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Institutional Matrix for Sustainable Waste Management

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1. Introduction

1.1 Background information

Ensuring environmental sustainability is one of the eight Millennium Development Goals (MDGs) adopted by world leaders in 2000. This underscores the priority the world places on achieving and maintaining a clean and safe environment for both present and future generations. Waste management is therefore a subject of immense interest to all nations and peoples.

Significant differences, however, characterise waste management service delivery in developed and developing countries. Though the developed countries generate larger amounts of wastes, they have developed adequate facilities and strong institutions to manage them. Developing countries, on the other hand, are faced with an uphill task of providing adequate facilities for waste management and to ensure their sustainable operation and maintenance. The Millennium Development Goals Report for 2007 notes that half the population of the developing world lack basic sanitation and that in order to meet the MDG target, an additional 1.6 billion people will need access to improved sanitation over the period 2005-2015 (United Nations Department for Economic and Social Affairs [UNDESA], 2007; World Water Development Report [WWDR], 2009). The delivery of sustainable waste management services in developing countries has therefore become an issue of grave global concern.

In line with the United Nations' blueprint for sustainable development, Agenda 21 (United Nations Division for Sustainable Development [UNSD], 1992), which recommends support for developing countries as a step towards the agenda, a number of developing countries have requested the collaboration of external support agencies in improving environmental sanitation services delivery. To achieve the MDGs in the poorest and most disadvantaged countries, the United Nations (UN) recognises the need for developed countries to deliver on longstanding commitments to achieve an official development assistance (ODA) target of 0.7 per cent of gross national income (GNI) by 2015 (UNDESA, 2007). However, many project interventions in direct waste management service improvement by external support agencies have failed to provide lasting positive impacts on the state of environmental sanitation in the recipient developing countries (Menegat, 2002). Many have failed to continue activities after the external support agencies ceased their support (Ogawa, 2000; Pronk, 2001). Several authorities have pointed to the strength of the institutional structures and arrangements as a key underpinning factor to sustainable development in water and sanitation (Department for International Development [DFID], 1998; World Bank, 2000; Antipolis, 2000; Ogawa, 2000).

According to the DFID, the central lesson learned from the strong emphasis laid on the construction of new facilities in the 1980s and 90s is that, simply building new facilities does little to help the poor. “Projects that end with the construction phase inevitably fall into disrepair and disuse unless hardware installation is fully integrated with properly planned and implemented arrangements for the long-term operation, maintenance and financing of an improved service” (DFID, 1998: 118). This, the DFID explains, is because poor management of facilities leads to declining service levels, which in turn reduce the chances of good cost recovery in terms of both willingness-to-charge and willingness-to-pay (Heller et al, 2003; Wunder, 2005; Pagiola et al, 2005). Invariably, governments and municipal authorities are unable to ensure efficient operation and maintenance, let alone, to ensure that investment in the sector keeps pace with the increasing demand.

1.2 The problem

In spite of the inescapable connection between institutions and the attainment of sustainability in waste management, sections of the engineering and technical professionals commonly involved in the practice of waste management tend to possess a distorted view of the concept of institutions and are therefore susceptible to over simplifying the concept or ignore sensitive aspects which eventually affect the viability of the whole institutional framework. A common misconception is the equation of institutions to organisations whereas, in reality, the latter is only an aspect of the former. Beside this, the consideration of institutional issues has often been limited to the formal segment, oblivious of the crippling effect which informal institutions exert on the whole institutional framework. Consequently, efforts at developing institutions to pursue sustainable waste management tend to produce institutional interventions which fail to adequately respond to the root factors that determine whether or not service delivery will be sustainable. With reference to developing countries, in particular, the questions this chapter seeks to answer relate to what basic understanding of the concept of institutions technical waste management professionals need to guide them in the development of responsive institutional interventions required to ensure sustainability in waste management services, and the relationships between the institutional matrix and the prospects of sustainability in waste management.

1.3 Chapter objective and approach

The purpose of this chapter is to analyse the institutional matrix within which waste management services are rendered to explain key institutional issues which underpin the chances of attaining sustainability in service delivery – with special emphasis on developing countries. This is intended to equip technical waste management professionals with a basic understanding of the concept of institutions required to inform a holistic approach to the task of institutional development in the sanitation sector, and to make them appreciate how institutional issues affect sustainability in all of its dimensions.

The arguments and concepts presented in this chapter are drawn from literature and the knowledge and experiences of the authors. Reference is often made to cases in Ghana where a practical illustration is considered useful.

