



NAIROBI SOLID WASTE MANAGEMENT PRACTICES: NEED FOR IMPROVED PUBLIC PARTICIPATION AND INVOLVEMENT

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ABSTRACT

In the globalized world, the current focus in municipal waste management is on the development of sustainable and integrated waste management system, where the central role would be played by the public through effective participation. The reason for this is that the traditional system of collection, transportation and dumping on land is being replaced with an often complex assortment of source separation, collection, transfer processing and landfill components due to its failure in the service delivery and environmental protection. The East African region is not an exception to this as the problem of illegal dumping of uncollected household waste is being witnessed in the major cities of the region including Dar es Salaam, Kampala and Nairobi. The public misconceptions, attitudes and behaviours have greatly contributed to this problem. This has led to increased pollution of ecological systems including water, soil, air, plants and other wildlife species. At a regional level, there is no privatization programme that has succeeded in eliminating the waste generation menace. In most cases, waste minimization strategies and goals are far from realization due the absence of public participation and laxity to enforce the existing legislation. Resource recovery, recycling practices and diversion strategies have not picked up as required due to the inadequate capacity of the City Council of Nairobi and other government complementing departments. The proper

management of solid waste has thus become one of the pressing and challenging environmental problems in the city in recent years. The objective of this paper is to present the significance of public perceptions, attitudes and behaviours in relation to the Nairobi households' waste management practices. The research methodologies utilized consisted of the waste analysis, questionnaire survey and interviewing of knowledgeable informants. The data from waste analysis has indicated increase in waste generation rate from 0.67kg/d/p (JICA 1998) to 0.85kg/d/p (Ali, 2007) representing over 20% increase in the last decade. It is estimated that the household waste forms 61% of the total waste generated in the city. The roles of the private collectors including community-based organizations are becoming vital while the public sector is expected to become a strong regulator rather than public services delivery. For example, today the Nairobi City Council collects 20%, private collector 70%, and self-disposal 18% of the wastes generated in the Lavington residential area while no formal collection exists in the Kibera slums. The study also revealed that the present city waste management practices suffer from poor governance, inefficient scientific data, not in my backyard (NIMBY) syndrome, weak public participation and absence of public awareness. The paper argues for the need to have strong public-private partnership, community participation and capacity building to enhance effective awareness building, waste source separation and recycling as strategies for an improved waste management system.



Keywords: Waste generation, public-private partnership, community participation, capacity building, source separation, recycling, sustainability

INTRODUCTION

Solid waste management is an international issue (Tchobanoglous *et al* 1993). This is because “the environmentally sound management of wastes is among the environmental issues of major concern in maintaining the quality of the Earth’s environment and especially in achieving environmentally sound and sustainable development” (UN 1992). The term ‘solid waste’ has a different meaning for different people (Winthrop, Henry, 1980). In general, one can say that solid waste is ‘unwanted’ for the person who discards it, a product or material that does not have a value anymore for the first user and is therefore thrown away. But ‘unwanted’ is subjective and the solid waste could have value for another person in a different circumstance, or even in a different culture. There are many large industries that operate primarily or exclusively using solid waste materials – paper and metals are the commonest – as their industrial feed stocks. What is being presented here basically refers to the generated solid household waste.

In the above context, solid waste is regarded both as a negative and as a useful material providing a potential source of income. It can in fact be the only free resource available to poor people, or urban dwellers, who cannot cut wood or use other common property resources available in the country. This real value of waste in many low-and middle-income urban centres is confirmed by the huge informal sector that lives from waste collection and recovery effort. There are also formal sector examples, such as sugar cane factories that sell their fibres and cane waste to paper factories which in turn produce paper out of it. Unfortunately, not all wastes can be regarded as a resource (Spooner 1921). Many hazardous and toxic materials cannot be safely recycled or reused and hence should be disposed of in a proper manner.

