

## REVIEWED PAPER

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**33rd WEDC International Conference, Accra, Ghana, 2008****ACCESS TO SANITATION AND SAFE WATER:  
GLOBAL PARTNERSHIPS AND LOCAL ACTIONS****Using SEA principles to improve application of landfill  
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*The Ghana Landfill Guidelines was published in 2002. Since then a number of local government staff have received training on its application. Since the recommendation of by the National Development Planning Commission(NDPC) and the Environmental Protection Agency(EPA) for the application of Strategic Environmental Assessment (SEA) principles in formulation of policies, plans, programmes, tools have been developed for the water and environmental sanitation sector. An assessment of the Ghana Landfill Guidelines shows how SEA can be applied to critical stages of the landfill selection process. The central process-principle of SEA seeks to enhance broad stakeholder engagement, especially of non-specialists, improve transparent decision making and consensus building and thus add value to decision-making that enhances the likelihood of landfill development progressing to implementation. SEA further promotes community appreciation of issues concerning environmental quality and therefore demystifies the preparation of Environmental Impact Assessment as an exercise carried out only by experts.*

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**Introduction**

In order to provide operational guidelines to Metropolitan, Municipal and District Assemblies (local governments) in Ghana, the EPA and the Ministry of Local Government, Rural Development and Environment published Landfill Guidelines. The guidelines provide step-by-step processes for site selection, the size and type of disposal operations appropriate for various categories of settlements and waste volumes to be placed. The aim of landfilling of waste is to ensure that waste treatment and disposal occurs with minimal environmental impact.

In the traditional process of disposal site selection including preliminary screening and scoping of alternative sites leading to site assessment and detailed investigations, the essential output is to inform of the ability of the site to handle the wastes and the potential impact of the operation on the environment and *local community*. An important step in the Ghana Landfill Guidelines and often where public hearings become contentious is the presentation of the *environmental impact assessment* (EIA) report covering potential problems and how to mitigate these. While this step is critical and must be adhered to in all cases it has its limitations.

EIA is a site specific exercise and is usually carried out when final selection of a site has already taken place. In many instances, non-acceptance by residents within proximity of landfills may result after costs have been incurred in site investigations. Ghana's capital city of Accra is grappling with entry to a proposed site after more than 5 years discussions and preparatory costs of close to \$1.5 million. Other limitations include expensive mitigation as against *avoidance costs*, non-consideration of cumulative and induced impacts beyond the *local community* of, for example, traffic, scavengers and health effects. The focus of EIA on a single site also often neglects alternative least cost options which can result from considerations of use by say, more than one District Assembly.

This paper focuses more on how broad participatory tools and methods can be used to enhance landfill site selection process.

**Using SEA in landfill site selection process****Traditional selection criteria and process**

The Ghana Landfill guidelines published in 2002 follows the traditional process of selecting sites. The process allows for some consultations but generally it is an expert led and expert based approach. Table 1 lists the main steps and the objectives and key outputs.

