



KNUST-AISWaM NATIONAL SANITATION FORUM



PRESENTATION ON SUSTAINABLE ENVIRONMENTAL SANITATION IN GAMA.

**Lukman Salifu,
CEO WasteCare Associates**

KNUST-AISWAM National Sanitation Forum; 24 July, 2014. KNUST- AISWaM Conference Hall, Nmai Dzorn. Accra



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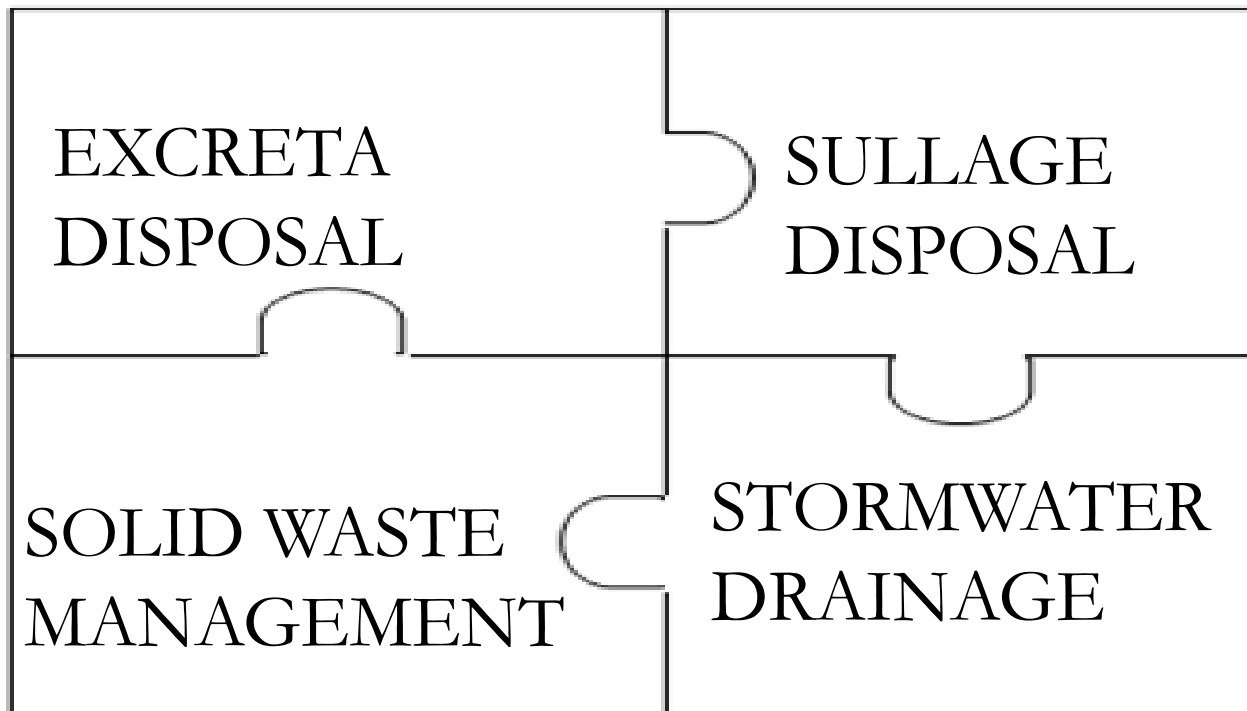
Environmental Sanitation service components...in policy

- Solid Waste Management
- Excreta (Liquid Waste) Management
- Stormwater drainage and sullage conveyance
- Environmental Sanitation Education & Enforcement Management
- Health-care Waste and Special Industrial Waste



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Linkages of cause and effect....

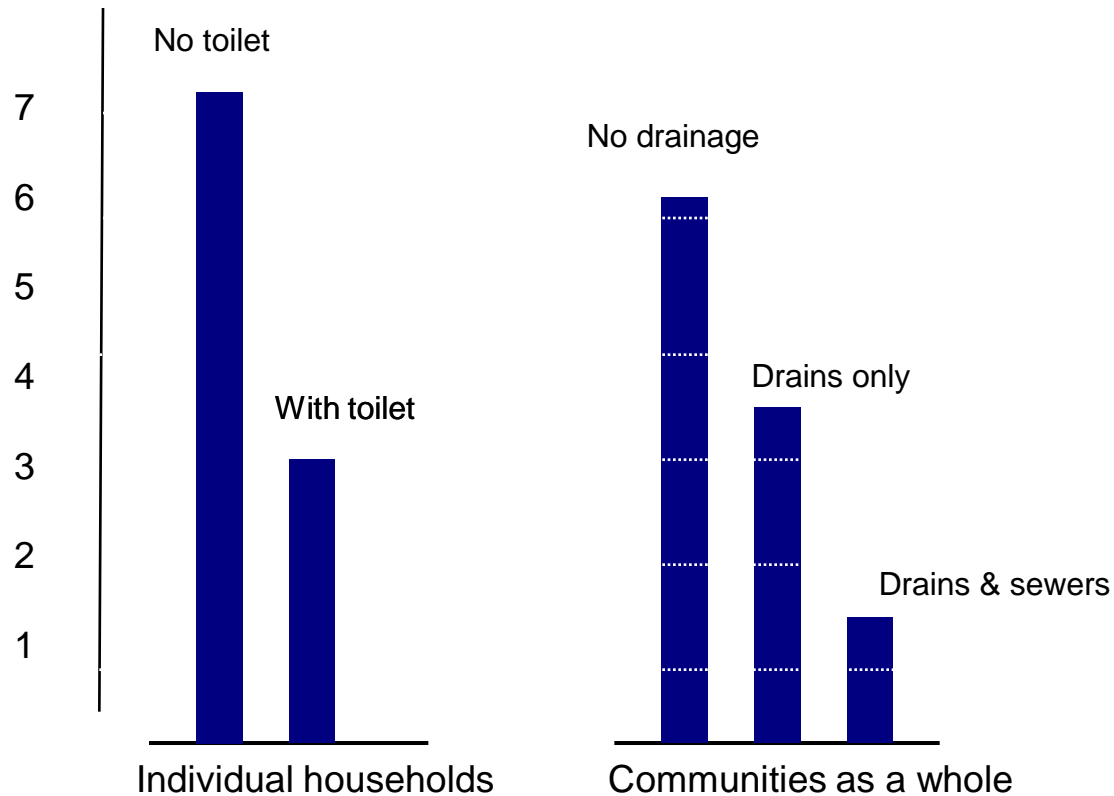




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Linkages of combined improvements...

