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Country report on the Solid Waste Management in **JORDAN**

April 2014



COUNTRY REPORT ON
THE SOLID WASTE MANAGEMENT IN

JORDAN



April 2014



This report was last updated in December 2013

Developed with the support of **Mr.Ahmad G. Alhyasat** and **Mr.Zaidoun Al-Nsourand** in close cooperation with the SWEEP-Net national coordinator **Ms. Hajar Mustafa Majar**

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COUNTRY PROFILE on the solid waste management situation in JORDAN

April 2014

BACKGROUND INFORMATION

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 ³ /year
Waste Tyres:	2.5 million no./year
E-Waste:	30,000 piece/year
Packaging Waste:	700,000 tons/year

TECHNICAL PERFORMANCE

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
Number of Controlled Landfills:	
Number of Sanitary Landfills:	
- Planned	-
- Under Construction	-
- Constructed	-
- Operational	1

Hazardous and industrial waste

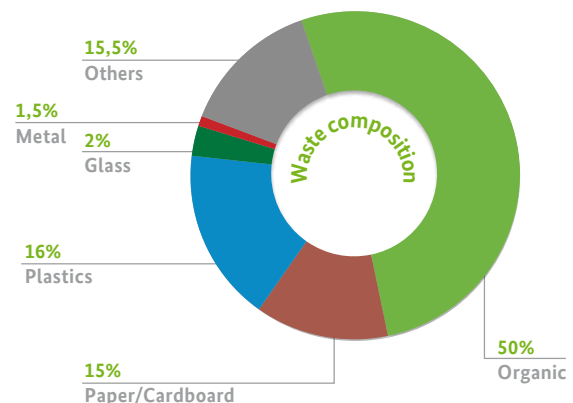
Number Of Hazardous Landfills or Plants (Chemical and Physical Treatment):	
- Planned	0
- Under Construction	0
- Constructed	
- Operational	1
Types of Disposal and Treatments for Medical Waste:	Incineration & sterilization using shredding autoclaves

Policy and planning environment

- Solid waste sector is among the target areas of the Government National Agenda for Sustainable Development;
- Designation of the Ministry of the Environment as the responsible agency for developing a solid waste management policy and laws and regulations;
- Encouraging Private Sector Participation in infrastructure;
- Adopting a National Energy Strategy, which calls for the development of renewable and sustainable energy; and
- Greater Amman municipality has developed a master plan, which provides a framework for infrastructure, planning and zoning, transportation, etc.

Legal framework

- Environment Protection Law No. 52 of 2006 and related regulations which sets the direct responsibilities for the Ministry of Environment and sets overarching principles for environmental protection;
- Solid waste management regulation No. 27 of 2005 which demands general requirements in terms of manpower, equipment, monitoring, container management, separation of hazardous wastes, documentation, and final treatment or disposal control;
- Waste oil handling and management instructions of 2003 which provides the licensing requirements and documentations for generators, transporters, and treatment and the technical requirements for generators, transporters, etc.;
- Hazardous waste handling and management instructions of 2003 which provides the licensing requirements and docu-



mentation for generators, transporters, and treatment/disposal, etc.;

- Organic compost (animal and plant origin) storage, production, trading, and use instructions of 2009 which provides the licensing requirements for compost plants and trading and the technical requirements for siting, storage, processing, etc.;
- Municipalities Law No. 13 of 2011 and amendments (latest No. 7 of 2012) which sets municipal responsibilities including municipal cleaning, waste collection, and disposal;
- Nuisance prevention and waste collection fees for Greater Amman Municipality No. 83 of 2009 which determines the different types of nuisances and municipal control measurement, including the municipal responsibilities for waste collection, transport, treatment, and disposal, and the attached fee system;
- Buildings and zoning regulation in the City of Amman No. 67 of 1979 and amendments (latest No. 21 of 2005) which sets permit requirements for excavations and renovations, to control C&D waste illegal dumping;
- Renewable Energy and Energy Efficiency Law No. 13 of 2012.

Institutional framework

- Ministry of Environment:
 - Sets waste management policy;
 - Regulates waste management sector; and
 - Monitors and enforces compliance.
- Ministry of Municipal Affairs:
 - Supervises municipal functions and service delivery;
 - Regulates MSW management;
- Greater Amman Municipality:
 - Regulates and operates MSW management system in Amman;
 - Regulates C&D waste permits and final disposal;
- Municipalities:
 - Operate MSW management system in Amman;
 - Joint services councils:
 - Operates MSW final disposal sites;
- Ministry of Health:
 - Regulates medical waste management;
- Ministry of Agriculture:
 - Regulates agriculture waste management;
- Ministry of Energy and Mineral Resources:
 - Regulates renewable energy market;

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Financial & cost recovery arrangements

- Residential
 - Only Greater Amman Municipality: Fixed JOD 20 per household per year plus JOD 0.005 per KWh (For >200 KWh per month);
 - All municipalities except Greater Amman Municipality: Fixed JOD 24, 15, and 8 per household per year depending on municipality class;
- Any professional license for commercial, institutional and industrial activities:
 - 20% of any professional license fees;
 - Professional license fee instructions (4 classes) (only for Greater Amman Municipality);
- Transport and tipping fees are charged for the use of transfer stations and landfills/dumpsites.

Private sector involvement

- BOT for commingled waste MRF in Ghabawi for 600 ton/day max. Greater Amman Municipality was the Contracting Authority. The project has been delayed;
- BOOT for hazardous waste treatment center in Ghabawi and Swaqa. The project has been terminated;
- Municipal cleaning contract for Aqaba City JOD M 2.5/Yr. Aqaba special economic zone authority is the Contracting Authority. The project is ongoing;
- Municipal cleaning contract for Petra region JOD K250/Yr. Petra Development and Tourism Region Authority is the Contracting Authority.