2. Understanding institutions

A successful application of institutional development as a tool for attaining sustainability in waste management service delivery requires a proper understanding of the concept of

institutions due to its complexity, especially, in the developing world. There is no doubt that in everyday language the term '*institution*' is used interchangeably with the term '*organisation*' as in such uses as '*academic institutions*', '*financial institutions*' and the likes. Nevertheless, a clear distinction is made between organisations and institutions in literature (Bandaragoda, 2000; Young, 2002; Alaerts, 1997; Uphoff, 1986; Pai & Sharma, 2005). The other dimension that exists in the use of the word is rather sociological and not as yet understood by sections of the engineering and technical professionals frequently encountered in the environmental sanitation sector. This dimension reflects in such uses as '*the institution of marriage*', '*the chieftaincy institution*' and '*the institution of priesthood*', which are not necessarily organisations.

According to North (1990: 4), institutions are "formal rules, informal constraints - norms of behaviour, conventions, and self imposed codes of conduct - and their enforcement characteristics". The DFID (1998: 154) elaborates North's definition. According to the DFID, while an institution may be defined as "a set of constraints and humanly devised rules which influence and shape the interaction and behaviour among groups and individuals" - akin to North's definition - it may also refer to an individual organisation, i.e. "an individual body with an explicit structure and hierarchy of authority and the formal allocation of tasks and responsibilities". These bodies with an explicit structure and hierarchy of authority - i.e. organisations - enforce rules, norms, conventions and codes whether formal or informal. The emphasis, however, is that the term '*institution*', does not necessarily refer to an organisation but, first and foremost, refers to a set of rules and arrangements existing in society to influence and shape interaction and behaviour among groups and individuals (North, 1990; Kingston & Caballero, 2008). For the avoidance of confusion, DFID (2003) distinguishes between institutions and organisations as suggested by North: it refers to institutions as '*the rules-of-the-game*' and organisations as '*how we structure ourselves to play*', adding that the key distinction between institutions and organisations is that between rules and players.

From this point onwards in this chapter, a conscious effort is made not to use the two bed-fellow terminologies interchangeably. '*Institution*' shall be used for the '*rules-of-the-game*' and '*organisation*' for bodies or '*the players*' unless where '*institution*' is used to represent the totality of the '*rules*' and the '*players*' as in cases where mention is made of the '*institutional structure*' or '*institutional framework*' which encompasses both the rules and the players.

It is worth mentioning that the isolation of one interpretation from the other is practically impossible as the existence of one often elicits the other. For instance, the promulgation of "a set of rules to influence and shape the interaction and behaviour among groups and individuals" (DFID, 1998: 154) often leads to the creation of bodies or organizations - whether in the form of committees, commissions or agencies - to implement, administer or enforce the set rules. On the other hand, every organisation has its own rules which define its "hierarchy of authority and the formal allocation of tasks and responsibilities" (DFID, 1998: 154). Thus, institutions are implicit in organisations and the vice versa. In Ghana, for example, a policy to separate rural water supply and sanitation from urban water supply and sanitation service delivery led to the creation of the Community Water and Sanitation Agency in 1998. Meanwhile, it took an act of Parliament to establish the Agency. Thus the new policy or institutional arrangement necessitated the creation of an organisation whose

establishment in turn called for further legislation from which it derives its “hierarchy of authority and the formal allocation of tasks and responsibilities”.

3. Institutional matrix for the sanitation sector

The application of a holistic view of the concept of institutions to the sanitation sector reveals a two-by-two *institutional matrix* with the two columns representing institutions and organisations and the two rows partitioning them (institutions and organisations) into formal and informal hemispheres as shown in Table 1.

	Institutions	Organisations
Formal	<ul style="list-style-type: none"> • Policies • Laws • Regulations • Guidelines • Codes • Standards, etc. 	<ul style="list-style-type: none"> • Government Ministries, Departments and Agencies • Municipal authorities • Private sector organisations • Non-governmental organisations (NGOs) • External support agencies, etc.
Informal	<ul style="list-style-type: none"> • Customs • Beliefs • Norms • Values • Historical experiences • Practices • Standards of honesty, etc. 	<ul style="list-style-type: none"> • Traditional leaders • Pressure groups • Clans and family gates • Religious groups • Social clubs • Community watchdog committees • Community-based organisations, etc.

Table 1. Institutional matrix for the sanitation sector

Thus four segments of the matrix can be distinguished, namely formal institutions, informal institutions, formal organisations and informal organisations, all of which play crucial and interrelated roles to ensure the overall viability and sustainability of the institutional framework. It must be mentioned, however, that the structure of the matrix is not peculiar to waste management or the sanitation sector *per se*. Almost all sectors of a nation’s economy is characterised by institutions and organisations – both formal and informal.

3.1 Formal institutions

Formal institutions set the tone for the sector. They are the ‘formal rules’ in North’s definition, which “influence and shape interaction and behaviour” (Hearne, 2004; Kingston & Caballero, 2008) among sector stakeholders including service providers, users and government itself. They come in the form of laws, policies, regulations, guidelines, codes and standards etc. They also include international treaties and protocols to which the national government is a signatory. National, state or regional and municipal authorities usually promulgate them. As the sceptre of governance, their presence or absence is the most critical factor that determines the level of orderliness or chaos that can be expected to exist in the waste management industry and the sanitation sector in general.

