



Received: 10 August 2017
Accepted: 10 November 2017
First Published: 20 November 2017

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Reviewing editor:
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ENVIRONMENTAL CHEMISTRY, POLLUTION & WASTE MANAGEMENT | RESEARCH ARTICLE

Environmental sanitation unleashed: Effectiveness and challenges of the National Sanitation Day as a community sanitation participatory approach in Aboabo, Ghana

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Abstract: Investment in technical facilities by government alone is not enough to meeting the challenge of providing adequate sanitation services in communities. This study aimed at examining the effectiveness and challenges of the National Sanitation Day (NSD) as a community participatory module towards environmental sanitation in Aboabo, Ghana. Adopting a descriptive and inferential mixed method design, 10 key informants were interviewed using purposive sampling and 180 study participants using systematic sampling techniques. Result indicates an encouraging number of participation during the NSD. Statistically, higher educational attainment was a predictor of respondents' participation in the exercise. Using respondents' perception about the extent of environmental sanitation before the NSD exercise and their perception about the current environmental sanitation as benchmarks for assessing the programme's effectiveness, the exercise was found to be ineffective. In recommendation, if needs be that prominent people are invited to intermittently grace the NSD exercise, their invitations should be to empower the local people to

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Emmanuel Mawuli Abalo holds a BA in Geography and Rural Development from the Kwame University of Science and Technology, Ghana. He is a member of the Rural Research and Advocacy Group (RRAG-Ghana). His research interests include Land use and Land cover changes, Climate Change issues, Poverty studies and Food Security, Environmental Sanitation and Management and health. The authors work contributes to studies on the importance of community members' involvement in the management, sustainability and sanitary of the environment. Specifically, this study examines the effectiveness of the National Sanitation Day Module as a community participatory approach in environmental sanitation in Ghana, with an emphasis on the Aboabo community.

PUBLIC INTEREST STATEMENT

Investment in sanitation facilities by government alone is not enough to meet the challenge of waste management hence, the need to involve the community. Though community participation efforts were an integral component of Ghana's national rural programme in the 1990s, the initiative waned over time. However, the cholera outbreak in 2014, and other diseases resulting from poor sanitation led to the declaration of the first Saturday of every month as a National Sanitation Day (NSD) by the government. Using interviewer-administered questionnaire, the inclusiveness, effectiveness and challenges of the NSD were assessed. The knowledge base and participation of respondents during the NSD were high, though economic activities restricted others. Given the importance of a clean environment on socio-economic life and health, the author(s) argue that community participation should be recognised as an interaction, rather than a coercion, which should be undertaken willingly so as to reap its full potential.



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esteem the importance of the programme by making it their own rather than depending on their presence to increase patronage.

Subjects: Environmental Management; Motivation; Urban Geography; Environmental Geography

Keywords: environment; sanitation; environmental sanitation; community participation; National Sanitation Day; Aboabo

1. Introduction

Environmental sanitation has been a topical issue drawing different views on ways to improve and maintain proper sanitation in communities. The need for improving sanitation has been necessitated by population increase, industrialization, urbanization, the alteration of urban consumption pattern towards packaging and economic growth, resulting in an increase in solid waste (SW) generation in developing countries (Dhokhikah, Trihadiningrum, & Sunaryo, 2015; Wahabu, Oduro-Kwarteng, Monney, & Kotoka, 2014; Zhu, Asnani, Zurbrügg, Anapolsky, & Mani, 2008; Zurbrügg, 2002).

Poor sanitation resulting from the practice of widespread open defecation and indiscriminate dumping of refuse have negative health and social impacts on communities with consequence of diarrhoea and cholera (Kar, 2005). For a long time, planning of sanitation service provision consisted of what came to be known as a “Top-Down” approach where the needs of communities were determined by well-meaning officials or political representatives at the central, regional, district and/or municipal levels to the neglect of community members who are beneficiaries of the project. This resulted in a poor maintenance of the services provided (Eawag, 2005).

Community participation was born out of the need of placing community members at the centre of the planning process with regard to environmental sanitation. Minkler (2005) defines community participation as a process brought about through social interactions expressed collectively, embedded in a community of place, and directed to the achievement of a specific task that is perceived to lead to the betterment of the community. Communities remain economically and socially viable when members of the community are involved in community projects (Taylor, Wilkinson, & Cheers, 2006).

Some notable community participatory approaches adopted to improve sanitation include the household-centred environmental sanitation approach (HCES) and the community-led total sanitation approach (CLTS) which focused on community empowerment, rather than negotiated development (Eawag, 2005; Kar, 2005; Lüthi & Tilley, 2008).

Developed by the Environmental Sanitation Working Group of the Water Supply and Sanitation Collaborative Council (WSSCC) in 2002, the HCES was targeted at providing stakeholders at every level, but particularly at the household level and neighbourhood level, to have the opportunity to participate in the planning, implementation and operation of the urban environmental sanitation services (UESS) in an effort to achieving the Sustainable Development Goals. This process was adopted to help community members live healthy and productive lives and also to protect and restore the natural environment (Eawag, 2005; Morel, Luethi, & Schertenleib, 2008).

Similarly, the CLTS involves facilitating a process to inspire and empower rural communities to stop open defecation and to build and use latrines, without offering external subsidies to purchase hardware such as pans and pipes (Kar, 2005). Countries where these approaches have been implemented and proved effective include Costa Rica, Burkina Faso, Kenya, Tanzania, Laos, Nepal and Bangladesh (Kar, 2005; Morel et al., 2008).

Caring for the environment and ensuring cleanliness has been a traditional communal affair in many sub-Saharan African countries, particularly Ghana, where all farming and other economic

activities were halted and community members collectively weeded and cleaned both public places as toilets, streets, markets, footpaths, as well as their private homes and compounds. These “communal labour” days were taken very serious by the rank and file, and even children had their part to play by running errands and also helping to clean the “drop down” public toilets. Severe punishment was meted out to members who deliberately refused to participate, including public ridicule (naming and shaming), being made to pay a fine, or prohibiting access to a community facility (such as toilet and water source) for a prescribed number of days.

However, the dawn of modernity has seen a roll back or erosion of most of these traditional mechanisms for safeguarding the environment, opening the floodgates for indiscriminate littering and mountains of filth that we see all around us. It is estimated that the cost of poor sanitation to Ghana every year is \$290 million, representing 1.6% of the country’s Gross Domestic Product (Water & Sanitation Program [WSP], 2012). Approximately 13,900 Ghanaian adults and 5,100 children under five, die each year from diarrhoea, with nearly 90% of the deaths directly attributed to poor sanitation and hygiene. Although these figures are worrying and poses threat to the well-being of citizens in the country, not much effort have been channelled to prevent the menace of sanitation related diseases until the 2014 cholera outbreak where 17,000 cases and 150 deaths were recorded, the worst ever, after the 1982 incidence in Ghana (Adubofour, Obiri-Danso, & Quansah, 2013; WSP, 2012).

It is against this backdrop that efforts to bring back the communal spirit and inculcate a sense of environmental awareness into the citizenry should be lauded by all. The government of Ghana, through the Ministry of Local Government and Rural Development (MIGRD), invoked the traditional communal spirit of collectively taking care of the environment through the institution of the National Sanitation Day (NSD) as a means of ensuring environmental cleanliness and dealing with the filth that has engulfed most parts of the country, especially urban areas. The NSD was earmarked on the first Saturday of every month to remove heaps of garbage at all refuse dumping sites across the country, and to educate the populace on sorting techniques (Ministry of Local Government & Rural Development [MLGRD], 2014).

In the initial stages of its implementation, the NSD were held up as a “game changer” in the ongoing sanitation albatross, amid much fun fare and publicity. Community members enthusiastically teamed up with their elected representatives, waste management companies and opinion leaders to rid their surroundings of filth. This led to a cautious conclusion that the nation’s challenge with environmental sanitation would soon be over if the momentum of the community approach was sustained. However, what started on a very bright note soon began losing its steam. The enthusiasm and fervor that greeted the exercise has waned down considerably, while participation and commitment have dwindled, pointing to an imminent dissipation of the spirit and purpose of the activity.

In the Aboabo Township, the outbreak of sanitation related diseases such as 171 typhoid cases in 2015 and diarrhoea, malaria and intestinal worm infections; 163, 174 and 47 cases, respectively, in the first quarter of 2016 are worrying and needs addressing (Asokore Mampong Municipal Health Directorate Report, 2016). These infections may have a negative toll on the economic activities of the Municipality, specifically, the study communities whose active labour force are involved in petty trading and other commercial activities.

Although various works have been undertaken with regard to sanitation improvement in the Ghana (Adubofour, 2010; Adubofour et al., 2013; Dakpallah, 2011), none of these ascertained the effectiveness of the NSD as a community participation module towards environmental sanitation. It is in this regard that this study seeks to assess the effectiveness of the NSD as a community participatory approach towards environmental sanitation and its associated challenges using the case of the Aboabo communities within the Asokore Mampong Municipality. Within the broad objective of the study, the author(s) seeks to find out whether respondents’ demographic characteristics influence their participation during the NSD.