<b>Step</b>	<b>Objective</b>	<b>Outputs</b>
Identification of catchment area and gather data on waste categories	To determine waste stream and design capacity of proposed landfill	<ul style="list-style-type: none"> <li>• Framework for data gathering prepared</li> <li>• Waste flows estimated</li> <li>• Size and type of landfill operation defined</li> <li>• Requirements for environmental protection determined</li> </ul>
Establish Inter-Sectoral Planning Committee to co-ordinate planning and a Technical Sub-committee to develop the design and manage the process	To coordinate landfill design and preparatory works	<ul style="list-style-type: none"> <li>• Inter-sectoral planning committee established</li> </ul>
Select landfill site, including the following steps: <ul style="list-style-type: none"> <li>- Constraint mapping to identify 4-6 sites;</li> <li>- Walkover surveys and discussions with local chiefs, landowners and communities;</li> <li>- Further desk studies leading to selection of 2-3 ranked candidate sites;</li> <li>- Discussion with interested and affected persons and any necessary amendment;</li> <li>- Preparation of conceptual designs for agreed candidate sites, including site investigations where necessary;</li> <li>- Preparation of final recommendations</li> </ul>	To select appropriate site	<ul style="list-style-type: none"> <li>• Exclusion ('no go') areas defined and mapped</li> <li>• Alternative potential sites determined (4 – 6 sites)</li> <li>• Candidates sites screened and less viable sites eliminated (2-3 sites)</li> <li>• Remaining sites ranked (by economic, environmental and public acceptance criteria)</li> <li>• Preliminary conceptual designs and costing of alternatives developed</li> <li>• Site selection report prepared</li> </ul>
Public forum	To gain public agreement on selected sites	<ul style="list-style-type: none"> <li>• Agreement reached on selected site (process starts all over if not accepted)</li> </ul>
Application for environmental permit from EPA and preparation of Scoping Report	To determine the focus for Environmental Impact Assessment (EIA) studies and obtain permit	<ul style="list-style-type: none"> <li>• Application submitted</li> <li>• Scoping report prepared</li> </ul>
Detailed investigation, preparation of feasibility study, preliminary design and Environmental Impact Statement	To prepare feasibility report incorporating preliminary design and EIA	<ul style="list-style-type: none"> <li>• Topographical maps</li> <li>• Geotechnical and hydro-geological data</li> <li>• Hydrologic data</li> <li>• Water quality data</li> <li>• Inputs for site restoration</li> <li>• Ecological baseline</li> <li>• Socio-economic and cultural baseline</li> <li>• Legal regime</li> </ul>
Review by EPA, including public hearing if deemed necessary	To evaluate Environmental Impact Statement (EIS)	<ul style="list-style-type: none"> <li>• EIS evaluated and decision made</li> </ul>

While it is expected that this process should lead to a successful selection and permitting for a site, in practice difficulties often arise at the public forum stage (Step 4). Non-acceptance by nearby residents to the selected site and speculative development of properties in anticipation of government compensation often result in lengthy delays and possible litigation.

Considering the time and resources that would have been spent in carrying out Steps 1- 4, it is necessary that these processes are improved so as to increase the likelihood of public acceptance. Emerging experiences from applying SEA in Ghana has shown how decision making is enhanced through active participation and have improved quality of choices and acceptance.

### **Enhancing the site selection process using SEA**

Applying SEA principles and tools appropriately to each of the key steps of the selection process will lead to active participation, increased transparency and better understanding of options and enhanced decision-making. In the following discussions, the suggested improvements to each of the site selection process steps are given.

<b>Table 2: Enhancing landfill site selection with SEA process – Step 1</b>		
<b>Step</b>	<b>SEA Tool/Process</b>	<b>Outputs/Outcomes</b>
Identification of catchment area and gather data on waste categories	<ul style="list-style-type: none"> <li>• Introduce community-led initiatives to reduce what goes to final disposal</li> <li>• Adopt participatory process that leads to community(ies) proposal of initial sites</li> <li>• Promote joint use of landfills across district jurisdictions</li> </ul>	<ul style="list-style-type: none"> <li>• Community sensitised on waste minimisation</li> <li>• Information on waste streams for final disposal obtained and disseminated</li> <li>• Catchment area defined</li> </ul>

While the object of Step1 is to define the catchment and provide data on the waste stream, SEA tools and processes will help focus communities’ attention first on options for waste reduction, re-use, recycling and recovery. This is important as it influences landfill size and operational life. Furthermore, the concept of joint use of landfills by groups of districts becomes an inherent part of the process in line with government policy.

