Research and Innovation (R&I) in Community-Based Natural Resources Management (CBNRM) and Waste Management (WM) in Malawi, Mozambique, Tanzania and Zambia

Sustainable Waste Management in National Parks: Key strategies and Principles

Presented at the Ruaha National Park 60th Anniversary Conference

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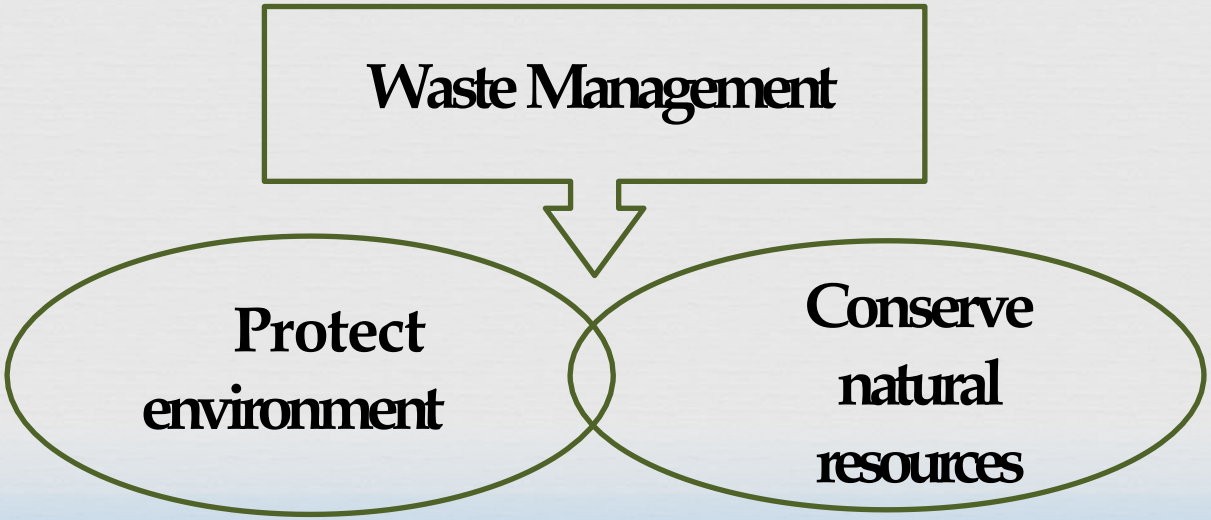
Introduction

Waste Management is the process of reducing, collection, treating, reusing, recycling, and disposing of materials considered waste.

Waste materials can be **solid, liquid, gaseous, or noise** which are mainly generated through human activity.



Introduction

Human population growth and increased demand for resources from Pas

- 61,741,120
- Improved infrastructures - more access to PAs and more wastes
- Marketing strategies - eg. Impact of Royal Tour - more investment and tourists
- Change of mindset and improved income - more domestic tourists

Why Waste?

Waste	Major issues
Solid waste	• pollute environment • public and animal health • spatial planning (land for disposal)
Wastewater	• pollute environment • public and animal health • spatial planning (land for disposal)
Air pollution	• climate change • acidic rain • wildfire

