

NATIONAL SOLID WASTE MANAGEMENT PLAN FOR IRAQ

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SUMMARY: After decades of turmoil and international sanctions many of the key infrastructures within Iraq have fallen into disrepair, leading to a terminal decline in the provision of basic and essential services. This is particularly true of waste and resource management which has seen years of underdevelopment and deterioration. This has resulted in a lack of provision of basic public services in the waste sector which have been replaced by a burgeoning black market in waste collection, disposal and recycling. As such a National Solid Waste Management Plan (NSWMP) for Iraq was developed in 2007 in order to plan the strategic development of all aspects of waste management in the country over the coming twenty years. In particular the NSWMP focused on policy development and integrated planning in the areas of regulatory framework, economic aspects, institutional capacity, social education and technical and operational development. This paper and associated presentation outlines the key objectives, challenges and subsequent recommendations contained within the NSWMP for Iraq.

1. INTRODUCTION

The National Solid Waste Management Plan (NSWMP) for Iraq was developed in 2007 through the international collaboration of a number of waste management specialists (the project team). It is designed to serve and fulfill the following key objectives:

- Provide key guiding principals for the development of waste management over the coming years;
- Provide a hierarchy of possible waste management techniques and options based on best practice;
- Provide definitive roles and responsibilities of the different organisations and bodies involved in the management of solid waste;
- Provide framework guidance for the implementation of the NSWMP through the development of regulatory and legal instruments; and
- Provide guidance and recommended options for the financing of the implementation of the NSWMP.

This paper presents a summary of the NSWMP along with the challenges faced and the methods and techniques utilised in order to overcome the obstacles both within the country and the project

1.1 Historical Context

After decades of turmoil and international sanctions many of the key infrastructures within Iraq have fallen into disrepair leading to a terminal decline in the provision of basic and essential services. This is particularly true of waste and resource management which has seen years of underdevelopment and deterioration. Improper management of municipal, hazardous and clinical waste streams have resulted in the requirement for not only an effective waste management infrastructure but also additional measures to mitigate against health and environmental risks.

Historically the disposal of waste within Iraq has been achieved by utilisation of unregulated landfill sites across the country. This practice has led to the disposal of wastes in unauthorised dump sites which have been initiated with little or no regard for pollution control and the potential risks posed to human health and the environment. Those landfill sites that have been formally sited, constructed and operated also appear to have minimal integration of pollution prevention techniques (liner systems, leachate and gas collection, etc).

1.2 Structure and Approach

In order for the NSWMP to be of optimal use and fully employed in the design and implementation of waste management strategies within Iraq the decision was taken by the project team to present the NSWMP as a live document. As such it is expected that the NSWMP will be reviewed and amended periodically to allow it to evolve to suit the changing situation within Iraq. The NSWMP was formulated in two parts, the Plan and a Supplemental Report.

The Plan outlines the key recommendations for the development of an efficient and sustainable solid waste management system in Iraq. The Supplemental Report complements the Plan by outlining the background to the decisions taken in addition to providing further detail on the key issues and strategies identified within the Plan.

The Plan contains the following sections:

- Chapter 1: Key Principles and Background;
- Chapter 2: Legal Framework for Waste Management;
- Chapter 3: Institutional Framework for Waste Management;
- Chapter 4: Technical & Operational Framework for Waste Management;
- Chapter 5: Social & Educational Framework for Waste Management; and
- Chapter 6: Economics & Finance Framework of Waste Management.

The topics in each of these Chapters are addressed over a twenty year period, with recommendations presented as short term (0 to 5 years), medium term (5 to 15 years) and long term (15 years plus) development goals. The overall approach of the NSWMP and the role it plays in waste strategy development within the country can be seen in Figure 1.

