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Attitudes towards plastic waste management in the Ga East Municipality of Ghana

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Abstract

The management of plastic waste has been a major environmental problem across countries. The study therefore sought to explore people's attitudes towards plastic waste management in the Ga East Municipality of the Greater Accra Region of Ghana. Descriptive survey design was adopted to collect data from 120 residents of the Municipality through interviews. Descriptive statistics and factor analysis were used to analyse the data. The results indicated that residents were adequately aware of the environmental implications of indiscriminate plastic waste disposal. However, their attitudes towards plastic waste reuse do not support environmentally friendly methods of managing waste. It is recommended that the Municipal Assembly should also broaden educational campaign objectives to include educating residents on re-use, plastic waste reduction techniques, and source separation of waste.

Keywords: Plastic; Waste Management; Attitudes; Ga East Municipality

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1. Introduction

Plastics may be one of the greatest developments to have improved human life in the twentieth century (Barnes and Milner, 2004). Plastics have replaced natural materials, as a cheaper and more cost-saving option, and also a quicker way to package food and carry shopping. The relevance of this assertion is emphasised by Arsova et al. (2008) that plastics are lighter and more durable, mouldable, hygienic, and economic. The European Bioplastics (2008) and Mooney (2009) therefore maintain that plastics have brought economic, environmental, and social advantages. It is estimated that plastics save 600 to 1,300 million tonnes of carbon-dioxide emissions through the replacement of less efficient materials, fuel savings in transport, contribution to insulation, prevention of food losses and use in wind power rotors and solar panels (Bioplastics, 2008).

In contrast, Hopewell et al. (2009) assert that the popularity of plastics has also meant a rise in plastic waste, which brings its own economic, environmental, and social issues. They add that the environmental problems from plastic waste are exacerbated by general property of plastics to be durable and non-biodegradable. When improperly disposed, plastics gather around the city, choking drains, threatening small animals, damaging the soil, and polluting the beaches. Attitudes are referred to because, they have been found to influence certain subjective norms, which translate into behavioural patterns (Aoyagi-Usui et al., 2003). Individual or group awareness and attitudes towards waste generation and management are therefore critical in the effort to respond to the waste management challenge (Rahardyan et al., 2004).

Behavioural patterns on the other hand can be influenced through education, awareness creation of the consequences of particular behaviours, and laws and policies, which place legal implications on certain behaviours (Ajzen and Fishbein, 1980). Environmental values, situational characteristics, and psychological factors together play a significant role in the prediction of waste management behaviour (Barr et al., 2001). Common attitudes need to be shaped towards waste reduction, recycling, and re-use. A critical limitation on shaping waste management attitudes would be the lack of or inadequacy of facilities, such as recycling facilities or alternative methods to reduce waste. The availability of these facilities would support awareness campaigns and implementation policies aimed at controlling environmental problems emanating from plastic waste.

Amankwah (2005) asserts that in Ghana, the majority of post consumer waste generated in the country are plastics and other polymers, such as plastic bottles, polythene bags, water sachets, and wrappers. The Ga East Municipal Assembly (2006) estimates that 134.25 tonnes of plastic waste is generated within the municipality every month. The plastic problem is compounded by the inadequate machinery and equipment by the Assembly and the private collectors. Thus, waste management behaviour among domestic and industrial waste generators may be a likely cause of waste and plastic waste management problems within the municipality. The study thus seeks to explore the persisting environmental attitudes and plastic waste disposal behaviours of residents of the Ga East municipality. It is so pertinent to find out by what means are residents informed about the environmental impacts of improper plastic waste disposal and how their awareness influence their attitudes and environmental behaviours.

The rest of the paper is made up of the theoretical and conceptual discussions and the methodology that underpinned the study. These are followed by discussion of the results or empirical evidence. The paper ends with conclusions and discussions of the policy implications.

2. Literature review

Several theories have been proposed to explain the fundamental relationship between human attitudes and their choice of waste management. Some theories focus on explaining attitudinal motivation towards waste management and attitudinal change from improper waste management techniques. The study draws on the tragedy of the commons (Hardin, 1959) and the theory of attitude formation and change (Katz, 1960) to explain peoples' attitudes towards waste management and their environmental behaviours.