Concerns have grown over the years on the ever rising environmental degradation all over

the world and that there could be a remarkable negative impact on flora and fauna (Ali *et al.* 2002). This prompted the inception of the multi-environmental agreements (MEA) e.g. Vienna Convention (1985), CITES convention (1973), Montreal Protocol (1987) and Basel Convention (1989) charged with the responsibility of protecting the biodiversity against hazardous wastes, endangerment of wildlife and depletion of ozone layer, among other dangers (UNEP 1999). According to the Basel Convention of 1989, each state including our Kenya have an obligation to take measures to ensure that wastes are controlled to protect human health. The sovereign states have the right to ban entry into or disposal of foreign hazardous wastes in their country. The wastes should be disposed of in the urban centres where they are generated. This approach has been further strengthened by the Montreal Protocol of 1987. The individual waste producers can be forced to handle the waste in an environmentally friendly manner. Both domestic and international policies need to be put into practice to control environmental pollution and improve management practices. This approach has successfully worked for the reduction and elimination of Chlorofluorocarbons (CFCs) and ODS (Ozone damaging substances) and the same can be achieved for municipal solid waste.

Inadequate environmental management practices in many Kenyan cities are a major cause of diseases and are a drain on the economy by way of lost workdays, cost of treatment and cleanup activities (Ali 2007). Municipal authorities and policymakers need to act fast to address this issue. One way to contribute to improved management is to promote effective stakeholder/public participation to realize sustainable waste management systems. Sustainable household waste management provides a comprehensive interdisciplinary framework for addressing the problems of managing urban household solid waste, in the resource constrained developing countries including Kenya where quality of such services are poor and costs are high often with no effective means of recovering them.

Upgrading the coverage of the household waste management and services and increasing their efficiency is a precondition for improving the environmental quality of Nairobi City as guaranteed by the constitution and the recent EMCA of 1999. The necessity of developing a



sustainable approach to the management of the city waste is widely recognised (JICA 1998, Kibwage 2002, NEMA 2006 and Ntiba *et al.* 2006 & 2007). Kenya is now in a position where the traditional approach to waste management, a heavy reliance on the crude dumpsite, is no longer feasible. New ways of dealing with growing amounts of waste must be found (Vision 2030 document). This paper provides a guide to a sustainable approach of involving the public in household solid waste management issues by increasing environmental information that could lead to policy implementation improvements and production of public knowledge systems with key actions recommended. The approach involves planning for household waste management in a practical way by making the household waste management plan flexible and sustainable, by applying strategic planning and holistic approach.

Research Design and Theoretical Framework Approach

The study was undertaken in the four regions within the Nairobi city and based on the existing household waste management practices. The study purpose was to provide an overview by sharing waste management experience as a way to learn and at the same time influence existing practices for improvements, innovations and networking with sustainability concerns. The study follows a critical action methodology that entails a commitment to socially transformative research in which ideological and household perceptions issues are addressed in organisations (Guba 1990). The methodology is grounded in a vision of organisational change and democratic values (Fien & Hillcoat 1996).

The first one involved identifying contextual issues that constrain or enhance waste management sustainability and need for change in Nairobi city using questionnaire survey, focused group discussions, expert interviews, workshops, short meetings, journals and internet research techniques, observation and literature reviews to gather empirical evidences. The second stage entailed acting upon some of the identified issues towards sustainability change. The final stage

entailed the need for public involvement and institutionalising waste management sustainability at both central and local government levels to effect the desired change. The whole approach followed participatory research method, where I undertook a critical action research process to review and alter basic assumptions related to household waste management sustainability and need for change.

Action research as used in this study describes processes of planning, need for transformation and evaluation that draw on insider practitioner inquiry and reflection. To capture emerging issues for critical analysis, the research project frequently organized workshops in which experts were invited to give waste management policy directions and sustainability issues by allowing them to share experiences and professional knowledge with me. Good examples are the experts engaged from the Nairobi City Hall (Director of Environment), Ministry of Planning (Project Manager-Poverty Environment Initiative), NEMA (Director Compliance and Enforcements), Ministry of Local Government (Chief Engineer, Water and Sanitation) and Nairobi Bins Services (Managing Director-private waste management firm).