In as much as government institutions are tasked with keeping the environment clean, the role of community members towards environmental sanitation, with regard to their attitude, cannot be underestimated. A person's attitude towards the environment has a significant influence on his or her behaviour. The interaction between man's behaviour and the social environment creates a conflict referred to as cognitive dissonance theory (Festinger, 1957). The theory explains the perceived inconsistency between one's behaviour and attitudes. It looks at why individuals get involved in negative activities amidst their knowledge of its consequences (Eagly & Chaiken, 2007; Festinger, 1957; Kassirjian & Cohen, 1965). Applying this theory to examine why people continue to smoke amidst their knowledge on hazards of smoking, Kassirjian and Cohen (1965) found that smokers justify their continued smoking by eliminating their responsibility for their behaviour; denying, distorting, misperceiving or minimizing the degree of health hazard involved and selectively drawing out information that reduces the inconsistency of the smoker's behaviour. To have a systematic and inclusive framework that articulates an in-depth understanding of how personal attitude impact on participation towards environmental sanitation, Festinger (1957) theory of cognitive dissonance was adopted to guide the study.

1.1. Literature review

The world's cities continue to experience population growth at a rate that far exceeds their absorptive capacity in terms of conventional sanitation infrastructure and environmental protection (United Nations Population Fund [UNFPA], 2007). This situation is compounded by the inability of governmental agencies to meet the corresponding waste generation associated with population growth through the provision of basic environmental services (Tukahirwa, Mol, & Oosterveer, 2010). Moreover, the challenge of sanitation service delivery results from the fact that many poor urban residents live in the unplanned and underserved informal settlements commonly known as slums. The United Nations Joint Monitoring Programme (UN JMP) report exemplifies the situation of poor sanitation services among the world's urban population. The report indicated that the urban population without access to improved sanitation will increase from 661 million (2006) to 898 million (2015) (UN JMP, 2008).

Though poor urban sanitation issue continues to be difficult for policy-makers, and presents great challenge in the development of integrated solutions for managing a variety of waste streams (Tilley, Atwater, & Mavinic, 2008), most of the interventions undertaken to reduce this canker are often implemented without consultation or participation of stakeholders and beneficiaries (Eawag, 2005; Rosemarin et al., 2008). Despite this trend, a number of recent initiatives have been embarked upon, focusing on motivating community involvement and encouraging appropriate technology geared towards environmental sanitation (Atkinson, 2007; Smith, 2006). These initiatives are collectively termed as community participation. It is argued that communities are able to raise more resources, achieve more result and develop a more holistic and more beneficial way when their citizens and partners engage in developmental activities (Ton & Patrick, 2003). Nance (2004) described the concept of community participation as the involvement in and contributions to a project by individual residents, households and the community as a whole. Undeniably, a high level of involvement in mobilization often signals a strong demand for a project and environmental sanitation is no exception (Nance & Ortolano, 2007). Bill (2007) articulates that participation carries with the feelings of ownership, and builds a strong base for intervention in the community.

Consequently, Nance and Ortolano (2007) discovered in their Brazilian study that the form of participation as well as community influence are key roles to ensuring the smooth implementation and execution of sanitation services. Commenting on how this is achieved, they outlined four forms of participation which are associated with various project outcomes and also helps to efficiently manage the task involved in taking a project from conception to operation. These forms of participation are: planning, design, construction and maintenance. The planning process is also known as the mobilization stage. The focus of this stage is to bring community members together so that the cost and benefit, in terms of improved health and sanitation, of the project could be explained to them. Hence, a high turn-out at this stage is considered as an indication of goodwill for the project (Sara &

Katz, 1997). In effect, this stage focuses primarily on fostering support for the project by creating awareness among community members and also provides a platform for them to air their needs and preferences concerning the project (Nance & Ortolano, 2007). The next form of participation, design, incorporates the insights and local knowledge of community members into the project. Thus, this stage is described as the participation in decision-making. Specifically, this stage examines the receptive capacity of residents to the project implementation. Since each community participation initiative is targeted at making community members identify with the project, incorporating their local knowledge in the decision-making process helps to strengthen the projects' success (Nance, 2004). Significantly too, whereas the participation in construction contributes to reducing project cost and brings about a sense of ownership among the participants, participation in maintenance looks at the regular and timely preservation of the project to ensure its success. Together, participation in construction and maintenance is assessed based on the amount of time, money, tools, materials and labour contributed by the beneficiaries of the project. Moreover, at these stages, the role played by sanitation agencies can potentially lead to better cost recovery, higher connection rates and reduce the risk of ill health since the quality of construction and maintenance work performed by residents may not be high (Nance & Ortolano, 2007).

The concept of participation in all developmental activities is certainly not a new one. The concept emerged out of the recognition of the limitations of top-down development approaches. The limitation led to a shift towards participatory research and planning methods by communities. Proponents in the participatory approach are Fritz Schumacher with his seminal work "Small is Beautiful" (1976) and Robert Chambers, the father of participatory rural appraisal (Chambers, 1983). That notwithstanding, the past decade witnessed the benefits associated with participation in development which was described as participatory development (Lawrence, 2006). Different studies have examined the concept of community participation from varying angles. For instance, Nance and Ortolano (2007) examined the concept of participation more carefully by distinguishing among forms of participation in Northeastern Brazil, community participation in rural water projects (Ishaku & Majid, 2010; Isham & Kahkonen, 1999; Narayan, 1995; Ostrom, 1992; Prokopy, 2002, 2005; Sara & Katz, 1997; Wade, 1988) and from other public service sectors where the concept of participation may be viewed as a form of "co-production" (Brudney & England, 1983; Levine, 1984; Percy, 1984; Sundeen, 1985). Community participation has also been identified as a key factor for attaining the goal of solid waste management (SWM) (Chung & Poon, 2001; Kamara, 2006; Sukhor, Mohammed, Sani, & Awang, 2011; World Bank, 2004) and plays an important role in achieving SW management in developing countries (Dhokhikah & Trihadiningrum, 2012; Mongkolnchaiarunya, 2005; Zurbrügg, Drescher, Patel, & Sharatchandra, 2004). In these countries, the human resource holds potential for development and is useful in sanitation services (Dhokhikah et al., 2015).

Aside the above studies, the notable community participatory modules towards environmental sanitation are the HCES and CLTS approaches which have been examined thoroughly in other studies (Kar, 2005; Lüthi, McConville, & Kvarnström, 2010). Hamdi and Goethert (1997) describes the HCES approach as a communicative planning framework that focuses on participatory, bottom-up methodologies where planners solicit the participation of a variety of stakeholders in a democratic planning process. The approach proffer solutions from storage to transport to treatment and disposal/re-use of municipal waste (Lüthi, Schertenleib, & Tilley, 2007). Notable countries where this approach have been implemented and proved successful include the Hatsady Tai Village, Vientiane and Tanzania (Lüthi et al., 2010). The CLTS was initiated in Bangladesh in 1999, as an innovative methodology for eliminating open defecation (Evans, Colin, & Jones, 2009; Kar, 2005; MoLG, 2005). CLTS uses a participatory approach to empower local communities to stop open defecation and promote the building and use of latrines through community-led action instead of subsidies. The approach has been lauded for its especially in rural communities (Kar & Chambers, 2008). Areas where the approach has been successful include rural South and South-east Asian, Southern Region of Ethiopia (WSP, 2007) and Kolkata, India (Stockholm Environment Institute [SEI], 2008).

In the Ghanaian context, different responses have been initiated by individuals and governments at keeping its cities clean. Government agencies in charge of sanitation activities provide skips and dustbins at vantage points so that refuse would be disposed of by community members. Later, the pay-as-you-dump (PAYD) policy was introduced. Repetto, Dower, Jenkins, and Geoghegan (1992) stated that: “fixed fee charged for waste disposal would serve as an incentive for respondents to reduce the amount of waste they generate”. Skumatz (1996) also described the PAYD policy as a mechanism put in place by city governments to make residents responsible for the waste they generate by charging them based on the quantity of waste they disposed of. However, the rapid springing up and sprawling of urban communities has reduced the effectiveness of these waste management policies. This is evidenced from the mounting filth on the streets of urban communities, left to be attended to by sanitation agencies in the community. The recent response to the fight against poor environmental sanitation is the advent of the NSD which was declared in response to the 2014 cholera outbreak in the country. In line with the forms of participation outlined by Nance & Ortolano, it can be said that the NSD adheres to all the four forms. Though the programme had not been in existence for long, the Millennium Development Goal (MDG) report in 2015 revealed that the country ranked very poorly on the global environmental sanitation ladder: the country was pronounced the seventh dirtiest in the world, having slipped from the tenth position (MDG, 2015). This results from the mounting garbage or filth disposal and poor sanitation services in especially the urban areas (WHO & UNICEF, 2015).