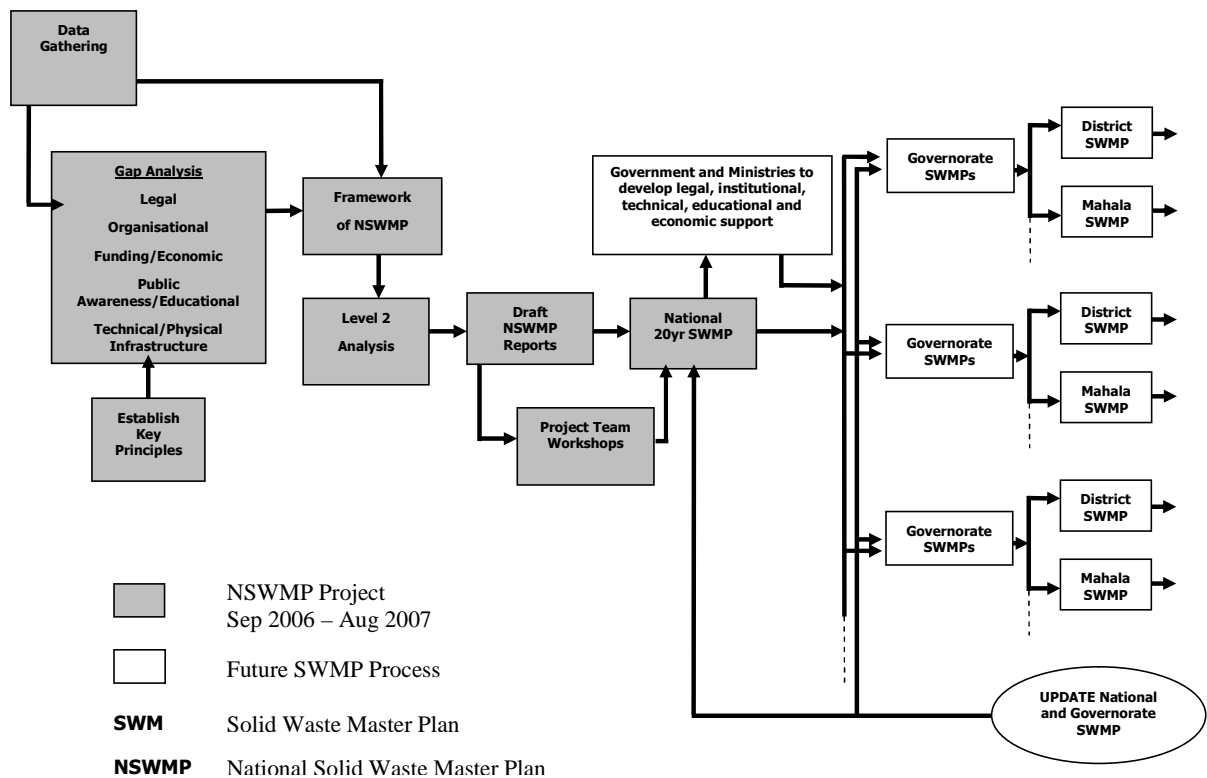


Figure 1: Approach Taken in Formulation of NSWMP for Iraq

2. KEY PRINCIPLES AND BACKGROUND

Several key principles of waste management strategy development, many of which have never been implemented within Iraq, are outlined and summarised in the NSWMP. These include:

- Sustainable Development;
- Proximity Principle and Self Sufficiency;
- Precautionary Principle;
- Polluter Pays Principle;
- Producer Responsibility;
- Waste Hierarchy; and
- Best Practicable Environmental Option (BPEO).

3. LEGAL FRAMEWORK

3.1 Integrated Legislative Framework

The legal tools dealing with waste management in most developed countries form a complex and intricate framework, much of which is missing within Iraq. There is therefore a requirement to develop an integrated legal framework in order to allow the implementation of comprehensive waste management laws and regulations by Iraqi stakeholders. This principle of providing a structure but stopping short of delineating and imposing legal instruments formed a key focus of this section.

Although it is seen as vitally important that any legal mechanisms comply with international agreements, conventions and good practice, it is imperative that they are initiated by Iraqi institutions to ensure positive acceptance. As such it is recommended that the Iraqi Ministry of the Environment undertakes the drafting of legislation in consultation with all relevant ministries and stakeholders thereby ensuring formulated legislation relates to environmental and public considerations as well as waste management.

3.2 Approved Codes of Practice

Due to the necessary wide and varied scope of the legislative framework it is recommended that a set of Guidance Documents and Approved Codes of Practice (ACOPs) are developed. Through interpreting the legislation and producing simple guidance documentation for waste operators, regulators and the public, acknowledgement and adherence of the legislative framework can be achieved.

3.3 Terms of Reference

In support of the legislative instruments a series of stipulating documents will be required in order to ensure compliance. These will form terms of reference and will comprise documents such as:

- Waste management Licences / Permit Conditions;
- Site Working Plans;
- Development Planning Permissions; and
- Discharge Consents.

The issuing and subsequent monitoring of compliance with these terms of reference should be undertaken by a proposed Environmental Protection Directorate, the foundation of which is a recommendation of the Institutional Framework strategy.

4. INSTITUTIONAL FRAMEWORK

The recommendations formulated within this section of the NSMWP were founded upon the belief that the development of a suitable institutional infrastructure to enable effective

waste management should ultimately aspire to attain the decentralisation of services. The goals are as follows:

- Fiscal and administrative decentralisation;
- Transparent and accountable local government institutions;
- Assistance to Civil Society Organisations (CSOs);
- Decentralisation at National government level; and
- An informed and engaged citizenry.

