



# Managing environmental sanitation in the catchment area of Benya Lagoon, Ghana: Education, regulation or infrastructure management as a matter of strategic priority?

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## GEOGRAPHY | RESEARCH ARTICLE

# Managing environmental sanitation in the catchment area of Benya Lagoon, Ghana: Education, regulation or infrastructure management as a matter of strategic priority?

Justice Mensah<sup>1\*</sup>

**Abstract:** Poor environmental sanitation is a menace in many parts of the world, but particularly so in the developing countries, including Ghana. While several strategies may be available for managing this environmental menace, interventions in education, regulation, and infrastructure appear to be the main options. However, resources for adequately managing all the three dimensions simultaneously are limited, necessitating prioritisation for efficient resource allocation for optimal interventional results. This study explored how the dimensions could be prioritised for efficient allocation of resources for effective sanitation management. Data were collected from purposively selected respondents mainly from the catchment area of Benya Lagoon in Ghana, using in-depth interviews and focus group discussions, and analysed thematically using interpretive narratives and most significant stories. The study showed that, theoretically, each of the dimensions was supreme in its own right but not sufficient in itself as, in practice, they complemented one another for

### ABOUT THE AUTHOR

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### PUBLIC INTEREST STATEMENT

The paper contributes to the discourse on the menace of poor environmental sanitation in developing countries, with particular reference to Ghana. It argues that while several strategies may be available for managing this environmental menace, interventions in education, regulation, and infrastructure are the main options. However, resources for adequately managing all the three dimensions simultaneously are limited, necessitating prioritisation for efficient resource allocation for optimal interventional results. It explores how the dimensions could be prioritised for efficient allocation of resources. It shows that, theoretically, each of the dimensions is supreme in its own right but not sufficient in itself as, in practice; they complement one another for the best interventional outcomes. Interventional prioritisation decisions by the Government, NGOs and Private Sector should be based on local-specific socio-economic factors such as income, education and residential class. Involvement of local-level stakeholders in the pre-interventional local environmental assessment is critical to the success of effective prioritisation for effective interventions.

the best results. Most respondents prioritised the dimensions based on local-specific factors, suggesting that there was no one-size-fits-all prioritisation strategy. The factors were socio-economic, including income, educational level and residential class that influenced attitudes towards sanitation. The implication is that prioritisation decisions by the Government, NGOs, and private sanitation companies should be guided by situational analyses which are informed by these local-specific factors. In conducting such assessments and analyses, the local-level stakeholders, namely the local council, traditional authorities, assembly members, youth, religious leaders and other opinion leaders should be involved to ensure effective prioritisation assessment, leading to efficient resource allocation for effective interventions.

**Subjects:** Sustainable Development; Development Theory; Environment & the Developing World

**Keywords:** environmental sanitation; education; infrastructure; regulation; strategic priority

### 1. Introduction

Despite being universally recognised as a critical development issue, environmental sanitation management (ESM) remains a challenge in developing countries. According to Van Minh and Hung (2011), 'while about 99% of people living in industrialized countries have access to improved sanitation, only a little above half (53%) of the population in developing countries have such access. Improved sanitation, in this context, refers to facilities that hygienically separate human excreta from human contact (Mara, Lane, Scott, & Trouba, 2010; WHO/UNICEF, 2015), while ESM refers to the principle and practice of ensuring clean and healthy physical environment in human settlements (Mara et al., 2010; Mensah & Enu-Kwesi, 2018; Worlanyo, 2013). One of the developing countries that have been battling with the menace of poor environmental sanitation is Ghana in West Africa (Mensah, 2019).

In Ghana, less than a quarter of the population have access to improved sanitation (WHO/UNICEF, 2015). A major challenge of ESM in Ghana has been inadequate financing (Mensah, 2019; Nimoh, 2016; Puopiel, 2010). The National Development Planning Commission (NDPC) of Ghana and the Ghana Statistical Service (GSS) (2018) have stated that inadequate financing of sanitation infrastructure, education and poor enforcement of regulations are major contributing factors to the poor state of sanitation in Ghana. The issue of inadequate financing makes the judicious use of the limited available funds for ESM imperative. That is, as the funds are limited, there is a need to strategically prioritise their allocation to the key dimensions of sanitation intervention (education, regulation, and infrastructure provision) to achieve the best improvement results.

However, in spite of its importance, studies (Mensah & Enu-Kwesi, 2018; Spencer, 2012; WaterAid, 2011) have shown that the issue of strategic prioritisation of the dimensions for resource allocation for effective interventions in ESM in Ghana remains unexplored. The issue needs to be explored because while simultaneous interventions in all the three ESM dimensions might be the best option, the effectiveness of such interventions depends on availability of adequate resources for all of them, which, according to WaterAid (2011, 2015), GSS (2018) and Mensah (2019), is a huge challenge in most developing countries. Whereas there is substantial literature on several aspects of sanitation management, there is a paucity of information on the aspect relating to strategic prioritisation of the management dimensional, leaving the question of how the dimensions should be prioritised for optimum allocation of resources for best sanitation management outcomes unanswered. The purpose of the present study, therefore, is to explore how the three main sanitation management dimensional options (education, regulation and infrastructure management) could be strategically prioritised to guide appropriate resource

allocation for best sanitation improvement results in selected communities in Ghana, and by extension, Ghana as a whole. The significance is that strategic prioritisation in that regard would lead to best allocation of scarce resources by government and non-governmental organisations (NGOs) for improved sanitation for community development, thereby, contributing not only to achieving the SDG on water and sanitation but also the entire global development paradigm, namely “sustainable development”.