Though the benefits of community participation in developmental activities have been largely lauded, the concept is not without some challenges. Dukeshire and Thurlow (2002) indicated that, it is important for communities to understand that government also faces barriers and challenges that can hinder its progress in responding to and recognizing the priorities of developmental issues in communities, and environmental sanitation is no exception. Some of the challenges outlined by Dukeshire include; lack of understanding of the policy process; lack of community resources and lack of access to information. Also, Nour (2011) posited that community participation in densely populated areas with little social consistency and a low level of popular organisation could pose as a challenge to participation efforts.

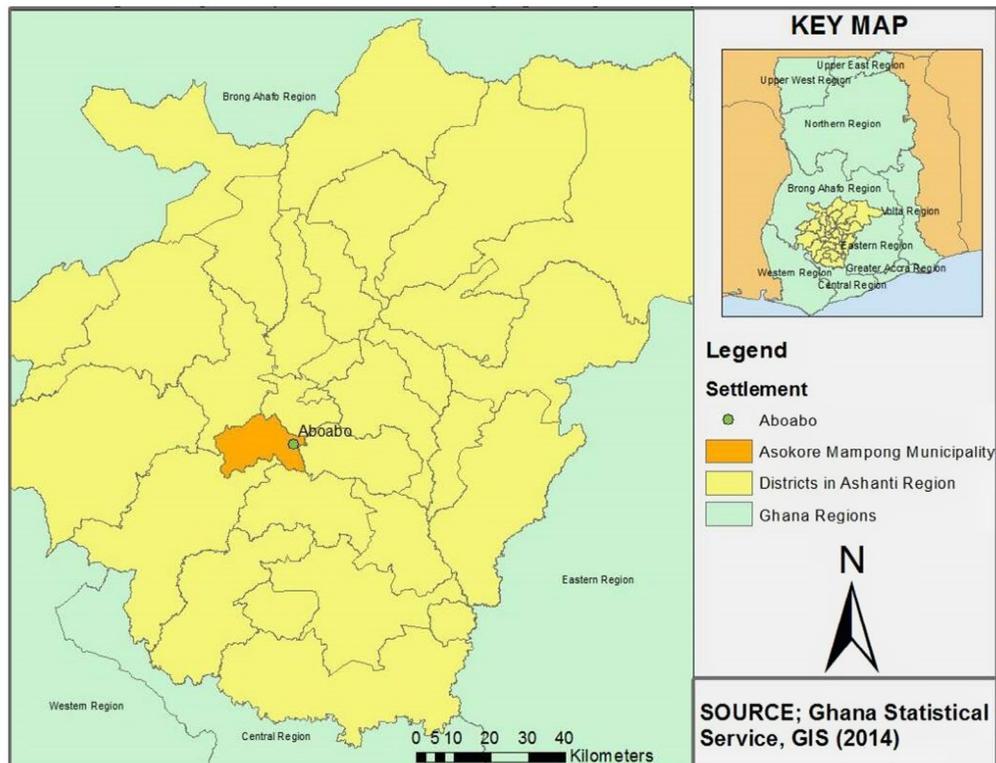
2. Materials and methods

2.1. Study area context

The study was conducted at Aboabo, an urban slum settlement within the Asokore Mampong Municipal Assembly in the Ashanti Region of Ghana. Aboabo, which is actually made up of two communities, Aboabo No.1 and No. 2 (with the two communities being contiguous with each other) used to be part of the Kumasi Metropolitan Assembly until 2012. Other notable communities that fall within Asokore Mampong Municipality are Adukrom, Akurem, Asokore Mampong, Sawaba, Asawasi, New Zongo, Sepe-Tinpom and Akwatialine. Figure shows the study area in the municipality (Ghana Statistical Service [GSS], 2010).

The Municipality covers a total land area of 23.91 km² and lies within latitude 6°42'North: 1°34'West: 6.700°North and 1.567°West. The municipality shares boundaries with the Kumasi Metropolitan Assembly to the East, South and West, Kwabre East Municipal to the North-West and Ejisu-Juabeng Municipal Assembly to the South-East. The Municipality has a total population of 304,815 (GSS, 2010). Aboabo was chosen because of it being a beneficiary of the Urban Environmental Sanitation Project I and Component II of the same project (UESP I and II), as well as the Urban Poverty Reduction Project (UPRP) which sort to address sanitation infrastructure challenges in the communities (Dakpallah, 2011). However, though the community had benefited immensely from these projects, Aboabo is still beset with poor waste management practices due to indiscriminate disposal of refuse into gutters, on the road side and backyards which breeds sanitation related diseases such as diarrhoea, malaria, intestinal worm and typhoid among others (Asokore Mampong Municipal Health Directorate Report, 2016) (See Figure 1 for the Map of the study area within the Municipality).

Figure 1. Map of study area in the Asokore Mampong municipal assembly.



2.2. Sampling design, and data collection

The study was undertaken from September 2015 to June 2016. However, the period of data collection spanned from January to March 2016 on the days when the sanitation exercise was embarked upon (first Saturday of each Month). Prior to the period of data collection, the authors visited the communities for familiarization, and interacted with the Assemblymen of the two communities. This was necessary as the authors needed the permission of these prominent personnel's for entry into the two communities. During the period of familiarization, the authors also took transient walks to ascertain the extent of cleanliness of the communities. This exercise was instrumental in designing the research instrument which was used during the data collection process.

During the three month period, both probability and non-probability sampling methods were used to select a total of 190 respondents for the study. From the 190 participants, 180 household respondents were chosen from Aboabo No. 1 and No. 2, whereas the remaining 10 participants constituted the key informants in the study prefecture. Being one of the first empirical studies focused on the effectiveness of the NSD as a community participatory approach since its inception in 2014, the authors arbitrarily sampled 180 respondents from different households to serve as a basis for future studies on the NSD programme. It is important to note that, the homogeneity of the study participants allows for smaller sample sizes which are representative of the total population since it assumes equal expected value and variance (Business Advocay Network, *n.d.*; Chambers & Clark, 2012). Moreover, the sample was representative as the χ^2 test of homogeneity conducted between gender and the other demographic variables was significant ($p < 0.05$). That notwithstanding, a minimum sample of 70 is considered large enough for any statistical analysis (Bryman, 2001). The absence of a coherent house numbering system made it difficult to employ simple random sampling technique. Thus, on the field, systematic sampling was adopted, whereby every fifth house was entered and one adult (male or female aged 18 years and above) was contacted. In a situation where an identified person in a particular house refused to participate, another person in the same house was chosen for replacement. In each community, the procedure continued until the total number

allocated for it was exhausted. Thus, 90 participants from Aboabo No. 1 and No. 2, making a total of 180 respondents, took part in the study.

In addition to the survey sample, purposive sampling was used to select the 10 key informants from key sectors in the Municipality. These were: Environmental Health and Sanitation Officer of the Asokore-Mampong Municipal Assembly (AMMA)-1, one official from Zoomlion Ghana Limited, the Assemblymen of the two Aboabo communities, three Unit Committee members each from the two communities.

Standardized questionnaires were used to elicit responses from the survey sample. To avoid the problem of non-response created by low reading and writing abilities, the questionnaires were interviewer-administrated, making the process pass as structured interview or interview schedule. Thus, the questions were read in the local dialect, Asante Twi, and the responses recorded on the question paper. However, in a few instances, respondents who could read and write insisted on filling the questionnaires themselves. Issues covered included personal and household characteristics, awareness of the NSD, extent of participation, and consequences and reasons for non-participation. As regards the extent of participation, respondents were queried: "Have you ever heard of the NSDs?" The options provided were: (a) yes (b) no. Those who have heard about the NSD were asked to explain what they know about it. Respondents were further quizzed: "Have you ever participated in any of the NSDs in the last 12 months?" with the same options: (a) yes (b) no. Those who do not participate were asked: "What prevents you from partaking part?" The options provided were: (a) busy work schedule (b) not aware of such exercises (c) sickness (d) apathy on the part of the community members (e) inadequate tools to work with (f) inadequate communication and information (g) insufficient equipment for the cleanups. In an attempt to ascertain the seriousness attached to the NSD, the researchers asked whether any punishment were meted out to non-participants: "What normally happens to people who refuse to participate in the community clean up exercises?" The options provided were: (a) nothing is done to them (b) they are punished/pay fines (c) they are arrested and cautioned.

Data from the key informants was obtained by means of semi-structured interviews to avoid time loss and the problem of call-backs. Data from the final leg of respondents, the Assemblymen and the unit committee members, was obtained by means of in-depth interviews using a checklist. The list contained items spanning community attitudes towards environmental cleanliness and sanitation. The use of these qualitatively inclined approaches afforded the opportunity to clarify some of the issues raised in the survey. Interviews were conducted with the Environmental Health and Sanitation Officer and the Sanitation officer of Zoomlion Ghana in their respective offices at their convenience. The interviews were audio-taped and lasted for 40 min. Responses from the interviews were transcribed verbatim and presented through direct quotes.