The Tragedy of the Commons (Hardin, 1959) analyses environmental management from two conceptual viewpoints. The first describes a case where individuals in society seek to maximise their individual utility in a communally owned property, thus leading to the depletion of that resource. The second conceptual dimension describes a case of societal members neglecting their environmental responsibility of public resources, leading to pollution of communally owned resources. Thus, each individual in society is locked in a cycle of neglecting his/her responsibility to the commons (environment). The commons therefore becomes the society's cesspool. According to the theory, using the commons as a cesspool does not harm people under frontier conditions because of their low population (Kreps, 1990). However, the same behaviour in the metropolis is unbearable because the combined effect of each member within the metropolis is much greater. The Tragedy of the Commons is therefore a problem of large population.

The theory of attitude formation and change developed by Katz (1960) aims to find out why people think the way they do and how do they change their minds. In the fundamental sense, the theory aims to answer the question: why do people hold particular attitudes? According to the theory, any attitude is a hypothetical or latent variable rather than an immediately observable variable. Attitudes are, in other words, abstractions.

Green (2002) asserts that the concept of attitudes does not refer to one specific act or response of an individual, but it is an abstraction from a large number of related acts of responses. The theory asserts that attitudes are characterized by response covariation. In this respect, attitudes are identified as enduring syndrome of response consistent with regard to a set of social objects (Jones, 1998). For example, if society wants a clean and tidy environment, the practice of indiscriminate waste disposal will be seen as a negative attitude towards waste disposal. If society felt otherwise about the tidiness of the environment, indiscriminate waste disposal attitudes will go unnoticed.

According to Cohen (1964), opinion is the verbal expression of an attitude therefore one way of changing people attitudes is to change their opinions. The implication is that every opinion, even that which is most discrepant with the individual's life pattern, is an expression of an underlying attitude (McGuire et al. 1985). According to Wood (2000) and Cialdini (2008), attitudinal change or opinion change is a type of change in which the change agent exercises social influence. They emphasise that the degree of influence depends on the importance that the subject attaches to opinion-change as a means of attaining ones goal, readiness or

unreadiness to accept a particular opinion, and the power of the influencing agent as, for example, the prestige of the value carriers.

The particular conceptualisation of plastic waste management and the acceptance of adopted approaches in people's personal concept of plastic waste management are important to attitudinal formation and change with respect to plastic waste management (Arcury, 2000). The most common concept infused into plastic waste management is that of sustainability in the waste hierarchy. Hopwell et al. (2009) however assert that the waste hierarchy has taken many forms although the underlying concept borders on waste minimisation. The hierarchy presents a pyramid with the most favoured option of plastic waste management at the apex and the least favoured option at the broader base. The hierarchy places prevention at the apex of the pyramid, followed by minimisation (reduction), re-use, recycling, energy recovery, and at the base, disposal.

At the individual level, waste reduction, re-use, and recycling have been given much publicity (Arcury, 2000). Individuals are also encouraged to re-use elements of the discarded item. Re-use initiatives include hand-me-downs, garage sales, composting, regift, and upcycle (Tucker and Douglas, 2006). Widdicombe and Peake (2008) maintain that plastic waste management is basically a welfare and development matter and it is commonly accepted that public participation is essential for its success. This usually entails the involvement of all categories of people on the identification of their felt needs, mobilisation of resources, and deciding on the direction and execution of programmes and projects. It should take place at all levels of planning and management, including training, problem identification, implementation, monitoring and evaluation.

Attitudinal change in plastic waste management, according to Arcury and Johnson (1995) may also occur through the process of awakening and raising people's sensitivity to plastic management concerns. They emphasise that awareness can be created through formal and non-formal education with the assistance of both the print and electronic media. Environmental education with respect to plastic waste management, both formal and non-formal, is vital to changing people's attitudes to appreciating a clean and safe environment, and leads to their empowerment in enabling them to manage their wastes sustainably. It also creates responsibility among the different communities, increases environmental accountability and governance and encourages the rational use of plastics.

