

# Waste management in Cameroon: A new policy perspective?

Veronica Ebot Manga<sup>a</sup>, Osric Tening Forton<sup>b,c,\*</sup>, Adam D. Read<sup>d</sup>

<sup>a</sup> Department of Geology and Environmental Science, University of Buea, P.O. Box 63, Buea, Cameroon

<sup>b</sup> Waste & Energy Research Group (WERG), Faculty of Science and Engineering, University of Brighton, Brighton, BN2 4GJ, UK

<sup>c</sup> Ramboll Whitbybird, 60 Newman Street, London, W1T 3DA, UK

<sup>d</sup> Hyder Consulting Ltd., Aston Cross Business Village, 50 Rocky Lane, Aston, Birmingham, B6 5RQ, UK

Received 21 December 2006; received in revised form 21 July 2007; accepted 23 July 2007

Available online 4 September 2007

## Abstract

Towns and cities in Cameroon exhibit the burdens of waste management which characterise so many African cities. Several factors including inadequate financial resources, low levels of enforcement of regulations and poor governance often lead to poor solid waste management services. This paper presents a critical analysis of the state of solid waste management regulations in Cameroon and constraints this places on the delivery of sustainable waste management solutions. A case study of the Limbe Municipal Council is used to highlight some of the waste management related problems in the country. Results indicate that solid waste management services are rudimentary; essentially collect and dump. Current regulations do not adequately address waste handling or disposal. There are inefficiencies in the implementation of waste management policy due to the devolved responsibilities between several governmental agencies and the local councils. The paper discusses some of these constraints and concludes with suggestions for improving the delivery of sustainable waste management solutions.

© 2007 Elsevier B.V. All rights reserved.

**Keywords:** Cameroon; Limbe; Solid waste management; Stakeholders; Waste policy; Dumps; Stakeholder engagement

## 1. Introduction

The sustainable management of solid waste streams is imperative in order to minimize environmental and public health risks around the world (ISWA, 2002; Fletcher and Read, 2003; Ball, 2006). Whilst the balance between the specific components of this system in delivering sustainable waste management are already well understood and established in most developed countries, e.g. Read (1999) for a UK perspective, this is not often the case for

developing countries such as Cameroon. The literature concerning most of these aspects (collection, transportation, treatment, reuse, recycling, recovery and disposal) of waste management in Cameroon is scarce and/or non-existent making it difficult to evaluate the current situation or compare and contrast its performance with other locations/nations.

A key driver towards increased efficiency in solid waste management is the involvement of all stakeholders including, the waste generators, waste processors, formal and informal sectors, financial institutions and private initiatives such as non-governmental and community based organizations (Baud et al., 2001; Palczynski, 2002; Read and Wilson, 2003; Ahmed and Ali, 2004; Henry et al., 2006; Kassim and Ali, 2006; Wilson et al., 2006). They all have a fundamental role to play in

\* Corresponding author at: Ramboll Whitbybird, 60 Newman Street, London, W1T 3DA, UK. Tel.: +44 207 6315291; fax: +44 207 3234645.

E-mail address: [otforton@gmail.com](mailto:otforton@gmail.com) (O.T. Forton).

improving services and systems and ensuring more sustainable waste management services are developed and delivered. This paper will address some of these roles in the context of Cameroon. Specific reference will be made to a case study—The Limbe Municipal Council.

### 1.1. Overview of Cameroon

The Republic of Cameroon is located in Central Africa and lies between latitudes 2° and 12°N and between longitudes 8° and 16°E (Fig. 1).

Like most developing countries, e.g. Ahmed and Ali (2004), Cameroon is facing high rates of urbanization, estimated at about 4% annually, compared to an annual population growth of about 2.7% (World Bank, 2002). This growth is occurring in a period during which the country has been experiencing socio-economic pressures that have led to a decline in economic growth. Since the mid 1980s the fall in oil prices followed by the National Structural Adjustment Programs of the early nineties have resulted in a serious crisis in financial resources. As a result, the government drastically reduced its invest-

ments and subsidies in the urban sector. Since then, living standards have deteriorated, particularly in the areas of health and education (World Bank, 2002). Of all sectors, municipal solid waste management has been one of those most affected. Uncollected and illegally or improperly disposed of wastes pose serious risks to public health and the environment (Wilson et al., 2003; Olley et al., 2006). The prevalence of parasites, tetanus, malaria, hookworm, cholera and diarrhoea in many African countries is attributed to unsanitary conditions caused by waste being simply strewn around cities, villages and other habited areas (McMichael, 2000). In some African cities, incidents of flash floods, water pollution and littered landscapes have been attributed to poor waste management practices (Palczynski, 2002; Henry et al., 2006).

