Environment, Development and Sustainability (2005) 7: 465–500
DOI 10.1007/s10668-004-5410-3

URBANISATION WITHOUT DEVELOPMENT: ENVIRONMENTAL AND HEALTH IMPLICATIONS IN AFRICAN CITIES

KWASI BOADI*, MARKKU KUITUNEN, KOLAWOLE RAHEEM and KARI HANNINEN

Department of Biological and Environmental Sciences, Faculty of Mathematics and Science, University of Jyvaskyla, Finland

*(*author for correspondence, Present address: Toykkalankatu 17B 303, Turku 20540, Finland e-mail: kwaboad@yahoo.com)*

(Received 11 June 2003; accepted 24 October 2004)

Abstract. Sustainable development advocates for a balance between socio-economic development and the environment in the pursuit of human advancement. In Africa, high population growth and inadequate infrastructure in urban areas exert pressure on the environment and this threatens the health and wellbeing of urban residents. The population of the African continent until the 1960s was predominantly rural. This scenario has taken a swift turn and some of the major shifts in the global urbanisation process are taking place on the continent. Factors including natural increase in the population, rural–urban migration, strife and hunger leading to the internal displacement of populations have exacerbated the urbanisation process in Africa. The situation has been worsened by the imposition of Western development policies, including structural adjustment programmes on African nations, which has eroded the subsistence base of rural agricultural communities and further ignited rural urban migration. The failure of industry to absorb the increasing labour force has created massive unemployment and deepening poverty crisis in urban centres. Inadequate provision of infrastructure and services to meet the growth in urban populations has resulted in inefficient spatial development of urban centres, the proliferation of squatter settlements, inadequate basic amenities including potable water, sanitation and waste disposal. Poor environmental sanitation has resulted in the upsurge of infectious diseases and deteriorating urban health. Urban populations in Africa are also the worst affected by newly emerging diseases, particularly HIV/AIDS. The poor bear a disproportionately large share of the problems due to their particular vulnerability to environmental and health risks.

Key words: Africa, environment, health risks, poverty, rural–urban migration, sanitation, sustainability, urbanisation.

1. Introduction

Sustainability has emerged as one of the main concepts by which development and human welfare are defined and evaluated. Sustainability, as an innovative concept, requires that policy makers pursue the betterment of human welfare in consistent with the sustainable use of the environment (World Commission on Environment and Development, 1987). The Earth

Readers should send their comments on this paper to: BhaskarNath@aol.com within 3 months of publication of this issue.

Summit in 1992, produced Agenda 21 as a mechanism for translating the goals and objectives of sustainable development into concrete policies and actions at the local level. The basic objective is to ensure equitable distribution of the benefits of economic growth among a broader segment of the world's population, and at the same time maintaining the integrity of the environment.

Sustainable development advocates for increased human interactions in the areas of production, trade and commerce, and socio-cultural adaptations. Most of the global activities of production and consumption, and socio-cultural exchanges take place in cities and this phenomenon continues to draw many of the world's population into cities. Global urbanisation presents major socio-economic challenges, particularly in the less developed regions where the major shifts in urbanisation are taking place. Evidence suggests that the quality of life in some urban areas in the developing world is even worse than in rural areas due to high rates of poverty among pockets of the urban populations (United Nations Centre for Human Settlements, 2001). In Africa, poor economic performance has hindered the ability of governments to provide adequate infrastructure and services to meet the growing demands of the rapidly increasing urban population. The United Nations Centre for Human Settlements (Habitat) has since the Earth Summit in 1992, promoted local Agenda 21 as a basic concept for pursuing sustainable urban development in Africa. However, more than ten years of implementation of Agenda 21 has not led to any meaningful improvements in the environment and standards of living in urban Africa. African cities continue to face high unemployment, poverty, and severe environmental problems which have adverse impacts on the health of urban residents.

2. Urbanisation in Africa

The majority of Africa's population until the 1960s have been living in rural areas (Black, 1994; United Nations Environment Programme, 1999). This is however changing with an urban growth rate of 4.87% being faster than in any other continent in the world (United Nations Centre for Human Settlement, 2002). At the beginning of the 20th century, 95% of Africa's population were rural. Africa was the least urbanised continent in the 1960s with an urban population of only 18.8% (United Nations Environment Programme, 1999). This figure doubled by 1996, and by 2010 at least 43% of the population of Africa is expected to be urbanised (United Nations Population Division, 1997). Much of the growth in population is taking place in large cities (Black, 1994). Sub-Saharan Africa has the highest rate of urbanisation. The largest cities have been particularly growing rapidly (White, 1989; 2). In 1997, 24 African countries had cities with populations of over one million

with about half of them in Western and Central Africa (United Nations Development Programme, 1997; United Nations Environment Programme, 1999). The rapid process of urbanisation has become a hindrance to development in Africa due to inadequate provision of facilities for the needs of urban residents, thereby exerting pressure on the environment. Due to inadequate housing infrastructure, the majority of urban residents live in crowded tenements without basic environmental and sanitation infrastructure where filth and squalor pose serious health threats (Black, 1994).

3. The causes of urbanisation

The major factors accounting for today's rapid urbanisation in Africa are natural increase in the population and rural–urban migration. These factors interacting together are causing unprecedented rates of urbanisation in the history of the African continent.

3.1. Population Growth

The natural increase in the population is the result of improvements in medical health care and disease control (Black, 1994). In Africa, natural increase accounted for 75% of urban growth between 1960 and 1990 (Brokerhoff, 2000; 18). Between 1995 and 2000, natural increase accounted for 52% of the increase in urban growth in East Africa, 51% in Southern Africa, and 59% in West Africa (United Nations Centre for Human Settlement 2001). Many sub-Saharan Africa countries have population growth rates of 3% per annum, the highest in any region of the world (Table I). Advances in medical health care have drastically reduced the incidence of infectious diseases including malaria and tuberculosis which in the past

Table I. Population growth rates in selected sub-Saharan African Countries (1980–1995).

Country	Birth rate per 1000 people		Date rate per 1000 people		Average annual population growth
	1980	1995	1980	1995	1985–1990 (%)
Benin	49	43	19	15	3.0
Ghana	45	37	15	10	3.0
Madagascar	46	41	16	11	3.1
Niger	51	52	23	19	3.2
Nigeria	50	42	18	13	2.9
Senegal	46	40	20	14	2.8
Angola	50	49	23	19	3.0
Botswana	48	34	14	12	3.0
Cote d'Ivoire	51	37	16	12	3.4
Djibouti	48	46	20	16	4.8
Gambia, The	48	41	24	18	4.0

Source: Soubbotina and Sheram, (2000).

have been the major causes of death in Africa. There have been major reductions in infant mortality, thereby assuring the survival of many infants to the age of 5. Declining death rates resulting from improvements in medical health care, in the face of high birth rates, has almost resulted in a population explosion on the continent. The process of urbanisation and detribalisation and the influence of western cultural precepts on the urban populations, particularly the youth, have led to breakdowns in traditional norms on sexuality leading to increased premarital sexuality (Villarreal, 1998). The frequent teenage pregnancies in cities are a consequence of this behaviour. The situation is further worsened by strong cultural belief in the security that children provide parents in their old age and children's contribution to household income. The increase in rural populations has created pressure on land and a subsequent reduction in farmland in rural areas. Table II illustrates the status of population and land availability in sub-regions in sub-Saharan Africa in 1994. In many areas, holdings are not economical even under intensive forms of agriculture (White, 1989). Agricultural potential in many of the former homelands in South Africa has declined due to rapid growth in rural populations and subsequent reductions in farmland. Farmers in Bophuthatswana harvested 110 kg of maize

Table II. Population and land resource in sub-regions in sub-Saharan Africa (1994).

Sub-region	Total population (million people)	Total land area (million ha)	Total agricultural land (million ha)
Sudan Sahelian Burkina Faso, Chad, Mali, Cape Verde, Djibouti, Gambia, Niger, Senegal, Somalia, Sudan	81.20	744.40	282.40
Central and Western Benin, Cameroon, Congo, Central African Rep., Cote d'Ivoire, Equatorial Guinea, Gabon, Ghana, Guinea Bissau, Liberia, Nigeria, Sao Tome, Sierra Leone, Togo, Congo DR	216.00	595.50	169.40
Eastern Mountains Burundi, Comoros, Ethiopia, Kenya, Uganda, Madagascar, Mauritius, Rwanda, Seychelles,	127.60	257.10	96.80
Southern Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Swaziland, Tanzania, Zambia, Zimbabwe	90.42	571.00	247.20
Total	515.22	2168.00	795.80

Source: Food and Agricultural Organisation (1994).

and sorghum for each person in the 1940s. By the late 1950s this figure decreased to 80 kg per person, and by the late 1970s, to 50 kg (Durning, 1990). This has eroded the subsistence base and livelihoods of many rural families. A study in 1988 found that approximately 55% of the rural population of Bophuthatswana, had no agricultural land at all, whilst 37.5% had too little land to make a living (Boesema, 1988). Some African countries, including Namibia, South Africa, and Zimbabwe are saddled with colonial inheritance of inequalities in agricultural land distribution. In South Africa, 67 000 white farmers owned 86% of farmland and 12 million Africans lived on the remaining 14% in 1991 (OECD, 2003). The inadequacy of agricultural land forces people to move to cities in search of non-existing jobs. Many rural newcomers to the slums and shantytowns of cities tend to maintain their prevailing high birth rates as they take time to adjust their intimate behaviour to the constrictions of urban life, and in the process accelerate urban population growth (Black, 1994; 3).

3.2. Rural Urban Migration

The increasing rural–urban migration in Africa is due to the deteriorating livelihoods on the land and the magnet of urban jobs and economic activities which draw people, particularly the rural poor, into cities (Black, 1994). The agricultural sector dominates the economies of African countries and it is the main source of employment and income for rural populations (Table III). Fluctuating world market prices for agricultural exports affect export revenues and hence farmer's income. In 1999, the composite price index for coffee dropped by about 5% and fluctuated at around 95 cents a pound (cts/lb). In that same year cocoa prices fluctuated at around 55 cts/lb (Matthies and Timm, 1999). Also, the prices paid to farmers are far below the ruling world market prices of exports making exporters gain at the expense of farmers. In Ghana, the administered producer prices for cocoa remained at less than 50% of the world market price during the 1990s (Friis-Hansen, 2000).

Table III. Contribution of agriculture to the economies of selected sub-Saharan African countries.

Country	Employment in agriculture (%)	Contribution to export (%)	Contribution to GDP (%)
Burkina Faso	80	60	30
Ethiopia	85	80	40
Kenya	75	60	30
Tanzania	90	80	55
Uganda	80	90	50
Zimbabwe	26	40	13

Source: Food and Agriculture Organisation, (1994), World Bank, (1993).