While each of the segments of the matrix has a potential influence over the others, formal institutions are the most powerful. This can be explained by the fact that formal institutions decide which informal institutions or constraints can be adopted, tolerated or outlawed since governments can restrain by law what is culturally acceptable or technically feasible. For instance, many developing countries have enacted laws to ban the use of the pan or bucket latrine, which has been practised by some communities for several years. Consequently, this option for excreta disposal has given way to better practices and the organisational framework, both formal and informal, within which it was carried out has collapsed. Again, many nations have formally outlawed female genital mutilation, which has been practised by some cultures for centuries. Such is the strength of formal institutions.

3.2 Informal institutions

Informal institutions can be best described as the *unwritten rules* which govern behaviour (Helmke & Levitsky, 2004). These are the unofficial arrangements, which exist in society or organisations and influence the standard of acceptable or objectionable conduct. They often manifest themselves in traditions and cultural practices that are performed by the members of a society. They have been in existence for centuries and are a reflection of the deep-seated traditional value system of people and can be reflected in the formal institutional framework of a society (e.g. constitutions, laws, legal mechanisms) (Helmke & Levitsky, 2004).

In the environmental sanitation sector, informal institutions and constraints are major determinants of the commitments of various stakeholders to the enforcement of and compliance with formal institutions (Vogler, 2003). They influence such critical factors as attitudes to personal hygiene, waste disposal practices, willingness to pay for services, commitments to public interests and law enforcement, respect for sanitation professionals, etc. The impact of informal institutions and constraints on the sanitation sector is generally more pronounced in developing countries than in the developed world, where formal institutions are much better developed.

While some informal institutions tend to promote best environmental sanitation practices, others have a tendency to interfere with them (Alaerts, 1997). Traditional or cultural institutions, which uphold sound environmental practices, are to be harnessed and integrated into the local institutional arrangements. Where informal institutions conflict with best practices, formal institutions are used to constrain or outlaw them, but not just by the might of laws and regulations. This is because changing informal institutions require much tact, intensive education, stakeholder participation, dialogue and incentives (Hall & Thelen, 2005) because institutions have a degree of permanence and are relatively stable. It is also as a result of the fact that institutional change is viewed as a centralized, collective-choice process (Kingston & Caballero, 2008; Kantor, 1998). In this process, it is argued that “rules are explicitly specified by a collective political entity, such as the community or the state, and individuals and organisations engage in collective action, conflict and bargaining to try to change these rules for their own benefit” (Kingston & Caballero, 2008: 4).

3.3 Formal organisations

Organisations are groups of individuals engaged in purposive activity (North 1990; Saleth, 2006). Described as the ‘players’ (DFID 1998, DFID 2003, North 1990), organisations, in

general, are the primary custodians of institutions as well as the wheels on which they (institutions) are run.

Formal organisations are those with some form of officially recognised authority. They are material entities possessing offices, personnel, equipment, budgets, and legal personality (Bandaragoda, 2000). They are bodies with explicit structure and hierarchy of authority. Government ministries, departments and agencies, municipal authorities, private companies, non-governmental organisations (NGOs), external support agencies, etc, are among the formal organisations which play various roles in the delivery of waste management services within a framework defined by formal institutions. Thus, formal organisations are subject to formal institutions which may be promulgated by the self-same organisation. This illustrates the paradox of institutional-organisational relationships: institutions are evolved by bodies or organisations – be they state departments, ministries, commissions or the parliament – but all bodies or organisations are themselves built on and governed by institutions.

Direct waste management service delivery has often been a shared responsibility between state and private organisations, engendering a wide range of public-private partnerships. Water and Sanitation for Health [WASH] (1991) notes that the pressures to become more efficient and effective are changing the role of the government from that of a provider to a promoter and regulator. For instance, Obeng *et al* (2009) studied the impact of Ghana's Environmental Sanitation Policy on the institutional structures for solid waste management in Kumasi, the nation's second largest city. The study found that the major change that had occurred in the organisational structure for the management of solid waste in the city since the inception of the policy in 1999 was the involvement of the private sector in service delivery under the supervision and monitoring of the Waste Management Department (WMD) of the Metropolitan Assembly (see also Cook & Ayee, 2006).

3.4 Informal organisations

Informal organisations are groups with some common interests or aspirations who may not be officially established or registered by the national or local government but can be recognised as stakeholders in the delivery of waste management services due to their potential to affect the chances of successful service delivery positively or negatively. They include community-based organisations, pressure groups, opinion leaders, traditional leaders, gender groups, local religious bodies, etc.

The potential of informal organisations to affect the chances of sustainable service delivery has gained much attention in recent times, leading to the high emphasis that is currently laid on effective community participation in service delivery in developing countries (Menegat, 2002). Stakeholder analysis for community participation helps to identify all interest groups in the community, assess the conditions for their involvement in order to attract each group to fully participate in identification, planning and implementation of sanitation and waste management intervention programmes at the community level.

