Looking into the Past: Rethinking Traditional Ways of Solid Waste Management in the Jaman South Municipality, Ghana

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Abstract

Urban solid waste constitutes a major problem for environmental management in developing countries. The inability of municipal authorities to tackle this problem effectively calls for alternative management approaches, including private sector participation. This paper explores the relevance and application of indigenous knowledge and practices for improving solid waste management (SWM) in the Jaman South Municipality of Ghana. Employing a qualitative method, 28 respondents, comprising traditional leaders, assembly members, farmers and traders, were purposively selected and interviewed using an unstructured interview guide to gather data. The data were analysed qualitatively using a thematic approach. The result shows that taboos, communal labour, household composting, use of domestic wastes to feed animals and conversion of domestic wastes into tools and other material assets were the indigenous SWM practices within the Municipality. These SWM practices, which are believed to have positive effects on the environment by respondents, can be rethought and adopted as to enhance the management of municipal solid wastes. The paper acknowledges the erosion of these practices, due to the adoption of modern lifestyles by some residents and non-recognition by municipal authorities, and calls for the design of public education programmes that incorporates indigenous concepts.

Key words: alternative approaches, indigenous knowledge, modernisation, municipal authorities, solid waste management

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Introduction

The amount of solid waste generated in the world is steadily increasing. According to UN-HABITAT (2010), in 2006, the total amount of municipal solid waste (MSW) generated globally reached 2.02 billion tones, representing a 7 per cent annual increase since 2003, and current estimates (Kaza et al., 2018) suggest that around 4 billion tons of MSW are generated annually worldwide. Every government is looking for appropriate methods of approaching the challenges posed by municipal solid waste management (MSWM) (Schwarz-Herion et al., 2008). Solid waste constitutes a growing problem for developing countries in particular, where it has gained increasing political awareness in the recent past. Increasing population levels, expanding economies, rapid urbanization (Minghua et al., 2009) and a growing middle class with high levels of consumption have greatly accelerated the municipal solid waste generation rate in these countries. For example, MSW generation in the developing world ranges from 174 billion tones in sub-Saharan Africa to 231 billion tones in Latin America and 334 billion tones in South Asia (Kawai and Tasaki, 2016), and the total quantity of waste generated in low and lower-middle-income countries is expected to increase by more than three times by 2050 (Kaza et al., 2018). Municipal authorities are usually responsible for waste management in their cities and towns to provide an effective and efficient system to the inhabitants. However, there are often challenges which are beyond their ability to tackle the solid waste problem (Sujauddin et al., 2008), mainly due to lack of organizational capacities, financial resources, complexities and system multi-dimensionality (Burntley, 2007). In India, according to Sharholy et al. (2008), the huge expenditure needed to provide the service and, in Bangladesh (Sujauddin et al., 2008), the absence of financial support, limited technological resources, the unwillingness of service users to pay for waste management and lack of proper use of economic instruments have hampered the ability of municipal authorities to effectively deal with the challenges.

Municipal solid waste management in Ghana has been very daunting, particularly in the largest cities of Accra and Kumasi (Owusu-Sekyere et al., 2015). Most urban landscapes in Ghana are characterized by mountains of uncollected garbage, gutters choked with waste, open reservoirs that appear to be a little more than toxic pools of both solid and liquid wastes and beaches and bushes strewn with plastic garbage (UN-HABITAT, 2010). Without sustainable and appropriate treatment, solid waste becomes a source of contamination to the environment at large, resulting in air, water and soil pollution. Onibokun and Kumuyi (1999) and Owusu-Sekyere et al. (2015) indicate that the environmental, social and health impacts of this pollution is greatest among those living in the low-income and peri-urban settlements where access to collection routes is a challenge. While developed countries exercise the best management practices in waste handling and disposal, including recycling, reuse and engineered landfills (Ajibade, 2007), developing countries, such as Ghana, generally lack adequate means of waste handling and disposal in an environmentally safe and sustainable manner. It has been a common practice in most developing countries to dispose of waste by the most convenient method available (Ajibade, 2007). Meanwhile, with increasing population and urbanisation, solid wastes are piling up more than authorities are able to manage them.