The agricultural sector has suffered under structural adjustment programmes (SAP) imposed on African countries by the World Bank and the International Monetary Fund (IMF). Under SAP, investment in agriculture has fallen consistently over the past two decades. Agricultural expenditure in Ghana fell from 11% of public expenditure in 1981 to only 3.5% in 1987 and 6.2% in 1998 (IFAD, 1992: 181, in Baden, 1993; Ocran, 1998). The removal of subsidies on agricultural inputs such as fertiliser has increased the prices of inputs beyond the reach of many poor farmers. In Tanzania, farmer's access to fertiliser has been limited by the increase in prices following the removal of 80% of subsidies (Reed, 1996). In The Gambia, overall fertiliser use fell by over 50% between 1984 and 1987 due to higher prices (Jabara, 1990). Low soil fertility has resulted in declining crop yields and low incomes in the sector. Between 1989/90 and 1997/98, the production of four principal food crops in Tanzania (maize, paddy, wheat and cassava) experienced a negative average growth of 0.4% per annum, and this required the government to import food to supplement local production (Friisc-Hansen, 2000). 'Declining yields in agriculture forces people to encroach on forests, grasslands, and wetlands thereby creating a downward spiral of environmental degradation and poverty' (The World Summit on Sustainable Development, 2002). Trade liberalisation under SAP, has resulted in the dumping of foreign food commodities on African markets. Most of these imports are produced with subsidies at much lower cost, making them cheaper than domestically produced food items. With little or no protection for domestic food markets, their share of the market keeps falling in favour of imports, and this forces many farmers out of production. At the same time, western governments have erected trade barriers in the form of high tariffs on African exports, thereby making it difficult for African products to penetrate their markets.

Another major factor behind rural urban migration is uneven spatial development. Many African cities were planned as growth poles to stimulate economic growth in rural hinterlands. This concept of development has created uneven spatial development leading to the concentration of social and economic infrastructure and services in African cities to the neglect of rural areas. Between 1990 and 1995, only 28% of the rural population in Senegal had access to potable water, compared with 85% of the urban population (United Nations Development Programme, 1996a). In Ghana, about 32% of industrial activities are concentrated in Accra, whilst Lagos accounts for approximately 50% of the manufacturing sector in Nigeria (Laing, 1994; Global Network, 2000). The coastal urban zone in Egypt accounts for more than 40% of the Egyptian tourism industry (Economic Commission for Africa, 2001). The expectation was that, growth impulses in the cities would trickle down to rural areas in the form of agricultural raw material production and create employment for rural people.

However, the growth pole concept of African cities has not been successful. Many urban industries, with the exception of a few agro-based industries, import raw materials. Also, transport and telecommunication infrastructure between rural and urban economies remains poorly developed (Table IV), thereby making it difficult to link the two effectively. As demonstrated in Table IV, with the exception of a few countries like South Africa, Zimbabwe and Malawi, many sub-Saharan African countries do not have adequate communication infrastructure. Even in Zimbabwe and South Africa, there exist inequalities in the distribution of road infrastructure due to the colonial and former apartheid systems which discriminated against black communities in the allocation of resources. Much of the road infrastructure in rural areas are in deplorable conditions and become unmotorable during the rainy season. About a third of agricultural produce fail to reach urban markets due to poor transport infrastructure. On the other hand the concentration of job opportunities and amenities in the cities attract more people in search of a better life.

The situation in some African cities has been worsened by wars, strife and hunger, which have resulted in the internal displacements of populations and increasing the number of refugees in cities. The civil war in Sudan is estimated to have displaced 1.5–2 million people in and around Khartoum (United States Committee for Refugees, 2002). In Sierra Leone, during the decade of civil war (1991–2001), Freetown experienced a 217% increase in its population from 384 499 in 1985 to an estimated 837 000 in 2001 (Africa South of the Sahara, 2002; 926). Much of the increase in the population were rural people who had fled to the city for security and protection from rebels who were murdering innocent civilians, and forcing young men in particular, into force recruitment. The 1984 drought disaster in the Horn of Africa left about two-thirds of the population as temporary refugees in towns and cities (Hjort af Ornas, 1990; 152), many of whom failed to return to their original areas of residence after the situation had improved.

Table IV. Road and telecommunications infrastructure in selected sub-Saharan African Countries.

Country	Total land area km^2	Kilometres of road Per 1000 km^2 of land surface	Direct telephone lines per 100 people
Angola	1 246 700	60.0	0.59
Botswana	585 370	34.0	2.64
Lesotho	30 350	50.0	0.75
Malawi	94 080	118.6	0.34
Namibia	825 418	58.3	4.64
South Africa	1 219 912	107.3	11.23
Tanzania	886 040	57.14	0.34
Zambia	740 720	49.5	0.92
Zimbabwe	386 670	206.2	1.48

Source: Pan-African Productivity Association (2000, 45); CIA World Factbook (1999) (total land area in km^2).

4. Environmental sanitation in African cities

4.1. The Economic Crisis

The economic crisis which began in the 1970s in addition to rapid increase in population have had adverse impacts on urban areas, including congestion and high cost of infrastructure and services for the increasing and spatially dispersed urban populations (Economic Commission for Africa, 1996). African cities have been characterised as victims of their poor economic performance (United Nations Centre for Human Settlements 1992a). The annual average growth in per capita income between 1980 and 1991 for instance, was negative for sub-Saharan Africa and this resulted in low spending on urban infrastructure and administration (United Nations Centre for Human Settlements, 1992a). Nairobi spent approximately US$ 68 per capita on infrastructure and services in the mid-1980s, while Dar es Salaam spent US$ 5.80 in the same period (Stren et al., 1992). In addition to the above factors, the imposition of SAP on African countries by the International Monetary Fund (IMF) and the World Bank in the 1980s and 1990s has had disastrous effects on the provision of facilities, particularly health and sanitation. The removal of subsidies on urban infrastructure and services, and the introduction of user fees under the SAP mean that weak municipal authorities, which are accustomed to governments' financial support, are expected to raise revenues to finance their activities. Faced with low tax base resulting from massive unemployment, rising corruption, and financial misappropriation, municipal authorities have difficulties in raising enough funds to meet their budgets, and assure the sustainability of services. Municipalities in sub-Saharan Africa capture only a small percentage of GDP, US$ 14 per capita in revenue, and this creates a disparity between the requirements for municipal governance and available resources (Economic Commission for Africa, 2001; United Nations Centre for Human Settlements, 2001). In 1990, Dar es Salaam needed 240 trucks for refuse removal but had only 30, some of which were broken down (Mosha, 1990). The situation has led to deteriorating environmental infrastructure and rapid degradation of the urban environment.

4.2. Inadequate Water Supply

There is lack of reliable data on the proportion of urban residents in Africa living under harsh housing conditions without adequate supply of basic environmental and sanitation services. However, Demographic and Health Surveys in the 1990s show vast differences in the provision of social facilities among and within countries (Brokerhoff, 2000). The provision of environmental and sanitation facilities is often limited to only high income areas. Despite the connection between good health and water, many urban

residents in Africa do not have access to potable water (Economic Commission for Africa, 1996). Urban residents in Africa use only 50 L of water per person per day (United Nations Centre for Human Settlement, 2002). The percentage of urban residents with water connections range from 92% in Tunisia to 1% in Monrovia (Table V). Vending water accounts for over 20% of water needs of residents in some African cities (Economic Commission for Africa, 1996). Unsustainable use of water resulting from government subsidies, often exceeds the regenerative capacity of water resources and this creates water shortages in cities. The level of wasted water in urban areas has been estimated at about 50% (Economic Commission for Africa, 2001). South Africa, Swaziland, and Zimbabwe, began to encounter water deficits in the 1980s and by 2025, Lesotho, Malawi and Mozambique are expected to join the water deficit economies (Dalal-Clayton, 1997; Allan, 2002). The incidence of infectious diseases is high due to inadequacy of water, the prevalence of disease vectors (Economic Commission for Africa, 1996), and poor personal hygiene.

4.3. Growing Waste Pollution

The growth of cities has resulted in increased consumption of resources to meet the growing demands of urban populations and industry, leading to the generation of large amounts of waste in cities. Due to weak institutional policies and lack of resources both human and capital, waste management and sanitation in many African cities are in very deplorable conditions (see Table V). Between 20 and 80% of solid waste in African cities is disposed of by dumping in open spaces, water bodies, and surface drains due to inadequate infrastructure (United Nations Environment Programme, 1999). A study in Lagos found 105 illegal dumps in the city (Global Network, 2000). About 35% of the 1 800 tonnes of solid waste generated

Table V. Percentage of households with access to environmental facilities and services in selected African cities.

Country	City	Water	Sewerage	Wastewater treated (%)	Garbage collection
Cote d'Ivoire	Abidjan	62	45	58	70
Congo, DR	Kinshasa	50	3	3	0
Ethiopia	Addis Ababa	58	0	x	2
Ghana	Accra	46	12	0	60
Kenya	Nairobi	78	35	90	47
Liberia	Monrovia	1	1	0	x
Morocco	Rabat	87	95	0	90
Nigeria	Lagos	65	2	2	8
Sudan	Khartoum	52	3	45	12
Tanzania	Dar es Salaam	22	6	2	25
Tunisia	Tunis	92	73	82	61
Uganda	Kampala	30	9	27	20

Source: World Resources Institute et al. (1998, 278).

daily in Accra, is not collected for disposal and this gradually accumulates into refuse mountains in parts of the city. Dar es Salaam generates an estimated 2 000 tonnes of refuse daily, but the city's removal capacity is only 100 tonnes a day (Mosha, 1990). Indiscriminate disposal of organic waste is detrimental to health because it increases the breeding of disease carrying agents like rodents and insects. Sewerage disposal poses a major environmental and health threat in African cities. Many African cities either lack sewerage systems or operate inefficient systems serving only a small proportion of the urban population (see Table V) (Economic Commission for Africa, 1996). Even where sewers exist they are often blocked with solid waste, and overflow into streets and open spaces, which provide breeding grounds for disease pathogens. The majority of urban residents use pit latrines, bucket toilets or other sub-standard facilities. About 40% of the residents of Accra use pit latrines, 19.5% use bucket latrines, whilst 15.4% of the residents of Port Elizabeth use bucket latrines (Benneh et al., 1993; Thomas et al., 1999). In Nakuru, Kenya, 89% of the urban households use pit latrines in the low income high density areas of the city (Mwangi, 2000). It is estimated that 71% of the urban population in Senegal use pit latrines (Department of Forecasts and Statistics, 1993). Untreated human excrement and sullage are disposed of in surface drains and water bodies. In Accra, Ghana, sullage discharge into drainage channels and ditches is estimated at 280 m^3 per hectare per day in 1995 and 433 m^3 by the year 2000 (Ministry of Works and Housing, 2001; 86). In 1994, an estimated 850 million litres of untreated industrial and human wastes were discharged directly into the sea per day from coastal towns and cities in southern Africa (Southern African Research and Documentation Centre, 1994, unpublished report). Freshwater fisheries provide an estimated 14 million tonnes of fish for millions of sub-Saharan Africans annually (United Nations Environment Programme, 1999), the majority of which is consumed in cities. However, the high levels of pollution in water bodies, such as Lake Malawi/Nyasa, the Chetty River in Port Elizabeth (Thomas et al., 1999; Economic Commission for Africa, 2001), and the Korle Lagoon in Accra, have in the past resulted in fish kills, and this seriously threatens aquatic life. Pollution from the rapidly expanding cities pose major threats to an estimated 38% of the entire African coastline, and have endangered the survival of an estimated 50% of coral reefs in the western Indian Ocean marine region (United Nations Environment Programme, 1999).

