

Pollution



in African
villages and
cities



WORLD HEALTH ORGANIZATION

AIR POLLUTION IN AFRICAN VILLAGES AND CITIES

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1. PREFACE

The African continent arguably presents one of the most divergent ranges of air pollution problems. At one end of the scale are communes and hamlets in rural areas, where traditional, very primitive ways for cooking and heating cause dangerously high levels of indoor pollution. At the other end are cities where rapid population growth and industrial development pose ever increasing risks to the health of resident populations.

Although by no means uniquely confined to Africa, these air pollution issues are of particular importance because of the low economic development level that most countries will have over the next few decades. By implication, air pollution issues may receive relatively low priority because of other more pressing concerns.

The purpose of this document is to present to policy and decision makers at the national level, and to scientists, health officials and educators, a brief summary of the main air pollution issues in Africa, together with some supporting technical information. The aim is that the more major air pollution issues outlined in this document, affecting the health of large segments of the population, will be given due attention in the programming of national health and development schemes.

It is also hoped that international programmes aiming to provide technical and financial support for the abatement of air pollution problems in Africa will benefit from this document.

2. INTRODUCTION

In most regions of the world, human settlements grow first from simple groups of houses to villages that may have some infrastructure. Further development leads to ever-increasing size and the establishment of cities with quite well-developed municipal services and local government. The African continent evolved differently. It was developed during colonial times, from coastal cities which were connected to the interior by roads and railways. As a result of this pattern, there are relatively few intermediary towns in Africa and there is also a lack of adequate infrastructure at the provincial (or intermediate) and village level.

In the post-war period, and particularly since African countries began to gain independence, migration to cities has dramatically increased — twice as fast as the rate of growth of the total population. The flow of migrants to the cities drains the countryside of the labour needed to increase agricultural productivity. It also produces a commensurate deterioration of the urban environment and a widening range of social, economic and managerial problems. Current government policies on rural development encourage people to stay on their ancestral lands — a more promising sign for the future.

The lack of adequate environmental protection, in both urban and rural areas in Africa, has several major effects on the health of the people. In this booklet, various aspects of two major air pollution problems in Africa are highlighted. Indoor air pollution in rural settlements is covered in section 4, and air pollution in cities is dealt with in section 5, which also includes reference to air pollution from industrial sources, such as metal ore smelters.

Various solutions and approaches for improvement are outlined in sections 4.4 and 5.5. These, however, should not be seen in isolation as they are intended to form part of the overall social and economic development plans of African countries.

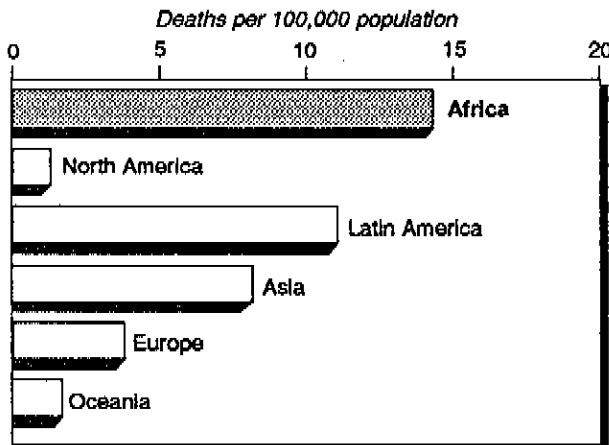
3. AIR POLLUTION AND DISEASE

Air pollution, occurring both indoors and outdoors, causes human sickness and sometimes premature death. People of both sexes and all ages can be affected, but the danger is greatest for groups such as the very young, the very old, pregnant women and those who already suffer from a debilitating illness such as asthma or heart disease.

Since everyone must breathe the air around us, everyone is exposed to air pollution to some degree. In Africa, though, people who spend a great deal of time indoors in rural houses are more likely to be affected, because of the high levels of smoke and pungent gases that occur there. Also, those living in or near big cities are likely to have more exposure because of heavy automobile and bus traffic and polluting factories, which tend to concentrate in these areas.

Health effects associated with exposure to indoor air pollution have not been very rigorously investigated. The picture that emerges from the data that are available, together with conclusions drawn from comparisons with relevant research in other areas such as smoking, shows that the impact of indoor pollution as a risk factor for several illnesses is quite widespread and serious in Africa.

Infant mortality



Mortality from acute respiratory illness in infants (less than one year) 1970-73

Morbidity and mortality from respiratory disease in children under five years is a serious problem in Africa. Studies carried out in several African countries show that wood smoke is a potent risk factor in the development of severe lower respiratory tract disease in infants. Health reports from Zambia and Burkina Faso, among others, confirm that respiratory illness ranks among the top two or three causes of morbidity. In Nigeria it was observed that mortality rates were lowest during the driest months when cooking was done outdoors, thus reducing exposure of infants to the fumes.

Chronic obstructive lung disease

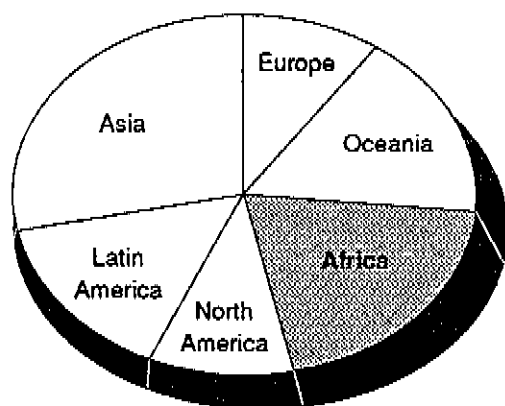
Relatively high rates of this disease have been observed among females in some developing countries, particularly in Asia. No statistics are available for this disease in Africa, but it is more than likely that exposure to smoke and other combustion products, particularly as related to cooking methods, affects the health of women in Africa as well.

Cancer

Cancer is probably the most critical health hazard associated with air pollution. A study in Kenya has shown a significant occurrence of nasopharyngeal cancer in populations living in the higher, colder areas. The disease has not been noted in the hot, low-lying areas. Although this disease is usually more related to ethnic, nutritional and viral risk factors, indoor wood smoke, containing high levels of polycyclic hydrocarbons, is also thought to be related to incidence of the disease.

Low birth weight infants

Exposure of pregnant women to indoor air pollution is one of the risk factors that contributes to low birth weight. Low birth weight is associated with a range of perinatal and infant ill-health. This observation is corroborated by the US National Academy of Science in its recent report on the relationship between the effects of environmental tobacco smoke and the health of pregnant women and children.



Distribution of low birth weight infants in 1985

3. AIR POLLUTION AND DISEASE

Nutrition and fuel scarcity

There are also more indirect health problems brought about by the current practice of biomass combustion for cooking. They relate mainly to inefficient burning and the subsequent increased difficulty in obtaining fuel and include:

- changes in diet, or selection of foods which require less cooking time. For example, it has been observed in Mali that the preparation of one-pot dishes, which have a shorter cooking time than many-dish meals, correlates with regions where fuel is scarce. Soya beans, introduced in an area of Burkina Faso, have reportedly not been accepted by local women because of the lengthy cooking period required. In Burkina Faso it has been reported that rural women walk three times a week for up to six hours to collect fuel;
- food contamination due to limited possibilities of re-heating "left-overs", boiling water, etc. Serving left-overs cold or slightly heated can be damaging to the health of small children. Also, causes of disease which would be destroyed by heating may become a problem.

Outdoor air pollution

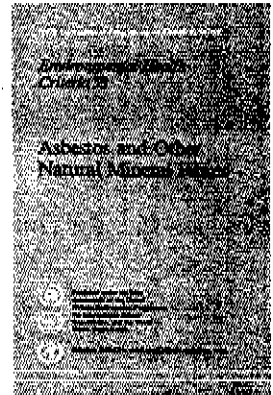
In African cities two types of outdoor air pollution problems occur most frequently and have the largest health impact.

- Industrial pollution from large uncontrolled sources, such as power stations, cement plants, paper mills, chemical factories, etc.
- Vehicular traffic with emissions from cars, buses and trucks, many with diesel engines, which produce mixtures of different pollutants, causing a haze in many of the built-up areas.

The effects associated with emissions from industrial sources range from annoyance with odours and dust to exacerbation of respiratory diseases such as asthma, bronchitis and emphysema. If the pollution contains hazardous chemical substances such as asbestos, heavy metals or certain organic complex compounds these may contribute to the incidence of cancer.



Health effects associated with automobile traffic result from exposure to carbon monoxide, nitrogen oxides, ozone, hydrocarbons and fine particles. These pollutants exert their effect on different systems in the body. Carbon monoxide reduces the oxygen carrying capacity of blood and is liable to affect persons with heart disease. Nitrogen oxides are powerful irritants to the lungs and lower resistance to infections such as influenza. Ozone is also an irritant that causes impairment of lung function. Hydrocarbons are a diverse class of pollutants, some of which, such as benzene and formaldehyde, have been shown to have a potent effect on human health. Tetra-ethyl lead is added to gasoline in most African countries and lead is emitted to the urban air as fine particles. Its effects are on the blood-forming, nervous and kidney systems. Young children are especially vulnerable to the effects of lead exposure.



The picture that emerges in Africa with regard to health risks from air pollution is that in rural areas, a substantial portion of infants, children and women are exposed to debilitating levels of indoor pollution, and that in urban areas a potential exists for increased ill-health, particularly among the old and sick. The overall effect of this on the relatively young nations in Africa may be one of reduced vigour and less potential to develop their economic strength and well-being.

4. AFRICAN VILLAGES

In most people's minds air pollution is associated with advanced industrial activity and a high level of economic development. This section deals with the opposite situation, rural agricultural communities in Africa where per capita income is among the lowest in the world and biomass is the principle source of energy.

4.1 Indoor air pollution

In rural Africa, both cooking and heating in houses are carried out in a traditional way. The most common arrangement is a fire inside the house with a cooking pot resting on three stones over the fire. The fuels used include a wide range of materials such as agricultural waste and dried dung from animals. The most important fuel, however, is wood, in the form of logs, branches, twigs and leaves, all of which have different combustion characteristics. The fuel is largely gathered by women and children.



There are many variations both in the types of fuels used and also in the type of arrangements for cooking. In some areas, of which Kenya is an example, cooking is done outside during the dry season. In others a separate kitchen hut is used for cooking, as for example in The Gambia (see picture on the left). Note also the ventilation opening under the roof.

Climate varies enormously in Africa and this has a major influence on cooking and heating practices. Different cooking arrangements in turn influence the extent to which pre-school children and women are exposed to air pollution from burning fires .

Combustion of wood and other materials, such as agricultural waste and dried animal dung, under primitive conditions produces large quantities of smoke and pungent gases indoors. WHO has carried out two studies, one in Kenya (1986) and the other in The Gambia (1987), to measure indoor concentrations of different pollutants in African houses. The results of this work are summarized in the table below.

Pollutant range	Average concentration	WHO guideline
Respirable particulate matter	400-2300 $\mu\text{g}/\text{m}^3$	100-150 $\mu\text{g}/\text{m}^3$
Nitrogen dioxide	80-140 $\mu\text{g}/\text{m}^3$	150 $\mu\text{g}/\text{m}^3$
Carbon monoxide	0-100 mg/m^3	30 mg/m^3
Polycyclic aromatic hydrocarbons	40-800 ng/m^3	no guideline
Formaldehyde	25-100 $\mu\text{g}/\text{m}^3$	100 $\mu\text{g}/\text{m}^3$

The information in the table shows that the average level of respirable particulates is very high. The peak values that were measured are even higher and a definite health hazard is indicated. For the other pollutants, concentrations are also quite high, often exceeding the WHO guidelines for the protection of human health. For the polycyclic hydrocarbons no guidelines exist, as many of these substances have been shown to cause cancer and under these circumstances every effort should be made to eliminate them completely.

4.2 Women's work and role

Country	Agricultural work	Non-agricultural work	Fuel collection and cooking	Other	Total hours worked
<u>Ghana</u>					
Savannah village	1.3	2.7	5.0	5.0	14.0
Fishing village	2.0	6.3	3.6	2.1	14.0
Forest village	3.8	0.3	4.1	5.8	14.0
<u>Mozambique</u>					
Average of four villages	3.1	0.1	1.8	9.0	14.0
<u>Indonesia</u>					
Irrigated village	2.9	0.2	1.5	6.9	11.5
Upland village	3.1	0.5	2.4	6.0	12.0
<u>India</u>					
Average of five villages	3.9	4.0	4.8	0.9	13.6
<u>Peru</u>					
Coastal desert	1.4	2.0	2.2	5.6	11.2
Sierra	4.0	1.0	3.8	2.4	11.2
High sierra	4.0	2.0	2.9	2.8	11.7

Breakdown of women's daily activity patterns

4. AFRICAN VILLAGES

Women's work in rural Africa is characterized by a variety of activities, including fuel gathering, agricultural work, childcare and cooking. Children often assist women in their tasks. A woman's work day is generally longer than that of a man and in Africa it runs from 10 to 14 hours. It has been said that "the real energy crisis is women's time."

	Number of households	Per cent
Women	13	43.3
Men	3	10.0
Children	5	16.7
Men and women	1	3.3
Women and children	7	23.3
Other	1	3.4
	30	100.0

Who produces household fuel in three villages in Ghana

planting and harvest periods, they often cut back on fuel collection and therefore cooking.

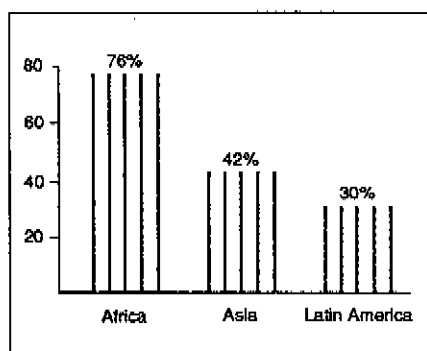
Women's heavy workload seems to affect their ability to carry out basic but time-consuming survival tasks such as childcare and cooking. Cooking with biomass fuels, for example, takes a lot of time especially with low quality fuels, as a fire has to be built and managed continuously. When women have more important tasks to do, especially during seasonal

The possibilities for improvement of people's lives in Africa are tied to the education of women. Particularly areas such as nutrition and cooking practices, including fuel-saving techniques and forest management would be beneficial. General education on hygiene and preventive medicine could also be included. The results of this training would be passed on to the children. Overcoming the cultural and traditional aspects of rural life in Africa are of overriding importance in instituting changes required to raise the general health and economic status of rural populations.

4.3 Biomass utilization and shortages

Biomass includes a wide range of materials such as wood, plant products and residues, as well as dried animal dung. These materials are burned under primitive

conditions for heating and cooking at an average efficiency of around 7-8%. Because of the inefficiency, large amounts of uncombusted materials are produced in the form of smoke and irritating gases. It is estimated that some 300 million people in Africa rely on biomass fuels for cooking, heating and even lighting.



Percentage of total energy supplied by fuelwood in 1980

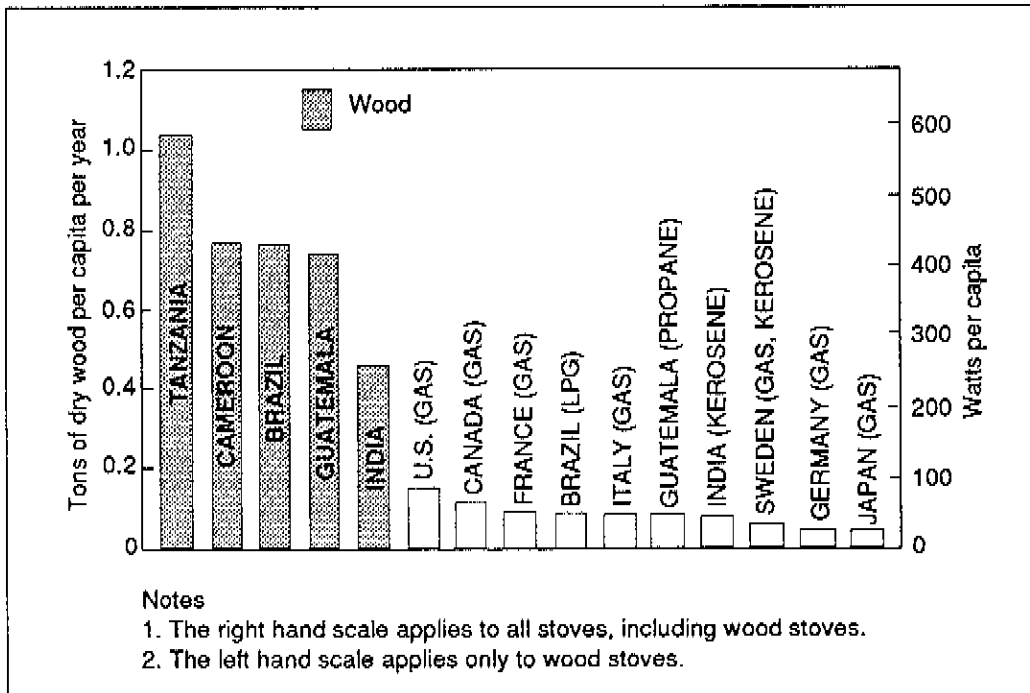
The high cost of oil helps to explain the unprecedented demand for fuel wood and other forms of biomass energy in Africa. Fuel wood use has increased over 30 percent between 1970 and 1982 in the world, and even more rapidly in Africa. At present consumption rates, the annual fuel wood deficit will more than double in Africa by the year 2000. Current rates of tree planting amount to less than 10 percent of what is required to offset the trend.

Country	Year	Household energy consumption as % of total energy consumption	Biomass fuel as % of household consumption
Burkina Faso	1983	92.7	97.7
Ethiopia	1982	92.8	99.5
Ghana	1985	72.0	94.0
Mozambique	1980	76.4	98.7
Senegal	1981	67.4	93.2
Tanzania	1981	85.0	98.8
Zambia	1980/81	45.6	91.8
Zimbabwe	1980	30.0	85.4
Ecuador	1984	32.8	30.5
Peru	1981	38.6	62.4
Indonesia	1978	—	84.0
Nepal	1980/81	94.0	98.7
Thailand	1983	29.3	84.8

Household energy consumption and biomass fuels in national energy balances for selected countries

The table above shows that in many countries in Africa, household energy requirements constitute a very high percentage of the total need. Also, with increasing industrialization, the percentage consumption by households drops, as shown for Zimbabwe and Zambia. Household dependency on biomass fuels, however, remains high, from 80 to 100 percent.

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Per capita use of energy for cooking in selected countries

Because of inefficiency of the combustion process, fuel is used up at an extremely wasteful rate. The chart above shows a comparison of per capita energy use for cooking in some African and other countries that burn wood with others that use other more efficient fuels.

The result of this waste is the gradual depletion of easily accessible sources of biomass fuels around the villages. Also, changes in land use permit less and less gathering of free fuel. Finally, the ever-growing cities are making increasing demands for wood and charcoal, thus competing with the rural populations.

To reverse this slide toward catastrophe, both the consumption of fuel per capita must be reduced and forestry management practices must be upgraded to achieve a better balance between production and consumption of wood.



Fuelwood supply in Africa

4.4 Possible solutions

The problems to be solved are to eliminate indoor air pollution, which is harmful to health, and to stop the wastage of fuel. A related issue is to produce sufficient wood for the developing countries for the next 20-30 years, because it is expected that this will remain their principal source of energy for cooking and heating.

Solutions will not be universal, in that they will have to be suited to the availability of local skills and materials, to traditional and cultural habits, and to other demographic, agricultural and climatic factors. Also, the solutions for smoke reduction and fuel conservation are intertwined and often more than one measure may be required to achieve the desired improvements. Available solutions in the near term will need to concentrate on:

Improving the design of stoves

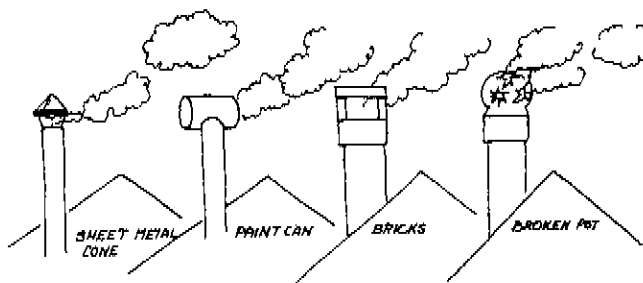
Many stove improvement programmes, have been carried out in Africa and in other parts of the world. Some, such as the programme that introduced the JIKO stove in East Africa have been quite successful. Many others, however, have failed