4. Institutions and sustainability in waste management

4.1 Overview of the concept of sustainability

The concept of sustainability, which literally refers to “the ability to sustain, or a state that can be maintained at a certain level” (Kajikawa, 2008: 218), arose out of the belief that the growing population of the world, with the attendant pressure on natural resources, poses a

threat to our survival on the earth. Back in 1798, Thomas Malthus argued that unchecked population growth follows a geometric order while subsistence for man increases arithmetically. Therefore, in the opinion of Malthus, if human populations and consumptions are not controlled, the earth would run out of its resources at some point in time (Malthus, 1798 as cited in Rogers *et al*, 2008).

This concept, which currently occupies a central position in all developmental issues, initially attracted the attention of the international community in 1972 when the United Nations Conference on the Human Environment in Stockholm first explored the relationship between the quality of life and that of the environment (Rogers *et al*, 2008). As the interaction between human populations and the environment are essentially the outcome of our quest for development, the term 'sustainability' became more associated with the term 'development' than any other. This has led to the frequent use of the phrase 'sustainable development' which was first defined by the World Commission on Environment and Development (WCED) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987: 54).

The concept of sustainability refers to a "dynamic condition of complex systems, particularly the biosphere of earth and the human socioeconomic systems within it" (Heintz, 2004: 6). The concept draws on the fact that societal development cannot be viewed without considering its natural prerequisites (United Nations Educational, Scientific and Cultural Organisation [UNESCO], 1996). Sustainable development then refers to a pattern of resource utilisation that seeks to meet human needs while preserving the environment so that these needs can be met in the present as well as in the future (Valverde, 2008). The term has come to encompass the economic, environmental and social realms (Hasna, 2007). It also includes the bio-chemical and physical dimensions (Gupta and van der Zaag, 2008).

This has informed the views of sustainability as the 'triangular view' which treats sustainability as being triple-dimensional, with three components addressing the need to sustain the environment, economy and society (Kajikawa, 2008; Rogers *et al*, 2008). Thus, Kajikawa (2008) describes the triangular view as including the three-pillar model in which the three pillars refer to the economy, the environment, and society (Kastenhofer and Rammel, 2005) and the triple-bottom-line model (People, Planet, Profit) or P3 (People, Prosperity, and the Planet) (Zimmerman, 2005). It can be argued then that a sustainable system or development is one which satisfies environmental sustainability (the sustainability of the planet), economic sustainability (the sustainability of prosperity or profit) and social sustainability (the sustainability of the values and cultures of people). Thus, a sustainable waste management system is one oriented at attaining all three components of sustainability: environmental, economic and social. It is important that each of the three components is given equal attention and priority in order to ensure sustainable outcomes (Rogers *et al*, 2008).

4.2 Institutions and environmental sustainability in waste management

In simple terms, environmental sustainability implies that human developments or activities such as waste disposal should not hinder the ability of biological and physical systems to maintain their ecological resilience or robustness (Rogers *et al*, 2008). That is, levels of harvest should be maintained within the capacity of the ecosystem (Kajikawa, 2008). In

waste management, environmental sustainability implies that, the rates of deposition of pollutants should be maintained within the rate at which the ecosystem can safely absorb or convert those pollutants to some other useful or harmless substances. Thus, the environment should only be used as a “waste sink” “on the basis that waste disposal rates should not exceed rates of managed or natural assimilative capacity of the ecosystem” (Pearce, 1988 as cited in Rogers *et al*, 2008: 43). In the design of sanitary landfills, for example, the provision of a lining material and physical installations to prevent leachate from reaching ground water resources is intended at enhancing the environmental sustainability of that disposal option.

Institutions play a vital role in ensuring environmental sustainability in waste management. This vital role becomes apparent as one reflects on the determinants of environmental protection such as:

- legislation and regulation to restrain or outlaw waste disposal practices which adversely affect the environment;
- monitoring and enforcement to detect and punish environmental abuse and malpractice;
- research to determine the capacity of the environment that can safely absorb different types of wastes and the technology options by which waste managers can make optimum use of this capacity.

All aspects of the institutional matrix contribute immensely to ensure that the determinants of environmental sustainability, including but not limited to those mentioned above, are in existence.

4.2.1 Formal institutions and environmental sustainability

Formal institutions in the form of laws, regulations, policies, standards and guidelines often take the lead in the pursuit of environmental sustainability. Examples around the world include:

- national laws such as the Resource Conservation and Recovery Act (1976) of the United States (United States Congress [U.S.C.], 1976) and the Hazardous Waste (England and Wales) Regulations (2005) of the United Kingdom (Statutory Instruments, 2005);
- regional directives such as those of the European Union, including the Regulation (1272/2008) on classification, labelling and packaging (CLP) of chemicals (European Union, 2008) and the Directive (2002/96/EC) on waste electrical and electronic equipment (WEEE) (European Union, 2003); and
- international conventions such as the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention, 2010).

