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The role of community participation in solid waste management in Zimbabwe: The case of Nyanga township

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ABSTRACT

The study was conducted in Nyanga rural district council which has the mandate to run the affairs of Nyanga township. The research focused on the role of community participation in improving solid waste management in Nyanga township. The research was based on a descriptive survey with clusters and simple random sampling being used to come up with subjects for the study. Triangulation of data collection tools was also employed to ensure reliability and validity of the results, although aspect of literacy is a key assumption on the use of questionnaires amongst communities. Improper solid waste management is a public health disaster risk that has largely been attributed to the historical bubonic plague in the developed world as well as the recent epidemics of cholera and typhoid in Zimbabwean cities, including the study area. Involvement of NGOs and WASH Projects in Nyanga largely, led to the reduction of illegal dumpsites, with community and school health clubs having played a pivotal role in promoting responsible citizenry. It was noted that separation of waste particularly at the household level was not being done, thereby exacerbating waste generation. The enforcement of relevant legislation on solid waste management was fragmented, with Environmental Management Act being enforced partly by EMA officials mainly towards corporate, industries, and not individuals. Other relevant actors like the Ministry of Health administers, Public Health Act and urban councils Act, parallel to the EMA statutes. Nyanga Rural District Council has to come up with specific by laws on solid waste management and capacity building to enhance sustainability of community health clubs and other community sustainable integrated solid waste management initiatives. The research focused on the role of community participation in solid waste management initiatives by individuals, community groups, or community-based organisations.

KEYWORDS
Community participation, Sustainable Solid Waste Management, Community, Community Perception, Integrated Solid Waste Management.

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1. Introduction

Community participation can be enhanced through solid waste management-sensitisation programmes giving various categories of the community the guidelines on how to participate in cleaning up the environment, (Mutuma, 1992). Municipal solid waste management (MSWM) is a multidisciplinary activity that includes administrative activities, and solid waste management practices such as the control of waste generation, storage, collection, transfer and transport, processing, and disposal of solid waste, submits, (Hirpe & Yeom, 2021). Poor and inadequate waste management decisions can affect daily health, cleanliness, and productivity, thereby affecting economic development at all levels of society (Cayumil, Khanna, Konyukhov, Burmistrov, Beisembekovich Kargin & Mukherjee, 2021). Of late, community participation has taken a significant role as a strategy in social development generally, especially in the field of human settlement (UN-Habitat, 2006). This has come about in developed and developing countries as well. Community participation means people's involvement in the identification of their felt needs, mobilisation of their resources, influencing direction, and execution of environmental programmes and projects (Nebiyou, 2020).

Through community participation in the solid waste management, the residents can significantly supplement the waste management efforts by council authorities which is already incapacitated by financial constraints (UNEP, 2021). Such a scenario holds great promise not only for meeting the basic human settlement needs but also for elaborating an active and cooperative mode of development (Saungweme, 2012).

The rapid increase in population coupled with the expansion of the industry is producing large volumes of waste, whose management demands greater infrastructure, institutional setup, and community participation (Umer, Shimelis, Ahmed, Sema, 2019). This massive generation of waste coupled with unbalanced waste management is a major challenge faced by developing countries, particularly the sub-Saharan African countries. Sub-Saharan countries are characterised by the least gross domestic product (GDP), and a large portion of their populations live below the poverty line. However, according to the recent World Bank (2021), the economic development of the majority of sub-Saharan African countries is growing at a fast rate, as well as the population growth and urbanisation in sub-Saharan African countries are increasing from time to time. As a result, the municipal solid waste management problems, such as an increasing generation rate of solid waste and open burning and dumping in sub-Saharan African countries, are found at an alarming rate (Sandra & Weghmann, 2021).