Previous studies on waste management in Cameroon have focused on waste collection, treatment, disposal practices and their environmental implications (Vermande and Ngnikam, 1994; Ngnikam, 2000) with little consideration of the legislative and regulatory aspects. However, achieving sustainable development goals associated with waste management would require the successful establishment of baseline levels of information from which more informed waste management and policy decisions can be made.

In this study, a critical analysis of the current waste management situation in Cameroon is presented with particular reference to the policy framework and the devolved roles of the various stakeholders in meeting specified waste management objectives. Empirical data from Limbe Municipal Council is used to highlight the constraints associated with solid waste management in Cameroon throughout the discussion.

## 2. Methodology

The study was carried out using three principle approaches. Firstly, a desk study involving consultation of official reports, articles and legal documents (Decrees) relating to solid waste management in Cameroon was carried out in order to obtain background information that would enable the construction of a conceptual model of solid waste management in Cameroon. Secondly, interviews were conducted with key stakeholders in various sectors including hygiene and sanitation, urban development and the environment as well as representatives of the private sector directly associated with waste management activities. The intention was to investigate the conceptual model and consider different perspectives with regards to municipal waste management policy and service delivery. Thirdly, site visits were made to

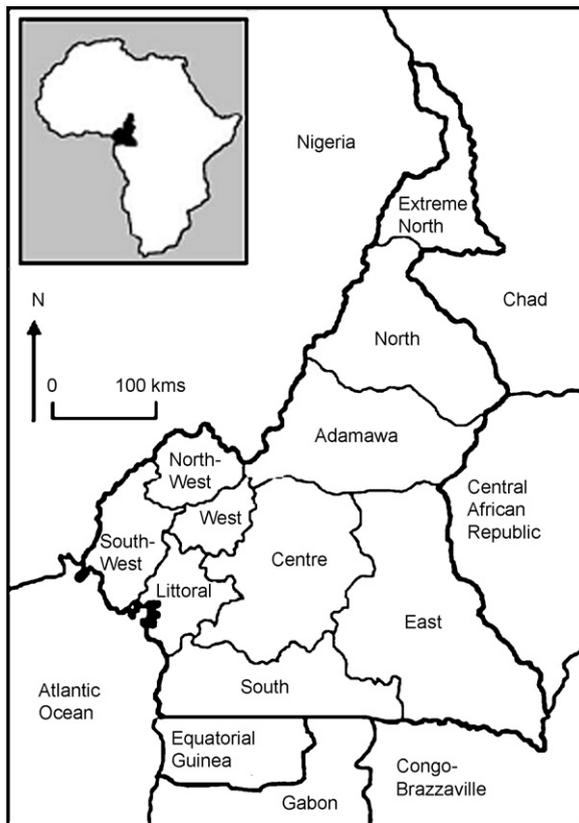


Fig. 1. Map of Cameroon showing the international and provincial boundaries (after (Page, 2003)).

dumpsites in Limbe Municipality and the immediate neighborhoods around these dumpsites where preliminary waste compositional analysis were carried out.

### 3. Results

The global initiative for sustainable development marked by the Rio Summit in 1992 and the aims and objectives of Agenda 21 in particular (UN, 1993; ISWA, 2002), ushered in a new phase in the regulatory framework of waste management in Cameroon. The creation of a Ministry of Environment and Forestry in 1992 and the development of a National Environmental Management Plan are products of this new era. However, over the last decade, the ministerial departments have been systematically transformed (separated or merged) repeatedly into different ministries all of which have devolved powers related to waste management. This has resulted in an uncoordinated approach to planning, regulating and delivering sustainable waste management, and no clear demarcation of their specific responsibilities.

#### 3.1. Roles and responsibilities

In Cameroon, several ministerial departments have mandates to implement solid waste management regulations. The highest body responsible for municipal solid waste management is the Inter-Ministerial Commission for Municipal Waste Management in Cameroon (ICMWM), created under the direction of the Prime Minister (Decree No. 95/230/PM of 31/04/95) and charged with formulation and policy development of appropriate municipal solid waste management strategies. Table 1 provides a summary of the roles and responsibilities of the different ministerial departments responsible for the implementation of municipal waste management in Cameroon.

Through the devolved responsibilities of the different ministerial departments (Table 1), a number of key Statutory Orders related to solid waste management have been enacted (Table 2). Generally, these aim to address issues related to all types of waste streams (Fig. 2); specifically environmental and public health protection.