5. The urban household environment

The rapid urbanisation in African cities has resulted in acute shortage of urban housing due to lack of financial resources to expand housing

facilities. The growth in the populations of the larger cities has resulted in substandard, inadequate and unreliable housing infrastructure (Economic Commission for Africa, 1996). The majority of urban dwellers in Africa live in crowded informal housing units without basic infrastructure and services to ensure good health (Economic Commission for Africa, 1996; Federal Ministry for Economic Cooperation and Development, 2000). About 30–60% of urban residents in Africa live in slums and squatter settlements (Table VI) where people rent rooms or whole units (United Nations Centre for Human Settlements, 1992b: 3, and 2001). Squatter settlements are usually built on floodplains, marshy areas and dumpsites at the peripheries of cities due to inadequate land and the inability of the poor to afford secure land tenure. The dwellings are usually constructed of discarded materials including, paper cardboards, wood, and galvanised sheets. The residents of squatter settlements live under degrading conditions without any basic sanitation infrastructure (Federal Ministry for Economic Cooperation and Development, 2000). Some African cities have more than 70% of their housing supply as rental units and often there is less than 8 m^2 floor area per person (United Nations Centre for Human Settlements, 2001). A study by Songsore and McGranahan (1993), revealed that 71% of the poorest and 34% of the wealthiest households in Accra occupied less than 4 m^2 per person in the sleeping room. In Port Elizabeth, South Africa, about 29% of households had more than two people sleeping in one bed. This situation was more common in low income groups (Thomas et al., 1999). The urban poor spend more, about 30–40% of their incomes on rent. The ratio for African cities, particularly in sub-Saharan Africa, is more than twice that of the cities in the advanced world (United Nations Centre for Human Settlements, 2001; 31).

Table VI. The proportion of households living in squatter settlements in selected African cities.

Country	City	Households living in squatter settlements (%)
Liberia	Monrovia	42.0
Uganda	Jinja	16.0
Algeria	Algiers	5.9
Cote d'Ivoire	Abidjan	15.0
Tunisia	Tunis	30.0
Tanzania	Dar es Salaam	65.0
Swaziland	Mbabane	60.0
Malawi	Blantyre	67.0
Angola	Luanda	80.0
Kenya	Nairobi	60.0

Source: UNCHS (2001); Collignon et al. (2000); World Resources Institute (1996); Banes (2000); Mwafongo (1991); Hill (1992); Mosha (1990); Matrix Development Consultants (1993).

6. Urban poverty

Poverty, food insecurity, and malnutrition in Africa until recently were viewed as largely rural problems. However, the rapid urbanisation of Africa at the beginning of the 20th century has resulted in adverse urban poverty with severe impacts on urban livelihoods (Maxwell et al., 2000) (Table VII). The United Nations Population Fund (1996), estimated that 28% of urban populations in less developed countries were living in poverty, including 41% in sub-Saharan Africa. Urban poverty in African has a broader meaning of cumulative deprivation, characterised by squalid living conditions, risks to life and health from poor sanitation, air pollution, crime and violence, natural disasters and the breakdown of traditional family and community safety networks (World Bank, 2000; 5).

6.1. Poverty and Exposure to Environmental Risks

Within African urban centres there exist intra-urban inequalities regarding access to environmental and health facilities. The urban rich have more access to facilities than the poor. According to Benneh et al. (1993), inequalities in access to toilet facilities in the Accra Metropolitan Area, Ghana, were related to household wealth. Pit latrines were common in low income households, whilst flush toilets dominated wealthy groups. In Accra, only 6% of the poorest wealth quintile had indoor piping compared with 78% of the wealthiest (Songsore and McGranahan, 1993). Low income areas in Nairobi, Kenya comprising about two-thirds of the city's population consume only 35% of the city's domestic water supply (Lamba,

Table VII. Percentage of urban populations living in absolute poverty in selected African countries.

Country	Urban Population (1995) (000)	Urban populations living in absolute poverty (percent) 1980–1990
Algeria	15 591	20
Botswana	418	30
Burundi	480	55
Chad	1362	30
Cote d'Ivoire	6211	30
Equatorial Guinea	169	60
Ghana	6333	20
Kenya	7817	10
Lesotho	473	50
Mali	2909	27
Morocco	13 071	28
Mozambique	5481	40
Nigeria	43 884	21
Tanzania	7230	10
Tunisia	5093	20
Zambia	4071	47

Source: United Nations Population Division (1995), UNDP (1994).

1994). The city's per capita consumption per day was about 90 L, but only 20 L in low income areas, compared with over 200 L in high income areas. Water consumption in the low income areas of Rufisque, Senegal, is estimated at between 10 and 30 L per person per day, and this is far below the average requirement for maintaining good health (Gaye and Diallo, 1997). The urban poor living in slums and shantytowns are more exposed to pollution and pest infestation, particularly malarial mosquitoes, flies, cockroaches and rodents. In a study by Songsore and McGranahan (1993) in Accra, the poorest households reported a high prevalence of flies (95%), cockroaches (66%) and rats (56%). Other households' risks include indoor air pollution. The major source of indoor air pollution in developing countries is household use of biomass and coal for heating and cooking in open fires or stoves without proper ventilation (WHO/EHG/97. 12, 1997; 15). In Port Elizabeth, South Africa, ventilation in the cooking places of the lowest wealth groups was considered as inadequate for 55% of households (Thomas et al., 1999).

Poverty in African cities is related to high prevalence of parasitic and infectious diseases. 'Data from Demographic and Health Surveys demonstrates that the ratio of stunting prevalence of poorer versus wealthier quintiles was greater within urban than rural areas and that intra-urban differences between socio-economic groups were greater than the rural urban differentials. In Accra, about 67% of deaths in adult resident population in the worst three areas might have been avoided had they lived in the best neighbourhoods' (United Nations Centre for Human Settlements, 2001; 55). The rate of diarrhoea among children under 3 years in the informal settlements in Nairobi is estimated at 31%, which is more than double the rate (13%) for the city as a whole (African Population and Health Research Centre, 2002). A study by Stephens (1996) on mortality differentials by age for infectious, respiratory and circulatory diseases in Accra revealed that people in the poorer socio-economic categories were at a higher risk of death for the cause and age groups (Table VIII). The study further revealed that circulatory diseases caused more deaths than infectious and respiratory diseases across all categories. A similar study in

Table VIII. Age-adjusted mortality differentials between socio-economic areas in Accra (Ghana) 1991. Mortality rates (per 10,000) and relative risks (RR).

Socio-economic area	Circulatory diseases rate (RR)	Infectious and parasitic diseases rate (RR)	Respiratory diseases rate (RR)
1(worst)	16.4 (2.3)	9.2 (2.0)	7.6 (1.9)
2	14.6 (2.1)	14.4 (3.0)	7.5 (1.9)
3	13.5 (1.9)	10.1 (2.1)	6.5 (1.6)
4 (best)	7.0 (1.0)	4.7 (1.0)	4.0 (1.0)

Source: Stephens (1996, 123).

Zimbabwe found that the prevalence of asthma in poor children in Harare is almost twice the prevalence rate among their wealthy counterparts (Keeley et al., 1991). Circulatory diseases are related to poor diet, malnutrition, lack of exercise and tobacco use. Poor diet and excess body weight can also contribute to the risk of diabetes and hypertension, which further increase the risk of these diseases.

High rates of inflation and the recent devaluation of the currencies of some African countries have had adverse effects on the urban poor. A study by Martin-Prevel et al. (2000; 111), found that the nutritional status of mothers and their children in Brazzaville (Congo) deteriorated after the devaluation of the CFA franc. The prevalence of stunting in children increased from 12.1–15.5% between 1993 and 1996. The prevalence of wasting also increased from 6.0–8.8%. Although the deterioration in nutritional status was the same for all age groups, the increase in the prevalence of stunting was not equally spread across the economic categories. While the prevalence remained stable in the richest households, it increased in the poorest households. In urban areas of South Africa, about a third of children living in poor former homelands are suffering from chronic malnutrition (World Bank, 1994).

6.2. Factors Underlying Rising Poverty

6.2.1. Lack of investment in industry

Poverty in African cities is a result of lack of investment in the industrial sector leading to the failure of industry to expand to absorb the large urban labour force. The manufacturing sector faces stiff competition from cheap imported goods, which has led to falling demand for local products, and lack of financial capital for investment in the sector. Under structural adjustment, growth in manufacturing output in Africa, has persistently fallen from 5.2% of Gross Domestic Product (GDP) in the 1980s to 3.5% in 1999 (African Development Bank, 2001, in Economic Commission for Africa, 2001; 12). In Zimbabwe, the SAP has been blamed for undermining the urban industrial base. Between 1991 and 1996, manufacturing output in Zimbabwe fell by 16% (Gunning and Oostendorp, 2002). About 56% of the firms in the textile, clothing and footwear sub-sector which was expected to be the engine of growth in Zimbabwe, under the SAP, experienced a decrease in profits between 1993/4 and 1995/6 as the full force of trade liberalisation took effect (Carmody, 2001). The industrial sector is also constrained by high lending rates and lack of collateral security to secure funds from financial institutions. A study by the Ghana National Board of Small Scale Industries (NBSSI) in 1993, found that only 0.59% out of 59.7% of urban small and medium sized firms which applied for financial loans had their applications granted. Restrictive lending policies

introduced under the banking sector reforms, and the liberalisation of interest rates have increased the cost of credit (Barwa, 1995) beyond the reach of many firms which need financial loans to expand their activities.

6.2.2. Trade liberalisation

Trade liberalisation policies adopted under structural adjustment by African governments have contributed to the failure of local businesses to absorb the urban labour force due to the inability of local firms to compete with cheap imports. The privatisation of state enterprises under SAP has led to job losses in the formal sector. It is estimated that 25% of the active population of African cities is unemployed (WHO, 2001). According to census reports, in 1994, Addis Ababa had an unemployment rate of 35% (Central Statistical Authority, 1997). In Ghana, between 1985 and 1992, employment in the formal sector declined from 464 300 to 186 300, and less than 10% of the labour force is currently in formal paid employment in the private and public sectors (Ghana Government, 1992, 1995; Ocran, 1998). The fall in employment in the public sector is due to the retrenchment of workers in the civil service and newly privatised state owned enterprises (Ocran, 1998). The reduction of employment in the private sector from 79 000 in 1987 to 31 000 in 1991, has been attributed to falling demand for locally manufactured commodities which have been displaced by cheap foreign imports as a result of trade liberalisation (Ghana Government, 1992, 1995; Ocran, 1998). Manufacturing sector liberalisation in Zimbabwe, led to a decline in employment from 205 000 in 1991 to 187 000 by mid 1995 (Central Statistics Office, 1996). About 91% of new entrants into the urban informal sector in Zimbabwe were retrenched (Mhone, 1995).