Community participation can comprise varying degrees of involvement of the local community, ranging from the contribution of cash, and labour to consultation, adaptation of behaviour, involvement in administration, management and decision-making (Ntakamulenga, 2010). To keep the service running, continuous participation of the community receiving the service, is required, for example, to store the garbage in a specific bag or bin, to bring it to an agreed point, to separate it in dry and wet waste (Jerie, 2005). Waste management should concern itself not only with final disposal of waste but also with the whole cycle of waste creation; transportation, storage, treatment, and recovery and does so to minimise pollution (Jerie & Tevera, 2014). Community involvement is the most vital integral component in the victory of any solid waste

project, in assortment and design of facilities essential for sustainability, (World Bank, 2021). It is largely agreed that involving community in basic social amenities initially offered by town councils, and local authorities could be the panacea towards addressing solid waste management challenges (World Bank, 2012). These communities have embarked on composting activities, have had robust legal backing in place, and largely reduced the high prevalence of diarrheal diseases because of poor sanitation.

Improper solid waste management (SWM) is a major public health and environmental concern in the urban areas of many developing countries (Lema, Mesfun & Eshete, 2019). Nyanga township (Zimbabwe), is not spared from the myriad challenges associated with poor solid waste management. Little research has been done on the impacts of community involvement, and participation in addressing solid waste management, in Nyanga. Therefore, Nyanga as one of the fast-growing ecotourism towns in Zimbabwe was selected as the case study of this systematic review because the author believed that Nyanga could represent the fast-expanding townships in Zimbabwe and even other developing countries in Africa. Partnership between groups in community, folks, and informal organisations such as Residents Associations (RA) and community clubs have been seen as the solution to tackle solid waste management dilemma (UN-Habitat, 2006).

Regardless of efforts made by government authorities over the past decades to attend to the predicament of waste management, many municipal authorities still have problems (Atienza, 2011). Solid waste management is an emerging and growing Safety, Health and Environmental (SHE) and financial problem in developing countries. Even with significant efforts between 2010 and 2020 to technically support town councils in terms of provision of machinery and waste collection vehicles, the majority of town councils in Zimbabwe fails to properly manage the mounting quantity of waste generated in cities and towns (Saungweme, 2012). What is evident is the requirement for a paradigm shift in the way solid waste is managed, hence, instead of a community being for mere rate payers, and pursuing the criticism agenda, there is need for them to be involved in the provision of such services. In January 2020, the President of Zimbabwe declared every first Friday of every month, a clean-up campaign day, which aids integrated solid waste management at national level.

2. Methodology

In order to solicit for the required information, the research adopted a descriptive research design. Descriptive research represents a broad category of techniques that need questioning as a strategy to elicit information (Merrian, 1998). It gives thick description of how things are, in their social context. The qualitative research method permitted the researcher to obtain data on the impacts of community participation and activities undertaken by the community. Judgmental or purposive sampling, a non-probability sampling method involving selective sampling was deliberately used to select community health club facilitators amongst community members. For the purpose of this research, cluster sampling, and simple random sampling was adopted for use. These were generally probability types of sampling. A sample of 200 units or households were selected from the residential areas that make up the two urban wards in Nyanga township through cluster sampling, and simple random sampling.

The researcher determines the sample size by deciding the number of people

to be involved in the research to ensure validity and reliability of the results obtained (Sekeran, 1992). Sample size determination, 10% of whole population under study, was chosen to represent the population. Validity and reliability of outcome representing the role of community involvement in solid waste management in Nyanga was attained.

For the purpose of this research, the researcher sought direct consent from the participants to appreciate the subjects under study, and acknowledging their constitutional rights. The consent was on the voluntary basis, meaning that an individual had the ability to choose whether to participate in the research or not. It is also imperative that the researcher avoided bias, which is an unethical practice. This was to ensure objective gathering, and reporting of the data. Appropriate research methodology, and correct reporting was also ensured as part of ethical considerations.

The researcher circulated questionnaires to chosen respondents in the sample frame. The questionnaires were hand delivered to relevant respondents to make sure that those who were selected by the researcher received them. Questionnaires contain list of questions the investigator intends to enquire from the subjects, and these had both open and closed ended questions.