2.3. Measure of NSD programme effectiveness

In order to estimate the effectiveness of the NSD, respondents' perception about the extent of environmental sanitation before the NSD exercise and their perception about the current environmental sanitation were used as benchmarks. For respondents' perception about the extent of environmental sanitation before the NSD exercise, the options provided were: "don't know, very clean, clean, filthy, very filthy". Respondents were asked: What is your perception about the sanitary condition of the community before the NSD exercise? As regards the respondents' perception about the current environmental sanitation, the following variables were used as indicators: "highly improved, improved, worsened, significantly worsened, no change". The specific question asked for this indicator was: What is your idea about the current environmental sanitation in the community? For the two indicators, a minimum higher rating of either "very filthy, filthy or both" for the sanitary condition of the community before the NSD exercise, and a further minimum higher rating of either "highly improved, improved or both" for the current sanitary condition of the community were regarded as proof of the programme's effectiveness. However, a higher response for description of the post-sanitary condition before the NSD exercise as either "filthy, very filthy or both" and either "worsened,

significantly worsened or both, and no change” for the current sanitary condition of the community were considered as indicators of the programme’s ineffectiveness

2.4. Data analysis

The field data were first subjected to checks and editing for consistency and validation. The quantitative data was entered into the Statistical Package for Social Sciences (SPSS) version 16.0 and analysed with the aid of descriptive analysis using counts, frequencies, tables and percentages from which patterns and trends were inferred and used to form the basis of the analysis. Also binary logistic regression model was used to tease out the influencing demographic factors on respondents’ participation during the NSD exercise. In this case, participation during the NSD exercise was the dependent variable, whereas respondents’ demographic characteristics were the independent variables. Participation during the NSD in the last 12 months preceding the survey was captured in the dependent variable box of the binary logit model, whereas the demographic variables were captured in the covariates box. All the demographic variables were captured in the covariate section and the first responses selected under the categorical section as the reference point with which other responses were compared to. The 95% confidence interval [CI] and the Hosmer and Lemeshow test were selected in the options section, whereas “enter” was maintained under the Method option to allow the step-by-step outcome of each variable been tested. A value of $p < 0.05$ means the measure is not a good fit, whereas a value of $p > 0.05$ is an indication of a good fit for the Hosmer and Lemeshow test. The qualitative data were transcribed verbatim and presented through direct quotes and linked to the requisite quantitative analysis, for better enlightenment. Besides, the primary data was supplemented with secondary information in the form of journal articles, unpublished thesis, and other official documents provided for by the Asokore Mampong Municipal Assembly.

3. Results

3.1. Sample characteristics

The background characteristics of the respondents are presented in Table 1. There were more male (58%) than female (42%) participants. In all, most respondents (86%) were youthful in nature, within the age cohort of ≤ 41 , schooled up to the basic level (48%) and 13% having no education at all. The average household size was 2, unemployed (12%), students (28%) and employed (60%), with (50%) in the informal sector comprising of petty traders and artisanal economic ventures. This low level of educational attainment is actually mirrored by the low percentage of the study sample working in the formal sector (11%).

3.2. Community participation

3.2.1. Knowledge and awareness of the NSD

Generally, respondents were aware of the NSD as a module for improving sanitation in their communities. In view of this, 98% of the respondents described the NSD as the first Saturday of every month set aside for community members to clean their community in order to avoid diseases. Meanwhile, some 2% of the sample had no idea of the existence of the exercise. These responses show that with the exception of a few study participants who were not aware of the NSD, the majority are adequately informed about the exercise.

On the mode of organization for the exercise, majority (72%) of the respondents mentioned that announcement was made on the local radio station days before the exercise comes off. Others (22%) indicated that they were mostly informed through word of mouth by the assemblymen and members of the unit committee, whilst 7% participated in the exercise based on their own initiative (see Table 2). This indicates that without the involvement of the local radio station in disseminating information on the NSD to the participants, indulgence during the exercise would be low.

Table 1. Background characteristics of study participants

Variables	N = 180	Percent (%)
<i>Gender</i>		
Male	104	57.8
Female	76	42.2
<i>Age</i>		
18–25	40	22.2
26–33	81	45
34–41	34	18.9
42–49	17	9.4
50+	8	4.5
<i>Level of education</i>		
None	24	13.3
Primary	31	17.2
Middle/J.S.S/J.H.S	56	31.1
Secondary/Technical/Vocational	42	23.3
Training College/University	27	15.0
<i>Household size</i>		
Mean	2.3	
Minimum	1	
Maximum	7	
<i>Occupation</i>		
Unemployed	72	40
Petty trader	55	30.5
Artisan/Craftsmanship	34	18.9
Civil servant/Public servant	19	10.6

Table 2. NSD related knowledge and mode of organisation

Variables	Frequency	Percent (%)
<i>Knowledge on NSD</i>		
Cleanup exercise on the first Saturday of every month to avoid disease	176	97.78
No idea	4	2.22
Total	180	100.0
<i>Mode of organisation</i>		
Community radio/FM	129	71.6
Personal contact/word of mouth by Assembly members	39	21.7
Self-initiative	12	6.7
Total	180	100.0

Commenting on the mode of organising respondents for the exercise, a member of the unit committee (MUC) mentioned that they either reach out to the participants in person, through the local radio station and/or at the mosque (Muslim’s place of worship).

We reached out to the community members through personal contact by the organisers, through the local radio station in the community and the mosque. Basically, we reached out to them by word of mouth. [MUC, Aboabo No. 2]

3.2.2. Participation during NSD

As to whether respondents participated during the clean-up exercise, 65% confirmed their indulgence during the exercise whereas 35% do not participate. Regarding the rate of participation, 41% said they sometimes participate during the exercise, 32% participate in the exercise whenever it is organised, whereas 26% participate most of the time (see Table 3).

The following quote confirms the respondents claim on the frequency of participation.

Participation has been encouraging and increases from time to time. This was due to the presence of prominent personalities who visited our community during the clean-up exercises. [MUC, Aboabo No. 2]

The turnout was not what we expected or projected but we record increase in numbers when a prominent personality is coming to grace the activity. [Assemblyman, Aboabo No. 1]

As regard the activities undertaken during the exercise, 45% of the respondents swept the street and markets, 19% de-silted clogged gutters and 25% cleaned public places of convenience (see Table 4).

The following quote confirms the respondents' claim.

Mostly we cleaned the community by sweeping the streets and de-silt gutters. However, attention is paid to other activities such as cleaning the households and fumigating the gutters. [MUC, Aboabo No. 1]

Activities undertaken during the NSD ranged from de-silting choked gutters, sweeping the streets and fumigating gutters. [Assemblyman, Aboabo No. 2]

The gutters were de-silted, we swept the streets and fumigated the gutters during the clean-up exercises. [Senior Operations Officer, Zoomlion Ghana Limited]

The community members clean the streets, de-silt choked gutters, clean-up the market places and also fumigate the gutters [Principal Environmental Health and Sanitation Assistant of AMMA].

3.2.3. Challenges to participation

Various reasons were ascribed for non-participation during the NSD exercise. Insufficient equipment recorded (27%), busy work schedule (26%), poor and non-patriotic attitude towards the NSD (22%) and inadequate communication (18%). Most respondents are not able to partake in the exercise due to their work schedule which usually coincides with the NSD. This could be inferred from the

Table 3. Attitude towards the NSD

	Frequency	Percent (%)
<i>Participation</i>		
Yes	117	65
No	63	35
Total	180	100.0
<i>Frequency of participation</i>		
Always	57	31.7
Most of the time	47	26.1
Sometimes	74	41.1
Never	2	1.1
Total	180	100.0

Table 4. Activities undertaken during the NSD exercise

Activities undertaken	Frequency	Percent (%)
Sweeping of streets and markets	82	45.5
De-silting of choked gutters	34	18.9
Weeding of streets, markets and other public places	19	10.6
Cleaning of public places of convenience	45	25
Total	180	100.0

Table 5. Reasons for non-participation in NSD

Challenges	Frequency	Percent (%)
Busy work schedule	32	26
Forgot and already preoccupied	27	21.9
Inadequate communication and information	22	17.9
Pressing economic needs	8	6.5
Insufficient equipment	34	27.6
Total	123	100

occupational background of the study participants where majority (31%) was petty traders whose businesses flourish during the weekends (see Table 5).

The following quotes throw more light on the reason for non-participation during the NSD.

The contributing factor to the problem of sanitation is apathy. You know that education is low in the communities, so community members do not really appreciate the importance of having a clean environment thus, the practice of disposing of refuse into open drains and practicing open defecation. [Senior Operations Officer of Zoomlion Ghana Limited]

Currently, we have twelve communal containers or skips in the community which are situated at vantage points. They are not enough considering the size of the two communities. However, we are working on adding more to the existing number. [Senior Operations Officer of Zoomlion Ghana Limited]

3.2.4. Punishment for non-participation

As regards whether respondents are punished for their non-participation during the NSD, majority (90%) said that nothing is done to them. However, few of the study participants indicated that non-participants are made to pay fines (7%) and/or cautioned (2%). The majority's view was buttressed by the key informants.

