untreated excreta contaminate

ground waters and surface waters used for drinking-water, irrigation, bathing and household purposes. Chemical contamination of water continues to pose a health burden, whether natural in origin such as arsenic and fluoride, or anthropogenic such as nitrate. Safe and sufficient WASH plays a key role in preventing numerous NTDs such as trachoma, soil-transmitted helminths and schistosomiasis. Diarrheal deaths as a result of inadequate WASH were reduced by half during the Millennium Development Goal (MDG) period (1990–2015), with the significant progress on water and sanitation provision playing a key role. Evidence suggests that improving service levels towards safely managed drinking-water or sanitation such as regulated piped water or connections to sewers with wastewater treatment can dramatically improve health by reducing diarrheal disease deaths. The program programs looked at; access to clean water supply, general sanitation issues, storm water drainage, hygiene education, water resource management. Overall, the main message passed by the three community radio stations in regard to sanitation was the fact that Proper sanitation promotes health, improves the quality of the environment and thus, the quality of life in a community.

During the focused group discussions which centered on the radio programs aired by the community radio stations that were directly relevant to the environmental problems in Nyalenda. The participants listed a number of programs that they had been listening to from the three Community Radio Stations and which they felt were very relevant to them.

Majority of the participants noted that programs that deal with solid waste management were the most relevant for them as each and every household generated a certain amount of solid wastes on a daily basis. A particular program of interest was that aired by Radio Lake Victoria on Wednesday night focusing on waste recycling. A participant noted

> *"Listening to Taka en Mwandu on Radio Lake Victoria has changed my life, before my house used to be full of litter everywhere but the program has taught my family how to sort garbage for recycling, I now earn income from this. My wife who fries chips by the roadside also earns additional revenue by selling potatoes peelings to farmers who rear pigs within the estate"*

Another participant who happened to be a committee member of a school within Nyalenda Estate said

"Yien e wadu' airing on Radio Lake Victoria every Monday evening is the most relevant for me, am in the school committee of Pandpieri Primary School and the program has realy motivated us to plant a good number of trees in the school. Other neighbouring schools such as Joel Omino, Kisumu Day, Nanga Secondary and Lions High School have now copied this from us"

"I never miss " pur gi kwan"-on Dala Fm every Sunday evening, from there I learn a lot about environmental conservation and best farming practices"

Quipped a participant from Kapuothe area in Nyalenda B. Kapuothe area is mainly an agricultural area bordering Lake Victoria.

In conclusion, the FGD on this particular topic noted the relevant environmental programs to be solid waste management, water and sanitation, sewerage disposal, wetland conservation as well as air pollution. This conquers with the findings in objective 2 that also put solid waste management at 39% in terms of relevance followed by water and sanitation at 28%, sewerage disposal at 19%, wetland conservation at 9% and air pollution at 5%

Of the environmental management programs that are aired by the three stations and relevant to Nyalenda, solid waste management and water & sanitation ranked top amongst those interviewed 39% and 28% respectively since these are the two major challenges in the area. Sewerage disposal ranked 3rd at 19% since majority of the tenants felt it's the responsibility of the landlord to provide such facilities. Most of the shallow pit latrines are filled up to the brim and the tenants generally do not have a say on how its disposed of since such a decision solely lies with the landlord, as such the landlords use the cheapest alternative which also turns out to be very unhygienic and that is by digging an open pit next to the latrines and emptying all the contents from the latrine into the pit. There are other viable alternatives such as using the Municipal or private waste exhausters but most of the landlords consider this as either too beurocratic in the case of municipal or too expensive for the private ones. Municipal solid waste management (MSWM) system in East Africa has changed from the colonial days in the 40s, 50s and early 60s when it was efficient because of the lower urban population and adequate resources Okot-Okumu &Nyenje (2011) to the current status that displays inefficiencies. The centralized waste management system has evolved into the current management mixtures that include decentralized as well as the involvement of the private sector. Most of the informal settlements

are temporary and illegal (UN-HABITAT, 2007; Ministry of Lands, Housing & Urban Development (MLHUD), 2008) and based on the sanitation policy, on-site sanitation is the responsibility of the user Kariuki et al., (2003). The business of pit emptying is mainly carried out by private pit emptier using vacuum tankers. Emptying charges are mainly based on distance and the capacity of the truck. The charges also depend on the pit latrine characteristics such as depth and accessibility, faecal sludge characteristics, disposal site and geography of the site Thye et al., (2011; Murungi and Van Dijk, (2014;) Mikhael et al, (2014). As a result, pit empties charge a fee that ranges from 5,000 to 8,500 for a trip within a distance of 5 km. Speer (2016) draws attention to the need for and importance of sanitation service provision among homeless people in California; and in Brazil, residents of East District ranked sanitation and sewers as an area requiring improvement (Pimentel Walker 2016). Investing in infrastructure also leads to development in other sectors.

Most of the residents in slum areas are low-income earners Morella et al., (2008) thus, the cost of conventional pit emptying is high. It requires pit owners to actively save and plan for pit emptying. For pit latrines that cannot be emptied by tankers due to poor accessibility and cost, manual emptying is carried out (Kone and Chowdhry, 2012; WUP, 2003). This involves accessing the pit by inserting a hole on the side, and removing the sludge usually with simple tools such as spades, shovels and buckets (WSP, 2014; Eales, 2005). This practice is risky due to the pathogenic content of the sludge with the presence of dangerous micro-organisms such as Ascaris, *Salmonella species* (Parkinson and Quader, 2008; Murungi and Van Dijk, 2014). Besides, sludge is often dumped into the environment (Klingel et al., 2002) by simply disposing it off in the nearest streams and drainage channels (Schaub-Jones et al., 2006; Samuel, 2008). Given that the pit latrines are located in high water table areas, they are usually shallow. The pitlatrines were not meant for solid waste disposal but given the poor management practices in the slum areas (Musiige, 2010) they fill up when the owners and users are not well-prepared for their emptying (Still et al., 2013). Desperate times call for desperate measures and so the pit latrines are either used when full or pit users seek alternative methods such as use of plastic bags and emptying into streams during the rainy season leading to a deplorable sanitation in the areas (Kulabako et al., 2007; Kimuli et al., 2016). This affects the environment and health of the

residents in these areas with frequent opportunistic disease (e.g. cholera and typhoid) outbreaks among the slum dwellers in Kampala (Kulabako et al., 2010).

The three radio stations had environmental programs coming at specified times. The mode of presentation of these programs was observed to be timely and majority of the respondents took part actively in these programs by either visiting the studio as resource persons, sharing their experiences, interviewed by the stations' news reporters, engaging the presenters in the studio through calling, short message services or through the social media platforms.