Table 1  
Roles and responsibilities of key ministerial departments related to waste management in Cameroon

Ministerial department	Key responsibilities related to waste management in Cameroon	Statutory Order
Ministry of Territorial Administration and Decentralization (MINTAD)	Follow-up and implement regulations for organization and functioning of Councils; Oversees the execution of the budget of the government's council support fund (FEICOM); Restoration of hygiene and public sanitation; Supervises Urban Councils which are responsible for follow-up and control—industrial waste management, management of all public spaces and infrastructure; Sweeping of streets, collection, transportation and treatment of household waste	Circular letter No. 0040/LC/MINAT/DCTD of 04/04/00, Order No. 00072/MINAT/MINVILLE of 21/05/00, Law No. 714/23 of 5/12/74, Law no. 2004/18 of 22/07/04
Ministry of Mines, Industries and Technological Development (MINMITD)	Develop strategies for industrial development and the control of Classified and commercial installations for pollution, security, hygiene and industrial nuisance; Define norms for industrial pollution; List of dangerous, obnoxious and polluting facilities in order to inform the public; Develops regulations governing installation and exploitation of facilities classified as dangerous, obnoxious and polluting	Decree No. 99/818/PM of 9/11/99, Order No. 13/MINMEE/DMG/SL of 19/04/77, 02/MINMEE/DMG/SDAMIo of 4/01/9
Ministry of Economy and Finance (MINEFI)	Financial control of organizations benefiting from supplementary budgets and autonomous public establishments, i.e. Councils; Responsible for managing the Finance Law as enacted by Parliament	Constitution Decree No. 2004/320 of 08/12/04
Ministry of Urban Development and Housing (MINDUH)	Develops and implement urban restructuring, management strategies, sanitation and drainage; Defines and enforces norms of hygiene/sanitation, collection and/or treatment of household waste; Liaises with international agencies for urban development	Order No. 00072/MINAT/MINVILL of 21/05/00
Ministry of Environment and Nature Protection (MINENP)	Collaborates with other agencies to define measures for the rational management of natural resources; Effective control of investigation and pollution in the field; Specifies the criteria (project specific) and supervises environmental impact assessments	Decree No. 2005/0577/PM of 23/02/05 7], Order No. 006/MINEP of 08/03/05
Ministry of Public Health (MINPH)	Creates Hygiene and Sanitation Units in Councils; Renders technical support to the Hygiene and Sanitation Units of Councils, Proposes norms for collection, transportation and treatment of industrial, domestic waste and emptying of septic tanks; Designs and implements public education campaigns on hygiene and sanitation	Order No. D67/NS/NN/ST/SG/BMPHP/NNPA of 11/08/87, Circular letter No. D69/N6/DMHK/SHPA of August 1980

Table 2  
Key legislative aspects related to waste management in Cameroon

Legislation	Key elements related to waste management in Cameroon	Statutory Order
Law relating to Environmental Management (No. 96/12 of 5/08 1996)	National Environmental Management Plan related to the protection of the atmosphere, marine and continental waters, soils, sub soils and human settlements; Regulates installations that pose dangers to the public; Stipulates modalities for the conduct of Environmental Impact Assessments (EIA) and categories of operations subject to EIA; Specifies air emission and waste water discharge standards; Sets conditions for issuing authorizations for allotment and management of land for uses, i.e. industrial, urban etc; Conditions for waste handling (e.g. collection, storage, recycling, etc.); Prescriptions relating to waste elimination by persons producing or treating waste; Stipulates the terms of reference for the supervision of municipal dumps by the competent authorities	Decree No. 2005/0577/PM of 23/02/05, Order No. 006/MINEP of 08/03/05
National Environmental Management Plan	Five year amendable plan; set up environmental information system; Preparation of bi-annual reports on the state of the environment in Cameroon, e.g. identifying problems arising from urban pollution and devising suitable micro-projects to mitigate the problems	–
Law relating to the installation of Classified establishments (Law No. 98/15 of 14/07/98)	Stipulates two types of Classified establishments (Class I and Class II). Dump sites are classified as Class II establishments for which operation and management must follow prescribed guidance. It sets out the regulations governing the installation and exploitation of facilities classified dangerous, obnoxious and polluting;	Decree No. 99/818/PM of 9/11/99, Order No. 13/MINMEE/DMG/SL of 19/04/77, 02/MINMEE/DMG/SDAMIC of 04/01/99
National Water Code (Law No. 98/005/of 14/04/98)	Provides framework for the exploitation of water resources including waste disposal, Specifies modalities for the protection of surface and groundwater from pollution (including from dump sites).	Decree No. 2001/165/PM of 08/05/01
New Urban strategy, 1999	Partnership among the state, local council authorities and civil society in urban intervention in areas such as solid waste management	–

3.2. Operational framework for Municipal Councils

The delivery of waste management services is a statutory duty for Municipal Councils. They are responsible for the provision and maintenance of infrastructure, e.g.

