PARTICIPATORY COMMUNICATION APPROACH FOR SUSTAINABLE SOLID WASTE MANAGEMENT: A STUDY OF MIGORI COUNTY, KENYA.

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A Thesis Submitted in Partial Fulfillment of the Requirements of the Degree of Doctor of Philosophy in Communication Studies of the department of Communication, Journalism and Media Studies, Rongo University.

2022

DECLARATION

Declaration by the Candidate

This thesis is my original work and has not been presented by any other person for the award of any degree in this or any other University. No part of this thesis may be reproduced without prior written permission from the author and or Rongo University.

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We declare that this thesis has been submitted for examination with our approval as University Supervisors

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DEDICATION

This thesis is dedicated to

My late mother Priscilla Atieno whose words of wisdom: “Read till you find a place written no more school ahead” still linger.

And

To all environmentalists who inspire public dialogue on saving Mother Nature.

ACKNOWLEDGEMENTS

This work would not have been possible without God to whom I am earnestly indebted.

I acknowledge several people for their support towards accomplishment of this work. First, my supervisors Prof. Agallo Jerry and Dr. Abila James for their resourcefulness, dedicated guidance and tireless support towards the accomplishment of this thesis. My gratitude goes to all members of staff in the School of Information, Communication and Media Studies, Rongo University for their support and Rongo University for creating an enabling environment for me to realize this dream.

I also acknowledge the following people and organizations for their support during data collection. Mr. Olwalo from Migori Municipality, the department of Environment and Natural Resources Migori County, Rongo Municipality, Oscar Ochieng, Harriet Okuku, Geoffrey Omwenga and Mr. Sadati Okeyo.

I thank my sister and first teacher Benter Akong'o for all the encouragement and support she has always accorded me. My special gratitude goes to my spouse Charles Okeyo and loving daughters June, Yvette and Laura for their unending support throughout the period I was doing this work.

ABSTRACT

Globally, community participation and stakeholder collaboration have been proposed as a way of improving SSWM. However, little remains known on how to structure collaborative communication for SSWM. The main objective of this study was to investigate participatory communication approach to SSWM so as to design community communication network for participatory communication of SSWM. The study was guided by four specific objectives namely; to investigate community involvement in dialogic communication of sustainable solid waste management in Migori County; to determine community access to media used in the communication of SSWM; to assess strategic messages communicated for SSWM in Migori County; and to design communication network for improving community participation in the communication of SSWM. The study was grounded on Participatory Communication theory which emphasizes use of dialogic communication for peoples' empowerment and social change. Communicative Ecology theory was used to structure community communication networks for participatory communication of SSWM. The study was informed by pragmatic philosophical paradigm and was conducted using mixed methods approach where 399 respondents from Migori, Isebania and Rongo urban areas in Migori County were sampled using Yamane's sampling formula. Purposive sampling was used to obtain 23 key informants: seven (7) from the department of Environment and Natural Resources, eight (8) from municipalities of Rongo, Migori and Isebania and eight (8) were community representatives. 144 members of the community were sampled using snowballing while another 233 were obtained by simple random sampling. Qualitative data was collected using semi structured interview and focus groups discussion guides while questionnaires were used for quantitative data. Qualitative data was analyzed thematically to produce themes and codes which were then used to construct scales and variables in questionnaires. Quantitative analysis was done using descriptive statistics. Data was presented using themes, quotes, tables, percentages and figures. Findings showed limited and uncoordinated community involvement in dialogic communication of SSWM; limited community access to media used in communication of SSWM; lack of focus on SSWM strategic messages and lack of appropriate communication structures for community participation in communication of SSWM. The study concluded that limited communication of SSWM and lack of participatory communication structures limit community participation in communication of SSWM and collaboration in SSWM. Lack of focus on strategic messages communicated for SSWM also contributes to inadequate knowledge of SSWM among the community. This thesis argues that limited community participation in communication of SSWM limits community understanding of SSWM, their involvement in decision making on SSWM, and empowerment needed for responsible SSWM. The study recommends the use of the proposed community communication networks to improve community participation in communication of SSWM. It also recommends community involvement in the construction and communication of strategic SSWM messages to make the messages more impactful.

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LIST OF ABBREVIATIONS AND ACRONYMS

EC	Environmental Communication
EMCA	Environment Management Coordination Act
EU	European Union
GHG	Greenhouse gas
MSW	Municipal Solid Waste
SSWM	Sustainable Solid Waste Management
NEMA	National Environment Management Authority
NSWMP	National Sustainable Waste Management Policy.
NSSWMP	National Sustainable Solid Waste Management Policy.
SDGs	Sustainable Development Goals
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WB	World Bank
WCED	World Commission on Environment and Development

CHAPTER ONE

INTRODUCTION

1.1 Overview

Although current statistics on solid waste generation paints not so bad a picture at the grassroot levels especially in developing nations, trends of increased consumption and improved technology shows that these communities are the potential most polluter of the environment that every government should get concerned about. Note the unpreparedness in collection and handling municipal solid waste and lack of public concern for solid waste. Food and green waste account for 50 per cent of solid waste in mid and low income countries. The grassroot communities in developing world are the deposits of all products of industrialization: food packaging, machinery, clothing, farm chemicals, and construction materials. Coupled with ballooning solid waste from ICTs, solid waste generation in grassroot communities pose a potential threat and is likely to cause more havoc on the already delicate environment if not sustainably managed.

In order to overcome the aforementioned, grassroot communities should have knowledge and be involved in communication and participate in making decisions on SSWM. Communication is essential in building critically empowered communities that can effectively participate in solid waste management. This chapter introduces the momentous role of communication in SSWM, communication approaches applied to sustainable solid waste management and the gaps that exist.

1.2 Background of the Study

The world generates 2.01 billion tonnes of Municipal Solid Waste annually out of which 33% is not managed in an environmentally safe manner (World Bank (WB), 2018). It is estimated that global solid waste is going to increase to 2.2 billion tones by 2025 and 3.40 billion annual tons in 2050 with almost all the increase in developing countries (WB, 2012; 2018). Urban solid waste generated in Africa, is estimated at 169,119 tons per day and is expected to increase significantly as a result of urbanization, industrialization and modern agricultural practices (WB, 2012). Kenya generates 22 billion tons of solid waste per day out of which 5.5 million tons is estimated to be urban solid waste (Ministry of Environment, 2019).

Poor solid waste management practices are health hazardous; cause pollution of air, surface and sub-surface water; affects flora and fauna, contributes to global warming, and impacts the achievement of Sustainable Development Goals (SDGs) (UNEP, 2013; NEMA, 2015; WB, 2018). The effects of solid waste impacts all sectors of the society; governments and non-governmental institutions, communities and individuals. Finding solutions to the problem of solid waste thus requires a multi-sectoral approach; participation of communities in solid waste management and collaboration between communities, private organizations and governments, however, effective participation and collaboration in SWM highly depends on effective communication among the stakeholders.

1.2.3 Participatory Communication Approach

Participatory communication is an approach that considers communication as a transactional and cyclic process. It has its roots to the use of dialogic communication espoused by Paulo Freire (1970) who postulated that dialogic communication raises peoples' consciousness leading to empowerment (Freire, 1970; 1993).

Participatory communication developed as a paradigm shift from one way top-down transmission of development information from developed to developing nations, to a two-way circular process (Servaes, 2008). It is critical of one-way transmission of information and emphasizes stakeholder involvement in communication using dialogue in exploring situations that require change and reach a common understanding on solutions. This entails coming together of people with common interests to discuss issues affecting them, providing suggestions on how to solve the problems and working together to implement their own solutions. This is in contrast to top-down communication approaches where external experts provide solutions which are then passed down to the local population with little or no input from the locals. Through dialogue, the people become empowered thus able to take charge of change process on their own leading to sustainability.

Some of the strengths of participatory communication approach is that it gives people a voice in the management of issues that affect them, it also facilitates ownership of suggested solutions to social problems which in turn enhances sustainability. In addition, discussions and exchanges of personal experiences in a participatory process enable experiential and practical learning leading to empowerment. It is also a mechanism for enhancing social inclusion and promoting collective decision making towards social change.

Owing to these strengths, participatory communication has been globally acknowledged and applied in a varied fields of knowledge and practice such as politics and governance, development communication, health communication, food and Agriculture and environmental communication (EC) (Mefalopulos, 2009; Pezzullo & Cox, 2018). When applied to EC, participatory communication entails raising peoples' environmental consciousness and involvement of stakeholders in environmental decision making.

1.2.1 Sustainable Solid Waste Management

Sustainable solid waste management is a concept that has been globally championed as an antidote to the effects of solid waste on the environment. It is summarized in the waste management hierarchy, popularly referred to as 3R (reduce, reuse, recycle) and presented as an inverted pyramid as shown in Figure 1.1. The hierarchy emphasizes reduction of solid waste generated at the source as the most preferred choice for SWM followed by reuse and recycling all aimed at minimizing solid waste in bins and eventual landfills (United Nations Environmental Programme [UNEP], 2011). Solid waste reduction and re-use encompass efforts to prevent and or minimize generation of solid waste at source and improve the quality of waste generated. Similarly, recycling of solid waste through composting and industrial recycling of products reduces effects of solid waste on the environment as well as costs of production thereby contributing to achievement of SDG 12 on responsible consumption and production.

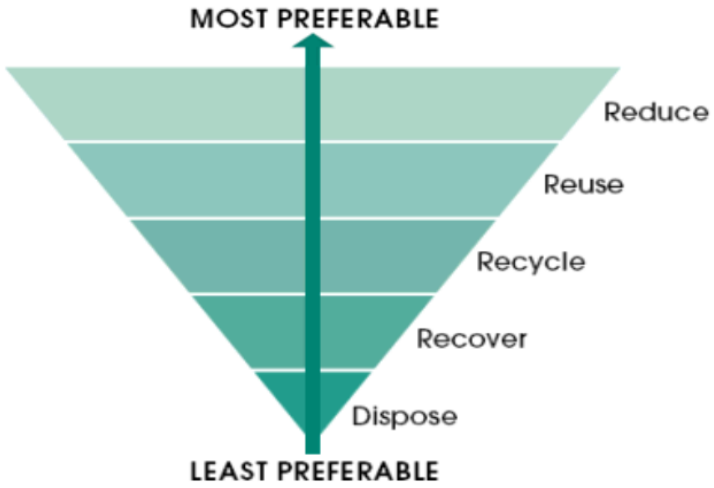

Figure 1. 1.: Waste Management Hierarchy.

Source: UNEP, (2011).

Studies highlight that hamper SWM. In African countries including Kenya challenges to solid waste management include lack of awareness on good practices for solid waste management including how people can reduce solid waste in their households, lack of community participation, poor communication and inadequate information among the communities and poor attitude towards solid waste management (Guerrero, Maas, & Hogland, 2013; McAllister, 2015; NEMA, 2015; Okot-Okumu, 2012; Sibanda, Obange & Awuor, 2017). Despite poor communication, research on communication approaches used in SSWM remains limited in literature. Studies on awareness creation through the mass media are inconclusive since some studies found that even where awareness was satisfactory, it did not translate to positive behaviour towards SSWM (Nunez & Moreno, 2016; Obuah & Okon, 2017) other scholars have also noted that awareness alone is insufficient in changing individual behaviour towards waste management; factors like social norms and community involvement contributes to how individuals manage solid waste. Social norms are values, beliefs and acceptable behaviour that are co-constructed within the community as people engage in dialogue with others. Therefore community involvement in discussions of SSWM through participatory dialogue presents an alternative approach that can be used to influence SWM behaviour.

Owing to these realizations, international and local policies such as The Stockholm convention (UN, 1992), the Constitution of Kenya (2010), County governments Act (2012) and NSWM policy (2019) recommend community participation in decision making on SWM. Nonetheless, participation in decision making takes place within a public sphere, a forum where people share ideas and experiences that cumulatively influence community understanding and behaviour towards SSWM therefore individuals and communities at the

local, national and international level should have access to a public sphere or media where they can participate in communication of SSWM.

1.2.4 Community Access to Media

Since the advent of information society in the 1980s, information and by extension media have become one of the most valuable resource as societies are increasingly becoming dependent on information. Alongside this is the advancement in communication technologies which have revolutionized communication where media has become the cornerstone of 'what' and 'how' of communication.

Access to media implies opportunities available to use media for the purposes of communication. It is critical for enabling communities exercise their right to information and expression as well as participating in an informed dialogue on issues that affect their lives. Community access to media enables them obtain information on SSWM and also provides opportunities for involvement communication of SSWM which includes participation in discussions on problems facing SSWM as well as finding solutions to those problems.

Based on this fundamental contribution, community access to information and participation in making decisions on waste management have been highly recognized as important elements in SSWM by both international and local policies (United Nations Conference on Environment and Development, 1992; County governments Act 2012; NSSWM Policy, 2019 & SWM Policy, 2019). The policies also emphasize government –community collaboration on SSWM. Despite these provisions, lack of information on how to manage waste among the public, especially in Africa remains a challenge (NEMA, 2015; Okalebo, Opata, & Mwasi, 2014; Pinawala, 2016; Sibanda et al., 2017). Besides, poor communication and lack of collaboration between governments and communities presents an impediment to SSWM

(Guerrero et al., 2013). Institutional challenges such as power structures; social-cultural factors such as literacy, gender, education, language, economic power and access to resources, personal commitments and technological divide have been pointed out as challenges to access to participation (Devas & Grant, 2003; Waisbord, 2008).

Over the years, however, improvement in information and communication technologies has led to the amelioration in access to media which in turn has greatly contributed to community access to information and participation in social development at the international, national and local levels. The increased number of community and vernacular radio stations in Kenya and other African countries has not only improved community access to information but has also provided a voice for people to participate in social development. In addition, increased availability of smartphones and improved network coverage, can offer the much needed access to media for information and participation in SSWM.

1.2.5 Strategic Messages Communicated for SSWM

Studies on communication for SWM have focused on the use of media to create awareness on waste management; however, lack of information on how to effectively manage solid waste among the public is still a major challenge. There is need to interrogate not just the media (channels of communication) but also the messages communicated.

A message is one of the elements of the communication process. It specifies what the communicator intends to achieve by their communicative action. Strategic messages are purposeful; intended to achieve specific desired goals therefore they are carefully planned with specific audience in mind and communicated using the most appropriate approaches. Strategic messages should have a significant bearing on the audience; therefore, in order to

achieve a significant desired outcome, messages communicated for SSWM should carefully and purposefully focus on the achievement of 3R(reduce, reuse and recycle).

One of the strategies applied in communication of SSWM is the use of colour codes to strategically communicate solid waste separation where green, blue and yellow colour coded bins symbolize biodegradable, non-biodegradable; and glass and metallic solid waste respectively. The colour coded bins meant for solid waste separation are also strategically placed whence solid waste generators are expected to identify and correctly dispose of solid waste. One challenge with this strategy is that meanings of colours are culturally assigned and different colours have different meanings to different people. Other factors such as exposure, experience and gender also play a significant role in how colours are used and meanings attached to them therefore universal application of specific colours to strategically communicate solid waste separation may pose a challenge. Some studies have found that the use of colour codes to strategically communicate solid waste separation does not produce positive effects (Leeabai, Khaobang, Viriyapnitchakij & Areeprasert, 2021). Therefore in order to be more impactful and achieve the desired impact on behaviour, strategic messages communicated for SSWM (reuse, reduce, recycling and separate solid waste) should incorporate indigenous knowledge and use symbols that are culturally relevant to the community.

1.3 Statement of the Problem

Participatory Communication has become a major component in development programs including achievement of SDGs. International and national environmental polices encourage

public participation in decision making, management, protection and conservation of the environment including SSWM. In Kenya, national policies require the national and county governments to create awareness on waste segregation, reduction, re-use and recycling using media with the widest public outreach. The environmental policies also emphasize community involvement in planning, implementation and decision making on environmental management (National Environment Policy 2013; National Environment Management Strategy, 2015 and the National Sustainable Solid Waste Management Policy, 2019). Despite these provisions, lack of knowledge on how to manage solid waste among the public remains a challenge. In addition, the policies do not provide communication mechanisms for community involvement in the processes of decision making. Nevertheless, little is known on community access to media used in communication of SSWM, community involvement in communication of SSWM, strategic messages communicated for SSWM and appropriate communication networks for community participation in communication of SSWM.

1.4 Objectives of the Study

The main objective of this study was to investigate participatory communication approach to SSWM in Migori County so as to design community communication networks for participatory communication of SSWM.

1.4.1 Specific Objectives

Specific objectives of this study were;

i. To investigate community involvement in dialogic communication of sustainable solid waste management in Migori County.

ii. To determine community access to media used in the communication of sustainable solid waste management.

iii. To assess strategic messages communicated for SSWM in Migori County.

iv. To design community communication network for improving community participation in the communication for SSWM

1.5 Research Questions

In order to realize the above objectives, the study answered the following research questions.

i. How are communities in Migori County involved in dialogic communication of sustainable solid waste management?

ii. Which media used in the communication of SSWM by Migori County government do communities have access to?

iii. What are the strategic messages communicated for SSWM in Migori County?

iv. Which communication networks can improve community participation in the communication of SSWM?

1.6 Justification of the Study

The study was justified by the need to improve: communication of SSWM, community involvement in planning and decision making on SSWM and collaboration between community and government on SSWM.

Poor waste management practices contribute to pollution, global warming, poor health and impacts achievement of vision 2030, SDGs 3,6,11, and 12 and Agenda 2063. Studies have indicated that poor communication and lack of knowledge on SSWM remains a challenge to SWM (Guerrero, Maas, & Hogland, 2013; McAllister, 2015; NEMA, 2015; Ndwiga et. al,

2019; Okalebo, Opata & Mwasi, 2014; Okot-Okumu, 2012; Ombis, 2017; Pinawala, 2016; Sibanda, Obange & Awuor, 2017; Yukalang et al., 2017).This points to the need to improve communication of strategic messages for SSWM and community access to SSWM information so as to improve community knowledge on SSWM and in turn help in the realization of Vision 2030, Agenda 2063 and SDGs.

This study was also justified by the need to have communication structures for improving community participation in planning, decision making and collaboration with the government on SSWM. The Constitution of Kenya and environment policies emphasize community involvement in planning, implementation and decision making on environmental management yet policies do not provide mechanisms for community involvement in decision making on SSWM. The study was thus justified in designing communication networks for community participation in communication of SSWM.

The National Waste Management Strategy (2015) provides that citizens should have access to information about solid waste management while the County Governments Act (2012) provides that county governments create awareness on SSWM. However, lack of information on SSWM remains a challenge among the public (NEMA, 2015). This study was thus prompted by the need to determine community access to media so as to ameliorate community access to information on SSWM.

Most studies on communication for waste management have focused on awareness creation on SSWM using the mass media. However awareness alone has been found to be insufficient in improving positive behaviour towards SSWM. This study was therefore prompted by the desire to investigate participatory communication approach to SSWM so as to improve community participation in planning and making decisions on SSWM.

1.7 Scope and Limitations of the Study

This study focused on participatory approach to communication of SSWM. Different types of waste impact the environment, however this study was limited to solid urban waste because it is the most pernicious pollutant in the environment. Participatory communication was viewed as a people centered approach to communication which utilizes dialogue for empowerment and collective decision making leading to social change. The study investigated community involvement in dialogic communication and their access to media and strategic messages communicated for SSWM. Involvement in communication of SSWM, was conceived as community participation in discussions, sharing ideas, planning and making decisions on SSWM. Since 3Rs are significant in ensuring sustainability in solid waste management, this study paid attention to the communication of the strategic elements of the waste management hierarchy (3R) as done by Migori county government so as to understand how this impact community knowledge and participation in SSSWM.

In terms of methodology, this study was grounded on pragmatist philosophy and was limited to mixed methods approach. The research design was limited to exploratory sequential mixed methods design which involved collecting both qualitative and quantitative data. The intent of collecting qualitative data was to delve deep into the inquiry and obtain in-depth data while was quantitative data was used to determine the generalizability of the qualitative findings. Interviews, focus group discussions and questionnaires were used to obtain data in three urban areas. Study participants were sampled from the department of environment and natural resources, municipalities and community members.

Geographically, the study was limited to urban areas (Migori, Isebania and Rongo) of Migori County. Urban areas were chosen in this study because they experience more challenges to solid waste management due to urbanization and increase in population (WB, 2012; 2018). Since waste is managed is at the county level, three towns were considered representative of the entire county of Migori.

In terms of time, this study focused on communication for SSWM within devolved systems of government between 2017 and 2020.

However the study was faced with a few limitations. There are seven major urban areas in Migori County but this study was limited to three urban areas. Since solid waste management is a devolved function of the county government the three urban areas were believed to be representative of the other urban areas in the county. Secondly, during data collection process, records of communication between Migori county governments were not available. To overcome this limitation, the study used source triangulation by obtaining data from multiple sources sampled for the study.

1.8 Significance of the Study

The significant role of Participatory communication in SSWM cannot be overemphasized. Findings from this study provide insights on how to manage communication challenges facing solid waste management globally and locally. Specifically, this study significantly contributes to improving community participation in communication of SSWM so as to empower them with knowledge on SSWM. Findings from this study assist in the evaluation of communication strategies applied to SSWM; messages communicated for SSWM and media used in communication, especially in today's pluralistic media society. Thirdly, by designing communication networks for participatory communication, the study significantly

provides knowledge on community participation in decision making of SSWM. Lastly, since stakeholder participation has become the dominant approach in development programmes, community communication networks designed in this study is worthwhile in enhancing stakeholder participation in communication especially at the grassroot levels which comes a long way in improving stakeholder collaboration not only in SSWM but also in other community development programmes.

1.9 Operational Definition of Terms

Access to media:	This means opportunities available and ability to utilize media to obtain information and communicate.
Communication approach:	Means a communication plan intended to achieve specific objectives. It includes messages to be communicated and choice for media that can achieve the intended objectives.
Community:	This refers to a group of people who share certain interests and socially interact. A community may include but not restricted to physical location.
Communication network:	Patterns of communication showing how people share and receive information and interact with one another.
Empowerment:	This means a critical process of self- learning and development of capabilities that enable people to influence and take control of their social well-being.
Media:	Tools, Channels or forum used in communication.
Participatory communication:	Holding discussions and debates aimed at sharing information and knowledge utilized in improving local situations and finding solutions to social challenges. It involves exchange of information through dialogue and interpersonal communication techniques.

Solid waste:	This refers to urban or municipal waste. It include waste from households, farms waste, markets, small holder businesses and institutions in urban areas.
Sustainable solid waste management:	This means effective ways of handling urban waste so that they do not cause harm to life and the environment. It includes generation of less solid waste, recycling and reuse of products.
Urban area:	Means municipality or town.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter presents a review of literature related to participatory communication for SSWM. It begins with key concepts and discussions on their relationships to the problem of study followed by literature related to objectives. Communication approaches currently applied to SSWM is reviewed noting the gaps that exists. The chapter ends with a theoretical and conceptual framework that guides the study.

2.2. Sustainability

The concept of sustainability can be traced to the divine providence in Christian theology and over-exploitation of forests in Europe in the seventeenth century (Judy & Moritz, 2015). Several organization commissions and conferences including the World Council of Churches (WCC), the International Union for the Conservation of Nature (IUCN), the World Commission on Environment and Development (WCED), and the Earth Summit in Rio (1992) were concerned with the safety of future life and continued high levels of risks on nature therefore accentuated realization of an ecologically sustainable society. WCC for instance, during a plenary in Nairobi in 1974 adopted a model of a "just, *participatory* and sustainable society" (emphasis mine) as a formula for solution to the world environment crisis (WCC report cited by Judy & Moritz, 2015). In their conception, realization of a sustainable society depends on peoples' participation on environmental matters.

Since the publication of Brundtland Commission report "Our Common Future" (WCED, 1987) and pronouncement of sustainability as a core concept of development during the Earth

Summit in Rio in 1992, the term sustainability has been adopted in all aspects of development- social, political and environmental- and emphasized by the UN on Sustainable Development Goals. In the context of development, sustainability is a concept used in reference to practices that enable communities fulfil their current needs as well as ensuring the needs of the future are met. It is based on environmental, economic, social and cultural perspectives and is concerned with achievement of the well-being of every human being (Di Fabio, 2017). The United Nations accentuates sustainability in the pillars of development; sustainable health, sustainable wealth creation and sustainable environment. Pezullo and Cox (2018) on the other hand perceive sustainability as the ability to negotiate environmental, social and economic needs and desires for current and future generations.

Sustainability encompass the interdependence of the four pillars; environmental, social, economic and cultural. Secondly, achieving sustainability requires some negotiation and compromise on current consumption so as to ensure future existence. Thirdly, and most importantly, the environmental pillar occupies a significant place in achieving sustainability and is paramount in the achievement of SDGs. This is premised on the fact that all life depends on the natural environment; therefore, all the other three pillars of sustainability are largely dependent on environmental sustainability.

Environmental sustainability refers to keeping the natural environment fit for humans and other creatures while at the same time satisfying human needs (Morelli, 2011). It incorporates the utilization of resources in a manner that ensures safety of the natural environment for the sustenance of both current and future lives. Since sustainability is multidimensional and multi-sectoral, it requires collaboration of all stakeholders; individuals, communities, state,

private and public institutions which in turn is realized through effective communication approaches such as those that which go beyond information provision to one that promotes participation in planning and decision making. According to Quarry and Ramirez (2004) communication in the context of sustainable development goes beyond providing information to giving people voice and enabling them to participate actively in different communication processes using dialogue.

The modern conception of communication for development is that it should enable people participate in their development. This is a departure from the traditional conception of transfer of development from the center to the periphery as was earlier conceived. According to WCED, the pursuit of sustainable development requires a communication system that gets conditions for sustainable development 'organized and accepted by all parties concerned at all levels of society' (Servaes & Malikhao, 2008 p. 6) which is a call for peoples' participation. Servaes (2013) adds that sustainable development needs a political system that safeguards effective citizen participation in decision making and a communication system that is accepted by all stakeholders at all levels of the society.

Servaes (2008) points out that

> "Successful sustainable development comes from the conscious and active participation of the intended beneficiaries at every stage of the development process; for in the final analysis, development cannot take place without changes in attitude and behavior among all the people concerned" (p. 211).

Based on the above discussions, participation is crucial in achieving sustainability in all spheres of development including SSWM since the people themselves must consciously agree to implement sustainable waste management practices.

2.2.1 Sustainable Solid Waste Management

Sustainable solid waste management (SSWM) is a systemic approach to solid waste management aimed at mitigating the effects of solid waste on health and environment and ensuring sustainability. According to the National Waste Management Strategy, SSWM is concerned with the careful use of both production and consumption resources so as to cut down on the amount of waste generated and where waste is generated it should be dealt with to contribute to economic, social and environmental goals of sustainable development (NEMA, 2015).

Most developed countries have embraced SSWM practices following the requirement by the European Commission (EC) that member states implement sustainable solid waste management by the year 2020, a factor that highly promoted improved recycling and waste reduction in countries like Finland (Piippo, 2013). Conversely, in Sub-Saharan Africa solid waste is poorly managed; 69 % of solid waste is openly dumped and often burnt, 24% is disposed in some form of landfill and about 7% is recycled (WB, 2018). Open dumping and burning, illegal and uncontrolled dumping of waste in water bodies and roadsides and sprawling of solid waste beyond the designated sites is common in many towns in countries in developing towns such as Juba in Nigeria, Nairobi and Migori in Kenya (Gabriel, 2015; NEMA, 2015; UNEP, 2010; WB, 2018). Solid waste affects every individual in the world thus sustainable solid waste management requires collaboration and participation of all

stakeholders; citizens and governments, locally, and nationally. Nonetheless, collaboration and participation require effective communication between these different stakeholders.

2.2.2 Communication and Sustainable Solid Waste Management

The role of communication in SSWM can be understood from an Environmental Communication (EC) perspective. Cox and Pezzullo (2018) define Environmental Communication as "the pragmatic and constitutive modes of expression of our ecological relationships in the world" (p. 34). The constitutive function of EC include the use of verbal and non-verbal modes of communication that shape, negotiate meaning, values, and evoke feelings and beliefs towards the environment. In this sense EC constitutes what the environment means to people, how they feel about nature and how these translate into their relationship with the environment.

According to this definition, symbols and signs used to communicate nature dictate how we perceive and understand the environment and how we develop attitudes and behavior towards the environment. Such symbols include words, pictures, images and messages that are used in EC. Considering the constitutive function, the verbal modes of communication such as spoken messages and songs and non-verbal presentations and representations of solid waste and environment shape how we understand and feel about the environment and eventually translate to how we handle solid waste. EC also helps to raise social consciousness about environmental conservation so that people begin to take actions about challenges facing the environments such as poor solid waste disposal. People first develop consciousness about an environmental situations which then helps them to make proper decisions.

This study is in agreement with the role of EC discussed above and considers communication for SSWM as the production and sharing of information about solid waste management among stakeholders aimed at raising consciousness, creating empowerment and influencing pro-solid waste management behaviour. It should transcend the informative function and empower people to make decisions and take appropriate actions on solid waste management. But again decision making on SSWM is a collective responsibility that requires collaboration between stakeholders therefore communication for SSWM should aim at influencing collective decision making on SSWM. When used in this aspect, communication serves more than informing and moves to one that promotes participation. Both informatory and participatory communication approaches have been applied in EC and in SWM albeit with different objectives. The foregoing section presents discussions on communication approaches applied to SSWM.

2.3. Communication Approach

Communication approach can be described as a strategy used to meet communication objectives. It not only directs how messages are relayed to target audience but also involves careful planning, choosing the right media and other communication techniques, careful construction of messages and directing how those messages are relayed to target audience so as to achieve specific objectives. According to Flor (2004) communication approaches are methods and techniques used to address specific issues in the most effective way.

Communication approaches used in EC are directed towards awareness creation, education, and advocacy, the latter involving mobilization in support for policies or change towards environmental management (Flor, 2004; Mefalopolus &Kamlongera, 2004; Pezullo & Cox, 2018; Nunez & Moreno, 2016). Though these approaches differ in their strategic design, they

are not mutually exclusive and can be combined depending on the communication objectives to be achieved. Cox (2010) however considers that there are two approaches to Environmental Communication (EC): advocacy and collaboration.

This study reviewed four approaches to communication for solid waste management: advocacy, public communication, mass media, and collaboration approach, focusing on how these approaches have been applied so as to find the research gap.

2.3.1 Advocacy Approach

Advocacy is a communication approach that involves the use of communication to create awareness, call for support for a course and create social change through strategic communication aimed at specific individuals for a specific goal to be achieved within a specific time frame. According to Pezullo and Cox (2018) advocacy is "a strategic course of action, involving communication which is undertaken for a specific purpose" (p. 224). The Alliance for Justice (2013) defines advocacy as "any action that speaks in favour of, recommends, argues for a cause, supports or defends or pleads on behalf of others" (p.1). Advocacy campaigns are used to seek support for a course that may lead to formulation, legitimization or challenging a policy or set of values. The approach applies the use of short, succinct persuasive messages meant to concisely express the campaign's objective.

Globally, advocacy has been used by environmentalists and different organizations in creating environmental awareness and to drive mass support from the public and stakeholders in advocating support for environmental conservation such as tree planting, climate change, campaign against fossil fuels and pollution; however, its use in SSWM remains limited in literature. An example of advocacy is the campaigns for 'waste wise cities' applied by the

UN-Habitat as a call to the whole world to address solid waste management challenges facing cities and towns (UN-Habitat, 2018). The campaign targeted awareness creation and change of public attitude towards solid waste management therefore it used multiple media channels including social media (Facebook, Twitter and You-tube), website, banners, caps and posters.

Theoretically, advocacy was based on Rhetorical tradition and applies theories of persuasion traced to Aristotle's persuasion model but over the years a number of theories including Agenda Setting theory by McCombs (2004) have also been applied in environmental advocacy campaigns. Because advocacy campaign aims at creating an impact ('effect' or 'outcome' of communication) on the audience, it employs a heightened media attention so as to create visibility and support for a course.

One weakness of advocacy campaigns is that they have limited time scope thus fall short of being sustainable and ensuring sustainability. SSWM requires sustainable behaviour change; not one stop campaign with heightened media campaigns followed by silence. White (1999) observes that advocacy views people as 'sponges' to 'soak up' information that was handed over to them' p. 64. In this analogy, a sponge sucks up fast but the content is not sustainable. Hence the use of advocacy campaigns can hardly lead to sustainability in development programmes since the local beneficiaries may not sustain the development information longer.

Secondly, since advocacy is non-participatory it seldom promotes empowerment among audience. White, (1999) notes that the use of advocacy in development often does not provide opportunities for communities to learn and build capacity, a factor that leads to collapse of

development programmes that are developed on external advocacy approaches. Pezullo and Cox (2018) posit that "individuals may have favourable attitudes or beliefs about the environment but they may not any take action" p. 240. They note that there is an attitude-behavior gap in using advocacy campaigns occasioned by an assumption by behavior change communication that provision of information and education is enough. In addition to these arguments, it is also worth noting that advocacy is a one-way communication approach where people are informed to take a particular action. The audience are treated as passive receivers of information who have limited opportunity to get their voice heard.

Based on the aforementioned weaknesses, the use of advocacy in communication for SSWM may not yield positive behaviour change towards SSWM. Ndonye (2014) observes that audience involvement is important in order for advocacy to yield the desired results. He points out that when audience is involved, the advocacy becomes inclusive and stakeholders see the project as part of them thereby making it sustainable.

2.3.2 Public Communication Approach

This approach involves the creation of public awareness using media such as posters, billboards, websites, radio ads, and print media. Public communication of solid waste management involves the use of posters with writings such as "don't throw litter" or "don't dump waste here" which warn against unacceptable solid waste management behaviour and others such as "keep the city clean" which encourage people to practice positive environmental behaviour. The strength of public communication approach lies in its use of short, clear and easily noticeable messages. It also creates wide publicity and awareness.

However, public communication approach to SWM seem ineffective in transforming peoples' behaviour since individuals tend to act in socially acceptable behaviour when they appear in public but resort to unacceptable behaviour while they are in private. Disregard for public notices is a common practice that is evident in places where solid waste is dumped at the very sites or spots with notices that discourage dumping. The other challenge with this approach to communication for SSWM is that other than telling people what they should not do, posters with expression like 'don't dump waste here' fail to add more on what one should do with the litter or how to keep the city clean. Details on how to segregate, recycle and reuse waste for sustainability require much more than this. This approach therefore falls short of directing peoples' behaviour towards sustainable solid waste management.

In addition, public communication is characterized by one-way transmission of information where information is banked on the receivers without feedback from them. This limits collaboration on SSWM between stakeholders which require feedback. Public communication also assumes that once people receive information, they are likely to change their behaviour; unfortunately, all it does is to create awareness, however behaviour change in SSWM requires much more than awareness as individuals should be able to relate information communicated to their waste management behaviour and practically learn how to handle solid waste, a process that requires some form of capacity building and empowerment that cannot be practically achieved using posters.

In regards to these weaknesses, public communication approach seem unsuitable for promoting community participation in communication of SSWM.

2.3.3 Communication by Mass media

Other than advocacy and public communication, SWM is also communicated through the mass media either as news stories or reports presented by journalists. This approach is motivated by the media's agenda setting role, its ability to create mass awareness and influence peoples' attitudes and behaviour. Issues such as tree planting, water conservation, waste management, climate change, global warming and environmental disasters such as earthquakes and floods, are communicated in the mass media to create an informed public as well as help people make decisions.

Nevertheless, environmental news usually receive limited coverage by the mainstream mass media which mostly focus on the specific events considered news worthy for example when a community is swept by floods. Similarly, though the mass media is a powerful tool for creating mass awareness, it seldom presents information on SSWM, a factor that has contributed to limited knowledge and capacities on how to manage solid waste among the public. Most studies show limited coverage of environmental news including solid waste management in the mass media (David, Mberia & Mulyungi, 2018; Koser, 2017; Lakshmikantha & Malur, 2014; Nunez & Moreno, 2017; Obuah & Okun, 2017; Oting'a & Ngigi, 2019; Patrick & Ferdinard, 2014).

Some scholars attribute this limited coverage of environmental news by the mass media to political economic interests of the media, the shrinking news hole and lack of training among journalists on environmental issues (Lakshmikantha & Malur, 2014; Nunez & Moreno, 2017; Oting'a & Ngigi, 2019; Pezullo & Cox, 2018). Indeed, commodification of news by the media dictate what to air, when to air and how to air it the aim being to attract audiences and ultimately advertisers. A study in Kenya found that most media personnel give coverage to

major environmental events “like the United Nations Environmental Assembly due to the calibre of delegates attending the sessions” (Oting’a & Ngigi, 2019 p. 17) thus attracting wider audience attention.

Due to economic interests of the media, the media is guided by audience preferences thus topics and issues with limited audience preference get limited attention and airtime in the mainstream mass media. Studies show that environmental news continue to attract limited preference by the public compared to other issues which again affects the attention and airtime accorded to former by the mass media. Oting’a and Ngigi, (2019) found that preference for environmental issues by T.V audiences in Kenya remains very low (3%) as compared to other programs such as news (36%), soap opera (26%), sports (22%). Pezzullo and Cox (2018) observe that despite the current threats on environment, environmental news continues to diminish in the mainstream media (Radio, T.V and print media). They quote Friedman (2004) who pointed out that,

> “the environmental beat has never really been stable, riding a cycle of ups and downs like an elevator,” often crowded out when competing against other events—economic news, war and terrorist events, and so on (Pezzullo & Cox, 2018 p.177).

Though there is close connection between media coverage of environmental news and audience awareness, some studies show that even where there is high level of awareness created using the mass media, individuals do not exhibit pro-environmental behavior towards waste management (Nunez & Moreno, 2016; Obuah & Okun, 2017). This lack of positive behaviour towards solid waste management can be attributed to three factors. First, the mass media is dictated by the inverted pyramid styles of reporting news therefore when presented as news, environmental matters tend to be brief, passive, and detached from the lives of the

people making it difficult for audiences to relate them to their behaviour. Secondly, the diffusion approach to communication of environmental issues in the mass media is akin to 'banking' process where audience are treated as passive receivers of information. This approach perpetuates passivity among audience and may inhibit them from developing critical consciousness, empowerment and ultimately transforming their SSWM behaviour. Flor (2004) and Servaes (2008) point out that where behaviour change is concerned, interpersonal approaches to communication is more effective than use of mass media.

Thirdly other than awareness, environmental behaviour is also affected by social norms therefore social behaviour plays a significant role in promoting pro-waste management behaviour. Some studies have shown that individuals are more likely to recycle solid waste when they saw others close to them do the same. Flor (2004) perceives communication for environmental management from the lens of the society and argues that the society, using its values and worldviews, collectively establishes consciousness towards the environment and that communication in the mass media may seldom change these worldviews.

From these discussions, advocacy, public communication and mass media approaches aim at creating awareness and persuading the public to take positive action towards waste solid management. The challenge of these approaches lie in their diffusion or transmission of information approach where audience are treated as passive receivers of information rather than active participants in the communication process. On the other hand, sustainability in solid waste management requires communication geared towards sustained social behaviour modification which requires some form of collective capacity building, empowerment and participation in both decision making and implementation of solid waste management programmes. As such communication for SSWM would best strive to promote collaboration

between stakeholders and active participation of the change targets in the communication process.

2.3.4 Participatory Communication Approach

Participatory communication is an approach that is grounded on the use of dialogic communication espoused by Paulo Freire (1970) who postulated that dialogic communication raises peoples' consciousness leading to empowerment (Freire, 1970; 1993). Participatory communication has been conceived differently by different scholars. Some scholars view it as a peoples' empowerment aimed at enabling them actively contribute to decision making in development programs while others consider participatory communication as a mechanism for sharing of information, perceptions and opinions among the various stakeholders thereby facilitating their empowerment.