6.2.3. Lack of education and training

Lack of education and training limit the ability of many urban residents to find employment in the formal sector. The modern globalisation process involves diversification and specialisation in the service industry, such as computing, banking, tourism, finance and insurance, which require highly educated and skilled labour. As African cities gain their places in the globalisation process, the service industry is expected to expand and absorb the excess labour force. However, lack of expertise for the sector serves as a disincentive for investment in the service industry. The changing socio-economic development in Africa has not been matched by the necessary revision of the education system which counts only few numbers of students enrolled in science, computing and engineering (OECD, 2003). Lack of investment in education and limited infrastructure makes it difficult for educational institutions to absorb the increasing number of applicants, particularly into tertiary institutions. In 1992, Senegal invested only 4.2% of

its GDP in education (Enda-Syspro, 1997). Secondary education enrolment index in urban areas of Senegal is estimated at only 19.7% (Enda-Syspro, 1997). Low wages and lack of incentives for research often force qualified teaching staff to leave for developed nations with better salaries and working conditions. Sixty thousand African professionals, including doctors, university lecturers and engineers left the continent between 1985 and 1990 (Barka, 2000). Educators are leaving South Africa in large numbers, with about 4 000 migrating to Britain between 1994 and 2001 (*Mail & Guardian*, 2001). This has created a brain drain in the educational sector and inadequate teaching staff needed to train people to participate in the development of cities. According to the deputy Minister for Higher Education, Ethiopian universities currently need over 600 teaching staff (www.afrol.-com/articles/10454). In Mauritius, the labour market faces an increasing skills inadequacy and a consequent rise in unemployment despite sustained economic growth, as the country evolves from a low technology economy towards a service economy (OECD, 2003). In urban areas of Kenya, 42.1% of illiterate residents are unemployed, compared with 64.8% of those with secondary or higher education employed in the service sector (Odhiambo and Manda, 2003).

7. The informal sector

The majority of urban residents in Africa are employed in the informal sector (Table IX) where wages are at the barest minimum and insufficient to push households out of adverse poverty. The sector employs between 20 and 80% of the urban population in some African cities. The informal sector comprises small enterprises with low capital base, low productivity, lack of employment protection, poor working conditions, limited access to training, and long working hours (Ocran, 1998; Federal Ministry for Economic Cooperation and Development, 2000). Informal activities usually comprise single person trading enterprises employing less than three people. By the late 1980s, the informal sector accounted for 40–80% of the share of public

Table IX. Percentage of urban populations employed in the informal sector in selected African cities.

Country	City	Informal employment (%)
Mali	Bamako	83
Nigeria	Lagos	70
Cote d'Ivoire	Abidjan	65
Burkina Faso	Ouagadougou	60
Niger	Niamey	51
Ghana	Accra	57
Sudan	Khartoum	15
Chad	N'Djamena	38

Source: Hall and Pfeiffer (2000); World Bank (2000); Montgomery et al. (2003), Benneh et al. (1993); Global Network (2000).

transport in most capital cities in sub-Saharan Africa (Mosha, 2001). It is estimated that the sector absorbs about 80% of the annual increase in the urban labour force in Ghana, 84% of urban employment in Uganda, and it is dominated mainly by women (Barwa, 1995; The Johns Hopkins University, 2002; Global Network, 2000). In Zimbabwe, about 57% of the workers in the urban informal sector are women (Mhone, 1995). The sector employs 66% of women in Dar es Salaam (Tripp, 1990). Despite the contribution of the informal sector to reducing urban unemployment, informal activities in many African cities are seen as a nuisance and considered illegal. City authorities often erect barriers, including seizure of wares, fines and imprisonment to deter informal activities.

8. Diseases and health risks in African Cities

8.1. Urbanisation Without Development

Industrialisation, economic development and improvements in health accompanied urbanisation in the west. Urbanisation in Africa has however not led to any meaningful development and urban residents are afflicted by poverty, preventable and newly emerging diseases. Urban residents in Africa are exposed to the double burden of disease. The first burden is related to lack of development, including lack of safe water, inadequate sanitation, malnutrition and vector borne diseases such as malaria (Brokerhoff, 2000). The second burden involves afflictions from newly modernising societies resulting from lifestyles, such as cancer and obesity, and inadequate environmental safeguards, including air pollution, exposure to toxins and waste, and road accidents (Bradley et al., 1991; World Bank, 2001a). A third dimension of emerging diseases include mental health and psychiatric disorders associated with poor living conditions, overcrowding, and increasing socio-cultural changes in urban areas (Brokerhoff, 2000).

8.2. Waterborne Diseases

Inadequate provision of safe drinking water, in addition to poor sanitation culminate in widespread infectious water borne diseases which afflict millions of urban residents. The proportion of urban residents in Africa having access to water supply is 85% compared with 100% in the industrialised world (WHO and UNICEF, 2000; 32). The major water borne diseases in African cities include diarrhoea, dysentery (United Nations Environment Programme, 1999) and malaria. Malaria presents a number of challenges in urban environments in sub-Saharan Africa. Many studies indicate that formal urban development reduces the density of mosquitoes, but the rapid

development of slums and shantytowns in sub-Saharan African cities simply changes the vector species composition and adaptation to the urban environment (Feachem and Jamison, 1991; Warren et al., 1999). Certain characteristics of the urbanisation trend in Africa such as sprawling urban suburbs and densely populated slums are associated with swamps and other stagnant water bodies that provide breeding sites for water borne diseases, particularly malaria (Warren et al., 1999; 5). More than 50% of the residents of Lagos are infected with malaria annually (Global Network, 2000). Between 1987 and 1990, malaria accounted for more than 40% of all illnesses reported at out-patient facilities in Accra (Benneh et al., 1993). According to Tavengwa (1995), malaria causes 1.5 million deaths in Africa annually.

8.3. Location of Industrial Activities

The location of industrial activities in cities constitutes a major source of environmental pollution (United Nations Environment Programme, 1999) which creates a conducive atmosphere for pests and parasites. About 126 factories in Maputo, Mozambique, discharge their waste directly into the environment (Couto, 1995). Textiles factories are also reported to discharge highly polluting waste, including dyes, bleaching agents, alkalis and starch directly into water bodies in Dar es Salaam in Tanzania (Bwathondi et al., 1991). In Accra, over 80% of industrial activities are located in the catchment of the Odaw River and Korle Lagoon discharging highly polluting industrial waste into the water bodies (Laing, 1994). The effect of industrial activities on surface and underground waters is immense. Polluted water bodies in cities have become breeding grounds for pests and parasites. In 1994, 61 960 cases of cholera were recorded which resulted in 4 389 deaths in Angola, the Democratic Republic of Congo, Malawi, Mozambique and Tanzania (WHO, 1995a). In that same year 171 000 cases of dysentery were recorded with at least 600 deaths reported in Malawi, Mozambique and Zimbabwe (Holloway, 1995, unpublished information). In Accra, infectious diseases mainly diarrhoea, malaria and measles accounted for 18% of all deaths (Stephens et al., 1994; 14). Despite these problems, most African states have few or no specific regulations on industrial activities. Much of the industrial activities are micro small-scale industries usually operating at the household level thereby making it highly impossible for authorities to monitor their activities.

8.4. Newly Emerging Diseases

Cities in Africa are the worst affected by newly emerging diseases such as HIV/AIDS. In sub-Saharan Africa, where the death toll from AIDS is the highest, the rate of infection of HIV is much higher in cities (United Nations,

1994). In Kenya for instance, "it is estimated that 1.4 million people or one of every eight adults are HIV positive, HIV prevalence rate ranges from 5–10% in rural areas and 20–30% in urban areas," (Pathfinder, 2001, unpublished). The prevalence of single men in urban migration in sub-Saharan Africa is a factor accounting for the widespread prostitution and multiple sex partners in cities, which are the greatest risk factors in the spread of HIV/AIDS (Chirwa 1997; Brokerhoff, 2000). In Dar es Salaam, Tanzania, HIV/AIDS is the primary cause of deaths of urban males, while HIV/AIDS and maternal mortality are the primary killers of urban women (United Nations Centre for Human Settlements, 2001). In Zimbabwe, life expectancy has fallen from 65 years to below 40 years due to the AIDS epidemic (Clarke, 1993). "By 2005, AIDS treatment costs are expected to account for more than a third of all government health spending in Ethiopia, more than half in Kenya and nearly two-thirds in Zimbabwe" (United Nations Centre for Human Settlements, 2001; 55).

8.6. Respiratory Diseases

Respiratory diseases have become major health burdens particularly on the urban poor in African cities. "Risk factors include toxic emissions and suspended particulate matter and lifestyle habits such as smoking, alcohol consumption, high fat/low calorie intake and too little exercise," (United Nations Centre for Human Settlements, 2001; 55). The major sources of urban air pollution in Africa are vehicular emissions, manufacturing and industry. The industrial sources include thermal power stations, steel works, fertiliser plants and pulp and paper mills (United Nations Environment Programme, 1999). According to the World Bank (1992), thermal emissions would increase elevenfold in 2003 in order to meet the increase in urban demand for electricity with the current low technologies in Africa. Indoor air pollution resulting from the use of biomass as cooking fuel contributes to the high incidence of respiratory diseases due to the exposure to pollutants in a confined space. In sub-Saharan Africa, biomass use is expected to provide nearly 80% of the total energy use in 2010 (United Nations Environment Programme, 1999). Exposure to indoor pollutants is highest for women and children, who often spend many hours indoors cooking over open fires (World Resources Institute, 1996). Urban residents in Africa using charcoal and firewood as cooking fuel are often exposed to carbon monoxide (CO) concentrations above the UNEP–WHO guideline of 25 ppm for 1 h of exposure (Benneh et al., 1993; 65–67). Poorer households are the most at risk of exposure to pollutants from cooking fuel. In sub-Saharan Africa indoor air pollution is predicted to cause major premature deaths in the next two decades (World Bank, 2001a).