This approach was considered ongoing multi-dimensional learning process that seeks sustainability through adequate involvement of the key stakeholders, in order to realise improvement efforts. The waste management improvements can only be achieved through communicative action in organisations (Tilbury 2004). It is an education strategy for enabling and achieving sustainability within the waste management sector by infusing 'cultural change' to improve an internal and external understanding, thus enabling and advancing learning for sustainability. Habermas's (1984, 1987) social theory of communicative action forms the basis on which to understand organisational learning and change for environmental sustainability at the Nairobi city is based. I theorised the concept of 'organisation' simultaneously as both system and life-world according to Habermas (1987). The life-world is a differentiated structure closely bound up with cultural values and communicative practices. It is characterised by implicit assumptions about norms and values. Transforming norms and values through learning is thus essential to education for public involvement. It was through the life-world



and its institutions that environmental communication became possible through reflective understanding and learning. I have listed the environmental contextual issues that constrained sustainability of the existing practices within a systems thinking perspective (Sterling 2004).

My underlying argument is that organisations as both cultures and structures of the environmental communicative action can be transformed through public education to enhance sustainability. This study draws from both fields of environmental education and organisational studies. Socially, critical theory of environmental education (Fien 1993) has provided pedagogical assumptions underpinning sustainability change. Organisational learning and change theories (Senge 1990, Schein 2004) have provided strategies required to enable change for sustainability within a systems thinking perspective, so that all waste management related policies and laws are geared for improved implementation. The concept of sustainable waste management has been developed out of experience, to address certain common problems with municipal waste management in low-and middle-income countries in the South and also in countries in transition economies. The concept recognises three important dimensions in waste management: (1) stakeholders, (2) waste system elements and (3) sustainability aspects. The waste management hierarchy – a policy guideline that is part of many national environmental laws and policies – is also a cornerstone of the approach (ERM for World Bank/SDC, www.waste.nl). In this paper, significance of the stakeholders/public involvement for the improved household waste management practices is outlined.

Why is household waste management important?

Household waste management is important to both public and private sector because it is a visible and politically sensitive service. Inadequacies in the waste management service can have severe implications for the credibility of public administrations. Waste management absorbs a considerable share of municipal budgets and is a major provider of public

sector employment. Even larger numbers are employed in the micro sector, including the so-called 'informal waste recovery sector'. Proper management of solid waste is important for public health, environmental, economic and political reasons and therefore deserves increased attention from all sectors (Curzio *et al* 1994). Improper waste management can have negative effects on public health, the environment and natural resources.

As the population of each town including Nairobi increases, the meeting between the expanding residential areas (ERA) and the open waste dumping areas (OWDA) as it happens in the Dandora estate will be unavoidable. The meeting will definitely attract the attention of the officials especially when a substantial proportion of population mainly children falls sick due to epidemic diseases that were generously contributed by OWDA. through inhaling polluted air; or numberless domestic flies that may land on foods in nearby homes or hotels, or children eating with contaminated hands after playing in the area adjacent to the OWDA, or water drinking point contamination when it rains on OWDA and water coming from it joins to residential drinking point, which will result in a number of people to visit their toilets frequently without any medicine and lose strength (Conversation with Dr. Hassan, Senior Research Scientist from ICIPE, Mbita Research Station, 2008).

In Nairobi, Nairobi River is so heavily polluted by increased solid waste dumping that it has lost its naturalness and environmental taste (Micheka 2004). This problem of the Nairobi River is frequently being reported in the local media. But such concern is always raised when it is already too late to manage the problem. Still, the practical action toward control and rehabilitation of the affected natural resources is very minimal after too much magnification of the problem by the media houses. It is possible that a number of children who could be future bright brains for the country died due to OWDA-related epidemic diseases. Also, a reasonable amount of money that may be allocated for other development projects by both government and victims' relatives is spent on treating OWDA victims. Covered waste in front of private premises and residential areas, it is good as long as the waste can be taken immediately after the container gets full, otherwise, it will become an



eye sour and become health hazard in many aspects.

Waste elements of special concern

Hazardous waste should be a particular area of concern during assessments of waste management systems. Hazardous waste is waste that is potentially dangerous to living beings and/or the environment. Hazardous waste is produced by a variety of sources including households, large- and small-scale industries, and healthcare establishments, commercial operations like vehicle servicing, airports and dry cleaning shops and agriculture (e.g. unused pesticides, herbicides).

