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Stirring the Stagnant Waters: the Effects of Disposal and Management of used Sachet Water Polythene Bags in the Sokpayiri Community of Wa Municipality of Ghana

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ABSTRACT [ENGLISH/ANGLAIS]

There is disequilibrium between man and his environment as a result of his economic activities. This has led to so many environmental problems. . The daily activities of humans in order to meet their basic needs and nutritional requirements for sustenance generate a lot of unwanted materials. The amount of Thrash generated from consumption of sachet water has been on the increase since the past few years throughout the country. The paper reveals that, used sachet water polythene bags are improperly disposed of and managed in the Sokpayiri community of the Wa municipality in Ghana due to inadequate logistics, machines, and personnel. As such the environmental decay that results from the improper management of this waste exposes Ghanaians to a host of socio-economic and environmental consequences. For instance, 43 personnel are required for waste management in the sokpayiri community of the Wa municipality, however, 7 personnel are available. Also, 148 logistics are required, but only 90 are available. In the past, waste management in the Wa municipality was solely done by the Wa municipal Assembly. Subsequently, a private company known as Zoomlion Ghana Limited was contracted by the Wa municipal assembly to shoulder waste management in the municipality due to inefficiency in management on the part of the Municipal Assembly. This paper presents the effects of improper disposal and management of used sachet water polythene bags in the Sokpayiri community of the Wa Municipality of Ghana, by examining the availability of logistics, machines, and personnel for management.

Keywords: Environmental effects, disposal, used, sachet water polythene bags

RÉSUMÉ [FRANÇAIS/FRENCH]

Il ya un déséquilibre entre l'homme et son environnement en raison de ses activités économiques. Cela a conduit à tant de problèmes environnementaux. . Les activités quotidiennes de l'homme, afin de répondre à leurs besoins de base et les besoins nutritionnels pour la subsistance de générer un grand nombre de matières indésirables. Le montant de Thrash générés par la consommation d'eau sachet a été à la hausse depuis les dernières années à travers le pays. Le document révèle que des sacs de polythène sachet d'eau ne sont pas correctement éliminés et gérés dans la communauté Sokpayiri de la municipalité Wa au Ghana en raison de l'insuffisance de la logistique, des machines et du personnel. En tant que tel de la dégradation de l'environnement qui résulte de la mauvaise gestion de ces déchets expose les Ghanéens à une foule de conséquences socio-économiques et environnementaux. Par exemple, 43 personnes sont nécessaires pour la gestion des déchets dans la communauté sokpayiri de la municipalité Wa, cependant, 7 personnes sont disponibles. En outre, la logistique 148 sont nécessaires, mais seulement 90 sont disponibles. Dans le passé, la gestion des déchets dans la municipalité Wa a été fait uniquement par l'Assemblée Wa municipal. Par la suite, une société privée appelée Zoomlion Ghana Limited a été engagé par l'assemblée municipale Wa à assumer la gestion des déchets dans la municipalité en raison de l'inefficacité de la gestion de la part de l'assemblée municipale. Cet article présente les effets de l'élimination inadéquate et gestion des sacs en polyéthylène utilisés sachet d'eau dans la communauté Sokpayiri de la municipalité Wa du Ghana, en examinant la disponibilité de la logistique, des machines et du personnel de gestion.

Mots-clés: Effets sur l'environnement, l'élimination, utilisés, sachet d'eau sacs en plastique

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INTRODUCTION

Solid Waste Management is a crucial problem not only for developing countries but for the developed countries as well. Enormous amount of Waste is generated throughout the world and the most crucially posed

question is how to manage these wastes effectively and efficiently to save the environment and to ensure the continuous existence of mankind.

"The problems facing developing countries in the handling of Municipal Solid Waste are not impossible to

solve but they need concerted effort from all sectors of society. An all-inclusive approach should be adopted in order to achieve any meaningful and lasting solution" [1].