## 2. Literature review

Recognising the global health and livelihood implications of inadequate access to water and sanitation for human and community development, the United Nations (UN) included water and sanitation in the Sustainable Development Goals (SDGs). Goal six of the SDGs seeks to ensure availability and sustainable management of water and sanitation for all (UN, 2017). Achieving this goal calls for effective ESM strategies in all communities in the world, especially in developing countries (WHO, 2014; WHO/UNICEF, 2015) where the sanitation situation is most unacceptable.

Several scholars, development partners, researchers, and academics (Jenkins, Miklyaev, Khozapi, & Preotle, 2018; Larsen, 2003; Van Minh & Hung, 2011; UNDP, 2012), have reported on the magnitude of the sanitation menace and the need for cost-effective interventions to reduce the prevalence of the phenomenon in the interest of environmental sustainability and sustainable development. According to the UNDP (2012), annual GDP losses due to inadequate access to water and sanitation have been assessed at 6.4%, 5.2%, and 7.2% of the respective Gross Domestic Products (GDP) of India, Ghana, and Cambodia. Furthermore, Jenkins et al.'s (2018) analysis of cost-effectiveness of water and sanitation intervention services in Nigeria showed substantial social and economic gains from investing in integrated water and sanitation improvement services. These researchers concluded that the expected incremental health benefits of water and sanitation far outweighed the incremental costs of investing in sanitation interventions. Prior to Jenkins et al.'s (2018) findings, Larsen (2003) had argued that, despite the importance of the role of water and sanitation services in reducing mortality and morbidity, water and sanitation service coverage in the developing countries had not increased as much as expected because of the substantial resource requirements. This, according to Larsen (2003), calls for more cost-effective interventions, which, in turn, necessitates an evaluation of the existing sanitation management approaches to inform strategic cost-effective investments for optimal outcomes in the water and sanitation sector.

Varley, Tarvid, and Chao (1998), supported by Mensah and Enu-Kwesi (2018), have opined that, due to challenges with respect to resources for ESM, strategic prioritisation of software and hardware sanitation approaches is necessary in order to ensure judicious investment in ESM. Further to this, strategic promotion of sanitation and hygiene programmes in developing countries, as noted by Sijbesma and Christoffers (2009), could result in increased benefit at a relatively limited cost but there were limited studies with hard data on the cost-effectiveness of various promotional approaches to inform the optimal allocation of resources. Similarly, Sijbesma and Christoffers (2009) as well as Glenn et al (2018) have observed that if sanitation is to receive more investments or budget support from governments, donors, and other development partners, more research is needed on strategic priority decisions to inform cost-effective promotional methods.

While several promotional methods are available for ESM, the three main ones relate to the management of education, regulation and infrastructure [physical sanitation facilities] (Abalo, 2016; Gebremariam & Tsehay, 2019; McConville, 2010). In the view of Owusu Sekyere, Bagah, and Quansah (2015), educating the masses on ESM raises their consciousness on environmental sanitation. These authors see creating awareness through sensitisation on sanitation issues as central to solving the ESM challenges because such education enables the masses to know not only the importance of sanitation but also what should be done to improve sanitation for environmental sustainability, improved health and sustainable community development. On the other hand, Tsinda (2011) as well as (Mensah, 2019) maintain that sanitation infrastructure such as toilet facilities, refuse bins, drainage system, vehicles for transporting waste to the dumpsite and

others are important for ESM. They argue that the availability of the facilities reduces the incidence of open defecation and improper waste disposal practices. Adukia (2016) on the other hand argues that sanitation education and infrastructure provision alone may not be enough to ensure the desired standard of sanitation so there is the need for regulation of people's sanitation behaviour and practices. However, all these academics, researchers and sanitation experts concur that interventions in all three dimensions are needed to ensure proper ESM, but they are silent on how to prioritise them in the face of limited resources, in order to ensure optimal resource allocation for most cost-effective results.

Traditionally, managing poor sanitation, particularly open defecation and improper waste disposal practices, has been done using hardware solutions in the form of provision and use of infrastructure such as toilet, drainage, dustbins and dumpsite (Gebremariam, Hagos, & Abay, 2018; UNICEF, 2014). However, the current trend in the sanitation sector is to design interventions that incorporate the three promotional approaches—education, infrastructure and regulation—as components. This could be attributed to both theoretical and empirical endorsement of both hardware (infrastructure) and software (education and regulation) solutions as effective strategies (Achiro, 2012; Adukia, 2016; Daramola & Olowoporoku, 2016; Duru et al, 2017; Varley et al., 1998) This suggests that the systems approach of combining all the three ESM components could be helpful as the approach provides opportunity to leverage on the synergies among all the dimensions.

According to studies on ESM in Ghana (Abdul-Razak, 2018; Mason, Matoso, & Smith, 2016; Monney, 2018; Nimoh, 2016; Puopiel, 2010; Spencer, 2012), implementing sanitation promotional programmes entails huge cost but the resources to undertake the activities are limited and so cost-effective strategies are needed. This paper, therefore, argues that, due to inadequate resources for financing ESM, there is a need for strategic prioritisation in order to avoid misallocation of resources resulting from misplaced priority. WaterAid (2011, 2015) confirms that increased financing for the sanitation sector is needed because huge costs are involved in water and sanitation management but financing to the sector is insufficient and often poorly directed. WaterAid (2011, 2015), supported by Mensah and Enu-Kwesi (2018), has further argued that scarce resources are often used inefficiently on ineffective activities and so it is important to prioritise and target appropriately.