Nothing was done to those who do not participate in clean-up exercises. Especially in the market, the best we could do was to ensure that their shops were locked till the activity was over. The surprising thing was, the shop owners would come to the market alright but would close their shops and wait for us to clean the market. They open the shops when we are done cleaning. [Senior Operation Officer of Zoomlion Ghana Limited]

Although there are bye-laws in Ghana which enjoins us to partake in sanitation activities, people do not partake during the exercise and nothing was done to them. We tried to educate those who are closer to us on the need to keep their environment clean because it is all about us. [MUC, Aboabo No. 1]

3.2.5. Effectiveness of the NSD exercise

In accordance with the study objective, the effectiveness of the NSD was assessed based on two distinct indicators: respondents' perception about the extent of environmental sanitation before the NSD exercise and their perception about the current environmental sanitation. Table 6 presents the result for the indicators. Whereas about 38% of the respondents' described the post-sanitary condition before the NSD exercise in a positive light (very clean/clean; 37.8%), some 54% described it as grubby (filthy/very filthy; 53.9%). Likewise, whereas 40% opined that the current sanitary condition of the community have been made better (highly improved/improved; 40%), some 48% posited that the situation have degenerated (worsened/significantly worsened; 48.3%). Relatively, majority of the respondents posited that the poor sanitary condition (filthy/very filthy) of the community have become worse (worsened/significantly worsened) though the NSD is still ongoing.

3.2.6. Predictors of respondents participation in NSD exercise

The results of the binary logistic regression analysis of the unadjusted predictors of community member's participation during NSD are presented in Table 7. Factors that predict individual's participation in the NSD were: gender, age, level of education and major occupation. Though females were less likely than males to participate during the NSD, the relationship was insignificant (OR = 0.911; 95% CI [0.432–1.923]; $p = 0.807$). As regards educational status, participants with primary education (OR = 0.101; 95% CI = [0.325–1.814]; $p = 0.546$) and first degrees (OR = 0.171; 95% CI = [0.033–0.880]; $p = 0.035$) had odds of engaging in the exercise than those with no formal education. The odds of participating in the NSD was about 24% among respondents who were artisans than those who were unemployed (OR = 0.239; 95% CI = [0.075–0.761]; $p = 0.015$).

Using the Nagelkerke R^2 from the summary result, it is concluded that though the type of occupation and respondents educational background significantly predict one's participation during the NSD exercise, only 21.1% explains the variation outcome. Since the pseudo R^2 value is not close to one, the strength of association between the dependent and independent variables are not strong enough. Hence, the model has a 0.211 measure of success of predicting the dependent variable from the independent variables (Nagelkerke, 1991). Moreover, the Hosmer and Lemeshow test value, $p = 0.434$ ($<.05$), buttresses the result of the Nagelkerke R^2 result (Table 8).

Table 6. Measuring the effectiveness of the NSD exercise

Indicators for effectiveness	N = 180 (%)
<i>Perception about environmental sanitation before the NSD exercise</i>	
Don't know	15 (8.3)
Very clean	18 (10)
Clean	50 (27.8)
Filthy	61 (33.9)
Very filthy	36 (20)
<i>Perception about current environmental sanitation</i>	
Highly Improved	14 (7.8)
Improved	58 (32.2)
Worsened	58 (32.2)
Significantly worsened	29 (16.1)
No change	21 (11.7)

Table 7. Binary logistic regression of predictors of community member’s participation during National Sanitation Days [NSD]

Covariate	OR	Participation during the National Sanitation Day in the last 12 months	
		95.0% [C.I.]	p-Value
<i>Gender</i>			
Male	1		
Female	0.911	0.432–1.923	0.807
<i>Age</i>			
18–25	1		0.855
26–33	0.767	0.325–1.814	0.546
34–41	1.134	0.313–4.112	0.848
42–49	0.522	0.119–2.287	0.388
50+	0.631	0.064–6.196	0.693
<i>Level of Education</i>			
None	1		0.010
Primary	0.101	0.024–0.425	0.002*
Middle/J.S.S/J.H.S	0.567	0.167–1.925	0.363
Secondary/Technical/Vocational	0.312	0.080–1.216	0.093
Training College/University	0.171	0.033–0.880	0.035*
<i>Major occupation</i>			
Unemployed	1		0.040
Petty trader	0.387	0.135–1.109	0.077
Artisan/craftsmanship	0.239	0.075–0.761	0.015*
Civil servant/public servant	0.857	0.233–3.148	0.816
Student	0.714	0.246–2.072	0.536

Notes: OR = Odds ratio; CI = Confidence interval—unadjusted for other explanatory variables in the table
 * < 0.05

Table 8. Model summary for binary logistic regression

Model summary	Test result
Hosmer and Lemeshow test	0.434
Nagelkerke R ²	0.211

4. Discussion

This is one of the first current surveys assessing the effectiveness of the NSD as a community participatory module toward improved environmental sanitation in Ghana. Studies have been carried out in developing countries to access the participation of community members towards improved environmental sanitation (Eawag, 2005; Kar, 2005; Lüthi & Tilley, 2008; Morel et al., 2008). To contribute to this debate in the Ghanaian context, the current study has detailed the contribution of community members towards improved environmental sanitation. The participants’ description of the NSD as the first Saturday of every month set aside for the citizenry to clean their communities concurs with the declaration by the MLGRD. This high response rate is consistent with findings by Shrestha (2011) in Nepal where awareness on environmental sanitation by community members increased participation during cleanup exercise. The study found information sharing as an effective tool in mobilizing the study participants for the NSD. On the one hand, participants’ mentioned the community radio and the use of the print media as means of gathering them for the exercise. This is in agreement other findings (Dhokhikah et al., 2015; Hotta & Aoki-Suzuki, 2014; Ramayah, Lee, & Lim,

2012; Salequzzaman & Stocker, 2001; Sukhor et al., 2011) where information about environmental sanitation disseminated through the media were effective in mobilizing the citizenry for cleanup exercises. On the other hand, respondents' were organised through personal contact. This could be attributed to the cordial relationship that exists among the Assemblymen, members of the unit committee and members of the study community. This stems from the fact that, prior to their election as Assemblymen, the communities have been their place of abode and as such, have developed a rapport with community members. Moreover, the Assemblymen and members of the unit committee always meet majority of the citizenry at their place of worship, the Mosque, due to the Islamic setting of the community.

Moreover, the study found among the general population in Aboabo a high indulgence in the NSD which was largely influenced by the presence of prominent personalities who grace the occasion. Though the high turn-out is good, this is a challenge that needs to be critically observed and addressed since participation during the exercise could drastically reduce in the absence of these personalities. NSD participation rate is comparable to findings of other studies in Asia, Central and Latin America and East and West Africa where majority of community members participated in keeping their surroundings clean (Eawag, 2005; Kar, 2005; Lüthi & Tilley, 2008; Minkler, 2005; Morel et al., 2008; Shrestha, 2011; Taylor et al., 2006). However, it is important to note that an increased participation helps communities remain economically and socially viable when community members are involved in community project (Taylor et al., 2006). This is due to the explicit link between participation and community benefit, that is, an improvement in environmental sanitation that would help promote a hygienic environment for the survival and growth of community members and the nation as a whole.

Respondents disposed of refuse indiscriminately and showed little concern to the sanitation of their environment as they openly threw rubbish into open drains as well as practiced "wrap and throw" (the act of defecating into polythene bags and dumping them in the environment). This attitude displayed by the respondents correspond to the theory of cognitive dissonance (Eagly & Chaiken, 2007; Festinger, 1957; Kassarian & Cohen, 1965) which explains the inconsistency that a person perceives between one's behaviour and attitudes. That is, the theory examines why people continue to undertake activities which are injurious to their health and the environment despite their knowledge of it.

As part of their participation, sweeping of the street and markets recorded the highest percentages followed by cleaning of public places of convenience and de-silting of clogged gutters. These responses were consistent with the objective for the institution of the NSD by the MLGRD (2014). Meanwhile, busy work schedule, apathy, inadequate tools to work with, pressing economic needs, indiscipline and insufficient equipment for the clean-up exercise were factors that limited respondent's continuous participation in the exercise. Apathy, lack of sanitation equipment, inadequate communication and information as limiting factors for non-participation are consistent other studies (Grodzińska-Jurczak, Tarabula, & Read, 2003; Robinson & Read, 2005; Shaw, Lyas, Maynard, & van Vugt, 2007; Singhirunnusorn, Donlakorn, & Kaewhanin, 2012; Water and Sanitation for the Urban Poor [WSUP], 2013) where apathy towards recycling and lack of public awareness deterred members of communities from participating in sanitation activities. These factors could be attributed to the lack of commitment of community members towards the NSD. As indicated earlier, some respondents' close their shops, wait till the exercise is over and then open the shop. Similarly, the fact that no punishment were meted out for non-participation in the exercise is enough incentive for respondent's to sit aloof whilst the exercise is being undertaken using the lack of sanitation equipment and inadequate communication and information as a front to cover for their lackadaisical attitude.