Capacity building and technology support issues are important in ensuring that the appropriate plastic waste recycling solutions are used in industrial, manufacturing and market activities (Kalantari et al., 2007). According to Arcury (2000), component activities of technology support include measures, such as undertaking of a technology needs assessment; development of a data bank of plastic waste recycling technologies and contacts of technology suppliers; training of youth groups in techno managerial skills and technology upgrading; setting up of a plastic waste recycling technology service centre, and publishing a waste minimisation, reuse, and recycling guide for plastic waste generators.

According to Defra (2009), capacity building can strengthen and expand community-based plastic recycling initiatives for effective plastic waste management. A comprehensive recycling approach would however, involve setting up drop-off centres for recyclable materials and effective information dissemination to make the public aware of recycling opportunities available to them.

Based on the preceding literature review, the following research questions were formulated to be explored in relation to the residents of the Ga East Municipality.

1) What is the awareness of household heads about plastic management practices?
2) What are the factors that influence people's attitudes towards waste management?
3) What factors influence the choice of mode of plastic waste management?
4) What are the challenges to proper management of plastic waste?

3. Research methodology

The study was conducted in the Ga East Municipality. A descriptive design was adopted because the study sought to ultimately describe the pertaining attitudes of Ga-East Municipality residents towards plastic waste management. A cross-sectional design was also adopted because, the study aimed to explore persisting practices and attitudes of managing plastic waste among Ga-East Municipality's residents and attempt to examine the underlying reasons for findings at one point in time (Levin, 2006).

The study population covered the residents of the Ga-East Municipality. According to Ghana Statistical Service (2000) the total number of households within the Municipality as at the year 2000 was 17,430 with a growth rate of 4.2 percent. The projected population for the year 2012 was therefore 90,636. The target population therefore included 90,636 household heads. The study sample was determined using the Krejcie and Morgan (1970) sample size determination table. According to the table a sample of 384 was derived from population of 90,636. The study employed a systematic random sampling technique to select the sampling units. First, the list of all households within the Ga East Municipality was obtained from the Ghana Statistical Service (GSS). This formed the sampling frame. The starting number was randomly generated using Q-Basic computer software to randomly generate one number for 1 to 90,636. The sample fraction was determined by dividing the target population by the required sample size. This will yield a figure of 236. This represented the interval with which all 384 respondents were sampled. However, due to time, financial and other logistical constraints, a sample of 120 was used for the study. Sarantakos (2005) indicates that a homogeneous population does not need a high sample size. Thus, the 120 used for the study was found to be appropriate.

Questionnaires were used to collect data from residents of the Ga East Municipality on their attitudes and practices of plastic waste management. The questionnaire was divided into four sections: from A to D. Section A solicited data on the demographic data of respondents. Section B covered data on the awareness of respondents of the effects and other concerns of plastics in the environment. Section C sought data on the factors that influence the choice of modes of plastic waste management among respondents and Section D solicited data on the challenges respondents face in plastic waste disposal.

Factor analysis from Statistical Product and Service Solutions (SPSS version 16) was used to describe the factors that influence attitudes towards waste management. Relationships between demographic data and other variables such as common waste management practices were established using appropriate tools such as chi-square and correlation. Other relationships between level of awareness on specific waste management

concerns and the resultant choice of disposal methods were drawn using chi-square. The functional attitudes of respondents were deduced from opinions on specific waste management issues.

4. Results and discussions

Results of statistical significance and practical importance are explained with respect to the attitudes of residents of Ga East Municipality towards plastic waste management. This was done in order to answer the research questions.

4.1. What is the awareness of household heads about plastic management practices?

According to Hopewell et al., (2009), variations in plastic waste management are often associated with variations in the awareness of the effects of plastic waste on the environment. People's awareness of the effects of plastic waste and also of the proper waste management mechanisms may therefore influence their attitudes and practices of plastic waste management. To this effect, the study explored the prevailing awareness of household heads of the Ga East Municipality of plastic waste management.

The general perspectives of household heads on different awareness issues about plastics were examined using the modes of responses, where the modes represented the response with the highest frequency. Thus, the modes were taken as the general responses of respondents. The results as shown in Table 1 depict that generally respondents disagreed to the assertion that plastic waste has positive effects on the environment.