It is fundamentally important to know what types of hazardous waste are produced by which sources and in what quantities in Nairobi city. From my study in the city, it revealed average hazardous household waste of 1.1% (Ali 2007), although the existing methods of collection and treatment of hazardous waste have not been identified. Because of its dangerous character, hazardous waste needs special attention during collection, treatment and disposal. Hazardous waste collection from high and middle income estates is often taken care of by private firms, which is no guarantee for safe transportation and disposal. There are also numerous small enterprises that store their hazardous waste with the ordinary household waste, so it is mixed, collected and disposed of at the Dandora dumpsite, thus becoming an ecology of increasing diseases (David *et al* 1998).

Common problems encountered by the City Council of Nairobi

The City Council of Nairobi (CCN) managers face a number of common problems with regard to waste management. System failures include a lack of a comprehensive policy framework for waste management and a shortage of tools to analyse and improve efficiency, effectiveness and sustainability. A failure in the existing model of waste management means that there is nowhere in Kenya and even in the highly industrialised countries in the North – where a municipal manager can look and say “That system functions well and I could copy it”. Frequently

quoted practical problems include inadequate, poorly maintained or out of date; or too little equipment or spare parts; or equipment that is inappropriate for local conditions, all of which are exacerbated by increases in the city population and of the waste volumes. Other obstacles for waste management are connected to under-functioning staff that are not motivated or difficult to find because of low status, low salaries and difficult working circumstances.

Financial problems regularly mentioned by the CCN managers include imbalances between income and expenditure because of rising costs and inadequate revenues. Adding to the financial difficulties are inefficient and increasing costs of the waste collecting, transporting and processing facilities and disposal and collapse of the public infrastructure. Although most of the city services are decentralized, little improvements have been achieved in terms of waste management. The CCN does not find it easy to cooperate or communicate with their own citizens, who appear not to be cooperating with them. Behaviour such as illegal dumping of waste, misuse or non-use of containers, damaging and stealing communal storage containers, and resistance to service charges lead the CCN to believe that the citizens are part of the problem rather than an ingredient of the solution. The CCN managers are also likely to have problems with private enterprises, both formal and informal. Local businesses may be dumping waste on roadsides and outside of the official disposal sites. As service providers, the CCN may compete with the private collectors and be envied for their ability to raise fees for services. When businesses are involved in providing a service, they are hard negotiators and may require or pay bribes. The CCN are also unprepared to undertake the task of coordinating and monitoring the activities of the private companies. The micro informal waste collection and recycling sector is usually considered a nuisance and not seen as businesses at all and hence not formally recognised both in policy and legal systems operating (Peters 1998).

Answers without analysis

There is a tendency in the waste management practices, but also common in the CCN functions to move directly from problems to solutions without an analysis of what is actually occurring. The most obvious answers are more money or



more equipment, even when money and equipment are not the essence of the problem. As a result, public funds and equipment are used properly for improving city waste management. As result of poor management, the Dandora dumpsite is perceived to be full and the City Council of Nairobi has no waste transfer facilities (UNEP/NEMA 2005). This poses particular environmental threats such as potential pollution of water sources by dumpsite leachates and the migration of explosive gases. This situation requires regular monitoring, which presently is not happening. This is why the city waste management sector is bleeding for improvement. The sustainable waste management model driven by effective public participation always tries to avoid such perception and mistakes.

Analysis and understanding first, then problem-solving

The sustainable waste management insight is that most waste management problems have to do with something other – or more – than money and equipment. Some problems have to do with the attitude and behaviour of the citizens, waste management staff, private enterprises and waste pickers. Other problems are caused or made more serious by factors that are not technical or financial, but relate to managerial (in)capacities, the institutional framework, the environment, or the social or cultural context. In these cases, it is not money or equipment that provides solutions, but rather changing social, institutional, legal or political conditions. These entire dimensions have great influence on the existing practices of the Nairobi waste management systems. In most cases, there is no good coordination of the above aspects and hence greatly delinked from each other. It is therefore important that in the waste management concept, all these aspects are developed to reflect this reality, as a means to articulate a vision of waste management that is desired. The desired waste management model should promote technically appropriate, economically viable and socially acceptable solutions which do not degrade the environment.