According to Akunyili [2], it is the inability of the Government to persistently provide adequate potable water for the growing population that has tremendously contributed to the proliferation of the so-called 'pure water' producers in Nigeria. Thus, the quest for solutions to the dearth of potable water led to the production of sachet. The private water enterprises mainly collect their water as the end-product of initially treated water supplied by the government-owned public utilities and do little treatment such as the removal of the suspended solids to make the water produced by the Government more potable. They also do some minor treatment on water from natural springs, open wells and boreholes. Many Municipalities, cities and towns continue to grapple with the problem of Solid Waste Management and the Municipality of Wa, in the Upper West Region of Ghana is not an exception.

According to Trashy Bags (a Non-Governmental Organization) hygienic water in Ghana can be brought on the streets where vendors sell them in small sachets to the public. The sachets (0.5L) were introduced in 2004 to provide safe and affordable drinking water for customers in sachets. The sachets can be opened easily in the corners to drink from, but after usage the plastic package is discarded and usually end up on the streets or in informal trash heaps.

In the year 2006 to 2008, about 65% of the urban population patronized sachet water. However in the year 2008 to 2010 the intake has increased tremendously which is considered as economic advancement. As a result of increasing demand for sachet water, more sachet water factories have been established. These factories are really making money but forgetting of how to manage the disposal of the sachet after drinking. These pure water sachets are really causing harm to the country. When checking our waste products, pure water sachets constitute about 90% of the waste found on the streets. These sachets have choked gutters which consequently causes malaria in the country. Also, if the sachets are being burnt it goes far to destroy the ozone layer [3].

Almost every nook and cranny in Wa is littered with sachet water polythene bags. This is as a result of indiscriminate disposal of sachet water bags onto the streets of virtually every corner in Wa. The packaging of

this sachet water is made of non-biodegradable synthetic polyethylene which does not decay, decompose or corrode, and which when burnt, produces oxides of carbon, nitrogen and sulphur which can harm man and the environment. The environmental externalities caused by the disposal of used water-sachets are, therefore, of three dimensions namely, air pollution, land pollution and water pollution.

The oxides of carbon, sulphur and nitrogen, methane, particulate matter and others, produced from burning of disposed water sachets causes various health problems such as cancer, brain damage, dizziness, headache, fatigue, respiratory problem, and eye irritation. Such conditions, according to Adenuga [4] can precipitate epidemics and national health crises. When the environment is damaged, both consumers and non-consumers of sachet water are affected since the environment is exhaustively composed of the two groups. Notwithstanding the above negative externalities of sachet water production, due to the availability, accessibility and issues of packaging, sachet water for drinking is still prominent. As at 2010, there were eight (8) sachet water production firms in Wa Township. A lot has been done by researchers on solid waste management in the Wa Municipality without focusing on sachet water polythene bag waste. As such this article aims at filling the research gap on sachet water polythene bag waste management in the central business district of the Wa municipality. It also provides a baseline data for policy makers and donors who are interested in the subject matter.

MATERIALS AND METHODS

The Study Area

Wa Municipal lies within latitude 1°40' N and 2°45' N and longitude 9°32' W to 10°20' W, thus covering an area of approximately 23,474 square kilometers which is about 32% and 2.56% of the total land area of the region and the country respectively. The Wa Municipal shares administrative boundaries with; the Nadowli District to the North, the Wa East District to the east and South, and Wa West district to the West and South [5]. Sokpayiri covers an area of 841 square kilometers. The community shares borders with Kpaguri to the west, Zongo to the east, Dobile to the north and Kabanye to the south [5].

Methods

Apart from the use of documented sources, the study also generated firsthand information from the field.

Purposive and simple random sampling techniques were also utilized in the study to select interviewees. The study relied on qualitative and quantitative approaches, taken in to consideration, sources of data, sampling techniques, data collection techniques, as well as data analysis and presentation techniques. The study area, Sokpayiri community of the Wa municipality was purposively chosen due to the fact that, it is within the central business district of the Wa Municipality in the Upper West of Region of Ghana with ongoing industrial activities, cognizance of the fact that there is a link between waste generation and level of industrialization. Qualitative tools such as interviews, observation, key informant interviews, as well as focus group discussions were used for data collection. Quantitative tools namely SPSS and Excel as software for data analysis as well as tables and charts were used for data presentation alongside descriptive analyses. The study settled on a sample size of 44 based on the formular of Taro [6]

