



# Waste Management

## Situation in Jordan

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# Introduction

- Environmental management of hazardous wastes has become a major concern as haphazard dumping of hazardous wastes results in severe environmental impairment.
- The adverse effects of hazardous wastes as well as the significant potential risks posed by them to the life and its supporting systems are increasingly recognized.
- Rapid growth of industries has resulted in generation of increasing volume of hazardous wastes.
- These wastes need scientific treatment and disposal
- Much work remains to be done to understand and find ways to reduce and mitigate the effects of harmful substances and hazardous waste on human health and the environment.

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# Current Situation in Jordan

Population:	6,388,000
Municipal Solid Waste (Msw) Generation:	2,077,215 tons/year
Per Capita Msw Generation:	
- Urban Areas	0.9 kg/day
- Rural Areas	0.6 kg/day
Msw Generation Growth:	3 %
Medical Waste Generation:	4,000 tons/year
Industrial Waste:	45,000 tons/year
Agricultural Waste:	> 4 million tons/year
C&D Waste:	2.6 million m <sup>3</sup> /year
Waste Tyres:	2.5 million no./year
E-Waste:	30,000 piece/year
Packaging Waste:	700,000 tons/year

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# Current Situation in Jordan

## Municipal Waste

Msw Collection Coverage:	
- Rural Areas	90 %
- Urban Areas	70 %
Msw Final Destination:	
- Composted	0 %
- Recycled	7 %
- Landfilled	48 %
- Openly Dumped	45 %
Number of Dumpsites:	20

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# Current Situation in Jordan

## Hazardous and industrial waste

Number Of Hazardous Landfills or Plants (Chemical and Physical Treatment):	
- Planned	0
- Under Construction	0
- Constructed	
- Operational	1
Types of Disposal and Treatments for Medical Waste:	Incineration & sterilization using shredding autoclaves

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# Current Situation in Jordan

## Quantities of MSW in Jordan

- Average per capita generation rate : 0.9 kg/day

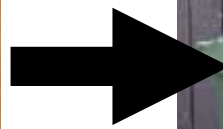
## Collection & Transport

- Mixed waste collection
- Curbside collection ( 1.1 m<sup>3</sup> containers)
- House to house collection (0.22 m<sup>3</sup> containers)
- Municipalities collect waste in cities
- Private companies collect commercial and industrial waste
- Direct transport of waste after collection to transfer stations and/or landfills

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# Current Situation in Jordan

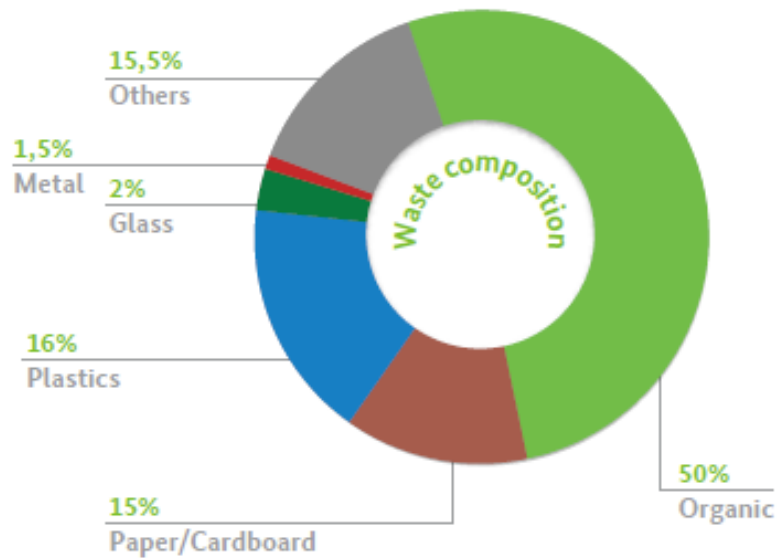


**Mixed municipal waste (no separation at points of generation)**

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# Waste Constituents



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# Current Situation: Treatment of SW IN Jordan

- Partial separation of useful materials (in landfills and outside )
- Recycling & export of materials separated
- Treatment of separated organic waste to generate biogas & electricity in a reactor (Russaifa landfill)

## Private Sector Participation in Waste Management

- Private contractors separate waste in landfills
- Recycling of specific types of waste
- Collection and transport of commercial and industrial waste by private companies



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# Current Situation

## Common Practices in Society

- Littering (non-uniform untidy collection of rubbish)
- Disposal of mixed waste
- No efforts for waste reduction
- No value of waste
- Scavenging (search for and collect usable thing from discarded waste)