Plate 6: Environmental Radio talk show involving county Director of Meteorological Services and Agric. Extension Officer, DALA FM Source: Studio File

4.4 The perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations.

The study sought to investigate the perception on Nyalenda residents in regard to the environmental management programs aired by the three community stations. Various indicators were used to analyze this. The indicators included message relevance, listening frequency, nature of information, challenges faced, what still needs to be done, content rating and ease of application. The findings were as presented in the tables below:

Table 4:5 Relevance of the Environmental Programs

Relevance	Percentage
Very Relevant	75
Relevant	18
Somehow Relevant	7
Irrelevant	0
TOTAL	**100%**

Majority of the listeners felt that community radio programs play a very important role in creating awareness to the public on environmental management challenges and provision of practical solutions. About 18% of the respondents felt that the programs are somehow relevant and that the people are already aware of the challenges they were facing and the only thing left to be done was to provide a financial approach in solving the environmental problems. A set of statements were presented to the listeners to gauge their participation, engagement, understanding and influence of the radio programs.
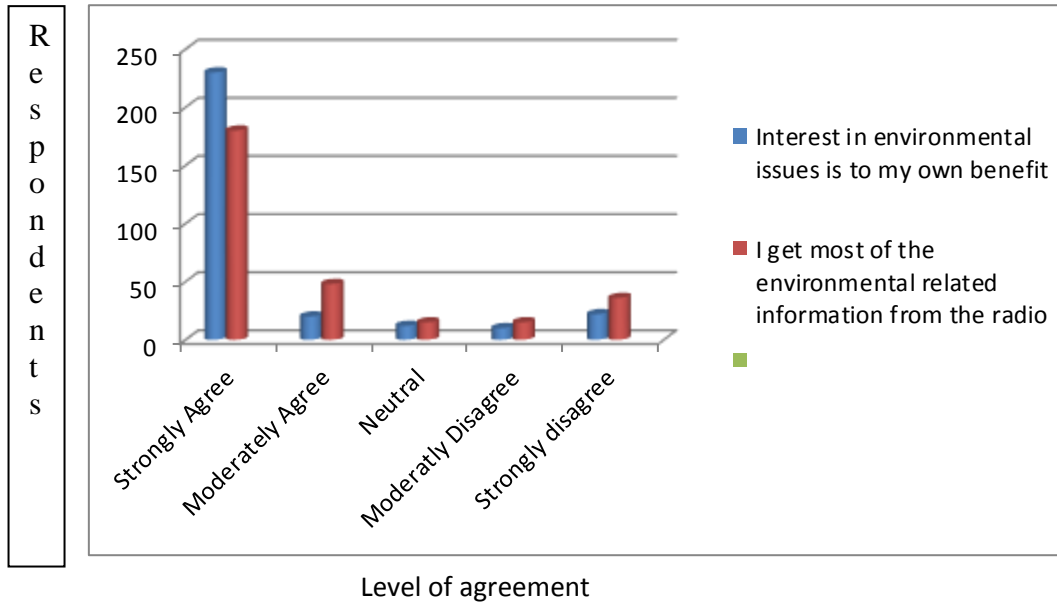
Figure 18: Response to Statement 1 & 2

From the above statements, 226 of the respondents strongly agreed that their interest in environmental related programs aired by the community-based radios is for their own benefit. 17 respondents also agreed with this statement. Only 19 people strongly disagreed with the statement. From the study we can therefore conclude that majority of the respondents consider the environmental programs aired to be of great benefit to them. On the statement of getting most of the environmental related information from the community radio, 172 respondents strongly agreed, 51 agreed, 27 were neutral while 5 strongly disagreed. This reveals that majority of Nyalenda residents rely on community radio from where they get most of the environmental related information. . This concurs with the findings of a previous study on media consumption in Kenya which found out that, Kenya‴s media consumers use radio the most, followed by television and newspapers (Mbeke, Ugangu, Okello: 2010). Community based radio has always been observed to be a powerful source of information in urban and rural areas (Tucker, 2013) and in creating awareness, providing information and education, improving skills and political and economic development or community empowerment. (Venu Arora, 2015) Community-based radio plays an important role in the lives of a community as it creates awareness, provides information and education. Many studies have proved that community-based radio is an instrument of power in changing the lives of a community (Nirmala, 2015).

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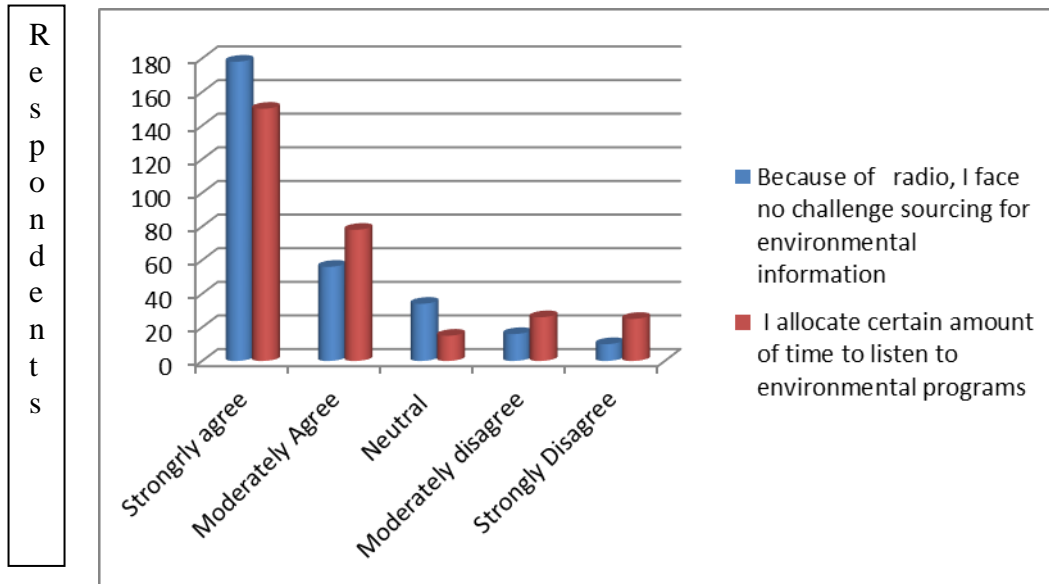
Level of agreement

Figure 19: Response to Statement 3&4

The 3rd statement was on challenges faced in sourcing environmental information, 143 respondents strongly agreed that because of community radio, they face no challenge in sourcing environmental information. This was followed by 71 respondents who agreed. 22 respondents strongly disagreed. This showed that because of community radio, majority of Nyalenda residents did not have challenges in sourcing for environmental information. The fourth statement on allocation of time for listening to the environmental programs 163 respondents indicated that they do allocate a certain amount of time to listen to environmental programs, 58 respondents agreed with the statement while 22 strongly disagreed. The conclusion therefore was that majority of Nyalenda residents do allocate time to listen to the environmental radio programs. This finding concurs with the findings of a study conducted by Lawrence (2012) which recognizes community-based radio stations as an important tool for information dissemination in regard to civic education, public health, environment and economic development. The study also noted that consistency in programing enable listeners to dedicate specific times to listen to their favorite programs.

Level of agreement
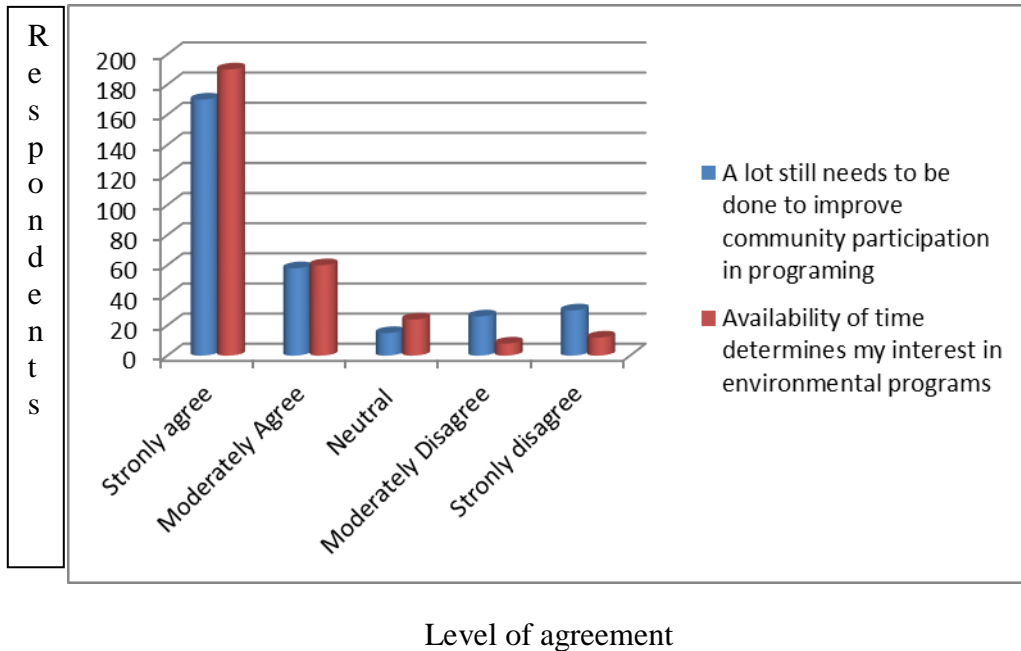
Figure 20: Response to Statement 5 & 6