Diarrhoeal episodes per child per year in favelas in Salvador, Brazil, 1989-90



The benefits of investments in communal environmental sanitation go beyond toilets

Source: Adapted from UNDP Human Development Report 2006 (Cairncross and others 2003)



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Overview of MSW

The old view !! Primary Goal of Managing Waste is to protect

Human Health



Environment



MSW Management practices:

- Generation
- Collection (primary and secondary) & Transport
- Final Treatment/disposal



Where does the uncollected waste go?...



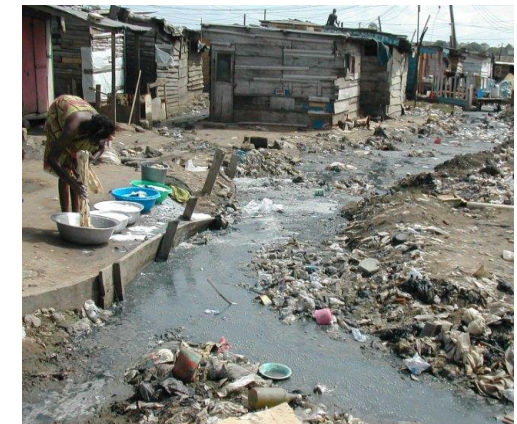


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Health Concerns...

Uncollected solid waste contributes to:

- Air pollution
- Flooding
- Public health impact
- Respiratory ailments
- Cholera
- Diarrhoea
- Dengue fever





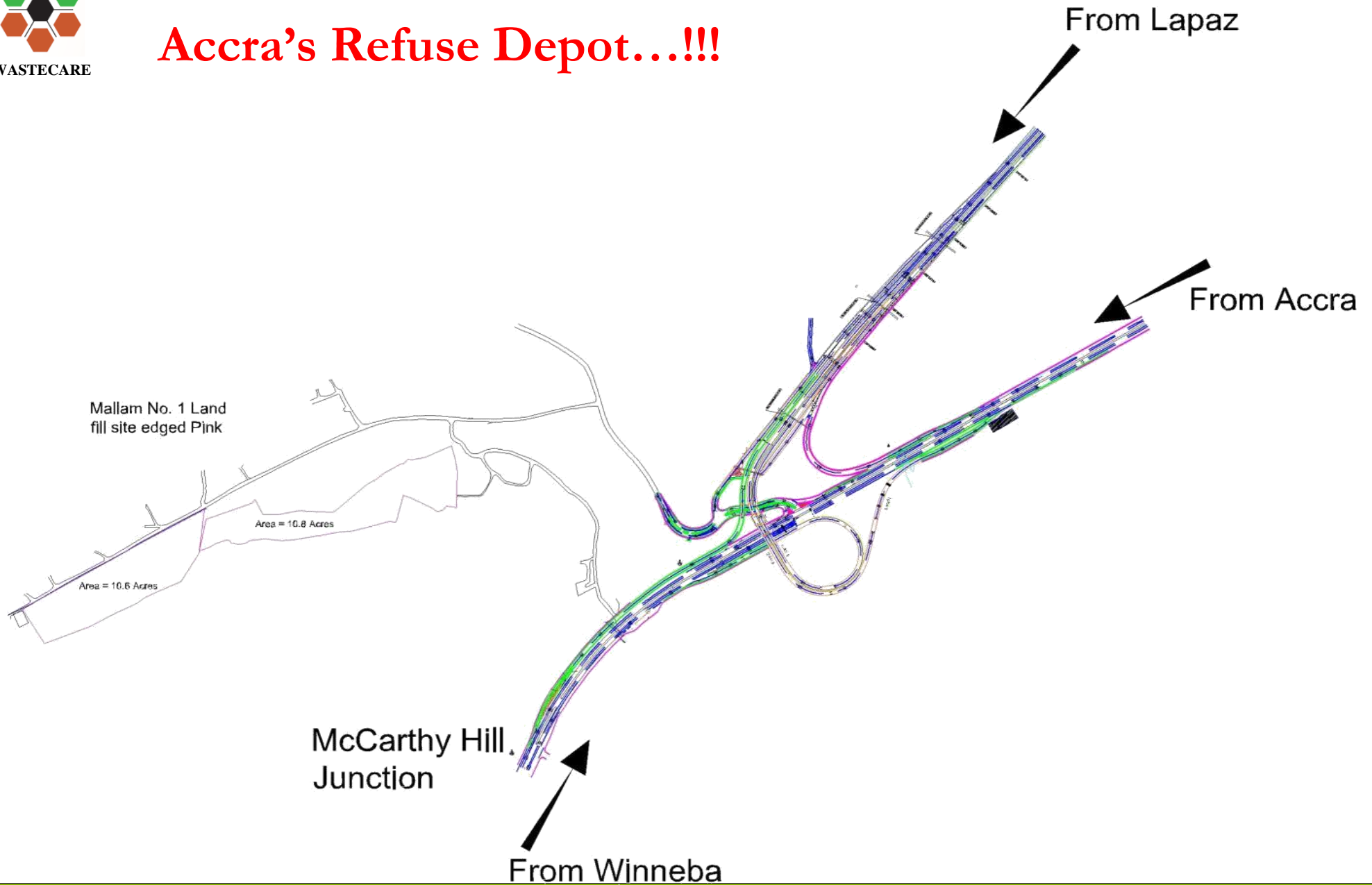
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Key bottlenecks in improving MSWM...

- Final Disposal Site(s)
- Haulage Distance (increasing round-trip time)
- Indiscriminate Littering
- Use of drains as refuse conveying channels
- Flooding



Accra's Refuse Depot...!!!





No more space in built up GAMA for refuse disposal...