Moreover, busy work schedules and pressing economic needs were also articulated by the respondents as reasons for non-participation. Similar concerns have been raised elsewhere (McDonalds & Oates, 2003; Momoh & Oladebeye, 2010; Schultz, Oskamp, & Mainieri, 1995). These bottlenecks could be explained by the predominant economic activity, petty trading, engaged in by respondents

in the municipality as well as the proximity of the community to the Central Business District (CBD). Petty traders in the community have their peak sale on Saturdays which coincide with the day set aside for the NSD. More importantly, the extent of apathy displayed by the citizenry to most public-spirited but populist interventions could be expressed in the disdainfully mocking statement “Yate abre”, in the local Akan dialect, which is interpreted to mean “We’ve heard similar things before, nothing came out of them. (This one too will not work), so stop disturbing us”. With such shrugs they signal the death knell to well-intentioned propositions, just because it infringes on their zones of comfort.

Albeit, no punishment was meted out for non-participation in the exercise. No policies and measures were put in place to deter respondents from non-participation. Shrestha (2011) observed in a regional study of Nepal that despite being aware of the importance of keeping proper sanitation, community members were reluctant to take initiatives themselves and no punishment was meted out to them. These responses agrees with Minkler (2005) who found that community participation was first and foremost about community benefit, arising spontaneously, and embedded in community narratives that supported it. Thus, forcing people to participate in developmental project downplays the essence of community participation. Hence, for community participation to be sustainable it must be spontaneous and not a coercion where non-participants are punished.

An overview of participants’ responses based on the benchmark provided for measuring the effectiveness of the NSD exercise was quite interesting. It can be concluded that participants within the study prefecture viewed the exercise as being ineffective in achieving its core mandate. Perhaps, given the fact that increased participation in the exercise was mostly dependent on the occasional visitation of prominent personalities on the day of the exercise, inference can be made that whenever such personalities are absent, participation level plummets. The question the author(s) ask is, for how long can these prominent personalities keep honouring the community’s invitation to participate in the exercise? This is a serious issue which requires urgent attention since the tenet of the NSD could be severely jeopardized when increased participation or otherwise is premised on the presence of distinguished personalities alone.

These challenges calls for sensitization of the respondents by the various stakeholders; Zoomlion Ghana Limited, Principal Environmental and Sanitation Assistant of the AMMA, Assemblymen and members of the Unit committee, on the need to keep their surroundings clean. Doing this, sensitization, will help the community members to identify with the sanitation problem and better contribute to keeping the environment clean. Similarly, the Municipality should make available enough sanitation equipment and tools during and after the clean-up exercises to house the waste generated. Doing this would help reduce the disposal of waste into drainage systems, on the street and may improve the health of the community members.

Different studies have been carried out to ascertain the influence of demographic variables on respondent’s participation in environmental sanitation (Ilevbare, 2015; Momoh & Oladebeye, 2010; Schultz et al., 1995). Using gender, age, level of education and major occupation as predictive variables for respondents’ participation in the NSD, the study discovered that one’s educational status and type of occupation significantly influenced their involvement during the sanitation exercise. Particularly, respondents with primary education and first degree holders were likely to be involved in the NSD than those with no formal education. Though Scott and Willits (1994) posited that education significantly influence individuals participation in sanitation activities, Momoh & Oladebeye in their Nigerian reported that participants’ educational level had no significant impact on their participation in environmental sanitation efforts. Similar findings were reported by Ilevbare (2015) and Ekong (2015). Interestingly, artisans significantly participated during the exercise as compared to those who were unemployed. This contradicts other studies where civil servants participated more in environmental sanitation efforts (Momoh & Oladebeye, 2010). Though Bell, Greene, Fisher, and Baum (2001) and Arcury and Christianson (1990) identified age to be the best predictors of environmentally concerned attitudes, this study discovered that age had no impact on participants

involvement in the sanitation exercises. As regards gender as a predictive variable in participants' involvement in the NSD, the study discovered no relationship. This in line with study by Ilevbare (2015). However, it contradicts the study by Zeleeny and colleagues in which women showed more environmentally responsible behaviour than men (Zelezny, Chua, & Aldrich, 2000). Moreover, our finding evicts the study by Ekong (2015) who reported a significant association between gender and participation in environmental sanitation activities ($p < 0.05$), with males showing nine times more odds of participation than females (OR = 9.84, CI = 1.225–79.018).

5. Conclusion

The study provides an empirical evidence to suggest that the knowledge base of community members about the organisation of the NSD in Aboabo is high. The high response rate is largely explained by the presence of prominent personalities who frequently grace the exercise. Their presence serves as pull factors to the exercise. Media was identified as a vibrant route for the mobilization of participants and activities such as sweeping the streets and market places, de-silting choked gutters and cleaning of public places of convenience are undertaken. Non-participation was attributed mainly to busy work schedule, poor and non-patriotic attitude, insufficient equipment to work and pressing economic needs. The problem of attitude has been shown to be among the leading factors accounting for the wanton disregard for the environment and the continuous practice of indiscriminate dumping of refuse together with the equally reprehensible act of open defecation. Moreover, the programme was identified as being ineffective in the study prefecture.

However, given the importance of a clean environment on the socio-economic life and the health of community members and the nation in general, there is the need for recognizing community participation as an interaction, rather than a coercion, arising in a community of place and as a developmental process that must be undertaken willingly so as to reap its full potential. With developing countries identified as falling behind in sanitation goals, coupled with the recent cholera outbreak in Ghana in 2014, it is imperative for community members to willingly participate in the NSD so as to continually keep their surroundings clean from needless diseases and death (Uwaegbulum, 2004). Again, participants in clean-up exercises should be motivated by way of rewarding those who participate in the exercise to serve as an incentive for others to partake. Particularly, the youth should be encouraged by opinion leaders to be involved in the exercise as reported in previous studies (Arcury & Christianson, 1990; Bell et al., 2001; DeYoung, 1991). Moreover, if needs be that prominent people are invited to intermittently grace the NSD exercise, their invitations should be to empower the local people to esteem the importance of the programme by making it their own rather than depending on their presence to increase patronage. Given that the study made use of 180 respondents as a basis to ascertain the effectiveness of the NSD as community participatory approach, it is recommended that future studies should take into consideration a larger sample size and the spatial distribution of other communities to help validate the findings of this study.

Funding

The authors received no direct funding for this research.

Competing Interests

The authors declare no competing interest

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Citation information

Cite this article as: Environmental sanitation unleashed: Effectiveness and challenges of the National Sanitation Day as a community sanitation participatory approach in Aboabo, Ghana, Emmanuel Mawuli Abalo, Seth Agyemang, Samuel Atio, Derrick Ofosu-Bosompem, Prince Peparah & Rita Ampomah-Sarpong, *Cogent Environmental Science* (2017), 3: 1405888.