An interview is a joint production of a researcher and a member. The interviewees are active participants whose feelings, cooperation, and insights are critical components of a discussion process that aims at bringing out qualitative meanings (Neuman, 2003). The interview allows probing for more explanation where information given is unclear (Chipato, 2012). Visits were done to observe accumulation of solid waste, strategies like reuse and recycling of solid waste by Community Health Clubs (CHCs). Field observations helped to validate information obtained from questionnaires and interviewees. Field observations technique was cheap compared to other techniques and unravelled other human behaviours and practices, particularly with reference to waste collection and sorting, which the general citizens do but do not yet appreciate. Focus group discussions (FGDs) are a tool for collecting qualitative data from group discussions. FGD allow for the shift in power from the researcher to the respondents as it gives room for open discussions. The FGD sessions were difficult to assemble since the participants were busy with other socio-economic obligations. The data collected from household questionnaires, and interviews from the officials were then analysed using Statistical Package for Social Sciences (SPSS) version 16.0. The views from the council officials were summarised for discussion.

3. Results and discussion

Scope of community participation in solid waste management

It was noted that 70% of the sampled households in Nyamhuka, Destiny, Bepe Park, Nyangani Park and Rochdale were females, whilst 30% were males. This could imply that females are generally closer to the environment than their male counterparts, hence interest in participating in environmental issues. Given their domestic roles, women are usually assigned to take care of their solid waste at household level, and are, therefore, more qualified to be environmental managers even at a community level than their male counterparts. Traditionally, men play technical roles, decision-making and labour-intensive menial jobs, and are unlikely to take part in such local environmental initiatives.

Age Interval	Female (%)	Male (%)	Total (%)
15-19	02	01	03
20-29	20	08	28
30-39	20	09	29
40-49	15	07	22
50-59	06	02	08
60-69	04	01	05
Above 70	03	02	05
Total	**70**	**30**	**100**

Table 1: Age and gender and of respondents *Source: Field Survey 2017*

Results from the sampled 200 subjects indicates a very youthful demographic distribution that has an economic active group with a low dependence ratio since 82% of the sampled population is below the age of 50. The economically active population such as the youth could be the most active people in terms of environmental issues and would, therefore, be more willing to participate in such issues. Above all, 59% of the sampled population were married, 28% were singles, 8% divorcees, whilst 5% was for widows.

Most interviewed participants were household heads, and as such, the relatively higher number of married participants could indicate that the participants were adults who could easily make informed choices once they were empowered to improve their environmental wellbeing through community participation in environmental safety and health. Besides that, 59% of the respondents indicated that they had reached secondary level of education, everyone had been at school, at least up to highest primary level. This translates to 100% literacy rate as all participants were able to read and write and they could easily appreciate the need for community participation in environmental issues that affect their life expectancy like solid waste management. Studies argue that knowledge is power, and if the community is literate on general environmental issues, it helps reduce morbidity and mortality due to poor solid waste management practices.

Gender	Marital Status					Employment Status			
	Single	Married	Widowed	Divorced	Total	Employed	Unemployed	Self Employed	Total
Male	12	42	2	4	60	18	26	16	60
Female	44	76	8	12	140	32	72	36	140
Total	**56**	**118**	**10**	**16**	**200**	**50**	**98**	**52**	**200**

Table 2: Cross tabulation of gender, marital and employment status of respondents *Source*: *Field Survey 2017*

Disparity in gender participation on solid waste management initiatives have been noted with more women participating more than their male counterparts in the five locations sampled in Nyanga. This could imply that females are generally closer to the environment than their male counterparts, hence, their interest in participating in such environmental issues. They are usually assigned to take care of their solid waste at household level and are therefore more qualified to be environmental managers even at social community level than their male counterparts. In most cases, men play a technical and decision-making role at household level since they would be the budget holders (payment of bills), hence their involvement in such community initiatives. Possibly, males are mostly involved in labour intensive menial jobs and are unlikely to take part in such local

environmental initiatives including research questionnaires

Table 2 indicates a very youthful demographic distribution that has an economic active group with a low dependence ratio since 82% of the sampled population is below the age of 50. The economically active population such as the youth could be the most active people in terms of environmental issues and would therefore be more willing to participate in such issues. They are the childbearing group with the responsibility of looking after children, hence their concern of environmental safety including proper solid waste management to reduce diseases epidemic. Most of the participants interviewed were households' heads and as such, the relatively higher number of married participants could indicate that the participants were adults who could easily make informed choices once they are empowered to improve their environmental wellbeing through community participation in environmental safety and health.