Arguably, the worst form of failure in securing the sustainability of the environment is the absence of formal institutions, at least on paper, to prohibit certain forms of actions and inactions which threaten the survival of vital ecosystems. Hence, the analysis and diagnosis of the overall institutional framework is recognised as the first step in the institutional development process in the water and sanitation sector (DFID, 2003) and, for that matter, in the field of waste management. One of the major factors which account for the differences in waste management in the developed and the developing world lies in the existence of

formal institutions. For example, with respect to electronic waste, Zhao *et al.*, (2009) note that developing countries have no laws or relaxed legislations.

4.2.2 Formal organisations and environmental sustainability

As custodians of formal institutions, formal organisations – including legislative assemblies, environmental protection and regulatory agencies, local authorities and waste management companies – are not only involved in the promulgation of formal institutions but also see to their implementation and enforcement. Research and academic ‘institutions’, as they are commonly referred to, are among the formal organisations which work hand in hand with waste management practitioners in the development of environmentally sustainable technologies.

The commitment and capacities of formal organisations existing in a nation are key determinants of the kind of formal institutions which would be developed and the extent to which they (formal institutions) are implemented and enforced or rather remain dormant. Private companies, for instance, seek to minimise operational costs in order to maximise profits (Coad, 2005; Cointreau-Levine, 2000) and would naturally crave the absence or relaxation of formal institutions which impose strict waste disposal regulations that have implications for operational costs. Therefore, it is always important to have a strong regulatory capacity within the public sector to regulate and monitor the private sector. A low level material capacity combined with a shortage of skilled staff and training leads to inefficient performance (Antipolis, 2000), and this is another key factor which distinguishes waste management in developing countries from that of developed countries.

4.2.3 Informal institutions and environmental sustainability

Informal institutions – including traditions, customs, beliefs, values and attitudes – play vital roles in waste management at the community level. In rural areas of developing countries, especially, where formal education is usually low and formal institutions either unknown or ignored, traditional authorities tend to apply traditional laws and customs to protect the local environment.

Nevertheless, it is not uncommon for informal institutions to conflict with best environmental practices. It is therefore important for waste management practitioners to understand the informal institutions existing in a community while selecting technologies aimed at protecting the environment in those communities. It is also imperative to incorporate informal institutions which promote good waste disposal practices in formal institutions while making use of the latter to outlaw the former, where they are found environmentally unfriendly. However, such a move should be accompanied with intensive education to convince traditional people of the need to abandon an age-old tradition in the light of new knowledge.

In the formal sector, popular opinion and values could also compromise the role of monitoring and enforcement in environmental protection. For example, when the values system makes it attractive for the enforcement official to connive with the waste generator or Collection Company to violate existing waste disposal regulations, environmental sustainability is compromised. The existence of monitoring and enforcement mechanisms is heavily predicated on the assumption that the officer-in-charge is not corruptible but, in some cases, that may not be true.

4.2.4 Informal organisations and environmental sustainability

Informal organisations, like their formal counterparts, are the custodians of informal institutions and play a role in applying them to protect the environment. Again in developing countries, where the low capacity of formal regulatory and policing organisations does not allow a close monitoring of communities and private organisations, informal organisations such as community watchdog committees and gender groups could be empowered to monitor compliance to formal and positive informal institutions at the community level. Examples exist in Ghana, where Water and Sanitation Development Boards (WSDBs) exist in small towns (for piped water systems) and WATSAN (water and sanitation) committees in small communities and villages (for single source water systems) to extend the powers of the local authority (District Assembly) closer to the communities to, among other responsibilities, ensure a safe environment for all community members.

Traditional authorities may be empowered to impose sanctions on offending community members who engage in waste disposal practices that are detrimental to the sustainability of the environment.

4.3 Institutions and economic sustainability of waste management

The economic sustainability component cautions against deriving today's wealth or achieving some other environmental or social benefits in a manner that diminishes the overall stock of capital or resources including natural resources (Rogers *et al*, 2008; Valverde, 2008). According to the World Bank, the pursuit of sustainable development should base developmental and environmental policies on a number of factors including a comparison of costs and benefits (World Bank, 1992 as cited in Rogers *et al*, 2008). In practical terms, waste management should be done in a manner that can be justified when the overall benefits – including the estimated economic value of environmental protection and resource recovery – are compared with the economic cost of the service. In solid waste management, for instance, the desire for economic sustainability justifies the practice of resource recovery, recycling and reuse, which reduce the quantity of wastes to be eventually disposed of in sanitary landfills. By these practices, the costs of collection and transportation to final disposal sites, as well as the “consumption” of land for landfilling, are considerably reduced. The role of institutions in ensuring economic sustainability resounds in such economic issues as availability of capital for infrastructure development, recovery of costs and operational efficiency.