Options for improvement

- Sector policy and national strategy document; Comprehensive detailed legal framework with regulatory standards compatible with the local context;
- An effective institutional set-up and organization with clear roles and responsibilities on the local and regional levels, and the promotion of arm' length organizations or independent agencies with the proper PPP mix;
- Diverse Capacity building programs across all agencies and target groups;
- Effective operational planning and M&E framework; and
- Effective regulator role with monitoring and enforcement.

EXECUTIVE SUMMARY

Solid waste management in Jordan, and particular MSW, has been improved for the last 15 years since the mid-1990s, with improvement of legal framework and institutional capacity to be the main drivers of sector's development.

With the adoption of Government National Agenda (NA) for Sustainable Development which represents the Government's policy for ten years (2006-2015), solid waste management sector is now a priority and will be addressed on par with water and wastewater issues.

Currently, Jordan generates about 2 million, 45,000, and 4,000 tons of MSW, hazardous industrial waste, and medical waste, respectively, per year.

MSW collection coverage is estimated at about 90% and 70% for urban and rural areas, respectively, about 50% of MSW is food waste and 35% is packaging waste that would be potentially available for recovery. Most of MSW ends up at dumpsites and landfills, whereas only 7% are currently recovered informally in the Kingdom.

There are existing plans to develop an integrated treatment centre for hazardous industrial and medical wastes, that are now partially controlled either in Swaqa hazardous waste treatment and storage centre or in various incinerators attached to health care facilities.

Various governmental agencies are involved in waste management, either as policy makers, regulators, or operators, with most typical examples to be the Ministry of Environment, by the virtue of Environment Protection Law No. 52/2006 and its executive regulations, and municipalities are directly responsible for MSW service delivery.

Despite the lack of a well-defined policy and strategy, there have been considerable achievements in the sector, and in particular in Greater Amman Municipality, in terms of city cleanliness, engineered landfilling, and service cost recovery, achieving one of the best rates in the MENA region. Still several improvements shall be targeted in terms of policy, strategy, institutional set-up, legal framework, and capacity building.

1 .INTRODUCTION

1.1. SOCIO-ECONOMIC AND POLITICAL SITUATION

Jordan is a small, middle-income, open economy country, with a limited natural resources base and active trade flow. Enhancing Jordan's environmental management can not only improve the well-being of Jordanians, but also enable the country to better compete in increasingly environmentally conscious markets.

The Jordanian economy growth rate around 3 percent in 2012 and is mainly driven by services, many of which are tourism-related (trade, hotels and restaurants, and transport and communication). Unemployment remained high about 12.5 percent in the end of 2012. Gas inflows from Egypt were severely reduced for most of 2012, resulting in expensive fuel imports. Moreover, the conflict in Syria has resulted in a large influx of refugees. Together with regional uncertainties, this contributed to pressures on fiscal accounts and also international reserves in late 2012. Political uncertainties were alleviated by the parliamentary elections in early 2013 and the re-appointment of the prime minister. During 2012, higher food and energy prices and public sector wage increases weighed on inflation. Following the liberalization of fuel prices in mid-November 2012, inflation picked up further to around 7 percent at year-end.

The Cost of Environmental Degradation (COED) in Jordan is estimated to be in the range of JOD 143–332 million, with an average of JOD 237 million, or 2.35 percent of gross domestic product (GDP) in 2006. If the impact of emissions on global environment is added, the total cost to Jordan and the global community as a whole would be JOD 393 million. Waste management accounted for 0.23% of the GDP COED in 2006.

1.2. SOLID WASTE FACTS AND FIGURES

The following table summarizes key facts and figures on solid waste management in Jordan for the year 2012:

Table 1: Key facts and figures on solid waste management in Jordan for the year 2012**Technical Performance – MSW**

#	Parameter	Unit	Value
1	Population	No.	6,388,000
2	Municipal solid waste (MSW) generation	Ton/year	2,077,215
	Composition of MSW	%	50
	Food waste	%	34.5
	Dry recyclables	%	15
	Paper and cardboard waste	%	2
	Glass	%	1.5
	Metals	%	16
	Plastics	%	15.5
	Others		
3	MSW per capita generation:		
	urban	Kg/capita/day	0.9
	rural	Kg/capita/day	0.6
4	Estimated MSW general annual growth	%	3
5	Hazardous industrial waste generation	Ton/year	45,000
6	Medical waste generation	Ton/year	4,000
7	Agricultural waste generation	Ton/year	> 4 million
8	Packaging waste generation	Ton/year	700,000
9	Construction and demolition waste generation (Amman)	m ³ /year	2.6 million
10	Scrap tires generation	No./year	2.5 million
11	Waste oil generation	Ton/year	10,000-15,000
12	E-waste generation	Piece./year	30,000

Technical Performance – MSW

#	Parameter	Unit	Value
1	MSW Collection/ sweeping coverage:		
	urban	%	90
	rural	%	70
2	MSW final destination:		
	Recovered	%	7
	Composted	%	0
	Landfilled		
	Engineered landfill	%	48
	Dumpsite	%	45
3	Number of containers	No.	50,000
4	Number of transport vehicles	No.	1000
5	Number of workforce	No.	10,000
6	Number of MSW engineered landfills	No.	1
7	Number of MSW dumpsites	No.	20
8	Number of MSW large composting plants	No.	0
9	Number of MSW MRFs	No.	1 Offline
10	Number of cardboard recycling plants	No.	8
11	Number of metal recycling plants	No.	5
12	Number of plastics recycling plants	No.	5-10

Financial Performance – MSW

#	Parameter	Unit	Value
1	Total costs	M JOD	55
2	Total revenues	M JOD	23.6
3	Cost recovery		
	Amman	%	60
	Other municipalities, average	%	30

Technical Performance – other waste streams

#	Parameter	Unit	Value
1	Number of hazardous industrial waste treatment centers	No.	1
2	Number of medical waste treatment units	No.	~30
3	Number of manure composting plants	No.	1
4	Number of scrap tires recovery plants	No.	15
5	Number of scrap tires recycling plants	No.	2
6	Medical waste treated in existing facilities per year	%	50
7	Hazardous industrial waste treated and/or stored in Swaqa per year	%	10