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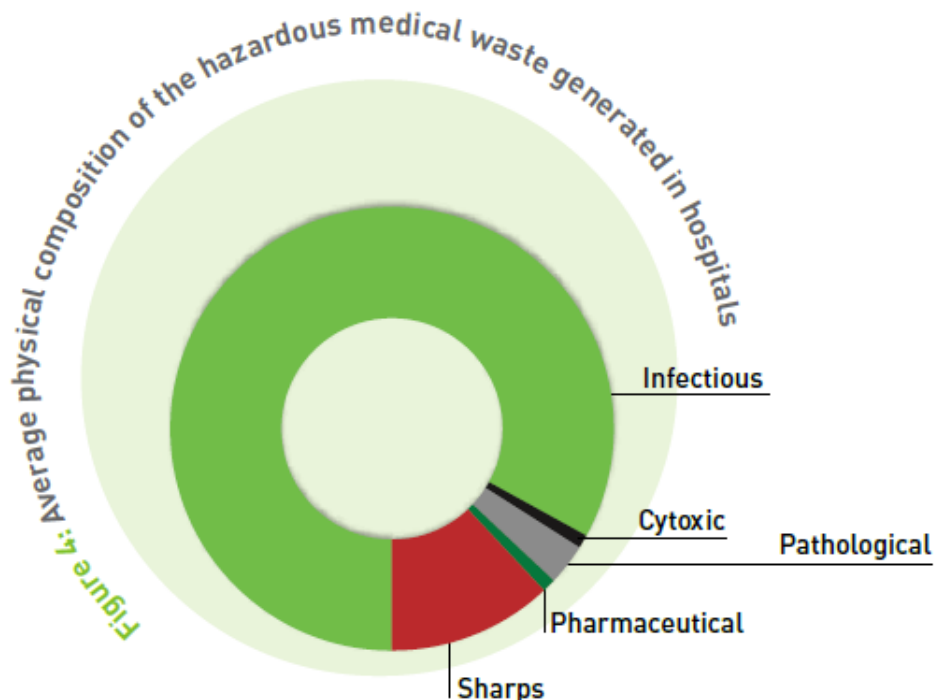


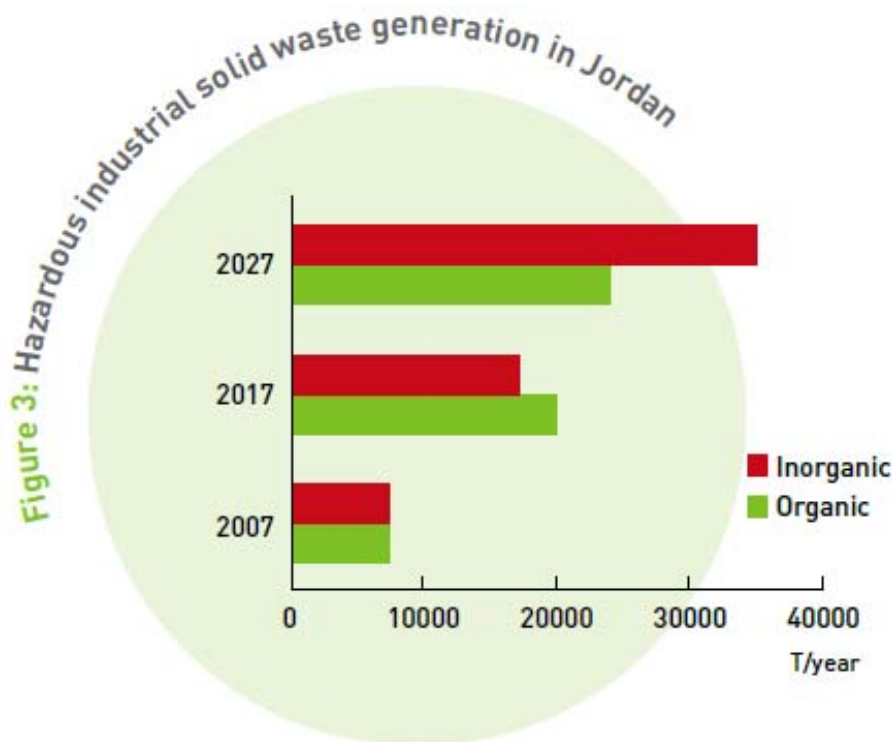
# Healthcare Waste Management

- The estimated average generation of healthcare waste was 0.75 kg/bed/day and 1.05 kg/patient/day (this specifically in KAUH during the study periods)
- The daily amount of the medical waste generated by all Jordanian hospitals is about 6 tons/day.
- **Examples of sanitary sewage**
  - Small amount, up to 100g of water-soluble solid chemicals diluted with water and disposed into the sewage system.
  - Strong acids and basis firstly diluted to near neutral pH and disposed into the sewage system.
  - Expired blood and urine are disposed in the sewer system with small amount of disinfectants (H<sub>2</sub>SO<sub>4</sub>, alcohols).