8.7. Vehicular Emissions and Accidents

Motor vehicles have become a major environmental threat to urban residents (Brokerhoff, 2000). It is estimated that 885 000 people die per year through traffic accidents (WHO, 1995b; 35). In Africa, fatality rates from accidents exceed 100 per 10 000 registered vehicles compared with only about 4 in Western Europe. In Kenya for instance, 40% of road accidents occur in cities (World Resources Institute, 1996). Pedestrians account for about half of deaths and disabilities from traffic accidents in African cities. Sixty two percent of children who die in vehicular accidents in Cape Town are pedestrians (Marais and Prinsloo, 2001). The explanation for this is high congestion, old rickety vehicles and inadequate road safety standards in African cities. Vehicular emissions cause air pollution which has become a major cause of respiratory diseases in African cities. The high levels of air pollution in some of the big cities have serious impacts on human health (Brokerhoff, 2000). The use of leaded fuel in vehicles is a major problem of air pollution. The region's old vehicles most of which are over 15 years old, exacerbate the problem of leaded pollution (United Nations Environment Programme, 1999). These old rickety vehicles emit five times more hydrocarbons and carbon monoxide, and four times more nitrogen oxides than new vehicles (World Bank, 1995). In Cairo, ambient lead levels of 1.5 μg per cubic metre are common (World Resources Institute, 1996). The World Bank (1992) estimated that vehicular emissions would increase fivefold by 2003 in order to meet the increasing demand for urban transport in Africa. Urban residents in Africa are exposed to respiratory diseases such as asthma, bronchitis and emphysema due to industrial emissions and vehicle exhaust fumes (Economic Commission for Africa, 1996). In Accra for instance, upper respiratory tract infections were among the major diseases reported at out-patient facilities (Songsore and McGranahan, 1993).

8.8. Occupational Health Hazards

Occupational health hazards contribute to the health burdens of urban dwellers. 'These hazards include contact with a wide range of toxic substances and communicable diseases, unsafe machinery, high noise levels, inadequate lighting or ventilation, and high levels of heat or cold' (World Resources Institute, 1996). Occupational hazards are often worsened by inadequate protective clothing or equipment, lack of sick pay or compensation for work place injuries and inadequate occupational health services (Hardoy et al., 1992; Choon-Nam et al., 1993). Many people work under very unsafe and exploitative conditions and yet they cannot complain for reasons of job security and fear of dismissal (Choon-Nam et al., 1993). Less than 25% of the workforce in Africa have access to occupational health care and often appropriate occupational

health measures are not adhered to (Choon-Nam et al., 1993; World Resources Institute, 1996). Health hazards in the workplace may be worsened by malnutrition and other chronic diseases affecting workers which may lower resistance to toxic or infectious disease encountered at work (Choon-Nam et al., 1993; 116–117). There is evidence that low intake and deficiency of certain micronutrients such as calcium, iron and zinc, predispose individuals to toxicity from nonessential metals such as lead, cadmium, and mercury (Goyer, 1995; Pereza et al., 1998). The demand for over time hours by employers, usually accepted by workers due to financial reasons can play a part in increasing exposures to chemical toxins or increasing accident rates due to fatigue (Choon-Nam et al., 1993; 116–117).

9. The vulnerability of women and children

9.1. The Plight of Women

Women in urban Africa are more exposed to pressures that contribute to conditions of poverty. Women are faced with certain social constraints including lack of education and their reproductive and household roles that limit their ability to secure wage employment. A meeting of African housing and urban ministers observed a recent trend of 'feminisation of poverty' in African cities (Harsch, 2001). The increasing migration of young women into a largely stagnant labour market has aggravated the incidence of poverty among women in African cities. A study by Levin et al. (1999), found that female headed households account for 40% of households in the lowest income quintile and only 23% of the households in the highest income quintile in Accra. In urban areas of South Africa, female headed households account for 15% of the poorest 20% of households, compared with only 5% of male headed households (Maharaj, 1999). Studies indicate that 21.6% of women in urban areas in Senegal, and 38.1% in urban areas in Kenya are unemployed (Department of Forecasts and Statistics, 1993; Republic of Kenya, 2002). High unemployment and poverty among females often force women to engage in illegal activities, such as prostitution, which expose them to the dangers of infectious diseases. In Accra, a study in 1995 indicates that 33.3% of young female migrants were involved in the sex trade (Anarfi and Antwi, 1995). The study found that some of these prostitutes changed from petty trading into commercial sex when their wares were seized by law enforcement officers charged with the responsibility of ridding the streets of Accra of peddlers. A report by the UNAIDS (1999), has revealed high prevalence of HIV infection among female sex workers in African cities–Kisimu, Kenya (75%), Yaounde, Cameroun (33%), Ndola, Zambia (68%), Cotonou, Benin (57%).

The conditions of social exclusion, poverty, and limited opportunities to participate in decent wage employment, combine to perpetuate an oppressive system that makes women more vulnerable to urban violence than their male counterparts. In South African cities, it is estimated that a woman is raped in every 35 s, or killed by her partner in every 6 days (Maharaj, 1999). Recent studies in Tanzania and Kenya found that 45% of women in Dar es Salaam have been sexually abused at some point in their lives, whilst 41% of women in Nairobi have sustained physical beatings (Robertshaw et al., 2000; Ravestijn, 2002). The studies also indicate that much of the abuse had occurred in the home and often perpetrated by known relations including spouses and partners. Women are also more affected by environmental hazards and ill-health due to their practical duties of ensuring household water supply and sanitation and caring for the sick. A study of three cities in Benin found that high diarrhoea disease rates among children under five years cause mothers to lose 7 to 10 working days per month (Yacoob and Kelly, 1999). Women are responsible for household meals and often spend long hours in smoky kitchens which expose them to high levels of indoor air pollution. Women's practical duty of household management exerts pressure on their physical wellbeing and this can weaken their physical defence systems, which coupled with malnutrition expose them to the dangers of the environment.

9.2. High Childhood Morbidity and Mortality Rates

Poor housing, inadequate access to potable water, and lack of sanitation facilities are correlated with childhood morbidity and mortality in urban Africa. This situation threatens to offset recent achievements in medical health care and the relative improvements in infant health. Infant mortality rates in African cities remain high at 12.6% for girls and 15.3% for boys (United Nations Centre for Human Settlement, 2001). A recent study found that one in every 20 children in Lagos die before the age of 5 (Global Network, 2000). Studies in some African cities indicate that the wider social and physical environment in which the household is located influences the health of urban children (United Nations Centre for Human Settlement, 2001; 55). In Accra, there is a high prevalence of under six childhood diarrhoea among households with inadequate access to sanitary toilet facilities (Table X), (Benneh et al., 1993). Children are more exposed to a number of infectious pests and parasites and toxins, especially during play and at meals (World Resources Institute, 1996). The presence of children in the kitchen during food preparation can have serious impacts on their health. Indoor air pollution can damage children's lung tissues and predispose them to viral and bacterial infections (World Resources Institute, 1996). Children who live in households with damp conditions in urban areas of South Africa are more exposed to respiratory problems (Thomas et al., 1999). A study in Zimbabwe

Table X. Type of toilet facility and prevalence of diarrhoea in children under 6 years in Accra (%).

Type of toilet	Number of households with children < 6 yrs	Prevalence of diarrhoea(%)
Flush toilet	164	6.7
Pit latrine	175	15.4
Ventilated improved pit latrine	66	21.2
Pan latrine	113	16.0
No toilet	17	11.8
Total	535	14.0

Source: Benneh et al. (1993, 29).

in 1991 showed asthma prevalence of 5.9% in black children aged 6–9 in Harare (Keeley et al., 1991). Children are also exposed to lead pollution during early childhood development and this can cause long-term impairments of the neural system (Goyer, 1995; Pereza et al., 1998). In Johannesburg and Cape Town, 80–100% of first grade school children have unacceptably high blood lead levels (Urban Health and Development Bulletin, 2001). Urban children are affected by injuries and accidents than their rural counterparts. Between 1999 and 2000, motor and vehicular accidents accounted for two-thirds of fatal accidents among children in Cape Town (Marais and Prinsloo, 2001) (Figure 1). The causative factors include lack of proper parental care resulting from long hours of work by parents, homelessness and high juvenile delinquency in cities.

10. Finding solutions to urban problems in Africa

The factors accounting for environmental and health problems in African cities are multi-dimensional, ranging from rapid population growth, poor

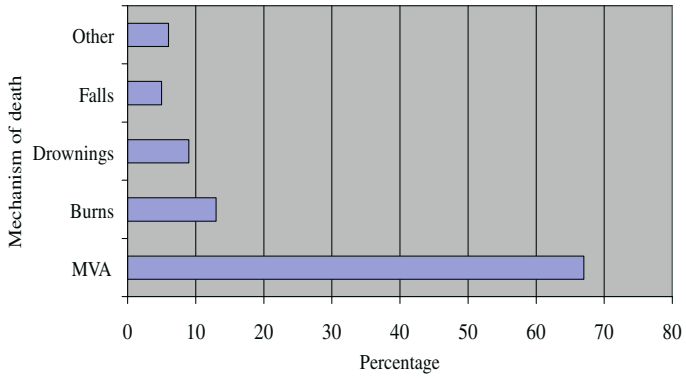

Figure 1. Causes of death among children in Cape Town. *MVA (motor and vehicular accidents). Source: Marais and Prinsloo, 2001.

agricultural performance, to poverty, external debt burdens and ineffective socio-economic development policies. Any meaningful attempts at finding solutions to the problems must take account of these cross-dimensional issues as well as democratisation.

10.1. Curbing Urbanisation

10.1.1. Redressing the population problem

Population control measures aimed at reducing both urban and rural populations are necessary in curbing urban problems in Africa. Population control must involve all stakeholders (national ministries of health, national population councils, non-governmental organisations (NGOs), community leaders and donors) in co-ordination to promote policy reforms, improve distribution of family planning commodities, and encourage private sector participation in providing family planning services. Other measures include training of population control personnel, facility rehabilitation, and commodity supply in both public and private sectors to increase access to and use of modern contraceptive methods. Family planning programmes include improving the health of women and children by preventing maternal and infant mortality, and reducing the number of child bearing. In rural areas where health facilities are sometimes non-existent, traditional health attendants including herbalists and traditional birth attendants (TBAs) play crucial roles in health provision, and their role in population control could be strengthened through education on basic hygiene practices to prevent infections and deaths among mothers and infants. Population control measures also include education on the benefits of a small family size in the face of growing economic hardships and pressures on the environment. Governments should also enact policies that promote women's status to enable them to participate fully in the development process. Measures for gender development must focus on providing secure economic opportunities for women by educating the girl child, addressing and incorporating gender issues into the policy making process, as well as providing women with income-generating activities as alternatives to child bearing. The establishment of a social security system that caters for the aged will reduce the incentive for having many children in the long term.

10.1.2. Rural agricultural development

Improving agricultural productivity to create employment for rural populations will reduce migration into cities. Development policies at the national and local levels should aim at promoting agriculture based on the inextricable linkages between agriculture and rural economic development. Measures to improve agriculture include the provision of subsidised

agricultural inputs, and guaranteed prices for agricultural products to ensure stable incomes for farmers. Also, credit facilities should be made available to poor farmers in addition to helping farmers to form co-operative organisations to mobilise savings for investment in agriculture. Policy measures in the agricultural sector should also aim at promoting sustainable agricultural practices that maintain the natural resource base. These measures include land tenure reforms that give secure property rights to farmers to provide an incentive for resource conservation. Agricultural extension institutions should train rural farmers to acquire basic skills in sustainable agriculture using minimum levels of external inputs and emphasising the use of safe nutrients such as compost. The negative impacts of trade liberalisation on agriculture should be redressed through tariffs on foreign food imports to make them competitive with local products. Governments should also enact measures that encourage value adding in the agricultural sector to ensure a large market for the sector through increased local consumption and exports.