4.1 Short Term (0 to 5 years)

During the initial phase of institutional growth the implementation of a capacity development program along with the essential components and principles for institutions to ensure effective administration are seen as the main focus.

This will be reliant upon the recognition and appointment of responsibilities to various organisations and will more than likely require the identification, construction and provision of resources for civic buildings to act as points of contact. It is recommended that an Environmental Protection Directorate be formulated to ensure regulatory enforcement is undertaken and to provide a degree of uniformity across the regulatory sphere.

4.2 Medium and Long Term (5 years plus)

The goals to be addressed and achieved through the medium term will attempt to ensure the process of the development of an integrated waste management infrastructure is sustainable. It is recommended that this is achieved through the involvement of a wide range of stakeholders, not limited to policy makers and formal institutions. In order to engage waste management professionals and the public regional and national forums are to be established to encourage communication and the transfer of information.

Once the primary institutions and the instruments to interact with these bodies have been created it is essential that these are continuously reviewed and their performance improved through internal and external assessment and audits.

5. TECHNICAL AND OPERATIONAL FRAMEWORK

The technical and operational considerations of the provision of an effective waste management service cover a wide and diverse range of activities. As such this section of the NSWMP addresses issues including the physical aspects of waste collection, transport and disposal as well as the collection of metrics associated with waste management and longer term trends towards landfill diversion. In order to more easily clarify the requirements presented within the NSWMP the technical and operational aspects were divided into the following sections:

- Data Collection and Analysis;
- Structure and Planning;

- Collection and Transport; and
- Disposal, Recycling and Re-use.

5.1 Data Collection and Analysis

In order to allow for the sustainable development of technical waste management resources some form of waste generation data is required. Due to the conditions currently present within Iraq there is very little in the way of data collection dealing with the various aspects of society. Any data that is available is often un-credited, limited in scope and extremely difficult to verify. There is therefore a pressing need to develop a data collection and analysis system to allow any development to cater to the needs and requirements of society.

Waste generation modelling was undertaken as part of the NSWMP to allow the process of technical assessment of needs to commence. This modeling exercise was based on assumed waste generation rates per head of populace (1.4kg/person/day as instructed by the client) and current estimated population values (Iraqi Ministry of the Environment, 2005).

The predicted waste generation values in conjunction with the assumed population densities of each of the Governorates allowed estimates of both the number and required size of landfills in order to effectively deal with the volumes of waste generated. This exercise was then extrapolated for the next twenty years based upon predicted future population growth (Iraqi Ministry of Planning and Developing Cooperation, 2006) as set out in Table 1.

5.2 Structure and Planning

During the early stages of strategy development the need was identified to delegate powers and responsibilities to regional bodies in the form of the local Governorates, districts and Mahalas (regional areas within cities and towns). This should be achieved through the short term development of Regional Solid Waste Management Plans (RSWMPs) in line with the NSWMP to allow for local considerations to be taken into account. These RSWMP will provide a more detailed needs assessment and gap analysis between existing and required resources than that within the NSWMP.

Table 1: Estimated Iraqi Landfill Requirements, 2007 to 2027

Governorate	Required Landfill Volume (Mm³)*	Required Landfills (Based on 2027 Population)
Anbar	32	2
Babil	34	2
Baghdad	138	6
Basrah	36	2
Dahuk	10	1
Diyala	32	2

Governorate	Required Landfill Volume (Mm³)*	Required Landfills (Based on 2027 Population)
Erbil	32	2
Karbala	20	1
Missan	16	1
Muthanna	13	1
Najaf	22	1
Ninewah	58	3
Qadissiya	20	1
Salah al Din	27	2
Sulaymania	39	2
Taamim	16	1
Thi Qar	33	2
Wassit	22	1
Total	600	33

* Values rounded to nearest million

5.3 Collection and Transport

In the short term the focus of the NSWMP primarily deals with the need to re-establish some basic form of collection and disposal system to allow the risk to human health to be reduced. Status reports from within the country provided by the University of Baghdad¹ indicate that in many areas domestic waste remains in close proximity to residential properties for months at a time. The formation of basic waste collection services has the potential to result in dramatic social improvement.

5.4 Disposal, Recycling and Re-use

Due to the underdeveloped nature of waste disposal within Iraq it is anticipated that the ultimate method for disposal of waste will be at landfill sites for the foreseeable future. A proposed landfill development strategy is outlined within the NSWMP based upon the assessment and categorisation of disposal sites as shown in Table 2.

The strategy is based upon achieving a final point where only Category A sites are operational and accepting waste. Key dates outlined for the assessment, engineering and subsequent management of sites were therefore determined dependent upon category.

