Water and **Environment Support**

in the ENI Southern Neighbourhood region



Technical assistance on Sustainable Medical Waste Management Activity no: N-E-PS-1

Consultation and Training Workshop 16-18 May 2023

Master Plan Structure

Presented by Mohammad Said Al Hmaidi





General comments on first draft



- 1- more details on the legal set up, institutional set up, mandates, adequacy, and challenges
- 2- more details on proposed technologies
- 3- centralization vs de centralization,
- 4- contradictions with SDGs: waste incineration!!
- 5- more details on budgets and financial modalities, sources and mechanisms
- 6- hierarchy at the national level, and the proposed national Institution
- 7- more details on the emergency plan; institutional, technical, financial and response mechanism for each emergency.
- 8- lessons learnt from previous emergencies

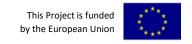








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Why this mission?



Medical waste is considered hazardous under the Palestinian legislation.

The Environmental Quality Authority (EQA) is in charge of the national solid waste management strategy (including hazardous waste).

EQA has also a monitoring and inspection role in the application of laws and standards.

EQA is the institution responsible for the application of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal in the OPT (member since 2015) and therefore has obligations at international level

IN THAT CONTEXT

EQA has asked the WES Project to implement a national activity entitled "Technical assistance on sustainable Medical Waste Management".





Objectives of the mission



The aim of the activity was:

to provide technical assistance to promote sustainable medical waste management solutions

The specific objectives were:

- support Palestine in the update of the Master Plan with its Roadmap for healthcare waste and to reinforce capacities of different actors to improve management practices;
- define a set of measures and actions to develop a contingency/emergency plan to be executed in crisis situations (outbreaks, conflicts, earthquakes, pandemic, etc.).



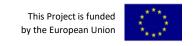


Master Plan Update Methodology



- 1. A kick of meeting with the key stakeholders, EQA, MOH and MOLG where national priorities were identified by stakeholders,
- 2. Review of the 2006 master plan, identification of gaps, shortcomings and implementation challenges,
- 3. Review and analysis of National policies, legal instruments; laws and bylaws and ongoing plans and procedures for the management HCW
- 4. Field survey covering HCF in most of the West bank and Gaza area to collect data aiming at updating existing and reported data.
- 5. Review of several key documents provided by EQA
- 6. Draft preparation
- 7. Draft presentation
- 8. Second update of the master plan





HCWM priorities identified,



- Review and update of the legal and institutional environment;
 (proposed national Unit!!!)
- Improve capacities and awareness of Healthcare Facilities staff;
- Adequacy of resources, technical and financial sustainability of HCWM;
- Improve emergency preparedness; (can this be tested?)
- Strengthening of monitoring and evaluation. (why to monitor, what, when and how?), what targets and benchmarks?





HCW plan objectives outlined



- Strengthen policy, regulatory structure and mechanism for HCWM;
- Provide infrastructure, commodity supplies and equipment for system strengthening in HCWM;
- 3. Build capacity among healthcare staff in HCWM;
- 4. Create awareness and advocacy on healthcare waste management among healthcare workers and policy makers;
- 5. Prioritize Health Care Waste Management in the planning process;
- 6. Develop M&E framework plan and tools for HCWM.





- 1) Compliance with local and international regulations;
- 2) Health and environmental protection,
- 3) Definition of responsibilities of stakeholders and employees;
- 4) Definitions/classification of healthcare waste;
- 5) Specific procedures based on best management practices for handling healthcare waste within facilities;
- 6) Training of related staff and workers.

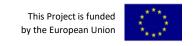




2006-2022 Master plans: Gaps analysais:

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- Emergency planning
- Financial and technical sustainability
- Reference to Sustainable Development Goals
- Magnitude and size of treatment
- Regulatory Structure





Priority Areas for 2022 and Beyond:

- 1) Institutional, Policy guidelines, Standards and Regulations: Review, complete.
- 2) Institutional Capacity: Strengthen institution capacity on HCWM.
- 3) Services sustainability: ensure technical and financial sustainability
- 4) Best Environmental Practices (BEP): Promote best practices on HCWM stream.
- 5) Monitoring, Evaluation and operational research.
- 6) Improve emergencies preparedness.
- 7) Infrastructure, equipment and supplies, treatment and disposal options:.
- 8) Awareness and commitment among decision makers.
- 9) Public Private Partnership (PPP): Promote PPP in HCWM.