Melkote and Steeve (2001) view participatory communication as a peoples' empowerment aimed at enabling them actively contribute to decision making in development programs. In their conception, empowerment is a fundamental requirement for peoples' participation in development. Tufte and Mefalopulos (2009) on the other hand, emphasize dialogue as a mechanism for empowerment. They define participatory communication as

> an approach based on dialogue, which allows the sharing of information, perceptions and opinions among the various stakeholders thereby facilitates their empowerment…it is not just the exchange of information and experiences; it is also the exploration and generation of knew knowledge aimed at addressing situations that need to be improved" (p. 17).

In their conception of participatory communication, Mefalopulos and Tufte view dialogue as the route to empowerment which in turn is crucial for social change.

The consortium of Communication for Social Change through a debate initiated by the Rockefeller foundation defines Participatory Communication as

> "a process of public and private dialogue through which people themselves define who they are, what they need and how to get what they need in order to improve their own lives. It utilizes dialogue that leads to a collective problem identification, decision making and community-based implementation of solutions to development issues" (Mefalopulos, 2009).

Though conceived differently by the different scholars, the common facets of participatory communication approach are the use of dialogue and peoples' empowerment. It is not just the exchange of information and experiences but includes exploration and generation of knowledge targeting situations that need to be improved.

Participatory communication developed as a paradigm shift from one way top-down transmission of development information from developed to developing nations to a two-way circular process whose goal is not to persuade audience to adopt pre-defined change but rather, to engage stakeholders in exploration of the situation and definition of the required change. It is critical of one-way transmission of information used in the mass media and emphasizes active involvement of audience in the communication process. Flor (2004) argues that communication programmes applied to environmental agenda 'should *enable* and

empower the audience not to stay as passive receivers at all times but to become active sources of information as well'(p. 5).

Participatory communication approach holds that communication for social change should be sensitive to cultural realities of audience and multiplicity of factors (Freire1970; Servaes, 2008). This is informed by the fact that cultural values, attitudes, beliefs, identities and social networks shape peoples' attitudes and behaviour including actions towards the environment. Therefore, communication for social change should be localized so as to take care of multiplicity and heterogeneous nature of the society. It should also and embrace local cultures and indigenous knowledge. Consequently, we argue that universal one-way communication approaches to SSWM that view social change as unilinear process where change can be transferred from one society to another and communicative approaches such as diffusion of information that ignore social-cultural realities within which communities are embedded may fail to impact a peoples' behaviour and yield the desired social change in SWM.

Participatory communication approach has several strengths. First of all it fulfils a social function by giving people opportunities to give their voice in the management of issues that affect them. By becoming sources of information, individuals generate and share their own perspectives leading to ownership of suggested solutions to social problems which in turn enhances sustainability since people consider the initiatives their own. Besides, the use of interpersonal communication in participatory approach not only provides knowledge but also facilitates experiential learning through discussions and exchanges of personal experiences. This stimulates discussions and evaluations of practicality in learning and empowerment among the community. Participatory communication is also mechanism for enhancing social inclusion and promoting collective decision making towards social change.

Based on the aforementioned benefits, international and national policies on waste management call for participation of communities and collaboration between stakeholders in environmental decision making (the Earth Summit, Rio Declaration, Constitution of Kenya, County governments Act (2012), National Waste Management Strategy (2015) and National Sustainable Waste Management Policy (2019). However, communication for solid waste management still remains one-way, mainly using the mass media approach.

Considering the gaps in the use of advocacy, public communication and mass media and strengths of Participatory communication approach, there is need for research on participatory communication for SSWM. so as to improve community participation in SSWM.

2.4. The Concept of Participation

The term participation was conceived in the 1960s and has since been widely used in a socio-economic and political realms. In politics, participation was seen as a struggle by the low class poor from the dominance of power by the political and the bourgeois class; it was a call for democracy and peoples' involvement in politics and development. In development realms, participation was conceived as a contestation to top-down approaches to development which viewed development as unilineal evolutionary process in which development could be achieved by 'modernizing' the underdeveloped nations in a top-down approach by the West. Participation is thus an approach to involving people in their development using bottom-up and horizontal communication.

There is no consensus on definition of participation and different scholars hold different conceptions of the term. Some scholars conceive participation as mobilization of people to eliminate social injustices while others conceive of it as inclusion of relevant groups in the

design and implementation of development projects (Tufte & Mefalopulos, 2009). Servaes (2008) view participation as a significant requisite in development and a way of creating social change. He points out that,

> "Successful sustainable development comes from the conscious and active participation of the intended beneficiaries at every stage of the development process; for in the final analysis, development cannot take place without changes in attitude and behavior among all the people concerned" (p. 211).

The National Public Participation Policy (2017) defines public participation as

> 'the process where individuals, governmental and non-governmental groups influence decision making policy, legislation, service delivery, oversight and development matters. It is a two-way interactive process where the duty bearer communicates information in a transparent timely manner, engages the public in decision-making and is responsive and accountable to their needs. The public gets actively involved in the process when the issue at stake relates directly to them" (p. 3)

Participation when used in development communication implies facilitation of exchanges between stakeholders to address a development problem. According to Bessette (2004), participatory development communication is based on participatory approaches as well as media and interpersonal communication meant to facilitate dialogue.

In Environmental communication, participation is a concept that refers to giving people voice and involvement in environmental decision making (Cox, 2010; Flor, 2004; Peeples &

Depoe, 2014; Pezullo & Cox, 2018; Senecah, 2004). Cox (2010) defines public participation as

> "the ability of individual citizens and groups to influence environmental decisions through (1) access to relevant information, (2) public comments to the agency that is responsible for a decision, and (3) the right, through the courts to hold public agencies and businesses accountable for their environmental decisions and behaviour" p. 84.

In this definition, Cox (2010) considers access to information as a fundamental requirement for peoples' participation in decision making and monitoring the decisions and action of other stakeholders such as governments. Such collaborative initiatives can lead to realization of sustainability in environmental management. He points out that such collaboration takes place within the public sphere, a forum where people freely exchange their views on matters that affect them. However we note that public sphere may not be accessible to the most affected people, especially where there are no clear structures for participation thereby posing a challenge to peoples' participation in decision making.

The term 'participation' has been used interchangeably with 'community participation', 'citizen involvement', 'community involvement' 'public engagement' and 'public participation'. This study uses participation to mean 'community involvement' and considers it as a process in which local community are actively involved in identification of their problems, decision-making, and implementation of solutions to those problems leading to sustainability. Because of the different conceptualization of the term participation, its eventual realization takes different forms some miniature. The foregoing section discusses typologies of participation.

2.4.1 Typologies of Participation

Considering the different conceptualization of the term participation as discussed in the previous section, different forms of participation can be applied in development programmes to meet different programme needs. Scholars have analyzed the different forms of participation, some forms being seen as miniature while others are mere 'ritualistic'.

Tufte and Mefalopulos (2009) identifies four typologies of participation: passive participation, participation by consultation, participation by collaboration and empowerment participation. Arnstein (1969) looks at participation from power angles and describes it in terms of power relations. Her ladder of citizen participation presents three categories each consisting of different levels: citizen power, tokenism and non-participation. Citizen power consists of citizen control as the strongest form of participation followed by delegated power and partnership. Tokenism consists of placation, consultation and informing while non-participation includes therapy and manipulation which appear at the bottom of the ladder.

'Informing' or tokenism involves one-way communication which allows little opportunity in decision making. Participation by consultation on the other hand involves seeking views of primary stakeholders to provide local answers but decision-making still lies with the external experts. Participation by collaboration or partnership is characterized by active involvement of project beneficiaries in joint discussion with the experts which leads to collective decision making on the problem. This level of participation is characterized by horizontal communication and capacity building among stakeholders. An advantage of this type of participation is that it has the potential of evolving into independence of primary stakeholders and eventual ownership of the project (Tufte &Mefalopulos, 2009). Citizen control is equivalent to empowerment participation- they are the highest form of participation

characterized by capabilities of the primary stakeholders, their willingness and taking full control of the development project (Tufte & Mefalopulos 2009; Arnstein, 1969).

The Declaration on the Right to Development (DRD) of 1986, considers active, free and meaningful participation as the most robust form of participation which goes beyond provision of information and consultation to authentic and empowered participation. Citizen participation of this nature utilizes mechanisms and strategies aimed at decision making on goals, policies, strategies and monitoring and evaluation. While the highest forms of participation may not be easy to achieve, participation by collaboration is the most agreed form since it facilitates peoples' initiative in discussion, conceptualization and planning, a process that results to ownership and sustainability of programmes (Carpentier, 2011; Tufte & Mefalopulos, 2009). Tufte and Mefalopulos (2009) also observe that collaborative participation has the capacity to evolve into independence form of participation. Environmental scholars promote collaborative and participatory approaches to environmental communication arguing that this brings different stakeholders together in environmental decision making leading to sustainability (Peeples & Depoe, 2014; Pezzullo & Cox, 2018; Senecea, 2004).

This study considers participatory communication as an avenue for collaboration where different stakeholder use dialogue to learn and reach a common understanding on how to realize social change. The objective of participatory communication approach to SSWM in this study is to promote community awareness, involve them in planning and making decisions about SSWM and empowering them so that they are able to participate in SSWM.

2.5. Dialogic Communication

The concept of dialogic communication has its roots in interactive models of communication whose main tenet is the exchange of sender receive roles where both the sender and receiver decode and encode information and give feedback in the process of communication. Dialogic communication is a contrast to one-way transmission of information; the latter is a linear process characterized by passivity of the receiver and focuses on informing; the former is a two-way exchange of information and meanings aimed at reaching collective understanding and building consensus. Dialogic communication is a collaborative process characterized by the exchange of knowledge and collective decision making which gives people voice and opportunity to be heard.

Based on his adult literacy programmes with peasants in Brazil, Freire argued that dialogic communication stimulates individuals to critically examine their situation; they begin to question rather than accept knowledge given to them. Freire used the term 'voice' to represent dialogue and proclaimed that subjugated people must be given voice to speak their minds their own way, a process that leads to critical consciousness and empowerment (Freire, 1993). He considers dialogue as

> "individual rights to exchange ideas, meanings and solutions to problems; it cannot be reduced to the act of one person "depositing" ideas in another nor can it become a simple exchange of ideas to be consumed by the discussants", rather individuals themselves must on their own give their views" (Freire, 1993 p.70).

According to Peeples and Depoe (2014), people must have a voice to speak about environmental matters and that lack of voice leads to death of the environment. They consider

voice as the process of giving an account of one's life and experiences and a chance to individually speak. In environmental communication, voice is access which includes the opportunity to be heard and actively speak about the environment, its challenges and solutions to those challenges. Voice include but not limited to collective talks, creating and sharing environmental news and stories in different platforms such as community meetings using indigenous folk media, mass media and social media platforms such as blogs(Cox, 2010; Pezzullo & Cox, 2018). Such communication that elicit dialogue about the environment constitutes dialogic communication. As noted earlier in this chapter, communication of SSWM requires effective communication between stakeholders; governments and communities. In order to realize this, the community should be involved in dialogic communication.

2.5.1 Community Involvement in Dialogic Communication of SSWM

Involvement in dialogic communication refers to giving opportunities for people to "name their world", a concept that when applied to communication for SSWM implies that people actively participate in discussions, planning and making decisions on SSSWM with an aim of understanding the nature of problems and coming up with solutions to SSWM. It involves their participation in identifying and defining the problem of solid waste management, prescribing solutions to the problem and making decisions on how to manage solid waste in their localities. This also ensures inclusion of the community and enhancing sustainability in SSWM.

Involvement of the community in dialogic communication is premised on the fact that solid waste affect not only individuals but the general community therefore there is need to involve

the community in finding solutions to SSWM. Pezzullo and Cox (2018) observe that people affected by environmental decisions have the right to be involved in the process of making such decisions. Further, Marshall and Farahbakhsh (2013) suggest that social interventions to solid waste management should incorporate increasing participation in decision making and inclusion of all stakeholders in planning, implementation and decision making processes while Tufte and Mefalopulos (2009) add that in defining the problem this way the communication strategy adopted takes a different pathway than if the solutions were suggested in a diffusion-oriented approach.

There are several advantages of community involvement in dialogic communication of SSWM. First, dialogic communication leads to individual development of critical consciousness so that people begin to realize the need to change their situation (Freire considers this the conscientization). Secondly, it leads to collaboration between stakeholders in finding solutions to local challenges, planning, making decisions and implementation of the solutions to the problems; and lastly, dialogic communication is a process towards transformation through empowerment of the people with knowledge and skills so that they are able to manage their own issues. Tufte and Mefalopulos (2009) posit that an advantage of empowerment participation is that it has the potential of evolving into independence of primary stakeholders and eventual ownership of development which leads to sustainability. Thus community involvement dialogic communication is an effective route to achieving SSWM.

Based on these advantages, community involvement in communication of environmental matters is highly institutionalized. Principle ten (10) of the Rio Declaration states that

> "Environmental issues are best handled with the participation of all concerned citizens, on a relevant level. On national basis, each individual should have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision making processes. …" (UN, 1992).

According to UNEP (2013) waste affects all sectors of the society thus sustainable solid waste management should have a multi-sectoral approach and ensure collaborating of all stakeholders; citizens, leaders, and governments; locally and nationally. Similarly, the National Environmental policy (2013) states that communities should be involved in the planning, implementation and decision making on environmental management.

In spite of the benefits of community participation in communication of SSWM, it has been noted that inappropriate structures may inhibit effective community participation in communication of SSWM. Scholars argue that formal consultation processes where invited citizens speak at public gatherings are ineffective forms of community participation (Phillips, 2011; Senecah, 2004; Walker, 2007). Cox (2010) opines that public sphere is often easily misunderstood as an official site for government decision-making; a monolithic collection of all citizens; and a form of rational or technical communication. He cautions that state sponsored spaces such as public hearings where citizens are invited to communicate about the environment do not exhaust public sphere. Public sphere exist in the public places such as markets where citizens gather every day to sell farm produce, tools, clothes and other items and also exchange ideas about life of the community. Effective discussions and debates about environmental concern often occur outside government meeting rooms and courts.

> A public sphere is not necessarily a monolithic nor a uniform assemblage of all citizens in the abstract but the real of influence created when individuals engage in discussions, it assumes more concrete forms such as calls to local talk radio show, letter to the editor, blogs and news conferences (Cox, 2010).

Ideally, communication for SSWM should be concerned with practical experiences and outcomes of participation instead of idealized processes or concepts. Cox (2010) notes that processes imposed from higher levels of governance may undermine environmental management initiatives by creating resistance and disempowerment at the local level.

There is also concern on the miniature form of peoples' involvement in communication which is partly contributed to by poor organizational structures, limited access and power structures within the community. For instance, it has been pointed out earlier that environmental policies on waste management emphasize collaboration of stakeholders and participation of communities in decision making do not provide structures on how to achieve this. Coupled with varied conceptualizations of the term 'participation', community involvement in decision making in SWM may remain laudable in policies but miniature in practice.

2.5.2 Dialogic Communication, Social norms and SSWM

The intricate nexus between the community and environment and other facets of life; social, economic, political and cultural and the interrelationship between nature; biotic and abiotic, and community life thrusts reason for community involvement in dialogic communication of SSWM. Community engagement in the discussions of how to manage solid waste provides opportunity to construct social norms that eventually guide how the community manage solid waste. Scholars have noted a close relationship between social norms and adoption of waste

management behaviour. According to the Socio-Cultural tradition, meanings derived from (of) communication arise from social interaction of people who engage in discourse and jointly construct their social realities (Mead, 1934) which implies that what SSWM mean to people and how they behave towards solid waste is socially constructed. This social construction of environmental social norms is also observed by Flor (2004) who posits that environmental consciousness is a "function of society's collective cosmology, worldviews and values" (p. 4). Miranda (2013) observes that environmental beliefs are attitudes themselves and they are related to patterns of life in the communities- the processes related to culture (social practices and lifestyles as guided by values) thus environmental behaviour is best understood by looking at social values, beliefs and attitudes. Pezullo and Cox (2018) on the other hand suggest that whereas beliefs do not have a direct influence on behavior, values and cultural norms have a direct role on behavior. Other scholars have also suggested that social norms and pressure from families, friends and neighbours influence recycling, reuse and source waste separation. For example, McAllister (2015) notes that people are more likely to participate in waste management activities such as recycling when they see other people around them doing the same. Besides, social pressure created by the community, family and friends can make individuals participate in environmentally sustainable activities so as to comply or conform to the social behavior.

In agreement with these arguments, this study observes that that social norms are generated through dialogic communication among members of a social system. As people discuss their views and experiences on SSWM which are guided by their beliefs, they come up with norms which eventually get adopted by the community. Therefore community involvement in

dialogic communication is one avenue that provides opportunities for the construction of social norms that guide and transforms behaviour towards SSWM.

2.5.3 Dialogic Communication, Empowerment and SSWM

Empowerment is a form of self-management whereby communities have the capabilities and willingness to take control of their own socio-development programmes. Tufte and Mefalopulos (2009) consider empowerment as self-management where local communities require limited assistance from development experts. According to Freire (1993), dialogic communication between local communities and experts and also among members of the community themselves provide opportunities where people can learn and empower themselves with knowledge on how to solve their problems.

Literature reviewed in this study shows that lack of responsibility among the public is a challenge to SWM. Solutions to this lies in peoples' empowerment - a process that begins with critical conscious raising where individuals first come to the realization that the situation requires change then they develop mechanisms of solving the problem. Kheerajit and Flor (2013) observe that critical understanding of mutual problem solving techniques enable people to acquire critical understanding of the problems and the action they need to take so as to solve it. Sharing of ideas, experiences, skills and knowledge on SSWM among the community creates opportunities for community empowerment. Besides, dialogic communication characterized by collaborative discussion with experts and capacity building enable people develop confidence that they are able to manage their own projects and solve their local problems. This study considers community empowerment as a critical requirement for SSWM because an empowered community are more likely able to take responsibility of

solid waste they generate. Communities thus should have access to opportunities for participation in communication.

2.6. Access to Media

Media as tools of communication are as old as human race, however since the NWICO agenda which opened a global debate on access to information by the South in the 1980s, communities especially those in developing nations have come a long way in pursuing access to media for information.

The term ‘access’ is applied in everyday usage to imply having opportunities to utilize something. Access to media implies much more than availability of media; the latter denotes the presence of media but if the community cannot use media (such as computer or mobile phones) for the purposes of communication this cannot be considered as access. According to Carpentier (2011), access implies the presence of both media technology and media content (media information). Community access to media used in communication of SSWM is twofold: It means ability to use the media to obtain information on SSWM which in turn creates awareness, improves understanding and equips people with knowledge and skills that empower them to sustainably manage solid waste. Secondly, access to media means the opportunities available to use the media to give feedback and necessitate collaboration and collective decision-making on SSWM among stakeholders.

The United Nations Education Scientific and Cultural Organization (UNESCO) points out that access, participation and self –management are key concepts in participatory communication. It defines access as

> "the opportunities available to the public to choose varied and relevant programmes and to have a means to transmit feedback and its reactions and demands to production organizations" (UNESCO quoted by Servaes & Malikhao, 2008 pg. 171).

Access to information is a major pillar in promoting free flow of information and public participation thus, it has been entrenched in both global and national policies. UNESCO, for example champions for protection and promotion of the right to access to information as a fundamental right and a key pillar for building inclusive knowledge societies. Principle 10 of the Rio Declaration champions for three fundamental rights: access to information, access to public participation and access to justice. It spells out that individuals must have access to information concerning the environment and the opportunity to participate in decision making processes (United Nations Conference on Environment and Development, 1992). Article ten (10) of the Stockholm Convention (2001) provides that the public should have access to information on persistent organic pollutants. Locally, the County governments Act (2012) requires counties to facilitate public communication and access to information on waste management while the NSSWM Policy (2019) and the SWM Policy (2019) also state that all sectors of society should have awareness, access to issues on waste generation and management and are able to participate in decision making and action at the local, county and national level.

Even though community access to information on waste management and participation in decision making on SWM is highly recognized in policies, inadequate information on how to manage solid waste including recycling and separation among the public remains a challenge (Guerrero et al, 2013; NEMA, 2015; Pinawala, 2016; Sinthumule & Mkumbuzi, 2019).

Community access to information and participation has been attributed to social-cultural, structural, institutional challenges and technological challenges. For instance, the current technological divide is not only witnessed between the rich nations and their developing counterparts but it also trickles down to their nationals as well such that citizens who have access to technologically advanced media have an upper hand in having access to both information and participation in the current techno informational society. But there is also a new turn in access to media for participation that emanate from pluralistic media environment and audience segmentation where people have access to different media at different times. This plurality is both a bane and a boon in the contexts of access to information and participation. Since communities are segmented audiences with people having access to different media at different times, access to information and participation can be skewed if medium used is accessible to only a few members of the community. On the flipside, the plurality presents multiple platforms for improved peoples' participation in communication. These new capabilities presents new challenges to participation which this study makes an attempt to provide a solution to.

Other social factors including gender, language and literacy levels impact access to information and participation. In many instances, women do not have equal access to resources such as media and technology as men, a factor that hinders their access to information and participation. In addition, social responsibilities like child bearing and household duties limit women from actively participating in decision making on issues of social development. White (I999) found that home-centered responsibilities that often conflict with women's ability to attend meetings affect their participation in agricultural trainings. Women also hesitated to speak in public meetings where men attend. Besides,

literacy levels play a significant role in access to media for participation since individuals with limited literacy capacity lack capabilities for meaningful participation. At the community levels, individuals with limited literacy capacities may lack not only information but also the right attitude and language to express themselves.

In addition, structural factors including organizational structures, government policies such as those that determine media licensing and free flow of information, media ownership and choice of media for communication and participation as determined by organizations holding information affect community access to information and participation . For instance, Ross, Clarke and Yukalang (2017) found that wrong choice of media for communication of SSWM hinder access to information about waste management among the public while Transparency International (2018) noted that participation of the community at the grassroots is skewed due to organizational structural powers.

Globally, community access to media has escalated especially since the rise of free flow of information, computerization of communication, introduction of new media and global recognition of the right to information. The widened media coverage, increase in media outlets including community and vernacular radio stations in Kenya and other African countries has not only improved community access to information but has also provided an alternative public sphere for community access and participation in social development. In Kenya, improved technology, network coverage and availability of mobile telephony has leapfrogged collaboration between communities and the government. The government of Kenya, through her digitized economic flagship aimed at devolving government services closer to the people, developed e-government services and 'Huduma' centers which enable Citizens access government information and give feedback using their mobile phones and internet services.

Therefore, one way of addressing impediments to access to media for community participation is to leverage on media plurality. Community radio (radio for the people and by the people) which in many instances broadcasts in local languages enable local communities to access information in local languages thus addressing barriers of language. Other than radio, mobile phones provide rich medium that enable people to access information and participate in communication in transcendence.

The foregoing section presents a review of different media used in the communication of SSWM and analysis of community access to these media.

2.6.1 Media used in Communication of SSWM

Media refers to tools and channels used to create, disseminate and store information. Media is broadly classified as print media, (newspapers, and magazines), broadcast or mass media (such as radio, TV) and folk or traditional media. Media can also be categorized as either old or new though the new forms of media are not new parse; they are basically old media in new forms. Old media which includes folk media, newspapers, radio, films and radio though not technologically advanced, allow exchanges between one-to-many while technologically advanced new media such as the internet, web 3.0 technologies, social media sites and mobile phones allow exchanges between one-to-one, one-to-many and many-to-many.

Media is also classified as mainstream and alternative media. Mainstream media is owned by the powerful bourgeois class who control resources. Due to their power, the bourgeois use the media for cultural domination and perpetuate political hegemony. The media sets their agenda upon which everyone operates. On the other hand, alternative media runs parallel to mainstream media by covering all that is not covered by the mainstream media. They also

offer voice to the less powerful in the society who use them to speak about social issues therefore alternative media try to break power imbalances in the society.

Different media can be used in different communication contexts depending on the objectives of the communication, target audience and the messages to be communicated. For example, in 2018 the World Habitat's campaign for 'waste wise cities' which aimed at awareness creation and change of public attitude towards solid waste management used multiple media channels including social media (Facebook, Twitter and You-tube), website, banners, caps and posters so as to reach as many segmented audience as possible. Whereas different media can be used in communication of SSWM, not all media can facilitate participatory communication. Effective community involvement in communication is determined by three factors: The media should be participatory; the community should have access to it and it should bear the right information. Ross, Clarke and Yukalang (2017) found that the use of inappropriate media which were ineffective in reaching households and residents to inform residents on how to manage their waste impacted negatively on waste management.

Tufte and Mefalopulos (2009) suggest that the choice of media in participatory communication should revolve around the following issues. Type of media (folk, mass media, new media); the level of media (from local to community based, national and transnational); institutional characteristics of media (public or private, national to community owned, free and independent to closely government controlled) and economic logic informing the media (commercial, non-profit or mixed). The key concern here should be whether the media environment can facilitate dialogue and participation and to what extent collaboration with the media will give voice and visibility to the communities involved.

These factors therefore inform the choice of media for community involvement in communication of SSWM.

2.6.2 Access to SSWM information in the Mass media

The mass media such as radio, print media and TV are useful in the communication of environmental management including SSWM due to its agenda setting role and the ability to diffuse information to a wide audience. Access to mass media has increased exponentially with improvement in technology. The BBC Media Action survey report indicates that 98% of Kenyan adults have access to radio, 81% have access to TV, 97% have access to mobile phone and another 51% have access to internet (BBC Media Action, 2018). The Media Council of Kenya (MCK) report (2019) indicates that 58% of Kenyan above 15years have access to T.V. whose consumption (65%) is higher in urban areas compared to rural areas with 54%. 74% of Kenyans above 15years have access to radio with a slightly higher proportion in rural areas at 76% and 71% in urban areas. Nyanza region has the second highest level of access to radio (78%) after Western region (79%). The report indicates that most Kenyans access radio via FM receivers and mobile phones.

The high access to mass media makes it suitable for communication of SSWM. However, studies show that the effectiveness of mass media in communication of solid waste management and promoting pro-environmental behaviour remains a challenge. A study on the role of radio in solid waste management showed that repeated coverage and campaign on the environmental issues on radio influences peoples' behaviors and attitudes towards waste management (Gabriel, 2015). Most studies however show contrary results. A study in Bangalore, India, found limited coverage of waste management by major TV stations thereby impacting negatively on public access to information and public awareness on solid waste

management (Lakshmikantha & Malur, 2014). These findings were found to be similar in Kenya where media coverage of environmental issues remains limited. A study on coverage of environmental issues by Kenyan T.V. found that environmental issues on TV remains very low as compared to other programs such as news, sports, politics and soap opera (Oting'a & Ngigi, 2018). Similarly, studies in Pakistan and India found that limited attention is given to environmental issues as compared to politics and other news (Koser, 2017). This limited coverage of SSWM by the mass media contributes to limited access to information on SSWM.

Regrettably, even where media sensitizations were satisfactory, behaviour towards solid waste management was not positive (Nunez & Moreno, 2016; Patrick, 2015; Obuah & Okon, 2017). The studies noted that the high level of awareness created using the mass media did not correspond to peoples' participation in waste management as individuals did not exhibit pro-environmental behavior towards waste management. Obuah and Okon (2017) conclude that the right attitude to waste management was a product of personal beliefs and values not media sensitizations.

Critics argue that political economic interests of the media, limited coverage of environmental issues, limited training among journalists and passive depiction of environmental issues in the mass media contribute to mass media's inability to influence pro-environmental behaviour (Koser, 2017; Lakshimantha, & Malur, 2014; Nunez &Moreno, 2016; Pezullo & Cox 2018). It has also been observed that journalese language and the event driven news coverage in mass media hamper access to complex environmental issues such as solid waste management. Pezzullo and Cox (2018) observe that

> "…many environmental news stories, like any other news stories present a snapshot, a specific moment or event, or action from a larger phenomenon" which makes many environmental phenomenon invisible (p. 115).

In Kenya, research shows that majority are not inspired to watch environmental shows due to complexity of language and issues being discussed and inconvenient timing of the shows (Otinga & Ngigi, 2018).

The mass media serves a critical role of setting agenda and creating awareness on pertinent issues affecting the society. However, communication for SSWM requires much more than awareness. SSWM requires an understanding of the nexus between nature and resources; waste reduction and recycling; effects of waste disposal and excess waste on the biosphere, health and sustainable development goals. Moreover people need to connect their waste management behaviour with environmental problems. Unfortunately understanding these complex environmental issues cannot be achieved by snapshots of news stories presented in news coverage. Flor (2004) posits that environmental consciousness is a "function of society's collective cosmology, worldviews and values" which can seldom be changed using T.V adverts, news release and posters- conventional promotional time-bound communication programmes. Therefore although there is high level of access to mass media in Kenya, overreliance on mass media for communication of SSWM may not provide the much needed solutions to SSWM.

2.6.3 Access to Participation in Communication of SSWM through Radio

In Kenya, radio has the highest level of public access as compared to other types of broadcast media According to MCK, most Kenyans listen to radio; only 16% do not listen to radio at all (MCK, 2019). Access to radio is high both in urban (94%) and rural (95%) areas. There

are different types of radio in Kenya: commercial radio and community radio. The Kenyan media market share is largely dominated by commercial radio with 93.7% listenership compared to Community radio stations with 0.7% listenership (BBC Media Action, 2018). Among the community radios, Ghetto FM has the highest national listenership of 38.3 % while Milambo and Onagi FMs, both based in Migori County, are ranked fifth (5.5%) and seventh(5.1%) respectively among community radio stations (CAK, n.d). The most listened to radio station in Kenya is radio Citizen (12%) followed by radio Jambo (10%). Both of these are commercial radio stations. Among the vernacular radio stations, radio Ramogi commands the third position nationally with 3% public access (MCK, 2021).

The high level of public access to radio in Kenya makes it appropriate for providing public access to information and participation in the communication of SSWM. This is because radio, especially participatory Community radio, is a two-way communicative medium which has more receptive capabilities among rural folk and gives listeners access to both information and means of informing. Community radio is that it is non-profit making, owned and controlled by the community, promotes community participation in development agenda of the community; it is oriented towards the community therefore lays emphasis on production of local content and promotes the participation of the community. It is radio for the people by the people. According to Ngugi and Kinyua (2014) community radio is a tool that should be used to educate, inform and entertain the community, controlled and owned by the community thus offers a valuable forum for communities to participate in communication of SSWM.

Often Community radio is mistaken for vernacular radio. Whereas the former is non-profit making, the latter is commercial, owned and managed by individual or corporates though with a target of a particular community whose vernacular the radio streams in. Vernacular radio broadcasts in indigenous language which is different from official or formal languages spoken in a country but this does not make it community radio therefore language used in radio is not a key defining facet for community radio but the agenda for which the radio is set. In Kenya, the first community radio was established in 1982 in Homa Bay and many others have been established thereafter including Mangelete FM, Koch FM, Pamoja FM, Shinyalu FM and Maendeleo FM which are owned and operated by the communities. On the other hand, vernacular radio such as Kameme FM, Radio Ramogi, Egesa FM, Radio Mayienga, Mulembe FM, and Inooro FM are commercially managed.

This high number of community and vernacular radio stations in Kenya, actually over ten, strategically positions radio as an effective media for community participation in the communication of SSWM. Literature shows that Participatory community radio has been effectively used in environmental initiatives across the globe including India, Latin America, Bangladesh, Nepal, Zimbabwe, Malawi and Tanzania. In Bangladesh for example, community radio were established in 2011 with an aim of institutionalizing community involvement in local government, capacity building to adapt to effects of climate change, achieve socio-economic and environmental sustainability, protecting local culture, identity and language (Sen, 2015 cited by Shahzala & Hassan, 2019). Radio Listening Clubs in Zimbabwe provides access to the rural communities and enable them share varied issues of concern to them. In Boukina Faso, community radio magazine programme enabled the local community to control soil degradation, deforestation and waster waste (Shahzala & Hassan,

2019). Through listening or call-ins on radio, members of the community understand each other's views, expectations and reactions about issues in discussion and such interactions shape their social norms.

However, in Kenya, a study on community radio programming in three radio stations in Migori County noted very limited community participation in radio programming and limited focus on important matters of the community such as peace and political violence which was a perennial election challenge in Migori County (Mac'Ouma, Kinya, Sangai & Oluoch, 2018). These findings put to question the theoretical and practical agenda of the studied community radio stations in relation to true meaning of Community radio.

As noted above, radio (especially community radio) is highly accessible by communities and has been effectively used to promote social change in agriculture, climate change and conservation of forests and natural resources; however, its use in promoting community participation in SSWM remains unknown in literature.

2.6.4 Access to Social Media

Kenya is considered as the Silicon Savannah due to its diverse use of social media technologies. It is a technology hub with 17% of its population having access to social media. In Sub-Saharan Africa it is ranked third after Egypt (42%) and South Africa (37%) (Mwaura, August 3rd 2020). Most Kenyans access various social media platforms for entertainment, education, social connections, and search for news content, exploration and sharing. A report by USIU Africa SIMElab (2019) indicates that the most widely accessed social media platforms are WhatsApp (88.6%) and Facebook (88.5%) while 51.2% use YouTube, beside

other forms of social media. The most active social media users in Kenya are aged 26-35 followed by those aged 21-25 most of whom are high school and college students.

Access to social media is higher among the urban populace than rural population basically due to differences in infrastructural and economic developments. The overall time spent on social media by Kenyans averages three hours per day which is higher than the global average of two hours twenty-four minutes (MCK, 2019). Urban Kenyans spend between two to three hours a day on social media unlike their rural counterparts who spend between one to two hours a day of their time on social media. Those in low middle income spend most of their time on social media than middle income and low income.

This high level of access to social media makes it very apt for community access to SSWM information and participation in communication of SSWM. However, literature shows that in Kenya, environmental issues have the least focus between 5-13% on social media as compared to news, social issues and entertainment. 90% of Kenyan digital consumers use it to access news which is higher than the global 82% (Mwaura, August 3rd 2020). Waititu (2021) found that respondents seldom used social media for addressing environmental concerns. Social media platform with the highest level of access is WhatsApp which is mainly used for interactions with family, friends and connection with other outside networks.

2.6.5. Access to Social Media for Participation in Communication of SSWM

Most studies show that social media influence is able to create change among individuals (Khan & DongPing, 2017; Young, Russell, Robinson & Barkemeyer, 2016) however,

research findings on social media effects on environmental awareness and management including solid waste management behaviour such as recycling and waste separation are not conclusive. Young, Russell, Robinson and Barkemeyer (2016) used control group to study change in peoples' behavior in prevention of food waste among two different groups and agreed that the participants engaged in the initiatives; however, social media, particularly Facebook, did not produce influence similar to face-to-face interaction. The study suggests that social media should be an information intervention since it does not display the elements of face -to-face influence. Though the conclusion was made on a comparative form, the study showed that participants made some initiative. Nonetheless, these two mediums are different and cannot produce the same effect.

In Bangalore, India, an online forum using Facebook to interact and get information from the public on solid waste management did not succeed due to lack of publicity of the website and immediate response by the corporation. In other studies, use of social media for consumer engagement showed that frequent posts by moderators on Facebook page leads to higher engagement (Khan & DongPing, 2017). Therefore from these two studies effective and proper public engagement and publicity can promote public participation on SWM. Kaur and Chahal (2018) found high exploration of environmental issues on social media among users and concluded that though social media does not guarantee pro-environmental behaviour, its competitive power in persuading people, user involvement and networking enable people to share concern on environmental issues.

Though little is known on the use of social media in promoting positive behaviour towards SSWM, findings from previous studies reflect some positivity on the use of social for

promoting community participation in communication of SSWM. The digital platforms allow customization of communication based on individual interests and needs allowing more opportunities for in-person engagement, especially in today's pluralistic media society. Coupled with its user generated content abilities, high accessibility necessitated by availability of smartphones and affordances of the internet, social media is well suited for content creation, dissemination and networking among community of groups thus can be used to facilitate participatory communication in SSWM.

2.6.6. Access to Public Meetings

Public hearings are face-to-face meetings which have their roots in indigenous communication. Public hearings held at the community level provide opportunity for involvement of the local community in environmental matters due to their accessibility. However, effective community involvement in public hearings is hampered by limited community access, lack of representation, and power play. Personal commitments at work and other duties such as personal businesses and child bearing also limit people from access to public hearings (Pezzullo & Cox, 2018). A study in Sri Lanka found low attendance of CBO meetings by community members who felt that they are busy hustling for money (Sinthumule & Mkumbuzi, 2019).

According to Cox (2010), use of stakeholder meetings in solving environmental conflicts may not be effective since sometimes stakeholders are unrepresentative of the wider community. It is also not easy to determine who is a stakeholder and who should set environmental policy. Besides, citizens' committees may lack authority to implement their decisions which may be overridden by government agencies thus compromising the latter's

efforts. Further, communication in public meetings may be affected by feelings of apprehension to speak in front of large groups to unfamiliar officials by citizens (Pezzullo & Cox, 2018). Cox (2010) cautions that the use public meetings for public participation in environmental issues is ineffective since those meetings do not constitute the public sphere. Besides, state meetings where community are invited to listen to a guest speaker makes environmental issues more abstract.

Servaes et al, (1996) suggests that since communities are heterogeneous, group meetings should not be all inclusive but segmentation of small homogenous groups so as to maximize participation. Emphasis is also put on venue for meetings and language use. In order to maximize participation, meetings should be conducted a venue most appropriate with their lifestyle and in the language of the people.

Despite these challenges, face-to-face meetings present valuable forums for community participation in communication for SSWM if effectively organized. With advancement in technology, it is possible to leverage on web 3.0 technologies to complement face-to-face meetings so as to offer solutions to challenges of access. This is possible especially when face-to-face meetings are streamed live to enable those unable to reach venues for meetings to participate. Besides, people can use social media platforms such as You-tube and WhatsApp to share views presented during meetings on how to manage solid waste.

In conclusion, literature reviewed here shows high level of access to mass media(especially radio) and social media (the highest being WhatsApp, particularly among the youth); however, there is limited coverage of information on SWM by both mass and social media which compromises access to information and participation in communication SWM. Community radio exist but their use in participatory communication for SWM remains

unknown in literature. Face-to-face forum such as public hearings face challenges of poor attendance, poor representation and power play which hampers access to effective community participation. The challenge therefore lies on whether to use mass media, social media, commercial or community radio or face-to -face communication for community participation in communication of SSWM for which this study is set out to determine.

Tufte and Mefalopulos (2009) suggest that the choice of media should revolve around certain pertinent issues, key concern placed on whether the media environment can facilitate dialogue and participation and to what extent collaboration with the media will give voice and visibility to the communities involved. These issues include:

i. Type of media (folk, mass media, new media).
ii. The level of media (from local to community based, national and transnational)
iii. Institutional characteristics of media (public or private, national to community owned, free and independent to closely government controlled) and
iv. Economic logic informing the media (commercial, non-profit or mixed).

Servaes & Malikhao (2008) observes that modern mass media and folk media are not mutually exclusive by definition. They are more effective if they are appropriately used in an integrated fashion, according to the needs and constraints of the local context. Flor (2004) adds that environmental communication planners should take note of the prevailing communication structures so as to build sound working strategies. These should not be limited to mainstream media but should explore other interpersonal and alternative channels as well" (p. 26).

In reference to the problem statement in chapter one of this thesis and literature reviewed in the section, it is evident that several media are accessible to the community, however their use in facilitating community participation in communication of SSWM remains limited in literature, a task that this study is set out to investigate. Secondly due to the variations in accessibility to different media by different groups in the community, planning for participatory communication requires careful analysis of media accessible to different groups to avoid social exclusion since certain individuals within the community may not have access to all the media.

2.7 Strategic Messages Communicated for SSWM

One of the challenges to SSWM pointed out earlier in this study is lack of information on how to manage solid waste among the public which raises concerns on the messages that are communicated for SSWM. A message is the symbolic content of communication and a critical element of the communication process. It can be describes as an idea or thought expressed using symbols such as words, phrases, pictures and signs.

