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## Abbreviations

AMA	Accra Metropolitan Area
APROSEN	National Agency on Waste Management
CBO	Community Based Organizations
CEIA	Centre for Environmental Impact Analysis
DESSAPs	District level Environmental Sanitation strategies and Action Plans
EPA	Environmental Protection Agency
ESPR	Extended Producer Responsibility
EU	European Union
IEC	Information, Education and Communication
ISWM	Integrated Solid Waste Management
IWWA	Integrated Waste Management in Western Africa
KNUST	Kwame Nkrumah University of Science and Technology
MEST	Ministries of Environment, Science and Technology
MMDAS	Metropolitan Municipal and District Assemblies
NGO	Non Governmental Organization
SWM	Solid Waste Management
UCC	University of Cape Coast

## 1. BACKGROUND

The West African sub - region faces many challenges including the inability of economic growth rates to deal with the numerous developmental challenges facing region. These constraints include access to clean and safe water and sanitation and development of infrastructure for dealing with solid waste. As urbanization continues to take place in Ghana, Nigeria, Senegal and Côte d'Ivoire who are immediate beneficiaries of the EU – IWWA project, management of solid waste is becoming a major public health and environmental concern in urban, peri-urban and rural communities.

It is within this context that the seventh EU framework programme on environment with focus on climate change was designed. Under this project, IWWA partners in Senegal, Nigeria, Ghana and Cote D'Ivoire were tasked to organise participatory workshop with relevant stakeholders involved in solid waste management in their respective countries.

The purpose of this workshop is to discuss with relevant stakeholders in solid waste management in the target countries some of the constraints that affect effective implementation of solid waste policies in a sustainable manner. The workshops will permit those different stakeholders with interest in the solid waste management to provide inputs in order to be taking into account in the proposal of recommendations that IWWA consortium will perform under work package 4. The participatory workshop is also to afford members of the IWWA consortium to discuss some of the results that have been achieved so far during the implementation of the IWWA project. At the end of the participatory workshop, the relevant stakeholders will be required to make inputs into formulation of sustainable solid waste management policies as well as development of workable solid waste principles that can be implemented in the target countries.

## 2. SENEGAL

The participatory workshop was held in Dakar (Senegal) from April 20th to 21th 2011 in the premises of the African Urban Management Institute (*Institut Africain de Gestion Urbaine - IAGU*). It started by a welcome address by Ms Salimata WONE as the vice Executive Secretary of IAGU. This welcome address was followed by speeches of the representatives of local authorities.

The IWWA programme was presented to all participants by Mr. Amadou DIALLO as the coordinator of Enda Ecopole. Mr. Abdou DIOUF, Director of the association EVE, also made a few comments on the evolution of the programme until now.

The participants introduced themselves: NGO Enda GRAF-EVE (*environnement, vie et eau*), IAGU, NGO Enda Ecopole Jacques BUGNICOURT, the association of the waste pickers of Mbeubeuss dumping site (*Association des récupérateurs de Mbeubeuss*), the workers' union of municipal waste workers (*Syndicat des Services de nettoyage*), the Secretariat of the Basel Convention, the National Agency on Waste Management (*APROSEN*), NGO Enda RUP, the concessionaries, ISE, SENECLIC, the Direction of the Environment (Ministry), NGO LVIA Sénégal, the sub cities of Ouakam, Thiaroye sur mer, and the Regional Council of Matam.

Some participants apologized for not being able to attend the workshop. These were CADAK and the City of Foundiougne.

Mr. Moussa GUEYE, a consultant, proposed a methodology for the working groups and the plenary sessions. After a few amendments made by the participants to the agenda, the workshop started.

## 2.1. State of the art

Senegal has a national Integrated Solid Waste Management (ISWM) strategy which aims at improving waste management both at local and national level. This strategy gives strategic directives to set up an integrated, operational and sustainable system which clearly identifies the roles, missions and institutional responsibilities.

Environment and natural resources management is one of the main areas of competence that have been transferred to local governments.

*“Domestic waste management is under local governments’ responsibility, i.e., municipalities”* (Code of Hygiene, Chapter 3, Article 16). However, SWM is a problem everywhere in Senegal and is a blatant evidence of the difficulties faced by municipalities to carry out their mission on SWM because of the lack of technical and financial means. Poorly managed waste ends up contaminating the environment beyond each municipality’s administrative territory. SWM is also confronted to the challenges of urbanization, demographic growth and growing quantities of waste.

Senegalese cities face a strong, not really controlled demographic growth, while consumption patterns have changed and generate more and more domestic waste. This quick demographic growth is due to the endemic droughts of the 70s that encouraged the development of urban economic activities, especially in the informal sector. When the socio-economic crisis got worse, thousands of people from various origins came to settle in cities.

In the context of this quick urbanization, infrastructures have not been upgraded to collect waste efficiently. Senegalese households take care of their houses but public areas are perceived as « no man’s lands » and thus converted into dumping sites for all types of waste (plastic bags, batteries, oil, and others). The multiplication of illegal dumping sites is a threat to human health and the environment.

Solid Waste Management actors face many challenges, among which are:

- (i) the ever growing quantity of waste;
- (ii) The need for a specific treatment of some types of waste (biomedical waste, plastic bags that are abundantly used to wrap up any kind of good).

To find solutions to these challenges, the government, local governments, community-based organizations and associations have been taking initiatives for many years. Unfortunately, these initiatives are not always coherent to face the challenges globally.

### 2.1.1. Solid Waste Management (SWM) approaches in Senegal

From the 1960s to the central government of Senegal transferred the responsibility of SWM to municipalities. In 1996, within the context of decentralization, several approaches have been tried with more or less success to find sustainable solutions to the solid waste problem and improve the living conditions. The efforts have been mainly focused on three areas:

- (i) building the capacities of elected representatives in SWM;
- (ii) getting waste collection equipment;
- (iii) Increasing the responsibility of the inhabitants in SWM.