It must be noted that prioritisation, in the sense being discussed here, does not necessarily mean selecting one or two of the components or dimensions and abandoning the other(s). It is rather about the level of attention to be paid to each of the dimensions, particularly in terms of resource allocation. The rationale is to ensure an efficient allocation of resources to the dimensions as dictated by the respective levels of their likelihood to influence the objective(s) and outcome(s) of the intervention. Using the case of ESM in the catchment area of Benya Lagoon, this paper reflects on the perceptions and experiences of local sanitation actors regarding the different dimensions of sanitation interventions (i.e. infrastructure, education and regulation) to understand how the dimensions should be prioritised with respect to resource allocation for effective sanitation management.

### 3. Theoretical underpinning

The study is underpinned by the systems theory, which seeks analyses of phenomena from a holistic point of view (Miller, 1978). The theory focuses on examining the interactions and relationships among the constituent parts of an entity in order to understand the entity's functioning and outcomes. According to Laszlo (1995), the systems perspective implies a dialogue between holism and reductionism, that is analysing from a holistic perspective. Proponents of the theory (Checkland, 1981; Persson, 2010; Von Bertalanffy, 1968) argue that we are not able to fully comprehend a phenomenon simply by breaking it up into elementary parts and then reforming it; there is rather the need to apply a global view to underline its functioning. In their view, although we can start from the analysis of the basic components of a phenomenon, in order to

fully comprehend the phenomenon in its entirety there is the need to observe it also from a holistic perspective. It can thus be gleaned that the main tenets of the systems theory border on taking a holistic view of a system to ensure that all of its components work to make the whole system function effectively and efficiently (Checkland, 1981; Persson, 2010; Von Bertalanffy, 1968). In this connection, it can be argued that the theory recognises complementarities of efforts and strategies in order to attain a common goal. This, according to Persson (2010), is premised on the theory's conviction that phenomena in the observed world are usually too complex to be understood by modelling all their parts and interactions and so some form of simplification is not just needed but rather inevitable.

Banathy (1993) observes that, in terms of structure, the systems theory sees a system as a divisible whole, but functionally as an indivisible unity with emergent properties. Flood (1990) and Thebolt (2013) perceive emergent property as being characterised by features portrayed wholly, but not in terms of isolated components. According to Flood, there are two aspects of emergent properties. First, they are lost when the system reduces to its components. Flood states that the property of life, for example, does not exist in an organ once it is separated from the body. Secondly, when a component is removed from the whole that part loses its emergent properties (Lilienfeld, 1978). It can, therefore, be argued from this standpoint that the notion of emergent properties connotes synergy, and is suggestive that the system is more than the sum of its parts.

The systems theory has relevance for the environment and implications for sanitation management. In systems theory, the environment as a concept is conceptualised as the set of all objects, a change in whose attributes affects the system as well as those objects whose attributes are changed by the behaviour of the system (Hall & Fagen, 1956). The implication of this for sanitation management is that it should be holistic and so the management strategies should complement each other.

Laszlo and Krippner (1998) have noted that the systems theory identifies three distinct approaches; namely hard systems approaches as used in natural sciences and soft systems approaches as used in humanities as well as mixed systems approaches such as those employed in operations research, all of which aid decision-making. It can be adduced from the literature that in environmental sanitation, hard and soft systems can be likened to hardware and software aspects of sanitation management, respectively, while the mixed aspect can be likened to the complementarities among the hardware and software approaches. The analogy is that hardware refers to sanitation facilities or infrastructure, while software relates to the regulation of sanitation behaviour through education and law enforcement, thus, reinforcing the argument that the strategies for managing environmental sanitation are education, regulation, infrastructure provision.

The systems theory holds much promise for the study of sanitation management due to the theory's adaptability. The principle of complementarity fits into this study since sanitation management entails complementary activities or strategies, namely infrastructure, education and regulation management as well as different actors, including individuals, households and institutions. Although the system theory has been criticised for not entirely mimicking reality (Barlas, 2007; Forrester, 2007; Lilienfeld, 1978), especially in the soft sciences, it has relevance for ESM through its lessons on how parts of a whole affect each other and the system as a whole. The application of the systems theory helps to gain an understanding of complementarities among sanitation management strategies. Based on foregoing theoretical and empirical background, this paper reflects on the perceptions and experiences of local sanitation actors regarding the different dimensions of sanitation interventions (i.e. infrastructure, education and regulation) to understand how the dimensions should be prioritised with respect to resource allocation for effective sanitation management.

