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National Solid Waste Management Planning

Policy brief 1 and its technical notes

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Title: Waste Governance: Technical Assistance to the EUD (Expected Result 2)

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> Waste management data are critical to creating policy and planning for the local context. Understanding how much waste is generated - especially with rapid urbanization and population growth - as well as the types of waste being generated, allows local governments to select appropriate management methods and plan for future demand.
>
> **What a Waste 2.0 – World Bank Group, 2018**

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A.

Context

Despite the presence of solid waste management initiatives ran by the national authorities (e.g. in Beirut and Mount Lebanon), most of the activities are implemented at local level. The management of solid waste has always been a major concern of local authorities for various reasons. Those include economic and social challenges and, equally important, the lack of a complete planning framework that allows for (1) the development of efficient plans and (2) smooth implementation.

A revised national Integrated Solid Waste Management (ISWM) strategy, along with the corresponding Strategic Environmental and Social Assessment, and a national master plan were developed in 2024. Service zones (SZs) are proposed and the development of regional master plans is scheduled within the 2023-2026 Lebanon solid waste roadmap, under various internationally funded projects. In this respect, various questions may arise that require policy dialogues on key planning aspects for the purpose of avoiding non-applicable (or at least non-fully implementable) plans.

B.

Analysis

Three technical notes were developed, involving a systematic approach that integrated research, analysis, and stakeholder consultation. The process involved consultations with key stakeholders, including national, regional, and local authorities, international donors, NGOs, experts, academics and the private sector.

The technical notes are structured systematically, starting with clear justifications for each aspect addressed and followed by detailed descriptions outlining the proposed frameworks or programs. The analysis was refined based on data collected through interviews with five waste management facilities and three landfill operators in Lebanon; It was backed up by the findings of the first strategic study under this project titled: Enablers for a sustainable Solid Waste Management System in Lebanon, including one-on-one interviews with 80 heads of municipalities (across the 24 districts of Lebanon – excluding Beirut) and 24 citizen focus group discussions.

The findings of the technical notes were streamlined into policy recommendations to provide a strategic framework for addressing the challenges and opportunities in waste management in Lebanon, with a **focus on standardization, inclusivity, sustainability, and innovation.** Implementation will require concerted efforts from policymakers, stakeholders, and the community to drive meaningful change and achieve long-term

C.
Recommendations

C.1. Master Plan Framework

- Standardization and alignment: Advocate for the development of a standardized master plan framework that ensures consistency in waste management strategies across all Service Zones (SZs) in Lebanon. This framework should be aligned with national waste management goals and international best practices
- Stakeholder engagement: Emphasize the importance of stakeholder engagement at all levels of the planning process, including national, regional, and local authorities, as well as international donors, NGOs, and local communities. Inclusivity in decision-making processes will help build support and ownership of waste management initiatives
- Neutrality and sustainability: Stress the need for politically and technologically neutral outcomes in waste management planning to ensure fairness and effectiveness. Additionally, advocate for the integration of sustainability principles, such as environmental protection and resource conservation, into the master plan framework.

C.2. Informal Sector Program

- Baseline analysis: Stress the importance of conducting a comprehensive baseline analysis to understand the socio-economic characteristics, size, drivers, and impacts of the informal sector on waste management. This analysis will provide the necessary data to develop targeted interventions.
- Regulatory gap analysis: Highlight the need to identify and address regulatory gaps related to the informal sector, including definitions, strategic frameworks, implementation structures, and interaction models. Recommendations should aim to formalize and regulate informal sector activities in line with national waste management strategies.
- National program establishment: Recommend the establishment of a dedicated national program to address the challenges posed by the informal sector in waste management. This program should cascade from uniform national guidelines to tailored regional and local measures to ensure equal opportunities and avoid localized opposition.

C.3. Informal Sector Program

- Holistic approach: Recommend a holistic approach to landfill planning that balances decentralization with centralized management for social, economic, and environmental sustainability. This approach should consider factors such as land availability, public perception, and integration with circular economy strategies.
- Dynamic landfills: Advocate for the concept of dynamic landfills that evolve beyond traditional single-use sites into temporary storage facilities integrated into circular economy programs. This approach emphasizes the gradual integration of landfills into the future "metabolism" of growing cities and explores options for landfill mining and re-development.
- Policy instruments: Propose the use of comprehensive policy instruments, including bans on specific waste materials, financial incentives, and robust enforcement mechanisms, to promote good practices, reduce landfill pressures, and stimulate recycling and waste diversion efforts.

D.

Technical Note 1.1 – Master Plan Framework

D.1. Justification

A masterplan framework is mandatory to ensure **standard outcomes** across all SZs, especially that they will be developed under separate projects and funded by different international donors. Also, the framework shall capitalize on **synergies** between the master plans, so that they contribute collectively toward meeting the strategic goals. The framework shall guarantee the **alignment with all stakeholders** (including national, regional and local authorities). In addition, the framework shall specify measures to ensure **politically-neutral** and **technology-neutral** outcomes (e.g. by requesting specific international expertise on the planning team).

D.2. Description

A master plan framework aims at answering the main questions that may be raised during the planning exercise. The framework comprehensively delineates the approaches and boundaries of the plan, including (as a minimum) the aspects described below.

D.2.1. Components of the masterplans

Commonly, a masterplan starts with a **baseline analysis** followed by four main **planning components:** (1) **strategic** (vision, objectives, targets, etc.); (2) **technical** (reduction, diversion, collection, treatment, disposal, etc.); (3) **commercial** and **institutional** (business models, PPP, cost recovery, etc.); (4) **implementation** (budget, timeline, management, awareness, capacity building, etc.).

D.2.2. Input parameters

The framework shall **unify the input parameters** adopted in all masterplans. Those may include, among others: guiding principles (polluter pays, extended producer responsibility, proximity, etc.), applicable regulations/agreements, national standards/guidelines, best practices, and current situation assessment. In addition, the framework should build on **lessons learned** to set country-specific requirements (**BOX 1**).

