

An Exploratory Study of Community Involvement in Communication for Sustainable Solid Waste Management: A Study of Migori County, Kenya

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Abstract

Sustainable solid waste management (SSWM) is intended to reduce impacts of solid waste on the environment and achieve of sustainable development goals on sustainable cities and communities. Past research focused on the role of mass media in awareness creation and influencing attitude towards solid waste management. However, studies show that awareness and attitude do not translate to positive behaviour towards solid waste management. Objectives of this study were to explore community involvement in the communication of SSWM, establish media used to involve community in the communication of sustainable solid waste management and examine community awareness on SSWM. Qualitative data was collected using face-to-face interviews and focus group discussions from 162 participants sampled using purposive, snowball and stratified sampling techniques. Results show minimal community involvement in the communication of SSWM due to lack of structures for community involvement in communication. There was minimal communication of SSWM through radio, public fora and stakeholder meetings which resulted to limited knowledge of SSWM among the community. The study recommends community involvement in the communication of SSWM using participatory media so as to improve their understanding and participation in SSWM.

Keywords: Sustainable solid waste management, Communication, Community involvement, Dialogue, Social change.

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1. Introduction

The world generates 2.01 billion tonnes of Municipal Solid Waste annually out of which 33% is not managed in an environmentally safe manner (International Solid Waste Association, 2012). It is estimated that upsurge of waste will significantly increase in developing countries due to increased rate of consumption and rise in human population, especially in urban settlements (World Bank, 2018). Poor solid waste management significantly impacts on health and environment, contributes to global warming and impacts on achievement of sustainable development goals (SDGs) numbers; eleven(11), six(6), three(3) and twelve (12). Poorly managed solid waste is harmful to health, affects flora and fauna, contaminates both surface and underground water, land and air; emissions of greenhouse gasses from poor management of solid waste contributes to climate change. The World Bank (2018) estimates that 1.6 billion tons of Carbon dioxide (CO₂) equivalent of greenhouse gas emissions were generated from solid waste management treatment and disposal in 2016 and will increase to 2.6 billion tons per year by the year 2050 if the current situations in solid waste management is not improved.

Sustainability is a concept applied to environmental, economic, social and cultural realms and is concerned with achievement of the well-being of every human being (Di Fabio, 2017). Environmental sustainability denotes keeping the natural environment fit for life (of humans and other creatures) while satisfying human needs (Morelli, 2011). 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. It 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, 2014).

Waste management hierarchy, popularly referred to as 3R (reduce, reuse, recycle and recover) is a framework for achieving sustainable solid waste management. Presented in an inverted pyramid, the hierarchy emphasizes reduction of waste at the source as the most preferred choice of waste management, followed by reuse, recovery and recycling of waste so as to minimize waste in bins and eventual landfills (United Nations Environmental Programme [UNEP], 2013).



Figure 1: Waste Management Hierarchy. Source: UNEP (2013).

1.2 Communication and sustainable solid waste management

The World Bank (2012) reports that lack of environmental awareness and appreciation of best practices for environmentally-sound management among the public is a serious challenge facing waste management in Africa. Similarly, research shows that lack of awareness on proper waste management practices among the community, inadequate communication between local Municipalities with the community, scanty information in the public domain, poor attitude and lack of awareness on the problem of waste results to poor waste management by communities in Africa (Abdulrasoul & Bakari, 2016; Guerrero, Maas, & Hogland, 2013; Kagumba, 2017; McAllister, 2015; Okot-Okumu, 2012; Sibanda, Obange & Awuor, 2017). In Kenya, awareness in regard to waste management is still very low amongst the general population and communities in municipalities (NEMA, 2014; Ombis, 2017).

Realization of sustainable solid waste management requires: Awareness and understanding the impacts of solid waste on health and environment, knowledge on sustainable solid waste management practices as well as individual responsibilities on solid waste management. Pezzullo and Cox (2018) observe that communication about the environment performs both pragmatic and constitutive functions; it creates awareness and invokes in people emotional and mental states that culminate into how they relate with the biosphere. Thus communication about the environment, including solid waste management, should go beyond awareness creation and elicit certain emotions towards nature which then influence how people feel about and behave with solid waste.

In Kenya, solid waste management is a devolved function of county governments, unfortunately, all counties face the challenge of poor waste management characterized by illegal dumping and littering (NEMA, 2014). Policy documents state that the national and county governments should provide timely information on waste management to the public using diverse platforms and carry out public awareness on waste segregation, reduction, re-use and recycling (Constitution of Kenya, 2010; County governments Act, 2012; National Sustainable Waste Management policy, 2019).