From the above statements, 182 respondents strongly agreed that a lot still need to be improved by the stations in terms of community participation, 59 respondents agreed with the statement while 8 strongly disagreed. It was therefore noted that the community radio stations need to do a lot in terms of involving the community in programing and content generation. 178 respondents strongly agreed that availability of time determines their interests in environmental related programs. 57 respondents agreed while 7 strongly disagreed. The conclusion therefore is that availability of time greatly determines the listenership of the environmental related programs. This supports the report that states that Community based Radio Stations provide relevant and community-focused programming that address community specific issues and concerns. The local voices promote local issues, which foster the development of community dialogue around important topics, which have the potential of creating significant impact on behavior change (Walters, James & Darby, 2011).

Influence of Existing Radio-based environmental programs to Nyalenda residents.
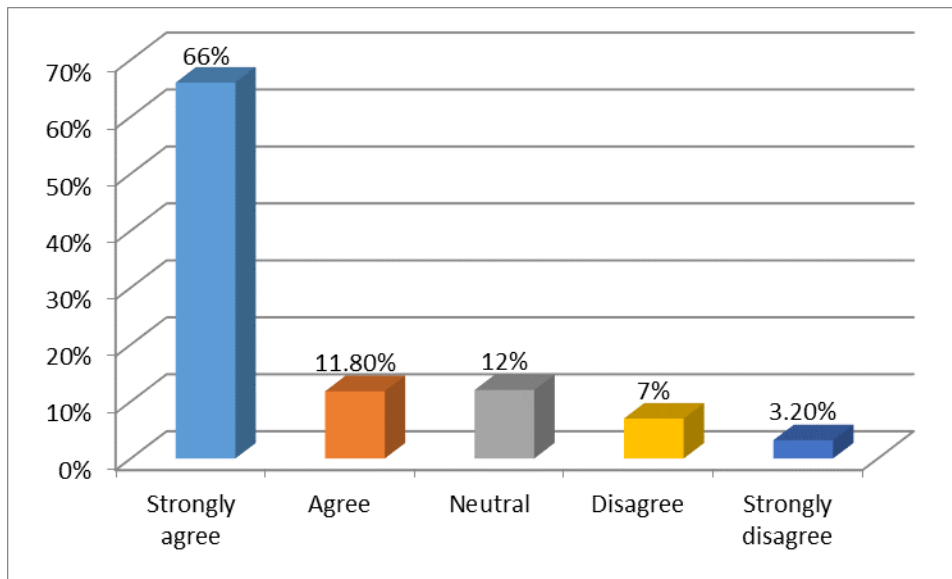
Level of agreement

Figure 21: Influence of environmental programs on the listeners: Source, Survey Data (2019)

More than half the number of respondents, as shown in Figure 4.4, at 66.6 % strongly agreed that the radio programs had influenced their perception about health issues. 11.8% agreed while 12% were neutral. 7% disagreed, while 3.2% strongly disagreed that the radio programs had any positive influence on the listeners. This shows that the community based radio stations do influence listeners to take positive action for improved standards of living. (Pullen, Fiandt and Walker 2011)

The respondents were also asked if they had acquired new knowledge through the aired environmental management programs. This was to gauge the level of influence the aired programs had on the listener. Results are as presented in Table 4.6.

Table 4.6: New knowledge through the aired environmental programs

Response	Value	Frequencies	Percentage
Strongly disagree	1	14	4.8
Disagree	2	17	5.8
Neutral	3	25	8.5
Agree	4	41	13.9
Strongly agree	5	197	67
	Total	**294**	**100**

Source: Survey data (2019)

From the above analysis, 67% of the respondents strongly agreed to having gained new knowledge from the aired programs followed by 13.9% that also agreed to having gained new knowledge. 8.5% of the respondents were neutral while 5.8%. The implication therefore is that a large percentage of Nyalenda residents acknowledge the important role that the community radio programs play in empowering them with new information.

These results are consistent with those of (Tsegyu and Asemah 2013) who asserted that community-based radio broadcasting could be used to bring about positive attitudinal change in a community.

The findings also revealed a notable direct influence of the environmental programs on the respondents. 70% of the households were applying water treatment methods learnt from the radio while 63% had taken up active roles in improving their waste disposal. 58% of the respondents were actively participating in clean up exercises while 28% indicated they had enhanced their rain water harvesting techniques. Other notable impacts included 21% of households that formed environmental conservation groups and 17% that had formed waste recycling groups among others as indicated below (figure 22).
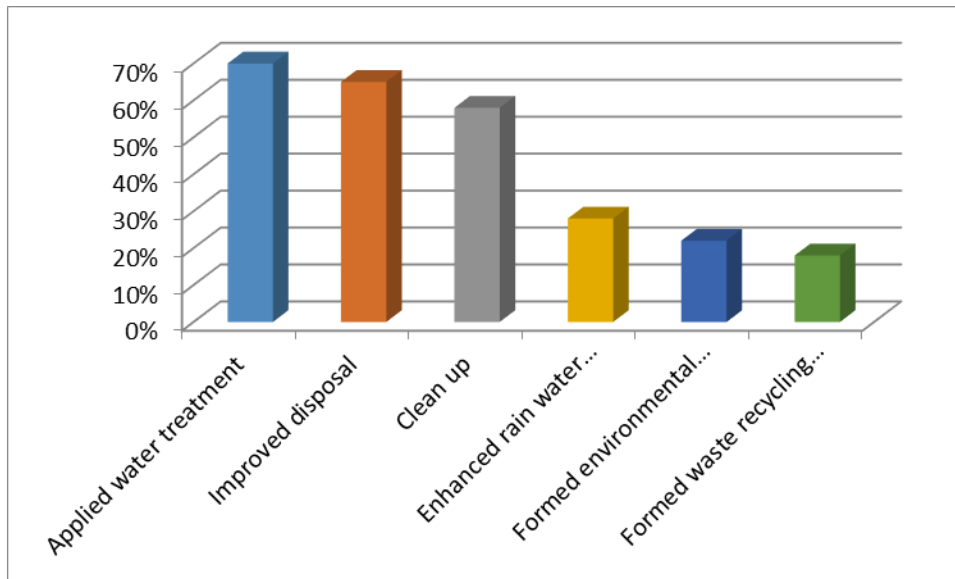
Practical Influence of the radio environmental programs

Figure 22: Practical Influence of the radio environmental programs in the study area: Source, Survey Data (2019)

From the study, it was evident that the radio programs have actively acted as a call to action among the Nyalenda residents. From the findings above, a good number of respondents had been inspired through the programs and were since then taking active roles in various environmental conservation activities such as adoption of recommended water treatment methods, enhanced rain water harvesting, adoption of proper waste disposal methods, participating in clean up exercises, formation of environmental conservation groups or councils etc. Health risk perception plays an ongoing role in the public response to environmental exposures (Dupler, 2001). Essentially, relationships between an environmental contaminant and health are mediated by perceptions of the 'exposure' which are in turn influenced by a host of individual and contextual factors (Ferner, 2001). The fact that more than half of the participants perceived themselves at high risk and that there was a significant association between education and perception may be because of the documentaries in TV stations about vegetables grown on raw sewage and the debates about relocations of Dandora dumpsite. Elliott (1998) reports that public opinion literature indicates that worries and concern about environmental and health has

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increased steadily over the past two decades and that the increase is associated with widely publicized environmental disasters.