D.2.3. Planning approach

The approach to each of the planning components should be clearly described:

a. The ***Strategic planning*** approach should specify potentially arguable aspects such as the method used to define the regional targets, i.e. cascading of national-level targets vs. different region-level targets – among others.

BOX 1
Lessons learned on baselining and pilot testing

The EU has funded, in 2018, the development of several regional MPs (including Tripoli, Miniyeh-Dannieh, Bsharreh-Koura-Zgharty, Tyre and Bent Jebeil) and local plans (Iqlim Al Toufah and Jurd Al Kaytee Unions of Municipalities). Those may be used as a starting point for the relevant SZs. The major challenge faced during the development of those regional plans was the lack of accurate data.

Accurate and comprehensive data on waste generation, composition, disposal and cost are essential to plan for appropriate infrastructure and effective resource allocation. Most importantly, reliable data is essential to set **realistic objectives.** The problem of lack of data is worse nowadays (during the economic crisis) and is accompanied by an **intrinsic confusion** of whether to plan using pre-crisis data or expect some new steady-state conditions few years from now (when the crisis passes), or run a current situation analysis and plan accordingly. Accordingly, a **unified waste modeling and forecasting** approach need to be identified for all master plans.

Earlier, The EU has funded a large number of waste treatment facilities in Lebanon. According to OMSAR (the implementing partner of most of those projects), all facilities were designed following the same concept (e.g. in-vessel composting) that was not tested in the country. The outcome was not as good as expected, which provides an evidence of the **necessity of pilot testing technologies** that are newly introduced into the country (e.g. through a small-scale plant in a cluster of towns).

b. The ***Technical planning*** approach shall specify, beyond the technical guidelines of the national solid waste management strategy, complementary directions. Examples include: elements of the value chain pathway, scenario development and selection criteria, essentials of waste diversion, minimum design requirements, benchmarking tools, etc.
c. The ***Commercial/institutional planning*** approach shall provide additional details to the financial guidelines of the national solid waste management strategy, such as: potential role of the private sector at each stage of the value chain and the contractual models; parameters to select the most appropriate and competitive business model (e.g. single-source vs. free market); risk sharing options; guidelines to define the most suitable cost recovery mechanisms (polluter pays, EPR, gate fee, etc.) and economic tools (refund systems, feed-in tariffs, etc.) – among others.
d. The ***implementation planning*** approach shall provide the planners with a normalized method of developing master plans that are **equally fair for all regions in the country.** For instance, it might tackle the criteria to be used for prioritization (i.e. differentiating between short-term and long-term initiatives). It can identify KPIs and monitoring means, set budgeting guidelines and highlight specific awareness and capacity building requirements (minimum local technical unit requirements, public reporting requirements, across-the-board or region-specific measures, etc.).

D.2.4. Boundary conditions

Examples of boundary conditions to be defined include: geological boundaries (e.g. SZs, clusters, etc.), materials boundaries (types of waste to be considered), design boundaries (i.e. the starting and ending point of the master plan and the required level of details at each stage), and the extent of impact assessment (e.g. qualitative vs. quantitative, number of scenarios assessed, with or without indirect impacts, etc.).

D.2.5. Inclusivity

The framework should specify the inclusivity approach to guarantee support and ownership of relevant stakeholders. A unified approach should be devised for coordination between different players (governmental departments, international donors, local authorities, NGOs, citizens, etc.) to allow synergies and boost the capacity of the implementing entities. A full-fledged participatory approach may be needed to achieve this target.

D.3. Benchmarking

Planning Strategies	Lebanon	Germany	Oman (Be'ah)	Singapore
Alignment with Stakeholders	Efforts required to enhance stakeholder alignment and collaboration.	Collaborative approach involving government agencies, municipalities, private sector entities and citizens.	Collaborative approach involving government agencies, municipalities, private sector entities and citizens.	High alignment with stakeholders: National Environment Agency, public institutions, private sector and the community.
Strategic Goals Met	Need for comprehensive planning and collaboration.	High recycling rates, resource efficiency and structured waste management aligned with Circular Economy Principles.	In progress. Improving waste management infrastructure, enhancing recycling rates and aiming for circular economy.	Landfill disposal rates reduction, aiming for achieving high recycling rates, waste-to-energy and sustainability.
Unity of Input Parameters	Varied input parameters, challenges in regulatory framework	Guiding principles, comprehensive set of regulations and standards.	Adheres to national regulations and guidelines. Collaboration with international partners to adopt best practices.	Adheres to national regulations and guidelines to adopt best practices.
Planning Approach	Challenges in defining strategies and planning components	Regional flexibility of strategy adoption, technical planning for the entire waste value chain, well-defined roles for the private sector and financial guidelines, public awareness and capacity building.	Adaptation to regional specifics while meeting national goals, technical planning for the entire waste value chain, well-defined roles for the private sector and financial guidelines	Regional flexibility of strategy adaptation, technical planning for the entire waste value chain, well-defined roles for the private sector and financial guidelines, public awareness and capacity building.
Boundary Conditions	Unclear evaluation of design boundaries, challenges may affect the effectiveness of impact assessments.	Geological factors for landfill site selection, waste hierarchy principles, thorough impact assessments (environmental and social)	Adoption of service zones according to different geological conditions, design depends on local conditions and waste characteristics.	Focus on resource recovery and WtE due to spatial constraints, well-defined design boundaries, conduction of a number of impact assessments.
Inclusivity	Potential for improvement through more community engagement.	Emphasis on public awareness and coordination between all entities.	Inclusive boundaries with emphasis on community engagement.	Community involvement and regular public consultations.

E.

Technical Note 1.2 – Informal Sector Program

E.1. Justification

Even though the scavengers achieve some waste divergence, they devaluate the MSW stream and affect the financial feasibility of formal waste management activities. Thus, if not properly managed, the impact of the informal sector on the execution of the national and regional master plans is considerable. To note also that their activities do not meet environmental, social, or human rights requirements and has often environmental and social impacts on the local community (**BOX 2**).