10.1.3. Rural social and economic development

Rural development policies should promote the growth of secondary urban centres which could serve as intermediate points of interaction with rural economies by promoting small-scale agro-based industries and markets for agricultural products (Mosha, 2001). Industries should be provided with low tax incentives to locate in rural communities to create job opportunities for rural populations. Governments should extend amenities such as electricity, preventive health care, educational facilities, and transport and communication infrastructure to rural communities to make rural areas more attractive. The provision of affordable electricity will serve as an incentive for agro-based industries to locate close to their sources of raw materials to reduce their cost of production. The existence of an effective transport system will enable rural farmers to transport their products with ease to urban markets. Providing good educational infrastructure and personnel, and preventable health care facilities such as, potable water, and sanitation, for rural communities will further strengthen the socio-economic status of rural areas by reducing the incidence of illiteracy and diseases, and also help to reduce the attractiveness of cities to rural populations.

10.2. Improving Urban Environmental Health and Sanitation

10.2.1. Provision of affordable housing infrastructure

Most of the environmental burdens in African cities result from lack of affordable housing for the poor which leads to the development of slum and squatter settlements. These settlements are often built on illegal and marginal

lands without any means of accessibility, which makes it difficult to extend facilities and services to these areas. Strategic policies for avoiding slum development, include improving access to land through land reform policies, and providing financial assistance for the poor to acquire and own land. Granting security of tenure rights typically motivates occupants to invest in infrastructure improvements (The Johns Hopkins University, 2002). Reforming housing finance systems can also give the poor more access to credit (World Bank, 2001b) to enable them meet their needs of adequate shelter. The provision of basic affordable housing will reduce crowding and septic conditions which expose children to infections and diseases.

10.2.2. Slum upgrading

Infrastructural upgrading to improve community live-ability has positive implications for urban form, for the material basis of urban life, and also for community social relationships that must be expressed as practical measures in planning (Rees, 1991; 17). Slum upgrading requires the introduction of physical, social, economic, organisational, and environmental improvements (The Johns Hopkins University, 2002). This includes improved water supply, sanitation, waste management, and preventive health care services in slum areas (Hardoy et al., 1992). Adequate safe water and sanitation are essential for improving children's health. Improving accessibility to slums through the provision of road infrastructure will enhance the extension of facilities and services to deprived areas. Upgrading policies must take cognisance of the need for a change in the supply driven approach to facility provision, which in most cases has favoured meeting the needs of the affluent and neglecting the poor. Attention should focus on demand oriented approaches to meeting the needs of consumers, by providing adequate facilities needed by the people, and requiring users to pay for the full cost of the facilities in order to enhance the efficient and sustainable use of facilities and services. This involves consultation with the people affected by environmental problems, and requires that people participate in the provision and maintenance of facilities. Participation can help build long-term capacity and enhance the ability of local people in managing and negotiating development projects (Mwangi, 2000).

10.2.3. Waste recycling

Recycling mountains of waste into useful resources will create jobs for recyclers, whilst at the same time improving the environment, by reducing indiscriminate disposal, the amount of waste to be disposed of in landfills, and depletion of resources. Metals such as aluminium can be recovered and sold to small-scale recyclers to produce valuable items such as lamps and cooking utensils to compete with imports. About 70% of solid waste generated in Africa is organic matter which could be composted for

the benefit of urban residents. Compost can be used as organic fertiliser for urban farming and help to reduce reliance on inorganic fertilisers. Urban agriculture is an important source of food and employment in Africa. According to the United Nations Development Programme (1996b), 80% of families in Libreville (Congo), 68% of urban dwellers in six Tanzanian cities, 45% in Lusaka (Zambia), 37% in Maputo (Mozambique), 36% in Ouagadougou (Burkina Faso), and 35% in Yaounde (Cameroon), are involved in urban agriculture. Urban agriculture provides about 90% of Accra's vegetable needs. In Africa, waste recycling is usually undertaken by informal recyclers and it is essential to fully integrate them into the waste management stream in order to realise the benefits of their contributions to environmental management in cities. Informal recyclers can be mobilised into co-operative organisations to pull resources together for investment, and also provided with training, protective clothing and equipment, to reduce accidents, infections and deaths.

10.2.4. Environmental and health awareness campaigns

Environmental awareness for sustainability should be aimed at creating an environmentally responsible population that contributes to sustainable development (Kassas, 2002). This includes information and education on sustainable use of resources to reduce pressure on the natural environment. Existing attitudes that need to be reinforced include recycling of wastes such as glass, metals and plastics, in order to reduce the amount of waste to be disposed of in landfills. Environmental health awareness programmes should create awareness on the links between poor sanitation and hygiene, and physical wellbeing. People tend to change when they understand the nature of change, and view it as beneficial, so that they make an informed and conscious choice to include it in their list of priorities (UNEP, 2000).

The barriers and taboos surrounding sex in Africa should be removed through sex education and awareness. Condom use must be promoted as a safe method of sexual intercourse to make it more attractive and acceptable in preventing unwanted pregnancies and the incidence of sexually transmitted diseases, particularly, HIV/AIDS infections. Urban residents should be made aware of the links between burning solid fuels and respiratory health to enable them to take decisive actions about shifting to cleaner energy sources. Health awareness programmes also include proper dietary, and physical fitness, to prevent the incidence of obesity and circulatory diseases. Parents should be encouraged to immunise their children against childhood killer diseases to reduce infant morbidity and mortality. Child health care also includes basic child hygiene and proper feeding to enhance children's physiological resistance against diseases.

10.2.5. Curbing industrial emissions

Environmental protection agencies should be equipped with financial and human resources to effectively manage and implement environmental policies to curtail industrial and chemical discharges into the urban environment. Environmental policies can take the form of command and control, economic incentives, or both. Economic policy instruments and programmes, such as pollution charges and environmental taxes, are useful tools that can be harnessed to protect the environment. If polluters can be made responsible for their actions, it will help to check indiscriminate discharge of effluents into the environment. Environmental agencies should also be able to undertake periodic surveys of industrial waste to provide comprehensive and reliable information on the amount and nature of the different types of waste produced, in order to find suitable approaches of treating or disposing such wastes. Informed environmental analysis based on adequate data can help improve policy making in urban environmental management (Bartone and Leitman, 1994).

10.2.6. Reducing vehicular emissions and accidents

Taxes on leaded fuel to make it more expensive, can help to switch demand to unleaded fuel in the long term, and reduce vehicular emissions into the atmosphere. Another means to reduce vehicular emissions is to introduce effective mass public transport systems to reduce reliance on private vehicles. There is the need for an effective policing system to check reckless driving in order to reduce vehicular accidents and fatalities. Strategies to ensure efficiency in policing include better wages and incentives, and appropriate sanctions to prevent the police from taking bribes from traffic offenders, to ensure that culprits are brought to justice.

10.2.7. Improving safety at work places

Poor people work under deplorable and exploitative conditions which increase the risk of accidents and infections. City authorities should enact effective policies that ensure the provision of adequate protection and safety at work places. Safety at work place includes, proper ventilation and lighting, and the use of adequate protective clothing and equipment. Employers who fail to adhere to safety standards at work places should be adequately punished through fines and possible imprisonment to serve as a deterrent. Governments must set minimum wage levels that ensure that the poor earn enough income to meet their basic needs in order to reduce overtime hours that expose poor workers to excessive fatigue and accidents.

10.3. Urban Poverty Alleviation

Poverty remains the primary cause of many environmental and health problems in African cities. Even where environmental facilities are available, many poor urban residents can not afford them due to the income elasticity of such facilities. Poverty alleviation therefore remains an important factor in solving environmental problems in African cities.

10.3.1. Creating job opportunities

Local governments must make efforts to create employment for urban residents by enacting the necessary policy measures to attract foreign direct investments. These include institutional policies that assure the safety of investments, creating free trade zones and removing bureaucratic bottlenecks to attract investors.

City authorities should also encourage local investment through soft loans to small-scale businesses to expand their activities to create employment, and encourage local entrepreneurs to form co-operative organisations to mobilise funds for investment. The negative impacts of SAP on industrial productivity should be redressed through the imposition of tariffs on foreign imports to make them competitive with domestic products, to enable local industries to make profits for investment, and expansion of their activities. Restrictions on the informal sector should be reduced to enable low income groups to have more opportunity to earn income (The Johns Hopkins University, 2002) to enable them afford adequate shelter, sanitation and health. If women can earn decent income in the informal sector, they will be able to afford environmental health facilities and also disengage themselves from dangerous activities, such as prostitution, which exposes them to infectious and life threatening diseases.

10.3.2. Education and training

Education enhances the productivity of the worker and the opportunities for wage employment. Local educational capacity should be upgraded through the provision of adequate resources to support research and large intake of students. Education and training measures should pay attention to the use of information and communication technologies that offer the potential for creating jobs in the emerging service sector. Conditions of service should be improved through incentives to attract qualified personnel into the educational sector to train people to partake in the development of Africa. Non-formal education through on-the-job training can be effective in complementing existing skills and integrating marginal groups, including women, the unemployed youth and refugees into the economies of cities to enhance popular participation in sustainable development programmes.

10.4. International Development Aid

Addressing urban problems in Africa calls not only for action at the national and continental levels, but also international development aid. At the international level, development aid measures for alleviating Africa's urban problems should include stabilisation of export commodity prices, technology transfer, and an end to structural adjustment programmes imposed on African countries. Since Western imposed development policies have proved ineffective, Africans must be allowed a free hand in choosing their own alternative development strategies that are adaptive to prevailing socio-economic and political environments.

Foreign aid and development policies should give priority to the use of local resources, developing local technical expertise, and debt relief to enable African governments to channel limited resources into development projects and poverty alleviation. Western nations should also remove protectionist barriers to their markets for African exports to enable Africans to earn the much needed foreign exchange for financing development projects. However, it should be emphasised that not until corruption is drastically minimised in Africa, both at the state and local levels, resources will continue to be mismanaged. International aid policies should encourage a new wave of political thinking that gives priority to the collective good of society rather than individual self-enhancement of political leaders. This can be achieved through the isolation by international donors, of African countries noted for high rates of corruption at the leadership level.

10.5. Democratisation

Effective urban development in Africa requires the active involvement of all sectors of society including municipal authorities, local governments, community leaders, NGOs, and firms in the decision making process. Participation can take the form of urban rehabilitation projects, land use and development, municipal budget and investment planning (Federal Ministry for Economic Cooperation and Development, 2000). There is the need for local urban level administrative and spatial restructuring aimed at strengthening local initiatives and promoting grassroots responses to change (Rakodi, 1997). Involving all affected parties through their common concern on urban issues can promote solidarity in mobilising untapped local technical and financial resources to sustain development programmes. Citizen participation in decision-making and programme implementation is useful for the introduction of democracy which allows for new forms of co-operation between municipalities through central governments (Federal Ministry for Economic Cooperation and Development, 2000).