During the Focus Group Discussion on notable contributions that the discussants could relate to the Community Radio Programs. Majority of the participants noted that they were able to put into practice lessons learnt from the radio and as a result some households had started applying water treatment methods learnt from the radio, some had taken up active roles in improving their waste disposal, some were actively participating in clean up exercises while others indicated they had enhanced their rain water harvesting techniques.

> *"The radio programs have taught me a lot, nowadays it's difficult for any member of my family to suffer from typhoid, after listening to a programe on Radio Lake Victoria about waterborne diseases I always ensure that the water that we drink in our house is thoroughly boiled"* Noted a participant from Nyalenda A.

Yet another participant from Kapuothe in Nyalenda B said

> *" Our area has completely changed in terms of dumping of solid waste, initially we used to have pampers scattered everywhere and the dogs would be scavenging on them everywhere but the radio programs have helped us a lot, nowadays we have a pit where we dump all the wastes from our plot and we burn them every Sunday evening. Of course there are some that we sell to Bamato for recycling"*

This is supporting the household findings of objective 3 which also noted ta notable direct influence of the environmental programs on the respondents. 70% of the households were applying water treatment methods learnt from the radio while 63% had taken up active roles in improving their waste disposal. 58% of the respondents were actively participating in clean up exercises while 28% indicated they had enhanced their rain water harvesting techniques. Other notable impacts included 21% of households that formed environmental conservation groups and 17% that had formed waste recycling groups among others as indicated in (figure 22).

Community radio is very instrumental in behavior change. It is usually a short-range, not-for-profit radio station or channel that caters for the information needs of people living in a particular locality, in the languages and formats that are most adapted to the local context. Community radio stations can be mobilized for campaigns, for example by announcing campaign events,

hosting talk shows with campaigners, or playing the campaign radio jingle and songs. As community radio is usually run by volunteers using low-cost technology, it tends to be easy to obtain free or inexpensive air time. It offers an opportunity for contributions by people whose voice is not much heard on national radio – e.g. "ordinary" women and youth – which can be highly empowering. Community radio reaches a large section of the locality it covers, as listeners tend to be interested in local issues. It is also an excellent way to communicate with communities whose main language is not the official national language ((UNIFEM, 2007).

Radio programs have generally been a very effective tool in behavior change especially in a small community set-up. Quite a number of CBOs, NGOs as well as County and National government ministries have used radio to run very effective campaigns on issues such as HIV-Aids, cholera, malaria control, flooding, and government sponsored vaccinations such as polio, voluntary medical male circumcisions, family planning, tree planting, wetland conservation etc. This finding is congruent with earlier findings by Kariyawasam et al., (2006) who showed that the level of education had a significant association with consumer attitudes and perceptions. Similarly, Scholz and Weber (2001) show that the increase in knowledge through being given new information increases participants' risk ratings. However, a survey by Coffie (2010) showed that the participant's perception towards waste disposal issues was not influenced by their educational level, income or age. Indeed, the results of this study reveal that participants' age did not influence their perceptions.

A few examples of such initiatives include public awareness campaign on biodiversity conservation, land use planning and climate change resilience using a community radio, Mpanda FM Radio, in Nkasi (Rukwa) and Tanganyika (Katavi) Districts in Tanzania, Mtaani Radio, run by a team of community-based volunteers in the Kawangware slum of Nairobi, effectively responded to the 2015 cholera outbreak affecting their community, Voluntary Medical Male Circumcision run by Dala FM in 2018, Floods and Early warning systems ran by Radio Lake Victoria and JICA in 2013, Peace campaigns ran by all community radio stations following the 2007-2008 post-election violence, Teenage pregnancy and readmission of teenage mothers in schools by Radio Lake Victoria in 2017 etc. Finally, our study findings were consistent with those of Wasonga et al.(2012) who indicated that 41.5% of the respondents reported community

health workers/clinics were their main source of information on hand washing, whereas 23.4, 20.2 and 9.6% indicated that media, schools and community gatherings, in that order, as their sources of information. Hygiene practices at home have been noted to provide a clean environment for children, thus reducing the threats to their health and provide the best chance of a prosperous living.

CHAPTER FIVE
SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions, recommendations, and suggestions for further research. The purpose of the study was to establish the role of community radio in addressing urban environmental challenges in informal settlements with reference to Nyalenda Informal Settlement in Kisumu City, Kenya as a case study. The study was set to establish the following research questions: Establish basis of radio programming in the three community-based radio stations in Kisumu City, Determine the relevance of the environmental programs aired by the three community-based radio stations to the environmental problems in Nyalenda and finally to analyze the perception of the Nyalenda residents regarding the existing radio-based environmental programs aired by the three community-based radio stations in Kisumu City. The study used descriptive survey design in which it targeted 321respondents comprising of 301 questionnaires were returned and analyzed.

5.2 Summary of findings

5.2.1 Basis of Radio Programming in Community Based Radio Stations

The study sought to establish the rationale of radio programming in community-based radio stations in Kisumu City. The findings indicate that entertainment through music took the highest percentage in radio programming among the three stations and this was to attract and retain huge listenership as explained by the station managers. It was also noted that majority of the listeners (80%) were never involved in programing or content development and only 12% of the respondents had actually actively participated in programming. Listeners however actively participated during program presentation where they all had unrestricted opportunity to engage the presenters through call-ins, sms as well as other social media platforms such as Facebook and twitter. This gave them the opportunity to ask questions, air their views as well as share their experiences with others.

5.2.2 Relevance of the environmental programs aired by the Community-based Stations to the existing urban environmental problems in Nyalenda

The study sought to establish the relevance of the Environmental programs aired by the three stations to the   existing urban environmental problems in Nyalenda. 39% of the environmental programs aired by the three stations focused on solid waste management,, 28% were on water and sanitation while 19% addressed sewage disposal. The residents on their part listed their major urban environmental problems as: solid waste management (33%), lack of clean water(27%), lack of proper sewage and drainage facilities (17%) and finally the prevalence of waterborne diseases at 13%. This clearly shows the direct relevance of the radio programs to the environmental problems in Nyalenda.

5.2.3 Perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations

Majority of the respondents (75%) felt that the environmental management programs were very relevant in addressing the existing challenges being witnessed in the study area. 18% noted the programs to be relevant while none of the respondents indicated that the programs were irrelevant. On the question of the radio programs providing new knowledge to the listeners, 67% of the respondents strongly agreed followed by 13% who agreed, only 14% disagreed. Regarding positive influence of the radio programs, 66% of the respondents strongly agreed, 17% agreed while only 6% strongly disagreed. The radio programs had actually influenced a number of the respondents to initiate various environmental management activities within their residential areas with 70% of the households applying water treatment methods learnt from the radio while 63% had taken up active roles in improving their waste disposal. 58% of the respondents were actively participating in clean up exercises while 28% indicated they had enhanced their rain water harvesting techniques. Other notable impacts included 21% of households that formed environmental conservation groups and 17% that had formed waste recycling groups among others.

5.3 Conclusion

Conclusion on the study on the role of community radio stations in solving urban environmental challenges were summarized based on the specific objectives as follows:

5.3.1 Basis of Radio Programming in Community Based Radio Stations

The study concluded that it is important for community F.M radios to involve the community they serve in programming and content development so as to make have a sense of ownership to the radio programs. It was also noted that the interactive programs where the listener participation is actively encouraged through call-ins, sms as well as other forms of interaction provided immediate feedback to the stations and encouraged the listeners to actively put into practice lessons learnt.