Despite this provision, lack of awareness on solid waste management is a major challenge to solid waste management in Kenya (Kagumba, 2017; Ndwiga, Nyambura, Kuloba & Ngaithe, 2019; Ombis, 2017; Sibanda et al., 2017). In Migori County poor solid waste management is a challenge to achieving county government developments plan. The county experiences vector borne diseases such as Malaria and Cholera, which are partly caused by poor solid waste management (Migori County Integrated Plan 2018-2022). In 2017, 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). Despite these challenges, studies show limited knowledge among members of the public on proper waste disposal, recycling, waste separation and dangers of burning of solid waste (Ndwiga et al., 2019).

Previous research on communication for waste management has focused on the use of mass media (TV, radio, newspapers), especially radio, in creating awareness and influencing individual behavior towards solid waste management (Gabriel, 2015; Lakshmikantha & Malur, 2014; Patrick, 2015; Patrick & Ferdinand, 2014; Obuah & Okon, 2017). Findings however show indirect relationship between awareness and positive behavior towards waste management. Patrick & Ferdinand (2014) found that broadcast media sensitization was satisfactory; however, attitude to solid waste practice was not positive. Patrick (2015) argues that awareness is not sufficient in transforming behaviour towards waste management; knowledge, understanding, change of attitude and participation are necessary. He adds that the ability of the broadcast media to influence positive behaviour largely depends on peoples' willingness (attitude) to participate in waste management. Similarly, Obuah and Okon (2017) found that high level of awareness by mass media campaigns towards solid waste

management did not correspond to compliance to solid waste management. Though they agree that awareness on right methods depended on media sensitizations, they conclude that right attitude to waste management was a product of personal beliefs and values not media sensitizations. Pezullo and Cox (2018) share in this view and posit that “individuals may have favourable attitudes or beliefs about the environment but they may not take action” p.240. They observe that beliefs do not play direct role on behaviour while values and social norms do. 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.

Other researchers argue that other than attitude and awareness, social norms and values as well community involvement influence pro-environmental behavior (McAllister, 2015; Cox & Pezullo, 2018; Flor, 2004; Nunez & Moreno, 2016; Yukalang, Clerk & Ross 2017). These studies provide a theoretical explanation to attitude-behaviour gap in environmental behaviour by depicting involvement and social norms as causal factors in pro-environmental behaviour. In deed theory and research have shown that social norms influence behavior (Ajzen & Fishbein, 1980). Geber, Baumann, Czerwiski and Klimmt (2021) studied the effects of social norms on risk behaviour and found that individuals are more likely to behave in risks that their peers enact and approve of.

In the context of SSWM, social norms include practices such as littering, re-use, waste minimization, recycling and burning of solid waste by other members of the community which influences how an individual manage solid waste they generate. Whereas an individual may have positive belief towards solid waste management such as recycling, behavior of their subjective norms such as neighbours and family members influences their likelihood of recycling. Studies indicate that social norms prompt individuals to adopt their behaviors so as to avoid becoming outsiders. Besides, the pressure to comply or conform to the social behavior, may make individuals alter their behaviour and avoid being punished or being perceived as an outsider (Yukalang et al., 2017; Nunez & Moreno, 2016). Miranda (2013) posits that pro-environmental attitudes are related to patterns of life in the communities, that is, peoples’ culture and values while McAllister (2015) notes that there is a relationship between social norms and pro-environmental behaviour. She adds that being presented with information without prior knowledge may be ineffective in creating change; that people are more likely to participate in waste management activities such as recycling when they see other people around them doing the same.

2.0 Community involvement in communication for SSWM

The term community involvement is used interchangeably with ‘public engagement’, ‘public participation’ and ‘citizen involvement’ and has been applied in politics and development programmes albeit with different conceptualizations, some miniature while others ritualistic. Arnstein (1969) conceptualizes involvement in rungs beginning with the most basic lower level to the highest level: Non-participation, tokenism and citizen power. Tufte and Mefalopulos (2009) considers four categories of participation: passive participation, participation by consultation, participation by collaboration and empowerment participation. Tokenism involves placation, consultation and informing or passive involvement which refers to one-way communication where communities are informed of what should happen or has happened. It depicts passive reception of information from experts or sources with little opportunity for the community to actively contribute their views.

Involvement by consultation on the other hand consists of seeking views of primary stakeholders but decision-making still remains with the external experts. The drawback of this form of involvement is that local stakeholders feel their input is undervalued leading to lack of ownership of those decisions made by outside experts. Collaboration or partnership is characterized by active and joint discussion between experts and local communities focused on collective decision making (Tufte & Mefalopulos, 2009). This form of involvement culminates into ownership of the decisions made, empowerment and sustainability leading to social change. Citizen power or empowerment is the highest form of involvement and it consists of citizen control, delegation and partnership (Arnstein, 1969; Tufte & Mefalopulos, 2009) where communities develop to manage development programmes even in the absence of the experts.