4.3.1 Formal institutions and economic sustainability

Formal institutions determine minimum service standards and requirements for waste disposal by corporate and individual citizens. These in turn determine the cost of service delivery. Besides, formal institutions determine whether or not:

- waste management services remain a statutory responsibility of the municipal authority, may involve the private sector or must certainly be delegated to the private sector;
- service should be provided as a social service (public good) or as an economic enterprise; and
- costs should be recovered in full or partially.

Answers to these questions and, for that matter, the formal institutional framework are decisive because the World Bank (2000) notes that an acceptable level of service for waste

management depends critically on a well planned management, operating within an enabling institutional framework capable of generating the financial resources required to meet operating, maintenance and investment cost.

An example of the relationship between formal institutions and economic sustainability can be found in Obeng *et al* (2009) relating to solid waste management in Kumasi as cited earlier. Prior to the inception of Ghana's Environmental Sanitation Policy in May 1999, solid waste collection services were provided by the Kumasi Metropolitan Assembly as a social service without any charges to beneficiaries. However, the policy introduced private sector participation as one of its key strategies towards cost recovery (Ministry of Local Government and Rural Development [MLGRD], 1999). Private companies were contracted to collect waste from communal storage points and also franchised to provide house-to-house collection services to households within various zones demarcated throughout the metropolis. While waste collection from communal storage points was paid for by the central government, the cost of house-to-house collection was borne by the individual households without any subsidy from the government. Thus, the growth of house-to-house collection services led to cost recovery or, better still, cost savings on communal waste collection, since wastes collected under house-to-house service would have otherwise been deposited in communal bins. The study found that the amount recovered from house-to-house collection services, as a percentage of the expenditure of the Metropolitan Assembly's Waste Management Department (WMD), increased from 26.5% in 2001 to 68.6% in 2004, as shown in Figure 1.

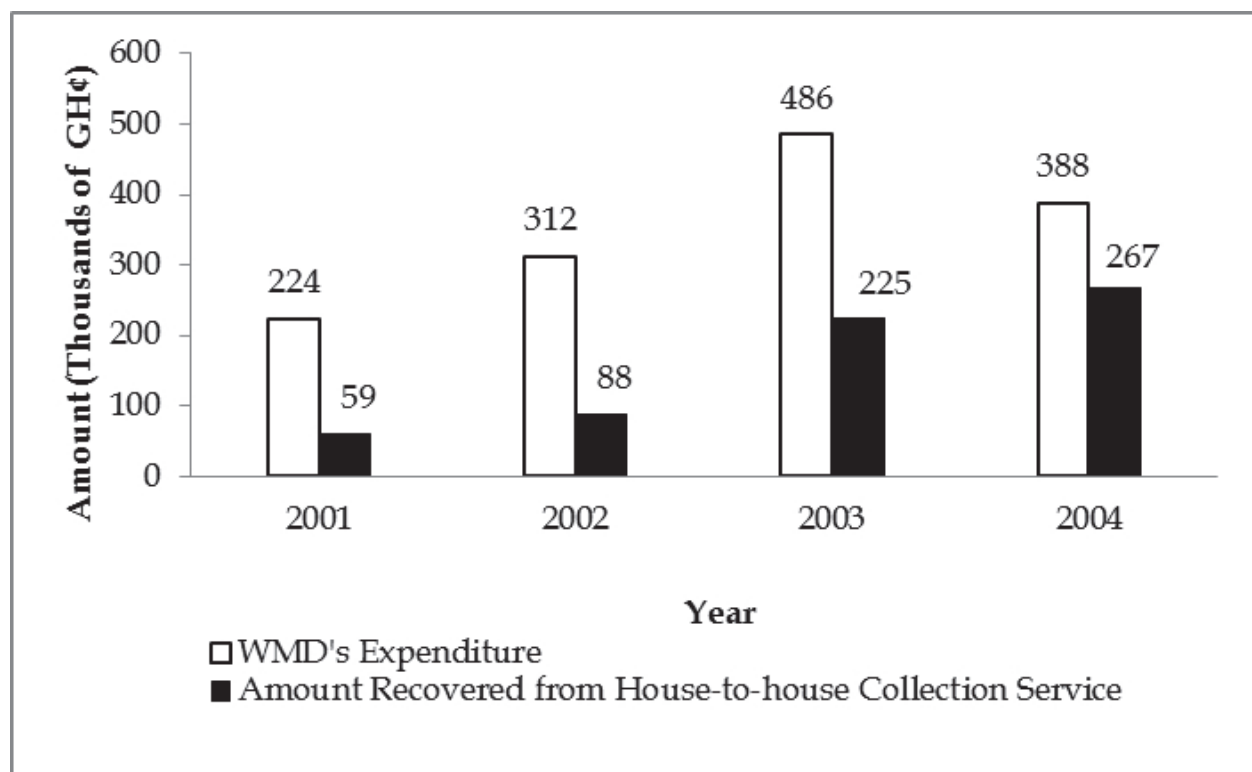


Fig. 1. Amounts recovered from solid waste collection in Kumasi after Ghana's Environmental Sanitation Policy of 1999 introduced private sector participation (Source: Obeng *et al* [2009])