Malam No.1



Mallam No.2



Oblogo No 1



Sarbah, Weija



Mallam No.1



Mallam No.2



Oblogo No. 1



Sarbah, Weija



Abokobi

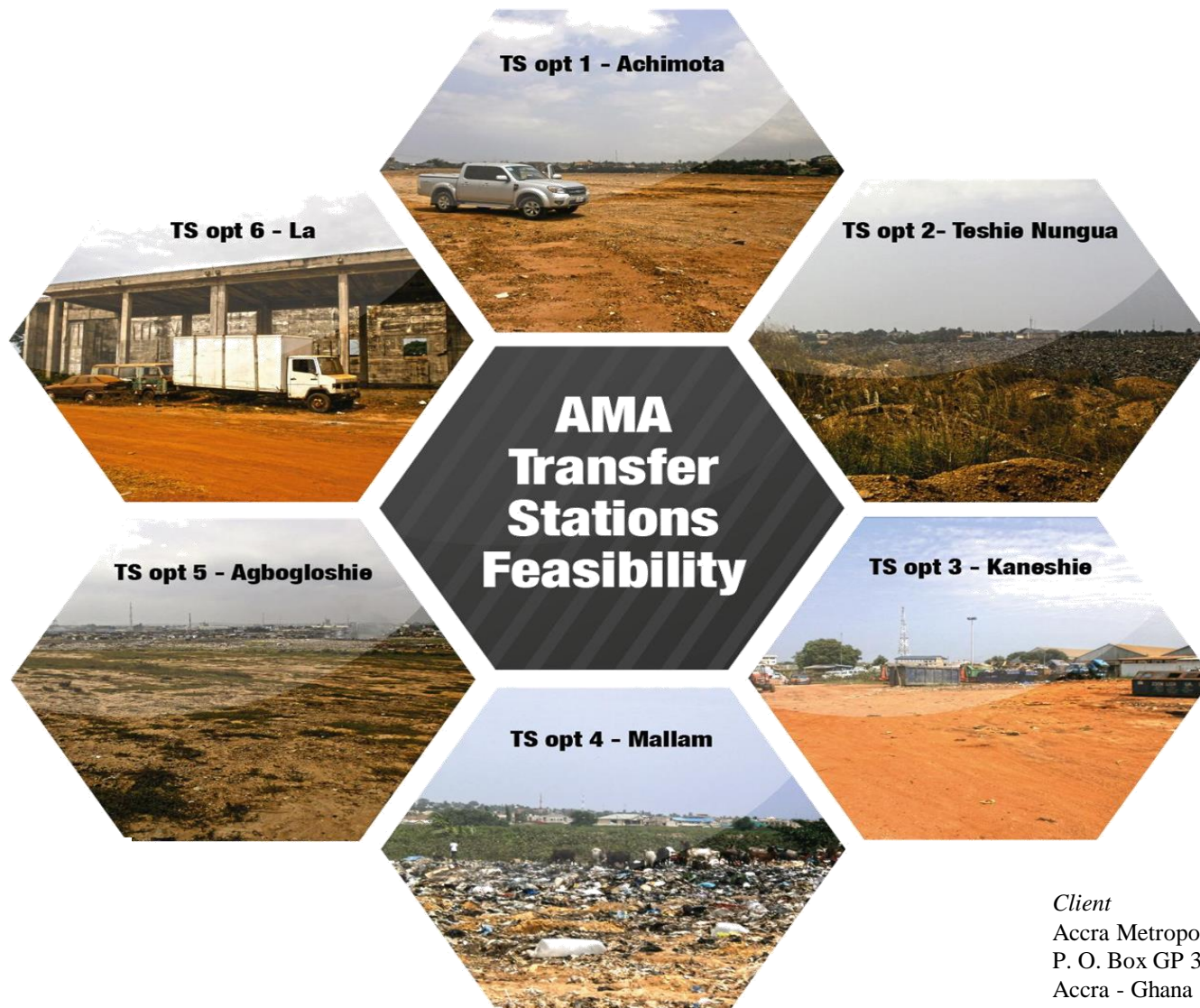
Now...



Tema Landfill



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Needs Assessment

- **Direct haulage** of waste generated in the Accra Metropolitan Area is **uneconomical** for travel distance in excess of **17.7 km** and **25.9 km** for the **skip trucks** and **compaction trucks** respectively.

Ranking of Proposed Locations

- 1 *Achimota*
- 2 *Agbobloshie*
- 3 *Mallam*
- 4 *Teshie-Nungua*
- 5 *La*
- 6 *Kaneshie*



1 - ACHIMOTA



2 - AGBOBLOSHIE



3 - MALLAM

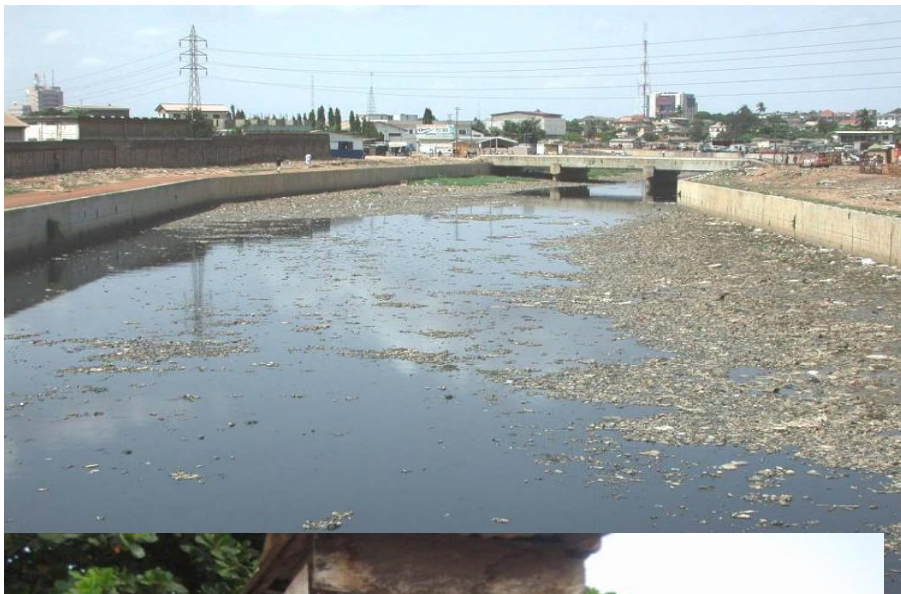


4 - TESHIE



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Poor services affects our quality of life...!



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Envisan affects safe use of our beaches and can improve tourism !



“...the great stink of the Thames (England) in July 1858 galvanized MPs legislative capacities to pass the necessary act for the purification of the river among others” (The Last Taboo)

...and yet the direct discharge of septage and faecal sludge on beaches near poor settlements continues. Lavender Hill (above) near Korle-Gonno, Accra is a classical example of how we are coping.