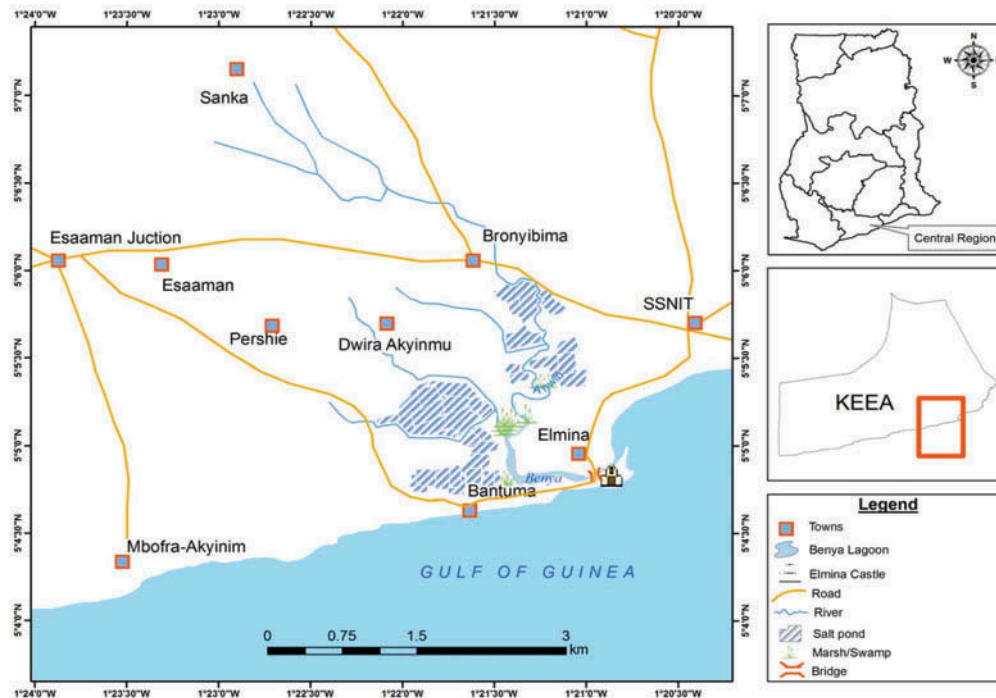
#### **4. Study setting and methods**

This study was conducted in the catchment area of the Benya Lagoon, Ghana (See Figure 1). The area comprised eight communities, namely; Elmina, Bantuma, Bronyibema, Sanka, Essaman,



**Figure 1. Map of the catchment area of Benya Lagoon.**

Source: Cartography Unit, University of Cape Coast, Ghana



Pershie, Mbofra Akyinim and Dwira Akyinim, all of which were involved in the study. The area is located in the Komenda-Edina-Eguafo-Abrem (KEEA) Municipality in the Central Region of Ghana, which is one of the poorest regions in the country. The area is noted for its tourist attractions due to its colonial history regarding the infamous slave trade in Africa and the presence of ancient monuments such as the Elmina castle and forts, which are designated as world heritage sites (Reed, 2006). In addition, the area is a prominent fishing and salt mining enclave and has a rich cultural heritage epitomised by a unique traditional festival known as Bakatue, which attracts patronage from within and outside Ghana.

The study used the qualitative design. This was informed by Narayan (1993), Sijbesma (2001) as well as Bolt and Cairncross (2007) argument that besides conventional quantitative survey methods, more participatory evaluation methods regarding studies on cost-effectiveness are needed to explore and understand the perceptions and experiences of the community people in regard to the issues at stake. Besides, the study was the first of its kind so detailed information was needed on the issues at stake. Additionally, in Ghana and most developing countries, sanitation (especially open defecation) has become more or less a culture among some social groups in some geographical areas, thus adding to the complexity of its management. Managing it effectively requires an ethnography-friendly approach to delve into the issues; hence, the use of the qualitative approach in order to have a deeper understanding of the phenomenon, based on the experiences and perception of the local residents as well as other key informants.

Qualitative data were obtained through key informant interviews (KIIs) and focus group discussions (FGDs) from varied respondents selected through purposive sampling. The interviews involved a Senior Officer at the Environmental Health Directorate of the Ministry of Local Government and Rural Development in Accra, a senior officer at the Environmental Protection Agency at Cape Coast, two Environmental Health Officers at the KEEA Municipal Assembly and two staff of Zoomlion Ghana Limited in the Municipality. Others were community-based stakeholders in the eight communities, including four traditional leaders, three religious leaders, two assemblymen, two youth club leaders and one other opinion leader from each of the eight communities. In

addition, data were collected from farmers, fisherfolks and traders through focus group discussions (FGDs). The respondents were selected because they were key actors in sanitation management in the study area and so their opinions were relevant and key in this regard.

The instruments (interview guide and the focus group discussion guide) contained similar open-ended questions, mainly on the strategies (education, infrastructure and regulation management) for improving environmental sanitation in the area in order to make the comparison of views and perspectives possible. Two research assistants who were fluent in English and the local languages, and also conversant with qualitative data collection were recruited and trained to assist the Principal Investigator to collect data. Every respondent's consent was sought through a signed or thumb-printed informed consent form depending on the level of literacy of the respondent. This was done after explaining the objectives of the study to the respondents and assuring them of confidentiality and anonymity. Each FGD was made up of between eight and twelve discussants. Prior arrangements were made with the participants regarding date, time and convenient venues for the interviews and discussions. Data were digitally recorded with the consent of the respondents, and where permission for recording was not granted, hand-written notes were taken. After conducting 12 FGDs (six with males and six with females) and 27 in-depth interviews, the data became saturated because no new data were emerging, which meant collecting additional data was unnecessary.

The audiotape-recorded interviews were transcribed verbatim and field notes typed up. Data were analysed manually using the Qualitative Content Analysis (QCA) (Mayring, 2014) technique, which is defined as a research method for the interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns. The conventional content analysis using the inductive approach which is not based on a predetermined framework was used. This analytical process began by reading each transcript from the beginning to the end. Then, each transcript was carefully read again, highlighting texts that appeared to describe perceptions or experiences about prioritisation of the dimension of the ESM strategy, namely education, infrastructure and regulation, and taking notes of the keywords or phrases, that seemed to capture these.