The best approach to solid waste management (SWM) in developing countries remains an important concern for researchers and policy-makers (Amuda et al., 2014). Public sector domination in service provision had been held responsible for the awful state of waste management (UNESC/ECA, 2005). It was argued that

public enterprises were characterized by the absence of competition, low levels of government investment, and lack of service expansion. These, according to UNESC/ECA (2005), resulted in inefficiency and lack of pricing mechanisms to reflect service cost and meet municipal solid waste demand. As a result, some scholars (including Sharholy et al., 2008; Oteng-Ababio, 2010) indicated that the involvement of the private sector is a factor that could improve the efficiency of the system. The rationale behind support for the private sector is to cut the size of public sector control of MSW management in search of new technologies and expertise and gain access to increased capital and greater economic efficiency to improve operations (Osumanu, 2008). Consequently, many governments in developing countries, including Nigeria, Indonesia, Colombia (Cointreau-Levine, 1994) and Ghana (Oteng-Ababio, 2010), took tentative steps toward public-private-partnerships (PPPs) in MSWM.

In general, the involvement of private sector in solid waste management services in Ghana has produced both positive and negative results (Osumanu, 2008; Oteng-Ababio, 2010). Private sector participation is seen as a possible opportunity - not a panacea (Cointreau-Levine, 1994). It is argued that, in situations where existing service delivery is either too costly or inadequate, private sector participation should be examined as a means of enhancing efficiency (and thus lowering costs) and mobilizing private investment (in infrastructure and technology). To decide whether to have private sector participation, many factors need to be analysed. These factors include cost recovery, efficiency, public accountability, management, finance, economies of scale, legislation, institutions, and cost. Cost factors in particular should be analyzed separately for the different components of solid waste service - collection, cleansing, transfer, and disposal (Bhuiyan, 2010). Experiences, so far, suggest that success in private sector participation depends more on the local government client than on the private sector service provider (Coad, 2005). One would have thought that involving the private sector in municipal solid waste management would mean a consideration of indigenous knowledge systems since they are well understood, culturally acceptable and capable of managing solid waste but that was not the case, especially in Ghana.

Despite the superfluity of studies (e.g. Osumanu, 2007: Oteng-Ababio, 2010, Owusu-Sekyere et al., 2015; Oteng-Ababio, 2017) on solid waste management in Ghana, little attention has been given to traditional systems of waste management, largely due to a lack of recognition of its potential contribution to improving MSWM. Meanwhile, indigenous systems possess a wealth of knowledge that could be revisited to boost municipal solid waste management. Backed by the modernised mixture approach (MMA), this study establishes that there is an environmental and health gain in blending traditional and contemporary waste management practices. The study highlights the need for exploring the contribution of indigenous systems in waste management by municipalities, districts and communities in developing countries and Ghana in particular. The potential impacts of these systems lie in the fact that they are part of the daily lives of people and, thus, can be easily implemented. This paper thus intends to stimulate discourse on the relevance of traditional practices for managing solid waste.

The paper is categorised into six sections. After this introduction, section two considers the modernised mixture approach which forms the basis for our argument in this paper. Section three presents issues on the concept of indigenous knowledge while sections four and five illustrate the research methods and study area and the results and discussion. The last section considers the conclusion to the study with some recommendations.

The Modernised Mixtures Approach (MMA)

The modernised mixtures approach (MMA) to waste management (Oosterveer et al., 2010; Spaargaren et al., 2006) is a conceptual framework for identifying more adequate and sustainable solutions to sanitation problems in cities of developing countries. The MMA refers to the development of medium and large scale environmental infrastructural systems which build upon and are constructed from decentralized and centralized units, and which take into account specific local conditions of developing countries. MMA integrates technological, economic and social dimensions of environmental infrastructures (Spaargaren et al., 2006). The MMA argues for the inclusion and integration of technical and social-scientific knowledge when designing sanitation solutions in specific settings (Hendriksen et al., 2012).

Since the 19th century industrial revolution, most towns and cities in developed countries have constructed large scale, central grid sewage systems which connect houses to a waste water treatment for processing and discharging waste. Solid waste collection and treatment systems in some developing countries and cities, such as Nairobi (in Kenya) and Karachi (in Pakistan), also followed this rationality of centralised organisation and treatment, mostly ending in sanitary landfills or large incinerator plants called the centralised system (Figure 1). All connected households pay substantial amounts of money for the development and maintenance of the system (Oosterveer et al., 2010).