4.3.2 Formal organisations and economic sustainability

The influence of formal organisations on the economic sustainability of waste management is demonstrated by the popular debate over whether to leave waste collection services in the hands of public or private organisations. It is certain that waste management services cannot be economically sustainable unless some key organisational factors exist. These include:

- willingness and ability to invest in the acquisition of adequate equipment to provide the level of service which justifies service providers' willingness to charge and elicits beneficiaries' willingness to pay;
- a good commercial orientation and operational efficiency, marked by use of optimal workforce and low cost of operation, to generate profit or recover cost without necessarily charging exorbitant tariffs;
- a healthy competition among service providers

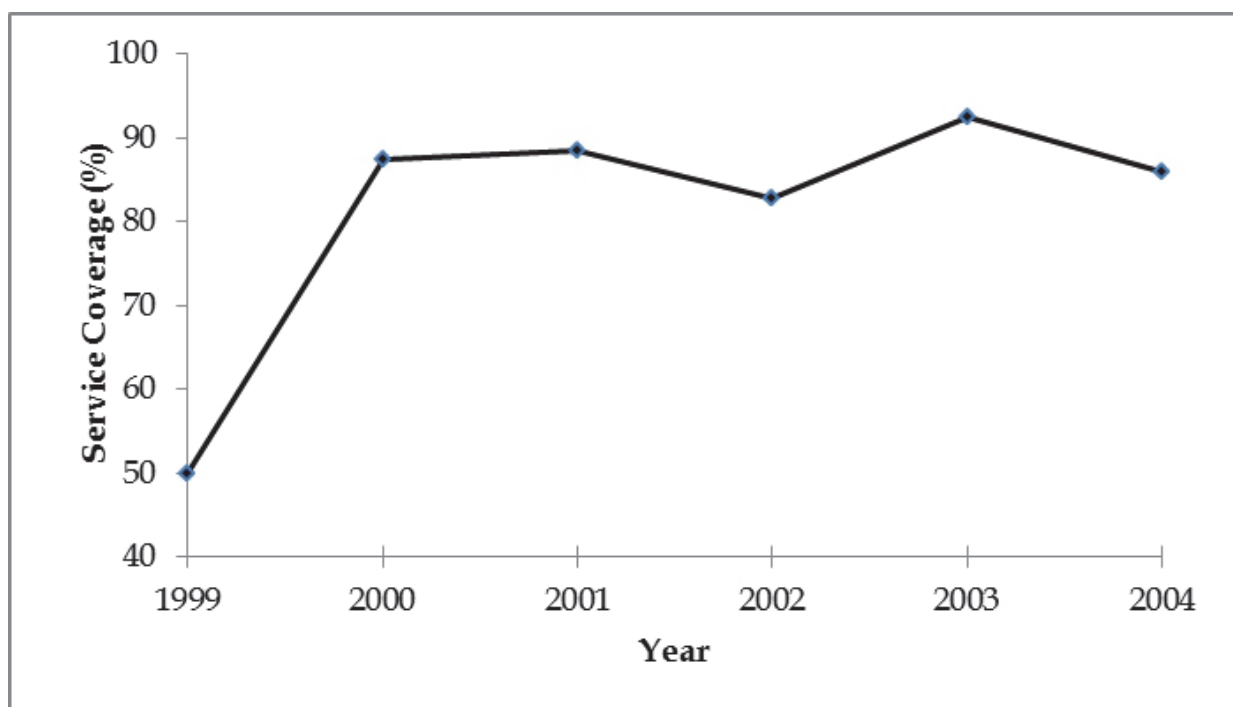


Fig. 2. Solid waste collection coverage in Kumasi after introduction of private sector participation (Source: Obeng *et al* [2009])

The existence of the above requirements for success tends to make the above mentioned debate end in favour of the private sector. For instance, the study by Obeng *et al* (2009) found out that the involvement of the private sector in Kumasi had led to an increase in service coverage in terms of the proportion of the estimated waste generation that was collected by the private companies. As shown in Figure 2, the annual average prior to private sector participation was about 50%. However, upon the introduction of private sector participation, the annual average ranged between 82.8% and 92.5% between 2000 and 2004. The trend was attributed to the fact that the private companies had come along with equipment which the Waste Management Department of the Kumasi Metropolitan Assembly could not acquire while it provided the service directly.

It must however be mentioned that, the introduction of private sector participation *per se* is no panacea to economic sustainability. Without adequate measures to regulate profit-

seeking private companies, they tend to exploit the public and cut costs at the expense of quality service. If the external costs of compromised service quality to beneficiaries and the environment are internalised, the service may actually be found to be economically unsustainable.