5.3.2 Relevance of the environmental programs aired by the Community-based Stations to the existing urban environmental problems in Nyalenda

An analysis of the environmental radio programs aired by the community-based stations and the environmental problems cited by Nyalenda resident's revealed a strong relevance since the programs directly addressed the existing environmental problems in Nyalenda.

5.3.3 Perception of Nyalenda residents towards the environmental management programs aired by the three community-based radio stations

Finally, the study concluded that a community radio can greatly influence behavior change in a society since the community strongly views them as agents of change within a given environment

5.4 Recommendations

The study recommends the following

I. Community-based radio stations should adopt the bottom-up approach in programing and content development, this will increase listeners' participation as they will feel part and parcel of the station.

II. All community radios should have programs that address relevant and specific needs of the community; the listeners will often pay more attention to programs that they feel directly relates to their immediate needs and concerns.

III. Perception of any radio program is key to positive or negative behavior change. Community-based radio stations should try as much as possible to develop a positive perception of their programs on the target audience.

5.5 Area for Further Research

This is by far the most comprehensive research on a community radio station in Nyalenda and a first of its kind. More importantly this is the first exclusive research on demonstrating the role of community radio in solving urban environmental problems in an informal settlement such as Nyalenda.

Nevertheless, this research is not complete by itself, given the limitations of the study, this sets the stage for further research in related frontiers. Considering the fact that majority of the residents in Nyalenda are native Luo speakers, the role of community radio broadcasting in the local language, Luo, has been very positive.

Further research can focus on the challenges that community radio stations operating in cosmopolitan informal settlements face in their effort to impact positively on issues of behavior change in relation to environmental conservation.

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CONSENT FORM FOR INTERVIEWS:

Thank you for reading the information sheet about the interview sub-study. If you are happy to participate then please complete and sign the form below. Please initial the boxes below to confirm that you agree with each statement:

Please
Initial box:

I confirm that I have read and understood the information sheet
Dated………. and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline.

I understand that my responses will be kept strictly confidential. I understand that my name will not be linked with the research materials, and will not be identified or identifiable in the report or reports that result from the research.

I agree for this interview to be recorded in writing. I understand that the recording made of this interview will be used only for analysis and that extracts from the interview, from which I would not be personally identified, may be used in any conference presentation, report or journal article developed as a result of the research. I understand that no other use will be made of the recording without my written permission, and that no one outside the research team will be allowed access to the original questionnaire.

I agree that my anonymised data will be kept for future research purposes such as publications related to this study after the completion of the study.

☐

I agree to take part in this interview.

☐

_____   _____   _____
Name of participant   Date   Signature

_____   _____   _____
Principal Investigator   Date   Signature

To be counter-signed and dated electronically for telephone interviews or in the presence of the participant for face to face interviews

Copies: _Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, and the information sheet. A copy of the signed and dated consent form should be placed in the main project file which must be kept in a secure location._

CONSENT FORM

Date: **Participants Code:**

Title: The role of community radio in addressing urban environmental challenges in informal settlements along the Lake Victoria basin

Consent Form for Interviews: a Qualitative Sub-study

Thank you for reading the information sheet about the interview sub-study. If you are happy to participate then please complete and sign the form below. Please initial the boxes below to confirm that you agree with each statement:

Please Initial box:

I confirm that I have read and understood the information sheet dated **1ST December 2017** and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline.

I understand that my responses will be kept strictly confidential. I understand that my name will not be linked with the research materials, and will not be identified or identifiable in the report or reports that result from the research.

I agree to participate in this interview. I understand that the data from this interview will be used only for analysis and that extracts from the interview, from which I would not be personally identified, may be used in any conference presentation, report or journal article developed as a result of the research. I understand that no

other use will be made of the recording without my written permission, and that no one outside the research team will be allowed access to the original recording.

I agree that my anonymized data will be kept for future research purposes such as publications related to this study after the completion of the study.

I agree to take part in this interview.

_____   _____   _____

Code of participant   Date   Signature

_____   _____   _____

Principal Investigator   Date   Signature

To be counter-signed and dated electronically for telephone interviews or in the presence of the participant for face to face interviews

Copies: *Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form, and the information sheet. A copy of the signed and dated consent form should be placed in the main project file which must be kept in a secure location.*

Participant interview consent form

APPENDICES

Appendix I: Household Questionnaire

THE ROLE OF COMMUNITY RADIO PROGRAMS IN ADDRESSING URBAN ENVIRONMENTAL CHALLENGES IN INFORMAL SETTLEMENTS.
A CASE STUDY OF NYALENDA INFORMAL SETTLEMENT IN KISUMU CITY KENYA

<u>**INFORMED CONSENT**</u>

Hello! My name is_. I am here on behalf of ODHIAMBO NICHOLAS OMONDI, a student of Maseno University in the school of Environment and Earth Sciences. In order to get more information about the impact of community radio in addressing urban environmental challenges in informal settlements in Nyalenda, Kisumu City, we are conducting a survey of households in the area. Your household has been selected by random sampling from all households in the area. I would like to ask you some questions related to the environmental challenges in your area and how you manage them. The information you provide will be useful for gauging the impact of community radios in addressing the environmental challenges prevalent in urban areas. This information will also guide future programming in various radio stations.

Participation in the survey is voluntary and you can choose not to take part.
All the information you give will be confidential. The information will be used to prepare general reports, but will not include any specific names. There will be no way to identify that you are the one who gave this information.
If you agree to participate in this survey, I will now ask you the following questions.

QUESTIONNAIRE NO: ………......   **ESTATE ……………....**

INTERVIEW'S SIGNATURE: ………………   DATE: …………………

SECTION 1: HOUSEHOLD CHARACTERISTICS

QUESTION NO.	QUESTION	RESPONSE	RESPONSE CODE
1.1	WHAT IS YOUR AGE?	1. BELOW 18YRS YRS………. 2. 18-30 YRS………………. 3. 31-40 YRS………………. 4. 41-50 YRS……………….. 5. 51-60 YRS……………….. 6. OVER 60 YRS……………	
1.2	AS A RESIDENT OF THIS ESTATE, HOW LONG HAVE YOU LIVED HERE?	1. LESS THAN 1 YEAR 2. 1-3 YRS 3. 4-7 YRS 4. 8-11 YRS 5. 11 YRS AND ABOVE	
1.3	GENDER OF THE RESPONDENT	1. MALE 2. EMALE	
1.4	WHAT IS YOUR HIGHEST LEVEL OF EDUCATION ATTAINED?	1. NONE 2. PRIMARY 3. SECONDARY 4. TERTIARY 5. UNIVERSITY	
1.5	TYPE OF HOUSEHOLD	1. MALE HEADED 2. FEMALE HEADED 3. YOUTH HEADED	
1.6	WHAT IS YOUR	1. CROP FARMING	

	MAIN LIVELIHOOD?	2. LIVESTOCK KEEPING	
		3. CASUAL EMPLOYMENT	
		4. SALARIED EMPLOYMENT	
		5. TRADE FISHING	
		6. CRAFT(MATT MAKING	
		7. OTHERS	
		(SPECIFY)…………………….	
		8.	