Table 2: Landfill Categorisation

Category	Description	Closure Date
A	Controlled, sanitary landfill sites with full containment and evidence of some form of landfill gas and leachate management.	Ongoing Operation
B	Sites with environmental and health protection, these may be retro-fitted to create controlled, sanitary landfill sites.	December 2017

C	Sites with some limited form of environmental and health protection may continue to be used in the interim period prior to the completed development of controlled landfill sites.	March 2014
D	High risk sites with no form of environmental and health protection and are in need of urgent mitigation measures.	February 2009
E	Uncontrolled dumping sites with no management or form of control, sites requiring urgent mitigation measures.	February 2009

In the medium to longer term disposal techniques for hazardous and industrial waste will need to be developed, however short term utilisation of existing incinerators may prove adequate. Although initial encouragement will be provided for recycling and re-use schemes the provision of formal resources for such issues is considered to be a longer term aim.

6. SOCIAL EDUCATION

The purpose of the key recommendations contained within this section of the NSWMP is to ensure provision for the development of an educational system that will promote the involvement of both communities and individuals in waste management.

6.1 Short Term (0 to 5 years)

Over the short term the main focus will be on educating the Iraqi population as to the benefits of implementing a formal solid waste management plan at both national and regional level. It is important that the public understands, accepts and appreciates that a new structured approach to strategic waste management is crucial in the ongoing development of their country. In order to achieve this goal a progressive teaching program will be introduced, particularly for primary school children, to instill in them the correct methods for disposing waste and the benefits this practice offers. It is hoped that through educating children they will in turn transfer this knowledge to their parents through home life. This educational drive will also extend to the provision of educational programs and uniform operating standards and best practice for those involved in the waste management sector.

6.2 Medium Term and Long Term (5 years plus)

Over a slightly longer timeframe the initial school and community educational programs will be expanded to incorporate topics such as waste reduction and recycling. It is predicted that during the final implementation stages of the NSWMP waste management infrastructure will be developed to a stage where initial waste resource use can be supported through recycling and recovery. This educational framework can also then be utilised by institutes to facilitate the promotion of wider environmental topics such as sustainable development and climate change.

With the increased awareness of the public and community engagement it will then be possible to collate waste practice data and information through surveys to both gauge the effectiveness of awareness building programs and to further feed into strategic waste management planning.

7. ECONOMICS AND FINANCE

The majority of the recommendations included within the NSWMP rely on high initial capital expenditure over a relatively short time frame to counter the current low level of development of the waste management infrastructure. The current limited status of the economy within Iraq implies that this initial expenditure will need to be funded from central government sources. Traditionally this was achieved through nominal charges attached to existing revenue generating products such as water bills, etc.

7.1 Short Term (0 to 5 years)

Once an initial level of operability has been achieved it is recommended that the following series of funding and procurement initiatives are explored and developed over the short term:

- **Phased Purchasing:** Prioritisation of capital expenditure requirements and allocation over an acceptable time period;
- **Funds and Loans:** The potential for utilising international sources of capital should be explored for initial expenditure however operational costs should be funded by income raised by central government where possible;
- **Inter-Sector Subsidy:** Funding released by central government from oil revenues could provide the initial source of financing for waste management development; and
- **Direct Charging:** 'Pay as you throw' schemes should be considered as a means of recovering costs and replacing the addition to water bills however it is felt these should be phased in due to potential public concern.

7.2 Medium and Long Term (5 years plus)

Over a longer time frame the involvement of the private sector is to be encouraged. This can be used to create a competitive industry and drive efficiency whereby the ultimate beneficiaries are the public and consumers. It is recognised however that private infiltration of the waste sector is improbable until the municipal and regional authorities have established a relatively effective and stable level of service. Caution is advised over the approach taken to introducing private investment into the sector until municipal waste management officers have achieved a level of experience required to manage private sector contracts. Failure of privatisation during the initial implementation of the NSWMP could have a considerable and wide ranging negative impact.

8. CHALLENGES AND ISSUES

Many of the challenges faced throughout the delivery of the NWSMP project stemmed from hindrances and obstacles inherent to working for a country poorly developed and resourced due to conflict. Access to accurate information and data relating to conditions within the country proved extremely difficult to obtain as did a working understanding of the complex inter-relationships between the various institutions operating within the country. Through the use of local partners within Iraq, primarily the University of Baghdad the project team was able to overcome some of these issues however it became increasingly obvious that the decision to design the NSWMP as a live document to allow for the inherent flux and change within the country was pertinent.

9. CONCLUSION

The NSWMP has been designed to act as a framework for the development of an integrated waste management service. Of vital importance is the role of the Iraqi people. Their understanding of the NSWMP combined with their local knowledge will allow them to extend the scope of this strategy. Only through their involvement in the strategy and decision making process will the final end target of a complete, functioning waste management service be achieved.

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