This perspective was in line with literature in plastic waste management (Kalantri et al., 2007) that portrays plastic waste as a menace to the environment, especially when they are improperly managed or disposed. Thus, it could be asserted that respondents rightly concluded that plastic waste has no positive effects on the natural environment, using a five scaled Likert scale.

It was also revealed that the general responses of household heads in the Ga East municipality concluded that burning plastic was unsafe to the environment. This assertion is confirmed by research (Hopewell et al., 2009; Kalantri et al., 2007) that conclude that burning plastics release some compounds, which can have detrimental effects on the ozone layer and also have repercussion on water bodies, aquatic life, and plants when those chemicals are transferred back from the atmosphere as rain.

Respondents were also generally of the view that burning plastics was a better alternative to other management techniques. Thus, although respondents were of the view that the burning of plastics is harmful to the environment they might continue to burn plastics under the assumption that the practice of burning plastics is a better alternative to other forms of plastic waste management, such as dumping them in the soil. According to literature recycling plastics is one of the safest methods of plastic management. The study revealed that respondents strongly agreed that plastics can be recycled. Thus, the reason for their choice to burn plastics may be due to inadequate or unavailable avenues to recycle plastics.

Table 1. Awareness of residents of proper plastic waste management

Issues	Mode	Mean	s.d
Plastic waste has positive effect on the environment	4	4.02	0.634
Burning plastic waste is safe to the environment	4	3.51	0.961
Burning plastics is a better alternative to other management techniques	2	2.51	1.037
Plastics can be recycled	1	1.23	0.706
Recycled plastics are not hygienic as primary plastics	2	2.97	1.108
Plastic re-use can have negative effects on the secondary user	2	2.78	0.955
There are no better alternative to household plastics	4	3.69	0.771
Plastics waste have no harmful effects on the atmosphere	4	4.27	0.649
Plastics waste have no harmful effects on the soil	5	4.48	0.697
Plastics waste have no harmful effects on wildlife	5	4.44	0.719
Plastics are hygienic and cost effective	2	2.41	0.794
Plastics are easier to use	2	1.95	0.532
Plastics are more durable and are a better alternative to paper	2	2.27	0.749
Plastics can be decomposed naturally	5	4.87	0.494

Scale: 1 = Strongly agree; 2 = Agree; 3 = Indifferent; 4 = Disagree; 5 = Strongly disagree; n = 120

Source: Field survey, 2013

Generally, respondents were aware that plastics are recyclable, but the general response also asserted that recycled plastics are not as healthy as primary plastics. This indicated that residents might be hesitant to purchase recycled plastics, as they generally stigmatise recycled plastics as less healthy. This stigma of recycling among residents can also have some extent of effect on the viability of recycling companies in the municipality. The preference for plastic as a better alternative may also be influenced by the fact that residents generally agreed that plastics are easier to use, and are more durable and a better alternative to paper. These assertions are confirmed in literature (Tucker and Douglas, 2006) that plastics are more durable. However, environmental concerns raised on the use of plastics suggest that it is more environmentally sound to use paper where applicable, to replace plastics.

4.2. What are the factors that influence people's attitudes towards waste management?

The study used factor analysis to determine the most important prevailing idea of plastic waste and its management that are most likely to influence people's attitude towards plastic waste management. These represented the ideas that influenced respondents' attitudes and practices of plastic waste management within the municipality.

Fourteen (14) items on the awareness of respondents about environmental implications of indiscriminate plastic waste disposal were subjected to Principal Component Analysis (PCA). An inspection of the correlation matrix revealed the presence of many coefficients of 0.3 and above, indicating that the data does not violate correlation strength assumption. The Kaiser-Meyer-Oklin value was 0.653, exceeding the recommended value of 0.6 and the Barlett's Test of Sphericity was significant (p-value =0.000<0.05), supporting the factorability of the correlation matrix. PCA revealed the presence of 6 components with Eigen values exceeding 1, explaining 17.5 percent, 13.0 percent, 9.9 percent 9.2 percent 8.2 percent, and 7.2 percent of the matrix respectively.