The third approach is more and more being tested by municipalities. It clearly has some advantages especially in the sense that it allows for waste collection. In addition, involving households and municipal technical services contributes to creating appropriate conditions for the sustainability of the system. However, achievements are difficult to consolidate because:

- (i) there is very often no controlled landfill for the final disposal of the collected waste;
- (ii) there is not possibility to valorize domestic waste to minimize their negative impact;
- (iii) There is no specific collection circuit for some waste such as plastics and batteries.

In conclusion, this approach is far from solving the problem, considering the quantities and the nature of waste that is generated. It is urgent to draft a local strategic plan for SWM and tools to better understand and choose the most appropriate waste treatment option. The problem is complex, it is therefore important to improve its analysis to gain coherence and above all efficiency.

The participatory workshop was organized in Senegal within IWWA programme from April 20<sup>th</sup> to 21<sup>st</sup> 2011 and was seen as a starting point to better understand the issue and find appropriate solutions to improve existing systems in Senegal. Be it in collection, transportation, treatment, recycling or final disposal, there are many existing tools and experiences have been carried out around the world. Local expertise also exists. In addition, local elected representatives are now aware of the threat posed by domestic waste to the environment and to straying cattle (plastic bags).

## **2.2. Purpose and objectives of the workshop**

The purpose of this workshop was to discuss with relevant stakeholders in solid waste management in Senegal some of the constraints that affect effective implementation of solid waste policies in a sustainable manner. The participatory workshop was meant to enable these stakeholders to discuss the findings of the studies carried out within IWWA so far.

The relevant stakeholders were required to make inputs into formulation of sustainable solid waste management policies as well as development of workable solid waste principles that can be implemented in the target countries.

The expected results of the workshop were as follows:

- Stakeholders mapping is updated;
- Institutional, organizational, technical and financial constraints are identified;
- A consensual action plan is identified;
- A follow-up mechanism is suggested.

### **2.2.1. Overview of the IWWA Project**

Once IWWA was presented to participants as well as the methodology, two working groups were set up to analyze the role of actors in waste management and the obstacles to an efficient waste management system. It was decided to focus on identifying good practices.

A plenary was then held to debrief on the results of the discussions of the working groups and to identify priorities and further investigation needs.

The two day workshop was structured around these objectives. Conclusions and perspectives were drawn thanks to innovative ideas articulating sustainable waste management, job creation and environmental protection.

The report of the two working groups has been summarized in tables 1 and 2 below.



**Table 1:** Results of working group 1: Analysis of the actors and of the institutional framework

Members of the working group 1: moderator, El Hadji Malick GAYE, rapporteur Papa Mar DIALLO, Amadou DIALLO, Madany SY, Adiouma DIONGUE, Salimata WONE, Oumou Khaïry Sy DIA, El Hadji Mamadou THIAM, Cheikhou GASSAMA, Abdou Karim FALL.

Categories of actors	Skills	Potential	Weaknesses related to the actors	Structural constraints	New elements in the context	Role/contribution to the development of the system	Capacity building needs	Recommendations
APROSEN	Definition of policies	Technical expertise	Lack of human and financial resources	Concentration framework with the technical Directions of relevant Ministries (environment, territorial).	Sustainable SWM programmes	Improve the coherence.	In human resources;	Set up a participatory, multi-factor strategy of waste management.
	Technical and institutional support for municipalities		Lack of communication		Institutional context management and coordination)	Bed making (produce information)	In technical skills	
Ministers	Validation of environmental impact studies	Expertise		No communication	Transfer of technologies, of know-how and of best practices	Control of quality	In management skills	
					Involvement of all stakeholders	Set up and operate infrastructures		
					Partnership with municipalities	Define environmental policies		
						Reform the Code of Environment		
						Disseminate legislation and policies.		

Categories of actors	Skills	Potential	Weaknesses related to the actors	Structural constraints	New elements in the context	Role/contribution to the development of the system	Capacity building needs	Recommendations
Municipalities	Waste collection  Waste transportation to disposal sites	To take initiatives  To link up with decentralized co-operation (for example, with foreign municipalities)  To link up with NGOs	Lack of skilled human resources  Lack of means  Low involvement of sub cities and rural towns <sup>1</sup>	Low level of inter-municipality cooperation	Participation, awareness-raising among the population  Legal framework of waste management	Follow up and control the operation of the infrastructures.	For elected representatives  For waste specialists (Mr. Waste)	Involvement in pre-collection.  Formulate municipal policies.  Set up waste management services.
NGOs	Experimentation  Action-research-training.	To take initiatives  To start innovations  To influence public policies.	Lack of coordination  Lack of means	No facilitation  No support		Action-research-training.  Social innovation	More support from the State.	Set up simple and adapted systems for collection and transportation.
Private sector	Implementation of waste management systems.	Human resources  Material means	Lack of material means  Lack of professionalism  Lack of training	Strong involvement in the system.		Waste collection and transportation  Involvement in policy formulation.	At the technical level  At the HR level  Capacity building for waste collectors	
Waste pickers and recyclers	Waste sorting	Expertise				Involvement in local observatories <sup>2</sup>		

<sup>1</sup> in French: *communautés rurales*

<sup>2</sup> In French: *conseils de surveillance*

Categories of actors	Skills	Potential	Weaknesses related to the actors	Structural constraints	New elements in the context	Role/contribution to the development of the system	Capacity building needs	Recommendations
						Take into account their visions.		
Associations or businesses lead by women <sup>3</sup>	Waste collection and processing (re-use, recycling)	Availability of local working force						Set up a concentration and experience sharing framework for the stakeholders.
Workers' unions	Defend workers' interests Waste collection Advocacy Expertise	Efficient capacity to mobilize actors						Promote waste valorization at close as possible to where waste is generated.

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<sup>3</sup> in French : *groupements de promotion féminins - GPF*

**Table 2:** Results of working group 2: How is the Solid Waste management system organized

Members of working group 2 : Moderator, Abdou DIOUF, Rapporteur Ousseynou FALL, Abdoulaye TOURE, Amadou Camara TOURE, Fagamous Sy DIOP, Mohamed GUEYE, Saliou CAMARA, Amadou BA.