References

- Adubofour, K. (2010). *Sanitation survey of Aboabo and Asawase*. Kumasi: Master of Science (Environmental Science) Faculty of Bioscience, College of Science, Kwame Nkrumah University of Science and Technology.
- Adubofour, K., Obiri-Danso, K., & Quansah, C. (2013). Sanitation survey of two urban slum Muslim communities in the Kumasi metropolis, Ghana. *Environment and Urbanization*, 25, 189–207. <https://doi.org/10.1177/0956247812468255>
- Arcury, T. A., & Christianson, E. H. (1990). Environmental worldview in response to environmental problems. Kentucky 1984 and 1988 compared. *Environment and Behaviour*, 22(3), 387–407. <https://doi.org/10.1177/0013916590223004>
- Asokore Mampong Municipal Health Directorate Report. (2016). *Governemnt of Ghana*. Retrieved February 10, 2016, from.
- Atkinson, A. (2007). Analysis of urban trends, culture, theory, policy, action. *City*, 9 (3), 264–277.
- Bell, P. A., Greene, T. C., Fisher, J. D., & Baum, A. (2001). *Environmental psychology* (5th ed.). Fort Worth, TX: Harcourt College Publishers.
- Bill, B. (2007). Participatory planning approaches to community interventions. *The World Bank Participation Source book*. Retrieved October 18, 2017, from <http://www/plannersweb.com/org/socialanalysis/sourcebook>
- Brudney, J. L., & England, R. E. (1983). Toward a definition of the co-production concept. *Public Administration Review*, 43(1), 59–65. <https://doi.org/10.2307/975300>
- Bryman, A. (2001). *Social research methods*. London: Oxford University Press.
- Business Advocacy Network. (n.d.) *Determining sample size*. Retrieved October 18, 2017, from <http://www.businessadvocacy.net/downloads/fsSampleSize.pdf>
- Chambers, R. (1983). *Rural development: Putting the last first*. London: Longman Publishers. Published by Routledge 21/11/1983; SBN 10: 0582644437/ ISBN 13: 9780582644434
- Chambers, R. L., & Clark, R. G. (2012). *An introduction to model-based survey sampling with applications: Homogenous populations*. Print ISBN-13: 9780198566625. doi:10.1093/acprof:oso/9780198566625.003.0003
- Chung, S. S., & Poon, C. S. (2001). A comparison of waste-reduction practices and new environmental paradigm of rural and urban Chinese citizens. *Journal of Environmental Management*, 62, 3–19. <https://doi.org/10.1006/jema.2000.0408>
- Dakpallah, T. A. G. (2011). *Slum improvement in Ghana: The study of Aboabo and Asawase in Kumasi*. Kumasi: Master of Science; Development Planning and Management Department of Planning, College of Architecture and Planning.
- DeYoung, R. (1991). Some psychological aspects of living lightly: Desired lifestyle partens and conservation behaviour. *Journal of Environmental Systems*, 20(1), 215–227.
- Dhokhikah, Y., & Trihadiningrum, Y. (2012). Solid waste management in Asiandevolving countries: Challenges and opportunities. *Journal of Applied Environmental and Biological Sciences*, 2(7), 329–335.
- Dhokhikah, Y., Trihadiningrum, Y., & Sunaryo, S. (2015). Community participation in household solid waste reduction in Surabaya, Indonesia. *Resources, Conservation and Recycling*, 102, 153–162. doi:10.1016/j.resconrec.2015.06.013
- Dukeshire, S., & Thurlow, J. (2002). Challenges and barriers to community participation in policy development. *Rural Communities Impacting Policy Project*. ISBN 0-9780913-2-9. Retrieved August 7, 2017, from <https://pdfs.semanticscholar.org>
- Eagly, A. H., & Chaiken, S. (2007). The advantages of an inclusive definition of attitude. *Social Cognition*, 25(5), 582–602. <https://doi.org/10.1521/soco.2007.25.5.582>
- Eawag: Swiss Federal Institute of Aquatic Science and Technology. (2005, June). *Household-centred environmental sanitation: Implementing the Bellagio principles in urban environmental sanitation*. ISBN 3-906484-35-1.
- Ekong, I. E. (2015). An assessment of environmental sanitation in an urban community in Southern Nigeria. *African Journal of Environmental Science and Technology*, 9(7), 592–599. doi:10.5897/AJEST2015.1882
- Evans, B., Colin, C., Jones, H., & Robinson, A. (2009, May). *Sustainability and equity aspects of total sanitation programmes: A study of recent wateraid-supported programmes in three countries* (Global synthesis report). Preprint prepared for the 34th WEDC Conference.
- Festinger, L. A. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Ghana Statistical Service. (2010). *Population and housing census*. Accra: National Analytical Report.
- Grodzińska-Jurczak, M., Tarabuta, M., & Read, A. R. (2003). Increasing participation in rational municipal waste management—a case study analysis in Jaslo City (Poland). *Resources Conservation and Recycling*, 38, 67–88. [https://doi.org/10.1016/S0921-3449\(02\)00124-6](https://doi.org/10.1016/S0921-3449(02)00124-6)
- Hamdi, N., & Goethert, R. (1997). *Action planning for cities – a guide to community practice*. New York, NY: Wiley & Sons.
- Hotta, Y., & Aoki-Suzuki, C. (2014). Waste reduction and recycling initiatives in Japanese cities: Lessons from Yokohama and Kamakura. *Waste Management & Research*, 32(9), 857–866. <https://doi.org/10.1177/0734242X14539721>
- Ilevbare, F. M. (2015). Socio-demographic characteristics associated with waste disposal behaviour among residents in selected communities of South-western, Nigeria. *Ifa Research Publications in Geography*, 13(2015), 38–48.
- Ishaku, H. T., & Majid, R. M. (2010). *Community participation: Alternative approach to water supply in Nigerian rural communities. The international conference on built environment in developing countries 2010 (ICBEDC 2010)*.
- Isham, J., & Kahkonen, S. (1999). *What determines the effectiveness of community-based water projects? Evidence from Central Java, Indonesia on demand, responsiveness, service rules, and social capital*. Social capital initiative (Working Paper No. 14). Washington, DC: World Bank.
- Kamara, A. J. (2006). *Household participation in domestic waste disposal and recycling in the Tshwane metropolitan area: An environmental education perspective*. Pretoria: Master of Education in the subject Environmental Education. University of South Africa.
- Kar, K. (2005). *A practical guide to triggering community-led total sanitation project (CLTS)*. Brighton BN1 9RE: Independent Consultant and Visiting Fellow, Institute of Development Studies, University of Sussex.
- Kar, K., & Chambers, R. (2008). *Handbook on community-led total sanitation*. Brighton: Institute of Development Studies at the University of Sussex and Plan.
- Kassarjian, H. H., & Cohen, J. B. (1965). Cognitive dissonance and consumer behavior: Reactions to the surgeon general's report on smoking and health. *California Management Review*, 8(1), 55–64. <https://doi.org/10.2307/41165660>
- Lawrence, A. (2006). No personal motive? Volunteers, biodiversity and the false dichotomies of participation. *Ethics, Place and Environment*, 9(3), 279–298. <https://doi.org/10.1080/13668790600893319>
- Levine, C. H. (1984). Citizenship and service delivery: The promise of co-production. *Public Administration Review*, 44, 178–187. <https://doi.org/10.2307/975559>