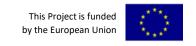


Other priority Areas (field Assissment):



- Improved occupational Health and safety at disposal sites,
- Improved operational procedures within HCFs including segregation and on site storage facilities
- Improved fees collection
- Incentives for cleaning companies workers at HCFs,
- Handling wastewater from HCFs,
- Budget allocation for HCW within HCF
- "Training" of medical staff.



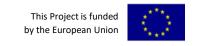




Challenges:

- Limited Law enforcement
- Limited Financial resources
- Adherence of workers to instructions
- Inadequate disposal facilities





Technology Selection Criteria:



- Economic Factors: Capital cost, Operation and maintenance cost, and Disposal cost.
- Environment Factors: Waste residuals and their environmental impacts, Energy consumption, and Volume reduction, adherence to Climate Change policy requirements.
- Technical Factors: Treatment effectiveness, Level of automation, Need for skilled operators, and Occupational hazards.
- Social Factors: Public Acceptance and Land Requirement.



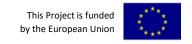
WHO Recommended Tecnologies



1)

	Autoclaving	Use a combination of steam, heat, and pressure to disinfect waste and medical equipment. rotating autoclaves, autoclaves with internal shredders or mixing arms.
Low	Continuous steam treatment systems	internal shredder, steam.
heat	Microwaving	a) Batch-wise - or b) Continuous - Should not be used on waste that may contain metal items such as surgical implements.
	Friction heating	Use a high-speed shredder to destroy waste while generating heat. Additional heat is provided by resistance heaters.

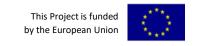






Chemical processes	Sodium hypochlorite treatment	widely used substance for cleaning and chemical disinfection due to its oxidizing properties.
High heat	Rotary kilns	Normally capable of reaching temperatures that break down genotoxic substances and heat resistant chemicals
	Dual chamber incinerators	Burn waste in the primary combustion chamber at or above 850°C.





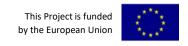




Technical Aspects	1	2	3	4	5	6	7	8
Range of capacities	+++	++	++	+	++	+	++	++
Range of waste treated	+	++	++	+	++	++	+++	+
Efficacy of microbial inactivation		++	+	+	+	++	+++	++
Volume reduction	+	++	++	+	++	++	+++	++
Mass reduction	-	+	+	-	-	+	++	-
Space needed for installation		+	+	+++	+	+	-	+
Installation requirements		+	+	+++	+	+	-	+
Degree of automation	+	++	++	+++	++	++	++	++

Legend: 1 — Autoclaves; 2 - Hybrid autoclaves; 3 - Continuous steam treatment systems; 4 - Batch microwave technologies; 5 - Continuous microwave technologies; 6 - Frictional heat treatment systems; 7 - Incinerators; 8 — Chemical treatment systems.



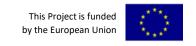


Qualitative Comparison Summary of Treatment Child Roll Region Surhood region

Selection Criteria for Treatment Technologies	1	2	3	4	5	6	7	8
Environment	+	+	+	++	++	++	_	-
Occupational safety	_	-	_	++	++	++	-	-
Job creation (based on equipment size)	+++	+++	+++	+	+++	++	+++	++
Social acceptance	+	+	+	+	+	+	-	-
Capital cost (per tonne of waste)	+++	++	++	+++	++	++	-	+
Operating cost (per tonne of waste)	+++	++	++	++	++	++	-	++
Institutional requirements	+++	++	++	+++	++	++	+	++
Regulatory requirements	+++	+++	+++	+++	+++	+++	+	++

Legend: 1 — Autoclaves; 2 - Hybrid autoclaves; 3 - Continuous steam treatment systems; 4 - Batch microwave technologies; 5 - Continuous microwave technologies; 6 - Frictional heat treatment systems; 7 - Incinerators; 8 — Chemical treatment systems





Recommended Options



(batch) microwave technologies have the advantages of low space and installation requirements, while presenting a high degree of automation.

Hybrid autoclaves also have several advantages, such as flexibility in dealing with varying quantities and HCW streams, as well as volume (and residues) reduction.