Waste generation, handling, collection and disposal.

Solid waste generated in Nyanga varies and differs in type and form depending on socio-economic activity practised in the residential area apart from household waste generation. Of the sampled population in Nyanga township, 37% produce plastics as waste, 20% produce organic waste of which wood sawdust makes up 8%, green waste 5% and food waste 7%. Furthermore, 16% generate paper waste, 1% generates wood waste, 26% generate all forms of waste which encompass rubber, cloth, glass and leather. Generation of (37%) plastics which comprises of food wrappers (10%), plastic bags (8%), beverage bottles (7%), and take out containers (12%) waste is worrisome because plastics are not environmentally bio degradable. However, the community can still adopt the order of waste hierarchy to sustainably manage the plastics such as reduce, reuse, recycle and recovery of waste. Moreover, 64% of the respondents do not separate waste at household level. They mix all forms of waste, including the organic and inorganic waste, thereby increasing the amount of waste generated, as well as the risk of diseases transmission and bed smell. However, 36% indicated that they separate waste at household level. This is an indication that the community health clubs established BY Caritas and Nyanga Municipal Council are playing a vital role in educating the community on solid waste sorting. Above all, 46% of the sampled population resort to indiscriminate disposal of solid waste at undesignated dumpsites, thereby attracting the flies, fires and polluting the environment.

Illegal dumps were mostly found at Nyangani Park, a new housing scheme that, however, was not properly serviced in terms of road network, sewer and water, making collection of solid waste a challenge since the areas is inaccessible. This was observed through transect walks to Nyangani Park, and is a typical example of bad development, and a public health threat that could actually increase the people's vulnerability to diseases. In spite of that, 2% of the households just wrap the organic waste in materials like newspapers for latter disposal. This may be an indication of unreliability of collection frequency by the municipal council, and lack of knowledge on proper solid waste storage management. Likewise, 50% of the respondents use waste receptacles they purchased for themselves. This is exacerbated by the NIMBY (not in my backyard) syndrome whereby no one wants the dumpsite in his or her backyard, but all the same want the waste removed, and dumped somewhere else (Jerie, 2006; Ray, 2008). This shows that the community has a sense of environmental consciousness though it seems to be a mammoth task for the council to provide

the receptacles to the bulging urban population. However, 32% of the respondents used receptacles provided by the municipal council. These receptacles have been donated by local non-governmental organisation (NGO), Caritas to Nyanga local municipality. The active involvement of the community in solid waste management issues is a step in the right direction insuring community citizenry and responsibility.

The Housing and Community Services Director (Nyanga Municipality) also indicated that receptacles are given to residents who pay their rates on time. The community had 8% of the respondents without receptacles. The receptacles provision is a sign that the council has been unable to provide solid waste collection facilities as enshrined in the Urban Councils Act. Additionally, 25% of the respondents indicated that they improvised mealie meal bags, sacks and cardboard boxes for waste collection and storage, and this validates the assertion by the Housing Director that council has been unable to provide waste receptacle to residents. The respondents indicated that Nyanga town council has been able to collect solid waste for at least 72% coverage on weekly basis. Odour attracts flies and rodents and this is why collection should be frequent and regular (Tchobanoglous, Theisen & Vigil, 1993; Tevera, 1991). The collection frequency could be a result of a new fleet of refuse compacter truck that was acquired by the council with the assistance by Caritas to replace an aging inefficient tractor. Collection of solid waste is negligibly very low or non-existent in low-income areas (Saungweme, 2012; Senner, 2000).

Community involvement and participation in solid waste management.