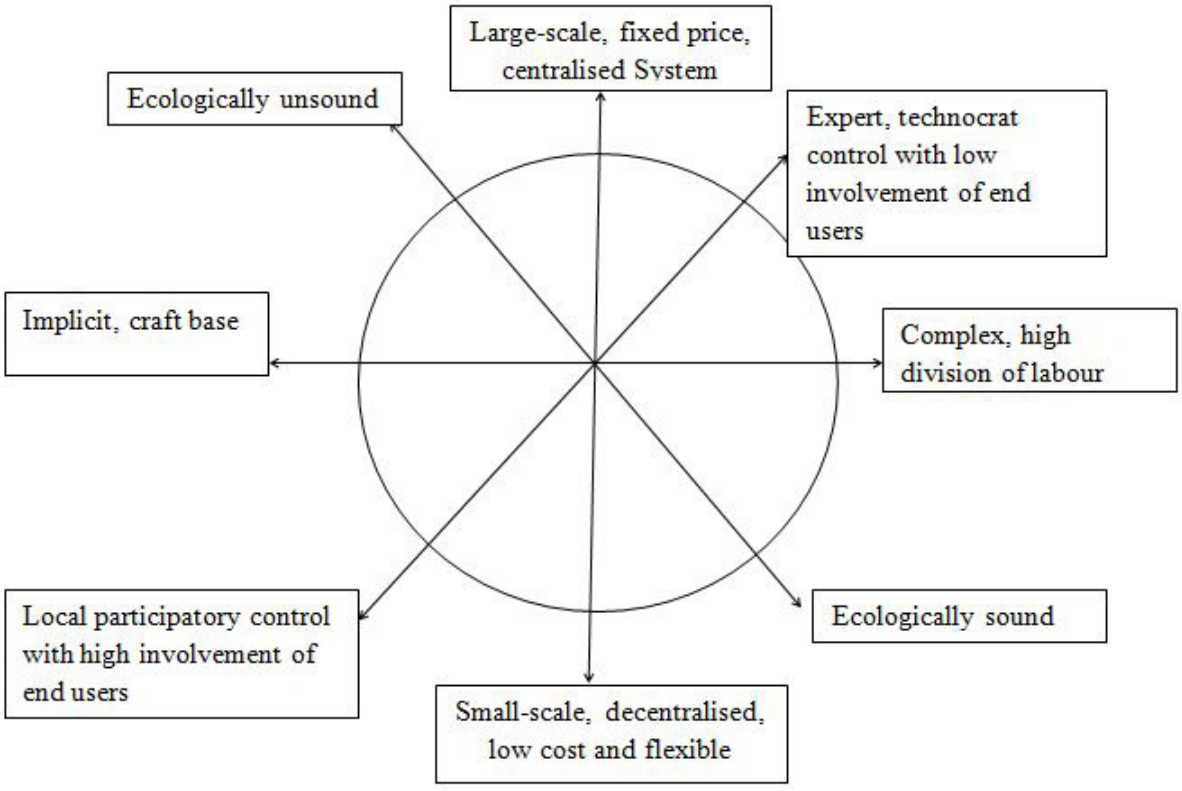

Figure 1: Centralised and decentralised systems with the various dimensions of environmental infrastructure.
Source: Authors, adapted from Spaargaren et al., 2006.

On the other hand, there are the small-scale, low cost and decentralised systems (Schumacher, 1973), usually practiced by rural and urban households in developing countries, such as Bangladesh, India and Indonesia. The decentralised systems are less technology dependent, low cost, and locally available materials and simple

technology can be used. They consider issues of waste collection, composting technologies, management systems, occupational health concerns, product quality, marketing and end-user demands (Rothenberger et al., 2006). The systems also integrate indigenous systems and practices of waste management and are regarded to be much stronger, robust, cheaper and are better able to deal with environmental challenges such as indiscriminate discharge of valuable waste substances (by sorting) that can easily be recycled or reused (Lens et al., 2003). From this type of construction, small scale household composting, improved pit latrines and other decentralised systems for waste reuse (see Oosterveer et al., 2010), which are inherent in indigenous knowledge systems, are widely conceived as potential solutions for developing countries.

Applying this MMA to sustainable urban solid waste management means the introduction of an 'organized eclecticism' (Oosterveer et al., 2010), where various levels of scale, strategies, technologies, payment systems and decision-making structures, combine to create a better fitting with the physical and human systems for which they are designed. This approach (Rothenberger et al., 2006), used in Dhaka (in Bangladesh) and Mumbai (in India), is referred to as 'mixture' because it takes the best features out of both decentralized and centralized systems, and combines them into hybrid solutions which better fit into local situations. The MMA presents four key criteria to designing and assessing adequate sanitation solutions. These are ecological sustainability, accessibility and affordability (particularly of the poor), cultural suitability, and technological flexibility (van Vliet, 2006). It is a simple biodegradable waste management alternative that can be implemented on a suitable scale for any city or town. In addition to the gains described above, cities that implement this waste management approach also (Rothenberger et al., 2006):

i. Reduce municipal costs for waste management;
ii. Reduce the environmental impact of disposal sites;
iii. Improve soil quality through compost application; and
iv. Increase the yield and quality of urban and peri-urban farm products.