waste disposal facilities; financing of all activities related to waste management; street sweeping, collection, transportation and disposal of household wastes as well as the management of all public spaces and infrastructure. Council funds arise from three main sources:

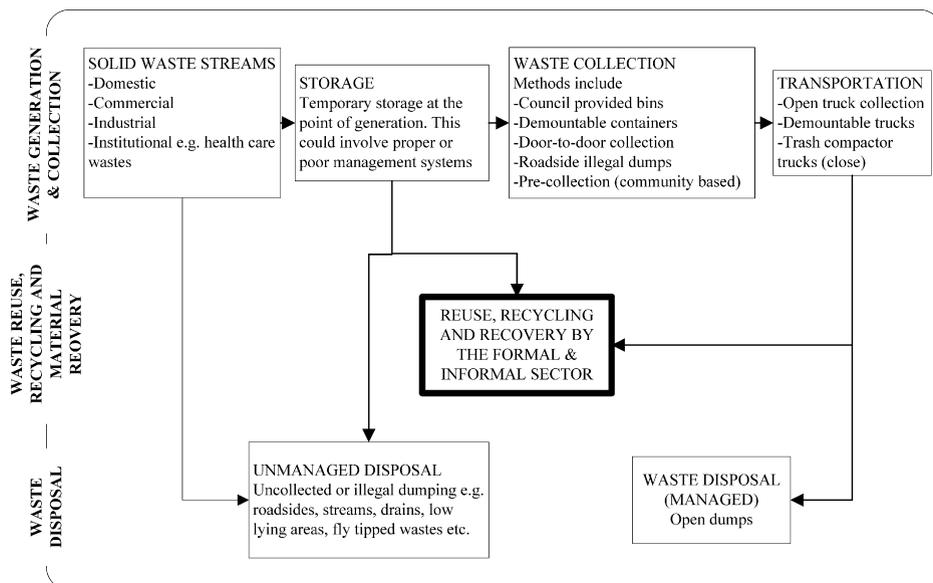


Fig. 2. Existing patterns of solid waste management processes in Cameroon.

- taxes and revenues generated by council activities;
- supplementary budgets from the state through MINEFI; and
- lending facilities from the Government’s Council Development Fund (FEICOM). Supplementary budgets are subject to scrutiny by MINEFI which is responsible for allocation of government funds on the basis of projected fiscal revenue flows.

Waste management related responsibilities are under the jurisdiction of the health and safety officers in the Hygiene and Sanitation Units of each Municipal Council. The highest qualified staff in each authority is the supervisor who may be a health worker. The Council has the responsibility for both creating and managing these units with partial responsibility for waste management or they may subcontract the responsibilities to third parties such as specialized waste management companies.

3.3. Case study: Limbe Municipal Council

3.3.1. Municipal solid waste collection and disposal

Limbe is a coastal town located in the Gulf of Guinea with an estimated population of 100,000 and an annual growth rate of about 2.9% (Awum et al., 2001) compared to a national average of 4.1% (World Bank, 2002). The economic landscape is dominated by a growing tourism sector as well as plantation agriculture and assorted commercial activities. It is dominated by a strongly tropical climate and with some areas only a few meters above the water table; thus flooding is common during the rainy season (Awum et al., 2001).

3.3.2. Waste volumes and composition

Municipal waste generation in Limbe is estimated at about 7300 tonnes per year (i.e. 20 tonnes/day) (Awum et al., 2001). These quantities are low when compared to those of other developing cities that have been studied, e.g. Bamako, Mali where waste volumes have been estimated at between 110 and 176 tonnes/day (Olley et al., 2004). The smaller waste volumes for Limbe can be attributed to a relatively smaller population. Limbe has a population of about 100,000 inhabitants compared to approximately 270,000 inhabitants for Bamako. The waste arises from households, industries and commercial establishments such as hospitals, schools and hotels.

There is a large variation in the material composition of the waste stream from different areas of the Limbe municipality (Fig. 3).

The waste stream is a heterogeneous mixture of materials and products whose composition varies with its sources of generation, as well as the socio-economic classification of the locality (Fig. 3). Proportionally higher amounts of biodegradable and plastic wastes arise from the middle income social neighborhoods. Possible reasons for this would include affluence and increased use of packaged foods and materials (linked to convenience lifestyles and aspirations to be more ‘western’). The contribution of plastics (light-weight polythene) generally reflects the increased use of this material for packaging in the retail sector. In the middle income neighborhoods, besides this plastic packaging there are also discarded toys and electronic products. Biodegradable wastes from these neighborhoods also contain significant quantities of garden/yard waste in contrast to low income neighborhoods where most biodegradable waste are recovered for use in crop allotments. Metals