Incineration technology is highly effective in terms of microbial inactivation and volume reduction; however, it has several disadvantages that have to be considered, such as environmental impacts, flue gas treatment requirements, health and safety concerns and the need for continuous monitoring





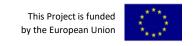
Proposed Action Plan



Action plan is based on:

- Listing of priority areas,
- Recommended activities for each priority area
- Listing of expected outcomes
- Performance indicators,
- Responsibilities,
- 4 years implementation plan (Time frame), and
- Budgets.



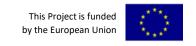


Included priority areas in the proposed action ::



- 1- Legal and institutional preparedness
- 2- Institutional capacities, awareness,
- 3- services sustainability
- 4- Operational Best Practices
- 5- Monitoring and evaluation,
- 6- Research requirements
- 7- improved emergency preparedness,
- 8- Infrastructure, equipment and supplies, treatment and disposal options
- 9- Public Private Partnership (PPP)





Monitoring Plan objectives:



- Ensure that any additional impacts are addressed appropriately.
- Check the effectiveness of the recommended mitigation measures,
- Ensure that the proposed mitigation measures are appropriate.
- Demonstrate that medical waste management is being implemented according to plan and existing regulatory procedures; and,
- Provide feedback to implementing entities to make modifications to the operational activities where necessary.







Contingency Plan



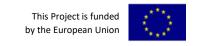




The contingency plan addressed the following issues

- 1. Standards used to guide a response,
- 2. Current capacities of the agencies or organizations to respond,
- 3. Initial assessment arrangements,
- 4. Actions as an immediate response to the situation,
- 5. Roles, responsibilities, coordination,
- 6. Resources needed,
- 7. Information flow between the various levels (local and national),
- 8. Specific preparedness actions to be agreed on and practiced.





EMERGENCY PREPAREDNESS



- 1. Contingencies related to sharp increase in infectious waste quantities
- 2. Contingencies related to waste handling
 - Lack of color-coded bags, bins or sharps containers
 - Lack of PPE (gloves, face masks, etc.)
- 3. Contingencies related to waste storage
 - Overfilled storage; lack of capacity
 - Flooding or fire in the waste storage area





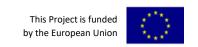
Water and

EMERGENCY PREPAREDNESS

Contingencies in a HCF and/or a HCW treatment / disposal facility can be summired as follows

- 4. Contingencies related to <u>waste transport</u>
 - Lack of vehicles to transport waste.
- 5. Contingencies related to waste treatment/disposal
 - Breakdown of waste treatment
 - Downtime due to maintenance or repair of treatment technology or lack of spare parts
 - Temporary closure of landfill
- 6. Spills of blood
- 7. Contingencies related to <u>labour</u>
- 8. Exposure incidents



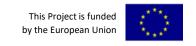




Coordination and Management

At the regional / national level or disaster-prone area, action plans on HCW management should be prepared by a responsible cluster (inter-agency cluster composed of national or international agencies / organizations, including at least MoH, EQA, Governor's Office, Civil Defence and MoPW as well as MoLG).

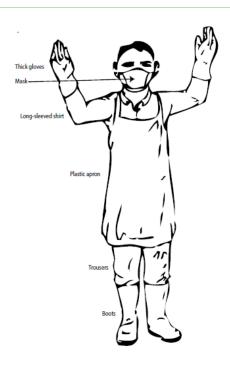
At the HCF level, action plans on HCW management should include emergency measures to apply during emergency situations. Contingency plans should be in line with existing national policies, strategies and legislations on healthcare waste management. The plans should be updated when there is a change in process, equipment, construction, etc.





Occupational Health and Safety Measures

- 1. Implementation of standardized management procedures
- 2. Timely information and training for waste workers
- 3. Hepatitis B vaccination (in addition to compulsory vaccinations)
- 4. Provision of sharps boxes where injections are taking place
- 5. Implementation of standard precautions
- 6. Promotion of proper hand hygiene
- 7. Provide equipment and clothing for personal protection
- 8. Allocation of an additional role (e.g. for an infection-control nurse)







Emergency Response Measures

The first step in the management of health care waste in emergencies is to carry out a rapid initial assessment. This will produce the information required to restart interim waste services where they are needed. The Following measures can be implemented:

- 1. Provide hepatitis B vaccination to all health-care staff and waste handlers.
- 2. A measure for contingencies related to Illness among waste workers is to train other employees or part-time workers in healthcare waste handling and collection as backup.
- 3. Develop clear procedures for exposure incidents
- 4. Encourage hand hygiene (washing, preferably followed by disinfection).
- 5. Use gloves for handling health-care waste.
- 6. Contain and promptly clean up spillages of infectious materials and disinfect quickly to avoid pathogen transmission [WHO, 2014].