The term strategy on the other hand has varied meanings; it generally refers to a plan, tactic or techniques used to achieve an objective. In this study, the word strategic is borrowed from the field of strategic communication. According to Holtzhausen and Zerfass (2013) strategic communication is an exercise that involves deliberate and purposive communication to reach set goals. It involves processes of planning communication objectives and activities, formulation of specific messages for specific audiences and applying the right communication tools such as media in order to achieve a specific communication objective. A strategic message should have a significant bearing on the audience. Because of this,

strategic messages are carefully formulated to purposefully achieve the desired communication outcome.

Considering the ever increasing contribution of poor solid waste management on the environmental and SDGs, messages used in SSWM should be strategic if desired outcomes are to be achieved. People need to connect their behaviour to these environmental challenges so that they take necessary action to avert the serious environmental challenges. Therefore messages targeting environmental action should not only create awareness but most importantly have a substantial impact on the audience.

As pointed out earlier, EC plays two significant roles: pragmatic which is concerned with awareness creation and constitutive functions which include verbal modes of communication such as spoken messages and songs, and non-verbal modes of communication including symbols, pictures, signs, words and messages. Strategic messages communicated for SSWM should therefore revolve around these two functions. Pezullo and Cox (2018) observe that a message can address the attitude-behaviour gap if the message refers to an important value that the audience perceive as threatened such as their health or a natural resource. They also add that messages related to peoples' values are more strategic in influencing environmental behaviour of an environmental campaign. Since values and behaviour are closely connected, messages that touch on peoples' values are more likely to impact behaviour. Therefore strategic messages should be communicated using symbols that are related to peoples' values.

In addition, values are products of culture and messages use symbols whose meanings are culturally co-constructed and assigned. This implies that symbols used in construction of

strategic messages should be culturally relevant if the desired outcome is to be realized. The co-creation and exchange of these meanings is realized in a public sphere which Castells refers to as

> "forum for societal interaction where "meaningful interaction; ideas and values are formed, conveyed, supported and restricted; a space that ultimately becomes training ground for action and reaction"(p. 9) (Castells, 2009 cited by Harris, 2017).

Strategic messages for SSWM should be constructed with the involvement of the community in forums or sphere which promotes the incorporation of symbols and signs derived from indigenous knowledge. According to the World Commission on Environment and Development (WCED), local communities are the repositories of wide accumulation of traditional knowledge and experiences that connect humanity with ancient origins (WECD, 1987) thus, environmental communication should incorporate indigenous knowledge so as to create an impact on the people. The World Commission on Culture and Development, on the other hand, emphasizes the place of culture in promoting development and suggests that development should incorporate peoples' culture for 'development divorced from its human or cultural context is growth without a soul'(Servaes, 2013 p.7). Both of these propositions depict that culture (and traditional knowledge) and messages (symbols and their meanings) used in the communication of environmental matters are closely linked; therefore; environmental communication messages are more strategic if they incorporate a peoples' culture and values.

The Convention for Biodiversity (CBD) further acknowledges that the practice of indigenous knowledge transcends all human activities including solid waste management (Kosoe, Diawuo & Osumanu, 2019) therefore messages communicated for SWM should incorporate

indigenous knowledge of the people. When communities participate in communication of environmental matters, they can become sources of knowledge that is communicated and also facilitate the contextualization of symbols used in the communication which in turn make the messages more impactful. Hynes and Tanner (2015) found that involving communities in production of media messages heighten their understanding of salient issues about the problem.

One of the strategies of SSWM which is a critical to effective recycling is solid waste separation. Waste separation, is conventionally communicated using strategies of colour codes whereby green, blue and yellow colours are used to symbolize biodegradable, non-biodegradable and paper and glass waste respectively. However, research shows that factors such as perceptions of colour and wrong interpretation of the meanings attached to the colours used to identify different types of waste can hamper solid waste separation even when separate bins are provided.

There is an assumption that conventionally used colour codes such as green, yellow and blue strategically communicate waste separation among all solid waste generators. However, meanings of colours are socially and culturally assigned and it is not uncommon to find contrasting meanings assigned to same colours depending on an individual's socialization and cultural background. For example genetics play a role in colour identification between males and females. Therefore universal use of green, blue and yellow colour codes as a strategy for waste separation may not elicit the desired outcome. In Kisumu City for example, though separate bins for different types of waste were provided, Sibanda, Obange and Awuor (2017) found that waste was mixed in all the bins and during collection to the dumpsite. In another study, Leeabai, et al., (2021) found that individuals failed to notice bins with colours

they least prefer. In Sri Lanka, though the Municipal Council gave bags to household for waste separation, some householders did not use the bags since they felt they were not suitable; some ended buying their own baskets for waste and thus stopped to separate waste (Pinawala, 2016). These findings puts to question the use of colour codes as a strategy for communicating waste separation and raise concerns on the need to strategically communicate waste separation.

The study in Sri Lanka also found that 68% of people were not adequately informed about the implications of combining waste and benefits of waste separation at source. In Kenya, although 50% - 80% of MSW produced is recyclable but this is minimally done due to inadequate public awareness on recycling (NEMA, 2015).

These findings reveal the gaps in strategic messages communicated for SWM which this study intends to fill. Most studies have focused on awareness creation (Ferdinand & Patrick, 2015; Obuah & Okun, 2013; Otinga & Ngigi, 2014) but little is known on strategic messages communicated to impact SSWM behaviour. Obuah and Okon (2013) studied communication strategy of the RIWAMA and looked at clarity of messages communicated for waste management based on language used against the audience. This study assessed strategic messages communicated for SSWM so as to ascertain how this impact community knowledge of SSWM.

2.8 The Concept of Community

The term ‘community’ has been used differently in different contexts to refer to locality or group of people. It derives its etymology from Latin root word ‘communist’ which means common. Using geographical perspectives, community is defined by geographical location

such as town or urban, rural or county. Sociological perspectives define community using social aspects such as religion, economics, and interests. Using this perspective we can identify religious and professional communities, and community of traders, farmers, or students. Archeologists define community using geographical and sociological perspective and say it is a group of people living closely and socially interact while Ecologists define community based on interactions between and among populations and say it is a grouping of people interacting with one another. The geographical and sociological perspectives are not mutually exclusive; within some macro geographic location there are micro-communities such as clans, religious groups or family. Besides there exists socially constructed communities devoid of physical locations therefore, in conceptualizing community, both geographical and sociological perspectives suffice.

2.8.1 Community Communication Networks

The term 'community' and communication have the same etymology – 'to share' or 'make common'. While the former refers to a group of people who interact with each other, the latter enables interaction among the group. Communication creates linkages in the communities and enable them perform different functions including creation of meanings, working together, and building relationships - to have a sense of belonging –all these lead to sustenance of the community. Thus communities cannot exist without communication. For instance, virtual and global communities are created by communication networks and they exist devoid of geographical and time boundaries. Schuler (1996) says that interactions and relationships (resulting from communication) help create strong and vital communities. Servaes (2008) notes that a defining feature of community is the direct and frequent contact between the members and the feeling of belonging and sharing.

Networks are systems of interrelated people. They identify and describe communication relations and activities such as obtaining and providing information, and collaboration. According to Manuel Castells, networks are emergent structures made up of interconnected nodes. They are open structures which are able to expand without limits, integrating new nodes (Castells, 1996). In this sense, networks are not static but adjust to dynamisms in the social systems. For example, emergent networks in the 21st century are products of adjustments in the use of communication technologies such as mobile phones and social media.

Community communication networks can be described as patterns of communication and relationships among people which describe how people in a community obtain and give information and how news travel including ways through which communities address social problems. Schuler (1996) observes that with advancement in technology, community networks are revitalized and expanded to enable communities address their social problems in a more efficient way.

The goals of community networks are building community awareness, encouraging involvement in decision making and empowerment through the creation of socio-economic opportunities. These goals are achieved by facilitating exchange of information between individuals in the community and micro communities. Community networks also provide opportunities for interactions between members through discussion forums on several topics of interest to the society. Schuler, (1996) observes that 'culture is an invisible force that help to sustain the community and that strong citizen participation from all sectors of the

community is more likely to result to better and more creative approaches to community problems than those approaches that attempt without such participation'(p. 19).

Advancement of technology and availability of internet services improves access to information and on-line discussions within community networks which immensely increases community participation in community affairs. The foregoing section presents a review of different communication networks within the community.

2.8.2 Formal and Informal Communication Networks

Informal communication networks describe unofficial communication interaction between members of a social system. They are characterized by interactive and all-channel network with a unidirectional flow of information (upward, downward, and horizontal) among members of the social group. At the community levels, informal networks include interpersonal communication in settings such as markets, families, funerals, festivals and other social gatherings. Traditionally, informal communication networks formed the cornerstone of indigenous African communication characterised by folk media, storytelling, drama, songs, face-to-face and interpersonal channels of communication.

Formal communication networks on the other hand, are based on classical structures of organizational communication informed by theories of Scientific Management by Fredrick Taylor and bureaucratic management by Max Weber (1864-1920) in the 1920s which emphasized scalar chain and bureaucratic rules, order and maintenance of structures characterized by top down communication flow. These networks apply linear models of communication depicted as S-M-C-R (source- sender- message- receiver) thus not participatory.

Formal communication networks are utilized by public and private institutions such as governments, and government institutions world over in the communication of public service delivery and implementation of government programmes and policies on education, health, economic and rural development. They are also used by formal religious, political organizations, and administrative units such as kingship, chiefdom and provincial administrations.

In Kenya, formal communication networks used by the national government and the provincial administration is hierarchically organized from the national government, devolved through the regional government, county government, to the grassroot levels, using chiefs and clan elders, down to the community level and vice versa. Communication flow at the grassroot level is facilitated by community leaders, and gatekeepers such as chiefs, and clan elders who ensure government information reaches members of the community. *Baraza*, a semi-formal open air meeting regularly convened by area chiefs, is used to discuss local issues and promote national agenda and policies at the local community level. *Baraza* (a Kiswahili word) originated from the colonial administration and has been used in the rural for decades. However popularity of *Baraza* is waning and majority of Kenyans rarely attend *Baraza* meetings.

A study on participatory communication strategies for enhancement of development in Kenya found that majority of the community members did not attend *Baraza*; consequently, only 35% of community members obtained information about CDF in *Baraza*. The study which was done in Migori County concluded that due to its historical background and administrative nature, *Baraza* was ineffective in facilitating community participation in CDF development programmes (Akong'o & Oluoch, 2017). Unlike informal communication

networks which are highly participatory, formal communication networks are non-participatory.

Local communities have different approaches to finding solutions to local problems. For example, while some techniques of SWM may be accepted in some communities, the same may not apply to all communities due to different values and social norms. In addition, some communities are technologically advanced in communication while others are not. Such communities utilize informal communication networks maximizing on the use of dialogic communication. For example Papua New Guinea, a developing country in Africa is still based on oral communication practices that have existed since traditional times.

> "Most activities in rural areas involving the public are conducted verbally with the public participating after listening to and observing demonstrations. Such practices have their origin in indigenous communication and have existed since traditional times (Panta, 2014, p. 7).

2.8.3 Digital Communication Networks

Digital communication networks evolved with improved technology in the 21st century.The rise of social media platforms like WhatsApp, Facebook, You tube, twitter and LinkedIn have led to the creation of virtual community networks and reshaped communication networks more than ever before.

Digital networks eliminate geospatial communication barriers, provide opportunities for generation and sharing of user generated content, and facilitate interactive communication between one-to-many and many-to-many in a way similar to but more sophisticated than the indigenous communication networks. Social networking sites such as blogs, twitter and instant messaging facilitate networking at all levels in the community. One advantage of new

technology is its ability to facilitate dialogic communication in transcendence therefore when used together with traditional communication networks, they complement each other and revitalize participatory communication. The main challenge facing the use of digital channels currently is high costs of digital connectivity and limited access to technology especially among the rural poor and in semi urban areas where majority have no access to smartphones and computers.

In the contexts of community networks, digital technology has had two effects; convergence and divergence. Different traditional media have converged; sound (radio) and pictures (film) into T.V; and sound (radio), picture (film/T.V) and print converging into computer which has now reshaped all aspects of life. Convergence of the media has consequently led to convergence of communities where one type of media brings all the dimensions of communication under one roof. People from different places listen to radio, watch T.V and also read newspaper at the same time– all these from a computer- forming a community of online viewers. Ironically, convergence contributes to audience segmentation and divergence in the community. Communities experience both 'uncommonness' and commonness in equal measure. Monge and Contractor (2003) observe that the challenge is whether to substitute digital media for the old media, to enlarge or supplement communication networks or reconfigure communication networks.

2.8.4 Hybridized Communication Networks

Communication networks in the community no longer rely on the conventional formal channels of communication such as community gatekeepers and mass media but on a combination of formal and informal channels. The use of formal communication channels such as emails and websites alongside informal channels such as social media networks has

changed the flow of communication from top-down or bottom-up to an all-channel flow of communication characterized by bottom-up, up-bottom, diagonal, and all-channel in a hybridized network as represented in figure 2.1 below.

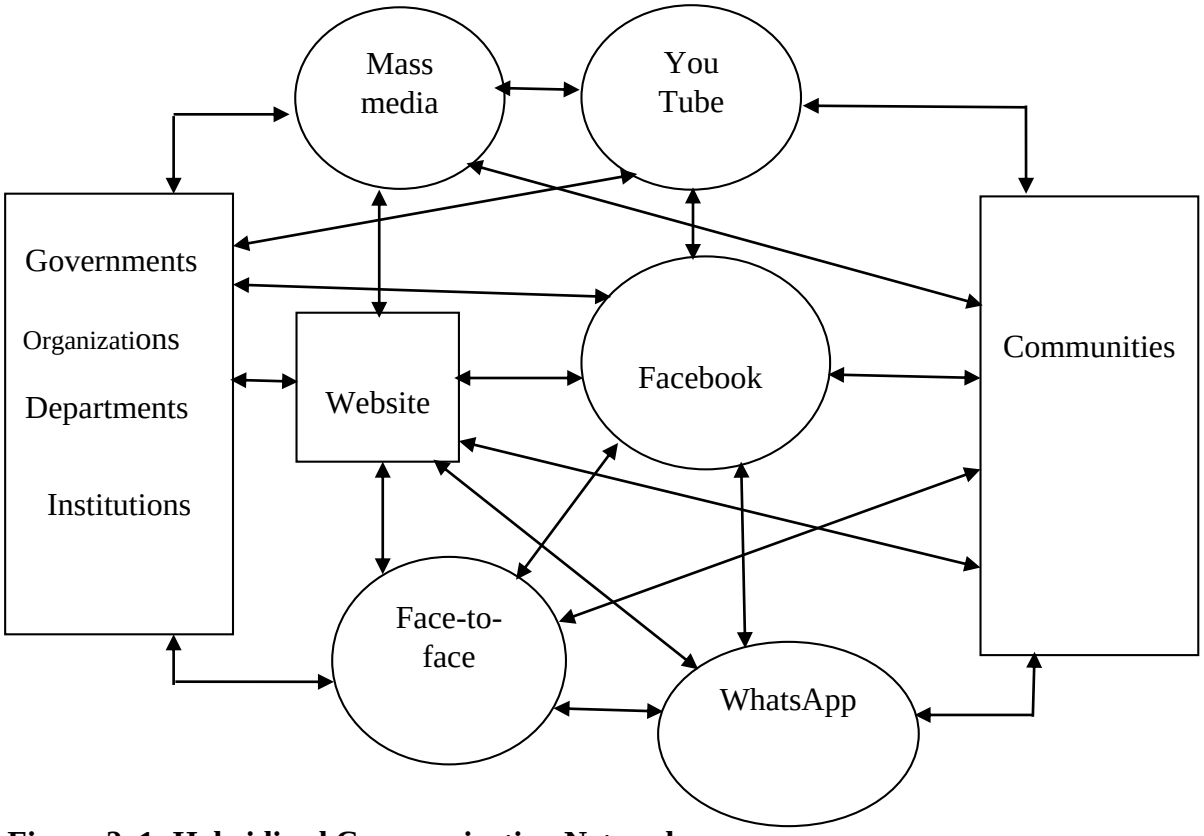

Figure 2. 1: Hybridized Communication Network
(Source: Researcher, 2021)

The emergence of hybridized communication networks presents challenges coupled with innumerable benefits for grassroot participation. Shailashree (2019) observes that enhanced need for rural development requires an appropriate communication infrastructure at the grassroot level. She adds that

> "There has to be a system of communication at the block-level built around inter-personal communication sources, traditional folk media, modern mass media, new

> information and communication technologies, social media, extension communication media and multi-media applications to make grassroots development process more meaningful and participatory." (Shailashree, 2019 p. 27).

For Flor (2004), both horizontal and vertical communication are needed in environmental communication; vertical in disseminating information about environmental concerns and horizontal in engendering dialogue where participants listen to each other, share opinions and debate with an aim of finding solutions. Shailashree (2019) adds that the mass media should be supported by audio-visuals aids, folk media, new communication technologies, social media and locally available inter-personal channels.

2.8.5 Communication Networks for Participatory Communication in Kenya

Community participation is highly institutionalized in Kenya. It is the cornerstone of devolution and recognized both at the national and county levels (Constitution of Kenya fourth Schedule, part 2(14); County governments Act, 2012). The County governments Act (2012) and the Urban Areas and Cities Act (2011) recommend that county governments establish structures for citizen participation including ICT based platforms, such as websites, town hall meetings, citizen fora as avenues for the participation of peoples' representatives, and residents in the management of the urban areas and cities' affairs.

Participation in communication in these fora has not been effective due to several challenges. Literature shows that in many instances those who attend town hall meetings are not representatives of the community. The institute of Economic Affairs (IEA) in a study of public participation in four counties in Kenya- Isiolo, Kisumu, Makueni and Turkana Counties- noted that in some cases though citizens attend public forum on development

projects, mobilization of citizens to participate in meetings was bias against those who hold contrary opinions; while in some cases, citizens who attend meetings are presented with a list of proposals to support without giving their own opinions (Institute of Economic Affairs cited by Transparency International, 2018). Due to these complexities the use of formal communication structures alone may be ineffective in facilitating participatory communication of SSWM. Environmental policies (NSWM Strategy (2015); NSSWM Policy (2019); SWM Policy (2019) recognize community participation in decision making of environmental matters; however, these policies do not provide mechanisms for community participation in environmental decision making at the grassroot level., community participation in communication of SSWM should strive to ensure access to opportunities for participation in communication by the heterogeneous groups in the community, a task that mainly informed the basis of this study.

2.9. A global Review of Communication Approaches used in SSWM

Global and national policies on waste management recognize the importance of communication in solid waste management. The Rio Declaration states that individuals should have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision making processes. The European Commission Circular economy Action plan emphasize implementation of a coordinated knowledge sharing and education initiative on waste hierarchy and circular economy. The role of communication is to create awareness, facilitate understanding of how to manage solid waste, and promote collaboration between solid waste generators, bodies in charge of solid waste management and local communities.

Most developed nations have incorporated Education and awareness in legislation, waste management strategies and in policies. Education and awareness campaigns are done using a mixed approach involving multi-stakeholders including Schools, Universities, NGOs, and municipalities and at the community level, face-to-face communication, books, pamphlets and the internet. The United States Environmental Protection Agency (USEPA) and Environmental Protection Authority of South Australia (EPASA) use internet to create awareness on solid waste management systems and its practical applications. The internet targets individuals, schools, households, different workplaces and the general public. In South Australia, NGOs partner with schools to teach students about waste management using face –to-face mode of communication. The local government also plays a role of education and awareness creation besides maintaining litter infrastructure. The waste management policy emphasizes a multi-stakeholder approach towards achieving a circular economy.

In Sweden, school education is considered as one of the methods of initiating pro-waste management culture. Concepts of waste management; reuse, recycling, composting and other techniques used in waste management are incorporated in the school curricular so that children are engaged in environmental education early in life. The children are believed to have the ability of changing their parents' behaviour when they talk about proper waste management at home. The Swedish government also organize direct interaction of the community with waste recycling plants as a way of increasing awareness and influencing peoples' attitude towards waste management (Stavchuk, 2005).

In India, Government initiatives towards waste management have not been sustainable. The use of public online forum website to interact with the public in Bangalore failed due to lack of publicity. Though T.V in India has the potential of creating awareness, it has not been effectively used. Major TV channels do not produce programmes on waste management during prime time; but focus on political and crime news. Awareness level on waste management among the public is low and poor waste management is rampant in Bangalore (Lakshmikantha & Malur, 2014). Though the government has failed in its communication efforts, NGOs like Greenpeace India play a significant role in waste management including carrying out education.

In Papua New Guinea, a developing country, awareness and education on waste management is the mandate of the municipal council which is the main body in charge of waste. The council uses radio and loud speakers to inform people to avoid littering and use dustbins. Public health officers also create awareness during the times they offer treatment services to the people (Panta, 2014). Despite these, a study on waste management in Goroka town, Papua New Guinea found "little or no awareness conducted by the council for the public to manage the solid waste in the town" (Panta, 2014 p. 283). Communication targeting the public was found to be random, uncoordinated and lacks continuity making it difficult for the message to reach most members of the public, thus unable to change public attitude and behaviour. Communication through radio and loudspeakers was thus ineffective in creating awareness and influencing behaviour change. Other stakeholders such as schools, non-governmental organizations such as the church community, youth and women groups communicate about waste management though this was found to be very minimal and uncoordinated focus mainly being on litter prevention (Panta, 2014).

In cities like Dar-es Salaam (Tanzania) Jarkata (Indonesia) and Bulawayo (Zimbabwe), awareness on issues of waste management done by Community Based Organizations (CBOs) contracted to manage solid waste are uncoordinated and resulted to very minimal positive results. In Nigeria, the Rivers State Waste Management Agency (RIWAMA), a statutory agency of the government mandated with waste management mostly uses radio and TV to create awareness among the public which have found to bear limited results on pro-waste management behavior. Interpersonal communication channels, billboards and print media such as magazines, newspapers and are not utilized (Obuah & Okun, 2017).

In Kenya, communication for solid waste management is documented in policies such as National Waste Management Strategy and the National Environmental policy (2013). The National environmental policy (2019) intends to establish an educational curriculum on environmental education to be taught and examined across all levels of education from primary to tertiary level. Non-state actors and CBOs engage in waste management such as collection and waste recovery for monetary purposes; however, little is known of their role in communication of SSWM. Awareness and education on waste management using mass media in Kenya has been found to be limited resulting to lack of knowledge on waste management practices and poor waste management among the Kenyan public (Aurah, 2017; Ndwiga et al., 2019; NEMA, 2015).

In conclusion, the reviewed literature shows that communication for SSWM remains a global challenge. Some countries have developed a multi-sectoral approach to communication for solid waste management including incorporating education of waste management in the in school curriculum. Though awareness on waste management remains a major challenge in

developing countries, governments and municipalities have not accorded communication for SSWM the attention it deserves. Efforts by CBOs and non-state actors to create awareness on SSWM have equally not been streamlined. This has resulted to an uncoordinated and haphazard communication for SWM which has borne very limited effect on behaviour change. Creation of awareness through the mass media remains the commonest approach to communication for SWM. However, the mass media's coverage of solid waste management remains limited and it has not achieved the desired results both in awareness creation and in promoting positive behaviour change. The use of internet in communication for SWM has been adopted by some developed countries like Australia; however there is limited evidence in literature on the use of internet in communication of SWM in Africa. Nevertheless, with technological advancements in the 21st century, municipalities in Africa can leverage on communication technologies to advance communication for SSWM.

Governments from both developed and developing countries highly recommended collaboration between governments and citizens and public participation in planning and decision making on SWM so as to achieve sustainability; however, in many instances communication is limited, not structured and uncoordinated resulting to lack of peoples' involvement in discussions, planning and decision making on SSWM.

2.10 Summary and Gaps in Literature

Communication for SSWM as currently practiced face a myriad of challenges. Focus has been put on awareness creation using the mass media which diffuses information to the public using top-down communication approaches. These approaches focus on individualized awareness and lack participatory structures. Little has been done to promote the development

of critical consciousness and collective planning and decision making much needed in SSWM. Previous studies show that high level of awareness through the mass media does not translate to pro-waste management behaviour. literature also show that inadequate knowledge among the public on sustainable waste management practices (3R) such as recycling and waste separation remains a challenge in many countries (NEMA, 2015; Okalebo et al, 2014; Pinawala, 2016; Sibanda et al., 2017). Other than awareness, scholars have noted that involvement, and social norms affect waste management behaviour. Nevertheless, limited research has been done on community involvement in communication of SWM.

In addition, collaboration between governments and communities in SWM has been highly documented in policies yet little is known on communication structures for community participation in communication of SSWM. As a result, communication of SSWM is haphazardly done and community involvement in communication of SSWM is unstructured and uncoordinated.

2.11 Theoretical Framework

Several theories have been used in the field of communication for social change. Some theories view social change as a process of transformation which can be achieved through transmission of information while other theories view communication for social change a collaborative process between change agents and change targets. The latter involves active involvement of targets of change in the process of social transformation while the former view them as passive recipients of knowledge for social change. This binary conception of social change led to the contestation between modernization and participatory paradigms, the former being pro-diffusion while the latter participatory. Similarly, communication for solid

waste management has been conceived by two contrasting theories. The following section presents a discussion on diffusion and participatory communication theories and their application to SSWM.

2.11.1 Diffusion of Innovation Theory

Diffusion of Innovation theory postulates that new ideas (innovation) are communicated through certain communication channels leading to social change (Rodgers, 2003).The theory takes the position that innovation creates uncertainty and diffusion of information reduces uncertainty thus social change can be achieved through diffusion of new ideas into the social system. This theory has been extensively applied in many studies including communication for SWM through the use of mass media.

DoI follows in the on the argument of Hypodermic needle theory that the mass media has powerful effects on mass audiences. It therefore uses mass media in 'diffusing' innovation for social change. However, researches on media influence on audiences such as the Two-Step flow by Lazarsfeld and Katz (1944) and Uses and Gratification theory by Katz (1974) debunked the magic bullet theory for being too simplistic in explaining effects of the mass media on audiences' behaviour. They argued that mass audiences are not passive as had been postulated by Hypodermic needle theory but active consumers who actively select media content and what to do with it (McQuail, 2005). Therefore an assumption that innovation diffused through mass media will have mass influence was not sustainable.

This argument is supported by studies on communication for SWM which applied Diffusion of Innovation theory and found that high levels of awareness created by high levels of media coverage of waste management does not translate to positive behavior towards solid waste

management (Gabriel, 2015; Nunez & Moreno, 2016; Patrick & Ferdinard, 2014). This gap can be attributed to several weaknesses of this theory. DoI assumes that innovation is diffused and adopted by all members of a social system yet the reality is that lack of compatibility between an invention and existing beliefs and values of the social system may hamper diffusion of innovation (Rodgers, 1995). Secondly, diffusion of innovation takes a non-participatory approach to communication and focuses on uncertainty reduction. Primarily, communication using this theory is non-participatory, lacks feedback and the audience remain passive receivers of information. Based on these explanations, diffusion of innovation theory is useful in creating awareness on SSWM however since studies have shown that awareness alone is insufficient in transforming peoples' behaviour towards SSWM, DoI may not sufficiently address social change in SSWM.

2.11.2 Participatory Communication Theory

Participatory Communication theory has its roots in the Critical Pedagogy of the Oppressed by Brazilian adult educator Paulo Freire whose seminal work in adult literacy campaigns among landless peasants in Northern Brazil empowered them to liberate themselves for a better life (Freire, 1970). Freire used teaching-learning analogy in his pedagogy of the oppressed and equated one-way communication to the 'banking processes' where the teacher banks contents to a student who in-turn gets 'filled' with the content that is alien of his existential experiences. Education is this case is a depositing or banking process where the teacher is the depositor and the student the container; a scenario which leads to less development of critical consciousness, lack of creativity, knowledge and transformation.

According to Freire, knowledge emerges only through "invention and re-invention, through continuing hopeful inquiry human beings pursue in the world, with the world and with each

other' (Freire, 1996 pg. 53), he therefore proposed a theory that explains the relationship between dialogue, development of critical consciousness and empowerment. Participatory Communication theory holds the view that dialogic communication raises peoples' critical consciousness leading to empowerment that enables them transform their situation.

The main tenet of this theory is that active involvement in dialogic communication leads to development of critical consciousness leading to empowerment. According to this theory, dialogue is a way of naming the world and an avenue to critical consciousness of problems; it leads to creativity, transformation and emancipation (empowerment). For Freire, dialogue cannot be reduced to the act of one person "depositing" ideas in another nor can it become a simple exchange of ideas to be consumed by the discussants"(Freire, 1993 p.70) rather, dialogue is an individual's rights to exchange ideas, meanings and solutions to problems that affect them. He observes that when individuals jointly speak their own minds about their problems, it raises their consciousness whence they consciously become critical of their own situations leading to emancipation about the problem in a process he terms as 'conscientization'. Thus, development should take a liberating approach devoid of dichotomy between the subject and the object and combined with reflection towards the problem resulting to conscientization – a heightened moral awareness (Freire, 1970).

This theory also proposes that individuals must have access to opportunity for participation in order to transform their world. Freire refers to this access as the *'Voice'* - opportunity for one to speak their minds their own way (Freire, 1970). Access is critical for participation since it gives people opportunity to speak their voice and be involved in decision making processes. Access to information is also a human and constitutional right.

Participatory Communication also incorporates interpersonal communication. In Freire's concept, the teacher and the student engage in a process that influences both the teacher's and the student's understanding. He argues that both the teacher and the student learn from each other unlike in the banking process where the teacher knows all while the student knows nothing. The input of this is that people have some knowledge, especially about their own existence which must not be assumed by the change agent in order for positive transformation to take place. This is the ultimate reasons for involving people so that they actively participate in their own transformation.

This theory also holds the view that social transformation is a product of dialogue and culture. Culture on the other hand is a created reality and that human problems cannot be solved in a culture of silence; people construct social realities that lead to transformation. Further, transformation can only be nurtured in open spaces within voluntary associations, among families, neighbourhoods and tribes not by bureaucratically organized economic and political settings. In this sense, culture is socially constructed by the people according to their own realities leading to social transformation.

Based on this, the success of social transformation depends on the extent to which the new concepts relate to the cultural realities of the change target. In essence, effective social change rejects universal application of approaches, focuses on multiplicity in one world, and emphatic of diversity and pluralism. This theory emphasizes the fact that societies are not homogeneous per se, some form of heterogeneity (political, cultural) exists even within fairly homogenous cultures; therefore, rigid and standardized strategies applied to social change is undesirable (Servaes, 2008).

The philosophical underpinning of Participatory Communication theory in this study is that in order to impact social change, people must be involved in construction and deconstruction of their own social realities. Participatory communication theory therefore provides an explanation for community empowerment through active involvement in dialogic communication and access to opportunity for participation in communication of SSWM. The use of dialogue and interpersonal communication where individuals jointly identify solid waste management problems and make decision on how to implement solutions leads to mutual problem solving techniques and enable them acquire critical understanding of the problems and the action they need to take so as to solve it. In this aspect, learning is a process facilitated by dialogic communication, interpersonal communication and active participation through sharing of experiences, interrogation of other peoples' experiences and behaviour, asking questions, and taking actions and relating SSWM practices to their own realities and behaviour. Thus learning of SSWM is an action oriented exercise that promotes the development of critical consciousness leading to empowerment.

The use of interpersonal communication in the learning process also provides opportunity for sharing personal experiences, experiential learning and enables individuals to develop confidence that they are capable of performing what others can perform leading to social change. Besides, participatory communication provides an action based learning where the community actively participate in collective decision making, generation and sharing of content leading to ownership of their solutions. In this aspect, solutions to community problems are community based and the people themselves make decisions on how to implement such solutions leading to sustainability. Lastly, participatory communication, focusing on cultural realities provides a framework for community involvement in

communication for SSWM at the local level which helps to ensure that communication is culturally realistic and more impactful.

The strength of this theory is that it provides a framework for understanding community empowerment, development of critical consciousness, as well as collective decision making leading to social change. Participatory communication theory also provides a framework for understanding community access to participation through giving people voice'- space or access to speak their own mind in a dialogic formula.

One of the weaknesses of participation communication theory is the incoherence in its application which arise from the different conceptualization of the term 'participation'. In practice, some instances ensure genuine participation while in certain cases participation is a miniature exercise characterized by lack of inclusivity, power imbalances and lack of access disguised to please stakeholders. Challenges of inclusivity and access to participation arise partly from institutional structures and assumptions that the community consists of homogeneous groups who have equal access to media for participation. The reality is that dialogic communication is realized when the communicating partners share fields of experience. Therefore effective participation in communication is more effective among similar groups.

The current pluralistic media environment has led to individualized media consumption and audience segmentation which presents another challenge to participation. On one hand, it may lead to exclusionary participation while on the flipside it presents a richer environment for enhancing inclusivity in participation since more people have access to different forms of integrated media. Besides, advanced technology has given rise to more participatory media than ever before leading to more opportunities for effective community participation.

Based on these factors, participation in communication needs to be carefully structured and planned so as to take care of heterogeneity in the community. Expressing his concern on exclusion and effective participation, Uphoff (1985) posits that who participate and how they participate is key in determining effective participatory communication. As mentioned earlier in chapter two of this thesis, the community is not a homogenous entity where people have equal access to opportunities for participation. A paradigm shift should address issues of exclusion in participation especially in societies where access, power and status can stand in the way of level playing field for community participation in matters that affect them. Challenges to exclusionary participation can partly be addressed by exploring communication networks in the community so as to determine media preferences and accessibility by the community.

Participatory communication theory however, falls short of providing perspectives for understanding communication networks in communities. To bridge this gap, this study used the theory of Communicative Ecology postulated by Altheide (1994) and advanced by Taachi, Slater and Hearn (2003).

2.11.3 Communicative Ecology Theory

The Communicative Ecology Theory was postulated by Altheide (1994) and extended by Tacchi, Slater and Hearn in 2003. The term communicative ecology refers to "the context in which communication process occur" (Foth & Hearn, 2007, p. 9). These processes are seen to involve people communicating with others in their social networks using both face-to face and a mix of media and communication technologies (Tacchi, Slater &Hearn, 2003). Altheide (1995) developed this concept to examine the mutually influential relationships between information technology, communication formats and social activities, within the

context of peoples' social and physical environments. Altheide conceives ecology of communication as a fluid construct that can be used as a framework to investigate the creation and modification of social activities through the use of technologies that in turn, give rise to new communication formats.

Communicative ecology is a network of various elements including media, people their relationships and social activities. It is defined as a "process that involve a mix of media, organized in specific ways through which people can connect with their social networks" (Tacchi, Slater & Hearn, 2003 p.17).These processes involve people communicating with others in the social networks using both face-to-face and a mix of media and communication technologies (Tacchi et al. 2003; Tacchi et al., 2007).

Networks are social systems that describe how people obtain information -including media and technology used and the flow of information - vertical, top-down, horizontal– and the relationships that exist among members of the community. Since the community is not homogenous, communication networks in the community are organized along social relationships and media used.

According to CET, social activities and information technologies used in a social system influence each other. The theory looks at how different communicative ecologies influence choice of media and how different media shape communicative events. In this study, CET provides a framework for understanding the different communication networks (ecologies) in the community are influenced by choice of media and how these affect their participation in communication. Three dimensions are used to understand these relationships; a technological dimension which consists of devices and media that enable the communities to interact; a social dimension which consists of people and their social organizations and a

discursive dimension which consists of the content of their communication. The social dimension defines different social structures with which people identify themselves such as groups of friends, formal community organizations and institutions; discursive dimension describes the content of the communication while technological dimension describes the communication media and technology used including both traditional and new media. The three dimensions are all mutually interrelated.

CE theory has been used to explore how social media networks within communities can be adopted to promote consumer engagement (Khan and Dongpin, 2017) and in understanding urban social networks (Foth & Hearn, 2007). These studies adopted ethnographic action research using participatory designs where participants act as co-investigators in the process of inquiry.

This study holds the view that community participation in communication of SSWM calls for their access to media; however, the heterogeneous nature of the community and multiplicity of media has contributed to different communicative ecologies therefore effective community participation in communication must consider multiple media/forums used within the social and technological contexts of the community. In this study, CET was used to provide an understanding of communicative ecologies in communities in Migori County and to design community communication networks for participatory communication in SSWM. The three dimensions of CET provides perspectives for understanding communication in different ecologies within the community as guided by social relationships, the communicative content within the different networks, and media used in those networks.

2.12 Conceptual Framework

The conceptual framework of this study is developed from Participatory Communication theory upon which this study is grounded. As mentioned earlier, it points out that participation in dialogic communication enables people acquire critical consciousness and empowerment leading to social transformation. The theory emphasizes access to media and involvement in dialogic communication as avenues for ensuring transformation in SSWM.

In this study, SSWM is presumed to be influenced by participatory communication. The conceptual framework presents a relationship between participatory communication as the independent variable and SSWM as the dependent variable. Participatory Communication comprise access to media for information and participation and involvement in dialogic communication which empowers people, provide opportunity for people to speak their voice and make decisions on SSWM. Using this analysis, this study developed a conceptual framework shown in figure 2.2.

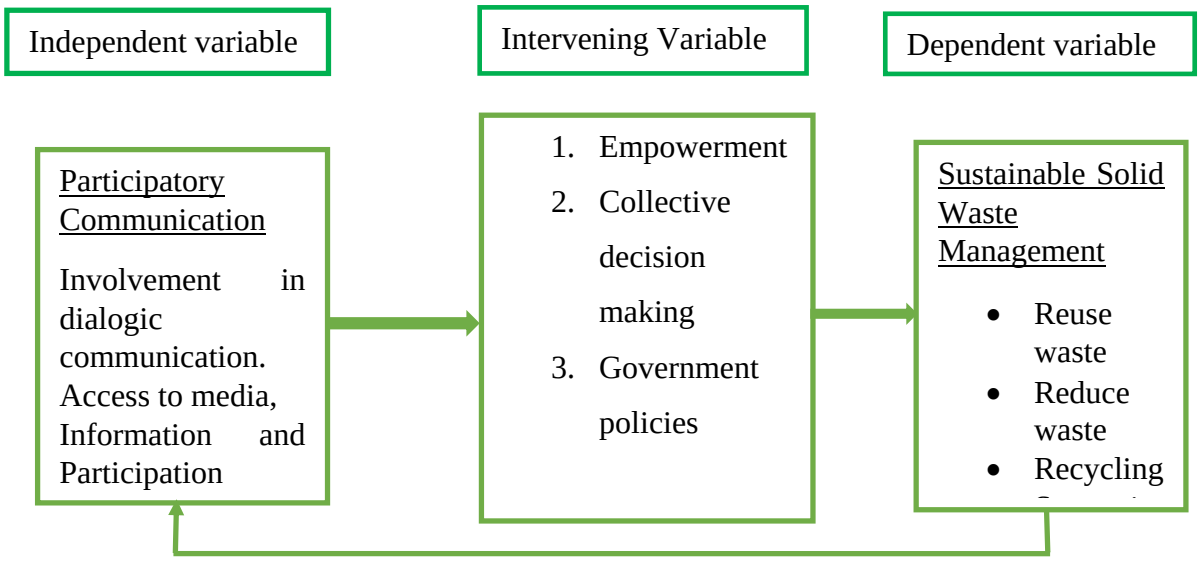

Figure 2. 2: Conceptual Framework

(Source: Researcher, 2021).

According to this conceptual framework, access to media and information and involvement in dialogic communication promote the development of critical consciousness that leads to peoples' empowerment so that they are able to participate in SSWM. Involvement of people in dialogic communication promotes collective learning and decision making towards SSWM. Empowerment, collective decision making and government policies represent the intervening variables thus determining the strength of connection between the dependent and independent variables.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Overview

This chapter presents research methodology that was used in examining participatory communication approach to sustainable solid waste management. It begins with the study area followed by ontological positions that informed the study, the research design, sampling techniques used and data collection techniques and procedures. The chapter ends with ethical considerations observed during the research.