Amount of waste generated and collected

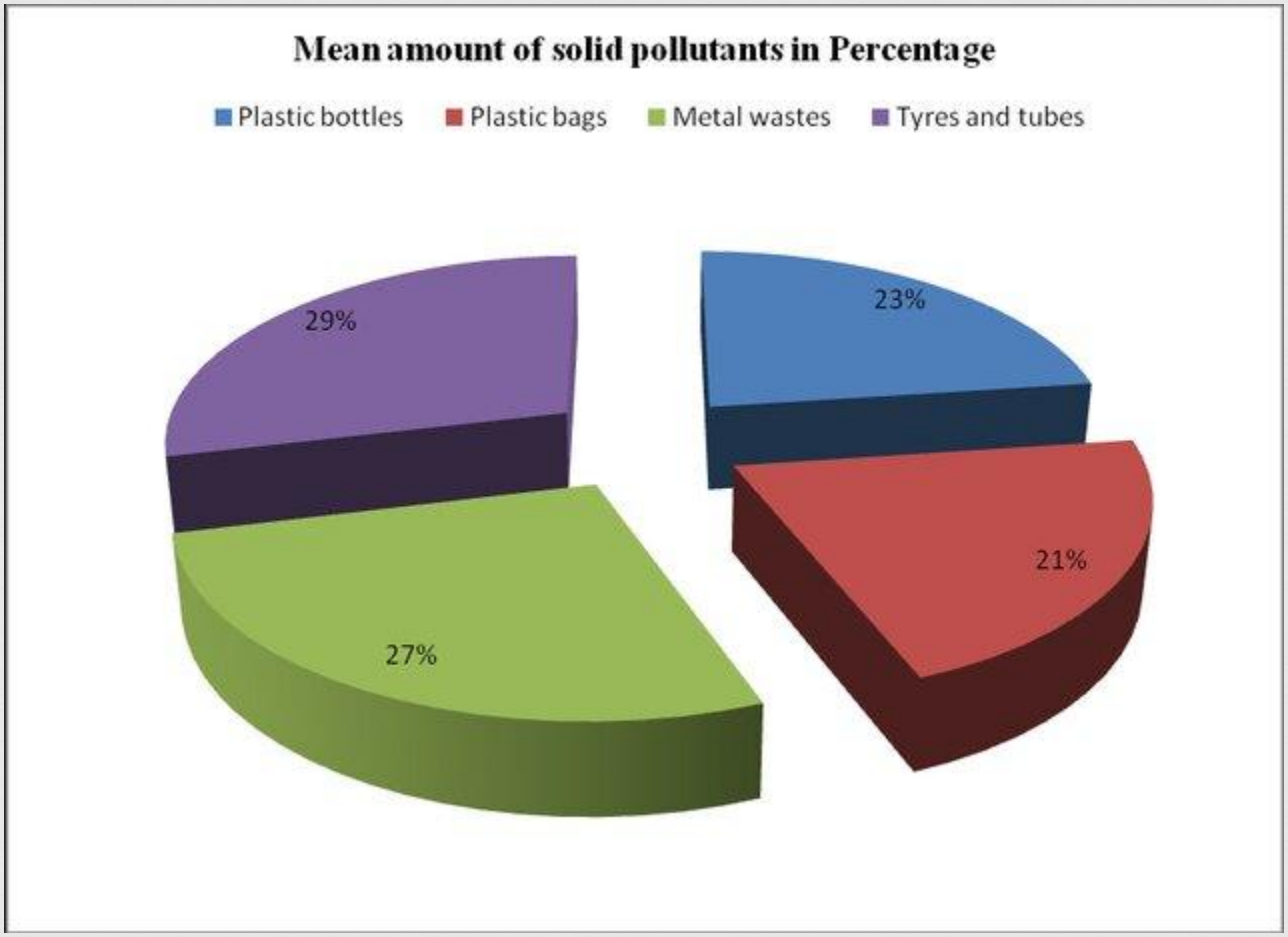
(a) Rate/country

	Waste generation		Collection rate	
Country	Mil tons/year	Kg/capita/day	(%)	Year
Malawi	3.7	0.5	30.0	2019
Mozambique	2.0	0.6-1.0	25.0	2012,
Tanzania	**7.0**	**0.5-1.0**	**32.7**	**2019,**
Zambia	2.0	0.49	24.8	2017
Sub-Sahara Africa	**3.62**	**0.46**	**44.0**	2018