Since environmental issues, including solid waste management, affect all sectors of the society, environmental policies and Environmental Communication scholars have suggested that the public should participate and influence environmental decisions (Cox, 2010; Flor, 2004; Pezzullo & Cox, 2018). The United Nations Environmental Program (UNEP) and environmental policy documents emphasize collaboration of stakeholders to achieve sustainable solid waste management (Constitution of Kenya, 2010; County Governments Act, 2012; National Solid Waste Management Policy, 2019; National Waste Management Strategy, 2015; UNEP, 2013). Flor (2004) suggests that communication programmes applied to the 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’ (pg.4). 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 (United Nations Conference on Environment and Development (UNCED), 1993).

Community involvement in communication is based on the principle that people understand best and develop ownership of programmes in which they are involved. Community involvement in communication underscores the dialogic concept of communication and is different from one-way transmission of information which is akin to 'banking' concept described by Freire in his *pedagogy of the oppressed* (Freire, 1993 pg.53). The banking approach is criticized for denying people their voice; the ultimate route to self-consciousness. In Development Communication, one way transmission of information is criticized for neglecting the cultural realities and multiplicity of cultures thus unable to promote sustainability. The major input of community involvement in communication is that it raises peoples' consciousness towards the problem, evokes a sense of responsibility and drives people towards collective problem solving and ownership of solutions which translates to peoples' behaviour. Kheerajit and Flor (2013) observe that 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.

Indeed studies have shown that community involvement in communication of environmental issues impacts positively on their behaviour. A study in Philippines found that involving women and children in communication in disaster and climate risk reduction using participatory video impacted on the individuals' behavior towards climate change (Plush, 2009). Hynes and Tanner (2015) found that involving the youth in communication using participatory video about disaster and climate action was impactful in identifying both social causes and impacts of disaster. In Malawi, involvement of communities in communication for climate change increased community awareness and led to positive decision to work out possible solutions; while in Ghana, involvement of communities resulted in creation of a sustainable forest management (Inagaki, 2007). These studies focused on climate change and natural resource management and showed that when communities engage in communication, they co-construct representations of the world which are then organized into social values that translate into social behaviour. In the same vein, 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. Similarly, Guerrero et al. (2013) opine that citizens should obtain information but should also be *involved in designing programmes* for recycling since involvement increases their likelihood to recycle waste (emphasis mine). While studies on waste management suggest the need for community involvement in decision making, no research has been done on community involvement in the communication of solid waste management.

The concept of community involvement in communication is furthered propelled by concepts of the socio-cultural tradition which espouses that the meaning derived from (of) communication arises from social interaction of people who engage in discourse and jointly construct their social realities. This study thus explores how community involvement in communication can be used to spearhead construction of social realities about solid waste management so as to transform community beliefs, values and social behaviour and influence collaborative decision making between stakeholders leading to realization of sustainable solid waste management and sustainable development goals.

2.1 Media used for Community involvement in the communication of SSWM.

Community involvement in communication is realized using participatory media such as participatory radio, face-to-face communication and new forms of interactive media such as social media. Community radio have the power to create public sphere where members of a community dialogue and build consensus on matters that affect them. Castells (2009) refer to this public space

'as the space of societal, meaningful interaction where ideas and values are formed, conveyed, supported and resisted; space that ultimately becomes a training ground for action and reaction' (Castells, 2009 pg.301 cited by Harris, 2017).

Though radio was used during early developments in development communication (based on modernization paradigm) to diffuse information to underdeveloped societies, developments in technology and communication show that radio is no longer used as mere channel of communication but a tool that offers opportunity for grass root participation in communication, dialogue and empowerment. The idea of radio listening groups by UNESCO has been applied in the fields of health, development and agriculture in many countries (Servaes, 2008). Participatory community Radio thus provides a voice for the voiceless and forum for collective decision making leading to social change. Besides radio, new forms of interactive media have the capability of initiating collaborative dialogue between stakeholders and communities. Social media platforms such as Facebook, YouTube and Twitter have become common space for initiating public dialogue, expressing peoples' voice and sharing of informative and educative content useful in imparting knowledge and understanding.

Servaes and Malikha (2008) observe 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. According to Flor (2004), indigenous folk media and face-to-face communication using drama, songs, and stories can play a significant role in ensuring peoples' participation. Old media, particularly indigenous media such as the use of puppetry, drama, folk tales and songs were the purview

of development communication in traditional societies and were used to instill environmental values to succeeding generations. Flor (2004) advocates for environmental communication approach that takes cognizance of the prevailing communication structures and is not limited to mainstream media but also explores other interpersonal and alternative channels as well.