Photo Credit: P. Dreschel, IWMI



Lavendar Hill (2013 !)





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No routine measurements for performance indicators...



To calculate
weight without
weigh Bridge....

Volume = ?

Density = ?



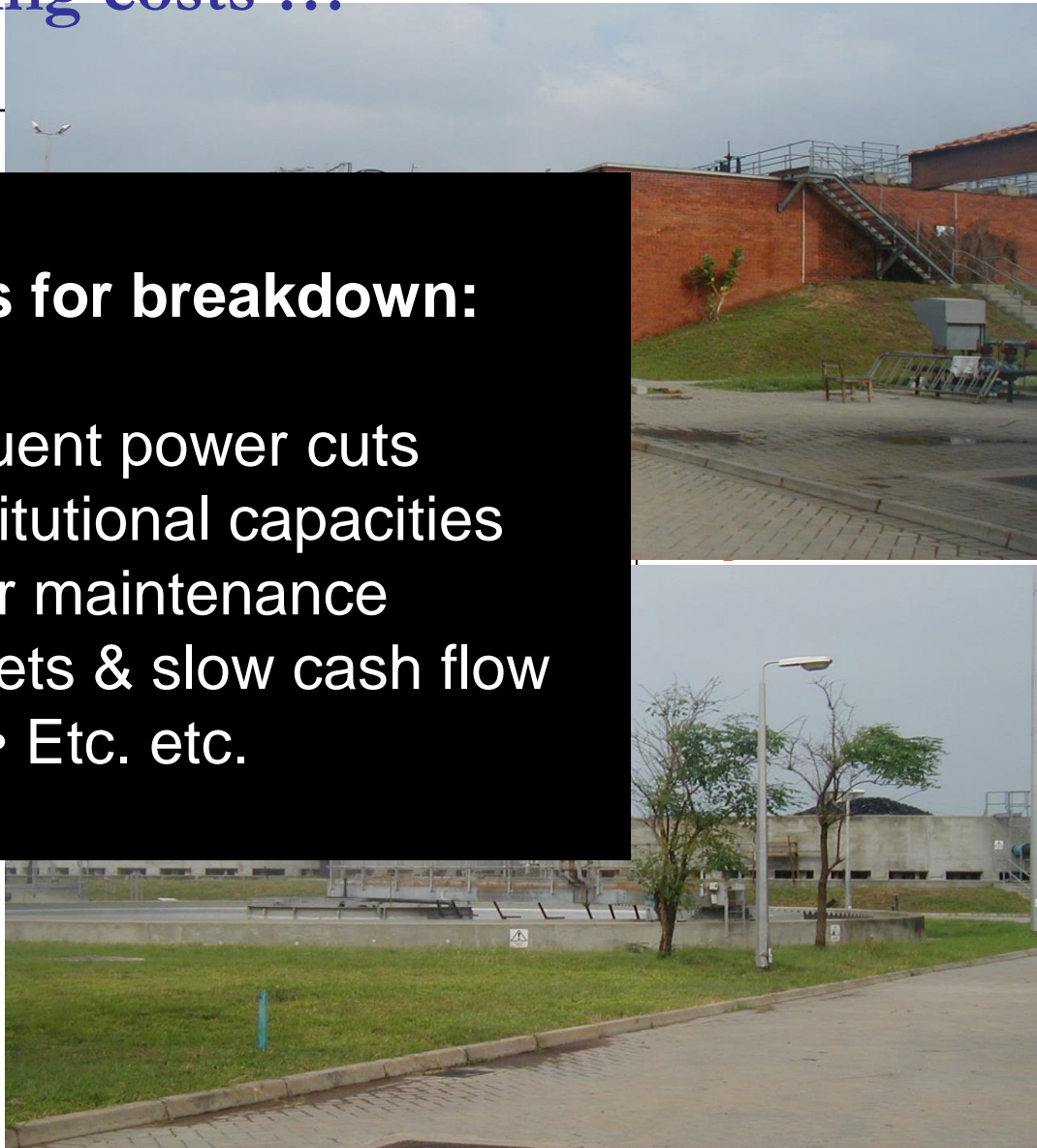
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Poor O&M management due to poor budgeting for routine owning and running costs ...

CITY/LOCATION OF SYSTEM	TYPE OF FACI	YEAR
Accra		
Accra Central Sewerage System, Palladium	<ul style="list-style-type: none">• Con./Se (Sea)• UASB-T Filter/Se Clarifier Beds	

Reasons for breakdown:

- Frequent power cuts
- Low institutional capacities
 - Poor maintenance
- Low budgets & slow cash flow
 - Etc. etc.





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Recent reforms for improve planning and management of resources ...?

HIGHLIGHTS OF REFORMS IN ENVIRONMENTAL SANITATION DEVELOPMENT

2003	Internal Audit Agency Act, 2003 (Act 658)
2003	Public Procurement Act, 2003 (Act, 663)
2004	Assessment of effectiveness of existing environmental sanitation policies
2006	Strategic Environmental Assessment (SEA) of water, and environmental sanitation polices implemented
2007	National Water Policy approved by cabinet and published by MWRWH
2008	Strategic Investment Plan for NCWSP revised to cater for MDG targets

HIGHLIGHTS OF REFORMS IN ENVIRONMENTAL SANITATION DEVELOPMENT

2008	Environmental Health and Sanitation Unit upgraded to Directorate
2009	Local Government (Departments of District Assemblies) (Commencement) Instrument, 2009 (L.I. 1961)
2009	Environmental Sanitation Policy revised, approved by cabinet in March 2010
2010	National Environmental Sanitation Strategy and Action Plan (NESSAP). Strategic Investment Plan (SESIP) approved by cabinet 2011.



