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SOLID WASTE MANAGEMENT IN AFRICA

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Introduction

- The total population in Africa increased from about 5,300 million in 1990 to more than 5,700 million in 1995
- By the year 2025, it is estimated that the population in the continent will reach 8,400 million
- The average annual increase in population in Africa reached about 2.9% between 1990 and 1995
- The per capita Gross National Product varies considerably from country to country, ranging from as low as US\$84 in Mozambique, to more than US\$3,800 in Gabon
- Many countries in Africa lack the establishment of basic infrastructure (water supply, wastewater collection and treatment, and solid waste collection and disposal)
- The changes in population will require substantial investments in various types of municipal services, including solid waste management

Populations and Per Capita Gross National Product (GNP) in Africa

Country	Population in 1995 (in millions)	Avg. Annual Population Change (%) (1990 -1995)	GNP in 1991 (per capita \$US)
Algeria	28.58	2.71	1,991
Angola	11.07	3.72	
Benin	5.40	3.11	389
Botswana	1.43	2.92	2,666
Burkina Faso	10.35	2.81	290
Burundi	6.34	2.88	218
Cameroon	13.28	2.83	858
Central African Republic	3.43	2.62	407
Chad	6.36	2.72	212
Congo	2.59	3.00	1,060
Cote d'Ivoire	14.40	3.68	677
Djibouti	0.51	3.01	
Egypt	58.52	2.20	611
Equatorial Guinea	0.40	2.55	345
Ethiopia	58.04	3.05	123
Gabon	1.37	3.31	3,879
Gambia, The	0.98	2.60	367
Ghana	17.45	3.00	420
Guinea	6.70	3.04	498
Guinea-Bissau	1.07	2.14	187
Kenya	27.89	3.35	350
Lesotho	1.98	2.47	582
Liberia	3.04	3.32	
Libya	5.41	3.47	
Madagascar	14.16	3.29	207
Malawi	11.30	3.31	200

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Populations and Per Capita Gross National Product (GNP) in Africa (cont.)

Country	Population in 1995 (in millions)	Avg. Annual Population Change (%) (1990 -1995)	GNP in 1991 (per capita \$US)
Mali	10.80	3.17	251
Mauritania	2.34	2.86	500
Mauritius	1.13	1.00	2,380
Morocco	28.26	2.40	1,033
Mozambique	16.36	2.83	84
Namibia	1.69	3.18	1,584
Niger	9.10	3.26	303
Nigeria	126.93	3.13	305
Rwanda	8.33	3.40	282
Senegal	8.39	2.70	736
Sierra Leone	4.74	2.66	202
Somalia	10.17	3.18	
South Africa	42.74	2.37	2,543
Sudan	28.96	2.78	
Swaziland	0.86	2.68	1,210
Tanzania	30.74	3.36	95
Togo	4.14	3.18	427
Tunisia	8.93	2.06	1,504
Uganda	20.41	3.00	163
Zaire	43.81	3.17	
Zambia	9.38	2.84	418
Zimbabwe	11.54	2.97	641
Africa Total	744.01	2.93	
World	5,7529.28	1.68	

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Socio-economic Conditions

- Most of the countries in Africa qualify as economically developing countries
- These countries are characterized by poverty and by having very limited technical and economic resources
- Another characteristic of countries in Africa is conflict -- nearly 25% of the countries in Africa are engaged in some type of hostility
- These conditions have a negative impact on environmental management and, specifically, on the management of solid waste, because as the economy suffers other priorities precede solid waste management

Waste Management

- The type and amount of resource recovery and recycling that takes place in a particular region depends upon the level of economic development
- As previously indicated, the majority of African countries are considered economically developing countries and, as such, practice scavenging
- Generally, the process of resource recovery starts at the house or commercial establishment and continues through storage, collection, and final disposal
- On average, municipal solid waste contains a relatively small quantity of recyclable materials by the time the material reaches the final disposal site
- Scavenging is an important source of income to a substantial percentage of the population
- Materials recovered from the waste stream, in particular the paper fraction, play a key role in the pulp and paper industry

Waste Composition

- It is well known that the characteristics of MSW are impacted by a number of factors, including: climate, socio-economic standing, and the presence of industrial activity
- The climate in Africa varies from humid to dry (jungle to desert)
- The climate governs the type of vegetation, as well as the level of agricultural activity
- Wastes from tropical areas generally contain a relatively high concentration of organic matter
- People living in poor urban areas use coal or wood for cooking and, in some cases, for heating; thus, the waste contains a high concentration of ash
- Industry impacts the quantity and composition of the waste, such as the timber industry in Ghana and the tanning industries in Kenya and Namibia

Composition of Municipal Solid Waste in Some Countries in Africa (% wet wt.)

Component	South Africa			West Africa		East Africa	
	Sandton (1)	Soweto (2)	Ratanda (3)	Ghana Tamale	Nigeria Ibadan	Kenya Nairobi	Tanzania Dar-es-Salaam
Metal	10.0	3.0	1.6	1.0	2.5	3.28	2.8
Glass	10.3	12.0	1.6	--	0.6	3.95	0.4
Textiles	1.9	1.0	0.5	2.0	1.4	--	0.9
Plastics	14.4	3.0	1.8	1.0	4.0	4.65	1.9
Paper	21.8	9.0	2.3	3.0	6.6	11.65	8.7
Putrescibles	40.1	9.0	17.4	53.0	76.0	73.58	59.8
Ash	0.0	63.0	71.5	--	8.9	--	--
Misc.	1.5	--	3.3	40.0	--	2.82	25.5

- (1) High income community
- (2) Low/middle income community
- (3) Low income community

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Waste Treatment

- With minor exceptions, treatment of waste prior to disposal is not popular in the area
- Several composting plants have been built in North Africa, particularly in Egypt and in Morocco
- The facilities were primarily of European design and mechanically intensive
- Most of the facilities have been closed
- A relatively high level of informal segregation takes place in most countries

Final Disposal

- Final disposal on the land is by far the most common means of waste disposal
- Most of the land disposal used in the region can be classified as follows:
 - uncontrolled open dump
 - controlled open dump
 - controlled and sanitary landfills

Uncontrolled Open Dump

- This is the most common method of land disposal in Africa
- Most uncontrolled open dumps are sited near residential areas
- Many of the disposal sites are set on fire as a means of volume reduction and to control nuisances
- Uncontrolled open dumps present risks to public health and the environment

Controlled Open Dump

- In these sites, access and burning are, to some extent, limited
- Waste is spread on a relatively frequent basis
- Generally, they are a result of one or more individuals trying to improve the situation
- Tipping fees rarely are collected
- Sites generally lack the required infrastructure

Controlled and Sanitary Landfills

- Sanitary landfills are properly sited and designed final disposal facilities
- There are a few sanitary landfills in Africa, primarily in South Africa and in Egypt, and they are sited in the capital cities and larger cities of the countries
- Some of these sites have been implemented with international support
- The facilities are intended to be operated according to acceptable principles of sanitary landfilling (compaction, cover, etc.)
- These facilities have scales, access is controlled, and a tipping fee is levied
- Not all of the sites are properly operated and soon they become controlled dumps

Solid Waste Management Needs in Africa

- Development of a comprehensive national policy
- Establishment of a regulatory framework
- Development of human resources
- Provision of sufficient financial resources to the sector