II. Reduce, reuse and recycle (3Rs) [i]

Introduction

Reducing the generation of waste, re-using and recycling products can substantially reduce the amount of wastes to be disposed on land. These activities require a high degree of coordination and organization of the waste management chain.

Technology characteristics

To reduce waste problems in future, reduction in waste generation and re-use of old products such as electronics can be one of the most important factors. Examples of possible reduction at the consumption level include better buying habits and cutting down on the use of disposable products and packaging.

Further, recycling is a viable option for a range of waste products. In some economies, there already are well-organized recycling businesses and processes in place for a range of products (e.g. furniture, clothing textile, etc.) and materials (e.g. paper, iron, glass and steel). For some specific wastes many dedicated so-called 'end-of-pipe' recycling lines have also been developed. Examples of such dedicated lines are plastic bottles (i.e. PET), glass, aluminium, steel, copper, etc.

Country specific applicability and potential

The policy and institutional arrangement options of the 3Rs concept may be more cost-effective and for this the public awareness and education has to be a priority. Although, the concept of 3Rs has been known to Bhutan for a long time, the actual implementation of the 3Rs concept has been difficult due to lack of proper guidance, budget, human resource and public awareness. However, Bhutan has now managed to take a step forward in managing organic waste, PET bottles and paper wastes through the application of 3R technologies[9].

Status of technology in country

One of the guiding principles of the Waste Prevention and Management Act 2009 is the principles of Reduce, Reuse and Recycle. Public Private Partnership models for waste management have also been initiated.

Benefits to economic / social and environmental development

Lower volumes of waste to be disposed, thereby reducing pressure on land and also the associated GHG emissions.

Lower air and water pollution impact due to avoidance of primary production processes.

Reduction of energy use in the material/product production process such as mining, quarrying, processing, etc. For instance, the copper recycling process results in energy savings of up to 85% compared to primary production.

Increased employment associated with handling and processing of waste streams, additional employment could be in waste collection, waste handling and processing, secondary material/product trade (e.g. second-hand store).

Climate change mitigation benefits

A lot of waste that would be generated and disposed on land is avoided by the implementation of 3Rs, thereby avoiding the associated methane emissions. In addition, the GHG impact of the production of other waste categories, such as old

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9 Country Analysis Paper (Draft), Third Meeting of the Regional 3R Forum in Asia, Technology Transfer for promoting the 3Rs–Adapting, implementing, and scaling up appropriate technologies Singapore, 5-7 October 2011, available at http://www.uncrd.or.jp/env/spc/docs/3rd_3r/Country_Analysis_Paper_Bhutan.pdf, accessed on 4 May 2012.

washing machines, computers, mobile phones, etc. can be significantly reduced by reusing them or formulating them with a view to promote durable, re-usable and recyclable products.

Further, there is a significant potential for reducing GHG-emissions through recycling processes, due to reduced process energy consumption. Primary production processes for intermediate products such as aluminium production req uire large amounts of energy input to melt the raw material (i.e. bauxite). Recovering and melting secondary aluminium requires much less energy as the scrap aluminium is already of high purity (as compared to bauxite). Lower energy consumption in turn implies lower CO_2 emissions.

Costs

The economics of waste management practices and specifically recycling activities are often a crucial factor in successful adoption of a new process or technology. In general, there are many factors that shape the financia l and economic environment for recycling initiatives. In some cases basic legislative changes, such as closure of a nearby landfill site or a regional ban on landfilling can make recycling more attractive as the costs of waste disposal go up.

Given the wide variety of waste types a multitude of recycling processes is possible. Therefore it is difficult to provide clear-cut cost figures for recycling practices.

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment and Technology Action Plans For Climate Change Mitigation– Bhutan. You can access the complete report from the TNA project website http://tech-action.org/**