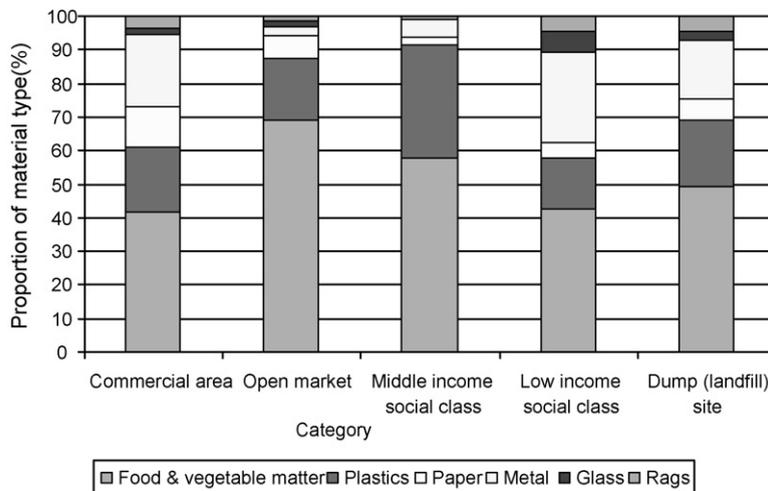


Fig. 3. Typical waste composition waste from different locations across Limbe.

and glass are comparatively higher in low income neighborhoods. The waste includes broken bottles, motor vehicle parts, metallic containers' etc which reflects the diverse types of activities carried out within these neighborhoods such as, petty trading (e.g. palm oil, kerosene sale), shops, bars, motor mechanic garages, etc. which are commonly conducted from people's homes. These are also commercial activities that modify the composition of the waste found in these areas, targeting reusable components which can be removed from the waste stream for their market value. There is clearly scope for further studies to determine the contribution of these waste management related activities on the local economy of the Limbe municipality.

### 3.3.3. Waste collection methods

In the Limbe municipality, waste collection and disposal is problematic. Collected waste represents only a fraction of the total waste generated, although there are no reliable statistics on collection efficiency. There is generally no distinction between service providers for industrial and municipal waste streams, though this is clearly stipulated in the legislation (Table 2). As such, the waste streams are commonly mixed together prior to disposal. Though the entire system of waste collection, treatment/disposal is the responsibility of the Councils, this can often be contracted to third party private companies. Generally, three approaches are adopted for the collection of waste in Limbe, namely pre-collection, door-to-door and fixed point collection.

**3.3.3.1. Pre-collection.** Pre-collection involves the movement of waste from the points of generation (the home) to municipal collection bins. Children move as much as 80% of household waste to public bins (Achankeng, 2003). This can be enhanced through the efforts of municipal authorities and community initiatives. In Limbe, a mandatory clean-up exercise under the auspices of the Municipal Council and representatives of the Ministry of Territorial Administration and Decentralization is organized once every month. On this day, residents are required to clean their neighborhoods, and clear up unauthorized waste dumps in order to protect public health.

The role of community leaders is often key to the success of such events as they would ensure maximum public participation in the exercise. Private companies with residential areas take responsibility for waste management in those areas. For example, the National Refinery Corporation (SONARA) based in Limbe pays contractors to provide waste management services in residential neighborhoods for its employees and others. In

these instances, residents can separate materials such as plastic bottles and scrap metal which are either taken to markets or collected by waste pickers.

**3.3.3.2. Door-to-door collection.** Door-to-door collection methods consist of mobile waste collection trucks (open or compaction), which give out peculiar hooting signals inviting residents to bring out their waste, which is loaded directly into the trucks for transportation. For efficiency, pickup days are fixed, however, truck breakdowns can sometimes seriously disrupt services. In this system, waste is usually stored at the points of generation for a very limited period and once loaded into the trucks are immediately taken off to the disposal site. This method relies on good roads and is a method of choice in markets and during the clean-up campaigns, but is not that common for residential areas otherwise.

**3.3.3.3. Fixed point collection.** Fixed point collection consists of siting large communal bins in designated locations for scheduled pickups. The choice of skip type, size, location and frequency of pickups is determined by the rate of waste generated, access and activities carried out in the area. This is the most widely used collection system in Limbe which inevitably depends on the participation rate of the residents in the community. In contrast to door-to-door collection, waste is stored for a longer period of time, along the road; providing habitats for rats, vermin and also exposing the waste to the population. Scavengers usually visit curbside dumps to recover materials that they can sell to market. Municipal waste collection from these sites will vary, with smaller portable bins emptied on the same schedule as door-to-door collection, whilst the heavier skips maintain a separate pickup schedule (a decision based on the type of transportation vehicle available and the access arrangements).

