

Tool 4.2 – Evaluation and Improvement of Organic Waste Management

Table T 4.2 A: overview of organic waste management

Category	Feature	Questions to ask – things to observe – elements to evaluate	Actions and possible improvements
Service provision	Waste separation and storage	Are organics segregated at source? Do users have access to the necessary infrastructure to properly segregate waste at the source? (specific bins or containers at home, dedicated community collection points, etc.) How well are the organics separated? Is it required to further sort the organics before treatment?	For a higher quality of the organic stream, waste segregation at the source should be pursued as a key strategy to enable high organics diversion and purity. Reinforce the behaviour change campaign to improve waste segregation at source and the purity of the organics collected. Provide adequate infrastructure and materials to allow for source segregation. Refer to the Compendium - Waste Separation (pp. 34-37) for more information on waste separation.
	Collection and transport	Are the organics collected and transported separately throughout the entire collection and transport chain? Is the collection and transport system of organics efficient? (optimise time and effort required at each task, adequate planning and monitoring) Is the infrastructure and local capacity for the collection and transportation of organics sufficient to meet current needs, and does it have the potential to handle an increased volume of organics?	Verify that the system design allows for the separation of organics throughout the system. If not, identify any loopholes to ensure that organics are not mixed with other waste once they have been previously separated. Evaluate the efficiency of the storage, collection and transport system – you can use Tool 2.2 – Evaluation and Improvement of Storage, Collection and Transport. Evaluate infrastructure utilisation and potential for increasing organics recovery. Estimate the maximum amounts of organics that can be collected and transported within the current capacity.
	Amounts recovered and potential expansion	What proportion of the generated waste is organic? What proportion of organics are currently recovered? Is there any competitive use for organics?	Evaluate the amounts of organics that are generated. Identify if you have different organic waste streams, such as kitchen or canteen waste (wet) and garden or park waste (dry), in your context, and do a waste generation and composition study (Tool 7 – Waste Generation and Composition Study). The type of organic waste is relevant for treatment design and operations. Implement monitoring and reporting mechanisms to accurately record the amounts of collected organics. Calculate the percentage of recovery and establish achievable short-, mid-, and long-term goals to increase the amounts collected, as relevant to your waste management strategy. To expand the organics management service, follow the steps outlined in Step 3.4 of the HAWAI guidelines core text to design and plan new services. Evaluate whether other sectors or stakeholders are already using organics – for example, for direct feeding of animals or any other use. Ensure that you identify synergies with existing systems and minimise negative interactions resulting from this competition. HINT: If organic waste is already used locally, it will not require management by the SWM service. Hence, organic waste used by farmers or breeders, or used for on-site composting, is usually excluded from recovery rate calculations.

Treatment	Plant design	Are there designated areas for the reception, pre-processing, treatment, and storage of organic waste? Is the layout designed to facilitate efficient material flow? Is the facility designed to handle the expected volume and type of organic waste? Does it have the potential to handle more organics?	Evaluate the layout of the plant and determine if improvements can be implemented to facilitate the flow of materials, with key areas corresponding to each step: reception, pre-processing, treatment, and storage of products. Evaluate the current processing capacity in the plant. Compare with design parameters. Estimate the maximum capacity of the plant with current operations. Eventual improvements to increase capacity are evaluated in the following paragraphs about operations.
	Storage & pre-processing	Are the organics pre-processed before treatment? (sorting, shredding, drying, etc...) Is there a clear protocol for handling incoming waste that ensures proper homogenization and removal of contamination? Is the purity of the organics reaching the treatment plant satisfactory? Is the infrastructure and local capacity for storing and processing organics sufficient to meet current needs, and does it have the potential to handle more recyclables?	Organics preprocessing can be necessary for further recovery. Consider preprocessing techniques such as sorting, shredding or others to fit treatment best practices. Prepare clear protocols for staff to pre-process waste for treatment and disposal. Evaluate infrastructure utilisation and potential for increasing organics recovery. Estimate maximum amounts of organics that can be stored and processed. Enhance waste segregation at the source to increase the purity of the organic stream. Reinforce the behaviour change campaign for better source segregation.
	Treatment	Is the feedstock mix assessed to fit the desired treatment parameters? (C/N ratio, water content, etc.) Are key process parameters regularly monitored and controlled? (temperature, pH, moisture, ventilation, etc...) How is waste conversion efficiency measured, and are expected yields being met? Is the processing time optimised for efficiency? (composting cycle, digestion retention time, BSF larval development time) Are system failures or inefficiencies promptly addressed? (slow decomposition, excessive gas production, pest infestations, undesired odours)	Ensure that the feedstock mix is adequate for the treatment and take measures to improve it when necessary. Moisture and C/N ratio are two of the most critical parameters. Measure and record key process parameters such as temperature, pH, moisture, aeration, or ventilation. Ensure that these parameters fall within the optimal range for treatment and act accordingly if not. Evaluate if improved processing is possible – ensuring the operations at the facility are done according to best practices for each treatment, for example, with sufficiently frequent turning of composting piles and controlling process parameters well. Identified and corrected process failures or inefficiencies promptly. Use the Tool 5.3 – Technology Evaluation Tool to conduct a rapid assessment of feedstock suitability according to treatment parameters and estimate product amounts. Refer to the Compendium – Treatment and Recycling (pp. 72-89) for more information on technologies for organic waste treatment.
	Waste from facilities	Does the facility have proper drainage and leachate management infrastructure? Is it functioning as intended? Is the residual waste generated at the facility taken to further recovery and/or disposed of safely?	Sorted undesired materials should be disposed of safely in a disposal site. Leachate should be contained or treated before discharge. Recirculation is possible in specific cases. The drainage system should prevent clean rainwater from perturbing operations at the facility and avoid contact with waste, thereby generating additional leachate. Rainwater can be harvested for use in treatment or for cleaning purposes, when relevant.
	Maintenance	Is there regular preventive and corrective maintenance on the infrastructure and equipment? Is the facility kept clean and organised?	Establish a regular preventive maintenance plan and ensure that corrective maintenance is performed promptly on all essential equipment and infrastructure. The facility should be kept organised and cleaned for safe and efficient operations.