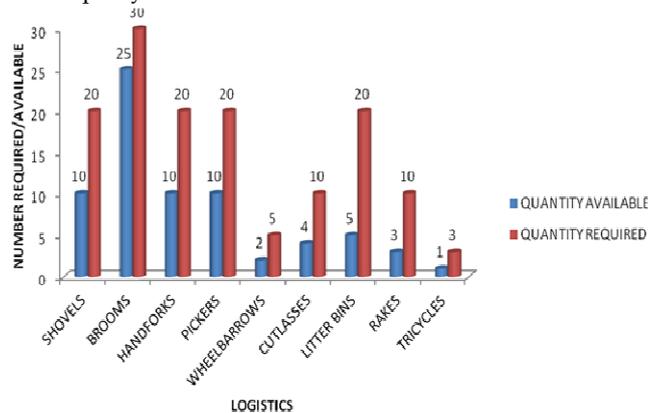
RESULTS

Equipment used in the management of sachet water plastic waste

Equipment used in the management of sachet water plastic waste in the Sokpayiri community of the Wa municipality can be categorized into three. They are logistics, machines and personnel.

Logistics used in the management of sachet water plastic waste in the Sokpayiri community of Wa municipality

Figure 1: This figure shows a graph showing logistics required/ available in the management of sachet water plastic waste in the sokpayiri community of the Wa municipality as at march 2012



Source: Field Survey, June 2012

From figure 1, the logistics which are highly required in quantity are brooms. About 30 pieces of brooms are required for efficient management of sachet water plastic waste in the Sokpayiri community of the Wa municipality. However about 83% of quantity required is available. The district requires about 3 tricycles, 20 litterbins and 5 wheelbarrows for efficient management of sachet water plastic waste, however just about 33%, 25% and 40% respectively of the requirements are met.

These logistics, although not sufficient, are currently supplied by Wa Municipal Assembly and Zoomlion Company Limited.,

Machines used in the management of sachet water plastic waste in Sokpayiri

Table 1: This table shows A table showing machines required/ available in the sokpayiri community of the Wa municipality for the management of sachet plastic waste as at march, 2012.

Machines	Number required	Number available
Roll on/off trucks	2	1
Compacters	1	0
Pick-up trucks	1	0
Bulldozers	1	0

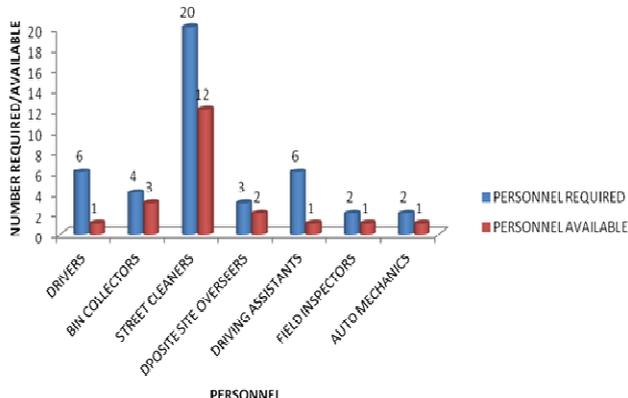
Source: Field Survey, June 2012

The community can only boast of only a Roll on/off truck. It is the only machine available in the community for the collection of sachet water plastic waste. However, the absence of compacters, pickup trucks, and bulldozers in Sokpayiri has hampered the management of sachet water plastic waste.

Personnel for the management of sachet water plastic waste in Sokpayiri

From table 2, the most available equipment is the logistics. About 62% of the total required logistics are available. This is mainly due to the fact that most of the logistics are locally manufactured and are not too expensive to acquire. On the other hand, only 20% of machines required are available in the community. These inadequacies of the machines are as a result of the fact that all the machines required are imported and hence expensive. Also the machines require specialized skills for operation. Also, spare parts to maintain these machines are not readily available when the machines break down.