### 3.4. Municipal solid waste disposal methods in the Limbe municipality

Collected municipal solid waste is disposed in open dumps. These dumps are sited and operated with no environmental consideration and no supervision or management documentation. Over the last 15 years about six dumpsites or 'landfills' as they are locally known have been established in different parts of Limbe. In the planning and location of these dumps, convenience is the topmost priority with abandoned pozzolan (volcanic ash) pits, flat and low-lying areas highly favored for location. Proximity to settlements, farms, streams and the height of the water table are given little or no

consideration. A classic example of such ill informed decision making process in the Limbe Municipality is the location of the Newmarket and Slaughterhouse dumpsites in swampy land where flooding is common in the rainy season. The waste dumps are neither inspected nor is there any form of environmental monitoring. Adequate design and engineering specifications for leachate control and landfill lining are non-existent. Soil cover is applied occasionally and very sparingly while, torching and occasional compaction are employed as measures of increasing dump capacity.

In slums and unplanned settlements, indiscriminate disposal of municipal solid waste in streams, roadsides, vacant lots and low-lying areas are very common. Stagnant rubbish-filled ponds are also common in many neighborhoods. In the rainy season, the accompanying floods carry away some of this debris with associated vermin and nuisance hazards, but this is hardly an acceptable management approach. Monitoring of the health and environmental risks associated with these practices is not done due to the lack of properly trained health and safety personnel. Periodic burning of the dumped waste as a means of volume reduction is still prevalent in several of the waste dumps. However, the potential impacts of the noxious gases that are emitted from such sites have previously not been quantified or documented.

#### 4. Discussion

The Republic of Cameroon's waste management legislation has evolved with time especially within the past 10 years. However much of the nation's municipal solid waste management (MSWM) practices have remained unaffected. Waste management is still regarded as an activity which is centred upon, collect and dump somewhere else; a practice that conforms to the traditional approaches to waste management in developing economies where cheap solutions are the principal drivers (Ball, 2006).

This reality is in stark contrast with current legislation and regulations that are framed within the formal policy goal of environmental sustainability. This hiatus is a common problem that has emerged in countries that have embarked on policies promoting greater sustainability in waste management from low service starting points and with limited economic provisions (Read, 1999) where the pace of policy making has not been matched by an equal effort to provide mechanisms for effective policy implementation (Read, 1998). While the present policy framework sets out strategies to protect environmental resources and promote materials conservation through safe disposal and materials recovery respectively, poor

waste collection and indiscriminate as well as improper disposal dominate local Municipal Council practices.

Failures in the implementation of adequate policies at the local level has been attributed to factors such as lack of funding, low staffing levels, political interference, implementation of inappropriate technologies and relative cost (Read, 1999; Wilson et al., 2005; Henry et al., 2006). Though these limitations were evident in the Limbe Municipal Council case study, this paper would only focus on the political and regulatory constraints in the delivery of sustainable waste management solutions in the Limbe Municipality as well as other towns and cities in Cameroon.

##### 4.1. Political and regulatory constraints

Clearly, there are far too many ministerial departments with devolved roles and responsibilities aimed at achieving similar objectives which are sustainable waste management and environmental protection (Table 1). This leads to inefficiencies through duplication and wastage of both human and capital resources. The current regulatory system relies on a top-down approach to decision making wherein the ministerial departments are able to exercise control over local councils which have limited autonomy. This results in decisions that reflect political inclinations rather than scientific reality. This is particularly common in the provision of technical assistance from the government and its agencies to local councils.

The plethora of waste management related statutory instruments and regulations are often either incomplete or not enforced. Non-enforcement is a reflection of a lack of supportive accompanying 'text of implementation' for the statutory instrument (e.g. technical prescriptions and special rules for dump disposal—Law 96/12 Chap. IV Sec. 1 Art. 47.2; 51.1 conditions for the authorization for discharge of pollutants into air, water or soil—Law 96/12 Chap. IV Sec. I Art. 53). This results in a situation where the regulatory enforcement officials are compelled to apply guidelines that pre-date the present law, e.g. Decree No. D67/NS/NN/ST/SG/BMPHP/NNPA of August 11th 1987: Circular letter No. 69/N6/DMHK/SHPA of August 1980 instead of decrees founded upon current and recent laws (i.e. Art. 43 (2), 47 Part 111, Sec. 1 of Law 96/12 of August 1996) and in some cases either apply/adopt arbitrary guidelines or ignore the regulations entirely. This does not provide a clear regulatory framework within which to operate.