2. NATIONAL MUNICIPAL SOLID WASTE MANAGEMENT POLICIES

2.1. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Jordan does not have yet a solid waste management (SWM) policy, however the GOJ has adopted a series of enabling elements toward SWM policy and reform that represent a sound framework in the short term, including:

- Solid waste sector is among the target areas of the Government National Agenda (NA) for Sustainable Development: The NA, which represents the Government's policy for ten years period (2006-2015), has established the following four objectives to be attained in the waste sector, namely: (i) extending waste service coverage by providing financial, technical and human resource capacity-building to empower concerned authorities; (ii) promoting environmentally sound solid waste disposal and treatment; (iii) minimizing generation of solid waste; and (iv) maximizing environmentally sound solid waste reuse and recycling;
- Designation of the Ministry of the Environment (MoE) as the agency responsible for developing a SWM policy and laws and regulations;
- Encouraging Private Sector Participation in Infrastructure, as stated in the National Privatization Law No. 21 year 2000 and Jordan's National Privatization Strategy, which calls for the restructuring and privatization of public institutions, increasing private sector investment in infrastructure, and attracting foreign technology and know-how;
- Adopting a National Energy Strategy, which calls for the development of renewable and sustainable energy; in view of the increase in energy prices, the Government has set an objective of producing 10 percent of its primary energy generation with new and renewable sources of energy by the year 2020; and
- Greater Amman Municipality has developed a Master Plan, which will provide a framework for infrastructure, planning and zoning, transportation, service provision, and PPP in municipal services for the next two decades. This plan is considered the city's blueprint for sustainable development and for the achievement of the objectives outlined in the National Agenda. Master Plan is the improvement of municipal services, including those related to municipal solid waste management. This is consistent with the National Agenda, which considers MSW management to be one of the major issues in Jordan.

The following table illustrates the institutional set-up of solid waste management in Jordan:

Table 2: Institutional set-up of solid waste management in Jordan

#	Agency	Main Responsibility	Legal framework	Main legal framework requirements
1	Ministry of Environment	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.
			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;	
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;

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;

2.2. STRATEGIES, ACTION PLANS AND INITIATIVES

Currently, there is no overarching National strategy for MSW management in Jordan; in 2012 a request for proposals to develop a national MSW strategy was issued under the Regional and Local Development Project that is financed by the World Bank and implemented by the Ministry of Municipal Affairs and the Cities and Villages Development Bank. The contract is being finalized for signature.

Greater Amman Municipality concluded a MSW management strategic planning study in 2012 for the horizon (2012-2022). The study defined renewal plans for equipment, phased introduction of waste separation at source, transfer network, landfilling including landfill gas recovery, and PPP options. It should be noted that the study requires further refinement in terms of technical feasibility and PPP options. Once the study is concluded, a MSW strategy document shall be prepared for City council endorsement.

2.3. PLANNING AND INVESTMENTS

In 2012, a feasibility study was prepared for an integrated solid waste management project in Al-Ekaider under the Mediterranean Hot Spot Investment Programme – Project Preparation and Implementation Facility (MeHSIP-PPIF), that is funded by the European Union - FEMIP Support. The project includes rehabilitation of Al-Ekaider dumpsite including the unlined wastewater ponds, construction of sanitary landfill cells, and the construction of a pilot-scale MRF and composting plant. CAPEX is in the order of JOD 50 M. The GOJ, through the Ministry of Municipal Affairs, shall decide on the sources of funds and conclude financing agreements to setup project implementation arrangements.

The Jordan Water Reuse and Environmental Conservation Project (2010-2015), funded by the USAID, aims to protect Jordan's water supply through: Regulatory strengthening, Pollution prevention and industrial waste management, Disposal sites rehabilitation, and Water reuse. Under the project, developing and designing solutions to improve waste management practices shall be performed for 3 landfills and disposal sites.

2.4. MONITORING

Generally speaking, municipalities lack the effective framework, tools, and the capacity to monitor and evaluate the performance of their MSW management systems in technical and financial terms. In August, 2012, Greater Amman Municipality started the development of a monitoring and evaluation system to measure sector performance. This system is designed to address service coverage and efficiency, financial performance, and environmental impact indicators. This dashboard system shall integrate with other data generating tools in the municipality and should be operational in the first quarter of 2014.

2.5. FISCAL, FINANCE AND ECONOMICAL STEERING INSTRUMENTS

The following describes the MSW fee system:

- A fixed annual lump-sum fee (JOD 20 per household) that is paid in monthly instalments plus JOD 0.005 per KWh (for every KWh above 200 KWh consumption per month), levied with the monthly electricity bill and is applicable for households in Amman municipality;
- A fixed annual lump-sum fee (JOD 24, 15, or 8 per household depending on municipality class) that is paid in monthly instalments, levied with the monthly electricity bill and is applicable for households in municipalities except Amman municipality;
- For any professional license of commercial, institutional, and industrial activities in municipalities including Amman municipality, 20% of any professional license fee is levied annually;
- For any professional license for commercial, institutional, and industrial activities in Amman municipality, a fee is levied annually based on special Professional license fee instructions (4 classes); and
- Transport and tipping fees that are levied from any party that uses transfer stations and/or landfill/dumpsite, operated by Amman Municipality and all other municipalities/joint services councils

The following describes the MSW fee system:

2.6. PRIVATE SECTOR PARTICIPATION POLICY

The Jordan's overall policy encourages private sector participation in infrastructure, as stated in the National Privatization Law No. 21 year 2000 and Jordan's National Privatization Strategy, which calls for the restructuring and privatization of public institutions, increasing private sector investment in infrastructure, and attracting foreign technology and know-how.