BOX 2
Impact of informal sector and local initiatives

Even though the majority of the interviewed mayors expressed resentment against the negative impacts of scavengers (e.g. littering, devaluation of the waste stream, etc.), they rarely attempted to control them because of the lack of (local and national) enforcement power. However, a few came up with creative means to benefit from them by, for instance allowing them to recover recyclables from the dump sites. Some municipalities requires a share of the scavengers income, some don't and some others give them incentives – as they consider them assisting in increasing the lifespan of the dump.

The approach to deal with this sector should be uniform across the country to provide equal opportunities and to avoid localized public opposition. This does not imply using the same measures in all SZs, but rather using the **same approach and decision-making parameters.** Therefore, in addition to the recognition of this sector in the national solid waste management strategy, a dedicated national program should be designed to: (1) provide a **well-rounded solution** to this sector that cascades from uniform national guidelines to tailored regional and local measures, and (2) **align** the outcomes with SWM strategy and master plans.

E.2. Description

The informal sector program is a national action plan toward alleviating the financial, environmental and social burdens associated with the informal activities in SWM. It should propose strategic guidelines, implementation actions and enabling factors. Below is a proposed structure of the informal sector program.

E.2.1. Baseline analysis

The baseline should describe the current situation from (at least) three major aspects:

- Workers' status, e.g. socio-economic characteristics, numbers, geographical locations, etc.
- Informal sector size and drivers, e.g. flows and types of waste handled and at which stages of the value chain, drivers behind the proliferation of informal activities, etc.
- Impacts on the SWM sector, considering environmental, social and economic parameters

E.2.2. Best practices

International experience and best practices shall be identified and thoroughly analyzed. Those may be categorized into:

- prohibitive, i.e. attempting to eliminate informal activities;
- integrative, i.e. aiming at blending the informal sector into governmental plans; or
- mixed, whereby prohibitive and integrative interventions are adopted depending on the targeted component of the sector.

E.2.3. Regulatory gaps

At the exception of the national solid waste strategy, the legislation related to the informal sector is lacking in Lebanon. Thus, recommendations to fill in the gap should be provided. Generally, informal sector legislations cover:

- Definitions, i.e. which activities and actors are classified as informal and how are they categorized
- Strategic framework, i.e. national-level vision, objectives and rules of the game
- Governmental implementation structure, i.e. designation of involved entities and their roles (at the national, regional and local levels) and the coordination and implementation mechanism
- Non-governmental players (e.g. a third party to liaise with the informal sector) and the interaction model.

E.2.4. Informal sector program

The informal sector program should be developed in a way that aligns with the SWM master plans. At the national level, it should specify unified measures across the country. Also, it should propose specific initiatives that are tailored to SZs (and possibly local communities). It should cover, at least, the aspects described below.

a. **Program's strategic** targets should be set based on the baseline analysis and the benchmarking exercise. The targets should take into consideration the gaps in the regulatory framework and the corresponding legislation bottlenecks.

b. **Viable interventions** should be selected (among identified international best practices) based on: (1) feasibility and sustainability, (2) alignment with regulations and national strategy, (3) success potential and impact, and (4) social readiness.

c. **Priority interventions** should be selected at national, regional and local scales in light of Lebanese setup and the specific challenges of each SZ and local community, respectively.

d. **Cost estimation and sources of funding** should cover both CAPEX and OPEX of priority interventions

e. **Impacts of the program** needs to be assessed including:

- Anticipated decrease in informal activities, e.g. in terms of % workers, % waste handled informally, etc.
- Economic profits, such as monetary value of recovered materials, saved expenses of cleaning and other damages, public revenues (e.g. tax payments), etc.
- Environmental benefits, such as percent reduction in emissions, uncontrolled dumping and landfilling, etc.
- Social impacts, including the number of new formal jobs, reduced health bill, etc.

E.2.5. Enabling factors

The enabling factors should be identified through international benchmarking. At least, the following enablers should be discussed: regulations and implementation, funding mechanisms, capacity building and communication.

E.3. Benchmarking

Analyzing global best practices in: solutions for dealing with informal waste sector + relevant supportive legislation.

Activities	Lebanon	Germany	Oman (Be'ah)	Singapore
Baseline Analysis	Briefly presented in the National SWM Strategy	Informal sector is relatively small, effective waste management systems. Limited negative impacts on the formal sector.	Efforts done to integrate informal workers into formal sector.	The informal sector is relatively small, with strict regulations on waste handling; negligible impact.
Tolerance	Remains to be defined	Integrative. Blending the informal sector into the formal.	Mixed. Aiming for a balanced and regulated system.	Prohibitive. Low tolerance for informal waste activities
Regulatory Gaps	Absence of specific regulations	Closed Substance Cycle and Waste Management Act (KrWG) to employ a formalized approach.	No regulation for the informal sector. Only employing formal workers and minimizing the informal ones.	Strict regulations under the National Environment Agency (NEA) to eliminate informal activities.
Informal Sector Programs	Not existing	Focus on alignment with regulation and the master plan framework	Balancing the integration and regulating informal activities	Regional flexibility of strategy adaptation, technical planning for the entire waste value chain, well-defined roles for the private sector and financial guidelines, public awareness and capacity building.
Cost Estimation and Funding	Not applicable	Funding from government budgets and potential private partnerships	Funding from government budgets and potential private partnerships	Funding from government budgets

F.

Technical Note 1.3 – Enhanced landfill planning

E.1. Justification

In the absence of an integrated waste management system, landfilling is considered a well-established starting point to limit the impacts of sporadic dumping. A sufficient and adequately performing landfill network should be established in the country. Only then, it makes sense to invest in treatment technologies, starting with low-tech and low-cost options and gradually moving to more complex solutions.