Figure 2: This figure shows a graph showing the number of personnel required/available in the management of sachet water plastic waste in the Sokpayiri community of the Wa municipality as at March 2012



Source: Field Survey, June 2012

Figure 2, Presents the number of personnel required and available in the management of sachet water plastic waste in Sokpayiri. Out of the 20 street cleaners required in the community, only 12 representing 60% are available. The personnel are employed from within the

Table 2: This table shows a table showing the capacity of the institutions in the management of sachet water plastic waste in the Sokpayiri community of the Wa municipality as at March 2012.

	REQUIREMENT	AVAILABILITY	PERCENTAGE AVAILABILITY
Machines	5	1	20
Logistics	148	90	62
Personnel	43	7	16.3
Protective	47	18	38.3

Source: Field Survey, June 2012

Methods of disposal of sachet water plastic waste at household level

From figure 3, good percentages (68%) of respondents litter the streets with sachet water plastic waste on the streets while only 7% rely on an environmentally friendly way of disposing the sachet water plastic waste (reuse for nursing seedlings). More so only 9% of respondents are able to deposit their sachet water plastic waste in the dustbins provided. It was explained that the dustbins are either located at longer distances or are always full and over flooded with waste. This has accounted for the inappropriate management of sachet water thrash at the household level in the Sokpayiri, community of the Wa Municipality thereby increasing the burden of stretched

community in order to ensure prompt service delivery. Figure 1 and 2 as well as table 1 suggest that logistics, machines, and personnel for the management of sachet water polythene bag waste are inadequate leading to inappropriate management.

Factors contributing to inappropriate management of sachet water plastic waste in Sokpayiri

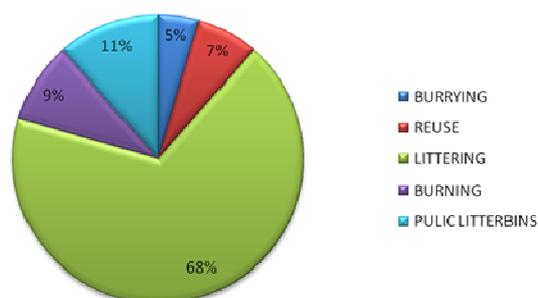
Inappropriate management of sachet water plastic waste in Sokpayiri can be attributed to a number of factors. The analysis below provides a proof of some of the factors that cause the menace.

Inadequacy of equipment and personnel in the management of sachet water plastic waste in Sokpayiri

Inadequate supply of equipment coupled with insufficient personnel curtails the ability of waste management agencies to effectively clear the heaps of sachet water plastic waste in the entire municipality of Wa in which Sokpayiri is no exception.

and understaffed manpower for waste management in the study community.

Figure 3: This figure shows methods of disposing off sachet water plastic waste at household level in Sokpayiri



Source: Field Survey, June 2012

Causes of inappropriate management of sachet water plastic waste in sokpayiri

Table 3 presents the views of waste management experts in Sokpayiri with regards to factors contributing to improper management of sachet water plastic waste. 35% of the poorly managed (littered) sachet water plastic

waste in Sokpayiri is attributable to inadequacy of logistics and personnel in the community. Again, 15% of poorly managed sachet water plastic waste in the community is due to insufficient capacity of waste management institutions.

Table 3: This table shows factors responsible for poor management of sachet water plastic waste in the Sokpayiri community of the Wa municiplaity

Causes of poor management of sachet water plastic waste	Contribution (%)
Low patronage in community clean up exercises	20
Poor attitude of inhabitants towards management of sachet water plastic waste	35
Inadequate logistics /personnel	30
Others	15

Source: Field Survey, June 2012

Consequences of inappropriate management of sachet water polythene waste

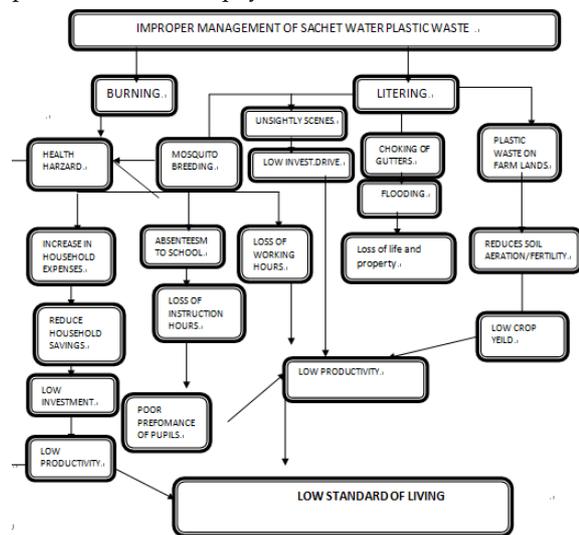
Inappropriate management of sachet water polythene waste poses a serious threat on the environment which in turn affects humanity. This consequence ranges from health, economic, even on governance.

other words an environment characterized by poor environmental sanitation scares away investors [9].