Even when completely enforceable statutory instruments exist, political interference can be a limitation to

their efficient delivery and enforcement. For example, the duties of undertaking regular visits to waste sites to monitor regulatory compliance is devolved between four ministerial departments (Table 1) and this often results in low levels of enforcements due to a lack of clarity in definition of responsibilities. Many of the inspectors interviewed in this study have cited lack of manpower, finances, expertise, testing facilities, and equipment as impediments to their enforcement of the regulations. Incomplete regulations, lack of clarity of roles and the absence of coordination are evidence of poor administrative planning. This arises as a result of inadequate technical training which is reflected in the production of overly ambitious by-laws which lack surveillance and control mechanisms; creating a great gulf between policy and practice (Buenrostro and Bocco, 2003; Olley et al., 2004; Wilson et al., 2005). Thus, until these key issues are adequately addressed it will be difficult to implement proper and sustainable waste management legislation and practices.

Despite Governmental efforts to create and implement legislation related to sustainable waste management and environmental protection, the current policy framework is not efficient. An inadequate legislative framework is a key reason for the lack of effective engagement of industry, commerce and the general public in more sustainable waste management practices. In the Limbe Municipality and Cameroon in general, this would suggest the need for the implementation of more robust measures including learning from examples of best practice from other developing countries (Johannessen and Boyer, 1999; Baud et al., 2001; ISWA, 2002; Palczynski, 2002; Ahmed and Ali, 2004; Henry et al., 2006; Wilson et al., 2006). However, for the successful implementation of best practice principles, there would be the need to adapt and customize them for an environment specific to Cameroonian towns and cities (Wilson et al., 2005). Such measures will guarantee the active engagement of all stakeholders in order to ensure successful delivery of the sustainable waste management practices (Anschütz and Keita, 2004). One approach to achieving this would be to implement guidelines such as those developed in the Strategic Planning Guide (SPG) by Wilson et al. (2003) and Read and Wilson (2003). The Guide lays down procedures for assisting decision makers in actively engaging with all stakeholders in the decision making process ranging from adequately identifying the baseline situation for MSWM in the city and establishing a framework for the delivery of sustainable waste management solutions. The SPG has already been shown to be a key document in developing economy situations, successfully com-

binning the tools for planning and waste management service delivery (Olley et al., 2006).

Specific measures for improving the current waste management situation would for example include the following:

- (a) The formulation of a comprehensive framework of legislation for waste management (with all relevant guidance for its implementation), integrating materials conservation, disposal, public participation and data gathering which reflects the realities of Cameroon.
- (b) Implementation of waste management legislation should be limited to fewer agencies whose roles are well defined. Institutional strengthening and cooperation (lateral and vertical) between these agencies should be enhanced with the aim of reducing excessive bureaucratic requirements and introducing transparency and accountability will have to be encouraged (e.g. Wilson et al., 2005). Ensuring financial autonomy of Municipal Councils will provide them with more financial resources and greater control.
- (c) Increase public participation in effective waste management through genuine decentralization of Council control and the empowerment of the electorate.
- (d) Public education and awareness (Wilson et al., 2005; Olley et al., 2006) related to neighborhood services and issues must be increased. However, while the civil society can take an active role in awareness raising campaigns, ultimate success would depend on the full backing of the key-decision makers so that the stakeholders would feel ownership of the project outcomes (Ball, 2006).
- (e) Strengthening of private–public partnerships in waste management is required. Such successful partnerships can be forged in the areas of materials recovery and community composting (e.g. Ahmed and Ali, 2004). Such partnerships should in turn encourage private investment in the delivery of waste related recycling and recovery facilities. For such partnerships to be established, there is a need for major participative consultation through facilitated workshops involving all key stakeholders [municipal councilors, government agencies, waste contractors and representatives of community groups] (Wilson et al., 2005; Henry et al., 2006) during which all perspectives regarding sustainable waste management can be developed, consensus built and policies and services implemented.

## 5. Conclusion

The overriding problems of solid waste management in Cameroon include poorly formulated legislation, inefficient collection and poor recovery and disposal practices. While collection can be improved through the involvement of public–private partnerships, public engagement and training, disposal remains a significant problem. In this study, waste management policy in Cameroon with reference to a case study of the Limbe Municipal Council was presented. Though there are several waste management Statutory Orders that should ensure resource recovery from various waste streams, the mechanisms for implementation are severely lacking. Delivering sustainable waste management, through consensus building, consultation, encouragement and openness must be developed prior to maximizing the potential available for waste reuse, recycling and recovery in Cameroon. For this to be achieved there is the need for a radical overhaul of the current policy and regulatory systems.