Aspects	Achievements	Constraints	Suggested solutions	New elements in the context
Organizational	<ul style="list-style-type: none"> <li>- Existing national policy on SWM.</li> <li>- Increasing number of partnerships in SWM.</li> <li>- Existing solid waste collection schemes in municipalities.</li> <li>- Existing implementation entities for the SWM policy.</li> <li>- Involvement of the private sector and associations (community-based organizations) in SWM.</li> <li>- Existing legislation on SWM.</li> <li>- Existing national strategy for SWM.</li> <li>- Existing observatory around the APROSEN.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of sustainability of companies, concessionaries in SWM in some municipalities.</li> <li>- Institutional instability of the SWM sector.</li> <li>- Lack of coordination between the various stakeholders.</li> <li>- Missions of the institutions are often at the national level and their interventions are limited.</li> <li>- Confusion among some actors about their roles and responsibilities in SWM (State, local governments etc.)</li> <li>- Partnership sometimes limited to projects.</li> <li>- Lack of implementation of policy and legislation on SWM.</li> </ul>	<ul style="list-style-type: none"> <li>- Clarify roles and responsibilities of the Actors in SWM.</li> <li>- Promote institutionalized at various levels.</li> <li>- Identify at the central level, a structure to coordinate actors in SWM.</li> <li>- Stabilize working relationships between the State and the private sector.</li> <li>- Prepare a policy brief on SWM.</li> <li>- Train actors on their roles and responsibilities.</li> </ul>	<ul style="list-style-type: none"> <li>- Code of Environment is being revised</li> <li>- Situation of the Entente CADAK CAR / APROSEN to be clarified.</li> </ul>
Technical / Technologies	<ul style="list-style-type: none"> <li>- Use of adapted technologies in some areas (pushcarts, tricycle.)</li> <li>- Existing SWM equipment (vehicles, sanitation...)</li> <li>- Existing pilot initiatives on waste sorting, recycling (valorization of solid waste)</li> <li>- Existing SWM infrastructure (landfills, be they controlled or not, recycling units)</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of waste pre-collection and collection material, or the material is not adapted.</li> <li>- Decayed material.</li> <li>- Poor management of infrastructure and technical equipment (controlled landfills, transfer stations).</li> <li>- Weakness of initiatives to valorize waste.</li> <li>- Lack of waste collection bins in crowded areas.</li> <li>- Long distances between waste generation areas and waste collection</li> </ul>	<ul style="list-style-type: none"> <li>- Multiply pilot projects on waste valorization.</li> <li>- Promote the setting up of intermediary infrastructures between waste generation areas and waste collection areas.</li> <li>- Draft and implement maintenance programmes for the equipment, material and Infrastructure.</li> <li>- Improve technical and</li> </ul>	

Aspects	Achievements	Constraints	Suggested solutions	New elements in the context
		<p>areas.</p> <ul style="list-style-type: none"> <li>- Decayed, sandy or rough roads.</li> <li>- No maintenance programmes for vehicles.</li> </ul>	<p>technological infrastructure (esp. collection equipment).</p>	
Financing system	<ul style="list-style-type: none"> <li>- Interest of technical partners to support SWM sector (EU, LUX-DEV, decentralized cooperation)</li> <li>- Political will of the State to provide financial support to SWM, especially in Dakar (10 billion / year in Dakar).</li> <li>- Existing tax on waste collection<sup>4</sup></li> <li>- Some community-based initiatives get access to grants.</li> <li>- Community financial participation in solid waste pre-collection initiatives.</li> </ul>	<ul style="list-style-type: none"> <li>- Municipalities face difficulties to collect the tax.</li> <li>- Financial support from the State is limited to Dakar.</li> <li>- Difficult collection of inhabitants' collection fee in community-based SWM initiatives.</li> </ul>	<ul style="list-style-type: none"> <li>- Reform the fiscal policy on waste.</li> <li>- Sensitize actors on the importance to pay for the tax.</li> <li>- Encourage the government to better allocate available SWM resources.</li> </ul>	
Social and cultural	<ul style="list-style-type: none"> <li>- Existing habits to sweep and clean around the houses.</li> <li>- Community leaders support cleaning initiatives in some areas.</li> <li>- Existing recuperation and re-use practices of some solid waste.</li> <li>- Development of skills around recuperation and re-use.</li> </ul>	<ul style="list-style-type: none"> <li>- Production and consumption patterns lead to ever growing waste generation rates.</li> <li>- Lack of exploration of the markets in SWM.</li> <li>- Lack of citizenship in SWM in public areas.</li> <li>- Controlled importation of second hand good that can become waste.</li> <li>- Individual behaviors and practices threaten the environment.</li> <li>- Anarchic occupation of public areas, streets.</li> </ul>	<ul style="list-style-type: none"> <li>- Improve the regulation on the importation of second-hand goods and on packaging.</li> <li>- Develop communication and education</li> <li>- Programmes on good SWM practices.</li> <li>- Enforce legislation on the occupation of public areas and on health.</li> </ul>	

<sup>4</sup> In French : *Taxe d'Enlèvement des ordures ménagères (TEOM)*

### 2.3. Analysis and synthesis of the results of the discussions in working groups

Fighting solid waste proliferation is the responsibility of municipalities but also of grassroots groups, civil society actors and the private sector. It must therefore combine as efficiently as possible means and resources to optimize achievements.

The best practices presented during this workshop advocate for a multi-actor approach for a sustainable solid waste management.

Efficient governance is necessary for sanitary, environmental and economic reasons. It is therefore urgent to take into account all categories of actors, be they actors or victims of the contamination generated by solid waste.

Improved governance will help to implement a more sustainable waste management by the local actors directly concerned, to protect the environment, to improve the living conditions, to create jobs and income opportunities for vulnerable groups, and in particular for young people that are left aside by the education and training system and that are tempted by illegal emigration.

In the conclusions of the workshop, the institutional and organizational framework was clearly seen as appropriate and in coherence with the laws on decentralization. Beyond the identified weaknesses and constraints, the workshop highlighted the need to build capacities and to better involve the actors as early as possible in the process. There is a need for alternative approaches, which the concerned authorities, fortunately enough, have understood.