3.2 Study Area

This study was conducted in Migori County, located on the South-West part of Kenya, a developing country in Africa. Migori County covers an area of 2,613.5 square kilometers and borders Homa-Bay County to the North, Kisii and Narok Counties to the East. It is a cosmopolitan region with inhabitants from the Luo, Suba, Abakuria, Abagusii, Abaluhyia, Kisii, Kikuyu, Somali, Indians and Nubian communities. Socio-economic activities in Migori County include small scale trade and farming. The county receives high amounts of rainfall and is one of the malaria endemic zones in Kenya. It Rivers Oyani, Migori, Sare and Kuja located in Migori County drain their waters into Lake Victoria.

Migori County was chosen in this study because it is one of the counties facing challenges of SSWM in Kenya. Migori County Integrated Development Plan 2018-2022 reports that generation and disposal of solid waste at household and urban areas in Migori County is done with total disregard of environmental conservation (County Government of Migori, 2018). There is also knowledge deficit among the public on how to manage solid waste (Ndwiga,

Nyambura, Kuloba & Ngaithe, 2019). Prevalent dumping of solid waste in rivers and roadsides contributes to poor sanitation and partly to the spread of disease such as diarrhea, malaria and respiratory infections. In Migori County Malaria prevalence stands at 53% and it is the leading causes of deaths while respiratory infections is the third cause of deaths (County Government of Migori, 2018). In the year 2015, Migori County experienced cholera outbreaks with recorded 915 cases and 12 deaths- fatality rate of 9% which were the highest in Kenya (Oyugi et al, 2017). Besides, media reports have shown that Rongo town faces serious health hazard from solid waste scattered in the main urban market (Dala FM, 2017). Based on these challenges, there is need for collaborative communication between the community and the county government on how to manage solid waste. Though the county government plans to collaborate with the community and sensitize then on waste management, the County lacks clear frameworks on community participation in communication (Migori County Integrated Development Plan, 2018-2022).

The study was situated in urban areas of Migori County. High population and high generation of solid waste in urban areas pose greater challenges to SSWM in these areas. Migori County comprises seven major urban areas namely Migori town, Awendo, Rongo, Isebania, Kehancha, Muhuru Bay and Sori. According to Mugenda and Mugenda (20I3) I0% to 30% is a good representation if the population is below 10,000 therefore three urban areas of Migori, Isebania and Rongo out of the seven urban areas were considered adequate for this study. Migori urban area has the highest population and is the county headquarters. Isebania town is located at the border of Kenya and Tanzania. Its population comprise a mix of inhabitants with Kenyan and Tanzanian origins who also closely interact with their neighbours from Tanzania. This would present rich data useful in understanding social norms

on participatory communication and SSWM. Rongo urban area has a considerably high population and has also been reported to face serious health hazard resulting from poor solid waste management (Dala FM, 2017).

Waste management in Migori County is domiciled in the department of environment, natural resources and disaster management. At the town level, municipalities are responsible for waste collection and communication with town to residents. The department of environment and natural resources estimates that Migori town produces over 40 tonnes of urban waste per day; Rongo town produces over 23 tonnes per day and Isebania 30 tonnes per day. Out of these, the county government collects less than 60% of total waste generated.

Urban areas in Migori County face several challenges to solid waste management including inadequate communication, limited funding to the department of environment and inadequate human resource, land, and equipment. The most common solid waste management practices in the towns are littering, burning and dumping of waste in skips, rivers, drainages, and roadsides. Waste collectors and scavengers also collect recyclables such as plastics, metals and iron sheets and sell them to recycling agents who eventually transport them to recycling plants outside Migori County.

3.3 Research Philosophy

This study was guided by pragmatic philosophy which holds the belief that reality is not absolute. In research, Pragmatic philosophy holds the view that focus should be laid on the problem of study and not methods of inquiry. The process of finding truth is open and the researcher is not tied to one method or techniques but uses ‘what works best’ in answering the research problem thus it allows the use of various methods (Creswell, 2014). Pragmatic philosophy is opposed to absolutist view of approaching nature of reality. It bridges the post

positivist and constructivist interpretivist approaches to research therefore applies a mixed methods approach. According to Creswell (2014) pragmatism is not restricted to only one system of philosophy; it is open to a mixed methods approach of understanding of the research problem.

In this study, multiple methods of inquiry assisted the researcher to obtain different types of data from different participants which was useful in providing a better understanding of participatory communication of SSWM and in designing community communication networks for participatory communication in SSWM. Qualitative approach was designed to explore and give rich details on community involvement in communication of SSWM and their access to media used in communication from few participants. There was also need for quantitative analysis of these findings so as to ascertain their generalizability to the study population.

3.4 Research Design

This study was conducted using exploratory sequential mixed methods design. This design involves the collection and analysis of qualitative data which are further analyzed quantitatively (Creswell, 2014). This choice was informed by the need for in-depth investigation of participatory communication of SSWM from different participants which would then be best be understood using both qualitative and quantitate data. The researcher needed to obtain rich detailed information on community involvement in communication of SSWM, their access to media used in communication of SSWM and strategic messages communicated for SSWM and participants' perspectives on community communication networks. Using exploratory sequential mixed methods design, qualitative data was first

collected to obtain in-depth information, analyzed into themes and codes which were further used to develop variables and scales in quantitate instruments. The qualitative data generated participants' perspectives on the problem of study while quantitative data was used to validate and measure the breath of replication and generalization of the qualitative findings. The two sets of data complemented each other and enabled the researcher to have a complete understanding on how to design participatory communication structures for community involvement in communication of SSWM.

Further, the mixing also enable the researcher to corroborate findings and triangulate results. Creswell and Plano Clark (2011) suggest that mixed methods can be used in a study to develop a complete understanding of a problem, to triangulate results, to have one data build on the other and to examine processes along with outcomes.

In order to answer objective one of this study on community involvement in communication of SSWM, the researcher interacted with the study participants to extract information from them about communication of SSWM and the nature of community involvement in the communication of SSWM. These perspectives were then subjected to a larger population and quantitative analysis done to determine their generalizability to the study population.

To answer objective two on community access to media used in communication of SSWM in Migori County, the researcher obtained community members' own perspectives on media used in communication and community access to these media. These findings were then exposed to quantitative methods to establish the frequencies of community access to these media and to determine to what extent the qualitative findings were general to the community. Objective three on strategic messages communicated for SSWM was answered by first obtaining in-depth data from the department of environment and natural resources on

strategic messages communicated for SSWM. To validate this data, the findings were analyzed and subjected to a larger audience using questionnaires answered by members of the community.

The last objective of this study was to design a community communication network for involving the community in communication of SSWM. The researcher closely interacted with community members to obtain information on their communicative ecologies and preferred media choice. Such constructed realities were interpreted and then analyzed quantitatively. In this manner, qualitative and quantitative data built on each other and gave a robust solution to the study problem.

3.5 Study and Target Population

The study population was 167,200 (KNBS, 2019). However this study targeted adults of 18 years and above because they are capable of making decisions and are constitutionally eligible to participate in decision making on matters affecting their towns and ensuring a clean and habitable environment as stipulated in the Constitution of Kenya (CoK, Article 69). Since the target adult populations of the three urban areas were not available, it was obtained from the populations of the targeted three urban areas (Table 3.1) based on the proportions of total study population (167,200) and adult urban population (85,113) as shown below.

Table 3. 1: Study Population

Town	Total population and sample frame
Migori	71,668
Isebania	23,891
Rongo	20,688

(Source: Kenya Bureau of Statistics, Migori County, 2019).

N_P = Stratum population/total population frame ×total aggregate target population.

Where, total population frame= 167,200

Total aggregate target population=85,113

Thus,

N_p for N_1= 71,668/167,200×85,113= 36,482
N_P for N_2= 23,891/167,200×85,113=12,161

N_P for N_3 = 20,668/167,200×85,113 = 10,531

Therefore, $N=N_1+N_2+N_3$

N= 36,482 +12,161+10,531

N= 59,174

The total target population was 59,174 adults.

3.6 Sample Size and Procedure

The sample size for this study was calculated using Yamane's formula. Since the population of three urban areas where the study was conducted was known, Yamane's formula was

suitable for this study. Thus, from the targeted population of 59,174 adults, Yamane's formula was used to calculate sample size as shown below.

$n= N/1+N (e)^2$

Where, n= sample size

N= Target population

e= margin of error of 0.05 with confidence level of 95% (Yamane, 1967).

Sample size thus,

$n = 59,174/1+59,174(0.05)^2 = 399.99$ rounded off to 400.

Using proportional allocation, this sample size was proportionately apportioned to each of the three urban areas based on the target population (calculated above) as shown below.

Migori: 400(36,482/59,174) = 246.6

Rongo: 400(10,531/59,174) = 71.18

Isebania: 400(12,161/59,174) = 82.2

Total = 400

Total sample size for the study was 400 with distribution of 247, 71 and 82 in Migori, Rongo and Isebania towns respectively.

Mixed sampling procedure including purposive, snowball and simple random sampling were used in this study. Purposive sampling technique allows the researcher to select participants with relevant information pertaining the study. Mugenda and Mugenda (1999) observe that purposive sampling "allows the researcher to use cases that have the required information

with respect to objectives of the study" p. 50. According to Kothari (2004) simple random sampling allows equal chances for members of the population to participate in an inquiry. In this study simple random sampling would suitably give equal changes for community members to participate in the survey.

First, the three towns were considered as strata from which sample units were drawn. The first sampling involved the use of purposive sampling technique. Purposive sampling technique was used to obtain seven (7) key from department of environment and natural resources where waste management is domiciled, eight (8) key informants from the municipality, and 8 community representatives who act as a link between the community and the county government. These were representatives of different groups from the business community, residential areas and town residents' association in the urban areas. A total sample of twenty three (23) were purposively sampled for interviews.

Sectors in the urban areas represented by the 8 community representatives (earlier sampled) met criteria for the study therefore they were included in the sample. The sectors included markets, transport, artisans *(juakali)*, hawkers, carpentry, garage and residential areas where large amounts of solid waste is generated. Bryman (2008) posits that purposive units of analysis are selected based on criteria for answering research questions. In qualitative studies, purposive samples are deliberately selected due to their centrality in the research problem. From these sectors, a total of nineteen groups (Ten, four and five groups from Migori, Isebania and Rongo towns respectively) were sampled for the study. Using snowball sampling techniques, the community representatives also acted as gatekeepers and helped in identification of community members who participated in focus group discussions. The total sample for FGDs was not decided beforehand but was arrived at using the principle of

saturation as the study progressed. Hennik, Hutter and Bailey (2011) observe that using cycling nature of data collection, a researcher can identify the point of saturation at which no more new information is being identified and further data collection serves no purpose.

Out of the 400 total sample size, 167 were sampled for qualitative data collection and the remaining 233 were sampled for Quantitative data collection using simple random sampling. The sample for quantitative data was drawn from the same population as qualitative sample but individuals were different.

3.6.1 Participant Recruitment

Participants in this study were recruited using two strategies beginning with deductive definition of study population and broadening the study population from inductive inferences. According to Hennik, Hutter and Bailey (2011), during initial data collection, the researcher may learn from key informants about other types of participants to include in the study. The first recruitment involved purposive identification of key participants from the department of environment and natural resources in Migori County and the municipalities.

The second group included community representatives who act as a link between the county government and groups in the community. This group included eight (8) representatives from different sectors of the business community and town residents from different estates in the towns. The representatives acted as gatekeepers and helped in participant recruitment of other participants for FGDs. In Migori town, participants were drawn from the following areas. Market, Apida, Bus Park, Suna garage, Juakali, Osaka, Nyasare, Kimaiga, Oruba, Posta, Aroso and Police line. In Isebania town participants were recruited from the Market, Junction, and Seloset and border point while in Rongo town participants were recruited from Juakali, market, Bus Park, Umbwa kali and Hass areas. Study participants included town

residents, traders operating in the markets, food merchants (including wholesalers, retailers), vendors, hoteliers, tailors, artisans, transport operators, barbers and hairdressers.

3.7 Data Collection

Data collection process begun with a reconnaissance and preparation of data generation instruments. The instruments were tested and corrected before the actual data collection begun. Piloting of qualitative instruments was conducted in Awendo town. Data collectionn process was done in two stages. The researcher first obtained qualitative data using in-depth interviews and focus group discussions. From the qualitative data themes and codes were generated and analyzed. The analyzed data was then used to develop variables for quantitative instruments. In this process the qualitative data was exposed to a larger population to ascertain the generalizability of those findings.

3.7.1 Interviews

In-depth interviews were used in this study for two reasons. First, little was known about the problem under study thus the researcher needed to obtain in-depth information from the respondents. Secondly, in-depth interviews allowed participants report their personal perception and experiences on the nature of communication for SSWM in Migori County. Jwan and Ong'ondo (2011) observe that interviews are suitable for obtaining rich information especially on topics where little is known or little research has been done.

Interviews were conducted with key informants purposively sampled from department of Environment and Natural resources, municipal boards and the community. Semi-structured interviews guides (Appendices 1, 2, 3 & 4) were used for deeper exploration of responses from the respondents. The researcher was able to probe and explore on emerging issues and to generate more elaborate and qualitatively rich data. The interviews lasted between 50

minutes to one hour during which voice recording was done with permission from the participants.

3.7.2 Focus Group Discussions

The researcher's objective of using FGDs in this study was to collect a range of rich information from the participants' own perspectives on their involvement in communication for SSWM, access to media used in communication, knowledge of SSWM and their communication networks. Focus group discussions were also used to corroborate and validate whether interview findings were shared by other community members. Hennik, Hutter and Bailey (2011) observe that Focus group discussions are used to

> "Gain a range of views in a single episode of data collection and in understanding typical behavior or socio-cultural norms in the study population" p.138.

Nineteen (19) Focus Groups Discussions each consisting of 6-10 participants comprising town residents, small scale traders, food merchants, vendors, hoteliers, tailors, carpenters, artisans, transporters, barbers and hairdressers were recruited for the study. Ten, four and five groups from Migori, Isebania and Rongo towns respectively were conducted. Eighty-four (84) participated in ten (10) FGDs in Migori town, twenty-six (26) participated in four (4) FGDs in Isebania and thirty-four (34) in five (5) FGDs in Rongo town. The number of focus group discussions conducted was guided by principles of saturation as determined through an iterative process during data collection. The researcher carefully assessed data for any variations and then continued with the process until the data started to become repetitive at which point the researcher stopped recruiting more groups. Hennik, et al. (2011) observe

that the iterative process is necessary in finding the number of participants sufficient to uncover the issues under study.

The groups composed of individuals with similar characteristics such as traders within the same sector such as fish mongers or artisans and residents of the same neighborhood. This made it easier for the participants to freely share their experiences. Hennik, Hutter and Biley (2011) observe that homogeneity and level of acquaintance among the participants are important factors for creating a comfortable group environment. Discussions were conducted during the time and in places most convenient for the participants. For example, discussions with traders were held at their natural settings such as locales of trade on a day different from market day during mid-morning hours just before the markets became busy. This was informed by one the principles of naturalistic setting in qualitative research (Jwan and Ong'ondo, 2011).

A semi-structured discussion guide (Appendix 5) was used to guide the discussions. The discussions were done in English, Kiswahili and *dholuo* languages as deemed fit by the participants. In some communities the gatekeeper acted as the translator. Both interviews and focus group discussions were conducted concurrently allowing the researcher to delve deeper into the issues raised. For example, it was noted from the initial interviews that community members participated in communication of SWM by complaining about uncollected solid waste. This issue was also raised in FGDs and was explored in discussions in order to find the intricacies about it. During interviews and focus group discussions, voice recorders and note taking techniques were used to record data.

3.7.3 Questionnaires

Semi-structured questionnaires were used in this study to collect data from members of the community. This data was used to validate the depth of qualitative findings, determine the extent of replication; convergence or divergence of data and triangulate data. Semi structured questionnaire (Appendix 6) were distributed to adult aged 18 years and above in the residential areas and in the central business districts.

3.8.1 Data Analysis, Presentation and Interpretation

This study developed a rigorous analytic process that begun during data collection, transcription, coding, interpretation before final presentation. Transcription is the process of transferring audio into written information. Data translation is a process of changing data from the original language of the respondent to official language such as English while coding involves identifying and assigning specific codes to themes.

Qualitative data was first transcribed, coded and analysed. Interview data were transcribed as soon as the interviews were complete so as identify themes that may require further exploration in subsequent interviews. For example, during initial interviews the researcher established 'meetings' as *a* theme which refers to a forum used by the county government to involve the community in communication.; however it emerged in successive interviews that there are different types of meetings and two codes; citizen public forum and stakeholder meetings emerged. Transcription of this data immediately enabled the researcher to identify the use of citizen public forum as a code to be further explored in data collection leading to a greater in-depth exploration of information as the study progressed. Immediate transcription from interviews was also useful in identifying successive participants such as community representatives who were later scheduled for interviews.

Data translation is a process of changing data from the original language of the respondent to official language. In this study, some interviews and focus group discussions were conducted in local languages such as Kiswahili in Isebania town and Dholuo in Migori and Rongo towns. These data were translated during transcription leading to a single transcript in English. During transcription careful attention was given to colloquial language and nuances used by participants.

Data coding followed transcription. A code is an issue, topic or idea in a study. Codes are essentially topics discussed by participants and are identified through reading data (Hennink, Hutter and Bailey, 2011 p. 216). Six (6) transcripts picked from both interviews and focus group discussions were used to identify and develop codes from deductively developed themes. Codes identified from transcriptions and field notes were identified and analyzed looking at frequencies of their occurrence. These codes and themes from qualitative data were analyzed and further used to develop scales and variables in questionnaires.The second step involved data sorting, recoding and final statistical analysis of quantitative in which frequencies, mean, mode and percentages were calculated using SPSS version 26.

The point of interface for data interpretation in this this study was during data interpretation. Both qualitative and quantitative data were presented during interpretation. The researcher presented qualitative data using themes and quotes then supported them with quantitative results using percentages, tables and charts. The quotes provided illustrations for the numbers in the results which provided a more understanding of the problem under study. Plano Clarke (2010) observe that qualitative and quantitative data can be merged to get a more complete understanding of a problem, to triangulate results, to develop a complimentary picture of the problem and to provide illustrations.

3.9 Validity and Reliability

Both external and construct validity were achieved by piloting the research instruments with interviewees from Awendo municipality and Rongo towns in Migori County. Data collected during piloting were shared with the respondents to ascertain their accuracy then revised and corrected to refine the study instruments before the actual data collection process. This study obtained same sets of data from different sources using different instruments.

Reliability was achieved using different data generation instruments. During interviews, the same questions were asked to different respondents which enabled the researcher to obtain a chain of evidence. Jwan and Ong'ondo (2011) note that chain of evidence obtained through different interviews so as to corroborate information ensure reliability. In this study, the researcher obtained information from two sets of qualitative data using different participants and one set of quantitative data. In addition the same constructs were used when collecting both qualitative and quantitative data. Reliability of results was achieved by quoting participants' views verbatim during transcription. External validity was achieved using different sampling techniques and by mixing methods. In the qualitative phase, the researcher used purposive, snow ball and convenience sampling. However to check on whether the findings can be transferable to other contexts, the researcher explored them in a survey using simple random sampling.

3.10 Ethical Considerations

The researcher first obtained a letter of clearance (Appendix 9) by Rongo University to carry out research and then obtained a research permit from NACOSTI authorizing her to carry out

the research in Migori County (Appendix 10). Permission was then sought from the department of environment, natural resources and disaster management in Migori County where waste management is domiciled. Since the study was going to involve towns, written permissions were obtained from Migori and Rongo municipal boards and Isebania sub-county (Appendices 11-14).

Before participating in the study, the researcher sought permission from respondents and explained the nature of the research, its purpose and their freedom to participate in the study. Informed consent to participate in the study was issued to study participants who read and signed them before participating in the study (Appendix 15). Confidentiality was observed by ensuring nondisclosure of participants, their views and details. Only co-participants were able to identify other participants in FDGs. Anonymity was ensured through non-disclosure of participants' details such as names on research tools, omitting identities of participants from the voice records and assigning codes to participants when presenting findings.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents findings of the study on Participatory communication approach for SSWM; A study of Migori County. The objectives of the study were to investigate community involvement in dialogic communication of SSWM, determine community access to media used in the communication of SSWM, assess strategic messages communicated for SSWM, and to design communication network for improving community participation in the communication for SSWM. The findings are analyzed, presented, interpreted and discussed sequentially beginning with the first to the fourth objective.

4.2 Response Rate and Demographics

A total of 399 respondents participated in this study. Out of this, twenty-three (23) informants participated in interviews; seven (7) from the department of environment, eight (8) from municipalities and eight (8) were community representatives. One hundred and forty-four (144) community members participated in nineteen (19) focus group discussions while two hundred and thirty-three (233) participated in survey. Out of 233 questionnaires distributed, 232 were returned. The response rate in this study was 99%. In terms of gender, 239 (60%) were males while 159 (40%) were females. Tables 4.1, 4.2, 4.3 and 4.4 show response rate and demographics of study respondents.

Table 4. 1: Response Rate

Town	Key informants		Focus group discussions		questionnaires	**Total Response**
	County government	community	No. Of FGDs	Total sample	No. of respondents	
Migori	6	4	10	84	152	**246**
Isebania	3	3	4	26	50	**82**
Rongo	4	3	5	34	30	**71**
Total	**23**		**19**	**144**	232	**399**

Table 4. 2: Gender Distribution of respondents by Town

Town	Males	%	Females	%	Unspecified	total	%
Migori	150	61 %	96	**39%**	**0**	**246**	**I00%**
Isebania	50	6I%	32	**39%**	**0**	**82**	**I00%**
Rongo	39	55%	31	**44%**	**1**	**71**	**I00%**
Total	**239**	**60%**	**159**	**40%**	**1**	**399**	**I00%**

Table 4. 3: Gender Distribution of Respondents based on to data collection

Gender	Respondents for Qualitative data	%	Respondents for Quantitative data	%	total	%
Males	104	62	135	58	239	I00
Females	63	38	96	4I	159	I00
Unspecified			1	I	1	I
Total	167	I00	232	I00	399	I00

Table 4. 4: Age of survey respondents

Age bracket	Number	%
18-24	42	18
25-29	46	20
30-34	44	19
35-39	34	15
40 and above	63	27
Unspecified	3	1
Total	232	100

4.3. Community Involvement in Dialogic Communication of SSWM

The first objective of the study was to investigate community involvement in dialogic communication of SSWM. In order to answer this objective, interviews were first conducted with 23 key participants from the department of environment and natural resources, municipal management and community representatives to get their perspectives and obtain in-depth information on community involvement in communication of SSWM. At the same time, focus group discussions were held with 19 groups in the community to get their own perspectives on their involvement in communication of SSWM. Data obtained from interviews and FGDs were categorized and analyzed into themes and codes which were later used to develop variables and scales used in questionnaires. 233 Questionnaires were distributed to respondents from the community to determine the generalizability of the

qualitative data. The quantitative data was then analyzed into frequencies and percentages using SPSS.

This study found conflicting views on community involvement in communication of SSWM. Whereas the department in charge of waste management in the county and the municipalities mentioned that community were involved in communication of SSWM, most community members had contradictory opinions. Out of the 19 groups comprising 144 participants, only one group comprising 10 participants (7% of focus group participants) agreed that they are involved in the communication of SSWM. The remaining 18 groups comprising 134 participants (93%) mentioned that they are not involved in the communication of SWM.

Responses from community members showed that communication of SSWM by the county government was rarely done, mostly in response to crisis on poor solid waste management in the towns and community members are not involved. Some key informants were in agreement with responses from the community as shown below.

> There has not been effective communication. It has not been done optimally. The community are less involved. Just recently, our casual cleaners were taking waste to Osaka, a temporary transfer station. The Osaka people held the wheel barrow saying they would not release the wheelbarrow until all this waste is removed and taken to the dumpsite. The waste had overstayed. I was called. We struggled….. (K.I.3 Migori town)

From the above quote obtained from one key informant, the community are hardly involved in communication of SSWM and whenever there is some crisis on poor waste management in the town, they demand to be addressed by the municipal management.

Similar findings were shown in the survey where 204 (88%) respondents mentioned that community members are not involved in the communication of SWM; 25 (11%) participants agreed while 3 (1%) respondents do not know. Overall, majority 346 (86%) of the study participants mentioned that community members are not involved in communication of

SSWM with only a few 50 (13%) agreeing that community members are involved in communication of SSWM. These findings are shown in figure 4.1 below.

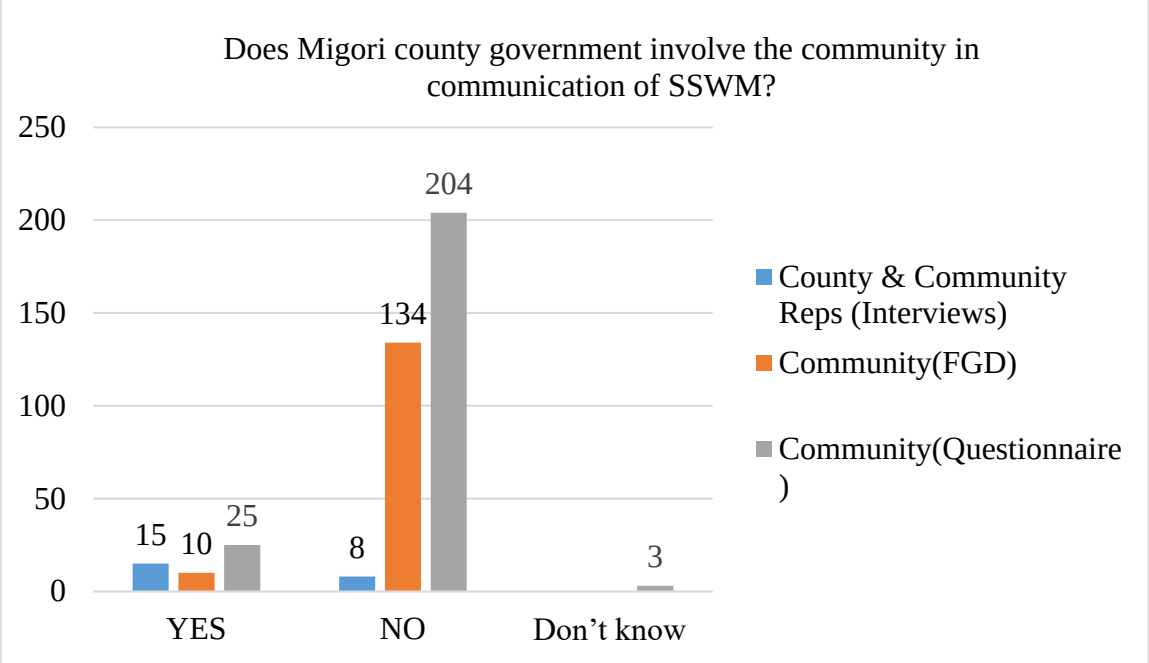

Figure 4. 1: Community involvement in dialogic communication of SSWM in Migori County

The study found that community involvement in the communication of SSWM was less frequent in all the three towns, especially in Isebania town where majority (96%) of the respondents disagreed while 2 (4%) did not know. This is shown by high frequencies of those who answered NO as indicated in figure 4.2.

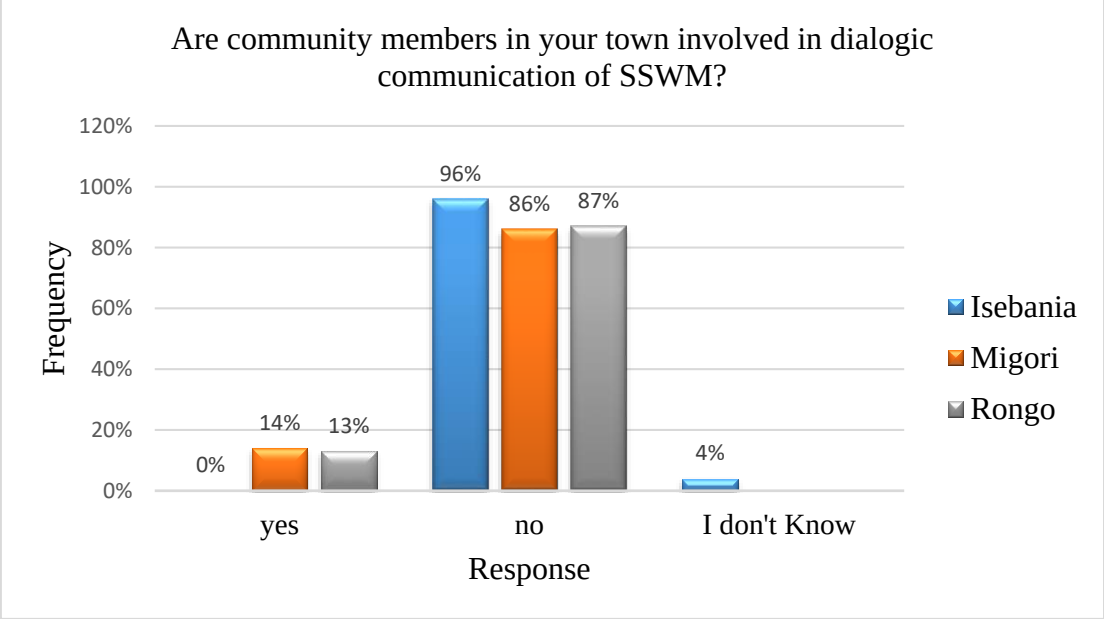

Figure 4. 2: Community involvement in dialogic communication of SSWM in different towns

Respondents were also asked if they had participated in communication of SSWM in their town or county. Out of 232 respondents, 53 (22.8%) agreed, 178 (76.7%) respondents disagreed while one respondent did not answer.

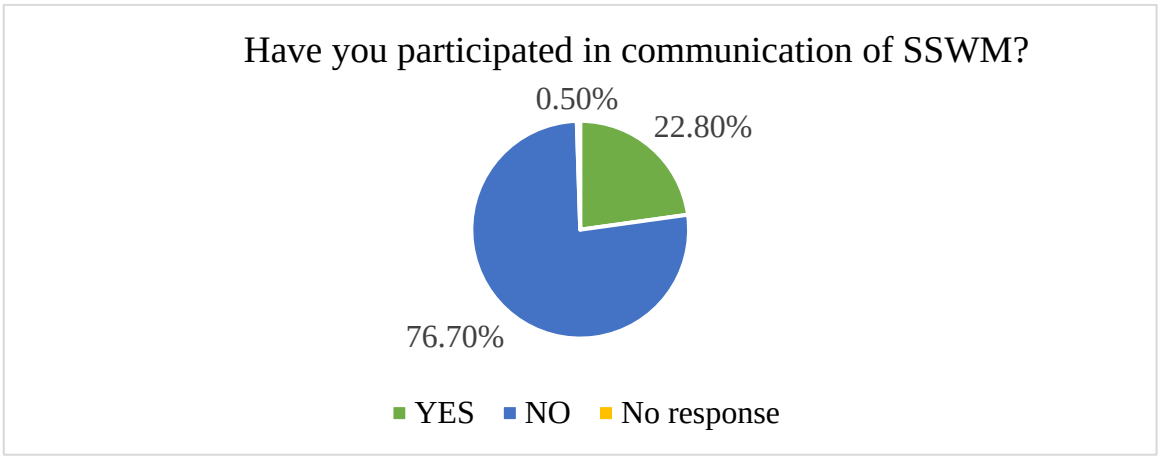

Figure 4. 3: Individual participation in communication of SSWM.

Figures 4.1 and 4.3 show high frequencies of 88% and 76% respectively on lack of community involvement in communication of SSWM. Survey findings were in convergence with findings from focus group discussions where most community members (93%) mentioned that the community were not involved in communication of SSWM. The limited frequencies on community involvement (11% in figure 4.1 and 22.8% in figure 4.3) confirm that there was limited community involvement in communication of SSWM.

Lack of community involvement in communication of SSWM as found in this study may be a deterrent to development of critical consciousness and community empowerment for SSWM. In such instances the community may show lack of responsibility for solid waste as evident in littering and careless dumping of solid waste in urban areas in Migori County. This study found that even where skips are provided by the municipalities, waste generators do not use them, instead they dump solid waste around the skips scattered all around it.

Involvement in dialogic communication of SSWM provides opportunities for people to discuss challenges they encounter on SSWM and share solutions to those challenges which helps raise their consciousness- individuals begin to individually and collectively develop awareness on the need to dispose of solid waste appropriately. Freire, observes that knowledge emerges only through “invention and re-invention, through continuing hopeful inquiry human beings pursue in the world, with the world and with each other’ (Freire, 1996 p. 53) therefore the community should be involved in dialogic communication of SSWM so as to achieve generate knowledge on SSWM otherwise lack of involvement may inhibit development of knowledge. Besides, collective planning and decision making on how to manage solid waste in a dialogic approach leads to ownership of those solutions which guarantees the much needed sustainability in SSWM within the community.

In order to draw conclusions on the high frequencies on lack of community involvement in dialogic communication of SSWM, this study sought to know reasons for limited community involvement in communication of SSWM.

4.3.1 Reasons for Minimal Community Involvement in Communication of SSWM

This study found that communication of SSWM by the county government is rare and reactionary and does not have frameworks for community involvement. Lack of knowledge on how to get involved in communication among the community and lack of access to communication for SSWM was found to hinder community involvement in communication. Community members lack knowledge on when communication for SSWM takes place thus do not participate in them. In Isebania town, residents reported that they have never heard of communication about SSWM and they have not been involved in any. In Migori and Rongo towns, communication on solid waste management is reactionary. It is ignited when there is public outcry on accumulation of solid waste in the towns for example when traders threaten to go on strike some community members make calls on radio to complain about uncollected solid waste which prompts the county government to react.

The community felt that lack community involvement in communication of SSWM resulted from the county government's inability to collect waste in the towns.

"They don't talk about how people can manage waste. How can they when they have not done their part?"(Community representative). Lack of access and knowledge on how to get involved in communication of SSWM was expressed in focus group discussion as follows.

> P1*:* *(in Dholuo) Kama wachiwe paro ema wakia*
> We do not know where to express our views
> P2: *(in Dholuo) Wakomplain ni gigi inyo wa to gini wadong' go mana ka…*
> (Translation) We complain that these things (waste) are harmful to us but the problem just remains with us here.

Table 4.5 presents some of the respondent's views on reasons why the community is not involved in communication of SSWM.

Table 4. 5: Reasons for Lack of Involvement in Communication of SSWM

Reason for lack of involvement in communication	Selected quotes
Communication is rare and reactionary	• When there is a problem in the markets or outside the town, we normally visit the areas and we address them. (K.I.4). • When *wananchi* (citizens) cry that this place is dirty, this place is dirty (now) they react....oh, we can have a meeting…they are just reactionary; they come when people have made noise (K.I.15) • If the market is dirty and waste is not collected we traders tell them that we shall not pay tax. We go on strike then raise the alarm, and then they begin to collect the garbage. In such cases they came to the market and address the traders. (Traders, Migori town).
Lack of framework for community involvement in communication	• There is still a lack of communication between the public and the government and especially due to lack of framework (K.I.1). • The department of environment does not involve people on the ground to discuss about waste management (community representative, Rongo town). • We have not heard communication about SSWM in this town. If they are done in meetings, we don't attend those meetings. We don't even know where and when they are held (Group 5, Migori town) • There is no communication from the county government on how to manage waste. People have not heard or seen forum where they can talk about solid waste management (Group 2, Rongo town).
There is no communication of SSWM	• *Hamna mawasiliano kuhusu taka. Hilo halipo* (residents, Isebania town). • Translation: There is no communication about waste… that does not exist. (Group 1, Isebania town). • Communication has not been done by the county government. (K.I.3).

The study found convergence in the qualitative and quantitative findings on reasons for limited community involvement in communication for SSWM. Out of 178 survey respondents who had not been involved in communication of SSWM, 59 (35%) were not involved in communication because of lack of frameworks for community involvement in communication of SSWM. 46 (27%) respondents cited lack of access to forums where SSWM is discussed, 39 (22%) respondents do not know whom to express their views, 18 (11%) respondents cited other personal commitments, 8 (5%) respondents felt that communication of SSWM does not concern them while 8 (5%) respondents did not answer the question. These findings are shown in figure 4.4.

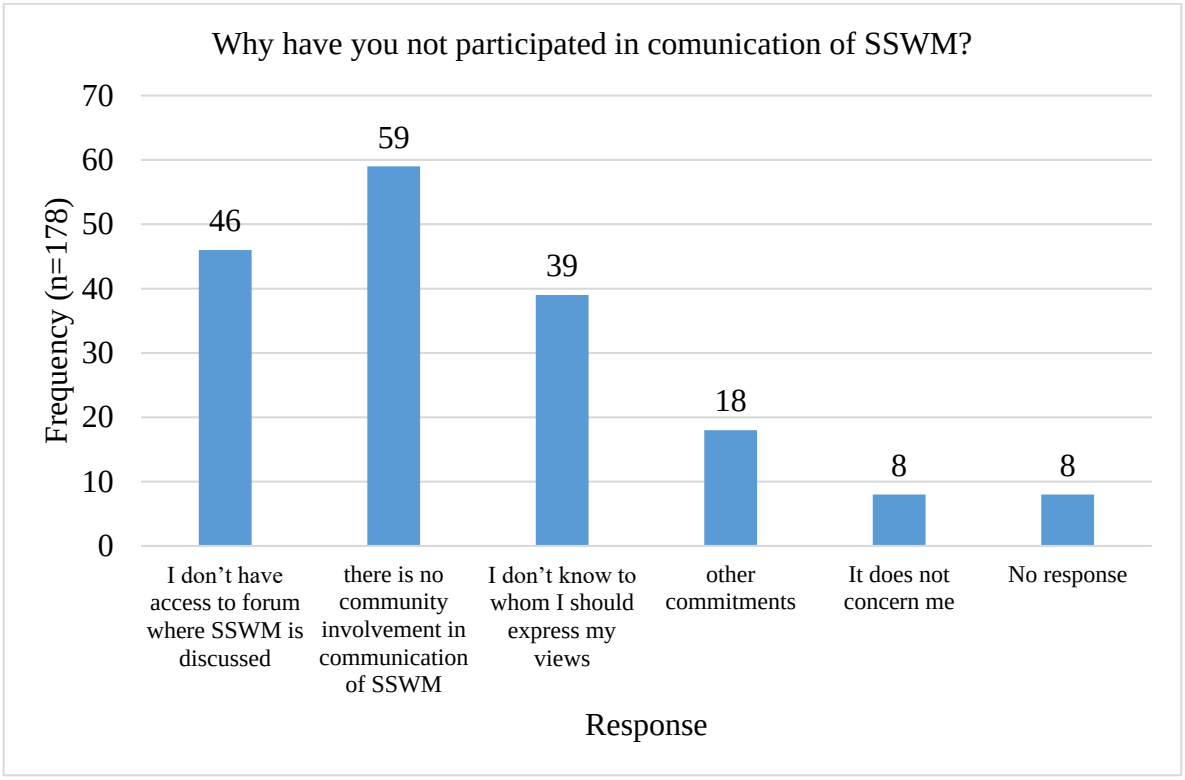

Figure 4. 4: Reasons for Limited Involvement in Communication of SSWM

From table 4.5 and figure 4.4, lack of frameworks for community involvement in communication of SSWM (35%) and lack of access to forums where SSWM is communicated (27%) were the main reasons why the community had not participated in communication of SSWM. Other reasons include lack of knowledge on the need to be involved in communication, lack of concern and personal commitments among the community members.

The consistencies in lack of community involvement in communication shown in figure 4.3, table 4.5 and figure 4.4 confirms that community involvement in communication of SSWM is limited in Migori County.

Some 27% of the study respondents do not have access to forums for participation therefore do not have opportunity to participate in planning and making decisions on SSWM. This finding is in agreement with Carpentier (2011) who observes that access is critical for enabling communities exercise their right to information as well as participating in an informed dialogue on issues that affect their lives therefore where there is no access the respondents were unable to speak their voice. Even though other reasons for lack of participation existed, it was conclude that lack of access and frameworks for participation play a great role since these two recorded high frequencies. It was evident that County government had not put in place frameworks for community involvement in communication of SSWM.