An inspection of the screeplot revealed a clear break after the third component. Using Catell's scree test, three components were retained for further analysis. This was further supported by the results of Parallel Analysis which showed only four components with Eigen values exceeding the corresponding criterion values for a randomly generated matrix of the same size (14 variables x 120 respondents).

The three components explain approximately 40.4 percent of the matrix. Table 2 presents the results of the factor analysis for the awareness of residents about the environmental effects of plastic waste. According to source, all eigenvalues above 0.3 are considered as high values. The results show that all the factors for awareness had eigenvalues above 0.3 except the perception that plastic reuse can have negative implications on the secondary user. This means that all the variables, except for the perception that plastic reuse is harmful to secondary users, has an influence on people's attitudes towards plastic waste management.

The eigenvalues show the magnitude of influence that each factor has on the attitude of respondents towards plastic waste management. The results show that the most influential perception of plastic on attitudes towards plastic waste management was the idea that plastic waste has no harmful effects on the soil (eigenvalue = 0.793). The fact that household heads strongly disagreed to the assertion that plastic waste has no harmful effects on the soil suggests that the actual practices of household heads, with respect to plastic waste management, will reflect their awareness that plastics are harmful to soils.

It is therefore expected that households head will practice safer modes of plastic waste management other than indiscriminate dumping. The next most important factor influencing respondents' attitudes towards plastic waste management was the notion that burning plastic was not safe to the environment (eigenvalue = 0.757). This suggested that the attitudes of respondents towards plastic waste management can be explained by their general awareness that burning plastics is not safe to the environment. Given the fact that earlier findings confirm that most respondents disagreed to the assertion that burning plastics is safe to the environment, it is expected that respondents would not practice the burning of plastics.

Table 2. Varimax rotated function for the factors explaining individual attitudes towards plastic waste management

Factors	Component		
	1	2	3
Plastic waste has positive effect on the environment	0.000	.359	.128
Burning plastic waste is safe to the environment	0.218	.002	.757
Burning plastics is a better alternative to other management techniques	0.048	-.315	.741
I am aware that plastic can be recycled	-0.012	-.089	-.509
Recycled plastics are not hygienic as primary plastics	0.756	-.059	.064
Plastic re-use can have negative effects on the secondary user	-0.212	-.222	-.259
There are no better alternative to household plastics	-0.048	.077	.316
Plastics waste have no harmful effects on the atmosphere	0.708	.096	.027
Plastics waste have no harmful effects on the soil	0.793	-.114	.130
Plastics waste have no harmful effects on wildlife	-0.084	.684	-.050
Plastics are hygienic and cost effective	0.273	.437	.361
Plastics are easier to use	0.196	-.329	.011
Plastics are more durable and are a better alternative to paper	0.093	.713	.042
Plastics can be decomposed naturally	0.405	.481	-.191
Eigenvalues	2.436	1.794	1.387
Total variance explained	17.5	13.0	9.9
Cumulative variance explained	17.5	30.5	40.4

Eigenvalues above 0.3 are highlighted

Source: Field survey, 2013

4.3. What factors influence the choice of mode of plastic waste management?

According to Tucker and Douglas (2006), several factors influence the choice of plastic waste management at the individual, household, and industrial levels. The literature review portrayed that these factors are related

to opportunities for waste reduction, reuse, and recycling. Therefore barriers to any of these avenues can impede choices of safe plastic management. The study therefore explored the methods of waste management at individual, household and industrial levels, the factors that influence the adoption of a particular waste management method, and the implication of these choices to the environment. Table 3 presents the examination of the management of plastic waste at the individual level.

Table 3. Factors influencing individual choice of managing plastic waste

Response	Method of management			
	Disposal in public waste bins	Disposal in streets and other places	Keeps waste in personal bags	Total
Keep clean surroundings	84(89.4)	0(0.0)	15(93.8)	99(82.5)
Unavailable public waste bins	0(0.0)	10(100.0)	1(6.2)	11(9.2)
Disposal into streets in lawless	10(10.6)	0(0.0)	0(0.0)	10(8.3)
Total	94(100.0)	10(100.0)	16(100.0)	120(100.0)

Source: Field survey, 2013

The study revealed that unanimously, household heads agreed that they produce plastic waste on a daily basis. At the individual level, most of the respondents (78.3%) noted that they disposed plastic waste into public waste bins when not at home. The fundamental reasons given for their choice of disposal was first, that they wished to keep the surroundings clean (89.4%) and then disposal into the streets was against the law (10.6%). Further examination showed that about eight percent of respondents chose to dispose of their plastic waste into the streets and other places because waste bins were unavailable in public places.