Emergency Response Measures

Segregation, Collection, Storage, Transport, Treatment and Disposal Options

For emergencies related to storage and transport, HCFs through the MoH can look into the following:

- 1. A temporary storage facility, consisting of a sealed container within solid waste transfer stations in each governorate,
- 2. Keeping available incinerators maintained all the time,
- 3. Allocating special waste cells within MSW landfills for untreated HCW,
- 4. Possibility of cooperating with private entities for HCW transport in case of emergencies,
- 5. Controlled burial can be a last option with the provisions described below.







Emergency Response Measures

Segregation, Collection, Storage, Transport, Treatment and Disposal Options

Burial of non-sharps and sharps wastes may be considered as a pragmatic option in emergency situations.

Onsite burial in pits (Dig a pit 1-2 m wide and 2-3 m deep)

Burial in special cells in dumping sites







Emergency Response Measures

Segregation, Collection, Storage, Transport, Treatment and Disposal Options

The following measures are proposed for the management of specific HCW streams in emergency situations:

- 1. Mercury thermometers \rightarrow collect for mercury recovery
- 2. Pressurized containers \rightarrow safe burial in pits
- 3. PVC plastics such as IV sets, catheters and PVC containers for sharps \rightarrow safe burial in pits
- 4. Vials of vaccines \rightarrow safe burial in pits
- 5. Anatomical wastes/body parts → safe burial in pits (UNDP, 2013, WHO, 2014, UNEP, 2020).







Emergency Response Measures

Response to HCW Spills

The following measures are proposed for emergency response in a HCF / HCW treatment or disposal facility for contingencies related to <u>HCW spills</u>:

- 1. Prepare spill clean-up procedures, conduct training including practice clean-up of simulated spills.
- 2. Provide warnings of hazards and advice about special requirements (e.g. infectious waste).
- 3. Small spills (which are not immediately hazardous) can be handled by a small group of trained employees, who are familiar with the properties of the spilled material.
- 4. Employees that are handling spills must use the proper personal protective equipment.
- 5. Employees must use available supplies to absorb and bag the spilled material (in case of small spills).
- 6. In case of large spills, remove personnel from immediate danger and bring in properly trained • L pfirst responders to clean spill up.



Emergency Response Measures

Response to HCW Spills

The following measures are proposed for emergency response in a HCF / HCW treatment or disposal facility for contingencies related to <u>infectious waste spills</u>:

- Access to the spill area should be restricted to reduce the number of employees at risk of exposure.
- 2. Ensure staff is trained to respond to infectious waste spills.
- 3. Workers should wear PPE (eye protectors or face shields, gloves, coveralls, respirators or face masks depending on the risks of exposure).
- 4. Residues should be recovered using hand tools and then packed safely.
- 5. Cover spilled area with absorbent pad or paper towels





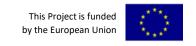


Emergency Response Measures

Response to HCW Spills

The following measures are proposed for emergency response in a HCF / HCW treatment or disposal facility for contingencies related to infectious waste spills:

- 6. The floor should be cleaned and disinfected after most of the waste has been recovered.
- 7. Decontamination using bleach, diluted to 1:10 with water:
 - to decontaminate the spill area,
 - to clean/decontaminate equipment used in spill response,
 - o pour diluted bleach over towels, let stand for 30 minutes.





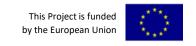
Emergency Response Measures

Response to HCW Spills

A Spill Clean-Up Kit in a HCF / HCW treatment or disposal facility should contain the following:

- 1. Disposable gloves, face mask and safety glasses, Small scoop or dustpan and brush, shovel,
- 2. Absorbent pads or powders for liquid spills,
- 3. Cleaning rags or paper towel,
- 4. Chlorine disinfectant (1:10 chlorine),
- 5. Germicidal wipes,
- Extra color-coded infectious waste bags,
- 7. First-aid kit,
- 8. Biohazard labels,
- 9. Aspirator bottle, spatula or mercury amalgam powder for mercury spills (UNDP, 2013).