The following table summarizes key PPP projects in waste management:

Table 3: Key PPP projects in waste management

#	Contract	Contracting Authority	Status 2012
1	BOT for mixed MSW MRF in Ghabawi 600 ton/day max.	Greater Amman Municipality	Delayed, dispute
2	DBO for LFG recovery and power generation in Ghabawi landfill 6 MW	Greater Amman Municipality	Delayed
3	BOOT for hazardous waste treatment center in Ghabawi and Swaqa	Ministry of Environment	Terminated
4	Municipal cleaning contract for Aqaba City JOD M 2.5/Yr	Aqaba special economic zone authority	Ongoing
5	Municipal cleaning contract for Petra region JOD K250/Yr	Petra Development and Tourism Region Authority	2006-2007 2012 tendered

2.7. PUBLIC AWARENESS, EDUCATION AND COMMUNITY PARTICIPATION

The Public Action for Water, Energy and Environment is a USAID-funded five year program (Sep 2009 – Present) intended to foster and support behavior change towards water and energy conservation and improved solid waste management. The program will develop communication strategies, to be implemented using several methodologies including a multi-million grant program for NGOs and CBOs.

Unlike other municipalities, Greater Amman Municipality established dedicated organizational units for public awareness and communication that utilized several available tools such as Hawa Amman Radio 105.9 fm, advertisement panels on bridges and street furniture, etc.; the main activities included so far are the dissemination of brochures, leaflets, 145 lectures in 2010, conducting environmental contests, running environmental movies, mass brochure distribution, my school-my environment project, advertisements, and several pilot waste separation at source projects.

2.8. NATIONAL CAPACITY BUILDING AND TRAINING INITIATIVES

A national training on integrated sustainable municipal waste management and sanitary landfilling was conducted in Amman, Jordan, in September, 2012 by Horizon 2020 capacity building program – Mediterranean environment program.

2.9. CAPACITY BUILDING REQUIREMENTS

Development of municipal staff's capacity in the field of integrated solid waste management is the first step needs to be done to improve current situation.

2.10. NATIONAL INITIATIVES MULTI STAKEHOLDER EXCHANGE

Several designated special committees are formed from different ministries and governmental agencies to tackle issues related to waste management, such as:

- Electronic Waste Committee (MoE);
- Committee of Investment at Al-Akeeder landfill (MoMA);
- Committee of Renewable Energy Projects Including Waste-to-Energy (MoEMR);

- Hazardous Waste and Chemicals Committee (MoE); and
- National Climate Change Committee (MoE).

2.11. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

Please refer to case studies, best practices, and lessons learned, provided in Annex I.

2.12. UPCOMING INITIATIVES

In July 2013, the Ministry of Energy and Mineral Resources has requested expressions of interest for investment in waste-to-energy in Jordan, shortlisted firms shall be announced once the evaluation is concluded.

3. INDUSTRIAL & HAZARDOUS WASTE MANAGEMENT

3.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Ministry of Environment regulates, monitors, and enforces hazardous industrial waste management requirements through the Hazardous waste handling and management instructions of year 2003.

Also the Ministry of Environment acts as the operator for Swaqa hazardous waste treatment center, the only licensed center for central storage, treatment, and disposal of hazardous waste in Jordan.

3.2. STRATEGIES AND PLANNING

Currently, there are no separate policies or strategies that deal directly with hazardous industrial waste management.

3.3. FINANCING

Ministry of Environment levies fees in accordance with fee collection for hazardous waste treatment and disposal instructions of year 2004, as gate fees in Swaqa hazardous waste treatment centre, as follows:

Table 4: Gate fees in swaqa hazardous waste treatment center

#	Hazwaste Classification	JOD/ton*
1	Organic solid waste	296
2	Hydrocarbon sludge – petroleum process	295
3	Organic sludge – high petroleum content	295
4	Petroleum waste	295
5	Organic chemical waste	296
6	Inorganic solid waste – solidification and landfilling	88
7	Inorganic solid waste – landfilling	40
8	Inorganic liquid waste	173

*includes transport costs up to 150 km, JOD 25 per ton shall be deducted if transport is done by a licensed party.