The Nyanga community participates in integrated solid waste management through various initiatives such as community, and school health clubs. Minimising solid waste generation is one of the key strategies aimed at managing solid waste using the integrated approach. In Nyanga township, 7% of the respondents practice recycling through community-based organisations such as Kuwirirana and Mangondoza. Separation and sorting are possible at household level but coming up with a new product seems to be a challenge for many communities (Manyanhaire, 2009).

Community Participation	Nyamhuka	Bepe Park	Nyangani Park	Destiny	Rochdale	Total	Total Percentage
Reduction	37	11	13	26	09	**96**	**48**
Recycle	05	03	01	04	01	**14**	**07**
Reuse	09	05	03	07	02	**26**	**13**
Composting	28	10	08	14	04	**64**	**32**
Total	**79**	**29**	**25**	**51**	**16**	**200**	**100**

Table 4: Cross tabulation of community participation and spatial area. *Source: Field Survey 2017*

The economic and operational costs of recycling can be solved if small to medium corporates with the capacity to incur the operational costs are roped in to create market linkages with the locals who can be tasked to do the primary tasks. However, 13% of the respondents indicated that they are involved in the reusing of solid waste both at community and household level. Of the respondents, 32% resort to composting to get manure for costing. The compost is used for gardening that further promotes nutrition amongst the households, thereby increasing their resilience and coping capacities to food shortages, now equally prevalent in urban settings (Saungweme, 2012). Landfilling provides the cheapest and most convenient method of waste disposal today when operated

efficiently (Krook, Stevenson & Eklund, 2012; Morris & Barlaz, 2011). Conversely, 48% indicated that they have adopted other ways of minimising solid waste generation like burning. It implies that there is need to continuously educate the communities so that they appreciate the sustainable ways of handling solid waste like recycling and reusing that can actually turn trash to cash for survival.

The depletion of the ozone layer has been attributed to increased release of greenhouse gases like methane, which comes out of the burning solid waste. Increased greenhouse gas emissions including methane have been partly blamed for the change in climatic conditions, mostly felt in developing states due to differential coping and adaptive capacities cross the globe.

It has been discovered that, 15%, 21% and 4% of those involved in community solid waste management activities participate in community health clubs, clean-up campaigns and recycling venture respectively. Clean-up campaigns were launched by the council in partnership with Caritas and residents cascading to all wards in the small township. These are regularly done, and could be the reason for reduced illegal dumpsites in the high-density suburbs. Community health clubs, besides raising awareness through clean-up campaigns, continuous drive behavioural change approaches through health and hygiene sessions done on regular basis. It was further noted that 40% of the respondents are involved in solid waste management initiatives at community level in different ways. Nonetheless, 60% are not in any way involved in community solid waste management initiatives. This means the partnership existing between council, residents and government departments could be bringing the much-needed change in terms of community participation.

The Community Health Clubs (CHCs) were formed to promote health and hygiene practices to reduce the high burden of diseases. Chief among the key result areas of the CHCs is Participatory Health and Hygiene Promotion (PHHP) approach that equally focuses on sustainable solid waste management strategies. The understanding of local hazards through education is also an important aspect of the framework, and this has been done at local level through PHHE sessions with the five clubs established in two wards of the five locations studied. The Housing Director also overstressed the importance of partnerships in solid waste management, and gave an example of the partnership that exists between council and Chibuku breweries on the transportation of segregated waste and recycled products for market.

Community Perceptions to solid waste management

Community Perceptions	Nyamhuka		Bepe Park		Nyangani Park		Destiny		Rochdale		Total
	O	**E**	**O**	**E**	**O**	**E**	**O**	**E**	**O**	**E**	
Not good	06	6.56	02	1.68	02	2.08	04	3.6	02	2.08	**16**
Improve environment	57	55.76	14	14.28	17	17.68	27	30.6	21	17.68	**136**
Costly	03	2.46	00	0.63	01	0.78	02	1.35	00	0.78	**06**
Scornful	02	1.64	00	0.42	00	0.52	02	0.9	00	0.52	**04**
Generate Income	11	12.3	04	3.15	05	3.9	07	6.45	03	3.9	**30**
Not Sure	03	3.28	01	0.84	01	1.04	03	1.8	00	1.04	**08**
Total	**82**		**21**		**26**		**45**		**26**		**200**