(b) Generation in major cities

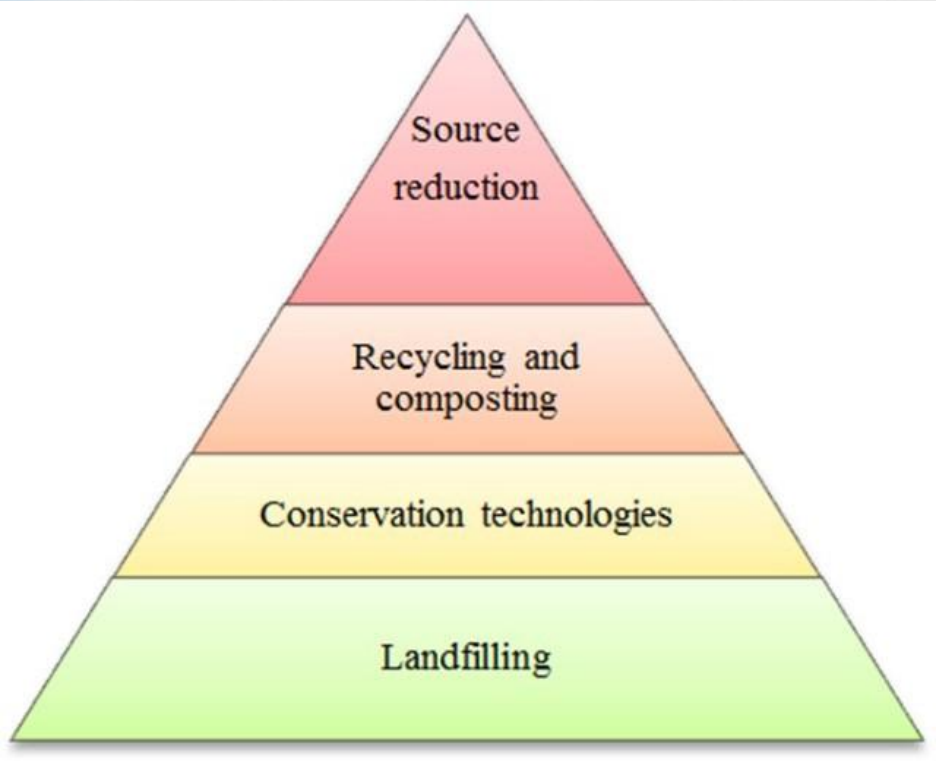
Country	City	Matric tons/year	(%) country generation)
Malawi	Lilongwe + Blantyre	360,620	9.75
Mozambique	Maputo + Nampula	1,326,625	66.3
Tanzania	Dar es Salaam + Arusha	1,752,730	25.0
Zambia	Lusaka + Livingstone	620,489	31.0
	Total	**4,060,464**	**27.6**

Quantity (in Kg) of solid wastes collected along the Mikumi National Park Highway



Quantification of Solid Wastes along the Highway Crossing Mikumi National Park, Tanzania by Nyahinga et al (2016).