It is now time for action for the existing frameworks. The common point in the best practices that have been identified is the eco-systemic approach, the promotion of complementarities and synergies among a diversity of actors.

Participation must be institutionalized for a better comprehension of the context on the ground and what is at stake when solid waste management systems are set up.

However, this approach is not a magical solution to all the damages caused by solid waste to the population. There is a set of conditions that can improve the perspectives of success of waste management systems, among which:

- (i) the need for all partners to agree on what the objectives are and to make sure each partner is legitimate in terms of mission and roles
- (ii) the need to respect the differences of each actor and to be aware of the added value of complementarity
- (iii) the need to stick to the commitments and the deadlines agreed by partners
- (iv) the need to take into account the direct beneficiary as a partner
- (v) The need to elaborate tools to enable a participatory evaluation of the solid waste management system.

A good solid waste management must include appropriate valorization of waste, involvement of various types of actors, and a new participatory approach. This will enable a system of waste collection, sorting, valorization and disposal to emerge and to be a reality on all the neighborhoods of the cities, by using simple and appropriate technologies.

When managed inappropriately, waste represents a source of contamination; when managed appropriately, it represents a source of income. A good management of urban waste implies:

- Valorizing (recycling) the largest proportion of waste in sustainable economic conditions.
- Setting up a sustainable fee-collection system to improve the inhabitants' financial contribution to costs of waste collection, in a participatory, consensual way.
- Giving inhabitants more responsibilities in terms of financial management of their contribution to the costs of the system and of the incomes generated.

- Setting up a wide education and awareness-raising programme on sustainable, integrated waste management, on the new legislation, on the risks of waste proliferation for public health, on insalubrities and its consequences as a threat for the socio-economic development of concerned areas. The success of any waste management system will depend on its capacity to implement Information- Education- Communication (IEC) programmes. Before being a technical issue, insalubrities is an education, a citizenship issue.
- reducing the environmental impacts (toxicity) of waste;
- reusing organic waste by producing clean compost that can be used in the local agriculture;
- Setting up an operational, controlled landfill complying with environmental standards.

There is a convergence between the workshop's results and the general objectives of IWWA which are:

- To reinforce the institutional framework around solid waste management, and co-ordination at all levels ;
- To promote the involvement of various actors (including the private sector) in planning and management of solid waste ;
- To promote the transfer of technologies, know-how and best practices ;
- To reinforce partnerships with municipalities ;
- To promote participation and awareness-raising of the general public and stakeholders ;
- To reinforce the legal framework of solid waste management in targeted countries.

The multi-actors approach will have to be articulated with an approach focused on skills. This latter approach consists in identifying where responsibilities and missions should be defined so as to professionalize solid waste management systems.

Bearing this in mind, civil society organizations should reconsider their position in the waste management system in the light of the law but also to the actual skills and competition advantages.



Fig. 1: Participants during the working group in Senegal

### 3. GHANA

#### 3.1. INTRODUCTION

The meeting started with an opening prayer by Mr. Eric Amamoo at 8:30 am on Wednesday 23<sup>rd</sup> March 2011 at Erata Hotel, Accra. The Chairman of the occasion was Rev. Prof. D. K. Dadoo who is the Board Chairman of CEIA. The Executive Director of CEIA, Mr. Obiri Samuel, in his speech to welcome participants to the workshop emphasised the need for participants present at the meeting be guided by the words of Dr. Ephraim Amu: “Yen ara ye asaase ni” which literally means “This is our homeland” and not to be divided by personal interest. He stressed on frankness in his speech. Mr. Obiri touched on the relationship between the attainment of middle income status, health and waste.

Dr. Mensah presented a brief overview of what IWWA is and how far it has been in existence including what they stand for. He said IWWA project involves four African countries namely: Ivory Coast, Senegal, Nigeria and Ghana. The consortium consists of 19 partners out of ten countries in Africa and Europe. There are three IWWA consortium members in Ghana namely: KNUST, Zoomlion and CEIA. As a prelude to his presentation, Dr. Mensah, stated that the Oxford English Dictionary has both subjective and objective definition for the term waste. The subjective deals with what the owner declares as waste and the value of the particular material while the objective requires higher authority to be disposed off as waste. He added that, waste is intended to be disposed of by a functional authority.

He further went on to define Integrated Waste Management as a management that integrates waste streams collections and treatment methods, environmental benefits, economic optimisation, social acceptability into a practical and sustainable system by designing continuously, improving and monitoring solid waste management for a community or region in a manner that renders it environmentally effective, economically affordable and socially acceptable. He also said that, finding means of dealing with waste that eventually ends up in our landfills is one of the aims of a successful integrated waste management system. He went further to discuss with participants elements of an integrated sustainable waste management. The elements of integrated solid waste management include:

- Collection and sorting of solid wastes
- Material recycling and re-use
- Biological treatment
- Thermal treatment
- Landfill

He stressed that the above five elements are integrated and used figure 2 below to explain the linkages between each of the elements.





Fig. 2: The elements of Integrated Waste Management

Mr. Edward Antwi of KNUST IWWA team presented a paper on “Results of IWWA Project achieved so far”. The outline of his presentation are as follows; WP 1: Setting up of project framework: definition of criteria and parameters, WP2: Analysis and evaluation of current situation in the targeted countries, WP3: Identified best suitable integrated municipal solid waste management systems and approaches, WP4: Elaboration of policy guidelines, WP5: Evaluation of the implication of proposed changes and WP6: Dissemination and training.