Table 4: Community perceptions towards recycling initiatives. *Source: Field Survey 2017.*

Community Perceptions	Nyamhuka		Bepe Park		Nyangani Park		Destiny		Rochdale		Total
	O-E	$(O-E)^2/E$	O-E	$(O-E)^2/E$	O-E	$(O-E)^2/E$	O-E	$(O-E)^2/E$	O-E	$(O-E)^2/E$	
Not good	0.314	0.048	0.32	0.061	-0.08	0.003	0.4	0.044	-0.08	0.003	
Improve environment	1.24	0.027	-0.28	0.005	-0.68	0.03	-3.6	0.424	3.32	0.623	
Costly	0.54	0.119	-0.63	0.397	0.22	0.062	0.65	0.313	-0.78	0.608	
Scornful	0.36	0.079	-0.42	0.176	-0.52	0.270	1.1	1.344	-0.52	0.270	
Generate Income	-1.3	0.137	0.85	0.229	1.1	0.310	0.55	0.047	-0.9	0.208	
Not Sure	-0.28	0.024	0.16	0.030	-0.04	0.002	1.2	0.8	-1.04	1.082	
Total		**0.434**		**0.898**		**0.677**		**2.972**		**2.794**	**7.775**

Table 5: Chi Square test on community perceptions towards recycling initiatives. *Source: Field Survey 2017.*

Null Hypothesis, (H_0): There is no association between community perceptions and recycling initiatives.

Alternative Hypothesis, (H_1): There is an association between community perceptions and recycling initiatives.

df = (r-1) (K-1): where r is the number of rows and k is the number of columns

df = (5-1) (6-1),

(4)(5) =20

20 = 31.4

X^2 cal (7.775) < df (31.4), hence, acceptance of the null hypothesis, therefore there is no association between community perceptions and recycling initiatives.

The people's attitudes and perceptions towards integrated solid waste management, illustrated that 8% viewed solid waste management as a bad idea, whilst 68% opined that it improves environmental sustainability. Furthermore, 15% views that recycling initiatives can be an income-generating project. However, 3%, 2% and 4% views recycling as costly, scornful initiative and not so sure about recycling consequences respectively. Above all, 47% of the respondents concur that the poor management of solid waste can result in disease outbreaks.

Zimbabwe is vulnerable to communicable diseases outbreaks like cholera, typhoid, and other forms of diseases, and these have been attributed to poor sanitation including solid waste. They also largely appreciate that dumpsites, besides being sources of diseases outbreaks, can affect the aesthetic value of the environment. The EHT looked at solid waste management as a public health issue that requires an all-stakeholder's approach to guarantee community wellbeing. Council, the Environmental Management Agency (EMA) and other local players, organise clean-up campaigns where awareness on solid waste management is intensified, as illustrated by 24% of the respondents appreciating the move. School children are also capable conveyers of environmental education, with 45% getting knowledge of solid waste management information from children and awareness campaigns. The Housing Director confirmed that school health clubs have been formed with support from Caritas and these have played a key role in disseminating of integrated solid waste management information through solid waste sessions, songs, and quiz questions.

Community attitudes and perceptions can adversely affect the efforts done through waste recovery. Scavenging for solid waste is a menial job that people discriminate against, either legally or illegally. Field visits done reflect that very few people from the community were seen picking and sorting waste at the dumpsite in Nyanga. Of the respondents studied, 27% argued that discrimination is a big threat towards solid waste collection. More women were seen participating much in solid waste management initiatives than their male counter paths. This implies that more awareness is needed to change community perception on solid waste picking to encourage solid waste recycling and recovery. As has been demonstrated by the Chi square test above, there is no association between community perceptions and recycling initiatives. From the data, 48% argued that the council has not been supportive in such ventures, leading to apathy; 4% confirmed that lack of motivation whereas 15% postulated that, they are yet to realise the monetary gains associated with solid waste recycling. Hence, the Nyanga council should embark on promoting the few community recycling initiatives through sourcing of market linkages for their products and marketing to enhance visibility.