The desired waste management model should promote the development of a waste management system that best suits the society,

economy and environment in a particular location. The model should commit itself to take into account the particular conditions in countries in the South, which are quite different from those in the North. The waste management models, systems and technologies in the North may open our eyes to see, but may not be suitable to copy blindly for African local conditions. The western models are capital and technology intensive, and labour extensive, like industries in the Northern industrial context. Exporting these models to the South where they may be less appropriate has proven not to be effective. There are many examples of failures of incinerators, composting plants and collection with compactor trucks. For example, compactor trucks may be dangerous to the waste scavengers who may wonder for food and recyclables in it and get sacked like waste materials (Discussion with Nairobi Bins, 2008), which may have legal implications.

Waste management model principles

The desired waste management model concept takes as a point of departure four basic principles:

1. Equity: all citizens are entitled to an appropriate waste management system for environmental health reasons.
2. Effectiveness: the waste management model applied will lead to safe removal of all waste.
3. Efficiency: the management of all waste is done by maximising benefits, minimising costs and optimising the use of resources, taking into account equity, effectiveness and sustainability.
4. Sustainability: the waste management system is appropriate to the local conditions and feasible from technical, environmental, social, economic, financial, institutional and political perspectives. It can maintain itself over time without exhausting the resources upon which it depends (Adapted from ERM for World Bank/SDC, www.waste.nl).

Equity goes beyond a moral imperative because:

1. Pollution in one part of the city ultimately affects the rest of the city, including its air



and water supply. Pollution 'travels' in the form of communicable diseases, flies, insects, rats, air and water pollution.

2. Polluted areas lead to poor living conditions, which in turn foster social unrest and anti-governmental activities. Abandoned waste is a symbol of a failed public service.
3. Unclean neighbourhoods can affect the city's economy and inhibit development. Investors will not invest in a dirty place and sick labourers have low productivity. The effectiveness of a service is the extent to which the objectives of the service have been met in practice. For example, a street sweeping service is effective if the streets are clean. Effectiveness for waste management in general means that all waste is removed, as planned and all recoverable materials are recovered. When effectiveness is limited to the city centre like it is in Nairobi, tourist areas or business districts, the overall waste management system is not fully effective. The less visible parts of the city are as important as and sometimes more important than the visible ones! (Adapted from ERM for World Bank/SDC, www.waste.nl).

The service is efficient when the benefits of clean streets are balanced by all beneficiaries paying a reasonable cost to keep them that way, using the optimal combination of labour, money, equipment, machinery and management. Sustainability refers to the ways in which resources are used and how these fit into the local culture, context and society. These resources can be human (manpower), material (equipment) or natural resources (water, air, soil). It includes distinguishing between the use of renewable and non-renewable resources on the earth. It also refers to the interplay of all the aspects, such as social and political, technical and environmental. A system is considered sustainable when it can reproduce itself without reducing the possibilities open to the following generation of systems.

Stakeholders, the first waste management model dimension

A stakeholder is a person or an organisation that has a stake, an interest in –in this case– waste management. A number of potential stakeholders are local authorities, NGOs/CBOs, service users, private informal sectors, private formal sectors and development partners. However, stakeholders in waste management differ in each city, so they need to be identified in the local context. Stakeholders have various interests and roles in their particular waste management, but they can cooperate for a common interest. Their influence (the extent to which stakeholders are able to persuade or coerce others into making certain decisions or following certain courses of action) and importance (the extent to which the problems, needs and interests of a particular stakeholder are a priority in a project or plan) varies.

In Nairobi, especially in low- and middle-income zones, many people outside of the official public workforce are involved in reuse and recycling effort to earn a livelihood. This includes:

1. Informal sector waste pickers who pick up discarded materials from streets and dump sites.
2. Itinerant waste buyers who collect and buy 'unwanted' items door to door from households.
3. Dealers, who buy, sort and sell materials.
4. Wholesalers, usually specialised in one material, who aggregate materials and compress them for more efficient shipment and who sell them to industries.
5. Recycling enterprises that process recyclables into intermediate industrial feed stocks.
6. End-user industries which purchase processed recyclables as feed stocks to make their final products.