Maintenance	Occupational health	Are there any health or safety risks associated with handling or processing the organics? Is the staff trained? (safety and occupational health, use of PPE, disposal site operations) Is the staff vaccinated and have access to healthcare whenever needed? Is the staff protected with PPE? Is there a contingency plan in place if individuals are unable to work due to illness or other reasons?	Prepare an occupational safety plan and Standard Operating Procedures for the facilities. Train all staff on occupational safety and proper handling of organics, equipment, and machinery. Equip all staff with the necessary personal protective equipment adapted to the facilities' requirements. Health checks and adequate vaccinations should be ensured according to a physician's advice. Provide access to basic personal hygiene amenities for staff, including toilets, handwashing facilities with soap, showers, a changing room, and separate break and eating areas. Refer to the Compendium – X.4 Occupational Health and Safety (pp. 134-137).
Products	Products	Is the quality of the products satisfactory for the desired market? Does the product have a market? Is there demand for the product? Is there any reluctance to use the product made from organic waste? Is there potential to address the immediate needs of affected populations with products derived from organic waste management? (fertiliser/soil amendment, biogas, insect feed) Was a market analysis done for the products?	A market analysis is essential to assess the potential for the products in the existing market. If the product quality is not satisfactory, revise the treatment process to ensure optimal conditions and higher product quality. Strengthen the behaviour change campaign to increase source segregation quality and increase the purity of the organic steam. Analyse reasons for any reluctance to use the products, reflect on possibilities to reduce this reluctance with local stakeholders, and directly involve individuals who would use these products. Find alternatives to mitigate this reluctance (communication and awareness, incentives for use (make it free) or others). If barriers are too strong, the technology used might not have been adequate for the context – possibly consider alternatives in terms of treatment technology.

Table T 4.2 B: Evaluation of service planning and governance of organic waste management

Category	Feature	Questions to ask – things to observe – elements to evaluate	Actions and possible improvements
Supervision and monitoring	Adequate supervision	Is the organic management supervised? Is there a mechanism for staff to report problems/issues at any stage of organic management?	Supervisor positions are essential for an efficient and functional service. Ensure that you recruit qualified managers for supervision and monitoring. Implement a clear and accessible reporting system to ensure staff can promptly report and track issues related to organic waste management. Regularly review and address reported concerns to improve efficiency and compliance.
	Monitoring and reporting	Are there any metrics in place to measure and monitor the organics management system? (recovery rates, reduction of waste disposal, product quality, etc.)	Implement monitoring and reporting mechanisms to record the amounts of collected organics accurately. Calculate the percentage of recovery and establish achievable short-, mid-, and long-term goals to increase the amounts collected, as relevant to your organic waste management strategy. Monitor product quality to ensure it meets national standards. (pathogens, contaminants, nutrient values, etc.)
Governance	Regulatory framework	Are rules and regulations regarding SWM clear and established? Are local, regional and national laws and regulations followed? (restrictions of use from waste-related end products, regulations regarding product marketing standards, etc.) Are there mechanisms in place to enforce rules and regulations? (prohibit dumping, burning, payment, obligation to use the service, obligation to segregate at source)	Ensure specific regulations for products from organic waste and quality requirements are respected. Establish simple rules and regulations that support the existing organic waste management system and align with local, regional, and national laws and regulations. Explore possible incentives to promote and increase organic segregation at source.
	Stakeholder engagement	Are the roles and responsibilities of the stakeholders involved in the recovery of organic waste clear? Is there close coordination with other humanitarian sectors? (shelter, WASH, health, planning) For situations where humanitarians oversee organic management, was the local municipality approached to develop a management strategy jointly? Are local authorities and other relevant local stakeholders engaged in the planning and implementation? Has collaboration been discussed? Is sharing of infrastructure and capacity an option? Are there efforts to integrate the informal sector into the SWM system? Are there any positive or negative interactions regarding the organics management system?	Early engagement and empowerment of local stakeholders and authorities will allow smoother transitions for long-term SWM. Engage at different levels: inform, consult, involve, collaborate, and empower. Clarify roles and responsibilities with the relevant stakeholders. Collaborate with waste pickers to reduce unsafe practices – support them to access recyclables or organics sooner in the waste management chain (at source if possible). Integrate their activities into the organic waste management strategy, as there may be positive or negative interactions that should be evaluated. Prohibiting access to the disposal site for informal waste pickers without providing an alternative solution to sustain themselves is not recommended. Collaboration with local municipalities from the outset of the project is crucial for ensuring long-term sustainability. By synergising resources for organics pre-processing, the project can also boost potential income through economies of scale and strengthen possibilities for using or selling the products generated during treatment.