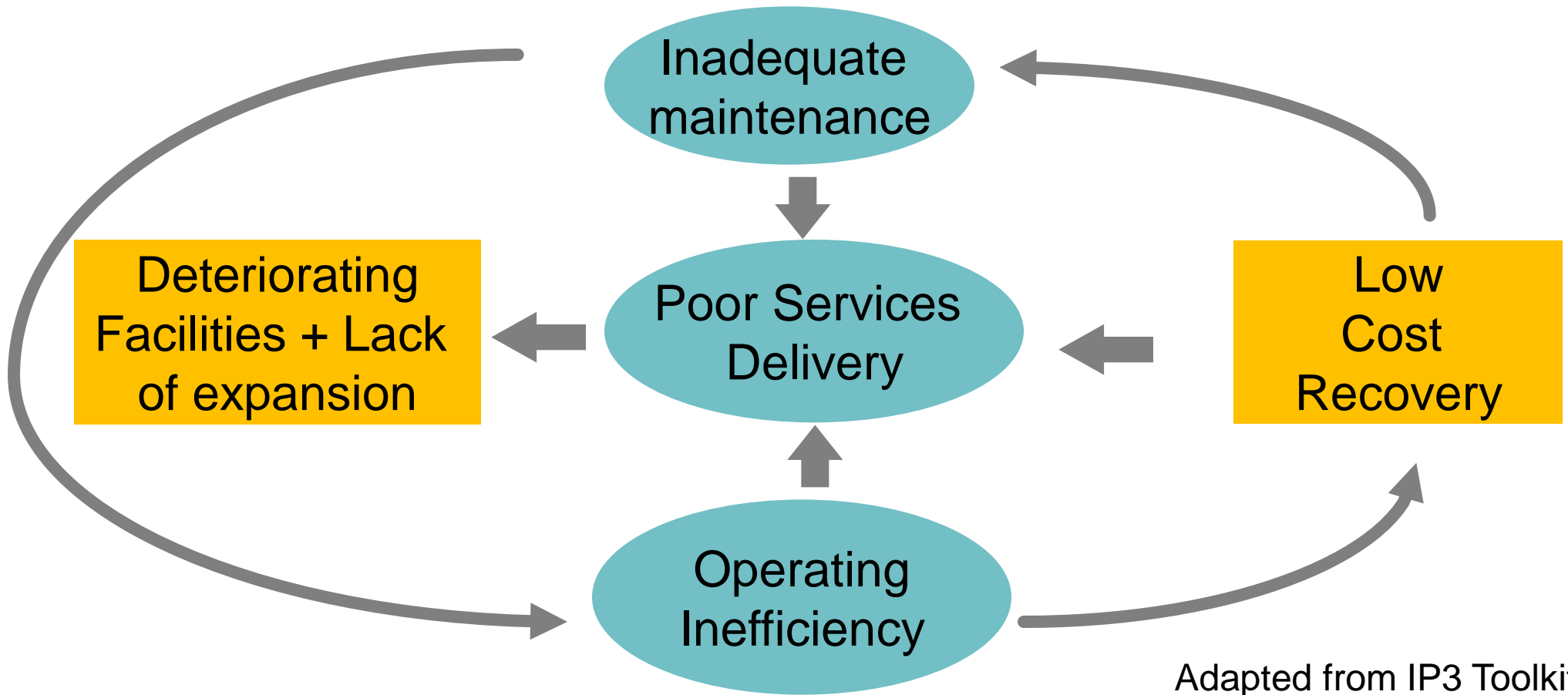
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Environmental Sanitation Policy (Focus Areas):

- Capacity development
- Information, Education and Communication
- Legislation and regulation
- Sustainable financing and cost recovery
- Levels of service
- Research and development
- Monitoring and Evaluation

The Challenge:

The “Vicious Cycle” of Public Services Management



Adapted from IP3 Toolkit



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New Paradigm...Sustainable MINT Management

Social

Environmental

Economic

Governance





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Sustainable MINT Management...

Outputs:

Recycled products,
Renewable energy and
Compost

Alternative Waste
Technology

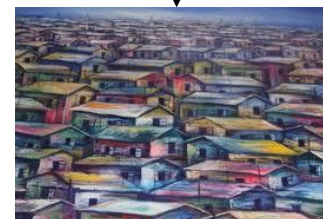


Farm

Closed Loop
Solid Waste
Management
Cycle



Market



Household/Office



Treatment Facility

Landfill



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Sustainable MINT Management- Landfills

Conventional/Traditional Landfill:

- Minimum amount of moisture intrusion and retention
- Very slow degradation: 50 -100 years
- Problem: availability of site



Kumasi Landfill

Bioreactor /Enhanced Leachate Recirculation (ELR) Landfill:

- Moisture addition and leachate recirculation (moisture content of 40% by weight)
- Rapid decomposition & Waste stabilization
- Enhanced gas production
- Space recovery