Municipal workers are sometimes also involved in sorting the waste they collect from the households or from the streets during street sweeping and (door-to-door) collection of waste. They supplement their usually low salaries by selling



these materials to dealers strategically located along the road to the dump sites. The lower levels of the recycling chain are often called the 'informal recovery sector' because they often operate outside official structures. This sector recycles large proportions of waste produced in Nairobi city. For example, 80% of the 3000 tonnes of waste that is generated each day in Nairobi is recyclable. Small-scale and informal sector enterprises recover around 2-5% of this recyclable material (Ali 2007 & Ntiba *et al.*, 2007). In Cairo, Egypt, one third of all waste (8,000 tonnes daily in 1999) is collected, sorted and recycled by approximately 30,000 informal sector workers, called Zabbaleen. The Zabbaleen recycle 85% of all recyclable waste (Kibwage 2002). In many of the larger cities in Latin America and Asia, it is not uncommon to find 50,000 people employed in this business, in each city slightly more organised than the Nairobi ones.

The recycling and waste pickers' participation in the waste management systems in Egypt and Latin America highlights the advantageous position that Nairobi City, in particular the CCN has, as there is a wealth of information from many developed waste reduction programmes operating internationally which point the way to successful waste management strategies. The City has the opportunity to achieve a high level of performance, beyond basic compliance with national and international waste management legislation by changing our way of thinking and doing waste management business (Ali 2008). The roles of the private collectors including community-based organizations are becoming vital while the public sector is expected to become strong regulator rather than public services delivery. For example, today the Nairobi City Council collects 20%, private collector 70%, and self-disposal 18% of the wastes generated in the Lavington residential area while no formal collection exists in the Kibera slums. The study also revealed that the present city waste management practices suffer from poor governance, inefficient scientific data, not in my backyard (NIMBY) syndrome, weak public participation and absence of public awareness.

The public are the major customers of the waste management systems service. Only a small proportion of these customers (20% of the Nairobi city resident) are however typically aware of what happens to their waste, or the full extent of services being provided by the CCN, private collectors and CBOs groups. Awareness of the potential health, safety and environmental impacts associated with waste is increasing steadily in the city alongside awareness of the benefits of recycling and resource conservation. More than 60% of the city residents are aware of the negative impacts of the poor waste management practices. The existence of this awareness, needs to utilise to increase participation, consultation, education programme and campaign relevant for improved waste management services.

- **Stakeholder Participation** is a process whereby stakeholders - those with rights, responsibilities and interests – play an active role in decision-making and in the consequent activities which affect them.
- **Public Consultation:** A forum for the public to voice opinions during the planning process (e.g., in landfill sitting) and for planners to inform the public on aspects of the Strategic waste management systems plan that may affect them.
- **Public Awareness and Education Programme** is a programme designed to raise public awareness and understanding of the relevant issues, comprising a set of targeted campaigns.
- **Public Awareness Campaigns** are campaigns designed to raise public awareness and knowledge, targeting specific groups and issues of importance to sustainable waste management.
- (Adapted from ERM for World Bank/SDC, www.waste.nl)

The Nairobi City waste management systems does not have any of the above components. With increased awareness comes a new demand for improved waste management systems services where services are improved and the public are satisfied with ongoing performance. The result is likely to be a steady increase in willingness to pay for waste management systems services as a whole.