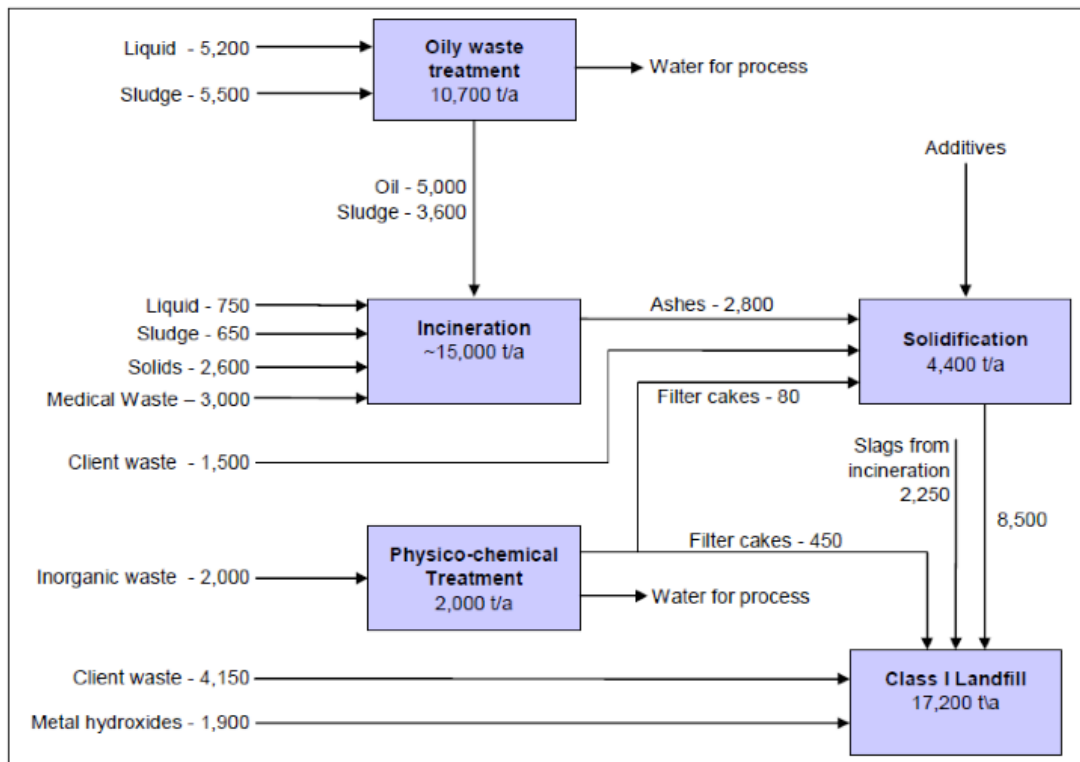
3.4. COLLECTION, TREATMENT AND DISPOSAL

There are no up-to-date accurate records for the quantity and quality of hazardous industrial waste. Several studies have been conducted to address the subject, with the most notable to be those of Cowi(1994) and Fichtner(2002). Nevertheless, it's been estimated that 45,000 ton/year¹² (2012) was generated throughout the country; this estimate includes waste oil.

¹² Estimated based on Ministry of Environment records

3.5. PRIVATE SECTOR INVOLVEMENT SECTOR INVOLVEMENT

In 2009, a 30 year concession BOOT contract of JOD 27 M CAPEX was signed by the GOJ and a private operator to supply, install, and operate an integrated hazardous industrial and medical waste treatment and disposal center. The plant was planned to be operational in the beginning of 2012, however for almost 2 years the private operator was not being able to achieve the financial closing (concluding financing agreements) and as such the contract was terminated in June, 2012 by the GOJ. A project schematic diagram is shown below.



In addition, the private sector is involved in the transport of hazardous industrial waste from registered generators to Swaqa.

3.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

3.7. UPCOMING INITIATIVES

Nothing is foreseen in the near future, except re-tender of the integrated hazardous industrial and medical waste treatment and disposal centre.

4. MEDICAL WASTE MANAGEMENT

Jordan is considered as the top medical tourism destination in the Middle East and North Africa. Treatment at specialized medical centres has commonly been sought by citizens of the neighbouring countries. Thus the expansion of healthcare services was inevitably accompanied by an increase in the volume of medical waste generated.

4.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Ministry of Health regulates, monitors, and enforces medical waste management requirements through medical waste management instructions No. 1/2001.

Ministry of Environment, Ministry of Energy and Mineral Resources, and municipalities are involved in the disposal and treatment processes of radioactive, chemical, pharmaceutical and heavy metal wastes.

4.2. STRATEGIES AND PLANNING

Currently, there are no separate policies or strategies that deal directly with medical waste management. The national medical strategy 2006 – 2010 didn't address the subject of medical waste management.

4.3. FINANCING

Healthcare facilities pay for their medical waste management, a cost that is eventually passed to patients' bills. The increase of fuel and electricity prices, affect to a high extent the cost for proper medical waste management, an item that is, sometimes, overlooked by healthcare facility management, just to keep prices relatively reasonable. Ministry of Health and Jordan University for Science and Technology signed a contract for medical waste incineration, mostly from northern governorates. The contract started on a fixed annual lump sum, however it was negotiated and the annual lump sum raised more than once, and finally, both parties agreed upon payments based on charges per tonnage of waste.

For indicative example, the tentative tariff offered by the operator of hazardous industrial and medical waste treatment and disposal centre, was in the order of JOD 400/ton and local market unit costs for medical waste transport is JOD 100 per trip, and incineration JOD 0.5-1 per kg.

4.4. COLLECTION, TREATMENT AND DISPOSAL

An estimated 4,000 ton/year¹² (2012) of hazardous medical waste is generated throughout the country. Major types of medical waste include infectious material, sharp objects, chemicals, pharmaceuticals, chemotherapeutic drugs residues, pathological waste, and radioactive items.

Abu Qdais, Rabi, and Abdulla (2006) concluded the following medical waste composition in northern Jordan: 83% infectious, 12% sharps, 3% pathological, 1% pharmaceutical, and 1% cytotoxic.

¹² Maximum estimate based on the total number of beds in 2012, 100% occupancy rate.

To a certain extent, the medical waste is collected in colour coded bags and containers and stored in a special storage facility until incinerated or autoclaved onsite, or transported to be incinerated in another location. A few tens of incinerators have been established in public, private, military and university hospitals (20-30 units); only a few of them meet the standards and function properly. Autoclaving is used in a very few facilities as well (3-5 units). Most of medical waste incinerators suffer from frequent breakdowns, being under-capacity, and being located in residential areas.

It should be noted that inefficient and improper segregation of medical and municipal waste, is still practiced, to varying extent, among healthcare facilities. Part of the medical waste generated ends up at municipal dumpsites along with municipal solid waste or it is even open-burnt.

The medical waste management instructions No. 1 of year 2001 allows the final disposal of treated hazardous medical waste in licensed dumpsites and landfills, subject to authorities' approval and other technical requirements per treatment technology.

Funded by USAID, a handbook on safe medical waste management in Jordan was produced and a training course was executed, in addition to a project to upgrade eleven medical waste storage facilities in public hospitals of north Jordan.

The substitution of mercury free medical instruments and equipment, such as thermometers, helped to some extent to mitigate the environmental and health impacts associated with mercury.

4.5. PRIVATE SECTOR INVOLVEMENT

Private sector is involved in all phases of collection, transport, and treatment.

4.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

4.7. UPCOMING INITIATIVES

Nothing is foreseen in the near future, except re-tender of the integrated hazardous industrial and medical waste treatment and disposal centre.

5. GREEN WASTE & AGRICULTURAL WASTE

5.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Ministry of Agriculture is the agency responsible, by the virtue of Agriculture Law No. 44/2002, to regulate, monitor, and enforce agricultural waste management operational requirements. Although, there are no specific regulations or instructions that address directly the agricultural waste management requirements, there are several instructions that address the subject indirectly such as the destruction of agricultural products not suitable for marketing and human consumption instructions of year 2009, and the Licensing, construction, and operation of olive mills of year 2007.