On work package 1, Mr. Antwi stated that it has already been completed. According to him, work package 1 was divided into three tasks. These are:

- Criteria for evaluation of the regional socio – economic situation and policy background (Task 1.1)
- Criteria for identification of relevant key stakeholders (Task 1.2)
- Criteria for evaluation of solid waste management practices (Task 1.3)

Under task 1.1, Mr. Antwi said that the following criteria were adopted to evaluate the socio economic situation and policy background for the four target countries:

- Demographic indicators have been defined
  - Population growth
  - Population density
  - Age distribution
  - Gender ratio
- Economic indicators that have been defined are:
  - Income levels (household)
  - Employment status
  - Principal productive sectors
  - Cost of waste collection and disposal
- Institutional indicators defined are

- Policy makers
- Law enforcement agencies
- Legal framework
- Education

For task 1.2 under work package 1, Mr. Antwi said that the following relevant key stakeholders involved in solid waste management practices had been identified in Ghana and the other target countries. These are:

- Ministries, MMDAS and Traditional Authorities
- NGOs and CBOs
- Recycling companies
- Services providers
- Industries
- Educational institutions
- Law enforcement authorities

On task 1.3 of work package 1, he stated that the following criteria have been developed to evaluate solid waste management practices in the target countries. These are:

- Waste characterization
- Origin of waste
- Quality of waste
- Collection frequency
- Separate collection of waste streams
- Number of people engaged
- Transportation technology
- Final disposal infrastructure and practice

Mr. Antwi had this to say on work package 2 which was divided into the following tasks:

Task 2.1: Regional characterization and assessment of solid waste management situation (state of the art) in the target countries. He said that the regions have been characterized into urban, rural and semi urban areas. In urban areas further classification into first class, second class and third class. Also legal background together with identifying loopholes has been prepared.

Task 2.2: Mapping and evaluation of current research in target countries. Under this task, Mr. Antwi stated that a database of current research activities of members of the IWWA consortium has been compiled together with other research activities on solid waste management outside the consortium members.

Task 2.3: Identification of relevant key stakeholders. He had this to say on this task; we are all present here because a comprehensive database of stakeholders emanating from task 1.1 has been prepared

Task 2.4: evaluation of solid waste management practices and technologies in target countries. He said the following has been achieved under this task:

Waste management activities in urban areas has been prepared

- Quantities of waste generated
- Waste management budget
- Recycling activities
- Industrial waste stream
- Technologies employed
- Waste management practices in rural/semi urban areas has been prepared

- Quantities of waste generated
- Waste management budget
- Recycling activities
- Industrial waste stream
- Technologies employed

For task 2.5 (detection of main barriers and obstacles for implementation of integrated solid waste management, he said that, members of the IWWA consortium are still working on it. On this note he ended his presentation.

There were three other technical presentations on Integrated Sustainable Waste Management in Ghana which focused on Technical, Socio – economic, Institutional and Legal constraints and prospects affecting successful implementation of ISWM in Ghana.

### **3.2. TECHNICAL PRESENTATIONS:**

#### **3.2.1. Integrated sustainable solid waste management in Ghana- Challenges and prospects**

This presentation was given Mr. Edward Antwi of IWWA KNUST team. The outline for his presentation is as follows:

- Background
- Identified challenges
- Finance
- Running cost
- Landfill
- Demographic
- Recycling
- Some key questions
- Conclusion

He began his presentation with the following statistics on solid waste management in Ghana:

- Huge waste generation – 12,000 tons per day
- On the national scale 57.6 % of waste generated ends up at improper disposal site
- Only about 70 % of waste generated in urban areas are collected
- Practically no waste management system in place in rural areas
- Only one engineered landfill in the country (Kumasi)
- Uncoordinated recycling activities

Having said this, he then identified some challenges affecting solid waste management in Ghana.

The identified challenges are:

- finance
- running cost
- availability of landfill
- demographic
- poor data collection
- recycling

He said waste management is very expensive. For example, the Accra Metropolitan Assembly spends GH¢ 500,000 annually on the management of solid waste. The high cost of solid waste management can be attributed to several reasons among them are; traffic situation in cities not helping, use of second hand trucks, poor maintenance culture and high fuel cost.

He lamented that the country has no engineered landfill site for disposal of solid waste. As most residents are not willing to allow sitting of landfill sites close to them. As a result of this, he stated

that there is indiscriminate dumping of solid waste at some supposed landfill sites by service providers.

He stated that most wastes are not sorted at their source as such recycling of waste in Ghana is very low. Other reasons he gave to explain low output on recycling of waste are as follows; poor coordination of recycling activities, attention and focus should be on waste reduction, individuals should be encouraged to recycle their waste by giving them incentives

### 3.2.2. Integrated sustainable solid waste management in Ghana- Socioeconomic constraints and prospects

This presentation was made by Mr. Kwadwo Miezah, Head of Research Unit, ZOOMLION Ghana Limited. The outline of his presentation is as follows:

- Introduction
- Sustainable waste management
- Socio – economic impact of waste management
- Challenges
- Prospects

He stated that waste management in Ghana is basically limited to sector level where each lead Ministry or Agency as an actor performs without the consent and participation of others. For example the lead ministry in charge of waste management is the Ministry of Local Government and Rural Development. However, the Ministry of Environment, Science and Technology as the sector ministry in charge with the protection of the environment do also implement or formulate some solid waste policies. In the light of this, he said that there is the need for sector collaboration of all the agencies as well as regulatory bodies in order to achieve and foster highly level of efficiency and effectiveness in their act. He also stressed the need for stakeholders to work in an enabling environment that helps to attain sustainability in waste management.

He stated that sustainable waste management is the major driver towards achieving the socio-economic goals in every society and also attainment of all the MDGs and it must takes into account management of public health, environmental quality and preservation of aesthetic quality of the environment.

He said for any waste management plan to be sustainable there is the need to consider to inclusivity of both users and service providers based on the following reasons:

- The User needs to be satisfied at all times, hence must understand any on-going waste management activity, programmes or projects
- The User is also committed to live in a clean environment and would do everything to achieve this aim
- New activities cannot be undertaken without the knowledge and consent of the nearby beneficiary communities
- They are waste professionals and bring knowledge and expertise on board
- They may be able to deliver services at lower costs
- They may achieve higher coverage rate

On financial sustainability of solid waste management, he advocated for full cost recovery for collection, transportation, sorting, recycling and disposal from waste generators. However, he also recommended the need for establishment of an Extended Producer Responsibility (ESPR) as well as sale of recyclable fractions of waste to ease the financial burden of waste sector service providers. He said the pricing regimes for the collection of waste through Public Private Sector Participation (PPP) should factor into consideration the pro – poor and the vulnerable in society.