At the household level (Table 4), 70 household heads (58.3%) noted that they engaged the services of private waste collectors to haul their waste from their households. Thus, the management of plastic waste management therefore befalls the private waste hauling firms. The results also showed that 94.3 percent of household heads who engaged the services of private waste collectors chose this method because of the long distances from their houses to public dump sites.

Table 4. Factors of household choice of managing plastic waste

Factors explaining choice	Management options				
	Waste haulers	Disposal at dumps	Burying	Burning	Total
Distance to dumps	66(94.3)	1(5.6)	14(82.4)	11(73.3)	92(76.7)
Lack of recycling avenues	3(4.3)	1(5.6)	12(11.8)	1(6.7)	7(5.8)
Cost of waste hauling services	1(1.4)	4(22.2)	1(5.9)	1(6.7)	7(5.8)
No place to burn waste	0(0.0)	5(27.8)	0(0.0)	2(13.3)	7(5.8)
For easy burning	0(0.0)	7(38.9)	0(0.0)	0(0.0)	7(5.8)
Total	70(100.0)	18(100.0)	17(100.0)	15(100.0)	120(100.0)

Source: Field survey, 2013

The second most popular method of plastic waste management among household heads was disposal at public dump sites (15%). The Municipal Assembly thus becomes responsible for managing the plastic waste, which is dumped at the public dumps. The most prevalent reason for disposing plastic waste on dumpsites, according to household heads was for easy burning at the dumpsite (38.9%).

Some household heads (14.2%) also chose to bury their plastic waste mostly because of the long distance from their houses to dump sites while others (12.5%) burned their plastic waste for the similar reason that the distance from their houses to public dumps are far (76.7%). Overall, the distance to public dumps (76.7%) was prevalent in explaining the choices of plastic waste management. This presupposes that there were no or inadequate waste bins and waste collection points between houses and dump sites. Thus, one would have to travel the entire distance from house to dump sites to dump waste. It also suggests that disposal could have been the most popular method of plastic waste management if residents were given safe avenues of disposal, such as adequate waste collection bins. Largely, recycling was not options used by residents to manage waste. However, further examination showed that about 10 percent of the 120 household heads mentioned that they make a conscious effort to reduce their plastic waste, through first

shopping with baskets or bags to reduce plastic use (91.7%) and second, by repeat use of plastic bags for shopping (8.3%).

4.4. What are the challenges to proper management of plastic waste?

According to the conceptual framework, several challenges including barriers to recycling, waste reduction and reuse may prevent proper management of plastic waste. The peculiar factors inhibiting proper management of plastic waste and their level of influence were examined to inform the study about which areas to direct possible interventions to improve plastic waste management options by residents. The results are presented in Table 5.

Table 5. Challenges to proper management of plastic waste

	Challenges				
Level of challenge posed	Distance to dumpsites	Insufficient refuse bins in towns	Cost of waste mgt	Lack of avenues for re-use of plastics	Lack of recycling companies
Very high	88(73.3)*	93(77.5)	36(30.0)	48(40.0)	103(85.8)
Fairly high	1(0.8)	3(2.5)	16(13.3)	32(26.7)	12(10.0)
Neutral	5(4.2)	2(1.7)	56(46.7)	25(21.0)	4(3.3)
Fairly low	2(1.7)	2(1.7)	2(1.7)	8(6.7)	1(0.8)
Very low	24(20.0)	20(16.7)	10(8.4)	7(5.8)	0(0.0)
Total	120(100.0)	120(100.0)	120(100.0)	120(100.0)	120(100.0)

** percentages are in parenthesis*

Source: Field survey, 2013

It was revealed that distance to the dump sites posed a very high challenge to waste management for most of the residents (73.3%). Inadequate public refuse bins also posed a very high challenge to about 77.5 percent of the residents. On the other hand, the cost of waste management did not pose a challenge for a greater section of the residents, they were rather neutral to costs involved. This means that irrespective of costs, residents would still opt to contract the services of waste management firms. The most challenging factor for proper plastic waste management identified was the lack of recycling companies.