SECTION 3: BASIS OF RADIO PROGRAMMING

QUESTION NO.	QUESTION	RESPONSE	RESPONSE CODE
3.1	DO YOU LISTEN TO RADIO?	1. YES 2. NO	
3.2	WHOSE RADIO DO YOU COMMONLY LISTEN TO?	1. OWN RADIO 2. NEIGHBOURS RADIO 3. RELATIVES RADIO 4. FROM A RADIO LISTENER GROUP	
3.3	FOR HOW LONG HAVE YOU BEEN LISTENING TO RADIO	1. LAST 6 MONTHS 2. LAST 1 YEAR 3. LAST 2 YEARS 4. MORE THAN 3 YEARS	
3.4	DO YOU LISTEN TO LOCAL F.M STATIONS?	1. YES 2. NO	
3.5	IF YES, WHICH LOCAL FM STATIONS DO YOU LISTEN TO?	a. RADIO LAKE VICTORIA b. DALA FM c. RADIO RAMOGI	

		d. RADIO NAM LOLWE	
		e. RADIO MAYIENGA	
		f. SKY F.M	
3.6	HOW OFTEN DO YOU LISTEN TO RADIO LAKE VICTORIA?	1. DAILY 2. 2/3 DAYS IN A WEEK 3. ONCE A WEEK 4. SPECIFIC PROGRAMS	
3.7	DO YOU CONSIDER YOURSELF AN ACTIVE OR PASSIVE LISTENER	1. PASSIVE(JUST LISTENENING 2. ACTIVE(LISTENING AND CONTRIBUTING VIA CALLS/SMS	
3.8	WHICH RADIO PROGRAMS ARE YOUR FAVORITES? (PUT THEM IN SEQUENCE)	a. AGRICULTURE & ENVIRONMENT b. SPORT c. HEALTH d. NEWS e. OTHER(SPECIFY	
3.9	DOES THE RADIO YOU LISTEN TO HAVE ENVIRONMENTAL CONSERVATION PROGRAMS?	1. YES 2. NO	
3.10	IF YES, WHICH ENVIRONMENTAL MANAGEMENT PROGRAMS DO YOU LISTEN TO?	a. WATER AND SANITATION b. INDUSTIAL WASTE MANAGEMENT c. SOLID WASTE MANAGEMENT d. SEWARAGE DISPOSAL e. COMMERCIAL	

		AFFORESTATION	
3.11	HAS THE RADIO EVER SOUGHT YOUR OPINION ON PROGRAME AND CONTENT DEVELOPMENT?	YES NO	
3.12	ARE THE PROGRAM TOPICS PRESENTED TO YOU ON THEIR RIGHT TIME (COMPATIBLE TO THE CHANGING SEASONS I.E FLOODS, FARMING PERIODS, DISEASE OUTBREAK?)	1. YES 2. NO	
3.12	HOW CAN YOU RATE YOUR PARTICIPATION IN THESE PROGRAMS	1. ACTIVE 2. PASSIVE	
3.13	IF ACTIVE, HOW?	a. VISITED THE STUDIO AS A RESOURCE PERSON b. VISITED BY THE REPORTERS AS A NEWS SOURCE c. CALLING THE STUDIO TO CONTRIBUTE d. SENDING SMS TO THE STUDIO TO ANSWER	

		QUESTIONS	
		e. ENGAGING THE PRESENTERS THROUGH THEIR SOCIAL MEDIA PLATFORMS	
		f. OTHERS(SPECIFY	

SECTION 3: RELEVANCE OF THE ENVIRONMENTAL PROGRAMS AIRED TO THE ENVIRONMENTAL PROBLEMS IN NYALENDA.

2.1	WHAT TYPES OF WASTES DO YOU GENERATE IN YOUR HOUSEHOLD?	a. FOOD REMAINS b. POLYTHENE BAGS c. TINS d. OTHERS (SPECIFY	
2.2	WHAT IS THE MOST COMMON MODE OF DISPOSAL	1. RECYCLING 2. DUMPING BY THE ROADSIDE 3. BURNING 4. SELLING TO RECYCLERS 5. PAYING GARBAGE COLLECTORS	
2.3	WHAT IS YOUR MAIN SOURCE OF WATER FOR YOUR HOUSEHOLD USE?	1. TAP WATER 2. SHALLOW WELLS 3. RAINS WATER 4. WATER VENDORS 5. OTHER (SPECIFY	
2.4	DO YOU CONSIDER THE MAIN SOURCE OF WATER TO BE SAFE FOR HOUSEHLOD USE (POTABLE	1. YES 2. NO	

2.5	HOW LONG DOES IT TAKE YOU TO FETCH WATER?	1. LESS THAN 10 MNS 2. 10-20 MNS 3. 21-30 MNS 4. 31-45 MINUTES 5. 1 HOUR 6. MORE THAN ONE HOUR	
2.6	WHICH WATER RELATED DISEASE IS COMMON IN YOUR AREA?	a. TYPHOID b. DISENTRY c. CHOLERA d. DIARRHOEA e. MALARIA	
2.7	WHAT IS THE MAIN METHORD THAT YOU USE TO MAKE YOUR WATER POTABLE?	1. BOILING 2. FILTERING 3. TREATING WITH CHEMICALS	
2.8	HOW DO YOU RATE THE ABOVE METHOD IN TERMS OF COST?	1. VERY AFFORDABLE 2. AFFORDABLE 3. EXPENSIVE 4. VERY EXPENSIVE	
2.9	DO YOU OWN ANY SANITARY FACILITY?	1. PIT LATRINE 2. TOILET 3. NONE	
2.10	HOW MANY HOUSEHOLDS ARE SHARING THIS FACILITY?	1. MY HOUSEHOLD ONLY 2. 2 HOUSEHOLDS 3. 3 HOUSEHOLDS 4. 4 HOUSEHOLDS 5. 5 HOUSEHOLDS 6. MORE THAN 5 HOUSEHOLDS	

2.11	WHAT PROBLEMS DO YOU EXPERIENCE IN USING THE ABOVE MENTIONED FACILITY?	a. LACK OF WATER b. CONGESTION c. DIFFICULTY IN CLEANING d. OTHER (SPECIFY)…………………..	
2.12	WHICH DISEASE CARRYING ORGANISMS ARE PREVALLENT IN YOUR AREA?	a. FLIES b. MOSQUITOES c. RODENTS d. OTHERS (SPECIFY	
2.13	DO YOU CONSIDER YOUR AREA PROPERLY PLANNED?	1. YES 2. NO	
2.14	DO THE FOLLOWING EXIST IN YOUR AREA OF RESIDENCE?	a. PARKS b. PLAYGROUND c. RECREATIONAL CENTRES d. STANDARD ACCESSIBLE ROADS	ANSWER IN THE TABLE BELOW

FACILITY	YES	NO
PARKS		
PLAYGROUND		
RECREATIONAL CENTRES		
STANDARD ACCESSIBLE ROADS		

QUESTION NO.	QUESTION	RESPONSE	RESPONSE CODE
2.15	ARE THERE ANY VIOLATIONS OF URBAN PLANNING RULES IN YOUR AREA	1. YES 2. NO	
2.16	IF NO,GIVE REASONS		
2.17	DO YOU EXPERIENCE FLASHFLOODS DURING RAINY SEASON?	1. YES 2. NO	
2.18	IF YES GIVE REASONS	POOR SOLID WASTE MENEGEMENT OVERPOPULATION UNPLANNED SETTLEMENTS OTHERS(SPECIFY	
2.19	WHAT IS YOUR MAIN SOURCE OF ENERGY FOR COOKING?	1. CHARCOAL 2. FIREWOOD 3. GAS 4. ELECTRIC COOKER 5. KEROSENE 6. OTHERS(SPECIFY	