Yet, Lebanese citizens favor open dumps over sanitary landfills because the latter is considered a "permanent" destination for waste coming from surrounding areas – whereas a dump is a temporary "local" solution. Consequently, municipalities are kind of "blackmailing" the government to agree on hosting landfills in their cities. Therefore, beyond the traditional technical procedure of landfill siting, the Lebanese government needs a wholistic "Enhanced landfilling planning".

E.2. Description

Landfill planning should aim for efficient use of limited public resources and reduced unnecessary costs and environmental risks. As such, the plans should not address landfill sites as a part of the problem but rather a part of the solution. The traditional approach to landfill planning aims at reducing the impacts of landfilling through adequate location siting policy (less vulnerable areas with a natural hydrogeological barrier are preferential) and remediation concepts. This requires a paradigm shift from the traditional concept of single-use landfills, followed by remediation, into "dynamic" landfills.

F.2.1. Long-term vision

The vision should evolve around conserving (1) land as a finite resource (especially in urban areas) and (2) secondary material. Thus, the vision should look, beyond landfill rehabilitation, toward integrating landfills into a comprehensive circular economy program. The aim is a gradual and smooth integration of landfills in the future "metabolism" of growing cities. As such, landfills should be visioned as "temporary" storage rather than a "permanent" destination of waste. On the long-term, mature and stable cells may be considered for landfill mining whereby they are emptied for future reuse. There is a need for a general vision on the re-development possibilities of landfill sites.

Locations and land plots for landfills should be defined at service zone (SZ) level, following internationally adopted landfill siting methods while considering local socio-economic

challenges. International experience is needed to provide a "reliable" scientific source; it has to be complemented with local expertise to fine-tune the outcomes into "clever" clustering to minimize public opposition.

A post-closure "vision" and plan should be developed, along with a "bounding" lifespan, and maximum allowable waste quantities and types for proposed landfill locations. For this to be achievable, it should be realistically reflected in the disposal fee. The current average of $8 per ton is too low to achieve adequate environmental protection – even when considering the low labor cost (common international average is around $40).

F.2.2. Mining as a rehabilitation option

Whereas (the few) engineered landfills in Lebanon do have a rehabilitation plan, none has been implemented so far (most are still active). This gives place for enhanced rehabilitation planning. Beyond traditional post-closure plans, which often consist of converting the capped landfill into a recreational area or a solar farm, the land on which the landfill is built may be re-exploited for the same purpose. This process is called landfill mining. Small-size material may be used as daily cover in new cells and large-size material as either converted into energy (via RDF, incineration, etc.) or stored until a viable alternative is available. This approach tends to improve the efficiency of land use, avoid wastage of land and the degradation of new areas. It's a process through which land is recycled and brownfields are regenerated.

In fact, the recovery of the waste stored and the underused space are no longer unrealistic scenarios. Yet, it may come at a considerable cost and thus requires accurate estimation of required resources. The plan should include, at least, the following:

1. Detailed characterization of the existing landfills and the planned ones
2. Expected stabilization period and anticipated date by which mining becomes technically possible
3. Potential extraction/valorization of landfilled material

Traditionally, the cost of mining is compared to that of traditional rehabilitation. Yet, there are externalities that would shift the balance, such as the fact that a landfill remains a source of pollution and risk on humans and groundwater. While international guidelines and legislation require long term monitoring, none is at an eternal scale.

F.2.3. Bans

There's a dire need to conceptualize and regulate centralized components to incentivize good practices, through a comprehensive set of legal, social, and economic instruments. For instance, regional landfills (run by a central authority) with a gate fee provides financial benefits for municipalities to reduce their waste and push them toward reduction and diversion. But it has to be accompanied with a dumping ban, otherwise the municipalities may opt for open dumping. Law #80 includes relevant penalties, but they require adequate implementation tools:

1. In the context of Lebanon, where landfill space is limited and environmental concerns are paramount, targeted bans can drive significant changes in waste disposal patterns. The implementation of bans should focus on **identifying waste materials that have downstream recycling potential** or can be repurposed within the local industry. This

not only reduces the burden on landfills but also stimulates the growth of the recycling industry, fostering economic development and job creation.

2. It is essential that bans are accompanied by robust enforcement mechanisms and public awareness campaigns to ensure compliance and understanding among stakeholders. Effective enforcement requires coordination between government agencies, municipalities, and law enforcement bodies to monitor waste streams and impose penalties for non-compliance.
3. Public awareness campaigns are vital for educating citizens about the rationale behind the bans, highlighting the environmental and economic benefits of waste diversion, and encouraging community participation in recycling and waste reduction initiative.

Overall, implementing targeted bans on specific waste materials represents a proactive approach to waste management in Lebanon. By aligning with international best practices and leveraging local expertise, the government can enact policies that not only alleviate pressure on landfills but also contribute to a more sustainable and resilient waste management system.

F.2.4. Education & Communication

The sources of erroneous information on the negative impacts of landfills, and the propaganda against construction new ones, are numerous in Lebanon. Informal businesses (e.g. dump land owners, individual waste collectors, etc.) have interest in maintaining business-as-usual. Also, politicians tend to give popular speeches that convey wrong messages and block useful interventions. On top of that, the prevailing corruption and previous scandalous and unsuccessful governmental interventions added to the extremely high opposition to landfills. Thus, any landfill action plan should have an outreach component consisting of:

1. An education program conveying accurate information on adequate landfilling practices, showcasing success stories and targeting social behavioral change; and
2. An innovative communication plan to overcome NIMBY[1] & BANANA[2] syndromes due to: (1) bad experience, (2) lack of trust in authorities, (3) erroneous messages by social media and activists/politicians, (4) lobbying by informal businesses.

[1] Not in my backyard
[2] Build absolutely nothing anywhere near anything (or anyone)

G.
Data

G.1. Relevant Feedback from Local Authorities and Citizens

- About 86% of the studied municipalities dispose of their waste in open dumps, vs. only 14% in sanitary landfills. About 91% did highlight the negative impacts of open dumping.
- Despite the above, 77% of the mayors stated that the citizens won't approve building a sanitary landfill in their town for various reasons, including[3]: fear of propagation of bad odors (17%), potential unsustainability of the project which might turn the landfill into a large dump (14%), lack of confidence in authorities (14%), fear of health problems (12%), among others.

Impacts vs. acceptance of landfills (% Municipalities)

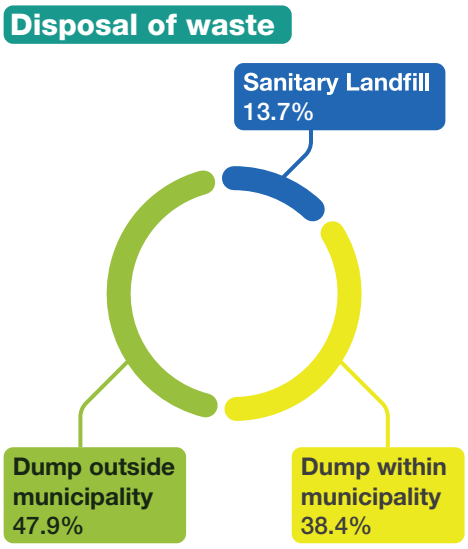

Figure 1. Disposal of Waste

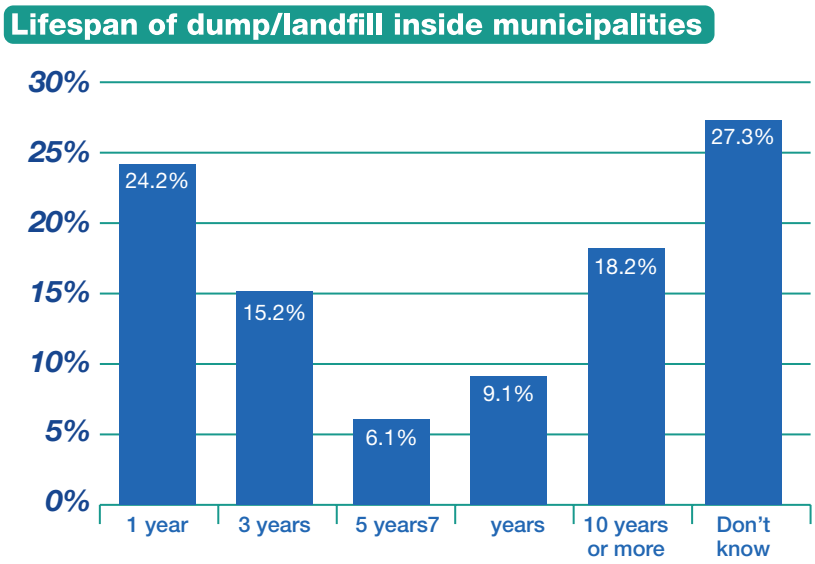

Figure 2. Lifespan of dump/landfill inside municipalities

[3] The results are not exclusive, i.e. mayors were given the possibility of choosing more than one reason

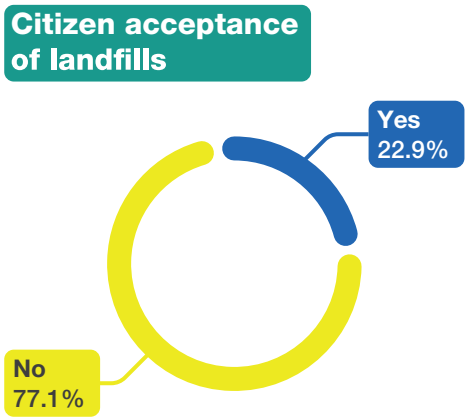

Figure 3. Citizen acceptance of landfills

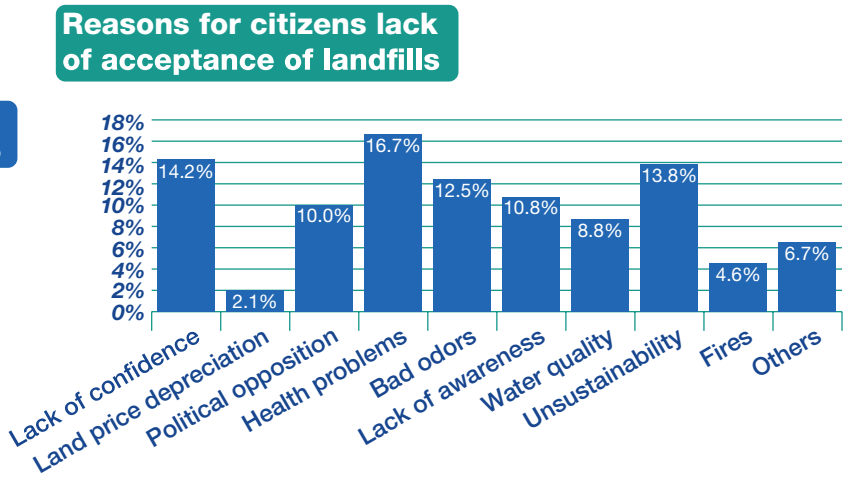

Figure 4. Reasons for citizens lack of acceptance of landfills

- About 39% of the studied municipalities do send their waste to a waste treatment facility (inside or outside the union of municipalities). Providing the necessary legal, technical and market requirements for RDF, creates incentives to those facilities to upgrade their systems into RDF generation. This would extend the lifespan of the disposal sites, of which 40% are expected to last for no longer than 1-3 years (and 27% don't know).