2.2 Theoretical framework

Studies on communication for solid waste management (Gabriel, 2015; Patrick, 2015; Patrick & Ferdinand, 2014; Obuah & Okon, 2017) were based on Diffusion of Innovation theory whose main tenet is that the mass media has the ability to diffuse innovation to mass audience thereby creating change (Rodgers, 2003). Similarly, the Hypodermic Needle theory postulates that the media, like a magic bullet injects messages into audiences thereby directly influencing their behavior (McQuail, 2005). These theories predict that audiences are directly affected by what they view or hear from the mass media therefore communication of solid waste management in the mass media will have a direct positive influence on behavior. However research has disputed the applicability of these theories in influencing behavior towards solid waste management.

This study argues that pro-waste management behaviour does not require top-down information dissemination but a people driven and collaborative communication approach that facilitates collaborative decision making and understanding of how to achieve sustainability in solid waste management. Communication should also relate SSWM to peoples' social norms, a concept that calls for their involvement in communication. This study was thus guided by Participatory Communication theory by Paulo Freire whose main tenet is involvement of people in matters that affect them through dialogue. According to 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" rather, individuals themselves must give their views their own way (Freire, 1970; 1983; 1993).

Participatory communication was adopted in Development Communication in the 1960s and has since dominated all spheres of social development. In 1997 the Rockefeller foundation initiated the Consortium of Communication for Social Change which defined Participatory Communication as

a process where people define who they are, what the need and how to get it using dialogue and collective problem identification and decision making in order to improve their lives (Mefalopoulos, 2009).

Participatory Communication theory provides the rationale for community involvement in collective problem identification, decision making and community-based implementation of solutions to sustainable solid waste management.

Literature reviewed depict that one-way communication and awareness creation through the mass media is significant but is insufficient in promoting positive behavior towards SSWM. This study explored community involvement in communication as an alternative approach to communication for sustainable solid waste management.

The objectives of the study were:

- i. To explore community involvement in the communication of sustainable solid waste management in Migori County.
- ii. To establish media used for community involvement in the communication of SSWM.
- iii. To examine community awareness of SSWM

The study asked the following questions:

- i. To what extent does Migori County government involve the community in the communication of Sustainable Solid Waste Management?
- ii. Which media does Migori County government use to involve the community in the communication of SSWM?
- iii. What is the level of community awareness on SSWM in Migori County?

3.0 Methodology

This study was grounded on constructivist ontology. It developed a qualitative approach to understanding community involvement in communication of SSWM from the research participants' own construction of reality. Using qualitative research the study interacted with the study participants to extract information from the study participants themselves about media used in communication of SSWM so as to understand the nature of community involvement in the communication and the level of community awareness of SSWM. Qualitative study approach using in-depth interviews and focus group discussions enabled the study to obtain in-depth data from study participants' own perspectives which were displayed using thick descriptions (Creswell, 2014). The use of qualitative approach was also informed by the participatory communication perspectives which argue that individuals can only speak their own mind their own way (Freire, 1980).

A total of 167 adults comprising 75 females and 92 males living in three major towns of Migori County participated in this study. 23 participated in face-to-face interviews while 144 participated in focus group

discussions. Seven (7) respondents from the department of environment and eight (8) from the municipal councils were purposively sampled due to their significant roles in solid waste management. Eight (8) community representatives from different sectors in the towns were recruited using snowball sampling. Areas where solid waste is generated were clustered into three: Central Business Districts (CBD), markets and residential estates. Using voluntary sampling, community members participated in 19 focus group discussions comprising between six to ten people from the residential estates, trading areas, municipal markets and central business districts. Estates included in the study were Apida, Oruba, Nyasare, Police line, Aroso and Ori in Migori town; Mbwa Kali, Hass and Jua Kali in Rongo town and Seloset and Kehancha Junction in Isebania town. Participants from the central district included artisans, carpenters, tailors, hawkers, mechanics, hoteliers, cyber café business operators, retailers and wholesalers.

Interviews were first conducted with key informants from the department of environment and the municipal councils followed by representatives of groups in the communities. Semi structured interview guides were used to obtain rich data during interviews. From the first data set, codes and themes were identified then further explored through discussions with community members. The researcher carefully noted convergence and discrepancies in the different sets of data. Voice recording was used during interviews and group discussions. Data was organized, transcribed and into analyzed into qualitative themes.

4.1 Community involvement in the communication of SSWM

This study found minimal community involvement in the communication of SSWM. Majority of study participants, 142(85%) out of 167, felt that community members are not involved in communication of SSWM. Community members commented that communication from the county government on SSWM is rarely done and they are not involved. The study noted contrast between community responses and those from those in charge of solid waste management who mentioned that the community are involved in the communication. The following table presents findings on community involvement in communication of SSWM.