Institutional frameworks governing integrated solid waste management in Nyanga

Environmental legal Instrument	**Governing Ministry/ Department**
Environmental Management Act Chapter 20:27	Environment, Climate and Water
Public Health Act Chapter 15:09	Ministry of Health and Child Welfare
Urban Council Act Chapter 29:15	Ministry of Local Government and National Housing
Water Act Chapter 20:22	Ministry of Water Resources
Rural District Councils Act Chapter 29:13	Ministry of Local Government and National Housing
Regional Town and Country Planning Act Chapter 29:12	Ministry Local Government and National Housing

Table 6: Environmental Legislation and Governing Institutions in Zimbabwe *Source: Primary Data 2014*

It was noted that 60% admitted that they were aware of the Environmental Management Act that is administered by EMA in managing solid waste. This means that EMA has been commendably doing well in selling the legal tool that supports their operations on solid waste management. The Public Health Act is known by 15% when it comes to solid waste management, despite it being a much older act than the EMA Act. The Urban Councils Act is known by 15% that means there could be adequate legal tools to enforce integrated solid waste management regulations with community participation. What could be a sticking point might be the fragmented nature of environmental laws in terms of enforcement. An overarching legal tool to oversee the enforcement of environmental issues would be ideal. Public Health and EMA acts could be repeating issues but with different implementing institutions. The majority of the respondents argued that Environmental Management Agency has been effective to corporates in terms of compliance and have been pivotal in calling for the formation of community-based organisations to partner local authorities to manage the local hazards like solid waste. The agency makes use of the print, electronic and social media to disseminate environmental education. They have also been offensive in putting punitive measures against corporates who do not

comply with requirements like waste management plans. However, this has been mainly focused on corporates who are able to pay fines, and not individuals, hence, questioning the effectiveness of EMA in controlling poor solid waste management.

Public Health Act, though administered by the Ministry of Health and Child Care, it has been generally misunderstood with many people arguing that the Act is used in private, and public health institutions to guard the medical health of the public. This is quite contrary to the multidisciplinary nature of public health. Increased life expectancy and reduced infant mortality is only possible with participation of all players, including the community. This further justifies the notion that solid waste management is a public health issue that demands the participation of all the players to get the required results. Of the respondents 45% pointed out that legislation could be the best tool towards solving solid waste management issues. They concur with many scholars such as Manyanhaire (2009) who argue that the enforcement and implementation of appropriate coordinated legislation would go a long way in solving the problem. Enforcement has been the biggest challenge, particularly to individual offenders. However, 55% countered that legislation alone cannot be the best tool to achieve cleaner, habitable and safe towns. They argued that education and awareness campaigns could be helpful especially if the efforts are sustained over a long period so that the messages are cultured into people to gradually promote environmentally responsible citizenry, where people would be compelled to practice safe hygiene even without the punitive demands of legislation. Sustained health and hygiene promotion on solid waste was equally echoed by the EHT as an alternative way to reduce solid waste challenges as well as roping in other players through Private Public Partnerships (PPPs) that have potential.

4. Conclusion

As illustrated, 20% of the respondents from the community members highlighted that they participated in waste collection for reusing, recycling and other initiatives. Collection of waste can fetch income for club members, whilst at the same time ensures a cleaner and safer environment. An affiliation has been established between Nyanga Waste Recyclers and community health clubs to collect and sort waste for further recycling in Nyanga. It was shown that part of the CHCs are involved in waste sorting and separation for recycling. They are under the auspices of NGOs like Caritas and CAFOD which assist in identifying and managing local sanitation risks like solid waste in small townships like Nyanga.