Health Risk

Improper management of sachet water plastic waste has been identified as one of the major contributory factors to mosquito breeding which consequently contributes to the prevalence of malaria in the community. The littered plastic waste tends to collect water from rains. The water collected provides a conducive breeding environment for mosquitoes and thereby increasing the incidence of malaria in the community with its attendant consequences.[7]

Figure 5: A diagram showing a chain of consequences that result from improper management of sachet water plastic waste in Sokpayiri



Disaster Risk

Littered sachet water plastic waste has been named by National Disaster Management Organization in the municipality as a number one anthropogenic cause of flooding. Littered sachet water plastic waste finds their way into the drainage systems in the community. With time the gutters gets choked. Consequently flooding occurs after heavy downpours [8]

The conceptual model in figure 5 depicts the comprehensive views of respondents and stakeholders in waste management on the possible consequences of the improper management of sachet water plastic waste on the living standard of individuals as well as on the environment. These consequences are triggered by littering and burning of sachet water plastic waste. Once sachet water plastic waste is littered or burnt, a path of consequences unfolds to impact negatively on the inhabitants, environment as well as the government.

Environmental decay and Investment Drive

Unightly environment created by littering of sachet water plastic waste has also been identified as a major disincentive to investment drive in the community. In

These consequences tend to lower the living standards of the inhabitants.

Suggestions to mitigate improper management of sachet water plastic waste in Sokpayiri

A number of suggestions have been put forward regarding effective measures of mitigating the menace. However, given the economic, political and socio cultural characteristics of the inhabitants of Sokpayiri community some of the suggestions would not be applicable.

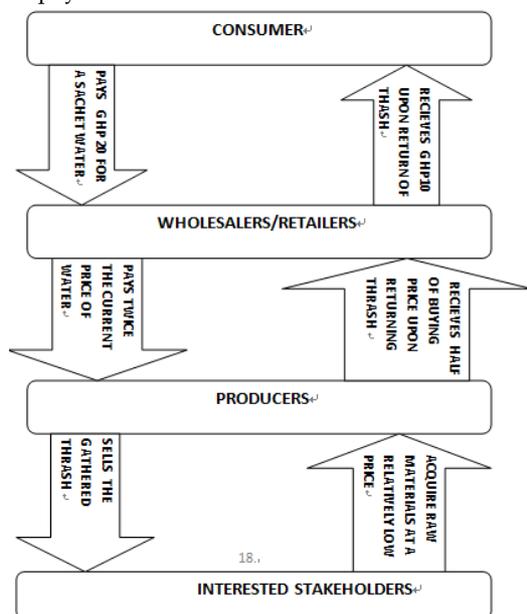
Upon deliberation with the producers, retailers and Wa Municipal Assembly, a Deposit Refund System was identified as a useful method in managing the waste as described above. In this system sachet water should be offered for sale at two times higher than the current price, when a consumer purchases at this new price, there exist the opportunity for him or her to be paid back half the price if the thrash is returned to the seller or any collection point. Interested stakeholders can now buy the empty sachets for reuse or recycling.

Table 4: This table shows suggested mitigation strategies to reverse the improper management of sachet water plastic waste

SUGGESTION	EXPLANATION
Reuse	For nursing seedlings
Recycling	Transforming thrash into raincoats, bags, etc.
Cash your thrash system	Monetary reward for sorting sachet water plastic waste
Outright ban	Ceasing producers from the use of non biodegradable material to package water.
Increase in equipments/ personnel capacity of waste management institutions	Increases the efficiency of institutions responsible for sachet water plastic waste Adequate supply of dustbins at vantage points to discourage littering
Frequent organization of community clean up exercises	To keep the surroundings of the community tidy
Use of biodegradable materials to package water	Reduce the cumulative effect of littering
Polluter pay principle	Imposition of well defined plastic pollution responsibility charges that equally target all plastic producers and retailers whose products litter the streets, as well as consumers of plastics.