Table 1: Findings on community involvement in communication of SSWM.

Themes	Selected Quotes
Minimal community involvement in communication	<ul style="list-style-type: none"> • We hold radio talks to tell people how they administer waste. (K.I. 1) • 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 (K.I.3). • 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.2) • The cleaners of the town directly communicate to waste generators. After sweeping they tell them: <i>usimwage takataka hapa</i> (don't dump waste here) (K.I.3) • Communication can be done once a month with representatives. We call them when there is need. (K.I.4).
Reactionary communication	<ul style="list-style-type: none"> • 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 <i>wananchi</i> (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 (Business community representative) • People call radio stations to complain about accumulation of waste in the town. That is when the county government reacts. (Community representative, Migori town) • 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).

Themes	Selected Quotes
Lack of involvement in communication of SSWM	<ul style="list-style-type: none"> • There is still a lack of communication between the public and the government and especially due to lack of framework (K.I.1). • Communication has not been done by the county government. (K.I.3). • The department of environment does not involve people on the ground to discuss about waste management (transport sector 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) • 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. (Representative, business community, Rongo). • 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 about waste... that does not exist. (Group 1, Isebania town). • Community are not involved in communication about SSWM. Most community members do not know representatives who attend stakeholder meetings and neither do they share any information with members of the community (Group 3, Migori town).

From the findings (Table 1 above) there is limited communication of SSWM by the departments in charge of solid waste management with minimal community involvement. In Isebania town, though the leadership reported that communication about solid waste management was occasionally done during community meetings held by chiefs popularly known as *Baraza*, community members reported that there is no communication of SSWM in Isebania town. In Rongo and Migori towns, the department of environment and the municipal councils had in three occasions communicated through radio but information reached only a few. They felt that the county government communicate about solid waste management when traders threaten to go on strike or declined to pay tax due to poor state of solid waste in the towns.

This study found sharp contrasts in community involvement in communication. Unlike the leaders who felt that the community members are involved in the communication, most community members who participated in this study said that the community are not involvement in the communication about SSWM.

4.2 Media used for community involvement in the communication of SSWM

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

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 (K.I.2)

The following graph represents findings on media used for community involvement in the communication of SSWM.

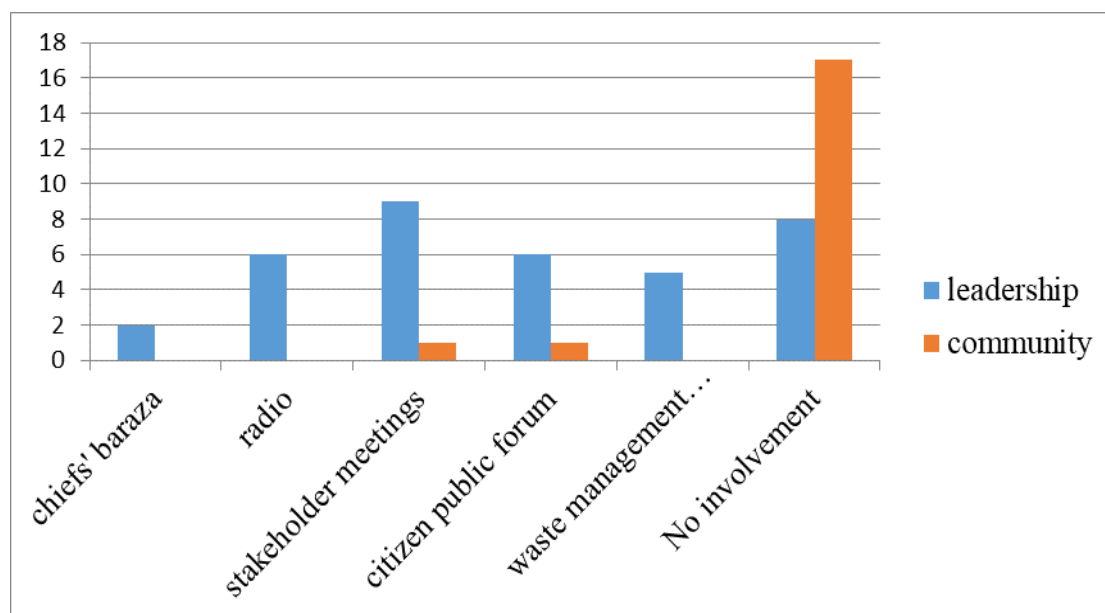


Figure 2: Media used for community involvement in the communication of SSWM

From the findings (Figure 2) majority of community members felt that they are not involved in the communication of SSWM through Baraza, radio and waste management supervisors and town cleaners. However few mentioned that the community are involved in communication during stakeholder meetings and public citizen fora. Out of the 144 participants in 19 focus group discussions held during the study, 134 felt that members of the community are not involved in the communication of SSWM. Community responses however, differed sharply from the leadership who felt that there is some form of community involvement using different media.