Household competitions and school quiz sessions were noted as bringing about the excitement to school children, and community health clubs so that the key messages on proper solid waste management issues are enjoyable and easily internalised. Progress on environmental cleanliness, and safeness were visible with a marked decline in the quantity of illegal dumpsites at household and community level. Private players like Delta, ZimParks and Nyanga Residents Association (NRA) have been supportive of initiatives meant to reduce the disaster risks associated with poor solid waste management through their involvement and participation in integrated solid waste management programmes. NGOs such as Caritas and CAFOD play a fundamental role in abetting sustainable integrated solid waste management through technical and financial support like the purchase of new fleet of refuse compactor, and being part of a Project Steering Committee running WASH matters in the township.

The paper also noted that current legal frameworks are not useful in combating solid waste management problems bedevilling the Nyanga populace. The laws on solid waste management are fragmented and there is no legal instrument that purposely deals with solid waste management at national level. EMA remains vocal to corporates, mainly being focused on reactive and passive enforcements that promote fines to offenders. Legal and institutional provisions should be reinforced to sufficiently deal with solid waste management matters. It is necessary to come up with definite solid waste management policies at national level that should be cascaded to local authorities for implementation and guidance. Nyanga Council should also come up with specific township level byelaws to govern solid waste management. The township, for instance, does not have by-laws to deal with illegal vending and that kind of a dilemma may further aggravate the efforts to organise vending, and reduce haphazard disposal of solid waste. Reinforcing the collaboration of Ministry of Health, EMA and Nyanga Municipal Council could be a mid-term resolution meant to attend to the legal and institutional shortfalls in the township. Having pieces of legislation may not be adequate but would also advocate the insistent enforcement of the appropriate legislation to create safer and healthy township. Pieces of legislation should take into consideration the importance of involving community participation in sustainable integrated solid waste management as a holistic approach to environmental problems bedevilling Nyanga society emanating from unsustainable management of solid waste practices.

Largely, Nyanga Rural District Council has made great strides in ensuring community participation and involvement in integrated sustainable solid waste management to decrease morbidity and mortality due to diseases. Empirical evidence includes the abridged number of illegal dumps, limited littering in town, health and hygiene information shown by the society and schools. Community participation can be improved by incorporating health education on sanitation with income generating projects to sustain the community health initiatives like clubs. Community Health Clubs (CHCs) have demonstrated to be effectual in ensuring the participation and involvement of the society in solid waste management. The sustainability of the CHCs ahead of the lifespan of NGOs has been the obstruction for persistent community participation. Nyanga council should improve solid waste management enabling amenities like provision of receptacles so that the superlative theoretical practices are sustained by readily accessible hardware components.

There has to be an incorporation of hardware and software apparatus to sustain solid waste management initiatives. Market linkages should sustain the waste collection and sorting ventures so that in the long term, they are capable to recycle and sell the trash at local township level. The socio-economic, environmental and public health benefits significant from the impacts of community participation should be documented, and sold to other community members with most important human-interest stories. Societies have been involved in beneficial community initiatives but what has been missing is the documentation of benefits and good practices that can incessantly improve.

The general public has not simply treasured community participation since some citizens still consider it as the responsibility of local authorities to administer solid waste. Awareness campaigns should be fortified in all communities so that citizens welcome the collective duty of keeping Nyanga clean. Nyanga Council should support community-based organisations like Nyanga Recyclers by offering waste storage sites, exempting them from paying licenses, and sustaining them with other operational costs like transport. Scotch carts and

wheelbarrows could be supplied to waste collection groups to enhance efficiency.

There is need for a paradigm shift of thoughts, and approaches of solid waste management not to be seen as a responsibility for the poor or mentally challenged citizens but everyone's obligation in the society. Waste picking should be taken as a source of income that can be done by everyone in the community. The knowledge, attitudes and perceptions of the community can be altered through the community health clubs. The higher number of female participants in Community Health Clubs validates the assertion that women participate more in solid waste management initiatives than their male counterparts. The smaller number of males participating in solid waste management can be improved by coming up with male forums where the awareness campaigns for appropriate solid waste management can be taken where men frequent, generally in sporting gatherings, workplaces during lunch hours and in churches.

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