Tema Landfill

Motivation - Landfill Mining



Protection
of waters



Climate
protection



Lifetime
extension
of landfill



Recycling
of land area



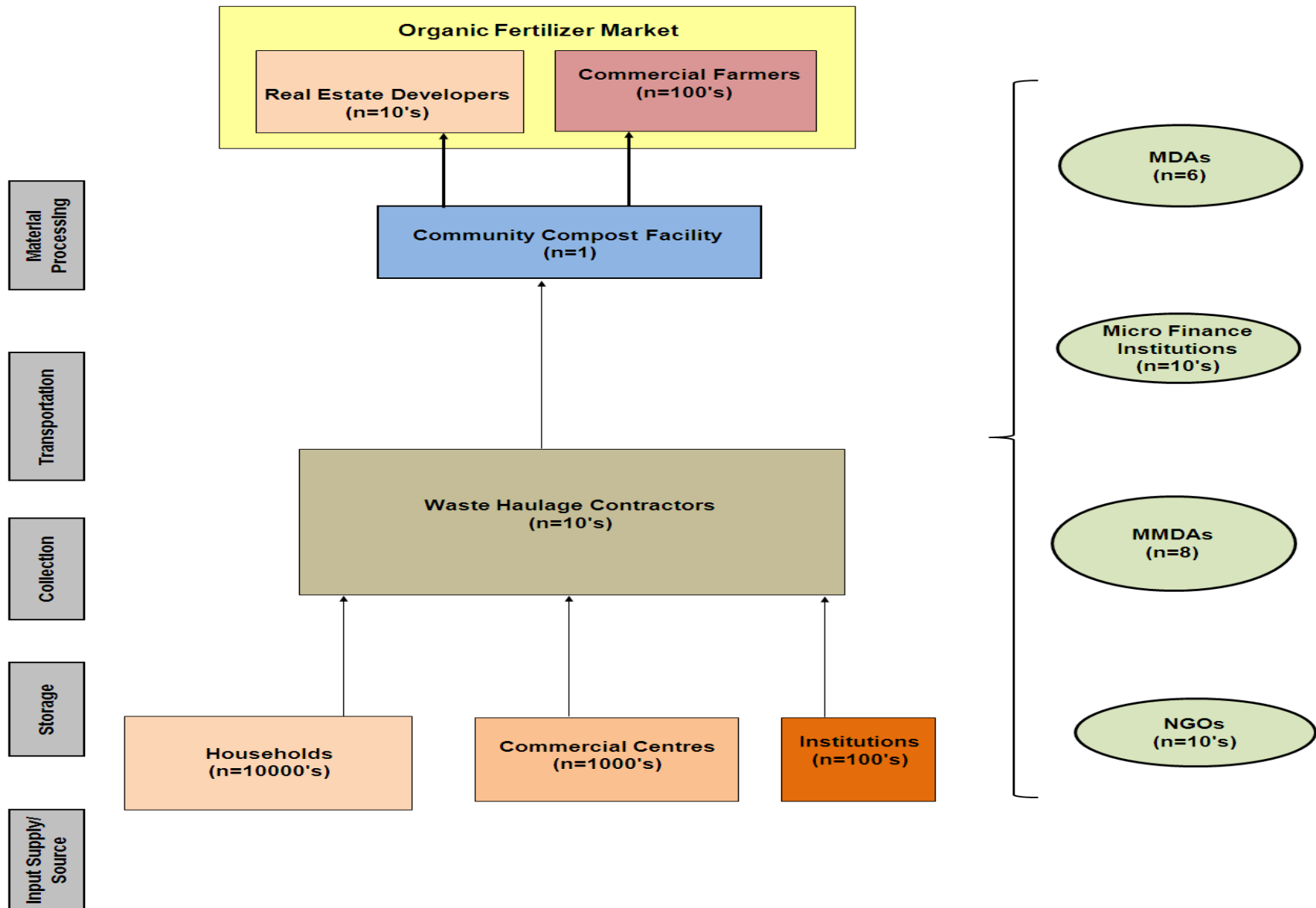
Resource
extraction



Decomposition Rates of Typical Landfill Refuse

PAPER	2 Weeks to 6 Months
ROPE	3 to 4 Months
COTTON MATERIAL	1 to 5 Months
METAL	More than 100 Years
TIN CAN	From 100 to 500 Years
NYLON	More than 30 Years
PLASTICS	450 Years
GLASS	Time Indeterminate
TYRES	Time Indeterminate


Compostables Value Chain...





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Balancing Input and Output for Sustainability



It is not possible to take more out of a soil than what is put in it without degrading its quality.

Rattan Lal, The Ohio State University



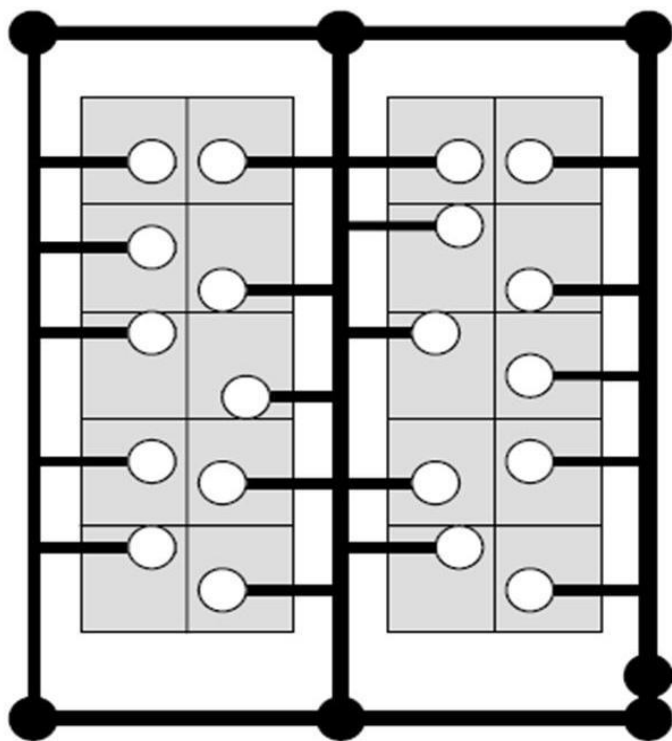
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Sanitation options: Simplified sewerage