## References

- Achankeng E. Globalisation, urbanisation and municipal solid waste management in Africa. In: Proc ASAAP: Africa on a global stage; 2003.
- Ahmed SA, Ali M. Partnerships for solid waste management in developing countries: linking theories to realities. *Habitat Inter* 2004;28(3):467–79.
- Anschütz J, Keita M. Integrated sustainable waste management in Bamako, Mali Lessons learnt from the UWEP programme WASTE; December 2004. <http://www.waste.nl/content/download/880/6295/file/Bamako%20City%20Study.pdf> [accessed October 13 2006].
- Awum D, Kamanda B, Ndongo F. Mainstreaming potentials for sustainable development in Limbe Urban Municipality, Yaounde; June 15th 2001. <http://www.unhabitat.org/offices/roaas/france/limbe.pdf> [accessed August 15 2005].
- Ball J. Waste management in developing countries: seven characteristics and seven principles. In: Proceedings WASTE 2006. Sustainable Waste & Resource Management; 2006. p. 687–96.
- Baud I, Grafakos S, Hordijk M, Post J. Quality of life and alliances in solid waste management: contributions to urban sustainable development. *Cities* 2001;18(1):3–12.
- Buenrostro O, Bocco G. Solid waste management in municipalities in Mexico: goals and perspectives. *Resour Conser Recyc* 2003;39(3):251–63.
- Fletcher P, Read AD. Strategic solid waste management planning for the city of Ekaterinburg (Russia), presented at Sardinia 2003; October 2003.
- Henry RK, Yongsheng Z, Jun D. Municipal solid waste management challenges in developing countries—Kenyan case study. *Waste Manage* 2006;26(1):92–100.
- International Solid Waste Association (ISWA). Industry as a partner in sustainable development—waste management. Copenhagen Denmark: International Solid Waste Association; 2002.
- Johannessen LM, Boyer G. Observations of solid waste landfills in developing countries: Africa, Asia and Latin America. Washington D.C.: The International Bank for Reconstruction and Development; 1999.
- Kassim SM, Ali M. Solid waste collection by the private sector: households' perspective—findings from a study in Dar es Salaam city, Tanzania. *Habitat Inter* 2006;30(4):769–80.
- McMichael AJ. The urban environment and health in a world of increasing globalisation, issues for developing countries. *Bull World Health Org* 2000;200(78):9.
- Ngnikam E. Evolution Environnementale et Economique du systeme de gestion des dechets solides municipaux : Analyse du cas de Yaounde au Cameroun. LAEPSI, Lyon. Institute National des Sciences Applique de Lyon; 2000.
- Olley J, Wilson DC, Read A. Getting results: realising the benefits of community participation in strategic planning for municipal waste management; 2006.
- Olley JE, Wilson DC, Read AD, Vreede Vd. Building municipal capacity for strategic waste management planning, presented at ISWA Annual Conference 2004, Rome, October 2004.
- Page B. Communities as the agents of commodification: The Kumbo Water Authority in Northwest Cameroon. *Geoforum* 2003;34(4):483–98.
- Palczynski RJ. Study on solid waste management options for Africa. Project Report for the African Development Bank – Sustainable Development & Poverty Reduction Unit. Abidjan, Côte d'Ivoire; 2002.
- Read AD. National strategy and local MSW management practice, a policy implementation problem in the U.K? In: Proceedings in the 14th International Solid Waste Technology and Management Conference, November; 1998.
- Read AD. Making waste work: making UK national solid waste strategy work at the local scale. *Resour Conser Recyc* 1999;26(3/4):259–85.
- Read AD, Wilson DC. The strategic planning guide for solid waste management—an interactive toolkit for environmentally developing countries. In: Proceedings of the Sardinia Waste Symposium 2003, October; 2003.
- United Nations (UN). The global partnership for environment and development: a guide to Agenda 21. New York: United Nations Organisation; 1993.
- Vermande P, Ngnikam E. Etude de la gestion et des traitement des ordures menageres de Yaounde (Cameroon), vol. I Actual Situation. Yaounde. Fond Special d'Equipement et d'Intervention Intercommunale (FEICOM). Maire d'arrondissement de Yaounde II, ENSP et l'Université de Yaounde I; 1994.
- Wilson DC, Pow S, Read A, Kolganov D. Regional waste management planning in the Kaliningrad Oblast of Russia—a case study of technical assistance to achieve sustainable improvements in waste management. In: Proceedings Sardinia 2005, Tenth International Waste Management and Landfill Symposium; 2005.
- Wilson DC, Velis C, Cheeseman C. Role of informal sector recycling in waste management in developing countries. *Habitat Inter* 2006;30(4):797–808.
- Wilson DC, Whiteman A, Read AD. Strategic planning for solid waste management; an interactive toolkit for developing countries. *Waste Manage World* 2003:55–60.
- World Bank. Upgrading low income settlement country assessment report. Cameroon; 2002. <http://web.mit.edu/urban%20upgrading/upgrading/case-examples/Cameroon.htm> [accessed April 30 2005].