2.21	WHAT IS YOUR MAIN SOURCE OF LIGHTING	1. ELECTRICITY 2. KEROSENE 3. SOLAR 4. OTHERS(SPECIFY	
2.22	IF NOT USING ELECTRICITY,GIVE REASONS	1. NO CONNECTIONS IN OUR AREA 2. EXPENSIVE 3. UNRELIABLE 4. VANDALISED 5. OTHERS(SPECIFY	
2.23	WHAT ARE THE MOST COMMON DISEASES IN YOUR AREA?		
2.24	IF YOU SEEK MEDICATION FROM A MEDICAL FACILITY,ARE YOU WELL TAKEN CARE OF?	1. YES 2. NO	
2.25	IF NO,GIVE REASONS	a. NO DRUGS b. INADEQUATE HEALTH WORKERS c. NEGATIVE ATTITUDE BY HEALTH WORKERS d. LONG DISTANCE TO THE FACILITY e. OTHERS (SPECIFY	

SECTION 4: PERCEPTION OF THE LISTENERS ON RADIO ENVIRONMENTAL PROGRAMS AIRED BY THE COMMUNITY RADIOS

QUESTION NO.	QUESTION	RESPONSE	RESPONSE CODE
4.1	DO YOU GET ANY INFORMATION ABOUT ENVIRONMENTAL CONSERVATION FROM THE COMMUNITY RADIOS?	1. YES 2. NO	
4.2	DO YOU THINK THE COMMUNITY RADIOS PLAYS A VITAL ROLE IN CREATING AWARENESS TO THE PUBLIC ON ENVIRONMENTAL MANAGEMENT?	1. YES 2. NO	
4.3	WHICH ENVIRONMENTAL PROGRAMS ARE YOUR FAVORITES IN THE RADIO? (PUT THEM IN SEQUENCE)	a. WATER AND SANITATION b. INDUSTIAL WASTE MANAGEMENT c. SOLID WASTE MANAGEMENT d. SEWARAGE DISPOSAL e. COMMERCIAL AFFORESTATION	
4.4	WHAT ARE YOUR MAJOR REASONS		

	FOR THE ABOVE ANSWER?		
4.5	HOW OFTEN DO YOU LISTEN TO THESE PROGRAMS	1. REGURLARLY 2. IRREGULARLY	
4.6	IN WHAT CONDITION YOU ARE LISTENING THE PROGRAM	1. WHILE WORKING 2. EATING 3. SITTING AND RELAXING	
4.7	WHEN DID YOU START LISTENING TO THE ENVIRONMENTAL MANAGEMENT PROGRAMS	1. 3 MONTHS AGO 2. 6 MONTHS AGO 3. 1 YEAR 4. 2 YEARS 5. MORE THAN 3 YEARS	
4.8	HAVE YOU EVER GIVEN UP OR DECIDED TO STOP LISTENING TO *THE* PROGRAMS?	1. YES 2. NO	
4.9	IF YOUR ANSWER IS YES TO THE ABOVE QUESTION, WHAT IS YOUR REASON?	1. INCONVENIENCE OF BROADCAST TIME 2. IRRELEVANCE TO MY CURRENT SITUATION 3. OVERLAP OF THE PROGRAM WITH MY FAVOURITE T.V PROGRAMS 4. OTHER(SPECIFY	
4.10	ARE THE WEEKLY ENVIRONMENTAL	1. YES 2. NO	

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	PROGRAMS ADEQUATE?		
4.11	WHAT DO YOU FEEL ABOUT THE DURATION OF EACH PROGRAM? SHOULD IT BE LONGER OR SHORTER?	1. ADEQUATE 2. LONGER 3. SHORTER	
4.12	HAVE YOU EVER GOTTEN INSPIRED BY THE ENVIRONMENT PROGRAMS ON THE RADIO?	1. YES 2. NO	
4.13	HOW RELEVANT ARE THE PROGRAMS TO THE ENVIRONMENTAL PROBLEMS IN YOUR AREA?	1. VERY RELLEVANT 2. RELEVANT 3. SOMEHOW RELEVANT 4. IRRELEVANT	
4.14	HAVE THE RADIO PROGRAMS HELPED YOU TO KNOW THE SOLUTION FOR SOME OF YOUR ENVIRONMENTAL PROBLEMS?	1. YES 2. NO	

4.15	IF YES ABOVE,WHICH PROBLEMS WERE THEY	a. WATER AND SANITATION b. INDUSTIAL WASTE MANAGEMENT c. SOLID WASTE MANAGEMENT d. SEWARAGE DISPOSAL e. COMMERCIAL AFFORESTATION	
4.16	HAVE YOU EVER PUT INTO PRACTICE THE INFORMATION YOU HAVE GOT FROM THE RADIO PROGRAM?	1. YES 2. NO	
4.17	IF YES, HOW?	a. PARTICIPATED IN CLEAN-UP EXERCISES b. FORMED ENVIRONMENTAL CONSERVATION GROUPS c. IMPROVED DISPOSAL OF MY HOUSEHOLD WASTES d. FORMATION OF WASTE RECYCLING GROUP e. CONSTRUCTED TERRACES, f. PLANTED TREES/STOPPED CUTTING TREES, g. DUG SOIL FOR RAIN WATER HARVESTING? h. ENHANCED RAIN WATER HARVESTING i. APPLIED WATER TREATMENT METHORDS(BOILING,CHLORINE	

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		ETC	
4.18	DO THE PRESENTERS AND THE INTERVIEWEES USE LANGUAGE/WORDS THAT YOU CAN CLEARLY UNDERSTAND?	1. YES 2. NO	
4.19	HOW DO YOU GENERALLY EVALUATE THE ENVIRONMENT COVERAGE ON ENVIRONMENT?	1. EXCELLENT 2. VERY GOOD 3. GOOD 4. NOT BAD 5. POOR	
4.20	WHAT WOULD YOU LIKE THE STATION TO IMPROVE ON WITH REGARDS TO THE PROGRAMS?	PROGRAME DURATION SELECTION OF TOPICS SELECTION OF RESOURCE PERSONS ALLOCATION OF TIME FOR CALL-IN SESSIONS INCOOPORATE MORE LOCALS IN PROGRAME DEVELOPMENT OTHERS(SPECIFY	

……..THANKS FOR YOUR COOPERATION AND TIME……………..

Appendix II. Interview Schedule for Environmental Focus Groups

Name of the group_____

What does your group deal with?

☐ Water and sanitation   ☐ solid waste   ☐ energy   ☐ other specify

STATUS OF ENVIRONMENT

A.   *SEWERAGE AND DRAINAGE FACILITIES*

1. What is the percentage coverage for sewerage and drainage in estates under study within the municipality? If low, why?

2. What sanitation facilities are used in Nyalenda?

3. What is the level of adequacy of these facilities?

4. What is the level of appropriateness of these facilities?

B.   **SOLID WASTE MANAGEMENT**

1. What is your take on the status of SWM in Nyalenda?

2. Do you have disposal sites for wastes from Nyalenda?

C.   **ROLES OF MEDIA IN ENVIRONMENTAL CONSERVATION**

1. What are the major environmental challenges in Nyalenda?

     ----

2. How does Radio Lake Victoria help in addressing these issues?

     ----

3. How frequent are the programmes aired in the radio?

----

4. How much time is allocated the environmental programmes?

30min ☐   45 min ☐   1hour ☐   2hours ☐

Other specify---

Yes its adequate ☐   No it's less ☐   No it's too much ☐

5. How articulate are the presenters when bringing out the environmental challenges?

----

6. In your opinion, are the problems addressed adequately?

Yes ☐   No ☐

If yes how?---

7. Does your members benefit from such programmes?

Yes ☐   No ☐

If yes, specify--

8. Are there improvement in environmental condition since the programs begun?

Yes ☐   No ☐

9.   What do you suggest that should be done to address the problems effectively?

        ----

10.   Have you ever taken part in these programs?

        Yes ☐   No ☐

        a) If yes, How often?