Waste management systems are not only technical, financial or organizational aspects, but affect other issues. Therefore, we should learn to involve community and other public or private



stakeholders effectively to enhance ownership and sustainability of the waste management systems. These stakeholders must be asked their opinions, inputs and concerns at several key points during the planning and implementation process, to build the levels of awareness required for improved waste management systems practices. The pace of development of waste management services will be heavily dependent on the level of public awareness of waste-related issues and participation in making improvements usually happen at the lower level. Major areas for stakeholder participation and public consultation necessary for the strategic planning include:

1. Strategic planning process
2. Participation in the development and implementation of primary and secondary collection systems
3. Community willingness to participate in the proper use of collection systems
4. Community participation in reducing overall quantities of waste
5. Determining willingness to pay by the service users
6. Landfill site selection (as part of environmental impact assessment)
7. Resettlement and compensation

Developing a Public Awareness and Education Programme

Public awareness and education (PA&E) campaigns are tools used to increase public support and participation for a particular course of action. The core idea behind PA&E is that popular support for any issue can be greatly increased if the public is fully informed of the reasons behind the action, and the intended benefits. This is particularly true for issues where non-cooperation from the public will lead to negative effects on themselves. The main objectives of a PA&E campaign are to provide information, gain public support, build the profile of the waste management and reduce quantities of waste. There are a wide range of media available around which to develop a campaign. The impact will be dependent on how well the campaign is targeted and the promotional messages

adopted. PA&E costs money - how much exactly depends on the combination of tools chosen for campaigning. PA&E options can be divided into low, medium and high cost categories, and an appropriate mix selected depending on the budget available, and likely major areas of impact. It is important, however, to not see PA&E activities purely as a cost, since a well-devised programme is likely to result in substantial savings in the medium term. PA&E is a powerful tool to help kick-start improvements to waste management systems services, combining high profile 'mass media' campaigns with well targeted local initiatives can significantly increase the profile of waste in the community, and act as a useful starting point for making sustainable improvements.

Sustaining Public Participation

The support and participation of the public will be essential to securing real improvements at the street level. In Nairobi city, the public will need to become more involved in ensuring their areas are kept clean (over 80% desired this and are prepared to participate). Full public support will only be received if a sustained improvement to the quality of services is demonstrated. For example, if secondary collection vehicles are continually unreliable, and piles of waste are left standing in streets, community participation in primary collection will deteriorate rapidly and services will fall back to their previous state. Sustaining improvements to services is essential to maximising public satisfaction, participation and willingness to pay. As the major customers of the waste management systems service, the waste management systems department should ensure that they are responsive to public needs, and work to build relationships of trust and mutual cooperation with local communities.

Communication is a key to informed public participation and simple communication on the waste management practices is fundamentally important as information to the public need to be improved if sustainable waste management and development is to be a realistic goal (<http://www.scidev.net/en/editorials/communication-is-key-to-informed-public-participat.html>) for Nairobi City. Effective waste management practices and related communication is crucial to informed and participatory policymaking. The need is becoming increasingly urgent as the city



household waste generators accelerate towards greater specialisation and complexity due to the increasing consumption and changing lifestyles. The speed of this evolution has overtaken the traditional model, under which household waste management issues was not normally and effectively communicated to the public until research results had become well established. But this trend is changing as we nowadays observe increased coverage of the city waste management problems and their impact on the city wetlands systems including the Nairobi River.

The consensus is that the information should flow to the public from the policy-makers and academicians circles as environmental issues move into the public domain as it contributes more and more to a range of policies that affect the people. Many policy areas depend on the spread of reliable scientific knowledge. For example, recent relocation plan of the Dandora dumpsite proposal to a new site has been faced with many difficulties although boosting environmental protection, energy saving and improving livelihoods. This is because the problem of the poor waste management practices has already become familiar in the Dandora estates. Nobody wants another Dandora on their backyard. It was recently acknowledged that Kenyan scientists responded inadequately to public questioning on the waste management issues with the result that inaccuracies and hearsay became commonplace (Ali, 2008). The information should get to the right and correct users. The situation in rapidly developing cities such as Nairobi could be more complicated. There is a growing public desire to participate in, if not control, policies that impact on people's lives. But this has not been accompanied by willingness on the part of the government to reveal information, or by scientists to communicate the relevant household waste impacts in an understandable way. We hope the newly proposed information bill will unlock this scenario.