Sustainable Waste Management

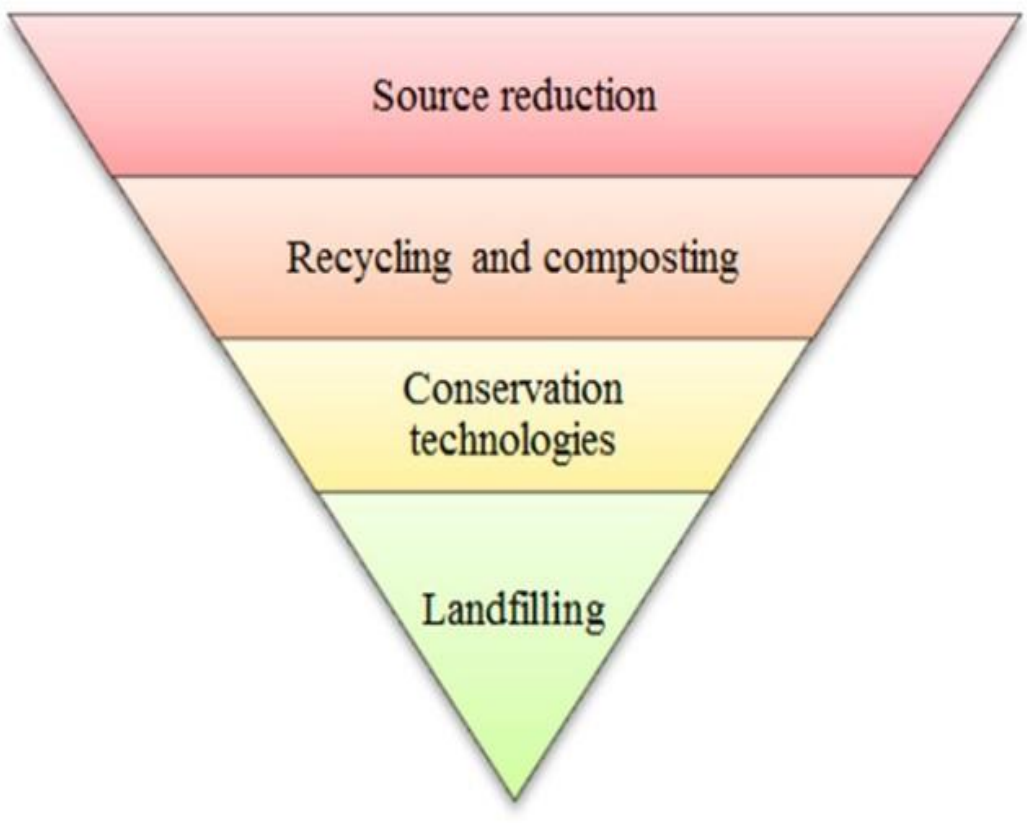


Current practice

- The current practices of waste management indicate that most of the waste goes **directly to landfills**, and **less consideration** has been given to **recycling, composting, or source reduction**.
- This approach **creates environmental issues** in terms of **leachate generation.**

Sustainable Waste Management

- Priority - **source reduction or source minimization** to produce less waste
- Emphasis on waste minimization practices through **education, electronic media,** and the **promotion of the 3Rapproach**



Reversal **approach**

Key performance indicators:

(1) Solid waste separation at source

(2) Use of recycled materials

(3) Composting of organic and food waste

(4) Purchasing of materials with recyclable features and

(5) Cooperation with recycling firms

Aspects of waste management in selected national parks

Country	Law	Infrastructure	Household	Waste disposal			
				Collection	Recycling*	Landfilling	Combiuston
China				x			
England	x					x	
France		x			x		
Germany	x						
Iran		x					
Canada	x			x	x		
Mongolia			x			x	x
Nepal				x		x	x
Poland	x			x			
Slovakia							
Sweden	x						
Tanzania	x	x	x			x	
Turkey		x				x	
USA	x			x	x		

*recycling = composting

Waste Management in Selected National Parks – A Review by Grzegorz Przydatek,2019

Existing Innovation

- Plastic waste recycling
- Manure production
- Maggot prodcution
- Briquette production

Waste sorting (Recycling)

Plastic waste shredding

Compost production

Maggot production

Briquettes

Challenges

- Lack of funds
- Inadequate capacity
- Poorly formulated policies
- Lack of engagement