Ecological sustainability refers to the environmental profile of sanitation solutions, in terms of minimizing pollution (e.g., waste), minimizing natural resource use (e.g., water), and reusing valuable resources (e.g., nutrients). Accessibility relates to the extent to which all households in poor communities can make use of sanitation infrastructures and are not prevented from doing so for financial, physical, or socio-cultural reasons. Technological flexibility looks at how sanitation systems function and "behave" in times of economic, political, and climatic variability, extremes, and instability (Hendriksen et al., 2012).

Situating indigenous knowledge and practices for waste management in the MMA, it is explicit that indigenous waste management systems are purely exhibited in the small-scale decentralised systems where reuse, recycling and recovery of valuable waste materials are notable. The MMA seeks the incorporation of all relevant stakeholders (including traditional authorities) throughout the waste management process. If implemented well, MMA has the potential to lead to socio-technical arrangements of systems, institutional arrangements and payment systems that take the best features from both centralised and decentralised systems. This can be achieved by combining the features of large-scale, high-technology and technocratic approaches. Together with small-scale, low-technology and primitive participatory approaches, it can then be built into new forms in order to better fit the local conditions characterised by different spatial structures (Oosterveer et al., 2010; Hegger, 2007; van Vliet, 2006).

Indigenous Knowledge Systems (IKS) and Solid Waste Management

Human beings have for a long time been doing things that are reflective of their culture, location, experience and environment. Developed to address survival challenges (Mapira & Mazambara, 2013), indigenous knowledge systems (IKS) are a part of humanity's heritage. The IKS are home-grown and have survived the test of time, because they form the basis for local decision-making in agriculture, health, natural resource management and other livelihood activities (Wahab, 2004). Rightly put, indigenous and local knowledge is a "lived knowledge" (Intergovernmental Platform on Biodiversity and Ecosystem Services [IPEBS], 2013). This form of knowledge is local and varies from one region and people to another (Ajibade, 2007; Bhat et al., 2018) but has survived the test of time. Indigenous knowledge is, therefore, the sum total of information or practices that are based on people's accumulated experiences (Sood & Sharma, 2009). Warren (1989) defined indigenous knowledge as local knowledge which is unique to a given culture or society. Such knowledge originates in and characterizes a particular community, region or country. They vary across space and keep changing over time (Basanta, 1990) and have been shown to be a repository of knowledge about the human-environment interaction (Wahab & Ogunlola, 2014). The knowledge of indigenous peoples is usually developed to ensure their continued survival and this has been transformed over time to meet new challenges and, in many ways, remains a cornerstone today as it has been historically. Recognition of the role that indigenous peoples and their knowledge may play in addressing global environmental issues has increasingly been emerging as part of international discourse, in part through continued lobbying by indigenous delegations to the United Nations (McGregor, 2010; UNEP, 2015).

In the popular document by the World Commission on Environment and Development (WCED) in 1987 titled *Our Common Future*, the Commission reconciled with the fact that indigenous knowledge is essential for sustainable development of the world's environmental resources. The Commission indicates that local communities are the repositories of vast accumulations of traditional knowledge and experience that links humanity with its ancient origins, hence their disappearance is a loss for the larger society, who would be deprived of the opportunity to learn from their traditional skills in sustainably managing very complex ecosystems (WCED, 1987). The Convention on Biodiversity (CBD) also calls for the recognition of indigenous knowledge and institutions in any bid to conserve the ecosystem (McGregor, 2010). In Article 8(j), the Convention acknowledges that knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles are relevant for the conservation and sustainable use of biological diversity. Indigenous practices of resource management have always been used, and are still followed. The practice of indigenous knowledge transcend all human activities, including solid waste management, and are preserved for future generations, building on them for the betterment of society (Ajibade, 2007). For example, according to Wahab (2004), traditional African societies possess IKS which promote and facilitate cheap, effective and sustainable community environmental sanitation.