11. Conclusions

The rapid urbanisation of African cities has brought with it a wave of unprecedented problems. Rapid urbanisation has become a hindrance to sustainable urban development due to the large number of people competing for limited urban resources, pressure on facilities and environmental pollution. Weak institutional capacities and lack of human and capital resources facing countries limits their capacity to provide infrastructure to meet the growth in urban population. African cities face high unemployment, poverty, crime, prostitution and the upsurge of diseases of poverty. Infectious diseases associated with sanitation and water inadequacy, and air pollution have become the major causes of death in urban centres.

Effective solutions to environmental and health conditions in African cities would require competent municipal governance and planning to ensure that sectoral polices lead to a balance between socio-economic development and environmental goals. These include local participation in decision-making, effective urban land planning and management, the provision of affordable housing, sanitation and health infrastructure, and poverty alleviation to enable the poor to afford basic services. Cities play an immense role in the socio-economic development of Africa. They are the major markets for agricultural produce, and also provide opportunities for exchange and interactions in the face of globalisation. African cities are important arenas for modernisation and provide engines of economic growth and development. It is therefore evident that the effective development of cities will provide an impetus for the socio-economic development of the African continent.

References

African Population Research and Health Centre: 2002, *Population and Health Dynamics in Nairobi's Informal Settlements*, Nairobi, African Population Research and Health Centre.

Africa South of the Sahara: 2002, *Africa South of the Sahara 2003, 32nd edn*, London, Europa Publications.

Allan, T.: 2002, Water resources in semi-arid regions: real deficits and economically invisible and politically silent solutions, in A. Turton and R. Henwood (eds.), *Hydropolitics in the Developing World: A Southern African Perspective*, Pretoria, The Africa Water Issues Research Unit, University of Pretoria.

Anarfi, J.K. and Antwi, P.: 1995, Street youth in Accra city: sexual networking in a high-risk environment and its implications for the spread of HIV/AIDS, *Health Transition Review*, 5 (Suppl.) 131–151.

Baden, S.: 1993, Gender and Structural Adjustment in sub-Saharan Africa, Report commissioned by the Commission for the European Communities, Institute of Development Studies, University of Sussex.

Banes, C.: 2000, How Swaziland Is Upgrading Its Slums, Paper presented at the Africa Roundtable on Upgrading Urban Settlements, Johannesburg, October 2000. Reviewed by Lindiwe Modonsela, Manager of the Swaziland Urban Development Project.

Barka, L.B.: 2000, Statement at the Regional Conference on Brain Drain and Capacity Building in Africa, 22–24 February, Addis Ababa.

Bartone, C. and Leitman, J.: 1994, Towards environmental strategies for cities, *Urban Infrastructure Notes*. Urban No. UE-11, Washington, DC, World Bank.

Barwa, S.D.: 1995, *Structural Adjustment Programmes and the Urban Informal Sector in Ghana*, Discussion Paper 3, Geneva, International Labour Office.

Benneh, G., Songsore, J., Nabila, J.S., Amuzu, A.T., Tutu, K.A., Yangyuoru, Y. and McGranahan, G.: 1993, *Environmental Problems and the Urban Household in the Greater Accra Metropolitan Area (GAMA) – Ghana*, Stockholm, Stockholm Environment Institute.

Black, M.: 1994, Mega-slums the Coming Sanitary Crisis, A WaterAid Report, London, WaterAid.

Boesema, N.: 1988, Making the Right Move: Migration Decision Making in a Rural Community, in H.P. Steyn and M. Boesema (eds.), *Making a Move: Perspectives on Black Migration Decision Making and Its Context*, Pretoria, Human Sciences Research Council, pp. 113–114.

Bradley, D., Stephens, C., Harpham, T. and Cairncross, S.: 1991, *A Review of Environmental Health Impacts in Developing countries*, Urban Management Programme Discussion Paper 6. Washington, DC, World Bank.

Brokerhoff, M.P.: 2000, An urbanising world, *Population Bulletin,* **55** (3 September), 2000.

Bwathondi, P.O.S., Nkotagu, S.S. and Mkuula, S.: 1991, *Pollution of the Msimbazi Valley*, Dar es Salaam, Tanzania, National Environmental Management Council.

Carmody, P.: 2001, *Tearing the Social Fabric: Neoliberalism, Deindustrialisation and the Crisis of Governance in Zimbabwe*, Portsmouth, NH, Heinemann.

Central Intelligence Agency.: 1999, CIA World Factbook, CIA.

Central Statistical Authority.: 1997, *The 1994 Population and Housing Census of Ethiopia: Results for Addis Ababa*, Abridged Statistical Report, CSA.

Central Statistics Office.: 1996, *Quarterly Digest of Statistics*, Harare, March 1996.

Chirwa, W.C.: 1997, Migrant labour, sexual networking and multi-partnered sex in Malawi, *Health Transition Review* **7** (Supplement 3), 5–16.

Choon-Nam, O., Jeyaratnam, J. and Koh, D.: 1993, Factors influencing the assessment and control of occupational hazards in developing countries, *Environmental Research* **60**(1) 112–123.

Clarke, J.I.: 1993, Polarisation and Depolarisation in Africa, in L.M. Schell, M.T. Smith and A. Bilsborough (eds.), *Urban Ecology and Health in the Third World*, Cambridge, Cambridge University Press, pp. 260–273.

Collignon, B., Taisne, R. and Kouadio, J.-M.S.: 2000, *Water and Sanitation for the Urban Poor in Cote d'Ivoire*, Paris, Water and Sanitation Program (Hydroconseil).

Couto, M.: 1995, *Pollution and its Management*, Harare, Zimbabwe, SARDC.

Department of Forecasts and Statistics.: 1993*, Research on priorities, social dimension of adjustment*, Dakar, ESP.

Dalal-Clayton, B.: 1997, *Southern Africa beyond the Millennium: Environmental trends and scenarios to 2015*, Environmental Planning Issues No. 13, International Institute for Environment and Development, UK.

Durning, A.: 1990, *Apartheid's Environmental Toll*, World Watch Paper 95, Washington, DC, World Watch Institute.

Economic Commission for Africa.: 1996, *Urban Environment and Health in ECA Member States*, Addis Ababa, Economic Commission for Africa.

Economic Commission for Africa.: 2001, *State of the Environment in Africa*, Addis Ababa, Economic Commission for Africa.

Enda-Syspro.: 1997, Senegal Report: Thirst and Water, Dakar, Environment Development in the Third World.

Feachem, R.G. and Jamison, D.T.: 1991 (eds.), *Disease and Mortality in Sub-Saharan Africa*, Washington, DC, World Bank.

Federal Ministry for Economic Cooperation and Development.: 2000, *Making a Future for Cities Development Policy in the Urban Century*, No. 015 July 2000, Bonn, Federal Ministry for Economic Cooperation and Development.

Food and Agriculture Organisation.: 1994, Funding Agricultural Research in Sub-Saharan Africa, in *Proceedings of an FAO/SPAAR/KARI Expert Consultation,* Nairobi, FAO, Rome.

Friis-Hansen, E. (ed.).: 2000, *Agricultural Policy in Africa after Adjustment*, CDR Policy Paper, Copenhagen.

Gaye, M. and Diallo, F.: 1997, Community participation in the management of the urban environment in Rufisque, Senegal, *Environment and Urbanization* **9**(1), 9–29.

Ghana Government.: 1992, 1995, *Ghana Living Standards Survey*, Accra, Government of Ghana.
Global Network.: 2000, Lagos at a glance (www.megacitiesproject.org/network/lagos.asp).
Goyer, R.A.: 1995, Nutrition and Metal Toxicity, *American Journal of Clinical Nutrition* **61** (Supplement 3), 646S–650S.
Hardoy, J.E., Mitlin, D. and Satterthwaite, D.: 1992, *Environmental problems in Third World Cities*, London, Earthscan Publications.
Gunning, J. and Oostendorp, R. (eds.).: 2002. *Industrial Change in Africa: Zimbabwean Firms under Structural Adjustment*, Basingstoke, Hampshire and New York, Palgrave.
Harsch, E.: 2001, African Cities Under Strain: Initiatives to Improve Housing, Services, Security and Governance, *Africa Recovery* **15**(12), 1–9.
Hall, P. and Pfeiffer, U.: 2000, *Urban Future 21: A Global Agenda for Twenty-First Century Cities*, London, E&FN Spon.
Hill, H.: 1992, Concrete and Clay: Angolas Parallel City, *Africa South*, June.
Hjort af Ornas, A.: 1990, Town-based Pastoralism in Eastern Africa, in J. Baker (ed.), *Small Town Africa*, Uppsala, Scandinavian Institute of African Studies.
Jabara, C.: 1990, *Economic Reform and Poverty in The Gambia: A Survey of Pre and Post ERP Experience,* Monograph 8, Cornell Food and Nutrition Policy Programme.
Kassas, M.: 2002, Environmental education: biodiversity, *The Environmentalist* **22** (4), 345–351.
Keeley, D.J., Neill, P. and Gallivan, S.: 1991, Comparison of the prevalence of reversible airways obstruction in rural and urban Zimbabwean children, *Thorax* **46**, 594–553.
Laing, E. (ed.).: 1994, *Ghana Environmental Action Plan, 2,* Accra, Ghana, Environmental Protection Agency.
Lamba, D.: 1994, *Nairobis Environment: A Review of Conditions and Issues*, Nairobi, Mazingira Institute.
Levin, C.E., Maxwell, D.G., Armar-Klemesu, M., Ruel, M.T., Morris, S.S. and Ahiadeke, C.: 1999, Working women in an urban setting: traders, vendors, and food security in Accra, *World Development* **27**(11), 13–22.
Maharaj, Z.: 1999, Gender Inequality and the Economy: Empowering Women in South Africa, Keynote speech at the Professional Women's League of KwaZulu Natal, August 8, 1999.
Mail & Guardian.: 2001, Shrinking supply of suitable staff, Johannesburg, April 5, 2001.
Marais, S. and Prinsloo, M.: 2001, Childhood injury mortality in the Cape Town metropolitan area, *Urban Health and Development Bulletin* **4**(2), 14–18.
Martin-Prevel, Y., Delpeuch, F., Traissac, P., Massamba, J.P., Adoua-Oyila, G., Coudert, K. and Treche, S.: 2000, Deterioration in the nutritional status of young children and their mothers in Brazzaville, Congo, following the 1994 devaluation of the CFA franc, *Bulletin of the World Health Organisation* **78**(1), 108–118.
Matrix Development Consultants.: 1993, *Nairobi's Informal Settlements: An Inventory*. A report prepared for USAID/REDSO/ESA, Nairobi, USAID.
Matthies, K. and Timm, H.-J.: 1999, World Commodity Prices 1999–2000, Report presented to the AIECE spring meeting, May 5–7, Oslo, Norway.
Maxwell, D., Levin, C., Amar-Klemesu, M., Ruel, M., Morris, S. and Ahiadeke, C.: 2000, *Urban Livelihoods and Food and Nutrition Security in Greater Accra, Ghana*, Washington, DC, International Food Policy Research Institute.
Mhone, G.C.Z.: 1995*, The impact of structural adjustment on the urban informal sector in Zimbabwe*, Discussion Paper 2, Geneva, International Labour Office.
Ministry of Works and Housing.: 2001, *Korle Lagoon Ecological Restoration Project: Environment and Social Impact Statement*, Final Report, Accra, Ghana, Government of Ghana.
Montgomery, M.R., Stren, R., Cohen, B. and Reed, H.E.: 2003, *Cities Transformed: Demographic Change and its Implications in the Developing World*, Washington, DC, National Academic Press.
Mosha, A.C.: 1990, Urbanisation and Environment–Case Study: Dar es Salaam, in International Society of City and Regional Planners (ed.), *The Environment and the City Case Studies*, Amsterdam, ISCRP, 27 pp.
Mosha, A.C.: 2001, Africas Future, *Forum for Applied Research and Public Policy* **16**(2), 28–33.
Mwafongo, W.M.K.: 1991, Rapid Urban Growth: Implications for Urban Management in Malawi, Paper presented at the RUPSEA Conference on Urban Management in Southern and Eastern Africa, Lilongwe, Malawi, 7–10 October.

Mwangi, S.W.: 2000, Partnerships in urban environmental management: an approach to solving environmental problems in Nakuru, Kenya, *Environment and Urbanization* **12**(2), 77–92.
National Board for Small Scale Industries.: 1993, *Meeting the Financial Needs of Small Scale and Medium Sized Enterprises in Ghana*, Accra, NBSSI.
Ocran, S.: 1998, *Dignity and Sustenance*, Accra, Social Watch.
Odhiambo, W. and Manda, D.K.: 2003, Urban poverty and labour force participation in Kenya, Paper presented at the World Bank Urban Research Symposium, Washington, D.C., December 15–17.
Organisation for Economic Co-operation and Development.: 2003, *African Economic Outlook*, Paris, OECD.
Pan-African Productivity Association.: 2000, Supply side constraints that hamper African enterprises from taking advantage of emerging export market opportunities, Geneva, ILO.
Peraza, M.A., Rael, L.T., Casarez, E., Barber, D.S. and Ayala-Fierrro, F.: 1998, Effects of micronutrients on metal toxicity, *Environmental Health Perspective* **106**(1), 203–216.
Rakodi, C. (ed.).: 1997, *The Urban Challenge in Africa: Growth and Management of Its Large Cities*, New York, United Nations University Press.
Ravestijn, S.: 2002, *Survivors Speak: A Snapshot Survey on Violence against Women in Nairobi*, Nairobi, UN-Habitat.
Reed, D.: 1996, *Structural Adjustment, the Environment and Sustainable Development*, Boulder, Westview Press.
Rees, W.E.: 1991, Sustainable communities: planning for the 21st century, *Plan Canada* **313**, 15–25.
Republic of Kenya.: 2002, *The 1998/99 Integrated Labour Force Survey Report*, Nairobi, Ministry of Planning and National Development.
Robertshaw, R., Louw, A. and Mtani, A.: 2000, *Crime in Dar es Salaam: Results of a City Victim Survey, Dar es Salaam*, Safer Cities Project and UN–Habitat.
Smith, K R. and Lee, Y.F.: 1993, Urbanisation and the environmental risk transition, in J. Kasarda and A.M. Parnell (eds.), *Third World Cities: Problems, Policies and Prospects*, Newbury Park, Sage Publications, pp. 161–179.
Songsore, J. and McGranahan, G.: 1993, Environment, wealth and health: towards an analysis of intra-urban differentials within the greater accra metropolitan area, Ghana, *Environment and Urbanization* **5**(2), 10–34.
Soubbotina, T.P. and Sheram, K.A.: 2000, *Beyond Economic Growth: Meeting the Challenges of Global Development*, Washington, DC, World Bank.
Stephens, C.: 1996, Research on Urban Environmental Health, in S. Atkinson, J. Songsore and E. Werna, (eds.), *Urban Health Research in Developing Countries: Implications for Policy*, Wallingford, CAB International, pp. 115–134.
Stephens, C., Timaeus, M., Akerman, M., Avle, S., Maia, P.B., Campanario, P., Doe, B., Lush, L., Tetteh, D. and Harpham, T.: 1994, *Environment and Health in Developing Countries: An Analysis of Intra-Urban Differentials Using Existing Data,* London, London School of Hygiene and Tropical Medicine.
Stren, R.E., White, R.R. and Whitney, J.B. (eds.).: 1992, *Sustainable Cities: Urbanisation and the Environment in International Perspective*, Boulder, Colorado, Westview Press.
Tavengwa, T.: 1995, SADC Unites in War Against Malaria: WHO Lays Platform of Action *The Herald*, December 7, Harare, Zimbabwe.
The Johns Hopkins University.: 2002, Meeting the Urban Challenge, *Population Reports*, Vol. XXX, No. 4, Baltimore, Maryland, The Johns Hopkins University.
Thomas, E.P., Seager, J.R., Viljoen, E., Potgieter, F., Rossouw, A., Tokota, B., McGranahan, G. and Kjellen, M.: 1999, *Household Environment and Health in Port Elizabeth, South Africa*, Stockholm, Stockholm Environment Institute.
Tripp, A.M.: 1990, The informal economy, labour and the state in Tanzania, *Comparative Politics* **22**(3), 253–64.
The World Summit on Sustainable Development.: 2002, Johannesburg, August 26–September 4.
UNAIDS.: 1999, *Differences in HIV spread in four Sub-Saharan African cities*, Lusaka, UNAIDS.
United Nations.: 1994, *AIDS and the Demography of Africa*, New York, United Nations.
United Nations Centre for Human Settlements.: 2002, *Urbanisation: Facts and Figures*, Nairobi, Kenya, UNCHS (http://pib.nic.in/urban-governance/facts.doc).
United Nations Centre for Human Settlements.: 2001, *State of the world cities 2001*, Nairobi, UNCHS.

United Nations Centre for Human Settlements (Habitat).: 1992a, *Shelter for Sustainable Development, A new Agenda for Human Settlements*, Nairobi, UNCHS.

United Nations Centre for Human Settlements (Habitat).: 1992b, The Role of Human Settlements in Improving Community Health in Africa, *International Conference on Community Health in Africa*, Brazzaville, Congo, 4–6 September.

United Nations Development Programme.: 1996a, *World Human Development Report 1996*, Paris, UNDP.

United Nations Development Programme.: 1996b, *Urban Agriculture: Food, Jobs and Sustainable Cities*, New York, UNDP

United Nations Development Programme.: 1997, *Human Development Report 1997*, New York and Oxford, Oxford University Press.

United Nations Development Programme.: 1994, *Human Development Report 1994*, New York, Oxford University Press.

United Nations Environment Programme.: 1999, *Geo 2000: Global Environmental Outlook 2000*, New York, Earthscan Publications.

United Nations Environment Programme.: 2000, *Recommendations for decision-making on municipal wastewater: practical policy guidance for implementing the global programme of action for the protection of the marine environment from land based activities on sewage*. UNEP Working Document, Version 10. UNEP.

United Nations Population Division.: 1995, *Urban and Rural Areas, 1950–2025: The 1994 Revision,* New York, United Nations.

United Nations Population Division.: 1997, *Urban and Rural Areas, 1950–2030: The 1996 Revision,* New York, United Nations.

United Nations Population Fund.: 1996, *The State of the World Population 1996, Changing Places: Population Development and the Urban Future,* New York, United Nations.

United States Committee for Refugees.: 2002, Country Report: Sudan, (www.refugees.org/world/countryrpt/africa/sudan.htm).

Urban Health and Environment Bulletin.: 2001, Children, environment and health in South Africa, *Urban Health and Environment Bulletin* **4**(2), 1.

Warren, M., Billig, P., Bendahmane, D. and Wijeyaratne, P.: 1999, *Malaria in Urban and Peri-Urban Areas in Sub-Saharan Africa,* Environmental Health Project Activity Report No. 71, Washington, DC, Environmental Health Project.

Villarreal, M.: 1998, *Adolescent Fertility: Socio-cultural Issues and Programme Implications*, Population Programme Service, Rome, Food and Agricultural Organisation of the United Nations (FAO).

White, R.R.: 1989, The Influence of Environmental and Economic Factors in the Urban Crisis, in R. Stren and R. White (eds.), *African Cities in Crisis: Managing Rapid Urban Growth*, Boulder, Westview Press, pp. 1–19.

World Bank.: 2001a, *Health, Environment, and Development,* Washington, DC, World Bank.

World Bank.: 2001b, Slum Prevention, (www.worldbank.org/urban/upgrading/slum.html).

World Bank.: 1992, *Development and Environment. World Development Report*, Oxford, United Kingdom, Oxford University Press.

World Bank.: 1993, *Uganda: Agriculture*, New York, World Bank.

World Bank.: 1994, *Reducing Poverty in South Africa: Options for Equitable and Sustainable Growth,* Southern Africa Department, Washington, DC, World Bank.

World Bank.: 1995, *Middle East and North Africa: Environmental Strategy Towards Sustainable Development*, Report No. 13601-MNA, Washington, DC, World Bank.

World Bank.: 2000, *Cities in Transition: World Bank Urban and Local Governance Strategy*, Washington, DC, World Bank.

World Commission on Environment and Development.: 1987, *Our Common Future*, Oxford, NY, Oxford University Press.

World Health Organisation.: 1995a, *Cholera-1994: Situation in the African Region*, Harare, Zimbabwe, WHO.

World Health Organisation.: 1995b, *The World Health Report 1995: Bridging the Gaps*, Geneva, WHO.

World Health Organisation.: 1997, *Health and Environment in Sustainable Development: Five Years after the Earth Summit*, WHO Executive Summary, WHO/EHG/97. 12, Geneva, WHO.

World Health Organisation.: 2001, Reducing Poverty through Healthy Cities Programme, WHO Regional Office for Africa (www.afro.who.int/des).

World Health Organisation and United Nations Childrens Fund.: 2000, *Global Water Supply and Sanitation Assessment 2000 Report*, Geneva, WHO.

World Resources Institute.: 1996, *World Resources 1996–97*: *A Guide to the Global Environment*, New York, Oxford University Press.

World Resources Institute., UNEP, UNDP and World Bank.: 1998, *World Resources 1998–99: A Guide to the Global Environment*, Oxford, Oxford University Press.

Yacoob, M. and Kelly, M.: 1999, *Secondary Cities in West Africa: The Challenge for Environmental Health and Prevention*, Comparative Urban Studies, Occasional Paper No. 21, Washington, DC, Woodrow Wilson International Center for Scholars.