Respondents further noted that they had adaptation strategies to cater for these challenges. It was found that giving waste to management firms was the most popular adaptive strategy by residents. Next to this were burning all plastic waste (29.4%), selling to waste collectors (24.4%), and disposal at dumpsites (10.9%). Some (3.4%) also chose to burn some of that plastic waste and dispose of the rest at dump sites.

5. Summary and conclusions

The study aimed to explore the attitudes towards plastic waste management among the residents in the Ga East Municipality. It was found that household heads were generally of the view that plastic waste have no positive effects on the environment, burning plastics is not safe to the environment, plastic reuse can have negative effects on the secondary user, and plastic waste can harm the atmosphere, wildlife, and the soil. They were also generally aware that plastics can be recycled and that plastics cannot be decomposed biologically. The awareness that plastics can harm the soil was more likely than any other factor to influence the attitudes of household heads towards how they manage plastic waste. Other factors in the order of importance were the notion that recycled plastics are not as hygienic as primary plastics, and burning plastics is unsafe to the environment.

At the individual level, the desire to keep the environment clean, unavailability of public waste bins, and laws against indiscriminate disposal of plastics were the factors causing variations in the choice of modes of managing plastics. At the household level, distance to dump sites, lack of recycling avenues, and cost of waste hauling services were the major factors identified to influence the modes of plastic waste management. Residents identified distance to dump sites, insufficient public waste bins, and lack of avenues for re-se and recycling as causing high level of challenge in their effort to properly manage their plastic waste.

The study concluded that residents of the Ga East Municipality are adequately aware of the environmental implications of indiscriminate plastic waste disposal. However, their attitudes towards plastic waste reuse do not support environmentally friendly methods of managing waste. The fact that recycling opportunities are not available in the municipality may also discourage the application of their knowledge of improper plastic waste management. The factors influencing the choice of plastic waste management include unavailability of recycling opportunities, laws against indiscriminate disposal of plastics, and distance to dumpsites. At the industrial and municipal levels, these factors included unavailability of recycling options and unavailability of facilities to support other waste management options. At the household level, distance to dump sites, insufficient public waste bins, and lack of avenues for re-use and recycling were identified challenges to proper plastic waste management.

6. Policy implications

The findings of this study have implications for policymakers, practitioners (owners and managers) and the academia. The Municipal Assembly should provide more waste bins within the municipality in order to shorten the distance between houses and disposal points. This could encourage the disposal of plastic waste

at points where the waste can be easily collected by waste hauling service providers. The Municipal Assembly should also broaden educational campaign objectives to include educating residents on re-use, plastic waste reduction techniques, and source separation of waste. This could help reduce the volumes of plastics generated daily, while education on source separation can make the management of waste easier for the Assembly and waste management firms.

Further academic studies can be conducted into ways of attracting recycling firms into the municipality to support ongoing waste management practices. Further research into attitudes and practices of plastic waste in other municipalities and metropolitan areas in order to get a holistic perspective of plastic management in the country could be done to come up with suitable strategies to improve ongoing plastic management practices in the country.

References

Ajzen, I. and Fishbein, M. (1980), *Understanding attitudes and predicting social behavior,.* New Jersey: Prentice-Hall, Upper Saddle River.

Amankwah, A. (2005), *Plastic waste wahala*, Accessed on 4th July, 2011 from http://www.ghanaweb.com/public_agenda/arcticle.

Aoyagi-Usui, M., Vinken, H. and Kuribayashi, A. (2003), "Pro-environmental attitudes and behaviours: An international comparison", *Human Ecology Review,* Vol. 10, pp. 4-11.

Arcury, T.A. (2000), "Environmental attitude and environmental knowledge", *Human Organ,* Vol. 49, pp. 3-4.