Mr. Miezah enumerated the following as some of the socio – economic challenges associated with solid waste management in Ghana:

- ✓ Poor Waste Management practices will cause huge public spending on managing adverse impacts:
  - Huge costs curing communicable diseases i.e. endemic cholera; malaria, etc
  - Morbidity and mortality rates will increase
  - Loss of productivity will be encountered
- ✓ Poor waste management leads to:
  - Pollution of surface and groundwater which in turn impose a burden on production of good water for consumption
  - Breeding of rodents, reptiles and insects which are nuisance to the general public
  - Production of odour which affects the air quality
  - Waste not properly managed leads to loss of the beauty of the environment of any human settlement

He had this to say on prospect of sustainable solid waste management in Ghana that the beneficiaries of waste management services range from the informal private sector, the formal private sector and the public sector waste management companies.

These companies create jobs for a great number of otherwise unemployed members of the society. Sustainable solid waste management activities will contribute to wealth creation and therefore poverty reduction of workers in the sector, especially when material recovery is considered on a full scale.

He concluded his presentation by stating that proper waste management provides a source of energy especially when biomass are turned into energy producing venture (waste to energy) also compost made from solid waste materials will provide nutrients for soil fertility and hence boost food production and greening of the environment.

### 3.2.3. Integrated solid waste management- Institutional and legal challenges

This was a joint presentation by Dr. Yvonne Idun and Mr. Samuel Obiri. The outline of their presentation is as follows:

- Overview of institutional/legal framework on solid waste management in Ghana
- Legislation and policy
- Institutional responsibilities
- Further proposal for regulatory reforms regarding Ghana's Waste Management Law
- Conclusion

They gave a brief overview of legal/institutional policies on solid waste management in Ghana. They stated that given the harmful effects of waste on human and ecological health, Ghana has over the past few years started working on promoting laws which could adequately deal with this issue.

As far as the formulation and enforcement of waste management laws in Ghana are concerned, this is the responsibility of the executive who send bills on waste management to the legislature who passes them into laws. At the District/Municipal/Metropolitan levels, assembly members, administrators, and environmental protection officials from Ghana's Ministries of Environment, Science and Technology (MEST), Ghana's Environmental Protection Agency (EPA) and some other ministries who prepare, enforce, and implement policies on waste handling. These officials participate in the planning and management of issues relating to waste.

Though these parties have made commendable efforts, some loopholes could still be identified Ghana's legal approach to managing waste, and some recommendations made for a better functioning of waste management laws in this country. On legislation and policy document on solid waste management in Ghana, they gave a list of some of laws that govern solid waste management as:

- Local Government Act, 1990 (Act 462)
- Environmental Assessment Regulations, 1999 (LI 1652)
- Criminal Code, 1960 (Act 29)
- Water Resources Commission Act, 1996 (Act 522)
- Pesticides Control and Management Act, 1996 (Act 528)
- National Building Regulations, 1996 (LI 1630)
- National Environmental Quality Guidelines (1998)
- Ghana Landfill Guidelines (2002)
- Manual for the preparation of District Waste Management Plans in Ghana (2002)
- Guidelines for the Management of Healthcare and Veterinary Waste in Ghana (2002)
- Handbook for the Preparation of District level Environmental Sanitation Strategies and Action Plans (DESSAPs).

They identified the following as success stories and pitfalls within Ghana's institutional and legal framework on solid waste management:

- Fragmentation of Laws and Lack of Co-ordination amongst Stakeholders/Agencies
- Partnerships for Various Stakeholders in Waste Management
- Absence of a Consolidated Law Regulating Waste
- Waste Reduction and Treatment Instead of Waste Dumping
- Lack of Sufficiently Trained Personnel
- Absence of Adequate Penalties
- Barriers to Private Sector Participation in Waste Management in Ghana.

On institutional responsibilities with regard to solid waste management, they stated that it is the responsibility of the Ministry of Local Government and Rural Development using the figures below.

### **INSTITUTIONAL RESPONSIBILITIES** National/Regional/Districts

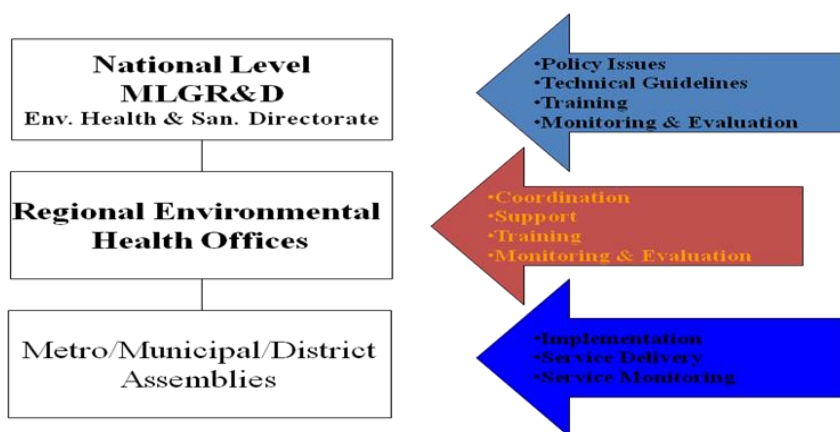


Fig. 3: Institutional responsibilities for waste management service delivery

Quoting from Fobil et al., in the 2008 analysis of waste collection model in Ghana, they pointed out some of the pitfalls within the current institutional arrangement concerning solid waste management in Ghana using the figure below.