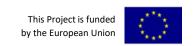
EMERGENCY RECOVERY

The Emergency Recovery Phase refers to the process of returning to normal situation prior to the emergency

The following key issues must be addressed during the recovery phase of waste management in emergencies:

- 1. Existing procedures and practices of HCW management.
- 2. Responsibility for the management of HCW.
- 3. Presence of an infection-control committee to oversee improvements and training.
- 4. Dedicated equipment for storage, collection, and onsite and offsite transportation of HCW.
- 5. Availability of onsite and offsite HCW treatment facilities.





EMERGENCY RECOVERY

The Emergency Recovery Phase refers to the process of returning to normal situation prior to the emergency

The following key issues must be addressed during the recovery phase of waste management in emergencies:

- 6. Availability of onsite and offsite disposal facilities.
- 7. Level of health-care staff awareness about the risks associated with HCW.
- 8. Staff health protection (protective clothing, vaccination).
- 9. Financial aspects related to HCW management and associated infection-control procedures, and a means to sustain funds to operate waste management in the future.





EMERGENCY RECOVERY

HCW MANAGEMENT DURING EMERGENCY RECOVERY PHASE



Waste Management Process	HCW management measures during Emergency Recovery Phase
Source segregation	Secure PPE for preparedness
Discharge and collection	 Promote the use of premises equipment and a facility for proper HCW management
Transportation	 Prepare emergency collection schedule, Secure PPE for preparedness Improve informal sector involvement Adapt collection vehicle to transport HCW safely
Treatment	 Promote proper HCW treatment (autoclave, sterilization, disposal, etc.) Prepare emergency treatment options
Final disposal	 Prepare for emergency disposal options Establish (improve into) sanitary / controlled landfills for HCW



Gaza Experience in Emergency Response

Response when the treatment plant is out of service

- 1. Identification of a cell designated for the dumping of acute and infectious medical waste surrounded by a red ribbon and a clear sign for hazardous medical waste.
- 2. Putting the waste in plastic bags of distinctive colour with a thickness of not less than 0.2 mm that are closed tightly with a plastic clip.
- 3. Covering waste with a layer of clay, immediately after each new landfill operation.
- 4. Maintaining records of waste quantities, sources, types and dates of arrival to the landfill and providing the Environmental Quality Authority with a monthly copy of the records.
- 5. Ensure that no digging, dredging or re-formation of the medical waste cell occurs within the landfill.







Gaza Experience in Emergency Response

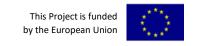
Response during military aggression or no access to the treatment unit and landfill

The emergency response action during military aggression is to store medical waste on site (within HCFs). Available storage areas in HCFs are not according to standards, as medical waste has been stored in normal containers in hospital yards. As there was no access to the treatment unit and landfill for more than 10 days, medical waste producers disposed medical waste to street containers of domestic waste. According to JSC operators, it is recommended to allocate adequate storage area in each hospital or clinic, to store the waste for 7-10 days



- Environment Support

 1. Emergencies should be budgeted within a special unit within the MOH. Environment Support
- 2. Information and training of staff involved in HCW management on emergencies is a prerequisite for emergency preparedness.
- 3. Data collection, analysis and reporting is important.
- 4. Adequate reserved capacity of medical waste collection, transportation and treatment facilities is highly necessary.
- 5. Waste segregation during emergency situations is important.
- 6. If possible, HCW management facilities need to be more "intelligent" and automated, relying less on labor



- 7. Large capacity mobile facilities as a strategic backup would be highly use the medical waste disposal facilities are not available.
- 8. During emergencies, the need for proper use of PPE and implementing occupational protection measures is a key issue.
- 9. The government needs to make a sound and firm voice in emergency situations, and media needs to bear the responsibility to disseminate correct information to the public.
- 10. Effective coordination among key stakeholders is crucial to successfully cope with HCW management during emergency situations.



Environment Support

For more information:





