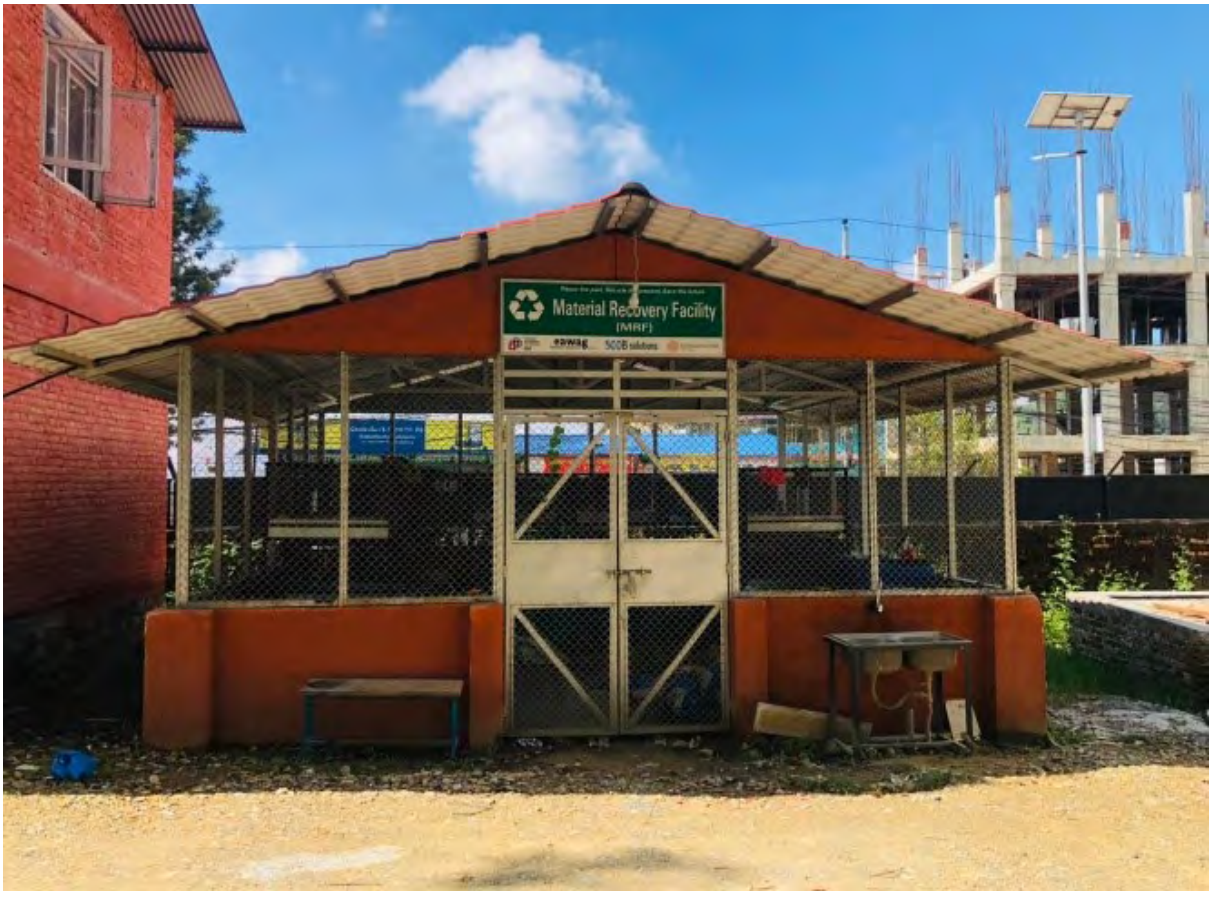
MATERIAL RECOVERY FACILITY (MRF)

Input materials	**Pre-condition/Pre-treatment**	**Operation & maintenance**	**Objectives / Key features**	**Key technical parameters**
Suitable recyclables waste: – Paper, cardboard – Metal – Glass – Clothes – Dense plastic (HDPE, PET) **Unsuitable waste:** – Organic waste – Hazardous waste	Waste segregation at source Optional: cleaning & drying	Regular low operation and maintenance required. Can be done internally or externally (outsourced).	Facility, which receives, separates and stores recyclables to facilitate their further use/recycling.	Space required depends on the recyclables generation rate & storage time
Outputs / paroducts	**Technical complexity**	**Maturity level**	**Educational aspect**	
Sorted recyclables ready for selling	Limited infrastructure required (covered area with storage space) Low-level skill required for construction & appropriate O&M	Widespread practice	**Topics:** Consumption; Finances **Practical exercises:** Storage size calculation; Revenue calculation	



A Material Recovery Facility (MRF) is a facility that receives, separates and stores solid waste to facilitate the further use and recycling of the materials.

At the MRF, the waste fractions are separated into specific categories such as Paper, Cardboard, Glass, PET bottles, Light plastic, etc. and then stored in different containers/compartments. Since an large part of the waste materials are recyclables, an MRF allows to maximize the recovery of these material that can be further sold, while reducing the quantity of materials requiring further transportation and final disposal.

Applicability: MRF can be used at school and community level and serves as storage unit before selling recyclables and partially also as sorting station. It can be managed by individuals and staff at the school or outsourced to external individuals or companies.

Technical design considerations: A covered area protecting from rain and winds is required. It is recommended to construct a concrete floor for easy cleaning of the area. The space needed will depend on the volume of recyclables generated and the storage time required. Metal cages or simple jute bags can be used to store different recyclables separately. Access to water and power are needed when cleaning of recyclables (and/or shredding) is envisaged to increase the market value.

The following formula can be used to determine the MRF compartment volume:

MRF compartment volume m3=

$$\frac{Daily\ compacted\ waste\ generated\ \left(\frac{L}{day}\right) * n_{storage\ days}}{1000\ \left(\frac{L}{m3}\right)}$$

Criteria for MRF location are:

— Easy road access

— Closest as possible to main waste generators

Materials needed: Cages or containers to store the different recyclable materials. Personal protective equipment (PPE) with gloves is necessary for workers. Broom are used to clean the floor. A table can be used to further sort the waste.

Technical operation & maintenance: Recyclables should be sorted on a regular basis. Depending on the local recycling market, cleaning and drying might be necessary. Shredding could also performed to increase the recyclable market value. Keeping records of recyclable amounts sold is advisable.

Health and safety: While sorting waste at a MRF is not an inherently dangerous activity, precautions are necessary to protect against injury, especially in presence of sharps.

Costs: Costs of building an MRF vary depending on the chosen design and further processing steps (i.e. sorting only, cleaning and drying, shredding, etc.).

Social, legal and environmental considerations: Collection and sale of recyclables are often informal sector livelihoods that could be negatively influenced by the implementation of an MRF. Where possible, opportunities to integrate these people into the management of the MRF should be assessed.

Strengths and weaknesses:

⊕ Enhance resource recovery

⊕ Easy-to-do

⊕ Revenue generation

⊖ Time consuming if managed by the school

⊖ Potentially negative impact on informal sectors livelihoods

> **References and further reading**

Wasteaid, Making Waste Work: A toolkit – How to prepare plastics to sell to market. 2017