Ministry of Environment, by the virtue of Environment Protection Law No. 52/2006, is also responsible to regulate, monitor, and enforce agricultural waste management environmental requirements, e.g., the "Hazardous waste handling and management instructions" of year 2003 that regulate agricultural hazardous waste, and "organic compost (animal and plant origin) storage, production, trading, and use instructions" of year 2009.

5.2. STRATEGIES AND PLANNING

Currently, there are no separate policies or strategies that deal directly with agricultural waste management.

The agricultural policy document of 1995 and the national agriculture strategy 2002-2010 have not addressed the subject of agricultural waste management in specific; however the agricultural policy document of 1995 calls for utilization of agricultural, food production, and slaughterhouse wastes in cattle feed.

5.3. FINANCING

Farms, slaughterhouses, food production plants, dairies, olive mills, etc. pay for their agricultural waste management cost, which eventually passes to consumers. Also revenues arise from the sale of by-product wastes, in some of cases after processing, such as raw manure, organic compost, some types of slaughterhouse wastes, olive mill processed pellets, etc.

5.4. COLLECTION, TREATMENT AND DISPOSAL

The following table provides an estimate of agricultural waste generation per type as well as some general uses, treatment, and disposal methods:

Table 5: Agricultural waste generation per type as well as some general use, treatment, and disposal methods

Agricultural waste type	Ton/year	Use, treatment, and/or disposal methods
Orchards, citrus, olives, field crops, and vegetables leftovers	450,000 ³	<ul style="list-style-type: none"> • Left on the land; • Stockpiled onsite; • Cattle feed; and • Open field burning.
Fresh raw manure all sources (cow, sheep, goat, camel, and poultry)	4,000,000 ⁴	<ul style="list-style-type: none"> • Used as unprocessed compost leading to environmental impacts especially in the Jordan Valley (Ex. breeding of flies);
	800,000 compost potential *	<ul style="list-style-type: none"> • Processed as compost onsite in large-scale farms;
	40 MW electricity potential *	<ul style="list-style-type: none"> • Used as feedstock for DierAlla organic compost plant; • Dumped on open land; and • Transferred to dumpsites.
Olive mills solid waste	40,000 ⁵	<ul style="list-style-type: none"> • Processed for use as a burning feedstock; and • Dumped on open land.
Slaughtering solid waste	100,000 ⁶	<ul style="list-style-type: none"> • Used as feedstock for cattle-feed production plants; and • Transferred to dumpsites.

* For potentials, only cow and poultry manure is considered

5.5. PRIVATE SECTOR INVOLVEMENT

The private sector is involved in all phases of collection, treatment, and disposal of different types of agricultural wastes, however, there are no specialized collection companies or centralized large-scale treatment or disposal facilities that are operated and managed by the private sector.

5.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

Please refer to Annex I.

5.7. UPCOMING INITIATIVES

Based on agricultural status report 2009, the Ministry of Agriculture aims to promote development of organic compost and olive mill solid waste treatment plants in Jordan.

Jordan is a partner country in the Global Methane Initiative, which is a voluntary, multilateral partnership that aims to reduce global methane emissions and to advance the abatement, recovery and use of methane as a valuable clean energy source.

³ Based on total production 2012 and residue product ratios

⁴ Based on animal population 2012 and standard manure production data

⁵ Provided by Ministry of Agriculture 2012

⁶ Based on red and poultry meat production 2012 and standard dressing percentages

6. PACKAGING WASTE

6.1. LEGAL AND INSTITUTIONAL FRAMEWORK

Currently, there is no specific definition for packaging waste stream in regulations, however packaging waste that is generated from residential, commercial, institutional, and industrial sources is collected, transferred, and disposed of along with municipal solid waste through municipalities and joint services councils, by the virtue of Municipalities Law No. 13/2011 and amendments (latest No. 7 /2012), and nuisance prevention and waste collection fees for Greater Amman Municipality No. 83/2009, and nuisance prevention and waste collection fees for Municipalities No. 1/1978 and amendments (latest No. 72/2009).

Ministry of Municipal Affairs and Greater Amman Municipality have the regulatory power to set any operational requirements.

Ministry of Environment regulates, monitors, and enforces environmental requirements for solid waste management in general, by the virtue of solid waste management regulation No. 27/2005.

6.2. STRATEGIES AND PLANNING

The Government's National Agenda for Sustainable Development, which represents the Government's policy for a ten-year period (2006-2015), calls for maximizing environmentally sound solid waste reuse and recycling.

The municipal solid waste management strategic planning study (2012-2022) for Greater Amman Municipality sets the conceptual framework for a phased introduction of waste separation at source in almost 50% of Amman City coupled with a Clean Material Recovery Facility (70,000-100,000 ton per annum) (5-10% recovery target).

6.3. FINANCING

EAs indicated above, packaging waste is managed as part of the MSW stream, and as such is financed in accordance with MSW financing scheme.

6.4. COLLECTION, TREATMENT AND DISPOSAL

The total estimated amount of packaging waste in the municipal solid waste stream is 700,000 ton/year¹² or 35 % in terms of composition (2012), which is partly recovered by informal waste pickers in the city (In the order of 5,000) or dumpsites.

Greater Amman Municipality developed and operated 3 pilot separation-at-source projects, namely Marka, Daheyat Al Hussein, and Um Uthyna; however the performance is poor due to lack of proper management, equipment, and maintained awareness.

Almost all of the joint services councils now lease dumpsites to companies that hire waste pickers to recover recyclables from the working face, posing however significant health and safety concerns. For

¹² Based on MSW typical composition data in Jordan

example, Al-Akaider dumpsite is leased in the order of JOD 250,000 per annum fixed fee with recovery rates being around 5%, achieved by 40-60 waste pickers.