After open-coding four transcripts, the preliminary codes were developed and then the remaining transcripts were coded using these codes and adding new codes when data that did not fit into an existing code were encountered. The open coding was followed by axial coding which sought to interconnect and link the categories of codes. That is, once all transcripts were coded, the data were re-examined thematically, resulting in some codes being combined during this process, whereas others were split into subcategories. Finally, the data were summarised and organized based on the themes to derive patterns, guided by the research objective. In discussing the findings, the results from the content analysis were compared and contrasted to highlight similarities and differences with the theoretical and empirical literature. The thick descriptive narrative mode of interpretation was used to present the results. Most significant stories and noteworthy quotations from the transcripts were used to highlight major arguments within findings.

## **5. Results and discussion**

Analyses of the issues are segmented into three, based on the EMS dimensions, namely infrastructure, education and regulation management as strategies for improving sanitation. It starts with that of infrastructure management followed by education and regulation.

### **5.1. Prioritising infrastructure as a sanitation management strategy**

In an FGD with farmers at Essaman regarding which of the three main sanitation management strategies should be prioritised for most efficient resource allocation for best sanitation improvement outcomes in the community, it emerged that more attention should be focussed on the management of sanitation infrastructure such as toilet and solid waste disposal services. According to the farmers, "many people indulge in unacceptable sanitation practices because they do not have better options with regard to sanitation facilities". They argued that if the proper infrastructure, including toilet, dustbins or waste containers, drains, dumpsites, and other logistics



were not put in place first, education and regulation would not work because the people would be compelled to use the unapproved alternatives. This evidence is consistent with UNICEF (2012) as well as Gebremariam and Tsehay's (2019) emphasis on the hardware component of sanitation—that is, the provision of sanitation infrastructure, especially household toilet. UNICEF (2012) was of the conviction that providing sanitation infrastructure would go a long way to improve sanitation in the underserved communities and, therefore, advocated the provision of sanitation infrastructure such as home toilet and public places of convenience in all communities.

Similarly, some traders appeared to concur with the farmers that provision of sanitation infrastructure deserved priority attention as regards resource allocation. They opined that due to the high poverty level in the low-class residential areas, the residents could not afford sanitation facilities such as domestic toilet; therefore, the government should assist the people to acquire such facilities. This finding suggests that for sanitation interventional purposes in the poor communities, more resources should be allocated to the provision of infrastructure.

In an FGD with traders at Mbofra Akyinim, a market woman, supported by other discussants, stated that:

The most important option to consider when it comes to environmental sanitation, especially in the predominantly income-poor communities such as ours, is to get the sanitation infrastructure in place. In some communities, waste bins are located at some points for the people, including the transient population to deposit their solid waste in them. This helps to keep such communities clean but other communities do not have such facilities. In this community, for instance, there are no dustbins placed at vantage points for waste collection. In some communities, the public toilets are either not available or are in such deplorable conditions that most people decline to use them. In such circumstances the only option available to the people is to throw the waste anywhere or to defecate at unapproved places such as the bush, the beach or near the lagoon. Passers-by are forced to dump waste anywhere due to unavailability or inadequacy of such facilities at vantage points in the communities. It is when the facilities are in place that we can talk about education and regulation otherwise putting emphasis on sensitisation and law enforcement will be a venture in futility. The facilities must be there first, although education and regulation are equally important.

It should be noted that, the traders' submission is significant because it supports why the Environmental Sanitation Policy (ESP) of Ghana (MLGRD, 1999) outlines a number of services., underlines some of them as mandatory, and charges the Metropolitan, Municipal and District Assemblies (MMDAs) to provide them. Key among these services is the promotion of domestic waste collection and disposal, which requires the procurement or supply of dustbins to every house and promotion of domestic toilet, implying that every house must have a toilet facility. Furthermore, the policy requires that, in heavily used areas such as markets and lorry stations, there should be sanitation infrastructure such as toilet and public waste bins for use by the transient population. A traditional leader at Sanka responded to the same issues as follows:

If everyone had toilet facility in their houses, and if other public sanitation infrastructure such as good public places of convenience, waste bins, and approved final waste disposal sites were adequately provided and strategically sited, the phenomenon of indiscriminate defecation and waste disposal being witnessed here could be reduced drastically, if not completely eradicated. Until the infrastructure aspect is seen to, sanitation education and regulation cannot work because people will still be compelled to do the unacceptable once the facilities for acceptable practices are non-existent or inadequate. Priority attention should, therefore, be given to fixing the infrastructure and then supported with education and regulation. The poor must be assisted to own toilet facilities in their houses or homes. (Traditional leader, Sanka)

The above submissions regarding prioritising sanitation infrastructure in terms of resource allocation, which were re-echoed by some other opinion leaders from Bantuma, Pershie, and

Sanka, reinforce Ilesanmi's (2006) emphasis on prioritising the provision of infrastructure in sanitation management. According to Ilesanmi, sanitation infrastructure such as toilet facilities, refuse dumpsites, drainage systems, vehicles for transporting waste to the dumpsites, dust bins and other tools and equipment are important for sanitation management. Mensah and Enu-Kwesi (2018) also observed that the availability, adequacy, affordability, location and quality of sanitation facilities in the communities greatly influence sanitation management practices and need to be taken up as a matter of priority by the government, local councils, sanitation-focused NGOs and private companies.

### **5.2. Prioritising education as a sanitation management strategy**

Contrary to the views of some traders, farmers, traditional authorities and other opinion leaders as articulated above, an Assemblyman from Mbofra Akyinim opined that:

In my view, education should be intensified in the communities. People complain about lack of facilities such as public toilet and dustbins, but there are many instances where people have thrown rubbish anywhere even where the public waste bins are around. The laws are there but people do not care about them, while others are not conversant with some of the laws or by-laws. This calls for intensive sensitisation. Now the emphasis is on Community-led Total Sanitation, which is education-driven so more attention should be paid to sensitisation as most of the residents in the low class residential areas are not educated. (An Assemblyman, Mbofra Akyinim)

The Assemblyman's view suggests that education should be given priority regarding resource allocation, which is consistent with the observation by Mukisa (2009) that public sensitisation or education on sanitation should be prioritised in managing sanitation. Additionally, the Assemblyman's submission confirms the importance of CLTS approach for stopping open defecation as proffered in WHO/UNICEF (2014) sanitation literature, particularly for rural and semi-urban areas, which is supported by a study by Gebremariam and Tsehaye (2019). CLTS refers to the process of triggering, through education or sensitisation, a community by creating dissatisfaction with unacceptable sanitation practices in the community in order for the people to understand and realize the negative effects of poor sanitation and work to change the situation for the better (Gebremariam et al., 2018).

In the view of some other opinion leaders, if the people were properly and adequately educated or sensitised, they would see the importance of environmental sanitation and strive to put the infrastructure in place. A religious leader argued as follows:

The sanitation problem in the catchment area of Benya Lagoon has to do with attitude and so if the sanitation messages go down well with the people, they will appreciate the need to engage in proper sanitation practices, and once they are maintaining acceptable behaviour and practices, regulation through law enforcement will be least necessary. All people in Ghana, whether rich or poor, educated or uneducated, need serious sensitisation on sanitation but more education is needed in the low and middle class residential areas where most poor and illiterate people live. (Opinion Leader, Dwira Akyinim)

Furthermore, in a focus group discussion with fisher folks at Bantuma and Elmina, the general consensus of the discussants supported the views of the assemblyman and the opinion leader at Dwira Akyinim regarding the need to focus on sanitation education, especially in the low and middle-income and predominantly unlettered communities. According to the fishermen:

Some information is occasionally put out through the radio but this is inadequate since not all people listen to the radio or even have the radio set. When the information is given in the newspapers too some of us cannot read so we do not even think about buying, let alone reading them. Now there are information centres (community broadcasting stations) in all the communities in the catchment area of the Benya Lagoon. The information centres always make announcements about funerals, religious services and wedding ceremonies but

important issues of social concern such as sanitation and hygiene are hardly given the attention they deserve in the announcements.

The fisher folks were of the opinion that sustained education was what should be prioritised, intensified and delivered through media that were far-reaching such as community radio and face-to-face conversation with the residents at the individual, household and community levels. This corroborated a similar report by Musoke et al. (2018) that, in the slum settlements of Kampala and Mukono located in central Uganda, the majority of community members had insufficient knowledge of the link between sanitation and health due to low level of education. On his part, a religious leader at Essaman, supported by a traditional leader at Dwira Akyinim, expressed his opinion on the same issue as follows:

Although the laws are there, most people are not aware of them. Some people may also not be aware of the importance of sanitation or even the existence of some sanitation facilities, which they can take advantage of. Others are aware but have poor attitude to sanitation; that is, they simply do not care about it. It is education that will make them conscious of the law and the importance of sanitation, which could change their attitudes. I will be 63 years old next month but never did I know until last week that the law requires people who live by the street to take care of tidying up the portion of the street close to their houses or premises. Anyway, I live close to the street and I have been ensuring that the portion abutting my house is clean somehow, not because I know I am obliged by law to do that but because I abhor dirty surroundings. I am sure this is the case with many other residents here. There is also the need to educate people on the fact that the health and productivity costs of poor sanitation is higher than building sanitation infrastructure and respecting sanitation rules. For me, since I see the sanitation problem here as largely attitudinal, my view is that it should be tackled primarily from sensitisation and education point of view and complemented with regulation and infrastructure provision or management. (Religious Leader, Essaman)

The quote reinforces Spencer's (2012) view that sanitation education is expected to instil in individuals' ethics, values, attitudes and behaviours that are consistent with proper sanitation management. It is also worth stressing that it was in this vein that the Ministry of Local Government and Rural Development [MLGRD (2010)] of Ghana, recognising the relevance of sanitation education for sanitation management, emphasised that environmental sanitation education should be an integral element of sanitation management activities in Ghana.

At Bronyibema, a volunteer had mobilised the youth in the community to form a Sanitation Youth Club known as the "Friends of the Environment". The motto of the club was "cleanliness is health". Led by their leader, the club members had been cleaning the community and sensitising people on sanitation through route marches. In an interview with the Youth Club Leader, he stated that:

We are friends of the environment. We embark on route marches to sensitise people on sanitation issues. We believe that the challenge of poor waste disposal practices and open defecation in the communities around could be reduced drastically with intensive sustained education and sensitisation because the people's level of education is very low. The people need to be educated on the need for "home toilet" and dustbins and the need to respect the by-laws on sanitation. People think it is the responsibility of the government to provide public toilet for the communities. Most of them are not aware that public toilets are primarily meant for the population in transit. So our Youth Club is rolling out a community sensitisation programme but we are constrained by resources. The other issues have to do with attitudes which require intensive education. Our Club believes that education should be prioritised because with sustained education, much can be achieved. (Youth Club Leader, Bronyibema)

It is realised from the youth leader's story that the club believes in the potency of education as a sanitation management strategy as demonstrated by their desire to embark on route march and sensitisation at local information centres. It is gleaned from the analyses of all the submissions in this sub-section that cost-effective interventions in ESM should prioritise education. However, the

fact that the submissions also acknowledged that the people needed to be educated on the need to obey sanitation laws and provide household toilet and other sanitation facilities showed that education alone would not suffice unless it was supported with the other strategies thus, lending credence to the complementarities among the strategies as espoused by the systems theory.