4.2.1 Community involvement in the communication of SSWM through local radio

The study explored how radio is used to involve the community in communication of SSWM. It was found that some members of the community call in on local radio stations during radio talk shows to complain about accumulated solid waste in the towns. The department of environment and natural resources and the municipal councils occasionally issued public statements through local radio and conducted radio talk shows to address the public on matters of solid waste management. During radio talk shows, information on the use of dustbins and regulations including penalties charged on offenders is disseminated to the public. The following table presents findings on community involvement in communication through the radio.

Table 2: Community involvement in the communication of SSWM through radio

Themes	Selected quotes
Reporting and addressing community complaints	We have communicated through local FM stations such as Mayienga, Milambo and Onagi where we send an advert to them... people call radio stations complaining over solid waste management, even the chief officer answering questions on waste management, even radio presenters asking questions.(K.I.6).
Information dissemination and interaction	<ul style="list-style-type: none"> We have used local radio station <i>Tarumbeta</i> and <i>Rameny</i> to pass information (K.I.4). When there is some information to be passed we go to these radio stations. In two occasions we have used it to disseminate information on use of dustbins while in three occasions we have used them as interactive sessions with community members where they ask questions (K.I.2). Radio Mayienga was used in early March. The message was enforcement of the law on waste management. Traders were being informed to take their waste to the transfer stations (K.I. 12).
Lack of communication about waste in Migori county	<ul style="list-style-type: none"> 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,Migori town) Radio Nam Lolwe and Ramogi talk about SWM in Kachok and Nyalenda in Kisumu but we have not heard any about Migori or Rongo. (Group 2, Rongo town)

Themes	Selected quotes
Crisis response	<ul style="list-style-type: none"> • Communication over the radio is only done when there are crisis and complains from the community. In such a case they respond to such complains. (Group 5, Migori town) • They don't have time to communicate to the people even on how waste can be managed unless we invite the media to see how certain areas are bad then they(government) will react (Artisans, Migori town).
No education and sensitization on waste management on radio	<ul style="list-style-type: none"> • We have never heard any communication from the radio (Group 1 Isebania town) • There is no communication....We have not been sensitized.
No communication on radio	<ul style="list-style-type: none"> • There is no communication....we have never heard any communication on the radio (Group 1 Isebania town)

These findings show that members of the community used radio to air their concerns on accumulation of solid waste in the towns while the municipalities used radio to address complains and disseminate information to the community to use of dustbins. However, majority of community members had not heard about communication of SSWM by Migori County on radio and were not involved in the communication of SSWM through radio. In Migori and Rongo municipalities, three radio talk shows had been held in the years 2019 and 2020 during which few community members called in on radio and asked questions which were addressed.

4.2.2 Community involvement in the communication of SSWM through public meetings

The study found that public meetings are organized in the county to facilitate citizen participation. The study found that there was no public meeting organized for discussions on waste management; the meetings had different agenda such as town planning, security, land issues and county budgeting. It is in such meetings that members of the community air their concerns about poor solid waste management in the towns. In Migori town during public citizen fora held in February, 2020, and multi-stakeholder forum in March 2020, community representatives asked the county government to provide dustbins in the central business district and in the markets. In Rongo town, community members raised the problem of poor waste management during public participation meeting organized to discuss urban planning. In one meeting Rongo municipality invited waste management expert to address the public on waste management. However most community members did not attend that meeting due to lack of information and other commitments.

We have had two citizen fora which began in 2020. One citizen fora that we had was about town planning and so many issues that affect the town came up. Waste management was one of them....we held one citizen fora, and waste management expert came and addressed the public on how to segregate waste and take them to a temporary transfer stations (K.I.4).

We have had departmental meetings with town residents, we meet their leaders they requested that they wanted dustbins so that they can manage their waste on their own. ... They push when town is dirty. Sometimes they can demand a meeting, sometimes they call you (K.I.3).

The study found that public meetings are rarely held, and according to the community representatives stakeholder meetings are held when there is a crisis such as accumulation of solid waste in the towns. Public meetings organized by the municipalities were first held in the year 2020 in Migori and Rongo towns while in Isebania town there were no public citizen fora. Public citizen fora organized by the county government for citizen participation in budgeting process as required by the constitution was held once a year. Representatives from different groups in the community felt that apart from complains on accumulation of solid waste in the towns, solid waste management is not given priority during public fora and stakeholder meetings. Agenda for which the meetings were held included matters of land, security, town planning and budget. They also cited that community requests and contributions were not implemented by the county government. The study also found that most community members do not attend public meetings.