Treatment vs. disposal capacity (% Municipalities)

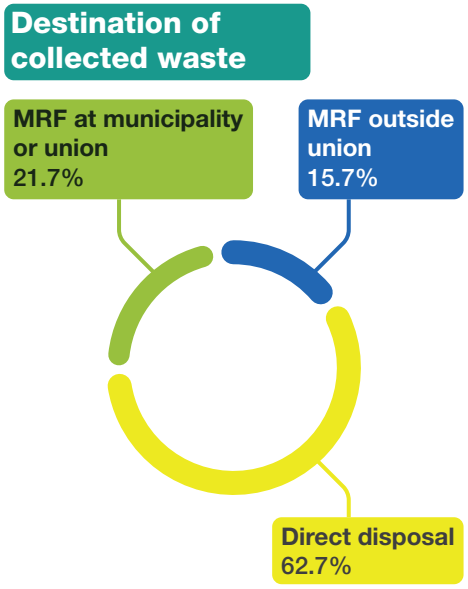

Figure 5. Destination of collected waste

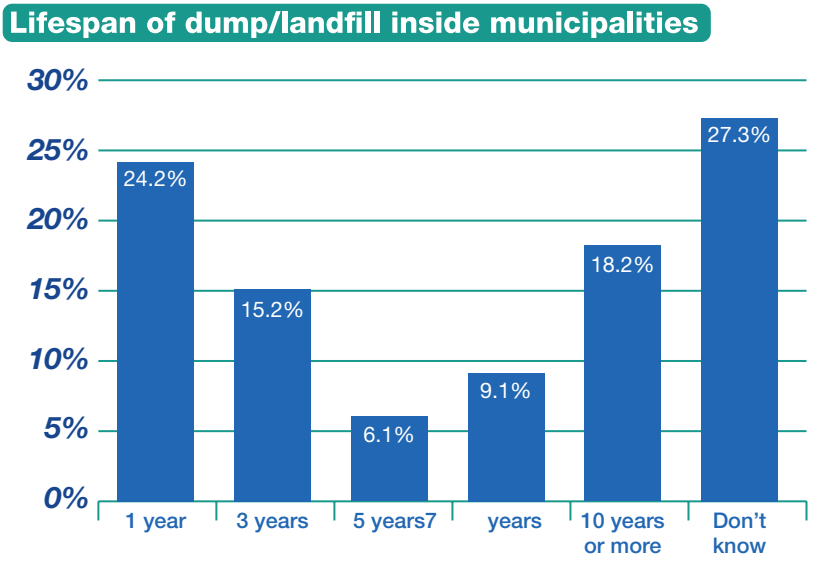

Figure 6. Lifespan of dump/landfill inside municipalities

G.2. Awareness and training

- The majority (97%) of the interviewed mayors agree on the importance of public awareness and 84% of the visited towns have implemented some sort of waste awareness campaigns. Most (60%) of the mayors rate the level of awareness of the community to be "medium" (score of 2 on a scale of 0 to 3, where 0 is no one, 1 is marginal, 2 is medium and 3 is outstanding).

- Also, most (81%) of the visited municipalities implemented waste-related training (mostly on source-sorting). Out of those, 62% were found useful.
- Citizens across the country have repeatedly identified "lack of continuity" as the main reason behind the failure of awareness raising initiatives. They attributed this phenomenon to various reasons, including termination of the funded project, lack of follow up by the local authority, inadequate initial planning (to allow self-sustainability of the project), assigning incompetent people to follow up, among others.

Community awareness and training initiatives (% Municipalities)

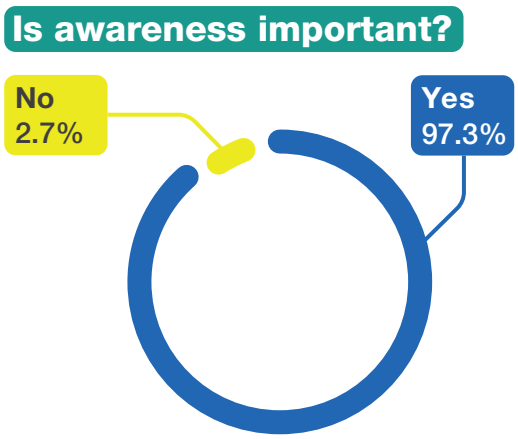

Figure 7. Is awareness important?

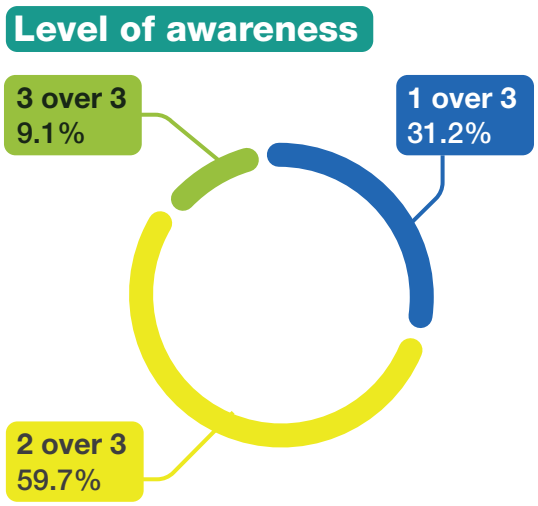

Figure 8. Level of awareness

Figure 9. Were community training initiative conducted?

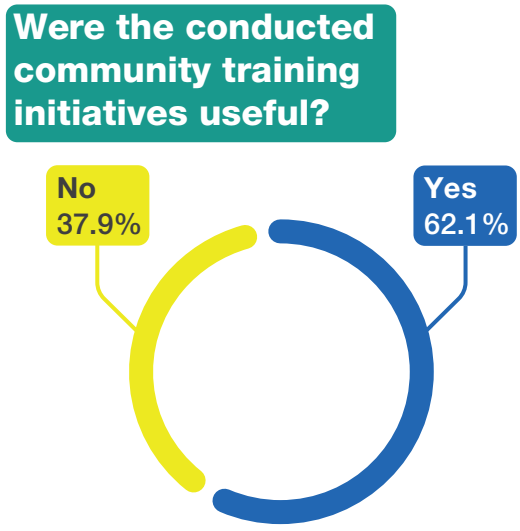

Figure 10. Were the conducted community training initiatives useful?