## 6. Regulation as a sanitation management strategy

According to Ackoff (2010), regulating sanitation behaviour entails the imposition of restrictions by an authority on the execution of an action in relation to sanitation management. This may include the provision of laws and by-laws to regulate sanitation behaviour, an inspection system for checking compliance, sanctioning mechanisms for failure to comply with the regulation and a system for conflict resolution. Responding to a question on which of the three main strategies should be prioritised for resource allocation for maximum sanitation improvement results in the community, an Opinion Leader at Pershie recounted the following story:

I once saw a passer-by throw rubbish onto the street when a rubbish bin provided by the Municipal Assembly for collecting rubbish was close by. I asked the passer-by why he did that. The response was that the Zoomlion staff employed to clean the streets would have no work to do if the streets were clean. In my view, for people with such mentality, no amount of sensitisation or provision of the infrastructure would make them observe proper sanitation and hygiene unless they are regulated through strict enforcement of the sanitation laws. This is why I am inclined to believe that law enforcement is what is most necessary, although I cannot say the infrastructure and education are not important.

It can be inferred from the above quote that regulation (law enforcement) needs to be given more attention regarding the allocation of resources, for the purpose of improving sanitation. This is not surprising because most studies on sanitation in Ghana (Abalo, 2016; Mensah, 2019; Money & Antwi-Afeyi, 2018; Nimoh, 2016; Spencer, 2012) have similarly highlighted the need to enforce sanitation laws to improve the phenomenon of poor environmental sanitation in the country. Supporting the story by the opinion leader from Pershie, a Senior Officer of Zoomlion Company indicated that:

The company has provided some sanitation infrastructure such as dustbins in some of the communities, and we expect the passers-by to deposit their waste into them so that we collect them periodically for final disposal at the appropriate dumpsites. Although we acknowledge that the communal dustbins are inadequate, what is worrying is that even where they are available, some people refuse to deposit their refuse into the facilities provided. They choose to deposit it elsewhere—that is, at unapproved locations, thereby polluting the environment. We have done some sensitisation on sanitation in most of the communities in the catchment area of Benya Lagoon, particularly on indiscriminate defecation and waste disposal practices but due to low level of education of majority of the people, everything seems to have fallen into deaf ears. People still defecate at the beach, in the lagoon, and throw faeces into the gutters as well as dispose of solid waste anywhere. Therefore, the challenge is with law enforcement. (Senior Officer, Zoomlion)

The sentiments expressed by the Zoomlion officer strengthen Worlanyo's (2013) argument that regulation is an effective approach to solving environmental problems. Additionally, regarding which of the three strategies should be given priority in terms of resource allocation, an Environmental Health Officer (EHO) opined that:

Although all three dimensions are important, law enforcement is the most important now. Most people in the communities claim they do not have money to build toilet or patronise door-to-door waste disposal services but these same people have money to spend on funerals, wedding, drinking and other merry-making activities. This is because they give priority to these social events but not sanitation. Some people defecate at the beach not because they do not know that it is not proper to do so or they do not have any other approved alternatives. That is, it is neither a matter of ignorance nor lack of sanitation facilities, The Assembly has provided some infrastructure in some of these communities. A toilet facility has been constructed near

the beach while there are public toilet facilities in some of the communities and the people have been sensitised on the dangers of open defecation, yet people still defecate at the beach and other unapproved places. The only solution is to enforce the laws but that is not easy to do because when people fall foul of the law and are being prosecuted, influential people in society step in to save them from being prosecuted.

What can be inferred from the above quote is that, while the officer did not downplay education and infrastructure management, he was clear that regulations should be prioritised in terms of resource allocation. This is similar to Achiro's (2012) finding. Achiro, researching on constraints and prospects of law enforcement for improved sanitation in Uganda argued that there was the need for regulation of people's sanitation behaviour and practices through law enforcement.

In a similar vein, an officer from the Environmental Protection Agency (EPA) indicated that the biggest challenge with respect to improving environmental sanitation in the whole of Ghana had to do with law enforcement. According to the officer, "the country is notorious not for absence or inadequacy of sanitation laws but rather lack of enforcement of the laws". This implies that the laws are there but they are not being strictly applied. However, he added that in the low-class residential areas where most residents do not have toilet facilities and are mostly ignorant, priority attention should be given to the provision of infrastructure and sensitisation. In the high- or first-class residential areas where virtually all households have toilet facilities and where most of the residents are formally educated, what should be done is to enforce the sanitation regulations. The quote below was what the EPA officer actually said:

As the level of formal education increases and the income and residential statuses improve, the likelihood of the people making provision for approved sanitation infrastructure such as household toilet and waste bins increases. Therefore, the type of residential area is a factor in determining which strategy should be applied for cost-effective and best sanitation results. In the low class residential areas where most houses do not have toilet facilities and where the public toilet facilities available are usually too dirty to attract use or patronage, attention should be focussed on sanitation infrastructure first, and supported with education and regulation. In these areas, level of formal education and incomes are also low and that is why they do not prioritise sanitation infrastructure; so any government or NGO intervention in sanitation should prioritise infrastructure, followed by sensitisation and regulation to make sure that the right sanitation behaviour is put up by everyone. However, in cases where the problem has to do with attitude, education and regulation should be given priority in that order. In my view, although infrastructure is a challenge, the sanitation problem here is basically attitudinal and so people must be compelled through law enforcement to do the acceptable. But even if you prioritise, you still have to consider the other dimensions because the dimensions complement one another for most effective interventional outcomes. (EPA, Officer)

It is instructive to note from the quote that location-specific cost-effective prioritisation decisions need to be informed by socioeconomic variables such as income and education levels of the residents as well as residential class. Additionally, implicit in the officer's submission is also the concept of complementarity as espoused by the systems theory. By stating that "even if you prioritise one dimension you still have to complement it with the others," the respondent endorsed the systems theory's tenet of complementarity.