# Healthcare Waste Management





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- The legislation in Jordan imposes that the generated hazardous waste should be stored initially at the place of generation, after which it should be labeled and transported to the hazardous waste facility at Swaqa.
- To control the hazardous waste transport and disposal, the cradle to grave concept is applied.
- Accordingly, each hazardous waste shipment should be subjected to manifest documentation
- At Swaqa hazardous waste facility, the stabilized and inert solid waste is landfilled in specially lined cells.
- Other types of waste that require physic-chemical treatment or incineration are stored in a safe storage at the facility until the second phase of the facility construction is implemented.

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# Institutional set-up of solid waste management in Jordan

#	Agency	Main Responsibility	Legal framework	Main legal framework requirements
		Sets waste management policy;	Environment Protection Law No. 52/2006 and related regulations	Sets the direct responsibilities for the Ministry of Environment; Sets overarching principles for environmental protection;
		Regulates waste management sector; and	Solid waste management regulation No. 27/2005	Demands general requirements in terms of manpower, equipment, monitoring, container management, separation of hazardous wastes, documentation, and final treatment or disposal control, For every party that generates and/or manages solid waste;
		Monitors and enforces compliance.	Waste oil handling and management instructions (2003)	Licensing requirements and documentation for generators, transporters, and treatment; Technical requirements for generators, transporters, and treatment in terms of storage, spill management, emergency, fuel specs, etc.

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# Institutional set-up of solid waste management in Jordan

1	Ministry of Environment	Hazardous waste handling and management instructions (2003)	Licensing requirements and documentation for generators, transporters, and treatment/disposal; Technical requirements for central storage, wrapping, transport, treatment, disposal, emergency, empty containers, etc.
		Fee collection for hazardous waste treatment and disposal instructions (2004)	Sets applicable fees for transport, treatment, and disposal of hazardous wastes;
		Organic compost (animal and plant origin) storage, production, trading, and use instructions (2009)	Licensing requirements for compost plants and trading; Technical requirements for siting, storage, processing, etc.
		Draft waste management framework law	Sets the legal basis for solid waste reduction, material and energy recovery, treatment, and final safe disposal in terms of priorities, general principles, responsibilities, planning, technical requirements, and penalties;

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## Institutional set-up of solid waste management in Jordan

2	Ministry of Municipal Affairs	Supervises municipal functions and service delivery; Regulates MSW management;	Municipalities Law No. 13/2011 and amendments (latest No. 7/2012)	Sets municipal responsibilities including municipal cleaning, waste collection, and disposal;
3	Greater Amman Municipality	Regulates and operates MSW management system in Amman; Regulates C&D waste permits and final disposal;	Nuisance prevention and waste collection fees for Greater Amman Municipality No. 83/2009 Buildings and zoning regulation in the City of Amman No. 67/1979 and amendments (latest No. 21/2005)	Sets the different types of nuisances and municipal control measures, including the municipal responsibilities for waste collection, transport, treatment, and disposal, and the attached fee system; Sets permit requirements for excavations and renovations, to control C&D waste illegal dumping;

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## Institutional set-up of solid waste management in Jordan

4	Municipalities	Operates MSW management system in Amman;	Nuisance prevention and waste collection fees for Municipalities No. 1/1978 and amendments (latest No. 72/2009)	Sets the different types of nuisances and municipal control measures, including the municipal responsibilities for waste collection, transport, treatment, and disposal, and the attached fee system;
5	Joint services councils	Operates MSW final disposal sites;	Joint services council regulation No. 75/2009	Sets the joint services council responsibility for the construction and operation of landfills/dumpsites;
6	Ministry of Health	Regulates medical waste management;	Medical waste management instructions No. 1/2001	Sets the technical definitions and classification for medical waste, technical requirements for segregation, central storage, transport, and treatment/disposal technologies;
7	Ministry of Agriculture	Regulates agriculture waste management;	Agriculture Law No. 44/2002 and amendment No. 22/2005	Sets the mandate for agriculture waste management;
8	Ministry of Energy and Mineral Resources	Regulates renewable energy market;	Renewable Energy and Energy Efficiency Law No. 13/2012	Development of waste to energy projects in cooperation with municipalities;

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## Challenges....

- Weaknesses in the existing legislations.
  - No proper separation of waste at points of generation.
  - Minor separation of recyclable materials from waste stream, recycling and resource recovery are done on a small scale.
  - No treatment of the organic portion in the waste stream.
  - Long distances to some landfills and thus high cost of transport.
  - Limited participation of private sector
- 
- Disposal of other types of waste in landfills
  - Improper location of some landfill sites (may influence groundwater quality).
  - Lack of new landfill sitting criteria.
  - No lining is applied to landfills and no studies were conducted to prove the necessity of lining. (Al Ghabawi landfill site is an exception).
  - No lechate collection and no landfill gas ventilation and /or collection ( Russaifa biogas plant and Al Ghabawi landfill sites are exceptions).