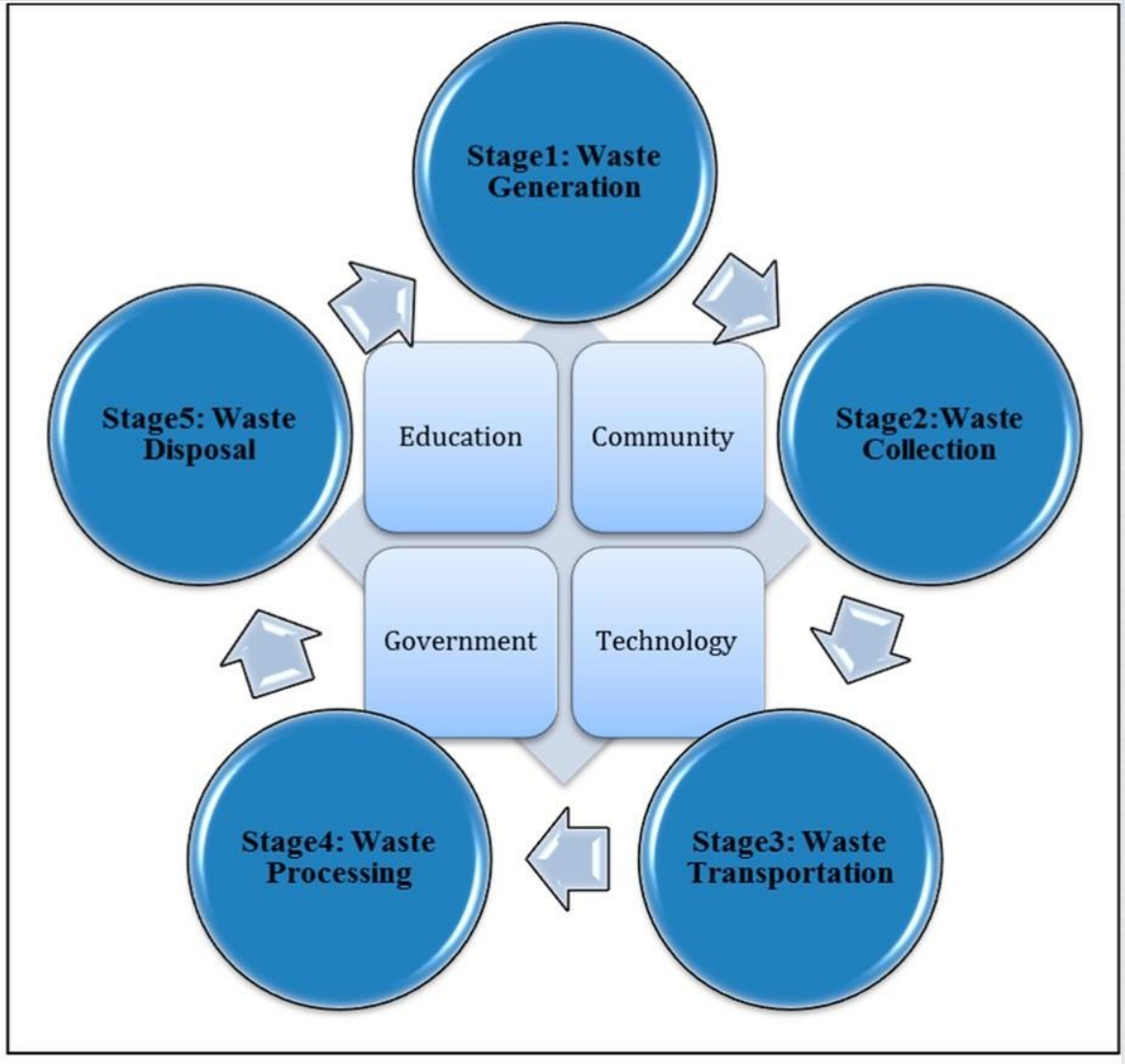
Principles towards responsible waste management in protected areas

In protected areas, waste should be managed in order to achieve:

- Protection of ecosystems and biodiversity
- Prevention and remediation of pollution
- **Implementation of the waste management hierarchy**
- Provision of effective waste services and infrastructure
- Promotion of participation and building of partnerships
- **Contribution to wellbeing, livelihoods, and capacity**

Recommendations

- Conduct a study on the effects of agrochemicals pollution in Ruaha River in order to assess the impact on natural resources.
- Conduct a thorough study on the best ways of managing solid wastes generated in the park.



Integrated approach for waste management

THANK YOU