The declarations emanating from the international community signify a call for the inclusion of indigenous peoples and their knowledge systems in addressing environmental and sustainability challenges, particularly solid waste management in developing countries. This call represents a departure from the development model of *'experts'* designing and implementing solutions for local communities (Sillitoe & Bicker, 2004; Ross, 2018) to a state where local conditions and factors, including indigenous waste management practices and traditional beliefs (Wahab & Ogunlola, 2014; Ojolowo & Wahab, 2017) and other small-scale waste

management (and decentralised) systems are fused into the *'new'* (and often centralised) model as premised by the modernised mixture approach (UNEP, 2015; Hammed et al., 2016).

The concept of '*Sankofa'*, used in this study, is derived from *King Adinkera* of the Akan people of Ghana (Gyekye, 1987). The symbol shown in Figure 2 is based on a legendary bird with its feet determinedly planted forward and its head turned backwards. Thus, the Akan believe the past serves as a guide for planning the future (Gyekye, 2003). To the Akan, it is this wisdom in learning from the past, so as to recover its richest lessons, its most instructive models and its best practices, which ensures a strong future. In this study the '*Sankofa Concept*' proposes the need for waste managers and individuals within cities and towns, especially the poor in low-income urban areas, to go back and take useful traditional practices for effective solid waste management.

Visually and symbolically, "Sankofa" is expressed as a mythic bird that flies forward while looking backward with an egg (symbolising the future) in its mouth.

Figure 2: The 'Sankofa' symbol.

Source: Gyekye, 1987

Study Area and Methodology

The Jaman South Municipality is one of the administrative districts in the Brong Ahafo Region of Ghana. It is located between latitudes 7°75'N and 7°85'N (*approximately*) and longitudes 2°43'W and 2°30'W. The Municipality has a total land area of about 552 km^2 and about 150 settlements, most of which are rural. Of these communities, only six have assumed urban status (using a population of 5,000 or more people as the rural–urban dichotomy). Four towns, Drobo (District capital), Dwenem, Adamsu and Gonasua, which have assumed urban status, were purposively selected for the study. The aim was to demonstrate the relevance of IKS in solid waste management in these communities despite their urban status.

The paper was produced using qualitative research method, combining interviews and observations. Qualitative techniques give more detail and better understanding of the subject matter under investigation since it deals with experiences and attitudes of the research subjects. Backed by philosophical social constructivism/interpretivism, the study used a case study strategy of inquiry to explore in-depth IKS and practices in the Municipality that enhance solid waste management. In-depth interviews were carried out with 28 leaders of identified groups including youths, women, farmers and traders. In addition, eight key informant interviews were held with traditional leaders (one chief and one queen mother from each town), and four assembly members (one in each town). Table 1 give details of the interviewees.

Table 1: Respondents of the study

Category	Description	Sex		Total
		Male	Female	
1	Traditional leaders	4	4	8
2	Assembly members	3	1	4
3	Youth leaders	3	1	4
4	Women leaders	0	4	4
5	Farmer groups	4	0	4
6	Traders association	1	3	4
Total				28

Source: Field work, 2018

All interviews were conducted by the researchers in the local (Akan) language in the evening after close of work on each day. The interviews were unstructured and made use of open-ended questions on key thematic issues related to IKS and SWM. All categories of respondents were assured of confidentiality and anonymity before the interviews were conducted. The data from the interviews were synthesized into various thematic areas of the study for analyses and discussion. The analysis of data in this study was mainly narrative. To complement the primary data, extensive literature was reviewed with regards to solid waste and its management, IKS and their significance in waste management.

Results and Discussion

The traditional institutional arrangements of indigenous knowledge in the Jaman South Municipality, the various traditional/cultural practices and norms of solid waste management are presented and discussed in this section.

Traditional Institutional Arrangements of IKS

Traditional political institutions are the custodians of the IKS almost everywhere in traditional societies, and the Jaman South Municipality is not an exception. The study showed that IKSs are held in the highest order by the paramount chiefs in their respective jurisdictions. The Municipality is made up of three major paramountcies: Mpuasu-Japekrom, Drobo and Dwenem (Awasu) paramountcies. These paramountcies regulate the traditional and cultural activities of people in the District. Under each paramount chief are divisional chiefs (who head the various towns and make up the paramountcy council and assisted by queen mothers), sub-chiefs (who are also representatives of the various clans in each town), clan/family heads, and individual households (Figure 3). Even at the individual household levels, men are usually considered to be in charge of decision making, including, environmental sanitation and waste management, as heads of households.