G.3. Community involvement

- About 57% of the local municipalities have tried projects that involve the citizens at various levels: informing, consulting, inclusion, collaboration, and empowerment.
- Only 31% of the municipalities had support from local NGOs and community-based entities; but they all (99%) showed their willingness to collaborate with such entities.

Community involvement (% Municipalities)

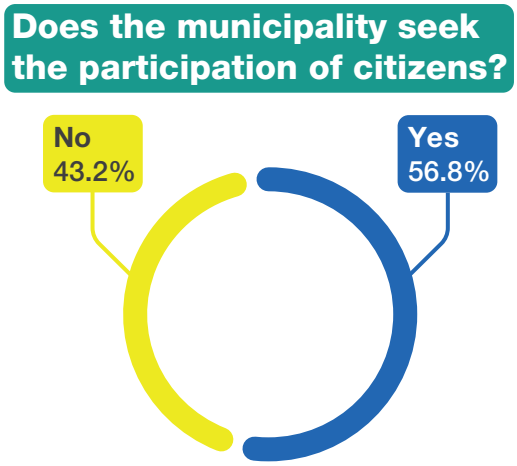

Figure 11. Does the municipality seek the participation of citizens?

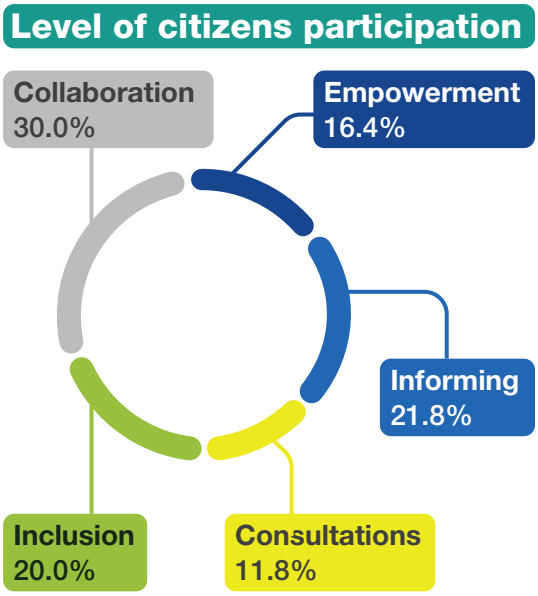

Figure 12. Level of citizens participation

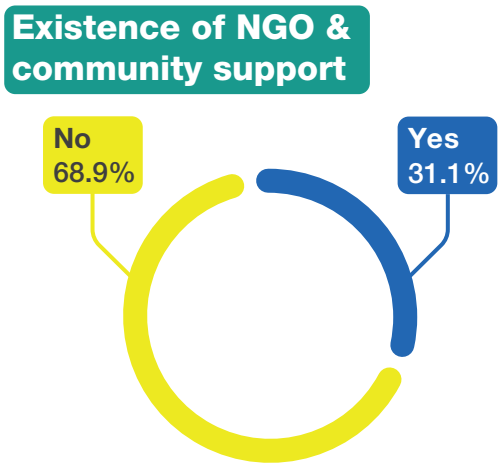

Figure 13. Existence of NGO & community support

Figure 14. Municipality willingness to collaborate when support is inexistent

Relevant Feedback from Local Authorities and Citizens

i. The data collected from municipalities clearly shows that some components can be properly managed at the local level, whereas others cannot. For instance, collection is mostly done by local authorities (municipality or union of municipalities) or by a local contractor (82% total), with a sufficient weekly collection frequency: 2-3 times (46%) and 5 times or more (41%) and with no accumulation of waste on the streets (83%).

ii. As a result, most mayors think that the **best entity to be in charge of waste collection is the municipality** (directly or through a contractor, 95% total) – despite the reported financial, social and technical challenges.

Collection at local level (% Municipalities)

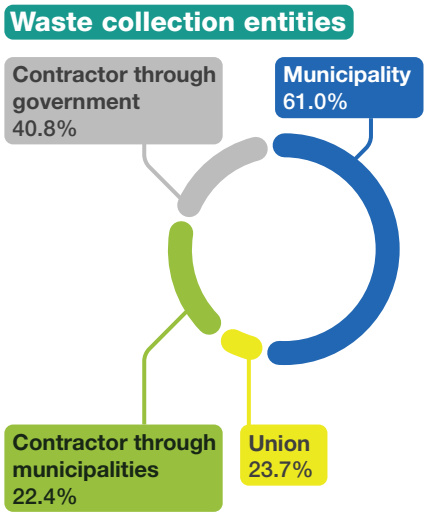

Figure 15. Waste collection entities

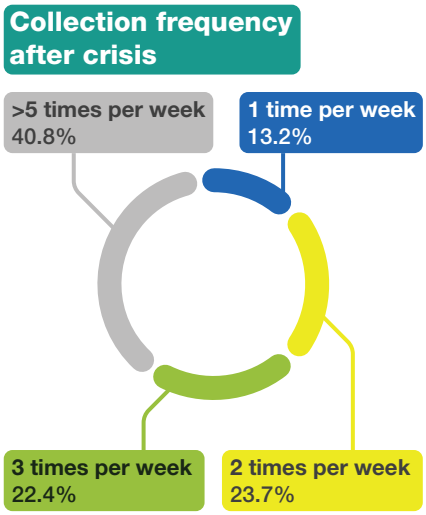

Figure 16. Collection frequency after crisis

Figure 17. Waste accumulation on streets

Challenges of local collection (% Municipalities)