The following table indicates the estimated amounts of cardboard, scrap metal, and scrap plastics recovered in Jordan (2012).¹³

Table 6: Amounts of cardboard, scrap metal, and scrap plastics recovered in Jordan (2012)

#	Recyclable	Ton/Year	Number of local recycling factories
1	Cardboard and paper	84,000	8
2	Scrap metal	360,000	5
3	Scrap plastics	25,000	5 - 10
	Total all streams incl. MSW	469,000	
	Total municipal solid waste	140,000	7% of MSW total volume

6.5. PRIVATE SECTOR INVOLVEMENT

In 2006, a 15 year BOT contract was signed by Greater Amman Municipality and a private operator to supply, install, and operate a 600 ton/day maximum capacity mixed-MSW MRF next to Ghabawi landfill (60 ton/day as a start). The MRF was planned to be operational in 2008, however, a legal dispute between the municipality and the private operator prevented the start of operations until now, nevertheless the plant is almost complete.

6.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

6.7. UPCOMING INITIATIVES

Nothing is foreseen in the near future

¹³ Ministry of Industry and Trade, except for scrap plastics, estimated

7. CONSTRUCTION & DEMOLITION WASTE

The total annual construction permits in Jordan is about 11.8 million m², this results in a huge volume of C&D waste that is generated each year, with no proper strategies or plans to handle and manage it.

7.1. LEGAL AND INSTITUTIONAL FRAMEWORK

“Municipalities shall regulate, monitor, and enforce C&D waste management”, this mandate is generally stipulated in the Municipalities Law No. 13/2011 and amendments (latest No. 7/2012), and in the nuisance prevention and waste collection fees for Greater Amman Municipality No. 83/2009, and nuisance prevention and waste collection fees for Municipalities No. 1/1978 and amendments (latest No. 72/2009).

Though there is a lack of specific regulations or instructions for municipalities to do so. Greater Amman Municipality, being an exception, regulates C&D waste final disposal, by the virtue of the buildings and zoning regulation in the City of Amman No. 67/1979 and amendments (latest No. 21/2005).

7.2. STRATEGIES AND PLANNING

Currently, there are no separate policies or strategies that deal directly with C&D waste management.

7.3. FINANCING

Every project owner shall contract licensed contractors for handling and transport of C&D waste to designated disposal sites, at which the tipping fee is in the order of JOD 1 – 2 per payload trip. For most cases, the contractor recovers the metals in demolition projects.

7.4. COLLECTION, TREATMENT AND DISPOSAL

For every project within Greater Amman Municipality, whether involves excavation or renovation, a permit shall be granted against a security for the proper handling and disposal of C&D waste in designated disposal sites. However, still considerable quantities of C&D waste end up to be dumped illegally.

In some cases, an approval for land owners to dump C&D waste in their land is granted by the Ministry of Environment, but this approval is limited by time and quantity.

The estimated volume of C&D waste received in Greater Amman Municipality disposal site is 2.6 million m³/year¹² (2012).

¹² Greater Amman Municipality records

7.5. PRIVATE SECTOR INVOLVEMENT

Private sector is involved in the handling and transport of C&D waste to designated disposal sites.

7.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

7.7. UPCOMING INITIATIVES

Nothing is foreseen in the near future.

8. WASTE TYRES

8.1. LEGAL AND INSTITUTIONAL FRAMEWORK

The Ministry of Environment regulates, monitors, and enforces waste tire handling and management, by the virtue of Environment Protection Law No. 52/2006; there are no specific regulations or instructions that regulate scrap tires management.

8.2. STRATEGIES AND PLANNING

Currently, there are no separate policies or strategies that deal directly with scrap tire management.

8.3. FINANCING

Scrap tires are sold by tire retailers and other parties as well to tire recovery or recycling plants for further processing and production.

8.4. COLLECTION, TREATMENT AND DISPOSAL

Approximately 15 plants for tire recovery and 2 plants for scrap tire recycling collect scrap tires from different sources. It should be mentioned as well, that Jordanian authorities allowed the import of scrap tires to provide raw material for the local industry, under certain conditions.

Tires are used as fuel in cement factories, whereas shredded tires are used in playground construction and other purposes. Some amounts of used tires are baled and exported, whereas other amounts of tires are recovered and reused on the streets again.

In 2012, over 1,200,000 vehicles were licensed in Jordan, which has produced 2.5 million scrap tires per year ¹², over 80% of which are recovered or recycled. Scrap tires that end up dumped in the environment are collected by individuals and are open-burned for their metal wires, thus posing environmental and health impacts.

8.5. PRIVATE SECTOR INVOLVEMENT

The private sector is involved in all phases of collection, recovery, and treatment of scrap tires.

8.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

8.7. UPCOMING INITIATIVES

Nothing is foreseen in the near future.

¹² Estimated by consultant, reference to other publications, meeting with local industry experts

9. OIL & LUBRICANTS WASTE

9.1. LEGAL AND INSTITUTIONAL FRAMEWORK

The Ministry of Environment regulates, monitors, and enforces waste oil handling and management, by the virtue of waste oil handling and management instructions of year 2003.

The Water Authority of Jordan prohibits the discharge of any wastes or liquids, including waste oil, into the public sewage system, by the virtue of Sewage system No. 66/1994 and amendments regulation.

9.2. STRATEGIES AND PLANNING

Currently, there are no separate policies or strategies that deal directly with waste oil management.

9.3. FINANCING

Waste oil generators handover their waste oil to licensed collectors for about JOD 200/ton (motor waste oils); which is transported and sold to treatment plants for further processing.

9.4. COLLECTION, TREATMENT AND DISPOSAL

An estimated 10,000-15,000 ton/year¹² of waste oil is generated in Jordan (2012), that is either dumped in the sewer system or directly on open land, burned directly as a fuel posing severe environmental and health impacts, or collected for further treatment and processing such as refining.