On his part, a Principal Environmental Health Officer at the Ministry of Local Government and Rural Development indicated that, while there was the need to ensure that houses had the bins and citizens were educated on sanitation, there was also the need to strictly enforce the laws, thus confirming the complementarity of the strategies. The Officer opined that attitude was a major factor in fighting the sanitation menace in Ghana. For this reason, all the three tools; education, infrastructure and regulation, needed to be applied as complementary strategies in achieving the desired result in sanitation management. However, the officer added that once there were some pieces of infrastructure in place and education was ongoing, what needed to be improved was the element of law enforcement, notwithstanding the fact that all the strategies were important.

It is gathered from the foregoing analysis that the respondents had their own priority depending on their experiences, perceptions, and orientation as well as the prevailing local sanitation situation, thus rendering the debate inconclusive. What is clear is that all the three dimensions were considered relevant for ESM by all categories of respondents but there was no one-size-fits-all priority strategy. This lends credence to the import of systems theory's argument regarding the principle of emergent properties (Banathy, 1996; Thebolt, 2013). The principle states that, structurally, the system is a divisible whole, but functionally, it as an indivisible unity with emergent properties. Flood (1990) as well as Thebolt (2013) perceive emergent property as being characterised by features portrayed wholly, but not in terms of isolated components. What this means is that, structurally, the sanitation management strategy is divisible into infrastructure, education and regulation but functionally, distinct though each of these is, they work to complement each other for a holistic solution to ESM challenges.

## 7. Conclusions and implications

The paper, based on the experiences and perceptions of community-level sanitation actors, explored how the different dimensions of sanitation management strategies could be strategically prioritised for efficient resource allocation for optimal sanitation improvement outcomes. The strategic prioritisation was considered in terms of education, regulation and infrastructure-based interventional mixes in the catchment area of Benya Lagoon, Ghana.

The results showed that all the three sanitation management dimensions were indispensable as far as improving sanitation was concerned. However, the sanitation actors valued the three dimensions differently based on their experiences and/or perceptions of the existing sanitation conditions in the given geographical area. The evidence suggests that each of the strategies is necessary but not sufficient in itself for optimal sanitation improvement results, thus, corroborating the observation by WaterAid (2011) that there is no single approach or technology for the delivery of sustainable sanitation that will work in all situations.

The implication is that it is advisable to give each of the three dimensions the attention it deserves, depending on the prevailing local circumstances, while not forgetting that it is best when they are regarded and applied as complements instead of self-sufficient stand-alone strategies. This supports the tenets of the systems theory's argument that the various parts of a system have complementary roles to perform in order to make the system effectively and efficiently operational and functional. However, the evidence also suggests that factors such as income (poverty), residential class, and level of education of the community people influence people's attitude to sanitation and should be considered for purposes of prioritisation of the dimensions. The findings suggest, for example, that in the low- and middle-class residential areas where most of the poor and unlettered people live, infrastructure, education and regulation could be accorded priority in this order since poverty prevents them from fixing basic sanitation infrastructure and low level of education prevents them from appreciating the need to fix such infrastructure and/or practising sanitation as culture.

The lesson learnt is that, while generally, all the dimensions are technically important, strategically, cost-effective sanitation should be based on situational analysis and for that matter needs assessment. The recommended sanitation management programme pathway for the government and other sanitation-focused non-governmental development partners is to assess the sanitation situation in every community and proffer tailor-made interventions based on the situational analysis. It is further recommended that, in conducting such assessments and analyses, the local-level stakeholders, namely the local council, traditional authorities, assembly members, youth, religious leaders and other opinion leaders should be involved to ensure effective prioritisation assessment, leading to efficient resource allocation for effective interventions.

## 8. Contribution to knowledge, limitations of the paper, and suggestion for further studies

In terms of originality, the paper appears to be the first attempt at exploring the need for prioritisation of ESM approaches in the face of resource constraints, using the qualitative design



and vivid interpretive, narrative analytical technique. The theoretical contribution that distinguishes this study from the previous ones is that most studies that preceded the current study talked about giving sanitation priority in developing countries but none of them talked about prioritisation of the management dimensions for resource allocation. That is, while the previous studies advocated the prioritisation of sanitation in developing countries and also acknowledged that financing sanitation management was a problem, they, unlike this study, failed to categorically indicate that due to limited funds the dimensional options could be prioritised for efficient resource allocation for the best improvement outcomes.

The limitation of the study, however, is that it was qualitative in design and used relatively few respondents who were purposively selected. It also used a relatively small geographical area as a case. Due to these limitations, although the results and findings are valid, their generalizability is limited. Therefore, similar studies could be conducted in wider geographical settings, using larger sample sizes and quantitative or mixed methods for greater generalizability of findings.

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