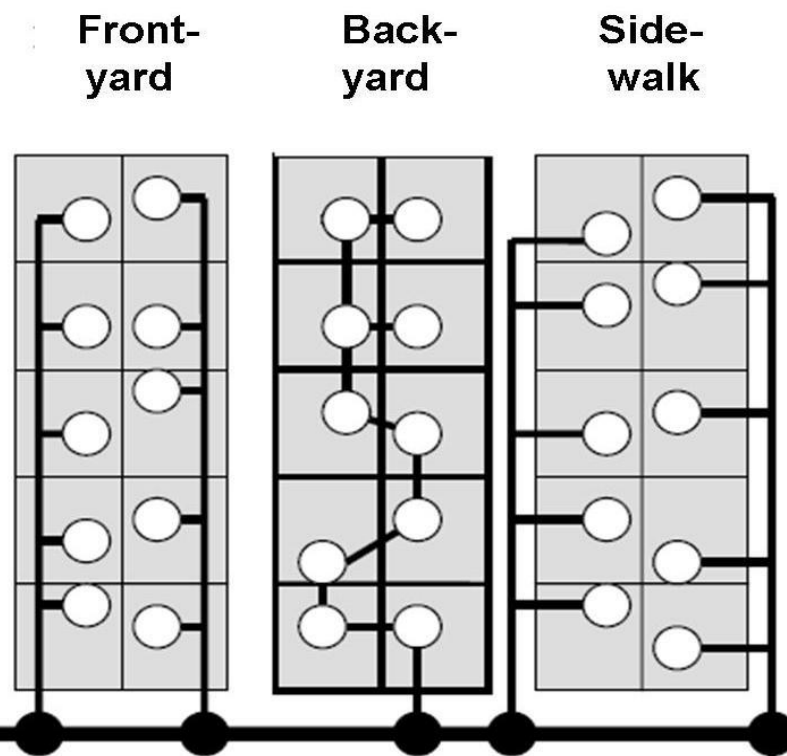


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CONVENTIONAL SEWERAGE



SIMPLIFIED/ CONDOMINIAL SEWERAGE



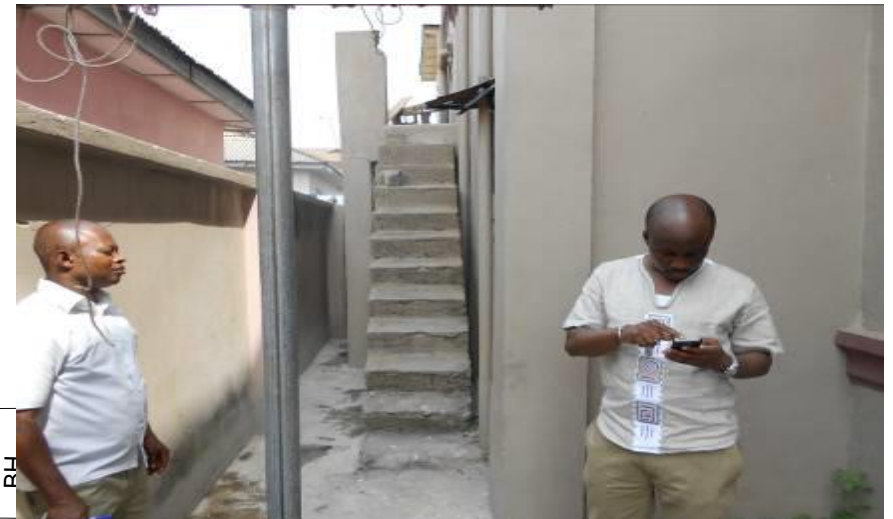


Plate : Well-constructed steps led to pan-latrine chambers on upper floors of tenement houses in Asafo.



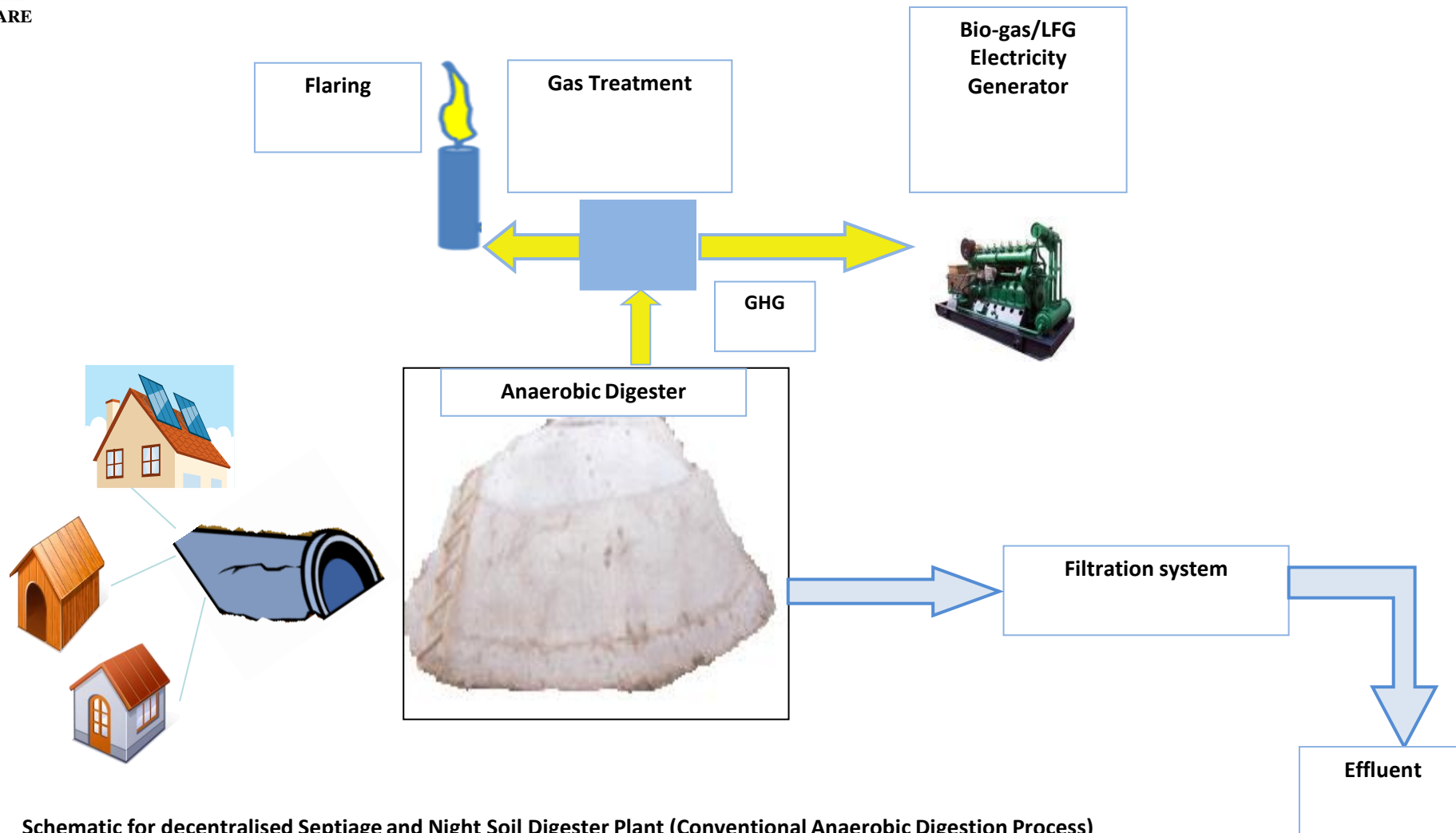
Plate : Additional anaerobic pond constructed to cater for institutional connections (Kumasi Polytechnic). Available land around ponds should be preserved against encroachment and for future expansions.

Indigenous knowledge is indispensable !



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Changing trends – indigenous innovators !!



Schematic for decentralised Septiagen and Night Soil Digester Plant (Conventional Anaerobic Digestion Process)

Indigenous developers: Biogas Technologies WA Ltd. etc



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Changing trends – indigenous innovators !!



BIOGAS STORAGE AT GHANA CHRISTIAN INTERNATIONAL HIGH SCHOOL

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Changing trends – indigenous innovators !!