Table 3 shows findings on communication of SSWM during meetings.

We have had two citizen fora which began in 2020. One citizen fora that we had was about town planning and so many issues that affect the town came up. Waste management was one of them. We held one citizen fora, and waste management expert came and addressed the public on how to segregate waste and take them to a temporary transfer stations (Rongo municipal council).

We have had departmental meetings with town residents, we meet their leaders. They requested that they wanted dustbins so that they can manage their waste on their own. ... They push when town is dirty. Sometimes they can demand a meeting, sometimes they call you (Migori municipal council).

Table 3: Community involvement in the communication of SSWM during stakeholder and public meetings

Themes	Selected quotes
Limited priority given to waste management	<ul style="list-style-type: none"> • Solid Waste Management is not given time for discussion...public health just ask if we have toilets, but this waste (<i>points at garbage</i>) we have out here they don't ask. Waste is not given attention by this government (Community representative) • I have attended two of such meetings but there is nothing like education about SSWM. Leaders from different sectors will present different issues. Nobody takes their time to educate people about SWM. (Representative of business community).
Lack of implementation	<ul style="list-style-type: none"> • After public participation nothing takes place, issues discussed are not implemented on the ground... Those in charge of the environment have not gotten in touch with the community on how to manage solid waste (Sector representative, Rongo town).
Lack of invitation to public meetings	<ul style="list-style-type: none"> • How can we attend public forum if we are not invited? We have not heard about any meeting (Osaka CBO). • We have not seen any invitation. We have never heard about such public forum, they invite big businesses but small scale traders who are the majority are not invited. I don't know who represent me either; I have not seen that person in-charge of trade. He has never called even a meeting with us (Small scale trader, Migori town).
Lack of representation	<ul style="list-style-type: none"> •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. (K.I.3). • We have not seen any person who represent us. How do we know? We have been here.... (Small scale traders). • We do not know who represent us and if they are there we don't know them. May be they go but they don't share with us. They have never come from those meetings and shared with us or called a meeting (traders in the CBD, Migori town). • There is no clear structure of communication about SWM in this town, even the public participation fora are not well done. Sometimes some sector leaders are not invited to attend meetings, sometimes information about the meetings is issued to leaders in the last minute (Market representative).

From these findings, involvement of the community in the communication of SSWM using public meetings is not properly done. The study found that community representatives who attended stakeholder meetings did not share information with the people they represent as was expected. Only 10 (7%) out of 144 community members who participated in this study had received information about waste management from community representatives who attend stakeholder meetings. The remaining 134(93%) had not received information.

This study found lack of proper representation, especially the residential community, in stakeholder meetings. Out of 144 community members who participated in group discussions, 103 community members in 14 groups did not know who represented them in stakeholder meetings. Nonetheless, even where there were representation, further communication was not done at the sector level. Only 10 members of the community agreed that their representatives share information from the stakeholder meetings with them. This was a group of traders in one municipal market where traders hold meetings and share concerns about poor solid waste management in the market with their chairperson who eventually attend stakeholder meetings. Nonetheless, the community members, expressed that the problems were still not addressed. Representatives from the community felt that concerns they present during public meetings were not implemented by the county government, a scenario which jeopardizes the true meaning of involvement.

Though public citizen fora are open to all, this study established that majority of community members do not attend public citizen fora due to lack of information and other commitments, a factor that hampered community involvement in the communication of SSWM. These findings were similar to those by Sinthumule and Mkumbuzi (2019) who found that community members gave low priority to attending CBO meetings because they were busy hustling for money.

4.2.3 Interpersonal discourses with waste management supervisors and town cleaners

According to the department of environment and natural resources and the municipal councils, waste management supervisors sensitize the community on keeping the environment clean during their regular duties.

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.3).

However, the study found that majority of community members do not know waste management supervisors and had not been engaged in communication of SSWM with them. According to community representatives, the supervisors inspect waste collection; they do not sensitize the community about solid waste management. Town cleaners also felt that they do not have powers to involve the community in the communication of SSWM.

There is no communication between waste management supervisor and market leaders (market representative).

"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?"(Town cleaner, Migori town).

4.2.4 Community involvement in the communication of SSWM through chiefs' Baraza

According to the municipalities, the community was involved in the communication of SSWM during local community meetings held by chiefs. These findings were however contradictory to those obtained from the community members who felt that they waste management is not discussed in chiefs' Baraza. The study also found poor attendance of chiefs' Baraza by members of the community, especially in the towns due to other commitments. The community associate Chiefs' Baraza with other matters such as land conflicts, theft of cattle and security but not waste management.

