

Training Module 4. Waste Management in Rural Communities

4.3.1 Waste Collection, Treatment and Valorization

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## S1 & S2

In the next presentation we are going into the central part of a waste management system which includes the collection and transport, sorting, valorization and treatment activities of waste and finally the operations for the final disposal in controlled landfills.

## S3

Solid waste should be separated into at least 4 fractions after generation: the wet fraction containing biodegradable waste and the dry or recyclable fraction divided into the following categories: paper and cardboard waste, plastic and metal waste (sorting is easy because they are very different) and glass waste.

The waste collection should be done with vehicles of a capacity adapted to the local conditions. The collection vehicles must be clearly marked with suggestive symbols and multi-lingual text, where needed, so that members of the community do not have suspicions about the separate collection of waste). Waste collection must necessarily be followed by waste sorting, but this stage must not exclude the sorting of waste as close as possible to the source of generation. Sorting stage must be followed by waste treatment where the material recovery of the waste is mainly considered, followed by energy recovery. The final disposal of waste in controlled landfills must remain the least used option in waste management.

## S4

An overview of the available waste treatment infrastructure in Romania as reported in the Eurostat international database can be seen in the following table. We can observe the situation at the national and regional level. The codification of the treatment options is in accordance with the Waste Framework Directive and with the existing national legislation.

## S5

Regarding the remaining storage capacity, official data present the situation at the national level for non-hazardous, hazardous and inert waste landfills. Total highest storage capacity is found in the case of the North East Region, the minimum value is registered in the case of the North West Region.

S6 Regarding incineration operations, the available waste treatment infrastructure is found in the South-Muntenia Region. Incineration with energy recovery facilities with the largest capacity is found in the North-East Region.

Going back to the technical components of waste management, it can be said that for rural communities, thermal treatment methods by incineration, with or without energy recovery, are not recommended due to the composition of the waste, which has a lower calorific value due to the high water content, due to the technical difficulties of operating such an installation in the rural environment, due to the high operating costs and community opposition. For rural communities, it is advisable to focus on the material recovery of biodegradable waste collected separately through biological degradation processes: composting and anaerobic digestion, the last one where financial conditions and technical skills to operate are met. The useful products that can result from the valorization stage are: from composting and anaerobic digestion, a material that can be used to improve soil quality. Biogas can only be obtained from anaerobic digestion, which due to the increased methane content can be used as energy source, and materials can be obtained from recycling.

S8

Traditionally, the reject from sorting, from recycling and from composting and/or anaerobic digestion are further regarded as waste and can reach the final disposal stage.

S9

However, in an efficient waste management, the reject from sorting and recycling could be refuse derievd fuel. The role of the representatives of the rural communities here would be to ensure that these categories of waste reach a form of valorization before reaching controlled landfilling. In the idea of supporting the concept of circular economy, the reject from anaerobic digestion and/or composting could be materials, which once stabilized could find a use. The refuse from incineration and the ash resulting from the heat treatment process of waste through incineration with energy recovery would end up in the phase of landfilling.

S10

The technologies used in waste management must consider the characteristics of the community and especially the distance from an urban center equipped with all the necessary infrastructure.

A comparative analysis between remote rural communities, villages and communities in the peri-urban area reveals some important conclusions. The degree of access to waste services is the lowest in remote rural communities and increases with the proximity to the urban area.

The reuse of waste, especially food waste as animal feed, in remote rural communities, is a very common practice, less encountered in the other cases. The capture rate for recycling materials is low in remote areas and is the highest in the peri-urban area. In remote rural communities, it is advisable to treat biodegradable organic waste in situ, being the right place for composting at the individual household level. In the case of villages, composting can be done in a centralized form. In remote rural communities, legal practices for obtaining waste biomass derived fuel must be encouraged, while in villages in the proximity of some economic activities in the agro-industrial field, a viable solution for the material and energy valorization of waste is anaerobic digestion.

For residents of the peri-urban area, access to the centralized sorting/treatment infrastructure is easy.

The greater distance from the urban environment leads to a higher probability of illegal waste management practices. Thus, in remote areas, the local administration has an extremely important role in discouraging these illegal practices.

S11

In summary, we discussed the components of waste management in rural communities, emphasizing the technical component and reviewing the possibilities of collecting/sorting/treating and valorizing waste, in a context adapted to the requirements and needs of rural communities.

Thank you for your attention!