In order to provide more understanding on community involvement in communication of SSWM the study further explored typologies of participation as was practiced in Migori County.

4.3.2 Typology of Involvement in Communication of SSWM

The study found that direct community involvement in communication of SSWM, also referred to as active participation is realized when the community actively contribute their opinions about poor SWM during meetings and when they call-in on radio to complain and ask questions on poor waste management in the towns. Migori and Rongo Municipalities had each held two radio talk shows during which the community were directly involved in giving their opinions on solid waste management. However this was not found in Isebania town where there had not been any radio talk show.

This study found inconsistencies in community involvement through radio. Views from community members who reported that they had not been involved in the communication of SSWM by the municipality through the radio were different from reports from the municipal management as shown below.

> K.I. 4: We have used local radio station Tarumbeta and Rameny to pass information. When there is some information to be passed we go to these radio stations. In two occasions we have used it to disseminate information while in three occasions we have used them as interactive sessions with community members. Someone goes maybe there for thirty minutes then they explain the plans that the municipality has laid on solid waste management then they also give listeners, the residents some time to ask one on one questions then they answer.
>
> K.I.22: The municipality is still new so we have not seen much. But the county government has not communicated any information about SWM through the radio. We have not heard.
>
> K.I 23: We have not heard any communication either by the county or municipality about SWM through the radio.

The study also found indirect involvement of the community in the communication of SSWM through representation. Community representatives are invited in meetings with the department of environment and the municipality. The representatives are expected to relay information obtained from the meetings to the community members they represent. However,

like in the use of radio, most community members mentioned that community representatives do not relay information about SSWM to them.

The study also found passive involvement in communication realized when information is disseminated to the community through radio as done by the department of environment and through community representatives. Table 4.6 presents respondents' views on typologies of involvement in communication of SSWM.

Most of those who answered questionnaires agreed that community members are not directly involved in the communication of SSWM. 178 (77%) respondents had not been directly involved in communication and only 53 (23%) respondents had directly participated in communication of SSWM. Lack of direct involvement in the communication of SSWM had high frequencies across the three towns. 41 (80%) respondents in Isebania town, 112 (74%) respondents in Migori town, and 26 (86%) respondents in Rongo town had not directly participated in the communication of SSWM as shown in table 4.7.

Table 4. 6: Typologies of Involvement in Communication of SSWM

Typology of involvement	Selected quotes
Direct/Active involvement	People call radio to complain about accumulation of solid waste in the town. That is when the county government reacts. (K.I. 14) The community sometimes call me on several occasions to report that a place is very dirty or waste should be removed from Osaka. They held our cleaners' wheelbarrow. I was called. I had to ensure the waste was taken from there (K.I.3). The cleaners of the town directly communicate to waste generators. After sweeping they tell them: *usimwage takataka hapa* (don't dump waste here) (K.I. 3). In two occasions we have used it (radio) to disseminate information while in three occasions we have used them as interactive sessions with community members (K.I. 4).
Passive involvement of the community in communication	We use radio station; Tarumbeta and Rameny to pass information. … When there is some information to be passed we go to these radio stations (K.I. 4). We use media, radio stations, issue leaflets or letters to waste generators and communication is also done orally (K.I. 2).
Indirect involvement/representation in communication	We had representatives of the business community. that meeting organized by the lands department was not about solid waste management it was about municipality, the business committee were called the manager and the board members thought it wise to involve the live ministries; public health, planning , waste management . They set a list of agenda. (K.I. 2).

Table 4. 7: Direct Involvement in Communication of SSWM

Question: Have you directly participated in the communication of SSWM in your town?

Town	Yes	No	No response	total
Isebania	8(16%)	41(80%)	1	50
Rongo	4(13%)	26(87%)	0	30
Migori	40(26%)	112(74%)	0	152
Total	**52**	**179**	**1**	**232**

Tables 4.6 and 4.7 shows less frequencies on active involvement of the community in communication of SSWM in Migori County which implies that passive involvement in communication was the most predominant.

Participation in communication can take different forms; active (direct) participation, passive participation (informing), collaboration, consultation and empowerment. In this study, passive involvement in communication whereby community are barely informed on what should happen or has happened such as being told to have and use dustbins for waste collection as found in this study was evident. This study found that the community in Migori County do not own the idea of using dustbins and are not committed to using them. Some community members in Migori County do not own dustbins while some who had dustbins do not use them effectively. Litter collected in the dustbins is emptied in drainages or roadside thereby contradicting the very reason for waste collection.

These findings are is in agreement with Arnstein, (1969) and Mefalopulos (2009) who observe that passive involvement in communication can lead to lack of lack of ownership of decisions and commitment on the part of the community. Cox (2010) observes that processes imposed from higher levels of governance may undermine environmental management initiatives by creating resistance and disempowerment at the local level. The community here seem to resist directives on use of dustbins as given by the municipal management.

Though participation by representation is used in other fields such as politics, it may be ineffective in communication of SSWM. In some cases representatives are consulted, for example, when they are asked to identify suitable locations for skips in the towns. However, community representatives do not manage solid waste on behalf of others in the community. Once the skips are availed, the community must understand how to effectively use them.

Because of this the community should be actively involved in communication of SSWM so that they understand why skips are provided and learn how to use them effectively.

This study found involvement by consultation done during consultative meetings with community representatives especially whenever there is public outcry on poor waste management in the towns. Such meetings were reactionary; held to handle crises at that moment and there were no capacity building for the community representatives. This finding is in agreement with arguments of Arnstein (1969) and Mefalopulos (2009) that participation by consultation is characterized by limited opportunities for decision making.

Another challenge with participation by representation is effective representation. This study found unequal representation of the community since not all sectors in the towns are represented during stakeholder meetings. Some communities do not know who represent them and in some instances those who attend meetings are not even representatives of the community. This limited certain sectors of the community such as those in residential areas from obtaining information on SSWM. Pezzullo and Cox (2018) point out that decision making in environmental matters is a collective responsibility of the entire society that cannot be left for a few people. Further, voice is an individual's right that cannot be transferred to another neither can it be reduced to one person depositing ideas in another (Freire, 1970). Dialogue is the word and when individuals speak their own word in their own way, they consciously become critical of their own situations leading to emancipation (Freire, 1970). Active involvement in communication also offers opportunity for self-realization and development of critical consciousness, personal learning and the capacity to evolve from the world of unknown to known. Therefore waste generators should be involved in

communication of SSWM at some level within the community so as to raise their consciousness towards SSWM.

In conclusion, community involvement in dialogic communication which includes discussions of SSWM, planning and making decisions on how to manage solid waste was found to be limited. Reasons for lack of participation in communication were found to be lack of access to forums for participation in communication and absence of appropriate frameworks for involving the community in communication of SSWM. Consequently, collaboration between community and government collaboration on SSWM was found to be limited. Findings which showed limited community involvement in communication of SSWM are in disagreement with provisions of the Principle ten (10) of the Rio Declaration, NSWM policy (2019) and County governments Act (2012) which emphasize government-citizen collaboration and community involvement in making decisions on waste management.

In order to provide further understanding on community involvement in communication of SSWM the study sought to determine community access to media used in communication of SSWM.

4.4 Community Access to Media used in Communication of SSWM

This study wanted to determine community access to media used in communication of SSWM so as to establish appropriate media for community involvement in communication of SSWM. Seven (7) respondents from the department of environment and Eight (8) from municipal management in Rongo, Isebania and Migori towns were interviewed on media used for communication of SSWM as well as their views on community access to those

media. This was followed by focus group discussions with 19 groups from the community and a survey with 232 community members to corroborate the interview findings and obtain community views on their access to media used in the communication of SSWM.

4.4.1 Media used in Communication of SSWM

The study found that communication of SSWM was done through local radio, posters, leaflets and circulars. Face-to-face communication was done during stakeholder meetings, public citizen fora, chiefs' *Baraza*, and by waste management supervisors and town cleaners.

> K.I.2: We use media, radio stations, issue leaflets or letters to waste generators and communication is also done orally. We have supervisors on the ground; …… All these work together to disseminate information to our people. It depends on the information we want to pass. Solid waste management requires a consolidated approach. In waste management Citizen Responsibility is key. ….. So this will mean even calling for even a Baraza- a meeting that brings together the business community they have representatives, the hotel industry, bodaboda, juakali, carpentry artisans so we normally call them for a baraza for three hours teach them we also get their views. If we want to cover a larger area we also go to a radio station. We also issue letters. As a department of environment we normally go to the media.
>
> K.I. 3: The cleaners of the town directly communicate to waste generators. After sweeping they tell them: usimwage takataka hapa (don't dump waste here).
>
> K.I.4: Posters are not purely about solid waste but among other things solid waste will be among the messages.

Local radio stations and citizen public fora are used to disseminate information on use of dustbins, designated dumpsites, penalties charged on offenders and to address complaints on accumulation of solid waste in the towns. Public citizen fora are open public meetings initiated for citizen participation in matters affecting the community as required by the Constitution of Kenya. At the County level public fora are conducted annually for citizen participation in annual budgetary processes while at the town level public fora are organized by municipalities when need arises, however these were found to be limited. In the year 2019 and 2020, the municipalities of Migori and Rongo held one public forum each to involve

town residents in town planning. However the study found that few members of the community attended the public citizen meetings.

Chiefs' *Baraza* are face to face meetings regularly organized by area chiefs to communicate matters of provincial administration to the local community while stakeholder meetings are held between municipal management and community representatives from different sectors of the community to discuss matters that affect town residents. The study found that public fora, chiefs' *Baraza* and stakeholder meetings are not purely organized to communicate SSWM but are held for other purposes such as town planning and security during which other matters affecting the community are integrated in the discussions.

Waste management supervisors and cleaners in the towns also communicate about SSWM with the community. They inform the community about existing waste management laws and sensitize them on keeping the environment clean. Each sub-county has one waste management supervisor responsible for solid waste management in the towns and trading centers of their jurisdictions. The supervisors also link the communities and the department of environment so they relay information from the department to community and vice versa. Community representatives and waste management supervisors also issue circulars from the department of environment to the community. Posters with writings "don't dump waste here" were used to warn people against illegal dumping in Migori and Isebania towns.

> K.I.2: We have supervisors on the ground; we also have municipalities and public health. All these work together to disseminate information to our people.
>
> K.I.3: The cleaners of the town directly communicate to waste generators. After sweeping they tell them: usimwage takataka hapa (don't throw waste here)
>
> K.I.8: When there is a problem in the markets or outside the town, we normally visit the areas we address them we advise them on how we can work together with them, let them have that information about waste, so when our people are working there they don't have any problem.

Though Migori county government does not use social media in communication for SSWM, the study found that few community members posted information on poor solid waste management in Migori County on social media which elicit discussions from the public and reactions form the departments in charge of solid waste management. These findings are similar to another study which showed that CBOs in Nakuru city do not regularly use social media to share environmental information (Waititu, 2021). This implies that social media has not been appreciated as an important platform for participatory communication of environmental issues including SSWM.

This study found divergence in findings on media used in communication of SSWM. While the county government mentioned several media used in communication of SSWM the community mentioned that there was no communication on SSWM in Migori County.

> K.I.3: Communication has not been done by the county government. As a municipality we talk through casual cleaners who are in touch and interact with waste generators. They tell them what they should do with the waste they generate…in the estates we have not gone up to that level….there has not been effective communication; it has not been done optimally the way it should be.
>
> (In Kiswahili) Hakuna mawasiliano…. Hatujawahi sikia mawasiliano yoyote kwa redio, hapa hawajali. Hamna mawasiliano kuhusu taka. Hilo halipo. (Group 2, Isebania town).
>
> (Translation) There is no communication…we have never heard communication on radio. They don't care. There is no communication about waste that does not exist.
>
> There is no communication….We have not been sensitized. Communication over the radio is only done when there are crisis and complaints from the community for example we here at Osaka have been complaining about accumulation of waste in this dumping site even on social media. In such a case they respond to such complains. We sometimes complain through the media. Waste management supervisors only come here if we raise complains; we must complain seriously. They come to inform us to give them time that the waste will be collected. There is lack of communication. There is no organized way of communication of waste management in this town. Communication only happens when we the community go out there to start complaining (Group 6, Migori town).

Findings from the community consistently showed that communication of SSWM was not done. From the survey 86 (37%) respondents mentioned that communication was not done

therefore they did not cite media used while 50 (22%) respondents do not know which media is used in communication of SSWM. 54 (23%) respondents noted that communication was done in radio; 15 (6%) respondents cited public citizen fora; 10 (4%) respondents cited chiefs' *Baraza*; 9 (4%) respondents cited waste management supervisors; 6 (3%) respondents cited stakeholder meetings; 2 (0.9%) respondents cited leaflets and posters.

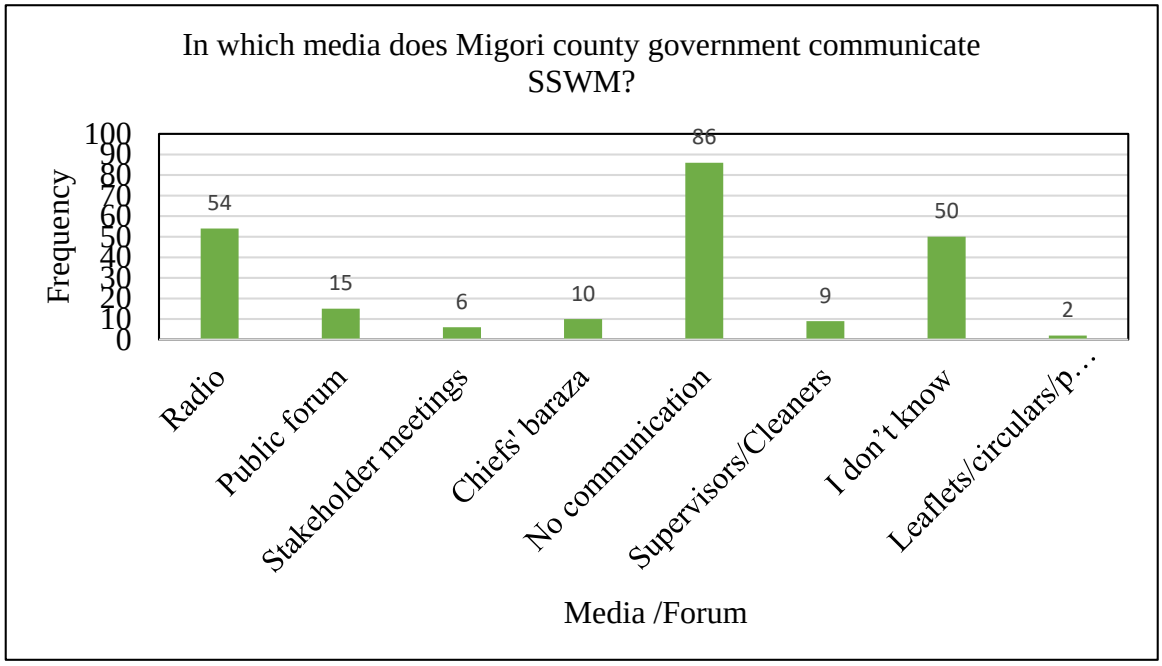

Figure 4. 5: Media used in communication of SSWM

(Source: Research findings, 2021)

Figure 4.5 shows high frequencies in lack of communication 86 (37%) and lack of knowledge on media used in communication of SSWM 50 (22%). This finding is consistent with findings shown earlier on limited communication of SSWM. The use of radio was more frequent in Migori town and least frequent in Isebania town where most respondents also mentioned that

there was no communication (Figure 4.6). This may imply that communication of SSWM was least done in Isebania town.

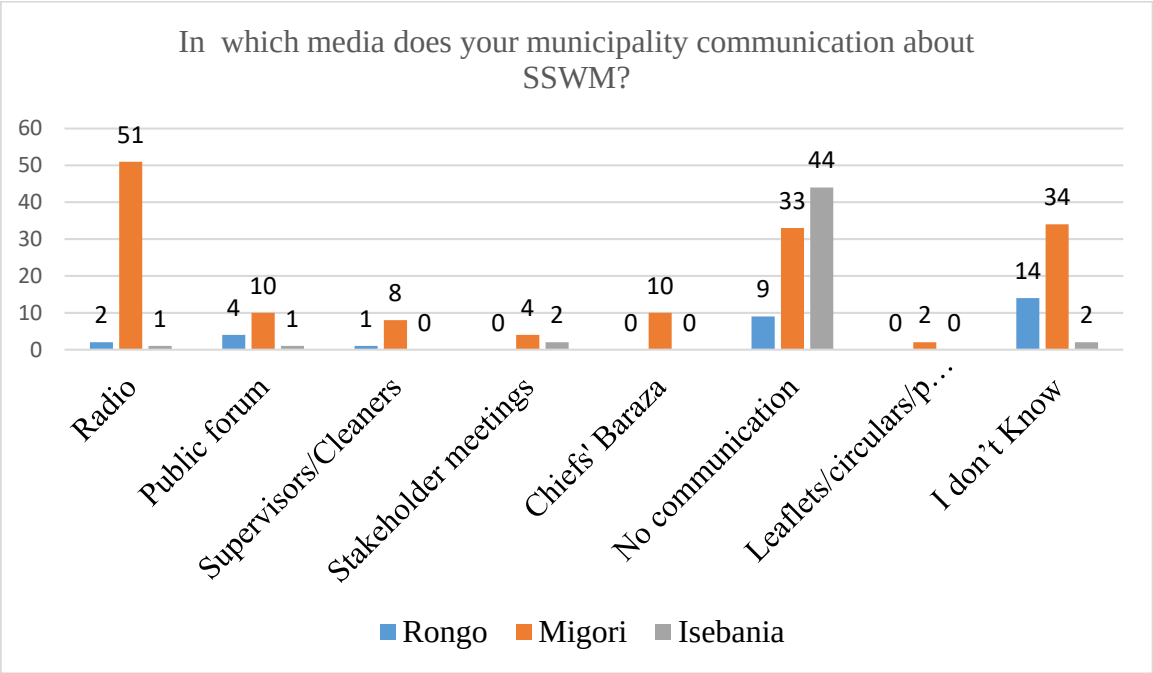

Figure 4. 6: Media used by municipalities in communication of SSWM

(Source: Research findings, 2021)

Findings showing that radio was the most frequent media used in communication was consistent with other studies which have shown that the mass media such as radio, T.V and print media are effective in creating environmental awareness including SWM (Moreno & Nunez, 2016; Patrick, 2015; Obuah & Okon, 2017). In this study though, communication of SSWM through radio was moderately frequent (23%) which can be attributed to limited communication of SSWM found in objective one of this study.

Whereas other studies looked at the use of radio for creating awareness through transmission of information on waste management, this study however found that radio was used (though

limited occasions) to create awareness and also to facilitate community involvement in discussions on SWM. During radio talk shows few community members in called-in on radio to ask questions or to complain about poor waste management in the towns. This is an indication that other than awareness creation, radio can be used to facilitate community dialogue in communication of SSWM.

The study however notes that radio were not effectively utilized to promote community involvement in communication of SSWM. The talk shows were found to be rare– conducted when there is public outcry on accumulation of uncollected solid waste. Community members hardly know when radio talk shows are conducted and so they do not participate in the discussions. This implies that radio had not been specifically identified as a forum for involving the community in discussions and making decisions on SSWM.

On access to media used in communication of SSWM, radio has the highest level of community access (85%) followed by Chiefs' baraza (26%) and public citizen forum (13%). Access to stakeholder meetings and waste management supervisors were least frequent (12%) as shown in figure 4.7. These findings on high level of community access to radio is in agreement with other reports which showed that public access to radio is high in Kenya (BBC Media Action, 2018; MCK, 2019).

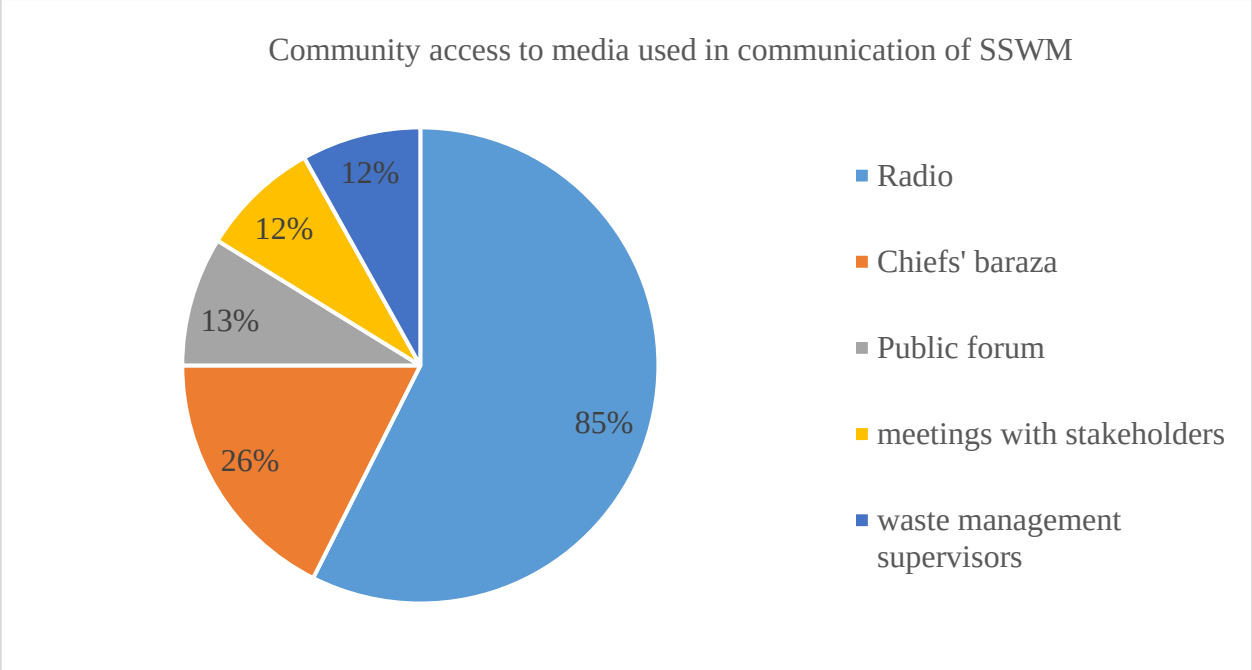

Figure 4. 7: Community Access to Media used in Communication of SSWM.

(Source: Research findings, 2021)

4.4.1.2. Access to Radio

The study found that five local radio stations: Radio Mayienga, Milambo, Onagi, Tarumbeta and Rameny were used by the department of environment and municipalities in the communication of solid waste management. However not all community members in Migori County have access to radio; others do not listen to radio due the nature of their work.

> Few of us take time to listen to radio. Because of the nature of our job we leave here so tired so we don't have time to listen to radio. During the day we are occupied in the market, you don't have radio by your side (Group 2, Migori town).

> We don't carry radio here to work because of these noise we produce at work. (Group 8, Migori; 3 Rongo)

This study found high frequencies on community access to radio across the three towns as shown in figure 4.8. In Isebania town most respondents; 45 (90%) have access to radio while 5 (10%) do not. In Migori town, majority 127 (83.6%) respondents have access to radio while 24 (15.8%) do not whereas in Rongo town 27 (90%) have access to radio while 3 (10%) respondents do not.

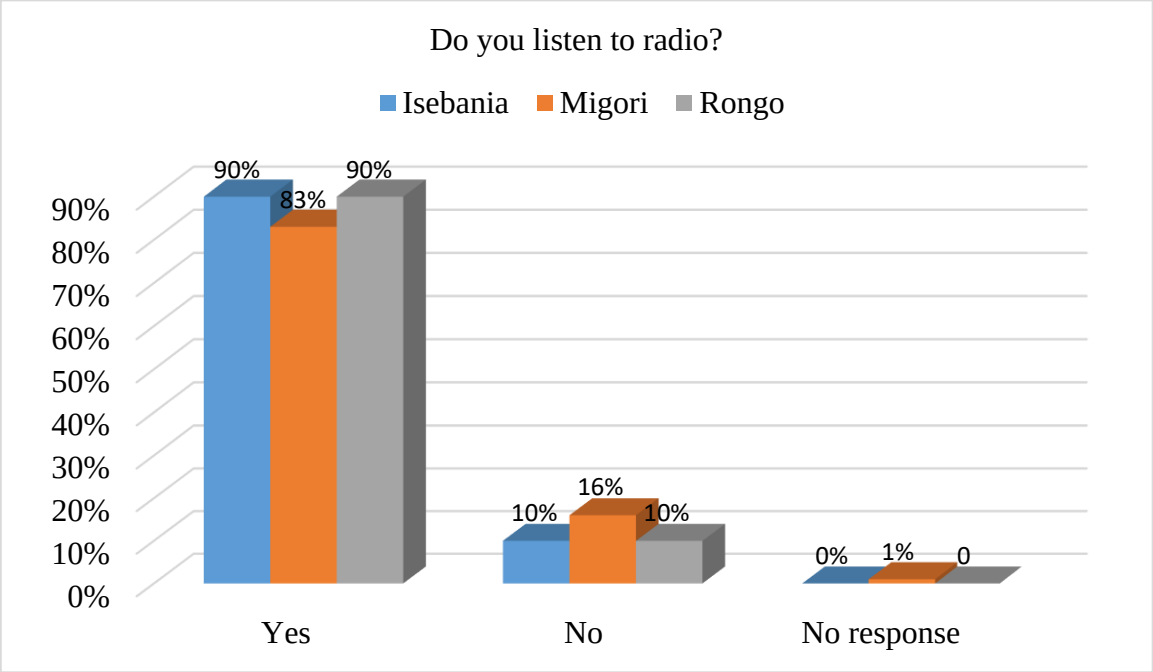

Figure 4. 8: Community Access to Radio in different towns.

(Source: Research findings, 2021).

Since there are several radio stations in Migori County the study found variations in the level of access to different radio stations. In Migori County, Radio Ramogi has the highest level of community access cited by 39 (17%) respondents followed by radio Citizen as cited by 34 (15%) respondents. However, some 32 (14%) respondents do not have preference for a specific radio station. Community access to Milele FM is 17 (7%); Milambo 14 (6%), radio Mayienga 13 (5.6%), Onagi 12 (5%), Radio Maisha and radio Rameny 9 (3.9%) each, Togotane 5 (2%) and Tarumbeta 1 (0.4%). Apart from radio Citizen and Milele FM which

broadcast in Kiswahili, the others are vernacular radio stations which broadcast in Dholuo and Kikuria (Radio Togotane) languages.

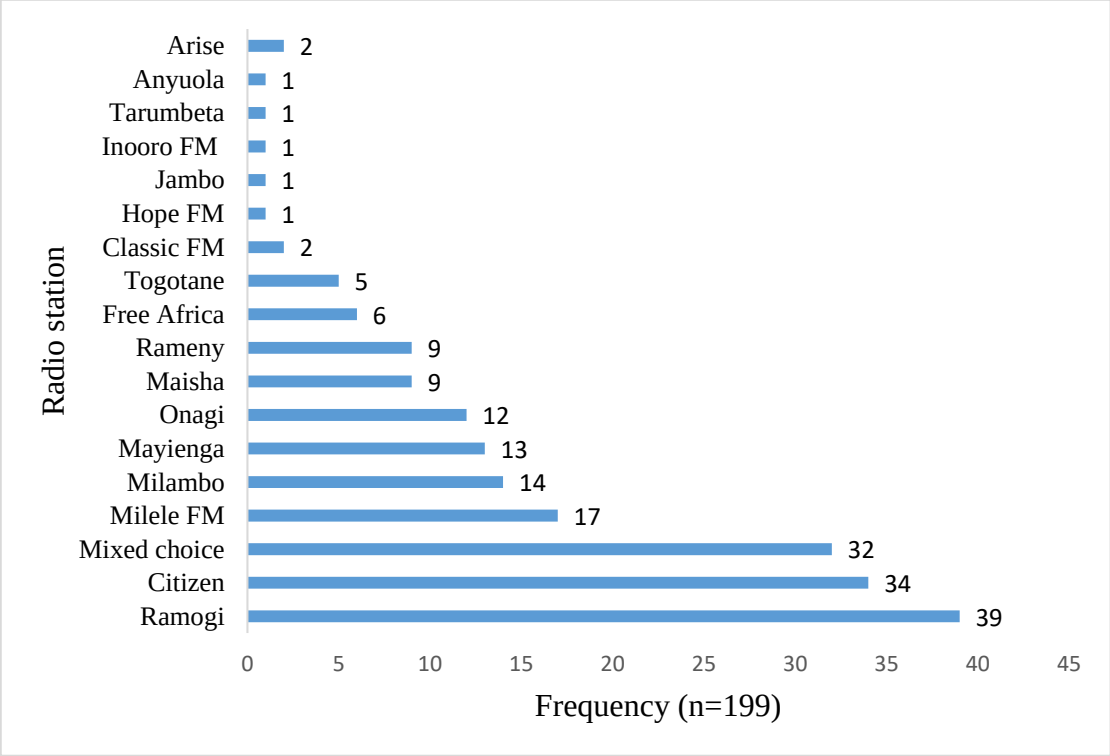

Figure 4. 9: Community Access to different Radio stations

(Source: Research findings, 2021).

Figure 4.9 shows that radio Ramogi has the highest level of community access while some 14% of the study respondents have access to a mix of radio stations. This high level of access to radio Ramogi is in agreement with MCK reports where radio Ramogi was ranked third most listened to vernacular radio stations in Kenya (MCK, 2021). High access to radio Ramogi in Migori County can be attributed to the fact that it broadcasts in Dholuo, the language of the dominant community in Migori County. This implies that radio Ramogi can be suitable for involving the community in communication of SSWM. Servaes (2008) posits

that effective participation should be conducted at the local level consider factors such as language. Since radio Ramogi is highly accessible to the communities in Migori County and also broadcasts in Dhlouo, it presents suitable public space for dialogic communication of SSWM among the community.

This study found variations in access to radio stations across the three towns. Radio Ramogi has the highest level of community access in Migori and Rongo towns as cited by 25 (16%) and 9 (30%) respondents respectively while in Isebania town radio Citizen has the highest level of community access as cited by 21 (41%) respondents. This variation can be attributed to the difference in the languages of broadcast used by the two radio stations. Radio citizen broadcasts in Kiswahili, the dominant language spoken in Isebania town while radio Ramogi is a vernacular station that broadcasts in Dholuo which is also the language spoken by most residents of Migori and Rongo towns.

Variation was also noted in community access to other radio stations across the three towns. In Migori and Rongo towns vernacular radio stations have the highest level of access; Ramogi (26%) Milambo (9%) and Mayienga (9%) in Migori town and radio Rameny and Ramogi (30%) followed by radio Citizen (10%) in Rongo town which broadcasts in national language. On the other hand, in Isebania town stations that broadcast in national language (Citizen 41% followed by Free Africa 12%). Have the highest level of access followed by vernacular radio stations (Togotane and Ramogi both 10%). Figures 4.10, 4.11 and 4.12 show access to radio in Rongo, Migori and Isebania towns.

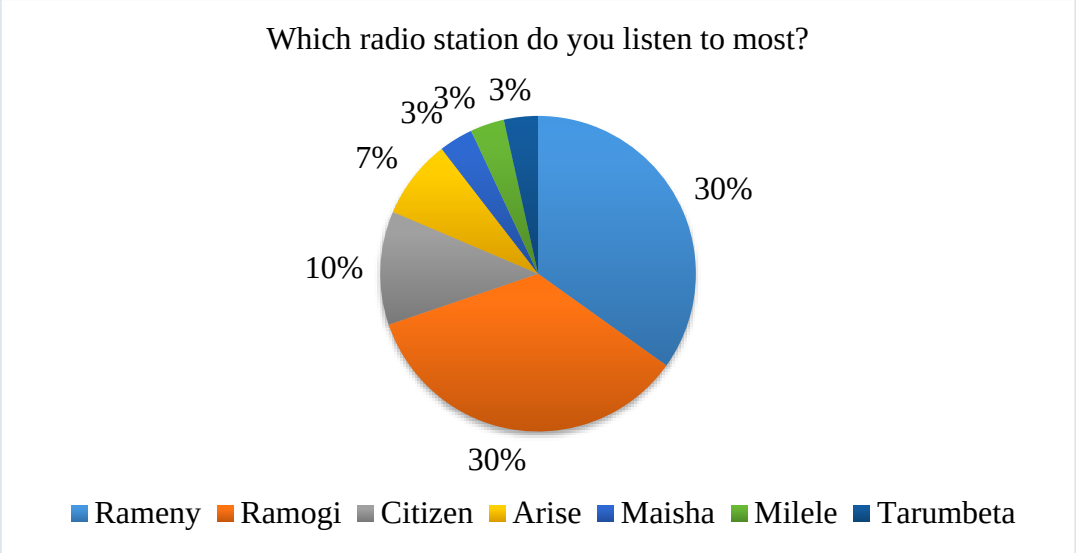

Figure 4. 10: Access to Radio in Rongo town

(Source: Rresearch findings, 2021).

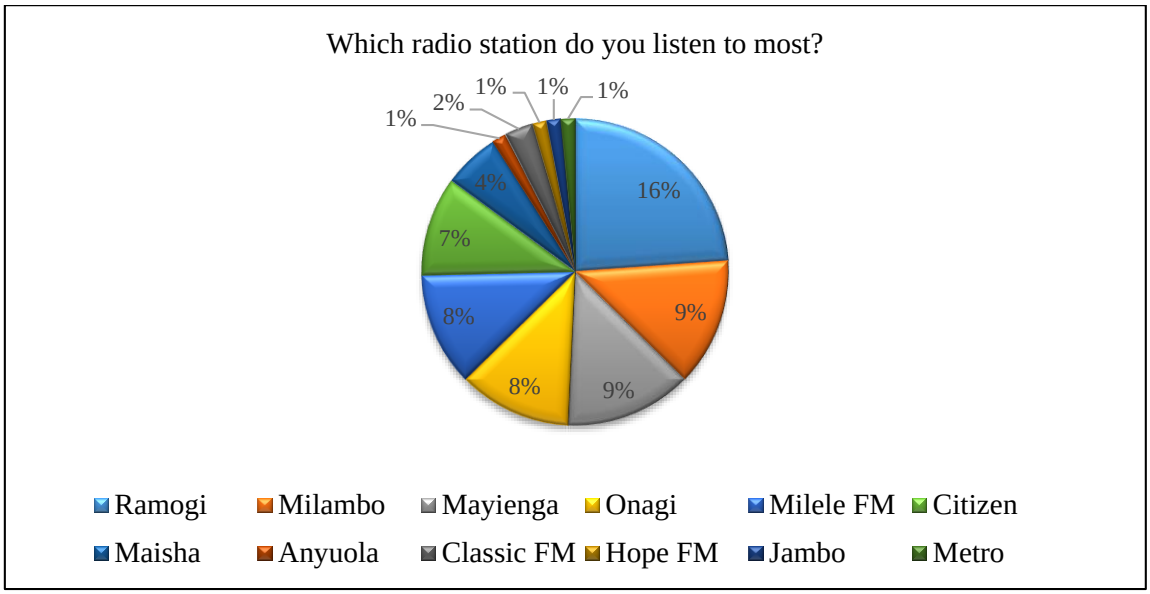

Figure 4. 11: Access to Radio in Migori town

(Source: Researcher findings, 2021).

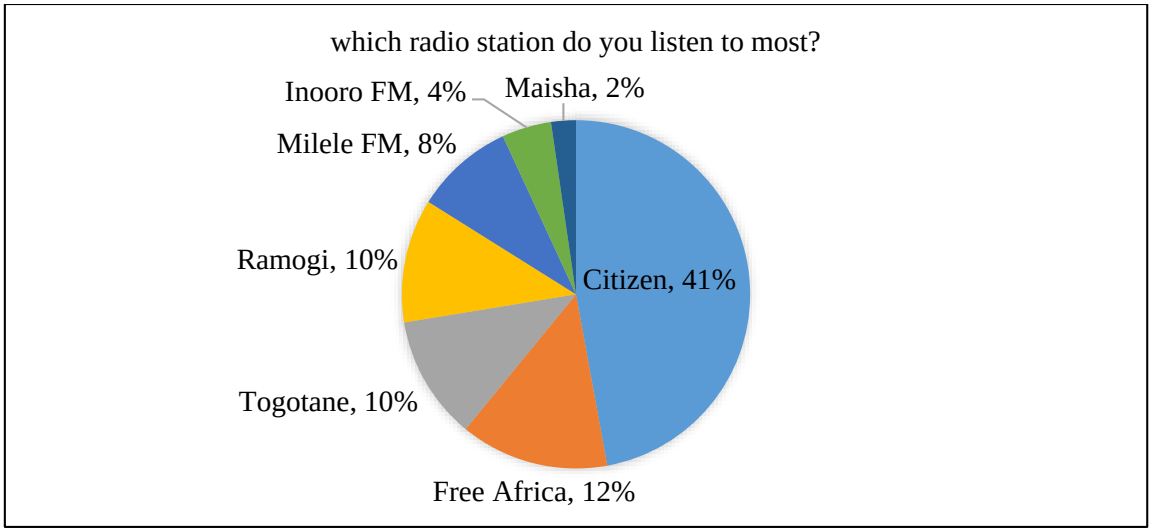

Figure 4. 12: Access to Radio in Isebania town

(Source: Research findings, 2021).

This study found some variation between radio stations used in communication of SSWM by departments in charge of waste management and municipalities and community access to radio. While radio Mayienga, Milambo, Onagi, Tarumbeta and Rameny were used in communication, radio Ramogi has the highest level of community access in Migori County. Similarly, in Isebania town communication of SSWM had not been done through radio, yet the residents have moderately high level of access to Radio Citizen (41%). This variation between choice for radio and community access to radio in Migori County may affect community access to information and involvement in communication of SSWM. Therefore, effective community involvement in dialogic communication of SSWM in a pluralistic media environment requires mapping of communicative ecologies within the community so as to determine technology of choice and how this determine communication in those systems.

4.4.1.2. Access to Public Citizen Forum

This study found that public citizen fora have mainly been organized to discuss county budgeting as required by the constitution, planning for town development and security matters but not communication of SSWM. Findings showed limited access to public citizen forum. According to the municipality community members are less motivated to attend public fora unless there are some monetary gain, otherwise they would prefer going to their usual businesses and to fend for their families. On the other hand, communities feel that invitation to public forum meetings is bias and majority do not have information on when and where the meetings are held.

> Public forum meetings are organized politically. They invite those who support them politically and if you are seen to belong to a different political wing you will never get the chance to speak. In fact those who are given chance to speak in the fora are predetermined. The organizers inform them in advance so those with neutral opinion hardly get chance to speak. Speakers are chosen prior to the meeting (K.I.14)
>
> (In Dholuo) Idhi mana e public participation koluongi, koro kikia to idhi nade? Onge time ma waseyudo information ni gima kama dhi timore. You cannot attend a meeting you know nothing about. (Group 8, Migori town)
>
> (Translation) You can only attend public forum if you are invited, how do you go if you don't know? There isn't any time we have gotten information that such a thing is going to take place. You cannot attend a meeting you know nothing about.
>
> Public fora are complicated, you may find that meetings are held but those invited are not representatives of traders; they have no connection at all and sometimes you (representatives) are not informed that there was a meeting. I'm not sure how invitations to those meetings are done (K.I. 22).

This study found convergence between qualitative and quantitative findings on limited access to Public fora. Majority, 200 (86%) of the study respondents do not have access to public citizen forum. Out of these 200, 94 (40%) respondents do not access public citizen fora due to lack of information on when and where the meetings are held, 48 (21%) respondents do not access public for a because they are not invited, 25 (11%) respondents do not attend due to other commitments while 4 (2%) respondents feel that the meetings are not useful to them.