9.5. PRIVATE SECTOR INVOLVEMENT

The private sector is involved in the collection and treatment of waste oil.

9.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

9.7. UPCOMING INITIATIVES

Nothing is foreseen in the future.

¹² Estimated by consultant

10. E-WASTE

10.1. LEGAL AND INSTITUTIONAL FRAMEWORK

The Ministry of Environment regulates, monitors, and enforces e-waste handling and management, by the virtue of Environment Protection Law No. 52/2006; there are no specific regulations or instructions that regulate e-waste management.

10.2. STRATEGIES AND PLANNING

A draft e-waste policy is available at the Ministry of Environment.

10.3. FINANCING

E-waste is recovered by waste pickers or mobile scrap dealers along with old furniture, other bulky items, and white goods.

10.4. COLLECTION, TREATMENT AND DISPOSAL

There are no records or studies that describe e-waste stream processing and final fate. Most probably e-waste is disposed of in municipal solid waste containers and collected by waste pickers or mobile scrap dealers for recovery of plastics and metal parts.

In 2010, Greater Amman Municipality opened a drop-off center for e-waste at al Yarmouk waste transfer station. However poor performance is reported due to lack of proper awareness and communication, in addition to lack of resources and infrastructure.

E-waste volume is estimated at 30,000pieces per year ¹² (2010).

10.5. PRIVATE SECTOR INVOLVEMENT

Private sector is involved in all phases of collection and recovery; however there are no large scale recovery projects that are operated by the private sector under PPP arrangements with authorities.

10.6. CASE STUDIES, BEST PRACTICES AND LESSONS LEARNED

No case study is available.

10.7. UPCOMING INITIATIVES

Nothing is foreseen in the future.

¹² Department of Statistics 2010

11. INTERNATIONAL FINANCIAL ASSISTANCE PROGRAMS (BI-, & MULTINATIONAL)

Greater Amman Municipality has obtained a Loan from the International Bank for Reconstruction and Development – World Bank (USD 25 M) toward the cost of the Amman Solid Waste Management Project (USD 40.5 M), 2009-2014. The main objectives of Amman Solid Waste Management Project are to strengthen the operational, financial, and environmental performance of municipal solid waste management in Amman and to improve the municipal capacity for better planning and management including enhanced cost-effectiveness and efficiency. The institutional component of the project includes technical assistance and capacity-building activities benefiting municipal departments involved in the planning, development, operation, and evaluation of SWM services. The infrastructure component includes extension of the existing landfill and DBO contract for landfill gas recovery and power generation.

12. INTERNATIONAL ASSISTANCE PROGRAMS (BI-, & MULTINATIONAL)

In 2012, a feasibility study was prepared for an integrated solid waste management project in Al-Akaider under the Mediterranean Hot Spot Investment Programme – Project Preparation and Implementation Facility (MeHSIP-PPIF), that is funded by the European Union - FEMIP Support. The project includes rehabilitation of Al-Akaider dumpsite including the unlined wastewater ponds, construction of sanitary landfill cells, and the construction of a pilot-scale MRF and composting plant. CAPEX is in the order of JOD 50 M. The GOJ, through the Ministry of Municipal Affairs, shall decide on the sources of funds and conclude financing agreements to setup project implementation arrangements.

The Jordan Water Reuse and Environmental Conservation Project (2010-2015) that is funded by the USAID to protect Jordan's water supply through: Regulatory strengthening, pollution prevention and industrial waste management, disposal sites rehabilitation, and water reuse. Under the project, developing and designing solutions to improve waste management practices shall be performed for 3 landfills and disposal sites.

The Public Action for water, energy and environment is a USAID-funded five year program (Sep 2009 – Present) intended to foster and support behavior change towards water and energy conservation and improved solid waste management. The program will develop communication strategies, to be implemented using several methodologies including a multi-million grant program for NGOs and CBOs.

13. NEEDS ASSESSMENT FOR CAPACITY DEVELOPMENT UNTIL 2015

Table 7: Capacity building needs

#	Agency	Target group	Capacity building
1	Ministry of Environment		Solid and liquid waste management policy, strategic planning, legal framework, PPP, monitoring and enforcement;
2	Ministry of Municipal Affairs		Municipal solid waste management policy, strategic planning, legal framework, PPP, operations, and M&E;
3	Ministry of Agriculture	Policy makers Directors Inspectors	Agricultural waste management policy, strategic planning, legal framework, PPP, and monitoring and enforcement;
4	Ministry of Health		medical waste management policy, strategic planning, legal framework, PPP, and monitoring and enforcement;
5	Ministry of Energy and Mineral Resources		Waste to energy general principles and PPP;
6	Joint Services Councils	Directors	MSW management Planning; MSW management sector M&E; PPP;
7	Municipalities	Directors	
8	Joint Services Councils	Operator Divisions	Operational planning; Landfill operations; Cost accounting; Daily operations M&E; Health and safety; Environmental management; Recovery and treatment technologies;
9	Municipalities	Operator Divisions	Operational planning; MSW operations; Cost accounting; Daily operations M&E; Health and safety; Environmental management; Public awareness and communication; Collection and transport technologies;
10	Municipalities	Regulator Divisions	Monitoring and enforcement;

14. CONCLUSION & RECOMMENDATION FOR SWEEP-NET ASSISTANCE

The following are recommended to improve waste management performance in Jordan, which can be channelled through Sweep-Net technical assistance:

- Sector policy and national strategy document;
- Comprehensive detailed legal framework with regulatory standards compatible with the local context;
- An effective institutional set-up and organization with clear roles and responsibilities on the local and regional levels, and the promotion of arm' length organizations or independent agencies with the proper PPP mix;
- Diverse Capacity building programs across all agencies and target groups;
- Cost recovery policy and mechanisms to alleviate the resource constraints that hinder MSW management in many municipalities, in a socially accepted manner;
- Effective operational planning and M&E framework; and
- Effective regulator role with monitoring and enforcement.

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The regional solid waste exchange of information
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