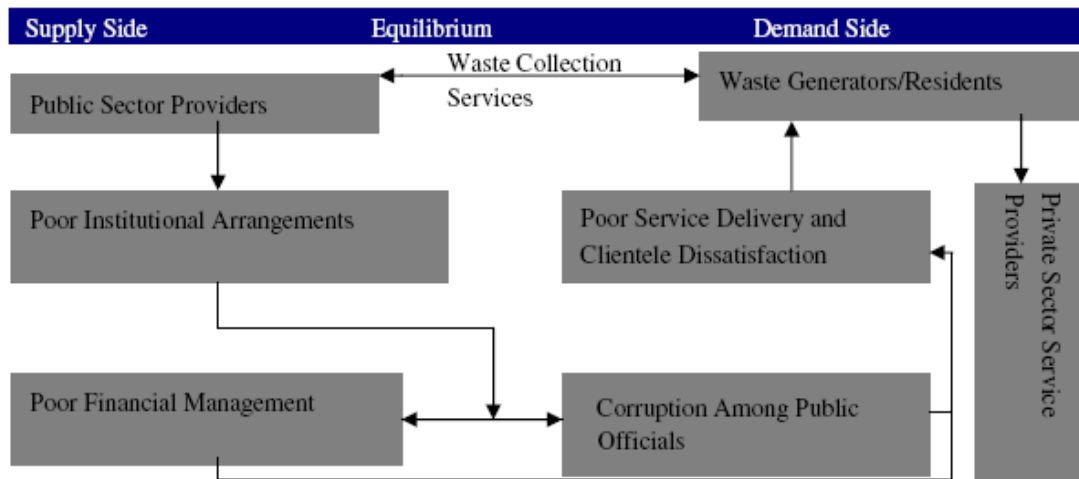


Fig. 4: Analysis of waste collection in Ghana adopted from Fobil et al., 2008

They indicated as a result of weak institutional arrangement in solid waste management in Ghana, it gives great latitude to public officials in applying the rules some of who do not take kindly to private sector participation in waste management as they see the loss of monopoly in the area including the right to employ staff as undermining their position. Other pitfalls Dr. Idun and Mr. Obiri identified are:

- Wrong attitude of the general public to solid waste disposal;
- Capacity of human resources;
- Finance;
- Weak research support and
- Politics.

They concluded their presentation by making the following proposals to be incorporated into Ghana's waste management laws:

- Increasing participation of the private sector and appreciation of the policy and supervisory roles of public service in waste management.
- Improved legal and regulatory instruments coupled with strict contract enforcement and monitoring to help achieve the desired results through the setting up of sanitation courts within our communities.
- Introduction of incentive schemes such as subsidies, concessional loans and tax incentives to encourage investment in equipment replacement, research, training, and demonstration projects by the private sector.
- Ghana's waste management law should include the principle of retroactive liability. See example of Love Canal. Advantage of reinforcing this principle: promotion of polluter pays principle as well.
- Need for strict definition of waste in a consolidated and uniform law and what waste amounts to-apart from reliance on definition by Basel Convention. Advantage: source of easy reference for parties handling waste.
- Ensure that formulation and implementation of law ensures a harmonious balance between both trade and environmental concerns.
- The need for an Annex to the uniform law on waste, stating which wastes should be banned from being recycled and which ones should be disposed of, in conformity with Ghana's obligations under Basel, Stockholm and Rotterdam and subject to the peculiar situation of this country.

After the three technical presentations the Chairman opened the floor for general discussions on the three presentations.

Mr. Frank formerly of A.M.A who is presently with National Waste stated that, there was datum of waste records in the country. However, since no one asks of them, it is not revealed periodically. Mr. Oduro of UCC wanted to know exactly the aims of IWWA in collecting data. He further said, knowing the aims will help them know how to go about it otherwise, IWWA should create data on characterisation which could be done through academia or other forms.

A representative of ASPAR said our laws are weakened because of political interference. This he said is because, if an individual is found guilty and the environmental officer follows up to prosecute, he is either transferred or totally removed from his position by an order (from above).

Mr Eric Atako of the GA East Municipal Assembly suggested IWWA takes research seriously since the assembly is not totally religious about research. Mr. Oduro chipped in that representatives of the Assembly, Ministry of Environment, Science and Technology and other bodies in charge of Waste Management should be constituted in IWWA to help in the implementation of policies on the management of waste. Prof. Doodoo stated that decentralization is a major hindrance in the implementation of policies. Mr. Agyemang Duah Zoomlion, said in making efforts to recruit effective personnel there is a need to educate and make it attractive for people to realise the need to work under such bodies.

### **3.3. GROUP WORK**

Participants were tasked to undertake some work in order to bring on their views concerning waste management in the country. Participants were divided into four groups with each group tackling one of the four constraints identified under waste management in Ghana. The constraints that were identified under waste management and used for the group work are as follows:

- Social constraints facing sustainable solid waste management
- Financial constraints facing sustainable solid waste management
- Institutional/legal constraints facing sustainable solid waste management
- Technical constraints facing sustainable solid waste management

#### **3.3.1. Group One: Social constraints facing sustainable waste management**

Under the social constraints, participants were tasked to do the following:

- Identify five key social challenges affecting successful implementation of solid waste management projects in Ghana.
- Identify five key cultural challenges affecting solid waste management in Ghana.
- Identify five key economic challenges affecting successful implementation of solid waste management projects in Ghana.
- Suggest ways in which each of the five key social, cultural and economic challenges identified above can be addressed so as to ensure successful implementation and delivery in solid waste management in Ghana.

For the five key social challenges, participants identified the following:

- Habit
- Education
- Community involvement in all stages
- Abuse and misuse of facilities
- Compliance

For Cultural challenges, these were identified:



- Non involvement of women in decision making.
- Use of children in waste disposal.
- Disregard for traditional authorities in waste management decision and program especially in cities.
- Rising of live stock in domestic premises.
- Gender imbalance, use of girl child.

Under the economic constraints, these were found:

- Affordability of waste management services.
- Street hawking.
- Poor/non existence of appropriate infrastructure.
- Unattractiveness of the sector due to huge capital investment.
- Difficulty in revenue mobilization

On how to address the above challenges, participants gave out these suggestions. For the social constraints, these were the solutions given:

- Public awareness and education.
- Enforcement of laws.
- Development programs and policies that involve society leaders and all relevant stakeholders.

For cultural constraints, these were the solutions given:

- Steps need to be taken to correct gender imbalance; equal attention to both sexes.
- Bringing waste management service close to the home.
- Developing program that involve women.