Some 10 (4%) respondents mentioned that public citizen fora are not organized in their towns while 19 (8%) respondents have no reasons for lack of access. Lack of information was the main reason for limited access to public citizen in all the three towns as shown in table 4.8

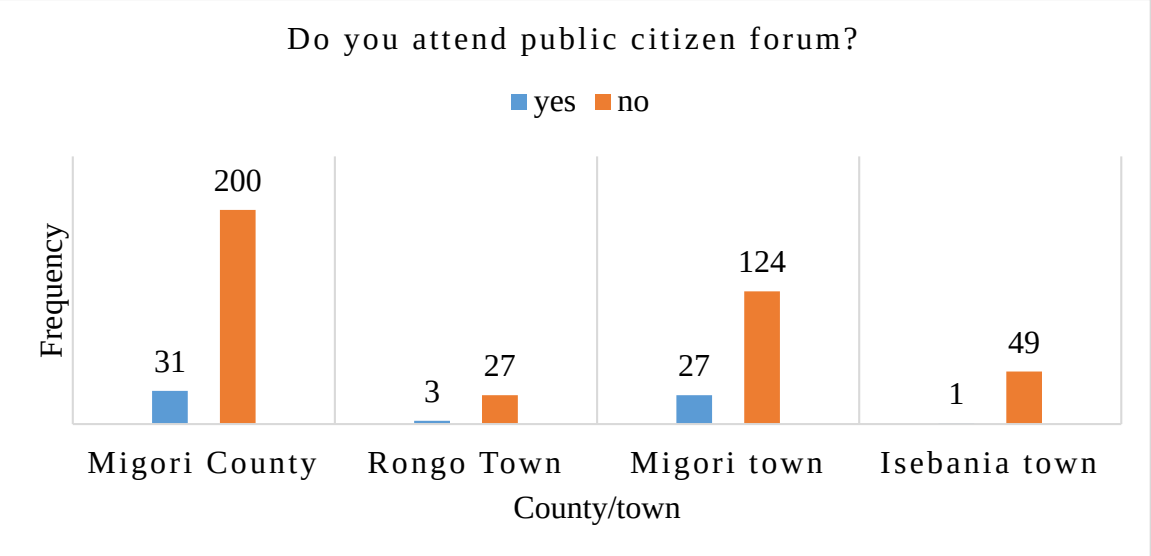

Figure 4. 13: Community Access to Public Citizen Forum.

(Source: Research findings, 2021).

Table 4. 8: Reasons for Limited Access to Public Citizen Forum

Reason	Migori county	Rongo town	Migori town	Isebania town
Lack of information	94(40%)	14(47%)	57(38%)	23(45%)
Lack of invitation	48(21%)	9(30%)	26(17%)	13(26%)
Other commitments	25(11%)	3(10%)	21(14%)	1(2%)
Not useful	4(2%)	-	4(3%)	-
There are no citizen fora	10(4%)	1(3%)	-	9(18%)
No response	19(8%)	-	16(11%)	3(6%)
Total	**200**	**27**	**124**	**49**

Findings which showed limited access to public citizen fora by the community are in agreement with other studies (Ross & Yukalang, 2017) which showed poor attendance of public meetings. Whereas Ross and Yukalang (2017) found that poor attitude and other commitments such as fending for themselves limit people from attending public meetings, this study found lack of information about those fora as the main reasons for lack of access to public forum. Personal commitments and poor attitude contributed minimally (4%). Lack of knowledge about public fora among the community is in disagreement with provisions of the public Participation Bill (2019) which provides that public forum be open to participation by all and be publicized prior to the meeting. This study however found that most community members hardly know about public forum. Limited access to public citizen forum may prevent the community from being involved in communication of SSWM which in turn affects their participation in making decisions on SSWM.

4.4.1.3. Access to Stakeholder Meetings

This study found that consultative meetings are held between municipal leadership, department of environment and representatives of different sectors in the community. However, it was also found that some community representatives do not attend stakeholder meetings due to lack of invitation. In addition, some sectors in the towns were found to be unrepresented during the stakeholder meetings.

> K.I.8: Communication can be done once a month with representatives. We call them when there is need. We cannot call everybody for discussion, they go and address their members.
>
> K.I.20: you may find that meetings are held but those invited are not representatives of traders; they have no connection at all and sometimes you (representatives) are not

informed that there was a meeting. I'm not sure how invitations to those meetings are done.

K.I.16: Sometimes some sector leaders are not invited to attend meetings, sometimes information about the meetings is issued to leaders in the last minute so you can't even attend.

4.4.1.4 Access to Chiefs' *Baraza*

This study found that few people attended chiefs' *Baraza*. Community members in this study felt that Chiefs' *Baraza* are no longer active and are only meant for clan elders. The study established that matters discussed in the *Baraza* include security and maintenance of law and order but not SSWM. Therefore even those who attend *Baraza* have limited access to information and participation in communication of SSWM in the *Baraza*.

> Here we have a clan elder but there is not time they've talked about waste management. May be if there is a disease, but waste management, there is no such thing (group 4, Migori town).
>
> There is no way you can ask a clan elder something about waste management because he will tell you to go to the environment office (Group 9, Migori).

> (In Kiswahili) Sasa baraza unaweza enda uwaambie maneno ya taka itolewe kwenye bararaba? Si watasema ni nani amekuambia hayo, nani amekutuma ulete mjadala kama hiyo hapa. Baraza unapeleka maneno Kama umeibiwa ama shamba umeibiwa Kama mtu amekutoa kwenye shamba ndiyo unaenda kwa baraza lakini maneno ya uchafu huweezi enda huko (Group 4 Isebania).
>
> (Translation) You cannot go to the Baraza to start telling them that waste should be removed from the roadside, they will ask you who sent you to take such agenda to the Baraza. In the chiefs Baraza you take information such theft, issues of land if stolen or someone has evicted you but you cannot take issues of waste to chiefs' Baraza) (Group 4, Isebania).

Survey findings showed that access to chiefs' Baraza was less frequent 60 (26%). Majority; 169 (73%) do not have access to chiefs' *Baraza*. Less frequencies on access to *Baraza* was found in all the three towns. In Rongo town, only 2 (7%) respondents have access to chief's baraza, while in Migori and Isebania towns 41 (27%) and 17 (34%) respondents respectively have access to Chief's *Baraza*.

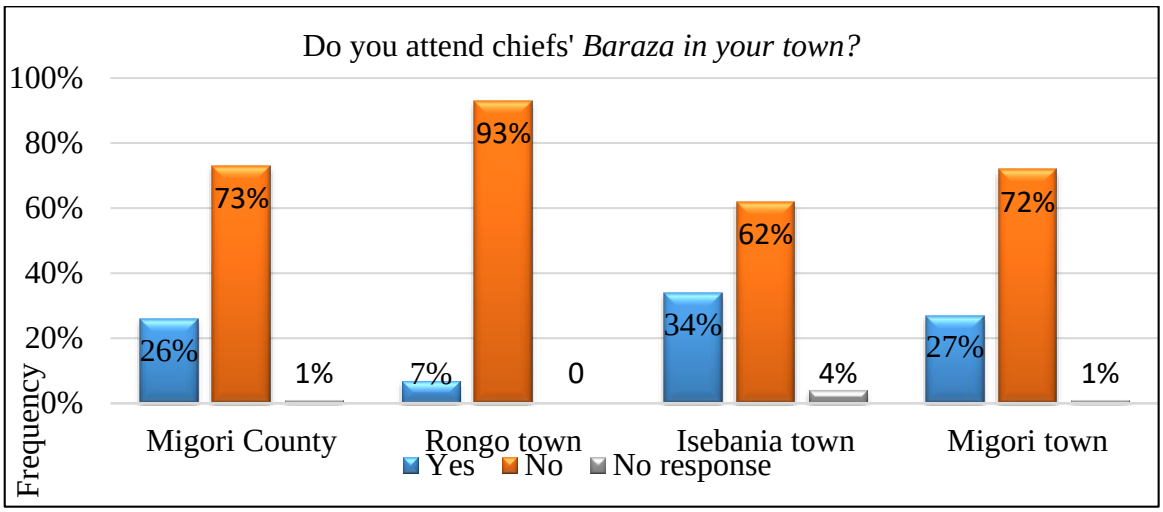

Figure 4. 14: Community Access to Chiefs' Baraza

(Source: Research findings, 2021).

Figure 4.14 shows limited community access to chiefs' *Baraza* in all the three towns. Due to limited community access to Chiefs *Baraza* and reasons that SSWM is not discussed in Chief's *Baraza*, the *Baraza* may be inappropriate for community participation in communication of SSWM. These findings are similar to another study which showed that poor attendance of baraza by the community and limited focus on CDF matters in the Baraza hampered community participation in the communication of CDF projects (Akong'o & Oluoch, 2017). Chiefs' *Baraza* serve administrative functions of the government at the grassroot level therefore the chiefs hardly engage in other matters non administrative.

4.4.1.5 Access to Waste Management Supervisors and town cleaners

According to the department of environment and natural resources and the municipalities, waste management supervisors should sensitize the community on keeping the environment

clean. Waste management supervisors also reported that they interact on a daily basis with waste generators whom they tell how to manage solid waste including the use of skips located in the towns.

> When there is a problem in the markets or outside the town, we normally visit the areas we address them we advise them on how we can work together with them, let them have that information about waste, so when our people are working there they don't have any problem (K.I. 6).

There were conflicting findings on access to waste management supervisors. The study found that most community members do not know and have not been engaged in communication of SSWM with them. Community members mentioned that waste management supervisors are concerned with supervision of waste collection; they do not sensitize the community on SSWM. This was in contrast to findings from the department of environment which showed that waste management supervisors are involved in communication of SSWM with the community members. In addition, town cleaners also feel that they do not have powers to involve the community in the communication of SSWM and since this is not clearly outlined in their duties, they hardly engage the community in communication of SSWM. In Isebania town, one employee who handles waste had this to say:

> I can communicate but I don't have the powers….the leaders in town pass all the waste scattered all over…who am I to talk to these people?(cleaner, Migori town).
>
> *(In Kiswahili) Hakuna kitu kama mawasiliano hapa. Kwani Mimi ndiyo nitaongea na watu kuhusu taka kama viongozi hawajali? Mimi nitawaambia nini? Sisi hata hatujaliwi, hamna malipo kwa miezi…hatuna vyombo vya kazi….eh...nitaongea nini?*
>
> (Translation) There is nothing like communication (about waste) here. Why should I talk about waste when those who should be concerned like leaders are not? What will I tell people? They do not care about us, we are not paid for months, and we lack working tools…eh! What will I talk about?)

In summary, findings on community access to media used in communication showed high level of access to radio (85%) and limited access to other media used in communication of

SSWM including public forum and Chief's *Baraza*. These two factors may limit public fora and Chief Baraza from effectively facilitating community participation in SSWM. Access is critical to participation in communication. Access to media used in communication of SSWM provides the community with opportunity to give their views on SSWM therefore limited access to media implies limited participation. Freire (1970) argues that people must be given the opportunity to speak their voice their own way therefore lack of access to media used in communication of SSWM is a deterrent to the individual right to information and participation.

In order to obtain conclusive findings on community access to media and participation in SSWM, this study went further to determine community access to information about SSWM from media used in communication discussed above.

4.4.2. Access to SSWM Information

This study found limited access to information on SSWM across all media used in communication of SSWM in Migori County. This can be attributed to limited communication of SSWM by the county government as found earlier in this study. The use of media inaccessible to the community may also hamper community access to information on SSWM.

This study found that Municipalities of Rongo and Migori had used radio in two occasions only showing limited communication. In Migori town, the department of environment used radio Mayienga, Milambo and Onagi in two occasions to communicate about SWM yet findings in this study showed that radio Ramogi has the highest level of access among residents of Migori town. This implies that most community members did not access that information. Similarly, in Isebania town 88% of the respondents have access to radio yet it is not used in communication of SSWM. The leadership in Isebania mentioned that they use

Chiefs' Baraza yet this study found that access to Chiefs' Baraza in Isebania town is only 33%.

> We hear the ministry of health talking about waste management in Radio Ramogi once in a while but they mostly concentrate in Nairobi. We have not heard any from Rameny - these local radio stations (Group 4, Rongo town).
>
> I have heard radio Nam Lolwe and Ramogi talking about SWM in Kachok and Nyalenda in Kisumu but I have not heard any about Migori or Rongo. In most cases I don't tune in those local radio stations, I tune in radio Nam Lolwe, Ramogi and Dala FM, then radio Tarumbeta. In radio Tarumbeta I have only heard songs and preaching not SWM (resident, Rongo town).

There are those who have limited access to information on radio due to timing of information on radio. In Migori County small scale artisans (*Juakali)* and women traders have limited access to information from radio due to conflict in timing of radio programmes and their daily activities. During the day the women sell at the market and in the evening after work they are busy attending to matters of the home and preparing food to their families, a factor that could hamper their access to information on radio. In addition, the artisans get engaged in noisy work therefore cannot not listen to radio during the day.

Other than access to information on radio, there was also limited access to SSWM information from Chiefs' *Baraza* and waste management supervisors which may have resulted from limited communication of SSWM through these media. Community members noted that they neither know waste management supervisors nor obtain information about SWM from them.

> Chiefs don't talk about waste management. We have never heard about chief talking about SSWM (Group 3, Migori town).
>
> In the chiefs' baraza information such theft, issues of land (if stolen or someone is evicted are discussed but not issues of waste. (Group 4, Isebania town).
>
> Chief does not get involved in SSWM that is the work of county not chief. Waste management is handled by the environment not chiefs. (Group 9, Migori town).

K.I.16: The supervisor sometimes just walks round and if he finds uncollected waste, he calls the leader of town cleaners who get to that place and ensures that waste is removed. He does not talk to us or the traders about how to manage waste.

Similarly, those who handle solid waste in the town do not engage the community on SSWM. This is partly due to lack of capacity to communicate about SSWM and poor attitude of the community towards those who handle waste. In Isebania town, one of the people who handle solid waste in the town expressed this as follows:

K.I.13: (In Kiswahili) Hakuna kitu kama mawasiliano hapa. Kwani Mimi ndiyo nitaongea na watu kuhusu taka kama viongozi hawajali? Mimi nitawaambia nini? Sisi hata hatujaliwi, hamna malipo kwa miezi…hatuna vyombo vya kazi….eh…nitaongea nini?

(There is nothing like communication here. How will I talk to the community about waste if leaders do not, what will I tell them? We are not taken care of, there is no payment for months, and we don't have working facilities, uh! What should I talk about?).

This study also found limited access to information about SSWM from community representatives. Apart from few meetings they attend where SSWM is given limited attention, the community representatives do not receive training on SSWM. It is therefore not practically possible for the representatives to engage the community in discussions on SSWM. Consequently, the community do not access information on SSWM from community representatives.

The study found convergence between qualitative and quantitative findings on access to SSWM information. Access to SSWM information is less frequent in all the media used in communication, the highest being radio with only 23% as shown in figure 4.15.

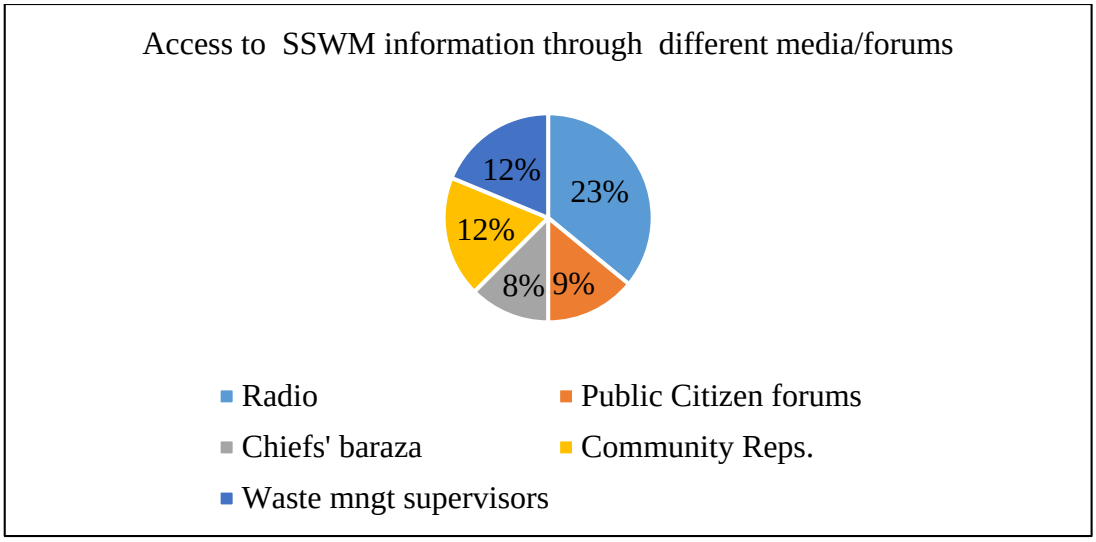

Figure 4. 15: Community Aaccess to SSWM Information.

(Source: Research findings, 2021).

Less frequencies on access to SSWM information as shown in figure 4.15 may be attributed to limited communication of SSWM shown earlier in this study. Noticeably, access to SSWM information does not correspond to access to media (shown earlier in figure 4.7). While there were high frequencies of access to radio (85%) (Figure 4.7) access to SSWM information on radio was found to be less frequent (23%) (Figure 4.15). Similarly, limited access to Chiefs' *Baraza* for example in Migori (27%) and Isebania towns (34%) (Figure 4.14) does not correspond to very minimal access to SSWM information from the *Baraza* which is only 8%. On the other hand, less frequencies in access to public citizen forum (for example 18% in Migori town) is directly proportional to less frequencies in access to information on SSWM from the citizen forums (11%). These findings confirm the finding on limited communication of SSWM in Migori County and imply that limited communication of SSWM contributes to limited access to SSWM information.

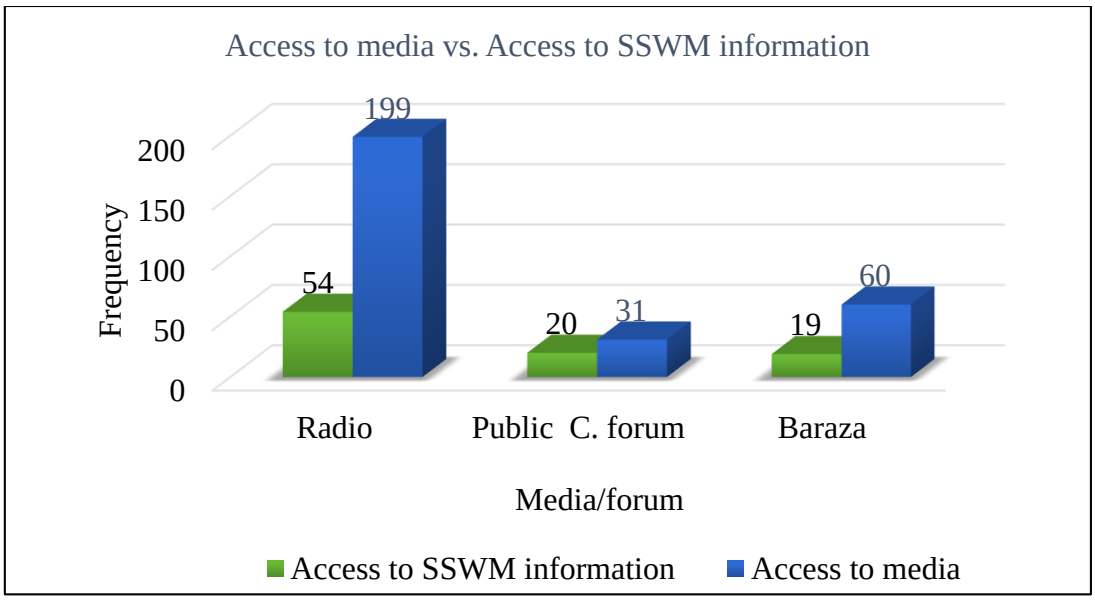

Figure 4. 16: Access to media and information on SSWM

(Source: Research findings, 2021).

Findings on limited access to SSWM information in this study is in disagreement with provisions of the Stockholm Convention on community access to environmental information and the National Waste Management Strategy which provide that community should have access to information about solid waste management (NEMA, 2015). Access to information is also a human and constitutional right. It not only builds a knowledgeable society but also helps in making informed decisions and participation in social development. Limited community access to SSWM in this study may contribute to lack of information and limited knowledge on SSWM among the community which translates to their inability to make appropriate decisions on SSWM. In addition, access to information is a precursor to effective participation.

To draw conclusion on access to participation, respondents were asked to give their views on their access to participation though media used in communication of SSWM.

4.4.3 Access to Participation in Communication of SSWM

This study found limited community access to participation in communication of SSWM which can be attributed to limited communication of SSWM and lack of appropriate structures for community participation. The following reports from respondents depict this scenario.

> K.I. 1: There is still a lack of communication between the public and the county government and especially due to lack of framework and the proposed Migori county solid waste management bill shall address that.
>
> K.I. 15 ….Asedhi e (I have attended) a number of public participation. Waste management imiyo time matin saana. Waste management is accorded very limited time. SWM is not given time for discussion. Public health just ask if we have toilets, but this waste we have out here they don't ask. Waste is not given attention by this government.
>
> The department of environment does not involve people on the ground to discuss about waste management (community representative, Rongo town).
>
> We have not heard communication about SSWM in this town. If they are done in meetings, we don't attend those meetings. We don't even know where and when they are held (Group 5, Migori town)

There were consistencies in qualitative and quantitative findings which showed that only 53 (23%) respondents have access to participation in the communication of SSWM. 14 (28%) respondents had participated through radio, 11 (22%) through public citizen forum, 7 (14%) through stakeholder meetings in the community, 4 (8%) through waste management supervisors, 5 (10%) Chiefs *Baraza* while 1 (2%) respondent did not answer. Some 6 (11%) respondents participated in communication of SSWM in schools, social groups and churches while 3 (6%) respondents used social media.

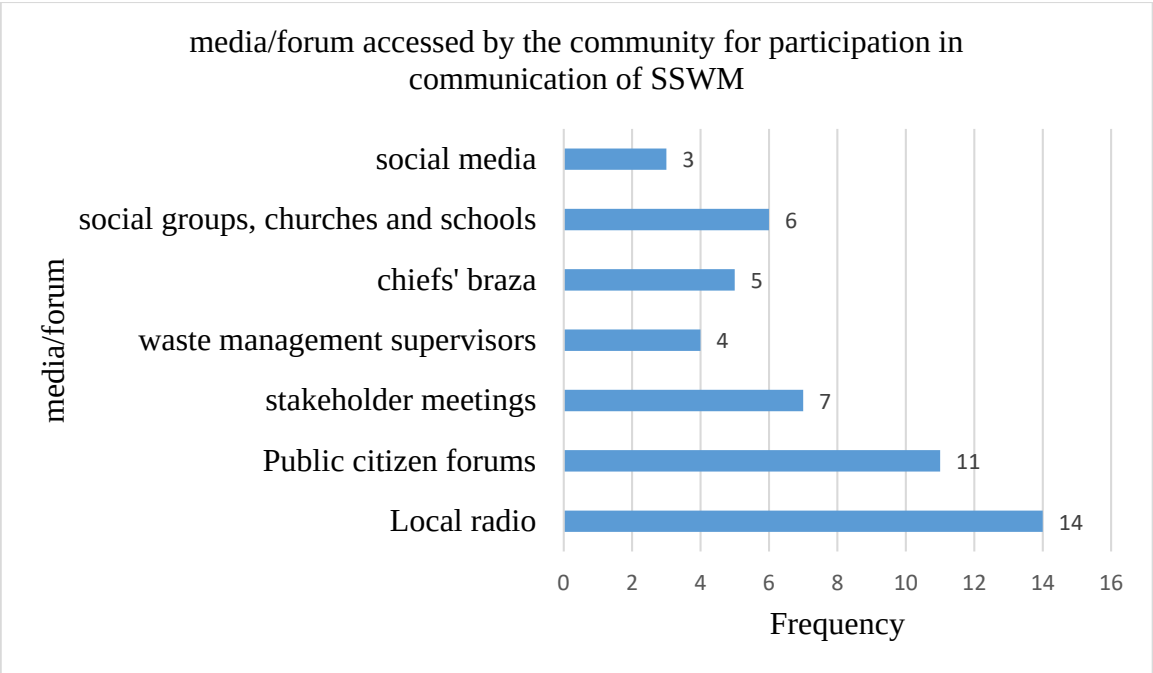

Figure 4. 17: Community Access to Participation in Communication of SSWM

(Source: Research findings, 2021).

Table 4. 9: Access to Media, Information and Participation in communication

Media/channel	Access to media	Access to SSWM information	Participation in communication
	(n= 232)	(n=232)	(n=53)
Radio	199(85%)	54(23%)	14(28%)
Public Citizen forums	31(13%)	20(9%)	11(22%)
Chiefs' *Baraza*	60(26%)	19(8%)	5(10%)
stakeholder rep. meetings	28(12%)	28(12%)	7(14%)
Waste management supervisors	29(12%)	29(12%)	4(8%)
Social media			3(6%)
Churches, social groups, schools	**-**	**-**	**9(17%)**

Figure 4.17 shows that most of those who participated in communication were only 53(n=232), majority of whom (only 14) used radio. Among the media that are used for communication of SSWM, chief's *Baraza* is the least accessible for participation in communication of SSWM.

This study found inconsistencies between access to media and access to participation in communication of SSWM as shown in table 4.9. Findings indicate that even where level of access to media is highly frequent, access to participation was less frequent. This finding is could be attributed to earlier findings in this study which showed that the community are not involved in communication of SSWM due to lack of frameworks for community participation in communication of SSWM. Though access to radio is more frequent, access to information and participation in communication of SSWM through radio is less frequent. This may indicate that radio has not been effectively utilized to facilitate community participation in the communication of SSWM. Other studies have shown that Radio can be used to facilitate participation of rural communities in social development such as control of soil degradation, deforestation and waster waste (Shahzala & Hassan, 2019).

This study also found that some members of the community participate in communication of SSWM through youth and women groups, schools and churches yet municipalities and department of environment have not utilized them in the communication of SSWM. Findings indicate that community access to participation in communication of SSWM through social groups is more frequent (17%) than Chiefs' *Baraza* (10%), waste management supervisors (8%) and stakeholder meetings (14%). This is an indication that social forums in the community may provide networks for community participation in communication of SSWM.

Similarly, some community members (11%) participate in communication of SSWM through social media though these media have not been utilized for communication of SSWM in Migori County. This indicates that social media may be appropriate for community participation in communication of SSWM. Other studies (Khan and DongPing, 2017) found that social media has the potential of promoting community engagement while Kahur and Chahal (2018) found high exploration of environmental issues on social media among users. If properly structured, social media presents appropriate networks where communities, especially the youth can participate in planning and decision making on SSWM.

Findings from this study on the use of interpersonal communication between opinion leaders and the community disagreed with other scholars who argue that interpersonal communication can be effective in creating social change (MaQuail, 2005). Those who were involved in communication of SSWM with community representatives were very few (14%). However this study established that due to limited capacity and lack knowledge and empowerment on SSWM among the community representatives they were unable to practically communicate about SSWM with the community members.

From these findings we can conclude thus: Access to media is crucial for information participation; however, there is need for structures for participation in order to ensure effective community participation. Institutions must provide not only information in those media but also appropriate communication structures for participation.

It is also evident that radio, especially community radio, provides a voice to the local communities and a space for democratic participation in development programmes. Gabriel, (2015) found that repeated coverage and campaign on the environmental issues on radio influences peoples' behaviors and attitudes towards waste management. In a similar way,

high numbers of vernacular radio stations in Kenya has widened democratic space and promoted informed citizenship. Local radio stations that broadcast in local languages provide a public sphere where local issues are discussed leading to social transformation. Community radio is radio by the people for the people. Its aim is to give the community a voice and promote their participation in matters of concern to them. This study found that community radio provides public space where the community interrogate the county government on poor waste management. This form of participation is related to activism, a concept that contributes to self-management which is effective in raising public concern and generating debates on SSWM that raise the community consciousness.

In spite of the advantages presented by radio, this study established that radio has not been effectively utilized to promote community participation in communication of SSWM. Few community members participate in communication of SSWM due to lack of information and structures for their participation. Based on these findings, governments can leverage on the existing several vernacular radio stations in the country to promote community participation in the communication of SSWM. Participation can be improved by engaging the community in production of radio content that gets recorded and aired for the rest of the community.

Other than radio, this study found some level of access to participation using face-to-face meetings; however some of these forums were found to be inappropriate for community participation in communication of SSW. Most community members do not attend public forums, stakeholder meetings and Chief's *Baraza*. Secondly, due to the formal structures of public forums and Chief's *Baraza*, community participation in communication of SSWM in these fora was found to be ineffective since limited attention is accorded to SSWM. Besides,

few community members are given chance to speak and those who speak in public fora are sometimes predetermined while others may find it difficult to speak before a large audience.

Pezzullo and Cox (2018) argue that state sponsored public hearings where citizens are invited to participate in communication falls short of real public sphere. Public sphere do not exist in formal boardrooms and state convened meetings; they exist in ordinary everyday gatherings such as markets where the community interact. Cox suggests that,

> A public sphere is not necessarily a monolithic nor a uniform assemblage of all citizens in the abstract but the real of influence created when individuals engage in discussions, it assumes more concrete forms such as calls to local talk radio show, letter to the editor, blogs and news conferences (Cox, 2010 p. 45).

Nevertheless, since baraza brings people of the same neighbourhoods with similar characteristics including families and clans together, this similarity and proximity to locales where solid waste is generated such as households makes Chiefs' *Baraza* appropriate for participatory communication of SSWM. Servaes (2008) suggests that location for participatory communication should be carefully chosen to reflect the needs of the community communication including language used. In addition, Chiefs are recognized opinion leaders capable of mobilizing the community towards an action therefore can be effective in promoting community dialogue on SSSWM.

Meetings involving community representatives held in hotels and boardrooms may be ineffective in promoting community participation in communication of SSWM. Solid waste is not generated in boardrooms. The aura in hotels creates an illusionary short-lived pleasant

experience of a clean environment which is the exact opposite of a filthy environment outside the hotels. This feeling alienates the representatives from the real problems and contradicts the very reasons for community participation in communication of SSWM, especially in communities faced with challenges of poor solid waste management. Cox (2010) observes that participation in environmental matters in meetings which are held in boardrooms and hotels with invited guests are ineffective. He also adds that formal state organized functions create an abstraction of the reality on the ground which makes it ineffective to engage in real discussions of the problems of waste. This study found that the attendees of the stakeholder meetings feel that meetings are mere formalities since whatever is discussed is not practically implemented. Further, majority of waste generators who are left out of the discussions feel unrecognized in the solid waste management programmes thereby failing to own those programmes.

This study suggests that capacity building for SSWM should incorporate practical realities of the community which are found in the locales where solid waste is generated. Practical experiences provided in communities in a participatory arrangement is one of the best ways to empower the community towards SSWM. In Sweden, government organize direct interaction of the community with waste recycling plants as a way of increasing awareness and influencing peoples' attitude towards waste management (Stavchuk, 2005).

Though community representatives are gatekeepers who are useful in creating social change through interpersonal communication, this study found that they have not been effectively utilized to promote social change in SSWM. Waste management supervisors are unknown to the community and most members of the community do not know who represent them in stakeholder meetings. Besides, this group does not engage in communication of SSWM due

to lack capacities in SSWM. Nonetheless, this group can be used to promote participatory communication within their networks such as groups they represent in the community.

Though Migori county government does not use social media in the communication of SSWM, positive interests on use of social media among residents of Migori County indicate that social media can provide networks for community participation in communication of SSWM. Availability of technologically advanced mobile phones, improved internet coverage networks in Kenya, high level of internet access and increasing usage of social media among the Kenyan public, especially in urban areas strategically positions social media as the next hub for government-community engagement on environmental matters. Other than access, the affordances of social media; including the capabilities of production of user generated content and participatory communication through one-to- many and many-to-many enable users to create, share, discuss content which can contribute to empowerment and collective decision making that is much useful in SSWM.

4.5 Strategic Messages Communicated for Sustainable Solid Waste Management

This study wanted to assess communication of strategic messages communicated for SSWM. The intent was to ascertain community knowledge of SSWM thus add to the rationale for community participation in communication of SSWM. Seven (7) key informants from the department of environment and eight (8) from Migori, Isebania and Rongo municipal management were interviewed on strategic messages communicated for SSWM. Data obtained was further corroborated from the community using focus group discussions and questionnaires.

The study found that the key message communicated for SSWM was use of dustbins for waste disposal. During stakeholder public meetings and radio talk shows the department of

environment and the municipalities created awareness on the use dustbins and skips located in the towns.

K.I.3: The key message that we have passed is make sure you have a dustbin in front of your shop. Don't put waste in drainages, they block the drainages.

K.2: We tell those basic things like use of dustbins….We teach them on recycling; you can have these uhuru bags, you can use them as much as possible to reduce the number of uhuru bags that you use- they are washable.

K.I.4: We have communicated about litter bins that everybody or every enterprise must have. Two, we have also talked about reuse. We have communicated to the community that if you have something that you can use again then don't dispose of it. In our last citizen forum 3R was stressed. We also stressed on segregation of waste. During our last citizen forum solid waste management expert stressed on segregation. We encourage the community to take waste to the transfer station.

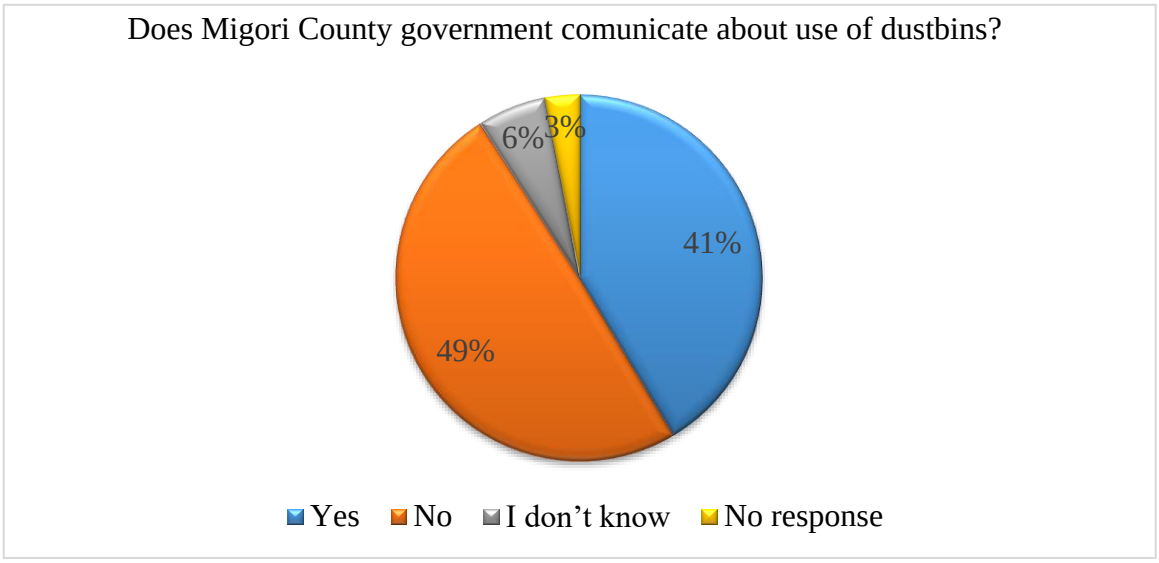

Figure 4. 18: Communication of use of dustbins

(Source: Research findings, 2021).

From the survey findings, 95 (41%) respondents agreed that use of dustbin was communicated while majority 115 (49%) disagreed as shown in figure 4.18.

The study sought to know whether SSWM (3R) is communicated in Migori County. Findings from the department of environment and natural resources indicated awareness on recycling and reduce waste was done but they do not communicate about waste separation due to lack of waste separation facilities in the county.

> K.I.2: Segregation is a problem; actually to us it is the final end before recycling. When you want to separate waste then even the vehicle you'll use for transportation must have compartments for separation….so separation of waste as a county we've not embraced'. Burning is a common practice even though we don't encourage it.

Majority comprising 158 (68%) respondents disagreed while 39 (17%) agreed that reduce waste was communicated. Majority of the study respondents; 171 (73%) mentioned that recycling was not communicated and only 26 (11%) respondents agreed. On waste separation, 20 (8%) respondents said Yes, 173 (75%) said NO, while 39 (17%) do not know. When asked whether re-use of solid waste was communicated 164 (70%) respondents disagreed while 30 (13%) agreed. Only 21 (9%) mentioned that communities were discouraged from to burning solid waste while 170 (73%) respondents said No. Another 24 (I0%) did not know. Burning of solid waste was used as because it is an easy option of reducing solid waste that often accumulates in the disposal sites. Overall, lack of communication of SSWM messages was more frequent as shown in figure 4.19.

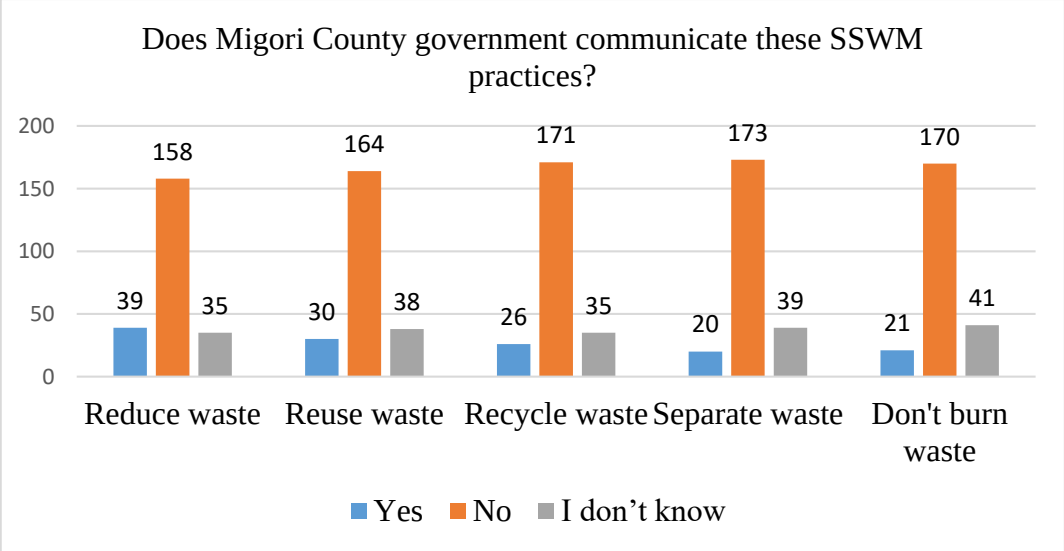

Figure 4. 19: Communication of Strategic SSWM Messages

(Source: Research findings, 2021).

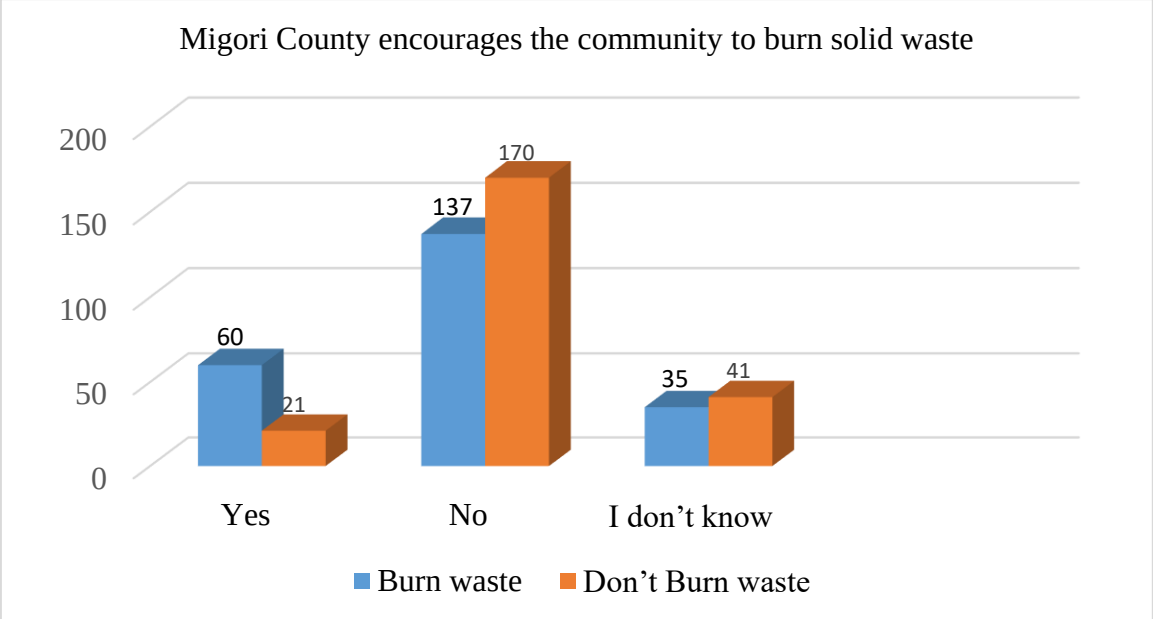

Figure 4. 20: Communication of burning of solid waste

(Source: Research findings, 2021).