In Figure 3, while the chiefs (and queen mothers) are the holders of IKS, the practice of such systems

always takes place at the household and neighbourhood levels often supervised by household heads and assemblymen respectively. The chiefs together with their council of elders (including women and youth leaders) make decisions concerning issues of environmental sanitation and announce them to the people for implementation.

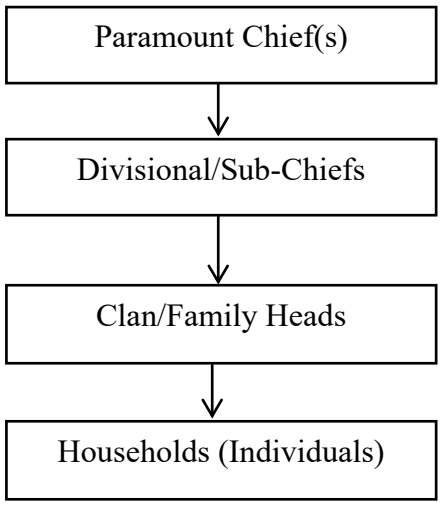

Figure 3: Institutional arrangement of IKS in the Jaman South District.
Source: Authors' Construct, 2018

There is always that command or communication channel between the chiefs and their subjects. This institutional arrangement has been practiced even before the beginning of modern civilisation and has survived intrusions. At best, they help among other things to preserve and uphold all indigenous belief systems and practices not only for waste management but also for biodiversity conservation (Ntiamoa-Baidu, 1991; Appiah-Opoku, 2007; Eneji et al., 2012; IPBES, 2013) and overall environmental management.

Indigenous Knowledge Practices (IKP) in Waste Management

Indigenous Knowledge Practices (IKPs) since time immemorial have been instrumental in waste management in households in rural communities, but with modern civilisation and knowledge, such systems have eluded present generations. The study revealed that such practices are exhibited in cultural norms and customs. Some of these valuable practices are the eclectic approaches for tackling the many solid waste management problems facing municipalities and governments. Within the Jaman South Municipality, the study found the following IKP worth rethinking *('Sankofa'*) for incorporation into domestic and municipal solid waste management systems.

Taboos

Derived from the Polynesian term *Tabu,* which means 'forbidden' (Adu-Gyamfi, 2011), taboos are the inhibition or banning resulting from social custom or emotional aversion, which are declared as sacred and forbidden by people (Diawuo & Issifu, 2015). Taboos embody oral social rules that control human behaviour. During interviews, the study found that an important taboo observed by the people and which helps in managing solid waste is the *foda* or *nkyida*. *Foda* or *nkyida* is an institutionalised day within the week where it is forbidden for people to go to farm (farming is the major occupation in the Municipality).

It is tabooed for people to visit their farms on this day as there is the belief that the gods rest on this day. Failure to do so is believed to bring curses and sometimes death to those that disregard it. As a result of this sacrilege, people used to take advantage of not working on their farms to embark on cleaning their surroundings. When asked about the relevance of *foda* for solid waste management, a 62-year farmer at Drobo indicated in an interview that:

> "It was the days that we all came together as a community embark on cleaning exercises. The day was used to clean our toilets, market squares and meeting grounds. People were even punished for not taking part by the traditional authority".

Notwithstanding the good that came with the observation of this day, its relevance has been eroded in recent times. The study observed that people do not honour or revere the day as was done before and immediately after independence. In recent times, people are found to be going to their farms on forbidden days not only to pick food stuff and fuel wood (which was somewhat accepted) but also to work the whole day. This, according to respondents, has weakened the traditional powers that sustained the practice. The reasons for the disregard of this once 'revered' day remain terra incognita. Respondents indicated that the intrusion andemphasis on modern civilisation and Christianity are the causes for the lack of 'respect' for the taboo. A sub-chief in Adamsu reacted to the abysmal recognition of traditional norms such as foda, by stating that Christianity and modern civilisation such as the urban lifestyles no longer respect the traditions and customs instituted by their ancestors. The study found that as many people now identify themselves as Christians or Muslims and profess beliefs other than African traditional beliefs means less recognition of crucial aspects of IKS and practices. The study found that, of late the only day(s) dwellers in urban areas do not work in their farms are Sundays for Christians and Fridays for Muslims. Also, as residents get used to urban lifestyles, municipal authorities and policy-makers learn about modern technologies, their attitudes and behaviours towards indigenous systems (such as *'foda'*) change. According to Diawuo and Issifu (2015:128), "modernisation, Christianity and formal education have become the greatest opposition to traditional belief systems".