Governance	Equal access to services	Was the host community approached to collaborate on organic management, for instance, to plan for a common treatment site or explore markets jointly? Is support also given to host communities?	Waste management benefits greatly from economies of scale – shared use of organic waste treatment facilities is often desired. Ensuring equitable treatment and resource distribution between host communities and refugees, addressing disparities in access to essential services and support to prevent inequalities or tensions.
	Strategic planning	Is there a long-term strategy to improve and/or at least maintain organic collection and recovery service provision? Is there monitoring of key indicators to facilitate planning and informed decision-making? (organic waste generation, amounts collected, amounts treated separately and disposed of at the disposal site, recovery rates, etc....) Are there any forecasts for future trends and needs in managing organic waste? (population, expansion of service, change in collection system, future segregation of specific waste streams, etc.) What mechanisms exist for adapting and improving the system in response to future needs and challenges?	Improving SWM typically involves a stepwise approach, and long-term strategies and a clear vision should be established, aiming for gradual improvements, especially in organic waste management. Define and measure key performance indicators for organic waste management, such as recovery rates. Conduct a forecast analysis to help plan for future changes that can impact the organic waste management.
	Financing and cost recovery	What are the current costs of the organics management system? Can the current costs be reduced? Are the current costs sustainable in the long term? What are the current revenue sources for contributing to organic waste management, and how can they be sustained? Is there a strategy to cover the long-term costs of operation and the capital costs of organic waste management? Has a tariff been implemented for organic waste collection and/or recovery? Is it possible to increase revenues from the products generated?	Define the annual costs of the organic waste management service, including both capital and operational expenses. Tool 8 – Cost Evaluation can be used for support. Evaluate the organic waste management system and improve efficiency to reduce costs. Consider implementing tariffs for service provision to waste generators (users) to offset the costs associated with waste management. Conduct a market analysis to assess opportunities for increasing revenue from sales of products from treated organic waste. Explore options for pre-processing and storing larger quantities of products from treated organic waste, which could help optimise pricing leverage and enhance profitability. (consider pre-processing steps such as cleaning, shredding, cutting, compacting, sell in larger amounts, store to sell at better market prices, etc.) Early collaboration and empowerment of local stakeholders are essential for the long-term sustainability of SWM services.
	Behaviour change	Is there an active behaviour change campaign to improve waste segregation at source and targeting organics? Is the community well informed and reminded of the good practices for waste segregation and collection? Is the efficiency of the behaviour change campaign monitored and evaluated? Are there cultural barriers to the segregation of organic waste? How can consistent participation be encouraged? Are there economic or social incentives to participate in source segregation?	Prepare a behaviour change campaign to be integrated into the overall SWM behaviour change campaign. Define the target behaviours to change and use adapted behaviour change techniques to achieve this goal. For more information on behaviour change, refer to the Compendium - X.6 Hygiene Promotion and Behaviour Change (pp. 139-141) and to the Compendium of Hygiene Promotion in Emergencies (Gensch et al., 2022) – Social and Behaviour Change. If social barriers are identified, integrate this element into the behaviour change campaign and work closely with the communities to find suitable and culturally appropriate alternatives. Regularly assess the behaviour change campaign and adapt according to the needs. The first focus should be on ensuring proper collection and disposal of waste, and then adequate waste segregation can be improved. Consider possible incentives to increase participation and good practices of waste segregation at source. Evaluate if the current system for organics collection is suitable to foster good practices of waste segregation.

Governance	Public awareness and participation	Are there opportunities for participatory planning and public consultation? Is there a regular education and public awareness program in place which are specific to organic waste? Is there a mechanism or periodic evaluation in place to capture feedback from wastegenerators regarding organic waste management?	Engage the community in planning and decision-making to ensure waste management meets local needs, encourages ownership, and improves compliance. Implement regular education and awareness activities to improve segregation at source and increase the amount of organics being collected and handled separately. Establish a structured feedback mechanism, such as periodic surveys, suggestion boxes, or stakeholder meetings, to gather insights from waste generators. Use this feedback to identify challenges, improve participation, and enhance the efficiency of the organic waste management program.
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