From these findings, Migori County government mainly communicate waste collection and disposal as a solid waste management strategy; messages on 3R are given limited priority. Though the National Waste Management policy states that county governments should create awareness on reduce, reuse and recycle solid waste, Migori County government has done very little on this. These findings are similar to report by Ombis (2017) who mentioned that county governments in Kenya have done very little in the promotion of 3R.

4.5.1 Community Knowledge of SSWM

Key informants from the department of environment, municipality and the community were asked to give their opinions on awareness of SSWM among the community. All the 23 key informants who participated in this study mentioned that knowledge of SSWM (3R) among the community is very limited. Study participants observed that most community members do not manage solid manage waste effectively due to lack of knowledge. Table 4.11 displays respondents' views on community knowledge of SSWM.

There were consistencies in qualitative and quantitative findings which showed limited knowledge on SSWM practices among the community.

Table 4. 10: Community Knowledge of SSWM practices

Do members of the community in your town know about Reduce, Reuse, recycle waste?	
Source	Participants' views
K.I.2:	Awareness is too low. On a scale of one to ten; 3. Not that they don't know what should be done completely, but on the 3R, recycling is so much higher, even for the government. It involves a lot to reach those levels of recycling. Recycling is for the elite, a given class. It is the scavengers that pick plastics and take to who recycle waste. As a generator of metallic waste you'll not find me taking that metallic waste to the recycling point.
K.I. 4:	Few know about 3R. These things are communicated extensively in the public forum so may be if you don't attend and probably those who attended the meeting are not free to share the information then it may be hard for you to learn. We need to improve on public awareness, increase our level of one on one interaction; may be of we can just do a weekly program then this thing will stick on the minds of the public.
Group 2, Isebania town.	(In Kiswahili) Ni wachache (wanajua) sababu, unajua maswala ya taka, mafundisho hayapo. Halafu kuna wale wanafaa kuja kufundisha watu; wanakuja wanasema kama hii area mnatoa taka mnapeleka sehemu Fulani; Hakuna. Si wanafaa kufundisha watu; si hawako sasa. (Translation) Few people know because you know issues of waste, there is no education. Then there are those who are supposed to come and teach people for example in this area dispose your waste in such a place, that isn't there. They are not there.)
Group 3, Migori town	*Ere kaka* (How can the) county government will teach us when they themselves have failed. A rotten dog is placed in the skip until people make noise. They have failed. We have never heard any education about waste management from any officer in Migori. I listen to Onagi, Milambo, Ramogi, and Lolwe. They've not been there. We know of one (meeting) which was done in heritage hotel but they discussed about road.
K.I.15:	People do not know. They have not been educated on how to handle waste. There is very shallow knowledge on how to manage solid waste. The government has not reached the people to educate them. There is no proper channel to communicate to the proper on how to control and manage solid waste.
Group 1, Isebania town	*(*Kiswahili) *Hapa kwetu, taka ni taka. Hakuma kutenganisha taka.* (Translation) Here waste is waste, we do not separate waste.

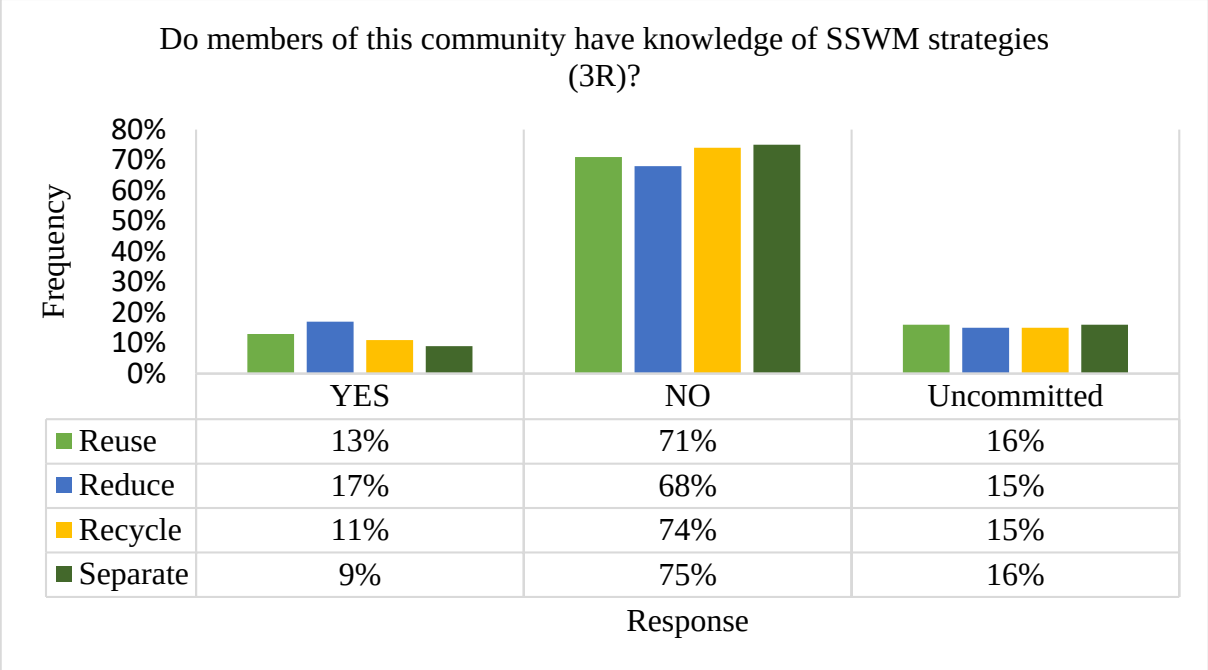

Figure 4. 21: Community knowledge of SSWM strategies

(Source: Research findings, 2021).

From figure 4.21 lack of community knowledge on 3R was more frequent. Limited knowledge on 3R can be attributed to lack of focusing on strategic SSWM messages in the communication. Similar findings were shown in others studies which highlighted that lack of awareness on sound waste management affected waste management in practices in Africa (Guerrero, et al., 2013; Ombis, 2017).

This study found that awareness level in regard to waste management and open burning of waste is still very low amongst the general population. Due to lack of knowledge some community members burn solid waste as a mechanism for solid waste reduction. Burning of solid waste produces GHGs which contributes to global warming and respiratory infections. Respiratory infections reported is to be the third causes of deaths in Migori County yet burning solid waste is one of the most preferred methods of solid waste management

practices. This behaviour can thus be attributed to limited knowledge on effects of burning solid waste among the public as found in this study.

Limited community knowledge on SSWM may be attributed to lack of communication of 3R. The community therefore do not have access to information on 3R. As pointed out earlier, strategic messages should have a significant impact on individuals' behaviour. Achievement of this requires that communities are involved in communication which gives them opportunity to share their lived experinces in waste management. This is opposed to 'banking' knowledge on SSWM in them which lives them with limited chances to critically interrogate the situations they live in. In addition, meanings of symbols used in communication are socially constructed, thus in order for SSWM messages to impact people, symbols used should be culturally relevant to the community. When the community becomes the source of knowledge, commmuncation becomes an embodiment of the peoples' way of life including how they relate with their environment which in turn affects how they manage solid waste.

This study found that some community members have knowledge that can be tapped and utilized in communication of SSWM strategic messages. This include some carpenters, tailors and mechanics who engage in reuse, reduce and recycling of solid waste. On the other hand, in Osaka, a trading area in Migori town, traders lack knowledge on what to do with waste generated from their carpentry and hotels businesses. These people collect solid waste and burn them on the road or dump together with other large amounts of solid waste generated from Migori market in an illegal dumpsite found in Osaka.

Based on findings from this this study involvement of the tailors, mechanics and carpenters in communication of SSWM strategic messages would help tap local knowledge and experience in SSWM and promote community understanding of 3R.

4.6 Communication Networks for Participation in Communication for SSWM

In order to design communication networks for community participation in communication of SSWM, interviews were first conducted with informants from the department of environment and the municipalities to obtain in-depth information on communication channels they use for community participation in communication of SSWM and challenges these networks face. Focus group discussions were then held with community members to obtain views on their communicative norms and their preferred communication media. These findings were then subjected to a larger sample using questionnaires to determine their replicability to the larger community.

Findings showed that formal communication networks are used to involve the community in the communication of SSWM. Communication from the department of environment and natural resources to the community follows a hierarchical top-down flow from the directors of environment through an officer in charge of solid waste management to waste management supervisors attached to the sub-counties who link the department of environment with the community. Other channels used in communication include radio, Chief's baraza, and public forum and community representatives.

> K.I.2: In our structures we have supervisors on the ground we also have municipalities and public health. All these work together to disseminate information to our people.
>
> K.I. 4: We are working on a solid waste management strategy and plan from where we will come up with a structure of communication. So far information is communicated by the environment officer.

The study found several challenges to community participation in communication of SSWM. One of the challenges with the top-down communication using waste management supervisors is incomplete communication. Majority in the community do not receive information about SSWM from waste management supervisors. Only 29 (12%) of the survey respondents had access to information about SWM from the supervisors. The study found that inadequate human resource and limited capacities hampered communication by waste management supervisors. In Rongo town for example, one supervisor is in charge of Rongo town and its environs including local markets such as Rakwaro and Opapo. Since Rongo town has a human population of 20,688 (KNBS, 2019) meeting all these town residents was a challenge.

It was also found that communication about SSWM is not clearly structured at the town level which inhibits community access to information on SSWM and participation in communication of SSWM. For example, whereas sometimes meetings are held between the municipalities and community representatives, the study found that some sectors in the towns like residential areas are not represented in the meetings. In addition, some representatives do not attend those meeting due to lack of information. In Isebania town public meetings were found to be rarely held.

The study also found that due to lack of clear communication structures for community involvement in communication of SSWM, department of environment and municipalities use other gatherings like public citizen fora and chiefs baraza to communicate SSWM to the communities. Unfortunately, these fora are poorly attended. They are also not organized for discussions of SSWM but for other agenda; consequently, discussions and community participation in communication of SSWM is given limited priority in those meetings. Study

participants mentioned that they used radio because there were no clear channels where they can engage with the county government in discussions about waste management with the county government.

K.I. 1: there is still a lack of communication between the public and the county government and especially due to lack of framework and the proposed Migori county solid waste management bill shall address that.

K.I. 2: That meeting organized by the lands department was not about solid waste management it was about municipality. The meeting was organized by the lands department …. But now on the key functions of municipalities, waste management is one of them so I had to be called to inform them about new laws and their responsibility….. Communication is not effectively done, it should be structured

K.I.3: There is no communication structure used

K.I.5: There is no programme for communication.

In Isebania town the leadership mentioned that the department of environment should create forums where SSWM can be discussed since chiefs' *Baraza* are inadequate. In Migori town, traders mentioned that communication through representatives is not satisfactory and they need forum organized for discussion of SSWM where they can express their concerns. Unfortunately, such forums are not available. This was captured during focus group discussion as follows:

P1, P 2& P3*:* *(they were in agreement) (in Dholuo) Wan ywakwa wamiyo jotendwa to ok wayud dwoko.*

(Translation) We channel our complaints to our leaders but we don't get feedback.

P1: *Mondo wawinj buch galamoro mondo water e pachwa.*
(And in order for us to obtain information about public forum where we can complain….)

P1, P3, P4 and P5 *:(in unison)…. (In Dholuo).be onge.*

(Translation) this too does not exist.

Another challenge is inadequate and incomplete communication between the county governments and the communities which hampers government- community collaboration. Due to lack of structures, communication between the departments in charge of waste management at the county level and the communities and coordination of community participation in communication of SSWM has not been realized. Due to lack of clear communication structures, feedback from the community was also found to be rare. In Isebania town, solid waste carried by wind and vultures from a dumpsite located within the residential units in Seloset estate ended in houses and affected children and underground used by residents. Though it posed serious health hazards to residents, there was no forum where they could express complaints about the dumpsite.

> (In Kiswahili) "*Watu wanalalamika kichinini…lakini tutaambia nani…..siku moja MCA akipita barabarani kwa mfano watu walimsimamisha."*
>
> (Translation) People complain silently here and in case the MCA passes here accidently we stop him to express our complaints.

In *Juakali* estate in Rongo town, residents living next to an illegal dumpsite feel that the county government does not care about solid waste from the neighborhood strewn all over the place up to their doorsteps. Due to lack of clear communication channels where they can express their views to the municipality, the residents resolved to poor solid waste management mentioning that they cannot collect waste from other parts of the town yet solid waste is strewn up to their doorsteps. Though they have dustbins in their houses, they no longer use dustbins but throw solid waste anyhow like the rest in their neighborhood do.

From these findings, lack of communication structures and appropriate communication channels may have hampered collaborative communication between the community and the County government of Migori. Coupled with limited community access to media used in

communication found in this study respondents were asked to suggest the communication channels they prefer for their participation in communication of SSWM.

4.6.1 Media preferred by the community for participation in communication

Finings in this study showed that the community prefer radio, community meetings in residential areas and locations of business, women and youth groups, churches, social media, chiefs' baraza and public forum for their participation in communication of SSWM. Table 4.11 present participants' views on their preferred media and forum for participation in communication of SSWM.

Table 4. 11: Media preferred by the Community

Question: In your opinion which media or forum is the most appropriate for involving you in communication for SSWM?	
Source	Response
FGD 3 (Migori town)	They should meet traders in the market and educate us instead of waiting for public forum. If we meet here many people will give their views. They will listen to everybody. We should have regular meetings in the market like after every two weeks so that we give out views.
FGD 3 (Isebania town)	Community meetings at the village level will create awareness to all including those who do not know how to manage waste in their homes. *Nyumba kumi* clan elders can involve the people so that we take care of cleanliness.
FGD 2 (Isebania town)	We request that clan elders involve the people at the clan level…They can also create awareness though radio Togotane since it has a wide coverage
FGD4 (Migori town)	*(In* Dholuo mixed with English*)Radio chopo ne ji, but here is problem in that there are many radio stations. Here people tune different stations so if the information is passed in radio Milambo and yet I tuned Ramogi, wachno dhi baya, onge kaka ibiro winje. Some information biro kaloni nikech ok ni tune radio miwache. An, kaka an, Milambo ok aket; Onagi.* (Translation) Radio reaches everybody, but the problem is that there are many radio stations. Here people tune different radio stations so if the information is passed on radio Milambo and yet I tuned in Ramogi, that information will bypass me, there is no way I will get it. For example, I don't tune in Radio Milambo but Onagi.

Views of community members from group 3 in Migori town (shown in table 4.11) are similar to those made by one of the key informants who suggested that there is need to increase the level of interaction between the county government and the community on communication of SSWM.

> K.I. 4: Few know about 3R. These things are communicated extensively in the public forum so may be if you don't attend and probably those who attended the meeting are not free to share the information then it may be hard for you to learn. We need to improve on public awareness, increase our level of one on one interaction; may be if we can just do a weekly programme then this thing will stick on the minds of the public.

It was found that preference for community meetings in the residential areas and business locations was based on three reasons: They are highly accessible, convenient and provide opportunity for practical learning on solid waste management at source. Familiarity with other community member and small number of meeting attendants which allows effective participation also made these fora more preferred. Groups in the community like *bodaboda* (motorcycle riders), hawkers and traders in the market hold regular meetings in the locations where they work therefore they find these familiar venues accessible and convenient for participating in communication with experts who can then show them how to manage the waste they generate. In other studies (Pezzullo & Cox, 2018; Sinthumule & Mkumbuzi, 2019) community members failed to attend public hearings on environmental discussions due to personal commitments and businesses; therefore, holding meetings in venues most convenient for the community as preferred by communities in this study is one way of improving community attendance of meetings and improving their participation in communication of SSWM.

Similarly, study respondents felt that communication of SSWM in residential areas can be improved through networks in residential areas where landlords can hold collaborative dialogue on SSWM with their tenants. One of the landlords who participated in this study engages her tenants on how to avoid littering in residential areas and gave this perspective as follows.

> (In Kiswahili) Ili wapangaji wangu waishi pahali safi, inabidi Mimi nigaramie usafi. Inabidi nilipe hela kivyangu ili landi zangu ziwe safi. Ilibidi niwaelimishe kwa sababau yenye mmoja huyo anaweza sababisha watu wasiishi pale. Mimi naongea na wapanagaji wangu. Nawaambia kuliko mnarusharusha (taka) kila sehemu, magunia ndiyo hayo; mnaweka uchafu kwenye gunia mpaka wakati wanaofuata uchafu wa serikalini wakipata wapate uchafu kwenye gunia ndiyo wapate urahisi wa kubeba uchafu wote. (Landlord, Isebania town).
>
> (Translation) In order for my tenants to stay in a clean environment, I am obliged to pay the bills for cleanliness. I pay on my own so that my plot is clean. It forced me to educate my tenants since if one does not observe cleanliness, the rest may not stay in the plot. I talk to my tenants. I tell them instead of littering, put waste in these sacks until the time the municipal waste collectors come then it will be easy for them to collect all the waste at once).

In another group, participants felt that community meetings held in the work locations bring communities who share similar experiences together. The local people understand the nature of waste they generate and the challenges they encounter locally therefore instead of attending meetings in boardrooms and hotels they are best suited to discuss how they can manage solid waste at the local level among themselves. This observation was reported as follows.

> K.I.23: (In Dholuo) Gimoro amora joma ni e ground ema ong'eyo...ok ng'at machielo. Kata ka idhi e village ka ok ipenjo. Challenges joma nikanyo ema ong'eyo. Ang'o mamono ja environment biro e stage ka mondo owinj pach jopiny modo okaw pachwa... An ok anyal aa ka adhi ng'iyo gima chiro en; jo chiro bende ok nyal biro ka…ok dang' ikon ja stage ni odhi e meeting e chiro, ok obidhi. Wuo gi jogi gi kaa. Ka udwaro ler wuo gi jogi ka: eh...un unene nade... e chiro kucha Jo chiro nyalo, Jo Apiko kuma gitiye nyalo. Olos buche matindo tindo mondo opuonj ji kaka nyalo rito ler. Kosetim kamano tee e sector tee korka itero e radio.
>
> (Translation) People at the local level understand their issues better than outsiders, even at the village level if you ask. Challenges are understood by the people themselves. Why can't the department of environment come here and get peoples' opinions. I cannot leave this place to attend a meeting in the market, even those people in the market cannot come here. Talk to these people here; if you want cleanliness involve the people where they are- at the market, bus stage and even motorcycle operators where they work. Hold small meetings with different

> sectors and educate people how to manage waste. After doing this with different sectors then you can take it to the radio (Community representative, Rongo town).

These views resonate with advances by Servaes (2008) who argues that local people understand their problems better than outsiders therefore they are better placed in finding solutions to those problems.

The question on media preference was posed to a larger quantitative sample from the community whose results are shown in figure 4.19. Most community members prefer participation in communication of SSWM in meetings held in residential and work locations. (35%) followed by radio 75 (32%). 31 (13%) respondents prefer participating in social groups in the community such as women and youth groups and churches, 10 (4%) respondents prefer Chiefs' *Baraza*, 29 (13%) respondents prefer social media while only 7 (3%) respondents public citizen forum.

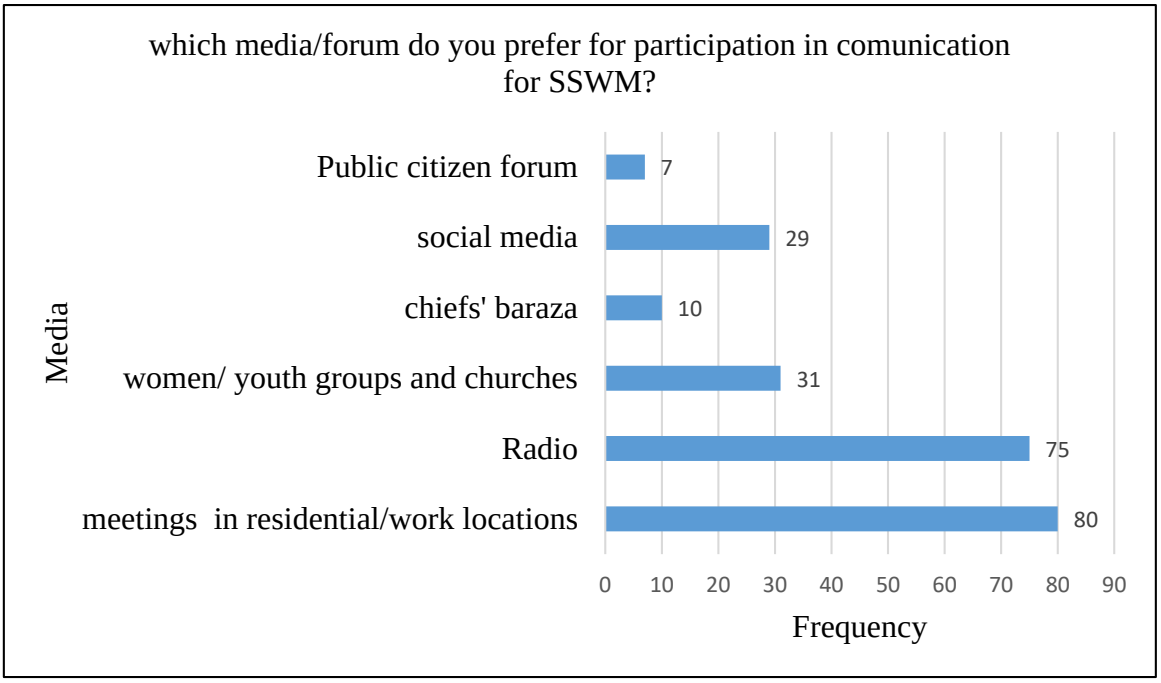

Figure 4. 22: Media preference for participation in communication of SSWM

(Source: Research findings, 2021).

Figure 4.22 shows that preference for public forum and Chiefs baraza were less frequent. This finding was consistent with other findings earlier which showed that Chief's Baraza are poorly attended and that limited attention is accorded to SSWM in these forums. These findings are in agreement with arguments made by Pezzullo and Cox (2018) that public hearings are ineffective in ensuring public participation in decision making during environmental conflicts due to inability of some community members to speak in front of large crowds and strangers.

4.6.2 Media preference by age and gender

Study findings showed that those aged 40 and above mostly prefer meetings in residential and work locations (40%) followed by radio (32%). Those aged 35-39 mostly prefer meetings in residential and work locations (32%) followed by radio (26%). Those aged 30-34 prefer radio (36%) to meetings (32%) while those aged 18-24 prefer meetings (33%) followed by social media and radio both 26%. This last age group has no preference for chief's *Baraza* and public citizen forum as shown in figure 4.22.

Table 4. 12: Media preference by Age

Age bracket	total	%	Media preference					
			Meetings in residential/work locations	Radio	Social media	Chief's baraza	Social groups	Public forum
18-24	42	18%	14 (33%)	11(26%)	11(26%)	0	6(14%)	0
25-29	46	20%	15 (33%)	12(26%)	10(22%)	1(2%)	7(15%)	1(2%)
30-34	44	19%	14 (32%)	16(36%)	4(9%)	2(6%)	7(16%)	1(3%)
35-39	34	15%	11 (32%)	9(26%)	3(9%)	3(9%)	6(18%)	2(6%)
40≥	63	27%	25 (40%)	20(32%)	3(5%)	4(6%)	8(13%)	3(5%)
unspecified	3	1%	1	1	1	0	0	0
Total	**232**	**100 %**	**80**	**69**	**32**	**10**	**34**	**7**
%	100		35%	30%	14%	4%	15%	3%

In terms of gender, more males than females prefer meetings in estates and places of work as well as public forum. Whereas six (6) males prefer public forum, only one (1) female preferred public forum for their participation in the communication of SSWM. This could be attributed to other duties like house chores and child bearing done by women which may limit them from attending public forum meetings.

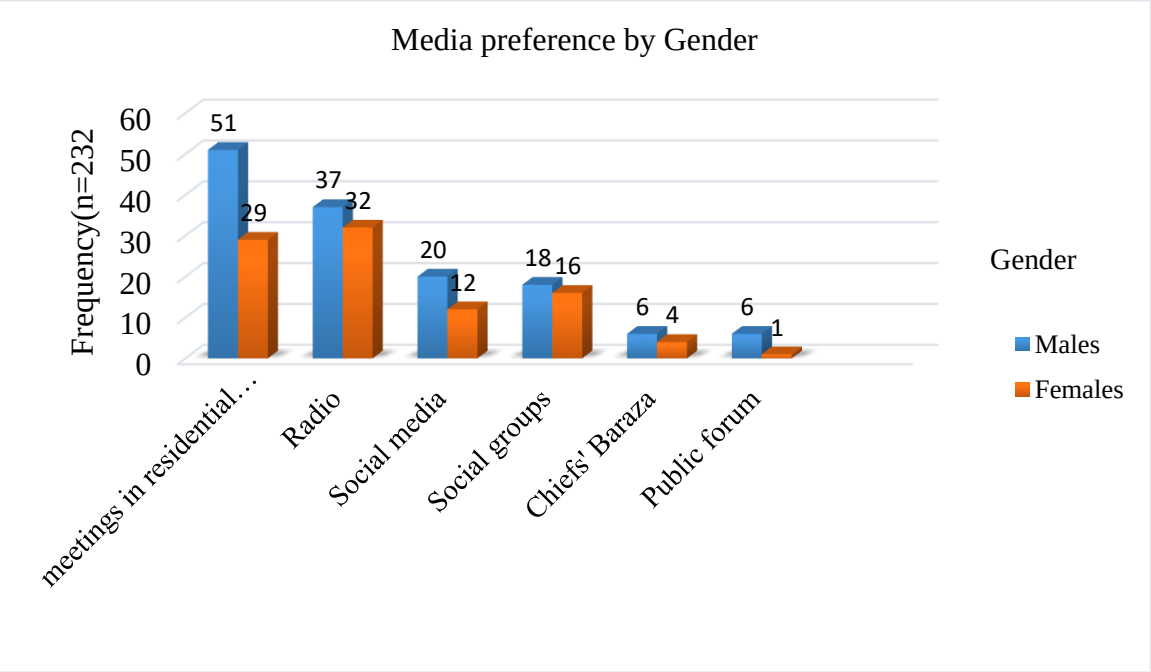

Figure 4. 23: Gender preference for Participatory Media.

(Source: Researcher, 2021).

Findings showing high level of preference (35%) for meetings in residential and work locations can be attributed to their proximity to areas of residence with familiar people and places where solid waste is generated. Since study respondents mentioned that other personal commitments and lack of information about public form meetings hinder them from participating in communication of SSWM, meetings conducted in the neighborhood and

places of work may be more convenient. This finding was in agreement with arguments by Cox (2010) who posits that,

> Public sphere exist outside formal boardrooms and state convened meetings; they exist in ordinary everyday gatherings where the community interact such as markets. Discussion and debate about environmental concern often occur outside government meeting rooms and courts. These could be public squares or market places where citizens gather every day to sell farm produce, tools, clothes and other items and also exchange ideas about the life of the community (p. 45).

Participation of the community in communication of SSWM should be done at the lowest local level most convenient with the communities. Such locales provide opportunity for interaction with familiar people in familiar environment which stimulates knowledge creation, negotiation of meanings in an interpersonal communication process and value based learning. Most importantly, community participation in communication in locations where solid waste is generated provides an opportunity for them to relate knowledge on SSWM with practical life in the community. Such locations are also convenient for most community members due to their proximity to where they work such as markets.

Findings also show that Radio is second most preferred media by the community. This can be attributed to the high level of community access to radio as earlier shown in findings of this study.

Preference for social media by those aged 18-24 can also be attributed to high level of access to social media by the youth. It also implies that social media can be utilized to involve the youth in communication for SSWM. Other studies have shown that social media can be used

for higher consumer engagement (Khan & DongPing, 2017). Moreover, due to its capabilities of user generated content and ability to communicate from one-to-many and many-to-many, social media can be utilized to promote community involvement in communication of SSWM. These findings are similar to observations from Kahur and Chahal (2018) who found high exploration of environmental issues on social media among users and concluded that competitive power in persuading people, user involvement and networking social media can be used to enable people share concern on environmental issues.

4.6.3 Community Communication Networks for Participatory Communication of SSWM

The main objective of this study was to investigate participatory communication approach to SSWM and design community communication networks that can be used to promote community participation in communication of SSWM. The community communication networks were designed using data analyzed from the first three objectives; community involvement in dialogic communication of SSWM, community access to media, and strategic messages communicated for SSWM.

Whereas Migori county government uses formal networks (radio, officers from the department of environment, official public forum and chiefs' *Baraza*) for community involvement in communication, most community members prefer informal communication networks for their participation in communication of SSWM.

This study found that community preference for media is determined by media (technology) accessible to the community, social factors such as place of residence, type and place of work, age, gender, and social affiliations such as social groups to which individuals belong. Using

CET theory, these factors were considered as different dimensions that determine communicative ecologies and were used to design community communication networks for participatory communication of SSWM.

(i) The Technological Dimension

The technological dimension comprised media technology accessible to the community including radio, social media, and face to face channels including meetings held by youth and women groups, churches, traders and residents in their respective locales. This study found preference for a mix of these media, which confirms the hypothesis of CET that communication in these ecologies involve the use of face to face and a mix of media and technologies.

(ii) The Social Dimension

The social dimension defines the social organizations in the community such as women and youth groups, small and medium enterprises, artisans, small scale traders, vendors and residential community where people prefer to interact. This study found that majority of community members (35%) prefer participating in communication of SSWM in their local set up with people they are familiar. These groups use a mix of media to connect with other groups in the community. For example, a vendor may belong to a social group of vendors who prefer face-to-face communication during their meetings. The same vendor communicates with people in their neighborhood using face to face and social media. Using this dimension participatory communication networks can be organized within these social networks using a mix of media accessible to members of the networks.

(iii) The Discursive Dimension

This comprise the content of communication. Participation in communication of SSWM can be organized in groups of communities categorized according to types of solid waste generated in the community. For example, carpenters and tailors generate solid waste that can be re-used; Vendors mostly generate waste that can be decomposed; while households generate a mix of waste. Based on these differences, groups in the community form networks where they share views on how to manage the different types of solid waste they generate. They therefore can use different media to share different contents for example, in one community network, carpenters can use social media in their networks to share video on how to reuse pieces of cloths in making household seats. Communication of SSWM in the different community networks can emphasize on the content most relevant to the group. The groups may use a mix of different media in a hybridized format.

The three dimensions-technological, social and discursive - are interdependent, the social dimension influences the content of communication, and both social and content dimensions in turn influence the media technology used by different groups in the communication network. Figure 4.23 is a structure of community communication networks designed for participatory communication of SSWM.

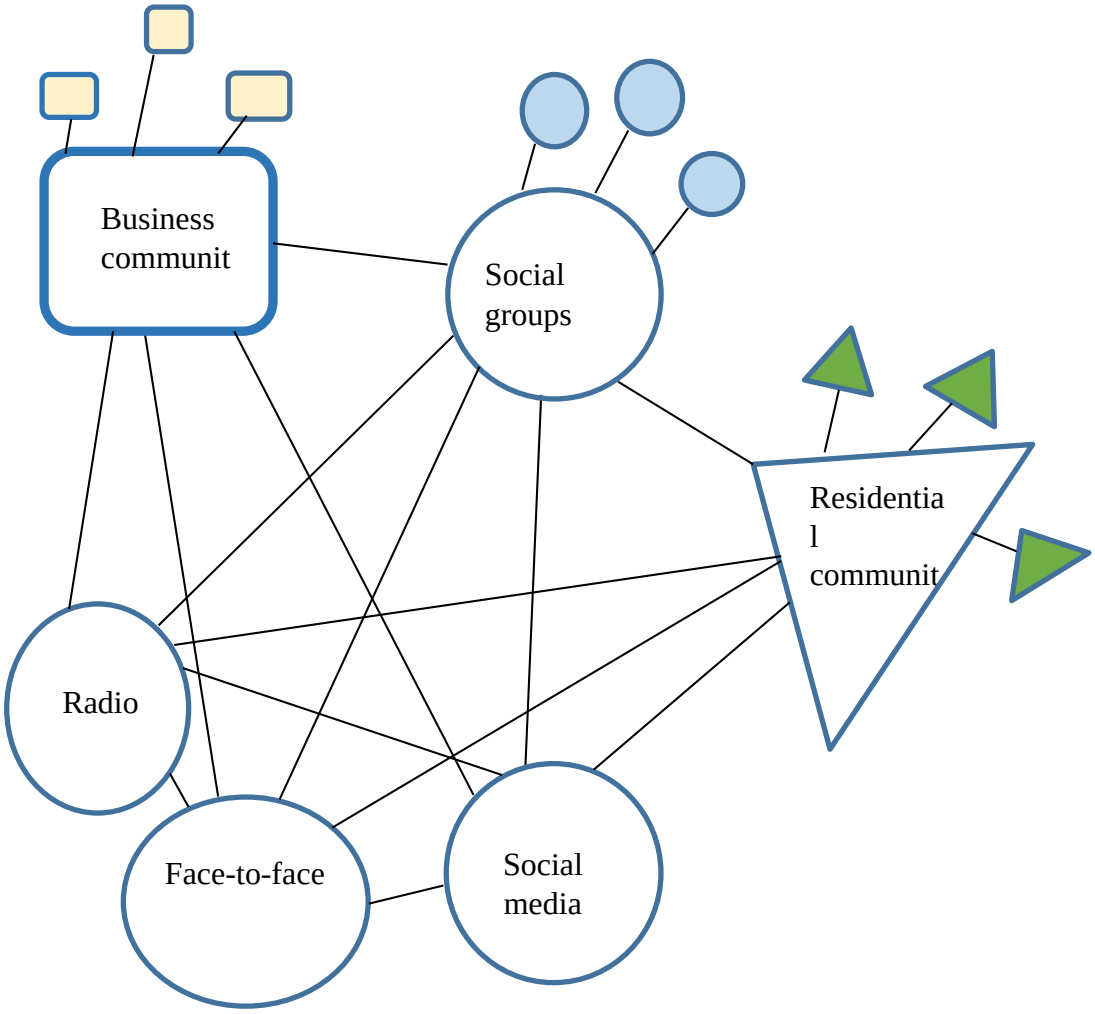

Figure 4. 24: Community Communication Network.

(Source: Researcher, 2021).

This Community Communication Network comprise macro-networks connected to smaller micro-networks similar to them. This similarity enhances homogeneity which is useful in achieving effective participation in communication of SSWM. Both macro and micro networks are linked to each other through a mix of media. This linkage promotes access to a mix of media used in communication of SSWM thereby enhancing opportunities for involvement in communication. This linkage also enable members of a network to engage in

dialogic communication among themselves but also have access to dialogic communication with others. The macro and micro networks are categorized according to social dimensions such as the business community who are also connected to other smaller similar networks like group of hawkers in the town; the residential community, also linked to smaller networks of communities belonging to the same neighborhood; and social groups comprising women, youth and religious groups in the community. Individual members of a network interact within their networks and indirectly with other networks in a dialogic formula.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The main objective of this study was to investigate Participatory Communication approach for SSWM in Migori County so as to design community communication networks for participatory communication of SSWM. Specific objectives of the study were to investigate community involvement in dialogic communication of SSWM in Migori County; to determine community access to media used in the communication of SSWM; to assess strategic messages communicated for SSWM; and to design community communication networks for improving community participation in the communication for SSWM. This chapter presents a summary of the major findings and conclusion of the study based on each objective of the study and ends with recommendations for further actions and research.

5.2 Summary of findings

This study investigated participatory communication of SSWM as practiced in Migori County. Data was obtained from key departments in the county where solid waste management is domiciled, three urban areas and the community. Literature related to specific objectives of the study were reviewed so as to critically identify gaps which this study made an attempt to fill. In this attempt, the study discovered that communication for SSWM is not accorded the desirable attention by governments and those in charge of SSWM

Findings show that community involvement in communication of SSWM is limited. The community are less involved in planning, discussions and making decisions on SSWM. The limited community involvement in dialogic communication of SSWM can be attributed to

limited communication of SSWM by the county government, lack of access to opportunities for participation and lack of appropriate communication structures for community participation in communication of SSWM. Communication of waste management is rarely done and most community members do not participate in those discussions.

Concerning access to media used in communication for SSWM, this study found that Migori county government uses mass media, particularly radio and face to face meetings to create awareness on SSWM and involve the community in communication of SSWM. It also uses interpersonal communication between waste supervisors, community representatives and the community. However, the study found limited access to all media used in communication of SSWM except radio. Most community members do not have access to public forum, stakeholder meetings, chiefs' Baraza, and waste management supervisors.

The study also found that access to SSWM information and community participation in communication of SSWM remains limited, a factor that can be attributed to limited communication of SSWM and lack of appropriate participatory communication structures. Findings showed that communication of SSWM is rarely done, and when realized it is reactive, uncoordinated and less structured and participation of the community is given limited recognition. Media used in communication of SSWM such as chiefs' baraza, stakeholder meetings and public forum are organized for other agenda not communication of SSWM. Some meetings are also poorly attended therefore inappropriate for involving the community in communication of SSWM.

The study found that social media, and social groups within the community such as churches, women and youth groups, are not utilized for communication of SSWM. Findings however showed that some community members use these media to share views on SSWM in the

county. The forums are community networks where similar groups of people in the community communicate with one another. They facilitate collaborative discussions thus may be effective for eliciting debates that can help in raising solutions to SSWM. The study found that because these fora are more convenient, highly accessible, and offer participation in familiar environments with familiar people, they can be used for community participation in communication for SSWM.

This study found that communication of SSSWM does not focus on strategic SSWM messages (3R), rather emphasis is laid solid waste disposal and the strategic message communicated is use of dustbins. Consequently, majority in the community lack knowledge on SSWM practices (3R) a factor that in turn leads to unsustainable solid waste management practices such as prevalent burning as found in the study.

The study also established that while communication of SSWM in Migori County is done using formal communication channels, the community prefer informal networks of communication for their participation in communication of SSWM. These include communication within social groups in the community such as women and youth groups, churches, and social media platforms and within the neighbourhoods in residential areas.

5.3 Conclusion

Based on the findings mentioned above, this study made the following conclusions. The study concluded that limited community involvement in a dialogic communication of SSWM limits development of individual and collective critical consciousness, acquisition of knowledge on SSWM and collective planning and decision making for SSWM among the community.

This study concluded that access to media is a critical for participation in communication of SSWM. Access to media enables the community access to information and opportunities for participation in communication. Other than access, participation is also affected by availability of participatory communication structures. Therefore effective community participation in communication of SSWM requires that they have access to information on SSWM as well as participatory media.

This study also concluded that lack of knowledge on SSWM among the community results from lack of communication of SSWM (3R) messages. Lastly this study concludes that absence of appropriate participatory communication structures hinders the community from participating in communication of SSWM. It also leads to lack of feedback, uncoordinated communication of SSWM and limits collaboration between community and government.

5.4 Recommendations

Based on these conclusions, the study made following recommendations:

1. This study recommends the use both formal and informal communication networks in the community such as churches, local meetings, women and youth groups and social media for community participation in communication of SSWM.

2. The County Government of Migori should increase frequencies of communication about SSWM so as to create a wider public knowledge on SSWM. Communication should be done using a variety of media including social media, locally available radio stations, churches, schools and informal groups in the community such as women and youth groups.