Arcury, T.A. and Johnson, T.P. (1995), "Public environmental knowledge: A statewide survey", *Journal of Environmental Education,* Vol. 18, pp. 31-37.

Arsova, L., van Haaren, R., Goldstein, N. and Kaufman, S. (2008), "The state of garbage in America", *Biocycle,* Vol. 49 No. 12, pp. 22-29.

Barnes, D. K. A. and Milner, P. (2004), "Drifting plastic and its consequences for sessile organism dispersal in the Atlantic Ocean", *Marine Biology,* Vol. 146, pp. 815-825.

Barr, S., Gilg, A.W. and Ford, N.J. (2001), "Differences between household waste reduction, reuse, and recycling behaviour: A study of reported behaviours, intentions, and explanatory variables", *Environment and Waste Management*, Vol. 4 No. 2, pp. 11–23.

Cohen, A.R. (1964), *Attitude change and social influence,* New York: Basic Books.

Cialdini, R.B. (2008), *Influence: Science and practice* (5th ed.), New York: Harper Collins.

Defra. (2009), *Sustainable clothing action plan,* London: Defra.

European Bioplastics (2008), "Position paper: Life cycle assessment of bioplastics", Accessed on 3rd July, 2011 from http://www.european-bioplastics.org/index.php?id=191.

Ga East District Assembly (2006), *Ga East District medium-term development plan (2006 2010),* Accra: GEMA.

Ghana Statistical Service (2000), *Population and Housing Census 2000*, Accra: Ghana Statistical Service.

Green, S.L. (2002), *Rational choice theory: An overview*, Prepared for the Baylor University Faculty Development Seminar on Rational Choice Theory on May 2002.

Hardin, G. (1959), "Rational choice theory", *Science,* Vol. 137, 18.

Hopewell, J., Dvorak, R. and Kosior, E. (2009), "Plastics recycling: challenges and opportunities", *Philosophical Transactions of the Royal Society,* Vol. 364, pp. 2115-2126.

Jones, J.F. (1998), "The theory of attitude formation and change and its application to social group work", Retrieved on August 22, 2100 from http://sunzi.lib.hku.hk/hkjo/view/6/600138.pdf.

Kalantari, K., Fami, H.S., Asadi, A. and Mohammadi H.M. (2007), "Investigating factors affecting environmental behaviour of urban residents: A case study in Tehran City- Iran", *American Journal of Environmental Sciences,* Vol. 3 No. 2, pp. 67-74.

Katz, D. (1960), "The functional approach to the study of attitudes", *Public Opinion Quarterly,* Vol. 24, pp. 163-204.

Krejcie, R.V. and Morgan, D.W. (1970), "Determining sample size for research activities", *Educational and Psychological Measurement,* Vol. 1, pp. 23-45

Kreps, D.M. (1990), *A course in microeconomic theory*, Princeton, NJ: Princeton University Press.

Levin, K.A. (2006), "Study design III: Cross-sectional studies", *Evidence Based Dentistry,* Vol. 7 No. 1, pp. 24-5.

McGuire, W., Lindzey, G. and Aronson, E. (1985), "Attitudes and attitude change", *Handbook of social psychology: Special Fields and Applications*, Vol. 2, pp. 233–346.

Mooney, B.P. (2009), "The second green revolution? Production of plant-based biodegradable plastics", *Biochemical Journal,* Vol. 418, pp. 219-232.

Rahardyan, B., Matstuto, T., Kakuta, Y. and Tanaka, N. (2004), "Resident's concerns and attitudes towards solid waste management facilities", *Waste Management*, Vol. 24, pp. 437-451.

Sarantakos, S. (2005), *Social Research*, New York: Palgrave MacMillan.

Tucker, P. and Douglas, P. (2006), "Understanding household waste prevention behaviour: Results of the Household Attitude/Behaviour Survey", *Technical Report,* Vol. 2, pp. 27-29.

Widdicombe, H. and Peake, L. (2008), "The rise of reuse", *Resource,* Vol. 43, pp. 23-26.

Wood, W. (2000), "Attitude change: Persuasion and social Influence", *Annual Review of Psychology,* Vol. 51, pp. 539–570.