- Lüthi, C., McConville, J., & Kvarnström, E. (2010). Community-based approaches for addressing the urban sanitation challenges. *International Journal of Urban Sustainable Development*, 1(1–2), 49–63. doi:10.1080/19463131003654764
- Lüthi, C., Schertenleib, R., & Tilley, E. (2007). HCES: A new approach to environmental sanitation planning. *Waterlines*, 26, 2–4. <https://doi.org/10.3362/0262-8104.2007.044>
- Lüthi, C., & Tilley, E. (2008). *Access to sanitation and safe water: Global partnership and local actions, 33rd WEDC international conference*, Accra, Ghana.
- McDonalds, S., & Oates, C. (2003). Reasons for non-participation in a kerbside recycling scheme. *Resources, Conservation and Recycling*, 39(4), 369–385. [https://doi.org/10.1016/S0921-3449\(03\)00020-X](https://doi.org/10.1016/S0921-3449(03)00020-X)
- MDG Report. (2015). *Ghana gets tagged as 7th dirtiest country?* Retrieved August 4, 2017, from <https://www.newsghana.com.gh/ghana-gets-tagged-as-7th-dirtiest-country-mdg-report/>
- Ministry of Local Government and Rural Development, Report. (2014). *Government of Ghana, Accra*. Retrieved October 18, 2017, from http://www.mofep.gov.gh/sites/default/files/pbb_/2014/Local.pdf
- Minkler, M. (2005). *Community organizing and community building for health* (2nd ed.). New Brunswick, NJ: Rutgers University Press.
- MoLG. (2005). *National sanitation strategy Bangladesh*. Bangladesh: Ministry of Local Government, Rural Government and Cooperatives. Retrieved October 18, 2017, from [http://www.watersanitationhygiene.org/References/EH_KEY_REFERENCES/SANITATION/General%20Sanitation%20References/Bangladesh%20National%20Sanitation%20Strategy%20\(MRDC\).pdf](http://www.watersanitationhygiene.org/References/EH_KEY_REFERENCES/SANITATION/General%20Sanitation%20References/Bangladesh%20National%20Sanitation%20Strategy%20(MRDC).pdf)
- Momoh, J. J., & Oladebeye, D. H. (2010). Assessment of awareness, attitude and willingness of people to participate in household solid waste recycling programme in Ado-Ekiti, Nigeria. *Journal of Applied Sciences in Environmental Sanitation*, 5(1), 93–105.
- Mongkolnchaiarunya, J. (2005). Promoting a community-based solid wastemanagement initiative in local government: Yala municipality, Thailand. *Habitat International*, 29, 27–40. [https://doi.org/10.1016/S0197-3975\(03\)00060-2](https://doi.org/10.1016/S0197-3975(03)00060-2)
- Morel, A., Luethi, C., & Schertenleib, R. (2008). *Integrate at the top, involve at the bottom – The household-centred approach to environmental sanitation*. Dübendorf: Eawag – Swiss Federal Institute of Aquatic Science and Technology.
- Nagelkerke, N. J. D. (1991). A note on a general definition of the coefficient of determination. *Biometrika*, 78(3), 691–692. <https://doi.org/10.1093/biomet/78.3.691>
- Nance, E. B. (2004). *Putting participation in context: An evaluation of urban sanitation in Brazil* (PhD diss.). Stanford University, Stanford, CA.
- Nance, E., & Ortolano, L. (2007). Community participation in urban sanitation experiences in Northeastern Brazil. *Journal of Planning Education and Research*, 26, 284–300. doi:10.1177/0739456X06295028. © 2007 Association of Collegiate Schools of Planning
- Narayan, D. (1995). *The contribution of people's participation: Evidence from 121 rural water supply projects. Environmentally sustainable development occasional* (Paper Series No. 1). Washington, DC: World Bank.
- Nour, A. M. (2011). Challenges and advantages of community participation as an approach for sustainable urban development in Egypt. *Journal of Sustainable Development*, 4(1), 86.
- Ostrom, E. (1992). *Crafting institutions for self-governing irrigation systems*. San Francisco, CA: ICS Press.
- Percy, S. L. (1984). Citizen participation in the co-production of urban services. *Urban Affairs Review*, 19(4), 431–446. <https://doi.org/10.1177/004208168401900403>
- Prokopy, L. S. (2002). *The relationship between participation and project outcomes: A study of rural drinking water projects in India* (PhD diss.). University of North Carolina, Chapel Hill, NC.
- Prokopy, L. S. (2005). The relationship between participation and project outcomes: Evidence from rural water supply projects in India. *World Development*, 33(11), 1801–1819. <https://doi.org/10.1016/j.worlddev.2005.07.002>
- Ramayah, T., Lee, J. W. C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environmental Management*, 102, 141–147. <https://doi.org/10.1016/j.jenvman.2012.02.025>
- Repetto, R., Dower, R. C., Jenkins, R., & Geoghegan, J. (1992). *Green fees: How a tax shift can work for the environment and the economy*. World Resources Institute. Retrieved August 8, 2017, from http://pdf.wri.org/greenfees_bw.pdf
- Robinson, G. M., & Read, A. D. (2005). Recycling behaviour in a London Borough: Results from large-scale household surveys. *Resources, Conservation and Recycling*, 45, 70–83.
- Rosemarin, A., Ekane, N., Caldwell, I., Kvarnström, E., McConville, J., Ruben, C., & Fogde, M. (2008). *Pathways for sustainable sanitation: Achieving the millennium development goals*. Stockholm: IWA Publishing, EcoSanRes Programme, Stockholm Environment Institute.
- Salequzzaman, M., & Stocker, L. (2001). The context and prospects for environmental education and environmental career in Bangladesh. *International Journal of Sustainability in Higher Education*, 2(2), 104–127. <https://doi.org/10.1108/14676370110388309>
- Sara, J., & Katz, T. (1997). *Making rural water supply sustainable: Report on the impact of project rules*. Washington, DC: UNDP-World Bank Water and Sanitation Program.
- Schultz, P. W., Oskamp, S., & Mainieri, T. (1995). Who recycles and when? A review of personal and situation actors. *Journal of Environmental Psychology*, 15(2), 105–121. [https://doi.org/10.1016/0272-4944\(95\)90019-5](https://doi.org/10.1016/0272-4944(95)90019-5)
- Schumacher, F. (1976). *Small is beautiful – Economics as if people mattered*. London: Abacus.
- Scott, D., & Willits, F. K. (1994). Environmental attitude and behaviour. A Pennisilvania survey. *Environmental and Behaviour*, 26(2), 239–260. <https://doi.org/10.1177/001391659402600206>
- Stockholm Environment Institute. (2008, August 25–26). *Proceedings from SEI/EcoSanRes2 workshop: Planning and implementation of sustainable sanitation in peri/semi-urban settings – a need for development of existing tools?*, Stockholm.
- Shaw, P. J., Lyas, J. K., Maynard, S. J., & van Vugt, M. (2007). On the relationship between set-out rates and participation ratios as a tool for enhancement of kerbside household waste recycling. *Journal of Environmental Management*, 83, 34–43. <https://doi.org/10.1016/j.jenvman.2006.01.012>
- Shrestha, R. L. (2011). *WaterAid in Nepal report – People's perception on sanitation: Findings from Nepal*. Gulmi: A Water Aid in Nepal Publication.
- Singhirunusorn, W., Donlakorn, K., & Kaewhanin, W. (2012). Contextual factors influencing household recycling behaviours: A case of waste bank project in Mahasarakham municipality. *Procedia-Social and Behavioural Sciences*, 36, 688–697. <https://doi.org/10.1016/j.sbspro.2012.03.075>
- Skumatz, L. A. (1996). *Nationwide diversion rate study: Quantitative effects of program choices on recycling and green waste diversion-beyond case studies*. Superior, CO: Report Prepared by Skumatz Economic Research Associates, Inc.
- Smith, M. K. (2006). 'Community participation', the encyclopaedia of informal education. Retrieved October 18, 2017, from www.infed.org/community/b-compar.htm
- Sukhor, F. S. A., Mohammed, A. H., Sani, S. I. A., & Awang, M. (2011). *A review on the success factors for community*

- participation in solid waste management. *International Conference on Management (ICM) Proceeding*.
- Sundeen, R. A. (1985). Co-production and communities: Implications for local administrators. *Administration and Society*, 16(4), 387–402. <https://doi.org/10.1177/009539978501600401>
- Taylor, J., Wilkinson, D., & Cheers, B. (2006). Community participation in organising rural general practice: Is it sustainable? *Australian Journal of Rural Health*, 14, 144–147. doi:10.1111/j.1440-1584.2006.00790.x
- Tilley, E., Atwater, J., & Mavinic, D. (2008). Recovery of struvite from stored human urine. *Environmental Technology*, 29(7), 807–816. <https://doi.org/10.1080/09593330801987145>
- Ton, S., & Patrick, M. (2003). *Community water management. From system to service in rural areas* (pp. 103–105). Southampton Row, London: ITDG publishing.
- Tukahirwa, J. T., Mol, A. P. J., & Oosterveer, P. (2010). Civil society participation in urban sanitation and solid waste management in Uganda. *Local Environment*, 15(1), 1–14. doi:10.1080/13549830903406032
- UN JMP. (2008). *Progress on drinking water and sanitation – special focus on sanitation*. Geneva: Joint Monitoring Programme for Water Supply and Sanitation. Retrieved October 18, 2017, from http://www.who.int/water_sanitation_health/monitoring/jmp_report_7_10_lores.pdf
- United Nations Population Fund. (2007). *State of the world population 2007*. New York, NY: Author. Retrieved October 18, 2017, from https://www.unfpa.org/sites/default/files/pub-pdf/695_filename_sowp2007_eng.pdf
- Uwaegbulum, C. (2004). World is meeting goals of safe drinking water but failing behind sanitation, says UN. *The Guardian Newspaper*, p. 50.
- Wade, R. (1988). The management of irrigation systems: How to evoke trust and avoid the prisoners' dilemma. *World Development*, 16(4), 489–500. [https://doi.org/10.1016/0305-750X\(88\)90199-4](https://doi.org/10.1016/0305-750X(88)90199-4)
- Wahabu, A., Oduro-Kwarteng, S., Monney, I., & Kotoka, P. (2014). Characteristics of diverted solid waste in Kumasi: A Ghanaian city. *American Journal of Environmental Protection*, 3(5), 225–231. doi:10.11648/j.ajep.20140305.13
- Water and Sanitation for the Urban Poor. (2013). *Getting communities engaged in water and sanitation projects: Participatory design and consumer feedback*, USAID. Retrieved October 18, 2017, from <http://www.wsup.com/resource/getting-communities-engaged-in-water-and-sanitation-projects-participatory-design-and-consumer-feedback/>
- Water and Sanitation Program. (2012). *Economic impacts of poor sanitation in Africa*. Retrieved June 1, 2016, from <http://siteresources.worldbank.org/INTAFRICA/Resources/economic-impacts-of-poor-sanitation-in-africa-factsheet.pdf>
- WHO & UNICEF. (2015). *Progress on sanitation and drinking water. 2015 Update and MDG assessment*. Retrieved August 7, 2017, from http://files.unicef.org/publications/files/Progress_on_Sanitation_and_Drinking_Water_2015_Update_.pdf
- World Bank. (2004). *World development report 2004: Making services work for poor people*. New York, NY: Oxford University Press.
- Water & Sanitation Programme. (2007, January). *From burden to communal responsibility. A success story from southern region in Ethiopia*. Nairobi: Author Field Note.
- Zelezny, L. C., Chua, P., & Aldrich, C. A. (2000). New ways of thinking about environmentalism: Elaborating on gender differences environmentalism. *Journal of Social Issues*, 56(3), 443–457. <https://doi.org/10.1111/0022-4537.00177>
- Zhu, D., Asnani, P. H., Zurbrügg, C., Anapolsky, S., & Mani, S. (2008). *Improving municipal solid waste management in India, A source book for policy makers and practitioners*. Washington, DC: World Bank.
- Zurbrügg, C. (2002). Urban solid waste management in low-income countries of Asia: How to cope with the garbage crisis. *Proceeding of the scientific committee on problems of the environment (SCOPE), urban solid waste management review session*, Durban, South Africa (p. 1).
- Zurbrügg, C., Drescher, S., Patel, A., & Sharatchandra, H. C. (2004). Decentralised composting of urban waste—an overview of community and private initiatives in Indian cities. *Waste Management*, 24, 655–662. <https://doi.org/10.1016/j.wasman.2004.01.003>



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