HOW THE BIOFIL® TOILET SYSTEM COMPARES TO THE PIT LATRINE SYSTEM

PIT LATRINES	BIOFIL® TOILET SYSTEM
<ul style="list-style-type: none"> System quickly becomes anaerobic when urine and anal cleaning water enters the pit. Hence releasing pungent odor with its associated problems Groundwater pollution occurs especially with deep pit where effluent leaches below the top soil. Not suitable for the rural areas where water supply is obtained almost exclusively from shallow dug wells. Danger of flooding and spillage of content in pit during storm. Difficult to control odor and flies. Not suitable for every soil type, especially rocky soil, waterlog areas, very porous and fractured soils (where waste water runs directly into the water table). Mosquitoes tend to breed in pits Pit will eventually fill with fecal sludge and will require its shut down. The sludge requires further treatment before final disposal 	<ul style="list-style-type: none"> Decomposition occurs always under aerobic conditions even when water used as anal cleansing and urine is introduced in it. NO gas emissions Ground water not affected; Water is directed through 2 inches of top soil where microbial activities are most active. Digester is always designed to be positioned above worse flood levels and typically has not more than 2 weeks of un-decomposed fecal matter. No odor or insects problem Suitable for every soil type System largely dry and does not breed mosquitoes No sludge buildup. No need for emptying Solid residue can be immediately used as manure



Environmental Friendliness of the Biofil® Toilet System

- There is no smell associated with the system, as water is rapidly filtered out, leaving the solid waste in a suspended, aerated state
- Waste water from system is filtered and reusable
- Biofil® Digester and pipes are often placed above ground, ensuring that the ground water table is not polluted
- Minimal foot-print
- Aerobic conditions ensure harmful and foul-smelling gases are not released.
- The innovative design prevents pest from invading/escaping from system, while keeping it well ventilated.
- Remaining solid residue (nutrient-rich humus) can be used as manure
- The Biofil® Digester is based on a "natural-environment" model and no chemicals are required to operate the system



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“Civilized man could embark on no task nobler than sanitary reform”

Boston Board of Health, 1869

Thank you for your kind attention



**Focus area of
Environmental
Sanitation
Policy (Revised,
2010)**

**Broad policy
objective**

**Policy
measure/action**

**Sample derived
actions**

**Levels of
Service**

To support adequate treatment and final disposal of all wastes

Ensure acquisition of appropriate sites for treatment and disposal facilities using participatory principles including SEA;

Locate sites for development of new Transfer Stations with material recovery facilities (MRFs) for municipality

Develop stand-alone MRFs/buy-back centres

locate, select and develop new landfill sites for municipality

To respond effectively to increasing waste volumes and changing waste streams due to growing economy and varying life-styles

Provide services and facilities for primary separation of solid wastes at household, community and public levels

Implement strategy for source-separation of MINT streams e.g. provision of labelled bins vrs branded sacks (e.g. for BoF, glass, plastics, paper)



**Focus area of
WASTECARE
Environmental Sanitation
Policy
(Revised,
2010)**

**Broad policy
objective**

Policy measure/action

Sample derived actions

**Information,
Education
and
Communication**

To raise awareness on the increasing waste levels associated with growing economy and related lifestyle changes

Promote benefits of alternative uses of wastes through Reduction, Re-use, Recycling and Recovery

Implement advocacy programme e.g. TV/road shows on specific projects on re-use, recycling and recovery


Promote use of biodegradable materials and minimise use of plastics

Implement vigorous campaign for labelled/branded sacks and bin liners

To enable effective community participation in the siting of environmental sanitation facilities

Develop participatory tools for identification and selection of sites in accordance with strategic environmental assessment (SEA) principles

Support advocacy on involvement of communities in the selection of sites for transfer stations and final disposal

 Focus area of ESP WASTE CARE (Revised, 2010)	Broad policy objective	Policy measure/action	Sample derived actions
Sustainable financing and cost recovery	To ensure sustainable financing of environmental sanitation services	Apply direct cost recovery from all users as far as possible covering all operating and capital costs, for services such as liquid and solid waste collection, issuance of permits etc	Implement Pay-As-You-Dump in selected collection zones for communal containers; to supplement franchised house-to-house collection schemes (for e.g. some residents of Atonsu and Abosbo communities in Kumasi, pay 0.50 GHp per dump)
		MMDAs shall set tariffs with full participation of private sector service providers and users	
	To develop a strategy and financing plan with clear allocation of resources (and costs) for households, communities, MMDAs and central government	Identify and implement options for generating sustainable revenue to support environmental sanitation such as levies on producers and importers of pollutants especially plastics etc	Review funds generation potential of tax on plastic material; Imported WEEE (end-of-life payments)
		MMDAs shall identify additional sources of revenue for sustaining environmental sanitation including rates, fees, water-surtax etc.	Implement new fiscal regime for raising revenue for waste management services including branded sacks for separated waste
		Develop and implement a Strategic Environmental Sanitation Investment Plan (SESIP)	MLGRD to champion passage of SESIP without delay to prompt/augment donor /private sector investments



Activity

Priority Interventions

Prioritized Bottlenecks

Prioritized Acceleration Solution

Solution Financing (GHC)

Potential Partners

Level of Service

Locate sites for development of new Transfer Stations with material recovery facilities (MRFs) for municipality

Develop stand-alone MRFs/buy-back centres

locate, select and develop new landfill sites for municipality

Implement strategy for source-separation of MINT streams e.g. provision of labelled bins vrs branded sacks (e.g. for BoF, glass, plastics, paper)



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Activity	Priority Interventions	Prioritized Bottlenecks	Prioritized Acceleration Solution	Solution Financing (GHC)	Potential Partners
Information, Education and Communication					
Implement advocacy programme e.g. TV/road shows on specific projects on re-use, recycling and recovery					
Implement vigorous campaign for labelled/branded sacks and bin liners					
Support advocacy on involvement of communities in the selection of sites for transfer stations and final disposal					



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Activity

**Priority
Interventions**

**Prioritized
Bottlenecks**

**Prioritized
Acceleration
Solution**

**Solution
Financing
(GHC)**

**Potential
Partners**

Sustainable financing and cost recovery

Implement Pay-As-You-Dump in selected collection zones for communal containers; to supplement franchised house-to-house collection schemes

Review funds generation potential of tax on plastic material; Imported WEEE (end-of-life payments)

Implement new fiscal regime for raising revenue for waste management services including branded sacks for separated waste

MLGRD to champion passage of SESIP without delay to prompt/augment donor /private sector investments