We use Baraza and sometimes when we attend public places and funerals and also schools. We normally take a day or after sometimes because it cannot happen every time and we organize with public health to talk to people then information is passed. Chief Baraza has elders from this villages which cover the whole ward. It is a public meeting and whoever feels like coming can come (K.I.5).

We have never heard about chief talking about SSWM.... I have done business here for four years. May be if cows are stolen or some issues, but about SSWM, NO. (Residents, Isebania town).

Across here, we have a clan elder, but there is no time he has ever talked to us about solid waste management.'(Residents, Apida estate, Migori town).

We have not heard the chief talk about SSWM...chief does not get involved in SSWM that is the work of county (government) not chief (residents Oruba estate, Migori town).

We rarely talk about waste management in the Baraza... very very rarely maybe if someone reports that another individual dumps waste in their plot....then in that case we intervene(Village elder, Migori).

Kiswahili: Sasa baraza unaweza enda uwaambie maneno ya taka itolewe kwenye bararaba? Si watasema ni nani amekuambia hayo,... nani amekutuma ulete mjadala kama huo hapa. Baraza unapeleka maneno kama umeibiwa ama shamba umeibiwa kama mtu amekutoa kwenye shamba ndiyuo unaenda kwa Baraza lakini maneno ya uchafu huweezi enda huko.

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 (Isebania residents).

4.3 Community awareness on SSWM

The study found limited community awareness on SSWM. Study participants felt that minimal communication of SSWM has resulted to limited awareness on SSWM among the community and poor waste management exhibited in the towns. All the 23 participants interviewed felt that most community members lack awareness on SSWM. Similarly, community members felt that they lack knowledge on SSWM due to lack of information. Burning of solid waste at source, in skips and final dumpsites, illegal dumping of solid waste in drainages and lack of waste separation were common. The study found minimal awareness on waste minimization evident in re-use of plastic containers, pieces of clothing from tailoring and food remains from hotels; however, most community members lack awareness on waste recycling and recovery. There is also lack of awareness on the effects of burning solid waste.

Table 4: Community awareness on SSWM.

Themes	Selected quotes
Lack of information	<ul style="list-style-type: none"> • Recycling, reduce and reuse waste are high order waste management practices that have not been communicated to the communities. We don't tell them to burn waste but we have also not told them not to burn waste(department of environment) • 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(community representative) • We have never heard any communication about SWM from the county government or from anywhere. There everybody does what they like with waste (Group 6, Migori town). • We have never heard about that sustainable solid waste management. We are hearing it for the first time (Group 3, Isebania town). • We have never heard any communication about SSWM from the county government or from anywhere. Here everybody does what they like with waste (Oruba residents, Migori town).

From these findings, lack of awareness on SSWM is attributed to lack of information and limited communication between the county government and the community. Lack of awareness led to poor waste management practices and lack of responsibility for waste among the community who feel that waste management is the responsibility of the county government.

5.0 Conclusion

This study found minimal community involvement in the communication of SSWM characterized by passive informational communication. Community involvement in communication is hampered by lack of communication policy, communication structures and programmes for involving the community in the communication of SSWM. There is also limited communication about SSWM by the department of environment and the municipalities. Communication through radio is mainly done to respond to public complains and to disseminate information to the public to use dustbins and designated dumpsites. Involvement of the community in the communication of SSWM using Chiefs' *Baraza* and public and stakeholder meetings were found to be ineffective due to lack of structures on how to involve the community in the communication, inadequate community representation, and poor attendance of the meetings by members of the community which in turn is occasioned by lack of information on when and where those meetings are conducted.

Public citizen meetings are rarely held and they are organized for other agenda other than solid waste management. As a result discussion on solid waste management is given limited priority during those public meetings. Stakeholder meetings are held in hotels and boardrooms with invited representative from the community most of whom do not share information with the rest of the community they represent after the meetings. Most community members do not know about waste management supervisors who are also expected to inform members of the community on how to manage solid waste. These factors lead to limited awareness on SSWM among the community. Consequently there is poor waste management practices and lack of responsibility towards solid waste management among the community.

This study recommends that the department of environment create structures for involving the community in the communication of SSWM. They should use participatory media channels such as community radio and social media so as to improve community awareness and participation in SSWM. Face-to face communication with the community should be done at the grass root level where waste is generated so as to involve waste generators themselves in making decisions on how to manage the waste they generate. Suggested further research should be on communication structures that can be used to involve the community in the communication of SSWM at the grass root levels. There is need for analysis of messages communicated for SSWM so as to further understand the communication-knowledge gap in solid waste management and improve how knowledge on SSWM can be effectively imparted to solid waste generators.

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