<b>Table 3: Enhancing landfill site selection with SEA process – Step 2</b>		
<b>Step</b>	<b>SEA Tool/Process</b>	<b>Outputs/Outcomes</b>
Establish Inter-Sectoral Planning Committee to co-ordinate planning and a Technical Sub-committee to develop the design and manage the process	<ul style="list-style-type: none"> <li>• Use stakeholder identification tools to ensure broad engagement</li> </ul>	<ul style="list-style-type: none"> <li>• Planning Committee formed with enhanced participation e.g. private sector, traditional authorities</li> </ul>

The traditional approach to site selection presumes that an inter-sectoral planning group made up of mainly state institutions is sufficient to achieve successful site selection. However, emerging experience suggest that the inclusion of representatives of private sector, traditional authorities and other interest groups including women helps to improve decision-making and promote acceptance

<b>Table 4: Enhancing landfill site selection with SEA process – Step 3</b>		
<b>Step</b>	<b>SEA Tool/Process</b>	<b>Outputs/Outcomes</b>
Select landfill site, including the following steps: <ul style="list-style-type: none"> <li>- Constraint mapping to identify 4-6 sites;</li> <li>- Walkover surveys and discussions with local chiefs, landowners and communities;</li> <li>- Further desk studies leading to selection of 2-3 ranked candidate sites;</li> <li>- Discussion with interested and affected persons and any necessary amendment;</li> <li>- Preparation of conceptual designs for agreed candidate sites, including site investigations where necessary;</li> <li>- Preparation of final recommendations</li> </ul>	<ul style="list-style-type: none"> <li>• Convert location criteria for exclusion into simple colour-coded tool to enable broad participation in process</li> <li>• Employ participatory tools to aid identification of candidate sites</li> <li>• Include local communities in walkover surveys</li> <li>• Include sustainability criteria as part of ranking process</li> </ul>	<ul style="list-style-type: none"> <li>• Communities engaged in determination of exclusion areas</li> <li>• Communities engaged in selection of candidate sites</li> <li>• Screening carried out with active community participation</li> <li>• Improved ranking process involving non-experts</li> </ul>

Step 3 is the core of the selection process. The traditional site selection processes will more often than not end up with the least-cost option and not necessarily the best-available technology not entailing excessive costs. By considering sustainability criteria other benefits which may have been overlooked are brought to the fore.

<b>Table 5: Enhancing landfill site selection with SEA process – Step 4</b>		
<b>Step</b>	<b>SEA Tool/Process</b>	<b>Outputs/Outcomes</b>
Public Forum	<ul style="list-style-type: none"> <li>• Use participatory tools for validating site selection</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced acceptance by stakeholders</li> </ul>

In the traditional site selection process difficulties often emerge after site selection and the public forum becomes contentious, whereas the SEA process enhances wider acceptance.

## Results and discussions

In applying SEA tools in the process of landfill site selection, the continuous engagement of stakeholders enhances transparency and thus the public consultation stage becomes an occasion for validating and endorsing the selected site. In developing countries with similar decentralised jurisdiction of authority for development and planning is emerging, SEA provides an effective tool for joint-district development of treatment and disposal facilities including landfills.

## Conclusion

The principles applied to developing the content of an SEA report focuses primarily on environmental sustainability. By considering other factors as such socio-cultural, economic and institutional besides natural resources, and evaluating how these respond to sustainability objectives, the planning process is further enhanced. For the case of landfill development, SEA has the potential to reinforce existing procedures for site selection and provide preliminary information including the effects of leachate handling and so the method of waste placement either through bio-landfilling or containment sites as well as future expansion, closure and aftercare considerations.

SEA is placed at a higher level in the hierarchy of environmental assessment tools and requirements for environmental safeguards go beyond those of Environmental Impact Assessment (EIA), which often focuses mainly on the natural environment.

In conclusion, the benefits of applying SEA process in landfill site selection in developing countries should lead to its further application in Strategic Waste Management Planning with greater emphasis on waste reduction, re-use, recycling and recovery, and ultimately “zero waste”.

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## Note/s

SEA is ‘*Systematic evaluation of the environmental effects of policies, plans and programmes, while considering alternatives to support transparent decision making*’.

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## Keywords

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