Under the economic challenges, these were the solutions given:

- Provision of requisite equipment and infrastructure – engineered landfills.
- Greater government commitment in implementation waste management program.
- Public education.
- Music/jingles.
- Involvement of school children.
- Development of programs to involve community leaders.

### 3.3.2. Group Two: Financial constraints facing sustainable solid waste management in Ghana

The tasks for participants under financial constraints were as follows:

- How do central government as well as municipal/metropolitan/district assemblies raise adequate funds for solid waste management?
- To identify ways in which the capacities of central government/municipal/metropolitan/district assemblies on good financial management and planning in relation to financing of solid waste service delivery.
- To identify ways in which central government/municipal/metropolitan/district assemblies can generate income from wastes generated in their areas.

Concerning how central government can raise adequate funds for sustainable waste management, these were the ideas given:

Participants suggested that there should be policy and regulatory framework (policy and by laws) and the policy should address the following issues,

- Environmental tax
- Polluter pays principle
- Setting up of solid waste management fund which can be generated from these sources
- Petroleum
- Salaries
- Property rates
- Market tools
- Building permits
- Utility bills
- Donor agencies

For the second task which is good financial management for MMDA'S, the group identified this point, Adopting SWM plants to promote Recycling, Composting, Less management cost on landfill sites.

The last task under financial constraints, the group identified the following income generating avenues,

- Drop tones
- Night service
- SWMs fund
- Recycling, composting
- Cost recovery
- Effective monitoring.

### 3.3.3. Group Three: Institutional/legal constraints facing solid waste management: Participants were tasked to undertake the following activities,

- Identify ten key institutional constraints affecting solid waste delivery in Ghana.
- Identify ten key legal constraints affecting implementation of successful solid waste services in Ghana.
- How can we address the institutional/legal constraints affecting solid waste management in Ghana?
- How do we enforce all laws governing solid waste sectors in Ghana?

For the ten key institutional constraints these were identified:

- Inadequate Effective monitoring and supervision
- Limited logistics available to institutions
- Financial Constraints - Delay in payment to W.M companies make the institution responsible incapacitated to exercise its obligations.
- Corruption: Revenue collectors are engaged in corrupt practices which lead to loss of revenue to the government institutions.
- Lack of partnership engagement and inclusivity of stakeholders
- Lack of political will to implement principles such as polluter –pays.
- Duplication of functions resulting in conflict among institutions.
- Improper/unstructured decentralization policy.
- Lack of coordination and synergy.
- Lack of commitment on part of politicians to address waste management problems.
- Limited spatial planning.



Fig. 5: Institutional and legal group discussing major constraints affecting solid waste management

These were the legal constraints identified:

- The public is not aware of some existing laws.
- MMDAs do not have legal officers to act on their behalf.
- Some bye-laws are not gazetted and cannot be used for prosecute.
- Longer time is spent to prosecute offenders
- Lack of specialized sanitation courts
- Judges have limited knowledge on waste management laws.
- Lack of sufficient deterrent penalties for offenders.

Under how to enforce laws governing solid waste management, these were given:

- Financial incentive for people to see the value of the waste.
- Create awareness.
- Law enforcement agencies should be more committed.
- Institutions should do more coordination/synergy.
- Training of judges to be more responsive to waste management laws.
- Review of existing laws that are obsolete to reflect the current situation.
- Inter-agencies waste management initiatives should be encouraged.

#### 3.3.4. Group Four: Technical constraints facing solid waste management in Ghana:

The tasks given under technical constraints were,

- Identify ten key technical challenges affecting successful implementation and management of electronic, plastic, industrial and other solid wastes generated in Ghana
- Suggest ways in which each of the ten key technical challenges identified above can be addressed so as to ensure successful implementation and delivery in solid waste management in Ghana.
- What are the roles of academia/research institutions in overcoming technical challenges facing solid waste sector in Ghana.
- What are the bottlenecks involved in sorting/segregation of waste at their source and recycling of the sorted wastes?
- What can be done to remove these bottlenecks?

Technical challenges identified by group members were:

- Transportation
- Lack technical expertise
- Poor planning of communities.
- Inappropriate methods of waste disposal
- Inadequate storage facilities
- Lack of source separation of waste (segregation)
- Lack of transfer stations.
- Lack of educations (public) on proper waste disposal
- Lack of appropriate technology in recycling.
- Insufficient collaboration between waste management/institution.

For the ways to address the challenges, these were suggested by the participants:

- Provision of good road network
- Provision of adequate/sufficient trucks.
- Training of personal to handle all types waste.
- Proper planning of communication at developmental stages.
- Enforcement of building regulations
- use of appropriate technology for water disposal
- Provision of dustbin and central containers for waste disposals.
- Institute waste segregation at all levels.
- Provision of approved disposal sites.
- Availability of engineers land fill site
- Provision of transfer station at community level.
- Segregation of waste
- Sensitization
- Outreach/ education on proper water disposal.
- Training of small and medium scale entrepreneurs.
- Research on appropriate technologies for recycle.

The roles of academia in overcoming technical challenges were identified as:

- Education and training of researchers in solid waste management
- Findings and recommendation on approved waste management systems.

Bottlenecks identified when it comes to waste segregation at source were

- Lack of incentives
- Lack of dustbin
- Inadequate education
- Inadequate equipment for waste segregation.

Concerning what can be done to remove the bottlenecks associated with waste segregation, these were suggested,

- Financial provisions
- Education
- Collaboration between waste management companies
- Networking between state institutions and waste management companies.

### **3.4. CONCLUSION**

From the reports of the two participatory workshops held in Ghana and Senegal, the following emerged clearly as some of the constraints affecting successful solid waste management in the respective countries. They are:

- To reinforce the institutional framework around solid waste management, and coordination at all levels;
- To promote the involvement of various actors (including the private sector) in planning and management of solid waste;
- To promote the transfer of technologies, know-how and best practices;
- To reinforce partnerships with municipalities;
- To promote participation and awareness-raising of the general public and stakeholders;
- To reinforce the legal framework of solid waste management in targeted countries.
- To train human resource personnel's involved in SWM.