The use of the media and other possible outlets (public hearings, visits, posters, church centres) to increase awareness building and campaigns are crucial for improved management strategies related to waste management, recycling, collection,

transportation, treatment and disposal. It is important to observe that the EMCA of 1999 adequately provided the opportunity for public participation and involvement during the Environmental Impact Assessments (EIA) and Environmental Audit (EA). It is fundamentally important that the city managers also involve the local residents during the approval of the development projects or change of user status facility to avoid development shocks currently happening in the city. This can best be done through holding of a public hearings. The environmental experts commissioned during such public exercise should avoid technical jargon while stating both positive and negative effects of the project using language that the audience will understand. Strong public pressure is a useful tool to bring about sustainable development and management practice for the environmental issues.

The sustainable waste management practices always encourage public participation and involvement. It has been used worldwide to develop strategies for involving the public in decisions relating to the waste management process. The city residents are ready to accept such involvement since it is done for the nature and peoples' benefit. In a survey conducted in the Lavington, South B, Kangemi and Kibera areas of Nairobi city, it was found that people were keen to participate in any waste management improvement efforts including willingness to pay for quality services. Prior communication and involvement from the start is important because it creates and boosts confidence and understanding of the issues. In promoting informed public participation in policymaking, many changes are needed — including willingness by government officials to involve the public in the environmental management and related issues to achieve effective communication and popularization of the issue. It is important to observe that priorities set by leaders are sometimes inconsistent with the requirements of the grassroots community. Effective communication, participation, consultation and awareness campaigns could to avoid such mistakes.

In Nairobi City for example, households in low and middle income believed that the local authority (CCN) should pay the waste collectors if the authority fails to render the service, over which it has legal mandate. The city residents feel that they are over charged and pay double for the household



waste collection and disposal services while the private waste collectors feel that the city's dilapidated infrastructure and congestion are wasting time, thus most of the private solid waste collectors end up taking their waste to the illegal sites (or open spaces), which do not charge user fees and are thus convenient for their operations. Presences of these illegal dumpsites within the city present potential and health risks. Professionally, the waste management systems should be driven by events and demand. When the public is involved to advance city waste management goal, they become part of it by reducing pollution, and poor practices. A wide selection from the public should be represented at such hearings, and delegates should be allowed time to express their reasonable concerns. Debates should avoid scientific jargon without sacrificing scientific content. Willingness to base suggestions and conclusions on scientific evidence — interpreted in a comprehensible way — should be adopted from the start. Reasonable public concerns should not be used to exaggerate their unproven health risk or to undermine the established understanding of their safety. Involving the public in decision-making on the waste environmental management issues is not easy. But it is an essential task for the city population to be adequately involved as their efforts will guide the use of the city waste management practices and technology in sustainable development.

CONCLUSION

The Kenya government and environmentally concerned Agencies (UNEP, UNDP, UN-Habitat, WWF, and IUCN, among many others) should seek and disseminate information on environmental issues, particularly on the waste management practices to the local communities, institutions and organization with the aim of promoting improved practices, sustainability and resource recovery for poverty eradication. In Kenya, both central government and local government has done very little in involving the public and other key stakeholders in the environmental management practices including waste management and pollution control systems (Gordon 1986). Even policy and bye-laws enforcement of the non-biodegradable polythene

bags of less than 30microns has become difficult to achieve for the last three years due to conflicts and lack of political will.

The use of Kiondos and traditional basket should be back to the market since they are environmentally friendly and also durable than polythene bags (Fatma, 2008). Such attempt will greatly save our biodiversity, natural resources and nature from pollution. The illegal dumping of the wastes should be surveyed, monitored and controlled by environmentally trained environmental inspectors and law enforcing agents. Financial support should be sought and organized from development partners and government to prioritise waste management by facilitating appropriate policy formulation, legal frameworks, institutional arrangements and improving governance and financial accountability issues while effectively involving the public and other relevant stakeholders.

The issue of the waste management and its disposal continues to be one of the biggest challenges that research and regulatory bodies are faced with in Nairobi city due to the accumulation and disposal problems. It is believed that the new initiative spearheaded by the Ministry for the Nairobi Metropolitan and Ministry for Environment and Mineral Resources to improve the city waste management image would shed some light on the strategic path for public engagement. The improved resources management practices of the city will promote compliance, public perceptions and image, provide better marketing opportunities of the commercial products and services as the modern consumers are becoming more and more environmentally sensitive (Friedman 2003).

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