4.3.3 Informal institutions and economic sustainability

Informal institutions play a significant role in the economic sustainability of waste management in rural areas of developing countries in particular. They determine the values, perceptions and attitudes of waste management service practitioners and beneficiaries towards the economic aspects of waste management, as well as the unofficial arrangements which may exist at the community level to respond to the requirements of economic sustainability.

Where traditional values place a high priority on personal and communal hygiene and institutes penalties for offenders, it is easier to convince service beneficiaries to make financial contributions towards service delivery and, hence, improve the chances of cost recovery. Besides, traditional laws may be used to control indiscriminate disposal and consequently minimise the cost of cleansing activities and the external cost of environmental pollution.

4.3.4 Informal organisations and economic sustainability

Informal organisations, usually at the community level, affect economic sustainability in a number of ways especially in developing countries. They offer informal structures by which informal institutions are applied to enhance economic sustainability. For instance, in rural Ghana, WATSAN committees mobilise community members to provide direct environmental management services such as drain cleansing and public latrine management in order to minimise or avoid the cost of hiring hands for the service. Also during the construction of waste management infrastructure, volunteer, youth and gender groups in the community may contribute labour to minimise the cost of the project. In that case, the poor can also contribute to the economic sustainability of services and projects without making any financial contributions. On the other hand, those who can afford financial contributions are allowed to do so in lieu of direct involvement while their contributions are used to engage the jobless to provide the service.

Co-operative groups also help each other to acquire household facilities by making regular contributions into a mutual fund. Community members who are not capable of making a one-off payment for the acquisition of such facilities like domestic toilets take advantage of such schemes to acquire them and pay for it over a conveniently long period of time.

4.4 Institutions and social sustainability of waste management

Social sustainability reflects the extent to which the stability of social and cultural systems is unaltered by the pursuit of one development agenda or the other. Thus the quality of lifestyles and the values of a society should not be compromised in a bid to satisfy some other environmental or economic aspirations. If social sustainability is violated, the reactions of citizens, communities and governments toward an otherwise well-intended environmental or developmental initiative are negative and uncooperative (Cox and Ziv, 2005). This is supported by the maxim that says "people do not resist change; they only

resist being changed". Thus a socially sustainable waste management scheme is one that is packaged in a manner that demands minimal inconvenient change in lifestyles or values of stakeholders or rather introduces a radical change through effective social marketing strategies that make the stakeholders perceive themselves to be better off with the change.

Where social sustainability is not achieved, people prefer to continue with their 'own way of life' rather than to adopt a new technology or facility which promises to offer environmental sustainability or even economic sustainability at the expense of some traditional values. This situation arises where the new technology calls for the abandonment of one traditional practice or the other. For instance, house-to-house refuse collection services, which have helped to reduce backyard dumping of refuse and led to cost recovery in many Ghanaian cities, was initially not patronised by some tradition-oriented people who could not sacrifice the traditional practice of emptying the waste bin every morning and/or evening for the weekly collection service offered by private companies. Meanwhile, it makes economic sense to provide a household with a large bin for a week-long storage so that the collection crew move into a particular neighbourhood weekly rather than daily, as some conservative traditionalist would prefer.

Harmonisation of formal and informal institutions and collaboration between formal and informal organisations are ways by which institutions could be used to deal with such situations and enhance social sustainability in waste management. For instance, in Ghana, the National Community Water and Sanitation Programme (NCWSP) prepared by the Community Water and Sanitation Agency (CWSA) seeks to address sustainability issues in rural water supply and sanitation. The programme adopts the community ownership and management (COM) approach to avoid problems of sustainability, especially social and economic sustainability. Under the programme, the CWSA only plays the role of facilitators while the community exercises the freedom to select technology options, under the guidance of the CWSA's technical team, and elects representatives to constitute a WATSAN committee or WSDB to manage and operate the facilities. Thus, there is opportunity to blend customs with best environmental and technical practices to the acceptance of members of the community.

This collaboration between the CWSA - a formal organisation - and the WATSAN committee or WSDB - informal organisations - is possible because the formal institutional framework allows it. The District Assemblies have bye-laws from which the WATSAN committees and the WSDBs derive their authority.

5. Conclusion

From a holistic perspective, institutions are not just about organisations but, first and foremost, the arrangements and rules, which exist in society to control behaviour and interactions among individuals and groups, both formal and informal. The institutional matrix for waste management should be viewed as consisting of four interrelated components, namely formal institutions, informal institutions, formal organisations and informal organisations.

All aspects of the institutional matrix play crucial roles to ensure sustainability in the delivery of waste management services and account for the differences observed in the quality and sustainability of services between developing countries and their developed counterparts. It is also noted that, the effects of informal institutions on the whole

institutional matrix is more pronounced in developing countries than in developed countries.

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