Although there are challenges to the practice of taboos, the essence in enhancing communal waste management remains indispensable. When asked whether it was necessary to *Sankofa* (that is, revisit) some of the taboos necessary for waste management practices, there was an overwhelming consensus among the interviewees (most of whom have accumulated knowledge of indigenous practices due to old age, long periods of stay in communities and by virtue of being leaders) that indeed, it was about time that firm decisions were made on such indigenous systems/cultural norms and practices. Explaining why they think more emphasis should be laid on the '*foda',* an assemblyman at Dwenem indicated that:

> "….. for far too long, our chiefs and their elders have been more lenient with offenders of the various customs like the taboos".

Respondents noted that the chiefs should work with the Municipal Assembly to enact bye-laws on such useful but eroding traditions to sustain IKS and for environmental benefits.

Communal Labour

Communal labour has its roots in traditional knowledge. The study found that one of the surest indigenous ways of eradicating filth and dirt, in order to prevent the breeding of mosquitoes and other health problems,

is communal labour. Communal labour is the process of working together; a cooperative labour within a community. Indigenous people have historically been cooperating to clean their environment, and for that matter, manage wastes generated. Since time immemorial, indigenous people have used communal labour to help each other in their community within several frameworks, such as weeding on their farms and harvesting of crops. As far as solid waste management is concerned in the study area, communal labour has been used by many communities to carry out community-initiated projects, such as building of communal toilets (usually pit latrines), construction of gutters, dredging of filled gutters, and community cleaning, among other environmental sanitation tasks. Reacting to the importance of communal labour, a 42 year-old fish seller at the Gonsua market said that:

> "…… in times back, during communal labour the entire community came together to embark on environmental clean ups and construction of communal projects".

Despite the importance of communal labour in managing waste and community development, the system has not been effective recently. The assemblyman of one of the communities indicated that people these days do not attend communal labour when announcement is made. Even though most of the towns in the Municipality has information centre where times for communal labour is announced, people simply refuse to obey. Most people believe that it is the responsibility of the Assembly and Town Council through Zoomlion (a private waste management company hired by the government) to collect and manage their wastes. But the issue is, Zoomlion too is not up and doing of late. Respondents revealed that, the ineffectiveness of communal labour has resulted in open defecation, which it is believed has dire consequences on the health of people.

Government's attempt to revamp the spirit of communalism in its national sanitation programme (through a national sanitation day) has not yielded any meaningful results as the programme is marred by corruption and politicisation. Diawuo (2017) asserts that the national sanitation day which was supposed to be on the first Saturday of every month was nothing but a political gimmick. The study found that the lack of commitment to communal labour in communities has significantly contributed to filth, obscenity and trash. When asked whether it would be prudent to *'Sankofa'* this traditional practice, the assemblyman at Drobo responded in the affirmative by stating that:

> "….. if only we could understand the spirit of togetherness. It is about time we revisited some of these very important systems to help us live in a clean environment".

Respondents, therefore, called on the Municipal Assembly to enact bye-laws which incorporate indigenous knowledge systems to make communal labour in the various communities compulsory for sustainable solid waste management and development.

Household Composting

The study showed that the commonest form of composting practiced by both rural and urban dwellers is shallow pit composing. The practice is undertaken by households on small-scale basis using animal faeces and food remains. In traditional waste management literature, the common IKP in many parts of the developing world is the composting of organic wastes from food, farm residue, animal faeces, dead plants and animals (Ajibade, 2007). Composting involves either burying easily degradable items in shallow pits (Izugbara & Umoh, 2004) or leaving organic waste in a container, wet with some water, stirred and left for

some time to decompose (see Plate 1).

Plate 1: A farmer practicing composting for backyard gardening
Source: Field work, 2018

This practice is particularly linked with the MMA of incorporating centralised and decentralised systems. Narrating how composting is done on a small scale, a farmer who has been practicing the system for over 30 years had this to say in an interview:

> "You only need a pit, maybe 50 cm depth and 50 cm width. Usually, the size of the pit depends on the capacity of the person involved. You then fill the pit with organic waste, usually kitchen waste or garden waste. The pit is then covered with soil to prevent bad smells when it is full. Usually water from domestic activities is channelled into dug pits together with the waste. It takes between 3 to 4 months for the wastes to decompose. The pit is dug open and the (rich) humus soil from them is used as fertilizers in surrounding household farms and home gardens. The rich decomposed soil is usually a dark brown fertile soil".