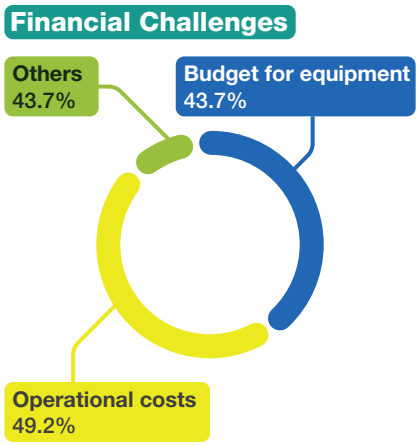

Figure 18. Financial challenges of local collection

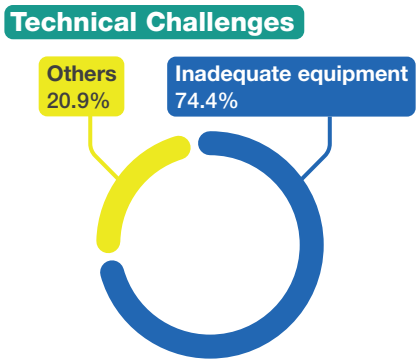

Figure 19. Technical challenges of local collection

Figure 20. Social challenges of local collections

iii. In comparison, only 31% of the local authorities have sorting/treatment facilities within their municipalities or union of municipalities. Among those, 80% need upgrade and most of them face financial, technical or energy problems (77% in total).

Existence and challenges of treatment at local level (% Municipalities)

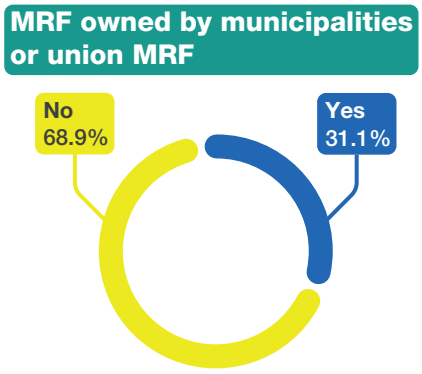

Figure 21. MRF owned by municip. or union MRF

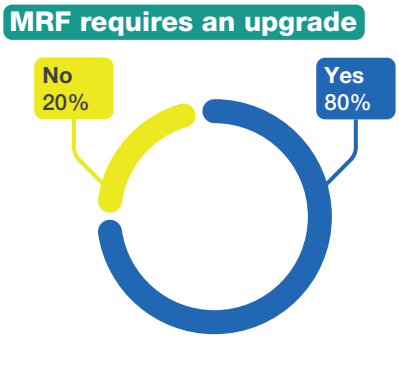

Figure 22. MRF requires an upgrade

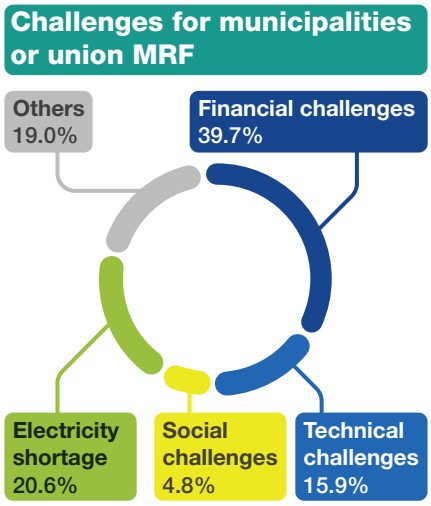

Figure 23. Challenges for municipalities or union owned MRF

iv. On the other hand, only 22% of the municipalities treat their waste locally; the rest send their waste for treatment outside the union (16%) or for direct disposal (i.e., without any treatment, 62%). Also, half of the studied municipalities have no resources at all to build future treatment facilities.

These observations indicate the incapability of local authorities to take care of the treatment stage of waste management.

Local management methods and resources (% Municipalities)

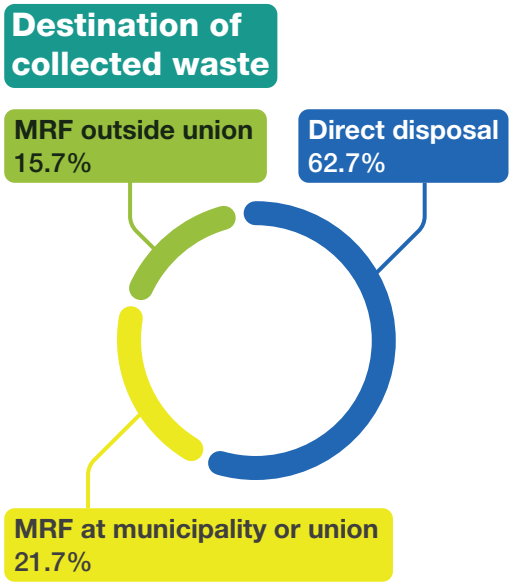

Figure 24. Destination of collected waste

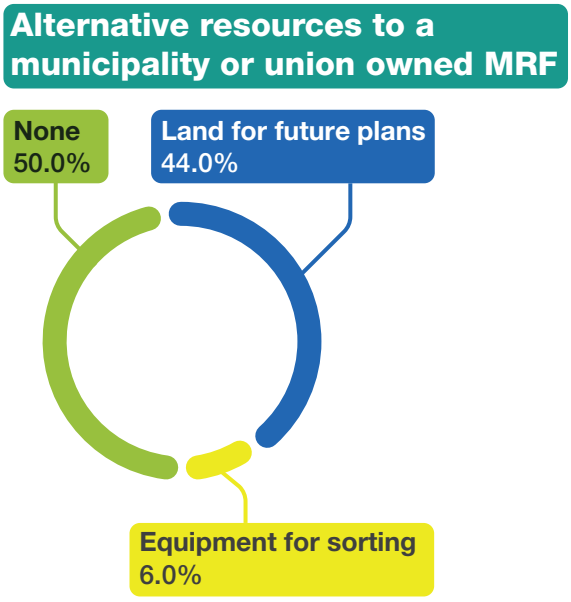

Figure 25. Alternative resources to a municpalities or union owned MRF

H.

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