11.   In what way do the programs impact on solving these problems?

Appendix III: Key Informant Interviews For Radio Station

PERSONNEL

Title of Respondent_____

Interview Schedule

1. What is the area of coverage for Radio Lake Victoria?
2. What is your main language of broadcast?
3. What is the nature of your target audience?
4. Why the above target audience?
5. What are the various categories of your radio programs?
6. How much time do you dedicate to key objectives of the radio?

Objectives	Time allocated
Information	
Education	
Entertainment	
Others	

7. How much time do you allocate to various programs

Program	Time allocated
Health	
Education	
Environmental management	
Poverty reduction	
Culture	
Others	

Basis of Radio Programming in your Community Based Radio Station

1. Is there listener involvement in programming and content development?

2. Do you air environmental conservation programs?

3. What are the major objectives of running these environmental programs?

4. What is the format for airing theses environmental programs?

format	
Talk-shows	
Infomercials	
Presenter mentions	
Presenter talk-ups	
others	

5. Who presents these environmental programs?

6. How can you rate the listeners' participation during these programs?

Active ☐ Passive ☐

    If active how

Calling and asking questions ☐ Sending sms answering questions ☐

7. Are the programs achieving their objectives?

....

8.	Apart from the radio programs, does your station organize any field events where they promote good environmental practices?

	Which ones?

....

....

9.	Do you work in collaboration with other organizations?

a.	If yes, which ones and in what areas?

	....

	....

	....

Relevance of Environmental Programs Aired by Community Based Radio Stations

1.	Do you have environmental conservation programs based on existing environmental problems within the community? Kindly give examples
2.	Kindly give a sample synopsis of any environmental program that has aired in the last two weeks.
3.	 Are these programs relevant to the environmental challenges experienced in your area of coverage?

Influence of Existing Environmental Programs

1. What is the nature of feedback received from listeners regarding the environmental programs?
2. As a station, do you do any follow-ups on the listeners after the radio programs?
3. In your opinion, do the environmental programs assist in creating positive behavior change among the listeners? Kindly elaborate.
4. Are there any positive testimonies shared by your listeners that emanated from the aired programs?

Thank you very much for taking your time to provide this very important information

Appendix IV: Interview Schedule For Environmental Sanitation Service Providers (MCK)

Title of Respondent_____

I. STATUS OF ESM

WATER SUPPLY

1. Are water supply services to the following estate sufficient?

Estate	Yes/No	Reason
Nyalenda A		

1. What is percentage coverage of piped water in the Nyalenda?

A. *SEWERAGE AND DRAINAGE FACILITIES*

1. What is the percentage coverage for sewerage and drainage in Nyalenda estate within the municipality? If low, why?

2. What sanitation facilities are used in Nyalenda?

3. What is the level of adequacy of these facilities?

4. What is the level of appropriateness of these facilities?

B. *SOLID WASTE MANAGEMENT*

1. What is your take on the status of SWM in Nyalenda estate?

2. Do you have disposal sites for wastes from Nyalenda?

3. If yes, is there better SWM in this mentioned estate?

C. ROLE OF MEDIA.

1. Do you incorporate the media in promoting best environmental practices within Nyalenda and the entire municipality?

    ----

2. Have you worked with the community-based radios stations in Kisumu in promoting proper environmental policies?

    Yes ☐   No ☐

    a) If yes, in which areas?

3. In your opinion, how relevant have these programs been in solving the various environmental challenges in Nyalenda?

    ----

4. What other possible interventions can the community-based radios use to address these environmental challenges found in Nyalenda?

    ----

5. In your opinion, what is the future of media in environmental conservation?

Appendix V: Interview Schedule For Sanitation Service Providers (LVSWSB & KIWASCO)

Name of Institution_____

Title of Respondent_____

I.   STATUS OF ESM

A. WATER SUPPLY

1. Are water supply services to the following estate sufficient?

Estate	Yes/No	Reason
Nyalenda		

2. What is percentage coverage of piped water in the Nyalenda?

B. SEWERAGE AND DRAINAGE SERVICES

3. What is the percentage coverage for sewerage and drainage in Nyalenda. If low, why?

4. What sanitation facilities are used in Nyalenda?

5. What is the level of adequacy of these facilities?

6. What is the level of appropriateness of these facilities?

C. ROLE OF MEDIA.

1. Do you incorporate the media in promoting best environmental practices within Nyalenda and the entire municipality?

    ----

2. Have you worked with the community-based radios in promoting proper environmental policies?

Yes ☐ No ☐

a) If yes, in which areas?

3. In your opinion, how relevant have these programs been in solving the various environmental challenges in Nyalenda?

   ----

4. What other possible interventions can community radios use to address these environmental challenges found in Nyalenda?

   ----

5. In your opinion, what is the future of media in environmental conservation?

Appendix Vi - Interview Schedule For NEMA

Name of institution_____

Title of Respondent_____

POLICIES, LEGISLATIONS AND ROLE IN ESM

1. What is your role in environmental management?

2. What policies, legislations and regulations do you use that are relevant to environmental management?

3. What is the level of compliance to these instruments in the municipality?

4. Are these instruments adequate for compliance in ESM? Explain gaps if any

5. Is there adequate institutional capacity in terms of skills and personnel for ESM? Explain

6. How do you engage with other actors in ESM especially the Media?

7. What challenges do you experience in undertaking your role in ESM?

8. What suggestions do you recommend for improving ESM in the municipality?

B. ROLE OF MEDIA

1.   Do you incorporate the media in promoting best environmental practices within Nyalenda and the entire municipality?

----

2.   Have you worked with the community radios in promoting proper environmental policies?

Yes ☐   No ☐

a) If yes, in which areas?

3.   In your opinion, how relevant have these programs been in solving the various environmental challenges in Nyalenda?

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4.   What other possible interventions can the community-based radios use to address these environmental challenges found in Nyalenda?

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5.   In your opinion, what is the future of media in environmental conservation?

Appendix Vii: Interview Schedule for NGOS & CBOS

Name of Organization_____

Title of Respondent_____

ROLE IN ESM

1. What is your role in ESM?

2. Which projects have you implemented/are you implementing in the following estate?

Estates	Project name	Project activities
Nyalenda		

B. ROLE OF MEDIA.

1. Do you incorporate the media in promoting best environmental practices within Nyalenda and the entire municipality?

   ----

2. Have you worked with the community radios in promoting proper environmental policies?

   Yes ☐   No ☐

   a) If yes, in which areas?

3. In your opinion, how relevant have these programs been in solving the various environmental challenges in Nyalenda?

   ----

4. What other possible interventions can community-based radios use to address these environmental challenges found in Nyalenda?

   ----

5. In your opinion, what is the future of media in environmental conservation?

Appendix viii: Observation Schedule

Using observation as an instrument for data collection, the researcher focused on the following key areas:

1. Means of Solid waste collection within Nyalenda
2. Garbage dumping points within Nyalenda
3. Sources of Water supply within Nyalenda
4. Sanitation Facilities within Nyalenda
5. Open sewers within Nyalenda
6. Garbage collection and sorting farms within the Estate
7. Waste recycling plants within Nyalenda
8. Organized community environmental activities such as cleanup exercises within Nyalenda

Appendix ix: Focus Group Discussions Guide

GROUP ONE, FIVE AND NINE

FGD Guide

The subject of discussion: Listener involvement in program content development.

GROUP TWO, SIX AND TEN

FGD Guide

The subject of discussion: Environmental problems in Nyalenda

GROUP THREE, SEVEN AND ELEVEN

FGD Guide

The subject of discussion: Community Radio programs relevant to Nyalenda

GROUP FOUR, EIGHT AND TWELVE

FGD Guide

The subject of discussion: Notable contributions in environmental conservation behavior change that can be attributed to the Community Radio Programs.