The practice described above has a lot in common with what Izugbara & Umoh (2004) identified in Nigeria. Izugbara & Umoh (2004) stated that very often, economic trees such as orange, raffia palm, coconut, banana, and plantain are planted atop such pits. The study, however, noted that although composting does not totally apply to the management of all solid wastes generated within households (only bio-degradable wastes are composed), to a large extent, it helps deal with the problem. The organic compost (fertilizer) generated from this indigenous practice supports smallholder farmers who cultivate vegetables and root crops around their homes. Interview with some respondents revealed that food remains do not go waste in their homes. From the peels of cassava, plantain and yam, everything is reusable.

The practice, although may seem new, has its roots in traditional knowledge systems. From practical observations, the study realised that not many households were practicing composting as organic household wastes were sent to dumping sites without the thought for reuse. A practitioner of household composting urged more households to take part in the process because the practice has the potential of not only helping in waste management but also will help boost their agricultural production, which is consistent with Rothenberger et al. (2006).

Waste Conversion

Converting waste materials into reusable items is an innovative way of reducing the amount of waste in the environment. The study found that conversion is another useful indigenous knowledge and practice of waste management. Waste conversion, also referred to as waste recycling, involves the use of all non-degradable forms of solid waste materials including metals. As a craft-based (decentralised) system, conversion in the form of indigenous blacksmithing converts by melting old (scrap) metals and using them to construct new desired items (knife, cutlass, hoe, axe, spoon, etc. [see Plate 2]). However, this practice is challenged by importations of similar products from cheaper sources into the country. This is also the case with other non-degradable waste items such as bottles which are re-used in their original form. The study found that local farmers and households use waste gallons commonly referred to as '*Kuffour gallon*' to store and fetch water. Similar to Izugbara & Umoh's (2004) report from the Ngwa of Southern Nigeria, people in the Jaman South District also use bottles to decorate graves, preserve seeds, and to store beads, hooks, trinkets, etc. In other instances, plantain peels are left to dry and used to produce local soap called '*amonkyem'*. Interestingly, waste cans and tins (such as milk, milo, etc.) are used for producing local items such as lanterns (for lighting), funnels, and bread baking pans. Used tyres are also converted to produce slippers and ropes for drawing water from wells.

Plate 2: A craftsman producing a hoe (left) and some 'blacksmithed' products (right)

Source: Field work, 2018

Food for Domestic Animals

The last but not least traditional practice of managing MSW is identified in the Jaman South District is recycling of food and yard wastes to prepare food to feed animals or other forms of processed food. For instance, yam and cassava peals, farm weeds and leftover farm fruits are used directly to feed domestic animals like goats, sheep, cattle and pigs. Generally, respondents indicated that they fed their animals with household wastes. One interviewee, who had 20 goats and 17 sheep, revealed that, almost every day the animals ate from household wastes. Another interviewee, a 61-year old pig farmer reminisced how people

got to know him through the collection of household waste:

> "I used to go out in the evening from one house to another picking cassava and plantain peels for my animals. At times, when I wasn't able to go round, some women would keep the peels for me till I went to pick them. Because of my age, of late I send my kids to pick the peels. It really helped when I started the pig farm and it continues to help me today".

The practice not only helps manage kitchen wastes but also enhances environmental sustainability. The idea is that fresh leaves that would have been cut to feed the animals are left untouched and preserved.

Conclusion

This paper has explored the relevance of traditional and indigenous ways of solid waste management in urban areas of Ghana, using the Jaman South Municipality as a case. The exploration was based on interviews and personal observations. The result has demonstrated the significant role played by indigenous knowledge practices such as taboos (*foda or nkyida*), communal labour, food production (through composting and livestock feeding) and conversion of wastes into productive tools and other material assets. These waste management practices have existed from time immemorial and have been part of communities' ways of life. Generally, the awareness and essence of IKS and how important they are managing wastes have not eluded communities, but they have become difficult to implement because of modern (urban and religious) lifestyles and the adoption of modern technologies by municipal authorities and policy-makers. The use of traditional waste recycling technologies is also threatened by importation of similar products from cheaper sources. First, the paper recommends studies and documentation of IKS, by district/municipal/metropolitan authorities, in waste management throughout the country, especially in urban areas where waste management problems are immense, to promote reuse, recycling and reduction of waste substances. Second, awareness creation should be on the agenda of the Ministry of Local Government and Rural Development (MLGRD) concerning the importance of IKS for waste management. This can be made possible by incorporating the concept of IKS (using a *Sankofa* slogan) into environmental education.

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