Source: Field Survey, June 2012

Figure 6: This figure shows practical and composite system of mitigating inappropriate management of sachet water plastic waste in Sokpayiri



SUMMARY OF MAJOR FINDINGS

The study investigated into the equipment used in managing waste specifically sachet water plastic waste in study area in terms of categories, quantities and sustainability issues. The study identified the following categories of equipment; logistics, machines, protective wares. Also the equipment outlined is considered as inadequate leading to inappropriate management of used sachet water polythene bags.

The three players; the Government, the Firms and the households were identified by the study to have had a composite contribution to the improper management of sachet water plastic waste in the study area.

Government’s inability to device and enforce appropriate waste management regulations and resource the waste management institutions adequately have been identified to be the most significant cause of the menace.

Again the study identified households’ inappropriate waste disposal methods have also been a fueling factor to the menace.

Improper management of sachet water plastic waste imperils the livelihood of the inhabitants of Sokpayiri. These consequences range from health, education as well as the economic drives.

The study suggested a number of mitigation strategies which when carefully implemented could help arrest the menace. Upon further deliberation with stakeholders in waste management, an economic instrument 'dubbed *Deposit Refund System*' was identified as the most appropriate measure to contain the menace. This instrument is practicable by increasing the current selling price of sachet water by a margin, such that when the consumer returns the thrash to an approved point, that margin of increment is returned to him or her. This economic incentive is expected to discourage consumers from littering the thrash.

CONCLUSION

The study has made efforts to identify the drivers of improper management of sachet water plastic waste in Sokpayiri. It is clear from the study that, the menace results from inappropriate methods of disposing sachet water plastic waste by consumers. This coupled with low institutional capacity to adequately scavenge sachet water plastic thrash from the streets of Sokpayiri has resulted the aggravation of the menace.

This situation provides a conducive ground for mosquito breeding and consequently increases in the risk of malaria prevalence in the community with its attendant disaster and investment effects.

RECOMMENDATIONS

In order that the situation of improper management of sachet water plastic waste is brought to the barest minimum, the study has identified a number of recommendations which when carefully implemented could best help curb the menace in Sokpayiri. Some of these recommendations are as follows:

The Wa Municipal Assembly in collaboration with its waste management partner, Zoomlion Company limited, must strive to improve upon the numerical strength of staff and equipment used in the management of solid waste with a special attention to provision dustbins.

The Technical Institutes in the municipality and the local craft men in the metal industry should be coordinated to design and produce containers to specifications that would be very suitable for collection of sachet water plastic thrash and also to burglarproof specifications.

The information Service Department of Wa Municipal Assembly, the educational institutions, the Media, traditional authorities, and civil society organizations should pull resources together to organize community forums, lectures, radio advertisements and van announcements; all of which are geared towards educating the masses on effects of improper management of sachet water plastic waste and the need to dispose sachet water thrash in a sustainable and environmentally friendly manner.

The introduction of a form of deposit refund system that would be operationalized as follows: a weighted proportion of the levy should be introduced by the Wa municipal Assembly and made to be borne by producers of the sachet water (production pollution levy) and a corresponding weighted proportion also borne by the consumers who patronize the sachet water (consumption pollution levy). The consumer PPP levy is meant to instill discipline in consumers regarding the way they dispose the sachet water plastics and this levy is retrievable by the consumer based on a tax refund system (or cash-back), which is part of the proposed levy system.

The Wa Municipal Assembly should again collaborate with the traditional authorities in the community to set up a vigilante group-a group of young men and women who would patrol the streets of Sokpayiri to ensure that citizens do not litter the streets with sachet water plastic waste. Proceeds that would be accrued from the fines of culprits would be used solely to purchase litter bins and to reward the vigilante group.

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CONFLICT OF INTEREST

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