3. Migori county government should communicate SSWM strategic messages (3R) so as to improve community knowledge on SSWM practices. Communication should focus on strategies for waste reduction, separation, recycling and eradication of open burning so as to reduce the effects of organic pollutants as stipulated in the Stockholm Convention guidelines.
4. The community should be involved in the communication of SSWM so as to empower them with knowledge on how to practice SSWM. The study recommends the use of small local groups for effective community participation. The community can be involved in discussions on SSWM including challenges and how to solve them. Such discussions can be conducted live, aired on radio and or recorded and shared with other groups via social media.

Policy recommendations

1. Migori county government should legislate policy guidelines on communication for SSWM. The policies should incorporate strategic messages which should be communicated for SSWM and participatory communication structures that would help facilitate community participation in communication of SSWM.
2. The Ministry of environment and the county departments of environment should incorporate participatory communication networks in their communication policies so as to provide a framework for community participation in communication of environmental matters.

3. The National Environment Policy (2013), National Waste Management Strategy (2015) and National Sustainable Solid Waste Management Policy (2019) should

incorporate participatory communication approach in communication guidelines for SSWM.

4. The ministry of environment and local governments should partner with vernacular and community radio stations to promote public awareness on SSWM and participation of the community in communication of SSWM.

5.5 Contributions to Knowledge

This study extends Participatory Communication theory by adding knowledge on access to participation. Access is a critical element of participatory communication however, Participatory communication theory does not explain how to ensure access to participation in the contexts of segmented audiences using a mix of media, a factor that may lead to exclusionary participation. This study showed that access to participation in communication is achieved by considering communicative ecologies in the community.

This study adds knowledge on how to improve participatory communication at the grassroot levels. It points out that communities are heterogeneous entities with audiences segmented into different communicative ecological networks. Therefore effective participatory communication should analyze dimensions that impact communication within those networks. This study adds knowledge on the need to involve the community in strategic communication of SSWM.

5.6 Recommendations for Further Research

This study recommends further practical research on participatory communication of SSWM involving community radios so as to draw conclusive results on their effectiveness in promoting participatory communication of SSWM. The assessment of strategic messages communicated for SSWM in this study was limited to exploratory methods using interviews,

FGDs and questionnaires and found that limited communication of SSWM strategic messages contributes to lack of knowledge and poor waste management among the community. This study recommends further research using other methods such as content analysis to draw conclusive results on community understanding of meanings in messages communicated for SSWM.

This study recommends further research on Community Communication Networks for participatory communication of SSWM designed in this study so as to draw conclusive results on its efficacy.

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APPENDICES

Appendix 1: Interview Guide for the Department of Environment, Migori County.

Introduction

This research is being conducted to get to know about community participation in communication of SSWM in Migori County. In this study, solid waste include food remains, rubbish, and litter from homes, markets, shops, hospitals, schools and hotels. Sustainable solid waste management means handling solid waste in ways that makes them less harmful to life and the environment. You have been selected in this study because you have significant information from your department that is relevant to this study. The research will include officials form the municipality and community members as well.

Interview no. ……..

Department……..Position……Period of service……

Gender: male [ ] female [ ] Age bracket: 18-24[ ] 25-29[ ], 30-34[ ] 35- 39[ ] 40 and above [ ]

1. Describe how Migori county government carries out communication for SSWM.
2. To what extent does your department involve the community in dialogic communication (dialogue) of SSWM?
3. Describe to me how the community is involved in the dialogic communication of SSWM.
4. Which media/forum does Migori county government use to involve the community in the dialogic communication of SSWM?
5. Which media does County government of Migori use in the communication of sustainable solid waste management?
6. To what extent do the communities in Migori County have access to media used by Migori county government and your municipality in the communication of sustainable solid waste management?
7. Describe the strategic (key/ most important) messages about SSWM that Migori county government communicates to the communities.
8. Does Migori county government communicate the following messages to the community

Strategic message	communication
Reduce waste	
Reuse waste	
Recycle waste	
Waste separation	

9. What is the level of awareness of 3R among the communities in Migori County?
10. Describe the flow of information on SSWM between Migori county government and the communities in Migori County.
11. Explain to me the challenges that face community participation in the communication of SSWM in Migori County.
12. In your opinion how can community participation in the communication of SSWM be improved?

Appendix 2: Interview Guide for Town Managers, Migori County.

Introduction

This research is being conducted to get to know about community participation in communication of SSWM in Migori County. In this study, solid waste include food remains, rubbish, and litter from homes, markets, shops, hospitals, schools and hotels. Sustainable solid waste management means handling solid waste in ways that makes them less harmful to life and the environment. You have been selected to participate in this research since your department is in charge of waste management in the town.

Interview no. ……..

Department……..Position……Period of service……

Gender: Male [ ] Female [ ] Age: 18-24[ ] 25-29[ ], 30-34[ ] 35- 39[ ] 40 and above [ ]

1. Describe to me how your town carries out communication for SSWM.
2. To what extent does your department involve the community in dialogic communication (dialogue) of SSWM?
3. Describe to me how the community is involved in the dialogic communication of SSWM.
4. Which media/forum does your municipality use to involve the community in the dialogic communication of SSWM?
5. Which media does your municipality use in the communication of sustainable solid waste management?
6. To what extent do the communities in your town have access to media used by Migori county government and your municipality in the communication of sustainable solid waste management?
7. Describe the strategic (key/ most important) messages about SSWM that your municipality communicates to the communities.

8. Does Migori county government communicate the following messages to the community?

Strategic message	communication
Reduce waste	
Reuse waste	
Recycle waste	
Waste separation	

9. What is the level of awareness of 3R among the communities in your municipality?
10. Describe the flow of information on SSWM between Migori county government, your municipality and the communities in your town.
11. Explain to me the challenges that face community participation in the communication of SSWM in Migori County.
12. In your opinion how can community participation in the communication of SSWM be improved?

Appendix 3: Interview Guide for Waste Management Supervisors

Introduction

This research is being conducted to get to know about community participation in communication of SSWM in Migori County. In this study, solid waste include food remains, rubbish, and litter from homes, markets, shops, hospitals, schools and hotels. Sustainable solid waste management means handling solid waste in ways that makes them less harmful to life and the environment. You have been selected to participate in this research since your department is in charge of waste management in the town.

Interview no. ……..

Department……..Position……Period of service……

Gender: Male [ ] Female [ ] Age: 18-24[ ] 25-29[ ], 30-34[ ] 35- 39[ ] 40 and above [ ]

1. Describe to me how Migori county government carries out communication for SSWM.
2. To what extent does your department involve the community in dialogic communication (dialogue) of SSWM?
3. Describe to me how the community is involved in the dialogic communication of SSWM.
4. Which media/forum do the department of environment and the municipalities use to involve the community in the dialogic communication of SSWM?
5. Which media does County government of Migori use in the communication of sustainable solid waste management?
6. To what extent do the communities in Migori County have access to media used by Migori county government and the municipalities in the communication of sustainable solid waste management?
7. Describe the strategic (key/ most important) messages about SSWM that Migori county government communicates to the communities.
8. Does Migori county government communicate the following messages to the community?

Strategic message	communication
Reduce waste	
Reuse waste	
Recycle waste	
Waste separation	

9. What is the level of awareness of 3R among the communities in Migori County?
10. Describe the flow of information on SSWM between Migori county government and the communities in Migori County.
11. Explain to me the challenges that face community participation in the communication of SSWM in Migori County.
12. In your opinion how can community participation in the communication of SSWM be improved?

Appendix 4: Interview Guide for Community Representatives

Introduction

This research is being conducted to get to know about community participation in communication of SSWM in Migori County. In this study, solid waste include food remains, rubbish, and litter from homes, markets, shops, hospitals, schools and hotels. Sustainable solid waste management means handling solid waste in ways that makes them less harmful to life and the environment. You have been selected to participate in this research since your department is in charge of waste management in the town. You have been selected in this study because you representative of members of the community therefore you have significant information about community involvement in communication for SSWM in this town.

Interview no. ……..

Department……..Position……Period of service……

Gender: Male [ ] Female [ ] Age: 18-24[ ] 25-29[ ], 30-34[ ] 35- 39[ ] 40 and above [ ]

1. To what extent does the municipality involve the community in dialogic communication (dialogue) of SSWM?
2. Describe to me how the community is involved in the dialogic communication of SSWM. (Probe for involvement in giving views and in decision making).
3. In which media/forum do the communities participate in the dialogic communication of SSWM?
4. In which media or forum do communities access information on SSWM?
5. To what extent do the communities in your town have access to media used by Migori county government and the municipalities in the communication of sustainable solid waste management? (probe for who has access and reasons for lack of access if any)
6. Describe the strategic (key/ most important) messages about SSWM that Migori county government and the municipality communicates to the communities.
7. Does Migori county government communicate the following messages to the community

Strategic message	communication
Reduce waste	
Reuse waste	
Recycle waste	
Waste separation	

8. What is the level of awareness of 3R among the communities in Migori County?

9. Describe the flow of information on SSWM between Migori county government and the communities in Migori County.
10. Explain to me the challenges that face community participation in the communication of SSWM in Migori County.
11. In your opinion how can community participation in the communication of SSWM be improved?

Appendix 5: Focus Group discussion Guide

Introduction

This discussion will be about community participation in communication for sustainable solid waste management in your town. Solid waste include food remains, rubbish and litter from homes, markets, shops, hospitals, *Jua kali*, schools and hotels. Sustainable solid waste management means handling solid waste in ways that makes them less harmful to life and the environment. We shall talk about waste management practices among the community, communication practices among the community and how members of the community obtain information about solid waste management.

Your participation in this discussion is voluntary and we value all your opinions. We encourage you to be open and share your experiences and opinions as these are valuable for this study. Whatever is discussed here will be confidential and used only for this research project. I would also like to say that there are no right or wrong answers so feel free to say what you think. We would also like to hear as many different points of view as possible so feel free to disagree with someone's view and give yours but please respectfully disagree with someone's point.

During the discussion, we will take notes but we would also like to record the whole discussion so that we do miss anything that is said. It is important that one person talks at a time so that we do not miss anything on the recording. We will use only first names and the discussion will remain confidential. The discussion will last about an hour.

Is it ok with everyone to record the discussion? Are there any questions before we begin the discussion? *(Check that all consent).*

Questions

1. What are the main sources of information about SSWM in this town?

2. To what extent do this community obtain information about SSWM from the county government and municipality? (Probe for variation in access to and reasons for lack of access to information if any).

3. What percentage of this community have access to the following media and forums (explore on the depth of access)

Media/fora	radio	Social media	Public Citizen fora	Stakeholder meetings	Chiefs' *Baraza*
Access					

i. To what extent do members of this community listen to radio? Which radio do they prefer?

ii. To what extent do members of this community attend public citizen forums organized by the county government and municipality?

iii. What is the general attendance of chiefs' Baraza by the community?

iv. To what extent do members of this community interact with waste management supervisors?

v. Other than *Baraza,* in which other meetings held in the community are sustainable solid waste management discussed?

4. To what extent is this community involved by the county government in the communication for sustainable solid waste management? (Probe for the nature of involvement).

5. What key messages about sustainable solid waste management does the county government communicate to this community? (Probe for communication of 3R-reduce, reuse, recycle- messages).

6. What is the level of awareness of sustainable solid waste management among members of this community?

7. In your opinion, what challenges face communication of sustainable solid waste management in this municipality?

8. Have the community been effectively involved in the communication of sustainable solid waste management? How can this be improved?

Appendix 6: Questionnaire for Migori County town residents

Research Title: Participatory Communication Approach for Sustainable Solid Waste Management: A study of Migori County, Kenya.

Instructions

This questionnaire should be completed by town residents in Migori County.

The questions are meant to know more about community participation in the communication of sustainable solid waste management in Migori County. In this study, solid waste refers to food remains, rubbish and litter from homes, businesses, markets, public places and hotels. Sustainable solid waste management in this study means waste management practices that reduce the effects of waste on the environment, human and animal health.

Part A: Respondent's information

Town of residence……..Residential area…….Period of stay……

Occupation…… Place of business…..……

Gender: Male [ ] Female [ ] (Tick One)

Age: 18-24[ ] 25-29[ ] 30-34[ ] 35- 39[ ] 40 and above [ ]

Communication for sustainable solid waste management

1. Does Migori County government communicate about sustainable solid waste management to the community?

   Yes [ ] No [ ] I don't Know [ ]

2. Does the department of environment and natural resources in Migori County communicate about sustainable solid waste management to the community?

   Yes [ ] No [ ] I don't Know [ ]

3. Does your Municipality communicate about sustainable solid waste management to the community?

   Yes [ ] No [ ] I don't Know [ ]

4. In which media or forum does Migori county government and municipalities communicate about sustainable solid waste management?
   A. Radio [ ]
   B. Public citizen forum [ ]

C. Chief's Baraza [ ]
D. Waste management supervisors [ ]
E. Stakeholder meetings with community representatives [ ]
F. Leaflets, posters and circulars [ ]
G. None [ ]
H. I don't know [ ]

5. Are members of the community in your town involved in the communication of sustainable solid waste management?

   Yes [ ] No [ ] I don't Know [ ]

6. If yes, how are they involved in the communication of sustainable solid waste management?
   A. They attend meetings where waste management is discussed [ ]
   B. They complain on radio about poor waste management [ ]
   C. They participate in discussions on how to manage solid waste in the towns [ ]
7. How often do the community participate in the communication mentioned above?
   A. Very rarely [ ]
   B. Rarely [ ]
   C. Frequently [ ]
   D. Less frequently [ ]
8. Have you participated in the communication of sustainable solid waste management in your town/county?

   Yes [ ] No [ ]

9. If No, why have you not participated in communication of sustainable solid waste management in your town?
   A. I have not seen participation in communication of sustainable solid waste management in my town [ ]
   B. I don't have access to forum where sustainable solid waste management is discussed [ ]
   C. I don't know whom I can share my views with [ ]
   D. I don't have time to participate in discussions of sustainable solid waste management [ ]
   E. It does not concern me [ ]
10. If yes, through which media or forum do you participate in the communication for sustainable solid waste management?
    A. Radio [ ]
    B. Public citizen forum [ ]
    C. Chief's Baraza [ ]
    D. Waste management supervisor [ ]
    E. Community representative [ ]
    F. Social media [ ]
    G. Any other [ ] Specify……..……

Community Access to media

1. Do you listen to radio? Yes [ ] No [ ]
2. If yes, state the radio station you listen to most. …….
3. If yes, do you obtain information about sustainable solid waste management on radio?

   Yes [ ] No [ ]

4. Do you attend public citizen forum organized by your municipality or county government?

   Yes [ ] No [ ]

5. If No, why don't you attend Public citizen forum organized by your municipality or county government?
   A. I don't know when and where public citizen forum are held [ ]
   B. I don't get invitation to attend the public citizen forum [ ]
   C. Due to other commitments [ ]
   D. Public forums are not useful to me [ ]
   E. Any other reason [ ]. Specify…….……
6. Do you attend Chiefs' Baraza held in your town? Yes [ ] No [ ] (Tick one)
7. If yes, do you obtain information on sustainable solid waste management in the Baraza?

   Yes [ ] No [ ] (Tick one).

8. Do you obtain information about sustainable solid waste management from waste management supervisor?

   Yes [ ] No [ ] (Tick one)

9. Do you obtain information about sustainable solid waste management from community representatives in your town?

   Yes [ ] No [ ] (Tick one)

Strategic SSWM messages communicated by Migori County government

1. Migori county government communicates the following messages about sustainable solid waste management to the communities. (Chose one: Yes /No/I don't know)

message	Yes	No	I don't know
Reduce waste			
Reuse waste			
Recycle waste			
Separate waste			
Don't burn waste			

2. Do you have knowledge of following sustainable solid waste management practices? (Choose one: Yes/ No.)

Waste management	Yes	No
Reduce waste		
Reuse waste		
Recycle waste		
Separate waste		
Don't burn waste		

5. Based on your observations on waste management in your community do members of your community know about following sustainable solid waste management practices (yes/ no)

Waste management practice	Choose Yes or No
Reduce waste	
Reuse waste	
Recycle waste	
Separate waste	
Don't burn waste	

5. Communication about sustainable solid waste management between the municipality and the community in my town is effective. (Tick one)

A. I strongly agree [ ]
B. I agree [ ]
C. I disagree [ ]
D. I strongly disagree [ ]

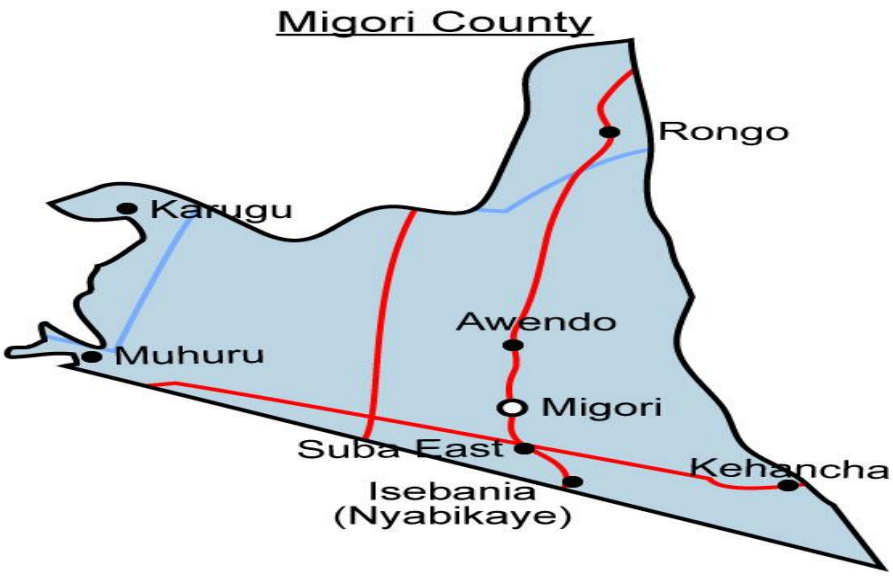
6. In your opinion, which media or forum is the most appropriate for involving you in the communication for sustainable solid waste management?

A. Radio [ ]
B. Meetings in residential and work location [ ]
C. Women /youth groups/ church [ ]
D. Public citizen forum [ ]
E. Chiefs'' Baraza [ ]
F. Social Media [ ]
G. Any other [ ]. Specify…….

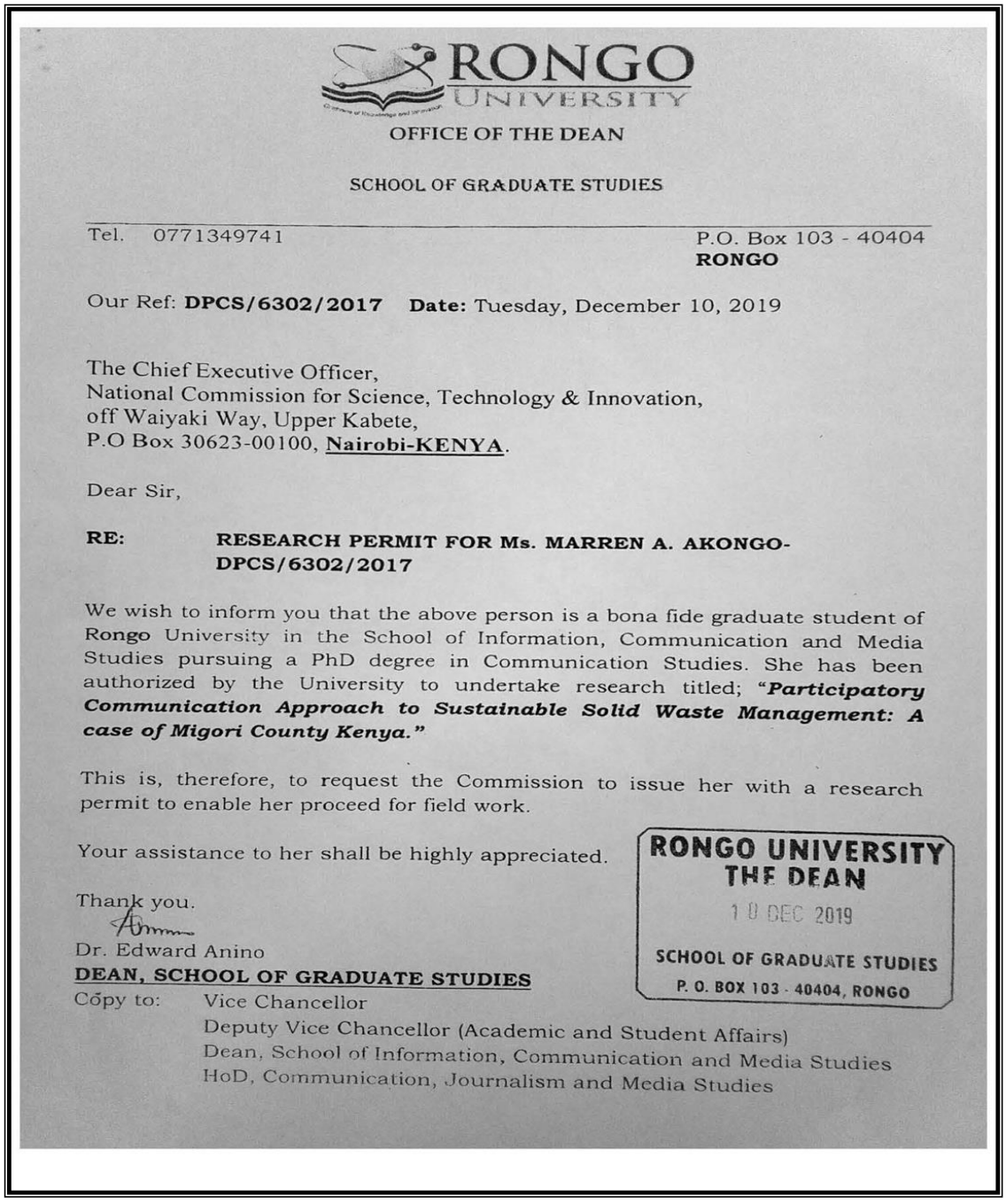
Thank you for participating in this research.

Appendix 7: Map of Kenya showing Migori County

Appendix 8: Map of Migori County showing major Urban Areas



Appendix 9: Introductory Letter from Rongo University



RONGO UNIVERSITY

OFFICE OF THE DEAN

SCHOOL OF GRADUATE STUDIES

Tel. 0771349741

P.O. Box 103 - 40404
RONGO

Our Ref: **DPCS/6302/2017** **Date:** Tuesday, December 10, 2019

The Chief Executive Officer,
National Commission for Science, Technology & Innovation,
off Waiyaki Way, Upper Kabete,
P.O Box 30623-00100, **Nairobi-KENYA**.

Dear Sir,

RE: RESEARCH PERMIT FOR Ms. MARREN A. AKONGO-DPCS/6302/2017

We wish to inform you that the above person is a bona fide graduate student of **Rongo** University in the School of Information, Communication and Media Studies pursuing a PhD degree in Communication Studies. She has been authorized by the University to undertake research titled; ***"Participatory Communication Approach to Sustainable Solid Waste Management: A case of Migori County Kenya."***

This is, therefore, to request the Commission to issue her with a research permit to enable her proceed for field work.

Your assistance to her shall be highly appreciated.

RONGO UNIVERSITY
THE DEAN
10 DEC 2019
SCHOOL OF GRADUATE STUDIES
P. O. BOX 103 - 40404, RONGO

Thank you.

Dr. Edward Anino
DEAN, SCHOOL OF GRADUATE STUDIES

Copy to: Vice Chancellor
Deputy Vice Chancellor (Academic and Student Affairs)
Dean, School of Information, Communication and Media Studies
HoD, Communication, Journalism and Media Studies

Appendix 10: Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **422580**

Date of Issue: **07/January/2020**

RESEARCH LICENSE

This is to Certify that Ms.. Marren Akong'o of Rongo University, has been licensed to conduct research in Migori on the topic: Participatory Communication Approach to Sustainable Solid Waste Management: A case of Migori County, Kenya. for the period ending : 07/January/2021.

License No: **NACOSTI/P/20/3311**

422580

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

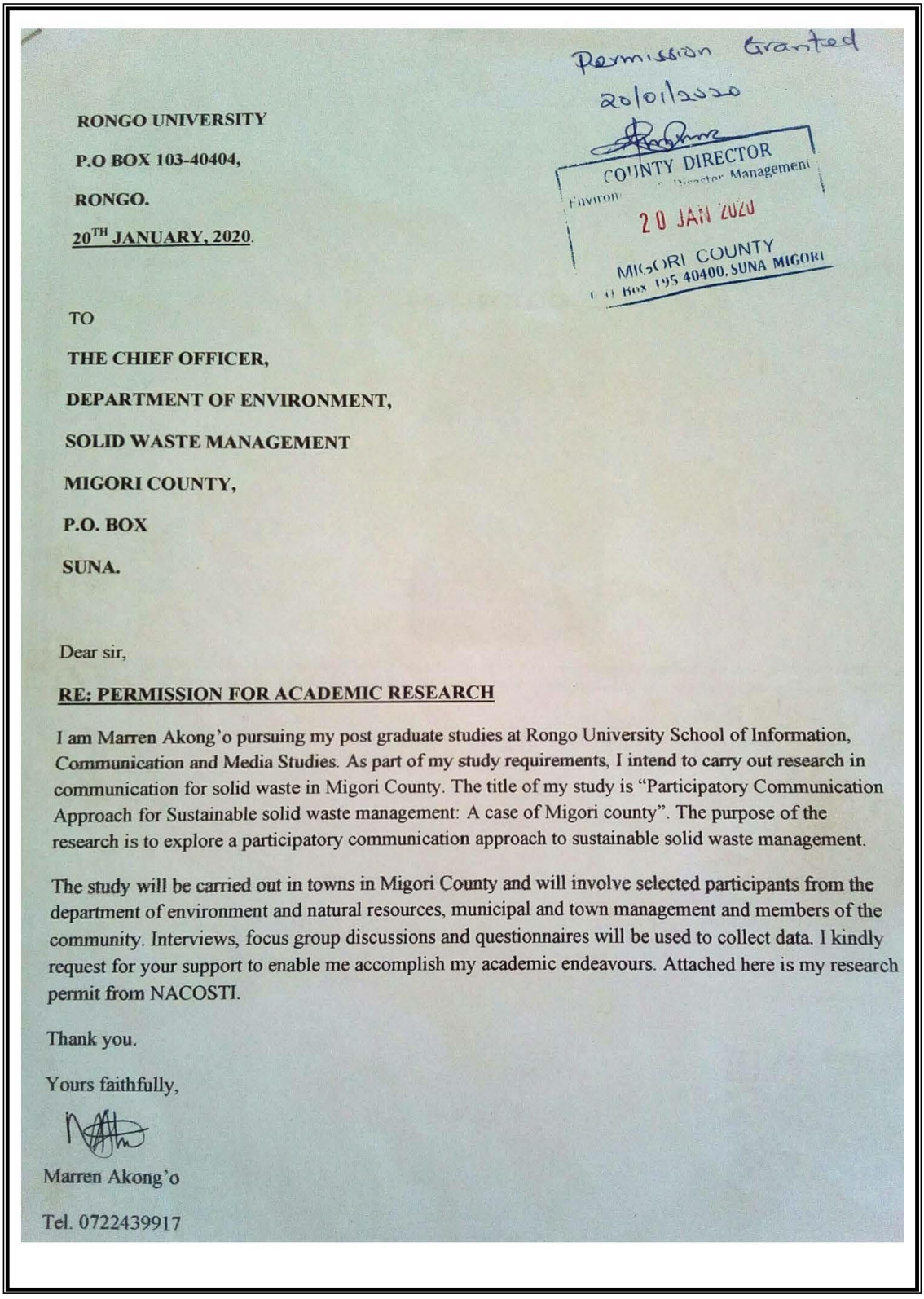
The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

1. The License is valid for the proposed research, location and specified period
2. The License any rights thereunder are non-transferable
3. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research
4. Excavation, filming and collection of specimens are subject to further necessary clearence from relevant Government Agencies
5. The License does not give authority to tranfer research materials
6. NACOSTI may monitor and evaluate the licensed research project
7. The Licensee shall submit one hard copy and upload a soft copy of their final report (thesis) within one of completion of the research
8. NACOSTI reserves the right to modify the conditions of the License including cancellation without prior notice

National Commission for Science, Technology and Innovation
off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100 Nairobi, KENYA
Land line: 020 4007000, 020 2241349, 020 3310571, 020 8001077
Mobile: 0713 788 787 / 0735 404 245
E-mail: dg@nacosti.go.ke / registry@nacosti.go.ke
Website: www.nacosti.go.ke

Appendix 11: Permission Letter from the Department of Environment and Natural Resources, Migori County



Permission Granted
20/01/2020

COUNTY DIRECTOR
Environment Management
20 JAN 2020
MIGORI COUNTY
P.O Box 195 40400, SUNA MIGORI

RONGO UNIVERSITY

P.O BOX 103-40404,

RONGO.

20TH JANUARY, 2020.

TO

THE CHIEF OFFICER,

DEPARTMENT OF ENVIRONMENT,

SOLID WASTE MANAGEMENT

MIGORI COUNTY,

P.O. BOX

SUNA.

Dear sir,

RE: PERMISSION FOR ACADEMIC RESEARCH

I am Marren Akong'o pursuing my post graduate studies at Rongo University School of Information, Communication and Media Studies. As part of my study requirements, I intend to carry out research in communication for solid waste in Migori County. The title of my study is "Participatory Communication Approach for Sustainable solid waste management: A case of Migori county". The purpose of the research is to explore a participatory communication approach to sustainable solid waste management.

The study will be carried out in towns in Migori County and will involve selected participants from the department of environment and natural resources, municipal and town management and members of the community. Interviews, focus group discussions and questionnaires will be used to collect data. I kindly request for your support to enable me accomplish my academic endeavours. Attached here is my research permit from NACOSTI.

Thank you.

Yours faithfully,

Marren Akong'o

Tel. 0722439917

Appendix 12: Permission Letter from Migori Municipality

REPUBLIC OF KENYA

DEPARTMENT OF PHYSICAL PLANNING &URBAN DEVELOPMENT
Tel: +254-059-20928
P O Box 195 – 40400
SUNA-MIGORI, KENYA
E-mail:migoricountygov@gmail.com
MIGORI MUNICIPALITY

MIGORI COUNTY

TO:
MS. MARREN AKONG'O
RONGO UNIVERSITY,
P.O. BOX 103- 40404,
RONGO,
20th January, 2020

Dear Madam,

RE: PERMISSION TO UNDERTAKE ACADEMIC RESEARCH WITHIN THE MUNICIPALITY OF MIGORI, MIGORI COUNTY.

Following your letter dated 20th January, 2020, requesting for permission to undertake academic research within the Municipality of Migori. The Municipality of Migori take this earliest opportunity to inform you that permission is granted to undertake the research and we would offer any support you will need during this period to allow you accomplish your Academic endeavors.

On behalf of the Board of the Municipality of Migori and on my own behalf we wish you the best and may God almighty bless your life to achieve your academic dream.

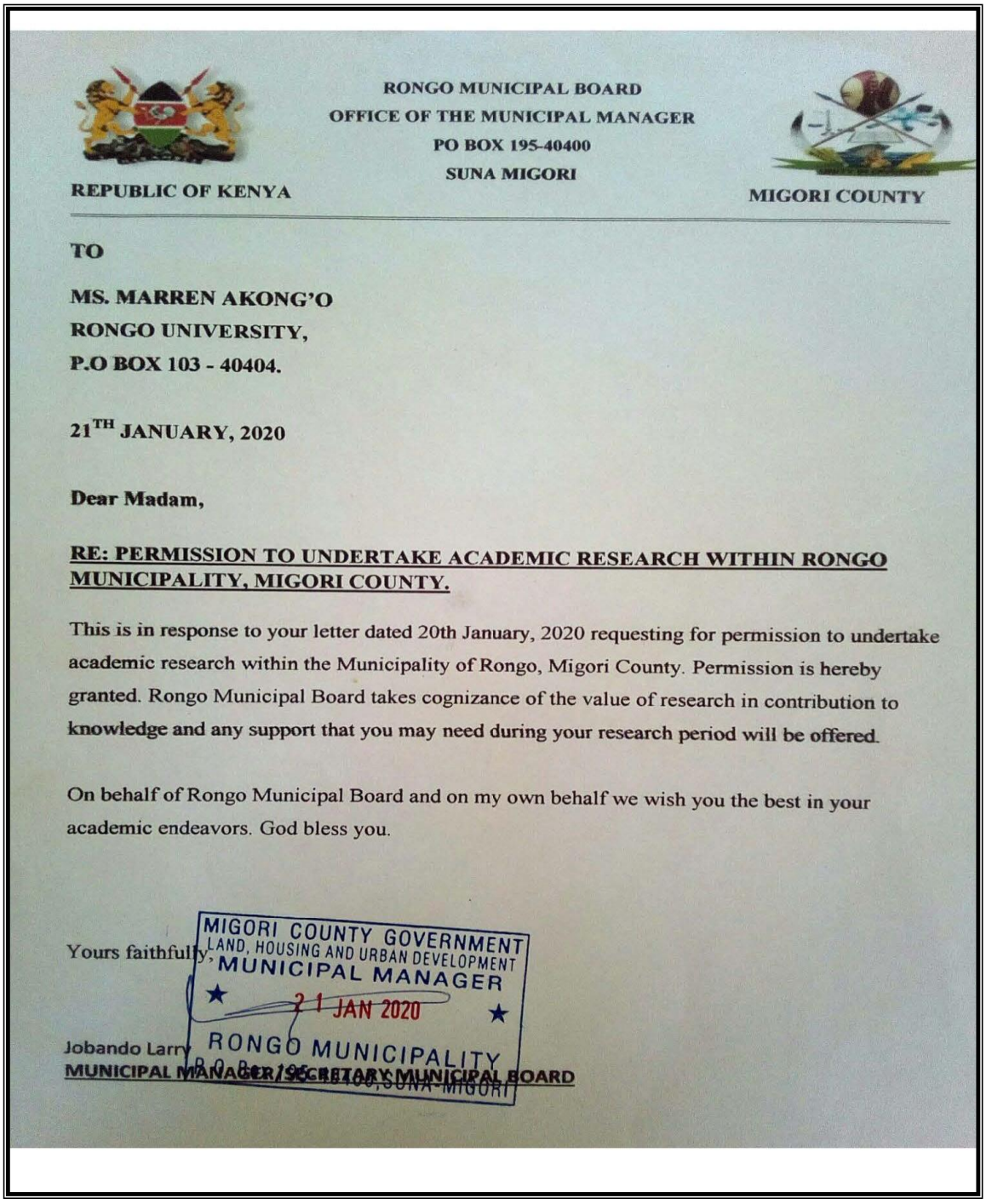
Thank You,

Yours Faithfully,

MIGORI COUNTY GOVERNMENT
LAND, HOUSING AND URBAN DEVELOPMENT
MUNICIPAL MANAGER
20 JAN 2020
MIGORI MUNICIPALITY
P. O. BOX 195-40400, SUNA-MIGORI

Musa Olwalo
Municipal Manager,
Migori Municipality,

Appendix 13: Permission Letter from Rongo Municipal Board



RONGO MUNICIPAL BOARD
OFFICE OF THE MUNICIPAL MANAGER
PO BOX 195-40400
SUNA MIGORI

REPUBLIC OF KENYA

MIGORI COUNTY

TO

MS. MARREN AKONG'O
RONGO UNIVERSITY,
P.O BOX 103 - 40404.

21TH JANUARY, 2020

Dear Madam,

RE: PERMISSION TO UNDERTAKE ACADEMIC RESEARCH WITHIN RONGO MUNICIPALITY, MIGORI COUNTY.

This is in response to your letter dated 20th January, 2020 requesting for permission to undertake academic research within the Municipality of Rongo, Migori County. Permission is hereby granted. Rongo Municipal Board takes cognizance of the value of research in contribution to knowledge and any support that you may need during your research period will be offered.

On behalf of Rongo Municipal Board and on my own behalf we wish you the best in your academic endeavors. God bless you.

Yours faithfully,

MIGORI COUNTY GOVERNMENT
LAND, HOUSING AND URBAN DEVELOPMENT
MUNICIPAL MANAGER
21 JAN 2020
RONGO MUNICIPALITY
P.O Box 195-40400, SUNA-MIGORI

Jobando Larry
MUNICIPAL MANAGER/SECRETARY MUNICIPAL BOARD

Appendix 14: Permission Letter from Isebania Town

RONGO UNIVERSITY

P.O BOX 103-40404,

RONGO

20TH JANUARY, 2020

TO

SUB-COUNTY ADMINISTARTOR,

KURIA WEST SUB-COUNTY

P.O. BOX

KEHANCHA.

Dear sir,

RE: PERMISSION FOR ACADEMIC RESEARCH

I am Marren Akong'o pursuing my post graduate studies at Rongo University School of Information, communication and media studies. As part of my study requirements, I intend to carry out research in Migori county.The title of my study is "Participatory Communication Approach for Sustainable solid waste management: A case of Migori county". The purpose of the research is to explore a participatory communication approach to sustainable solid waste management.

The study will be carried out in selected towns in Migori county, Isebania town being one of them. I am therefore asking for permission to carry out research in Migori municipality. It will involve selected participants from the department of environment and natural resources, municipal management and community members. I kindly request for your support to enable me accomplish my academic endeavours. Attached here is my research permit from NACOSTI.

Thank you.

MIGORI COUNTY
WARD ADMINISTRATOR
24 JAN 2020
ISEBANIA WARD
PO BOX 89- 40414 ISEBANIA

Yours faithfully,
Marren Akong'o
Tel. 0722439917

Appendix 15: Informed Consent to participate in the Study

Title of research: Participatory Communication Approach to Sustainable Solid Waste Management: A study of Migori County, Kenya.

Purpose and background
I am Marren Akong'o pursuing my doctoral studies at Rongo University. I am conducting research on Participatory Communication Approach for SSWM in Migori County. The purpose of this study is to explore participatory communication approach to sustainable solid waste management. Since you work in the department of environment Migori County, you are selected as a possible participant in this study.

Procedures
The study will involve the department of Environment and Natural resources, municipalities and the community. The participants will be expected to provide accurate information and any documents relevant to the study on the communication of sustainable solid waste management in Migori County, the people involved, the media used and messages communicated. During interviews, audio recording will be done to help me capture the discussions.

Risks and benefits
There are no risks involved in this study except your valuable time taken. There are also no direct benefits to the participant, nonetheless, the study will be beneficial to the department of environment and county government is formulating communication policies useful in sustainable solid waste management.

Confidentiality
Information obtained in this study will be confidential and remain for the purposes of this study only. Any personal and confidential records obtained will be treated with anonymity. Though data obtained in this study may be published publicly, details of participants will be accessible to the researcher only and remain undisclosed.

Voluntary participation
Your decision to participate in this study is voluntary and will not affect your work or relationship with others. You can also choose to withdraw from participation any time without prejudice.

Any questions and further clarifications can be obtained from the researcher: Marren Akong'o. School of INFOCOMS, Rongo University. Cell phone number 0722439917.

Consent
This is to confirm that I have read and understood this consent form and hereby voluntarily accept to participate in this research study. I am aware that I can withdraw my participation at will without penalty. I also understand that there are no direct benefits to me, that information obtained during the study will be audio recorded and that my records will remain anonymous. During the study I will be available for interviews and willing to provide

accurate information to enable the researcher meet the purpose of the study. My signature on this form indicates that I accept to participate in this research.

Signature (research participant)……..date……
Signature (interviewer)…….....date……

Appendix 16: Focus Group Discussion conducted during the Study

Appendix 17: Communication of SSWM using Poster in Migori Town

Appendix 18: Solid Waste collected and burned in a drainage in Rongo Town

Appendix 19: Mixed Solid Waste burning next to a shop in Migori Town

Appendix 20: Solid Waste being burned on the road in Rongo Town