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## Challenges....

- Unorganized landfill practices, methods and area efficient use.
- Lack of heavy machinery in some landfill sites.
- Absence of weigh bridges on the entrances of landfill sites to weigh the collection vehicles in order to know the exact amounts of waste entering the sites.
- Improper and unorganized separation of recyclable materials is done in unsanitary conditions and influencing land filling practices.

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# Role of MOE IN Solid Waste Management



وزارة البيئة  
المملكة الأردنية الهاشمية  
Ministry of Environment  
The Hashemite Kingdom of Jordan

- Preparation of legislations in WM
- New landfill sitting (in cooperation with concerned parties )
- Monitoring performance in landfill sites
- Study the influence of landfill sites on the environment
- Preparation of plans , studies and data collection and analysis in WM
  
- Specify suitable equipment and methods of collection , transport , separation , storage , recycling , treatment and disposal
- Specify methods of rehabilitation of closed landfill sites
- Carryout training and public awareness programs in the field of WM
- Carryout cleaning activities in public places

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# Progress so far (MOE) ....



- Legal approximation with EU legislations (ongoing)...
- Preparation of waste framework law (ongoing)....
- Monitoring of influence of landfills on groundwater (ongoing)....
- Institutional strengthening New divisions/ functions
- Preparation of solid waste policy
- Adoption of EU waste catalogue
- Preparation of waste manifest system (ongoing)....
- Pilot project: waste separation at source (ongoing)....
- Treatment of animal waste (manure) (ongoing).....

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# Main Future Objective

- Better environment through improved waste management



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# Specific Future Objectives

- Waste separation and treatment of organic and no organic portions.
- Waste reduction.
- Improve landfill sites to reduce their influence on the environment.
- Benefit from Clean Development Mechanism (CDM) carbon finance by methane gas reduction.



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## Recommendations

- Developing solid waste management legislations
- Awareness among general public with regard to waste handling, reduction and treatment.
- Training of staff for Joint Services Councils, municipalities and Ministry of Environment.
- Treatment of organic waste (food waste & animal waste)
  
- Land filling should be practiced where large amounts of waste are dumped ensuring exploitable amounts of biogas.
- Composting should be practiced with less amounts of waste and where biogas generated is not enough to be economically feasible.
- Encourage private sector to invest in the field of solid waste management for better waste collection, recycling and treatment.

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## Recommendations

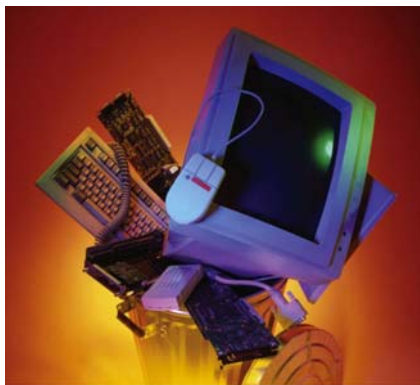
- Reduction of the number of landfill sites to three regional sites which are:
  - Properly located according to proper sitting criteria.
  - Properly designed and constructed on sanitary basis with lining, lechate collection and treatment and biogas extraction and utilization.
  - Al Ghabawi landfill site can be considered as one of these sites since it's a sanitary landfill.
  
- Transfer stations should be properly located and well managed.
- Waste compaction in transfer stations should be avoided to allow for waste separation before final disposal.
- Closure and rehabilitation of improper landfill sites.
- Benefit from Clean Development Mechanism (CDM) -carbon finance should be considered.



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# Global Problem



**Electronic Waste (E-waste)**



**Scavenging in the Philippines**



**Solid Wastes Polluting a River in Jakarta, Indonesia**

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# Global Problem



**Surface Impoundment in Niagara Falls, New York, U.S.**



**Leaking Barrels of Toxic Waste at a Superfund Site in the United States**

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## Your Responsibility

- The success of the hazardous waste management program depends on the conscientious efforts of you and your coworkers.
- When hazardous materials are mismanaged, they have the potential to pollute the environment and threaten human health.
- Because you are handling hazardous waste on a day-to-day basis, it is essential that you follow this document's guidelines. You are expected to:
  - Package, label and store hazardous waste and unwanted chemical products
  - Identify and label all chemical wastes properly so unknowns are not generated;
  - Whenever you are in doubt, seek the advice for procedures on how to handle and dispose of any chemical product; and,
  - Make every effort to reduce the amount of hazardous waste you generate.

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