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mainly because of the following problems:

- did not improve combustion efficiency
- did not reduce indoor air pollution
- did not accommodate the variety of different fuels that is often used
- were not adapted to specific conditions, such as periods of cooking, both long and short, size of pots, etc.
- could not be easily made with local materials and skills at a cost that was affordable
- were targeted on rural populations, who obtain fuel free, rather than on more motivated urban populations, who generally pay for fuel

Improving the venting of smoke and fumes to the outside



It has been shown that a chimney or a smoke outlet in the wall (under the roof for example) can greatly reduce the indoor air pollution problem. Sometimes, the problem of heat loss needs to be considered, but this can be overcome.

Reducing exposure time of inhabitants

In this category fall a number of measures which range from changes to improve kitchen facilities to better and more efficient cooking and heating practices. For example, the use of the so-called hot box or hay box can save fuel. Other possibilities include communal preparation of certain staple foods. These changes, however, involve modification of traditions and need to be brought about through health education and provision of information.



Changing fuel types

Conversion of wood to charcoal or cow dung to biogas are some of the possibilities. Conversion to biogas is in most cases not applicable in Africa since it involves maintaining domestic animals close to settlements where the manure can be conveniently gathered and fed into a biogas plant. On the other hand, more and more charcoal is being produced for use in African cities. Charcoal contains only about one-third of the energy of the wood from which it is made but has about twice the kilo calories of an equivalent weight of wood. It is therefore the most economical fuel for transporting long distances. Cities like Addis Ababa and Kinshasa are known to "import" in the order of 150,000 tons of charcoal per year and the situation is probably similar for most other African cities.

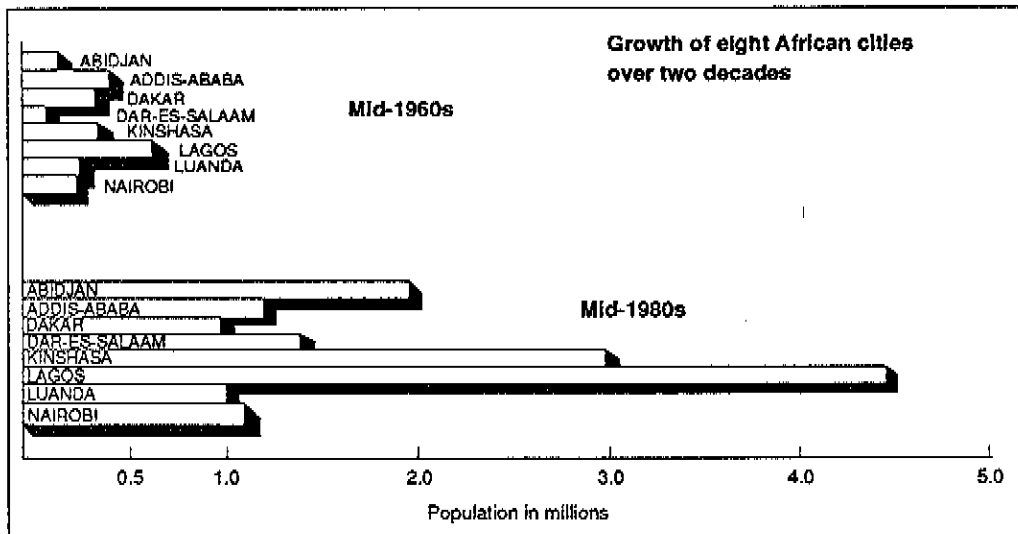
As has already been mentioned, these changes cannot be brought about easily, because of poverty and traditional attitudes which allow women very little say in the matter. There are also practical considerations. For example, an open fire provides light, whereas a closed stove does not; a chimney or other opening for improved ventilation is said to reduce protection of thatched roofs against termites, etc. Other problems relate to the lack of information and adequate infrastructure and also to the lack of literacy and awareness.

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Africa has long been considered the least urbanized continent, but this situation is now rapidly changing. The driving forces behind the migration of people from the rural areas to the cities are poverty, drought, civil strife and the general expectation that life in the city will bring increased prosperity.

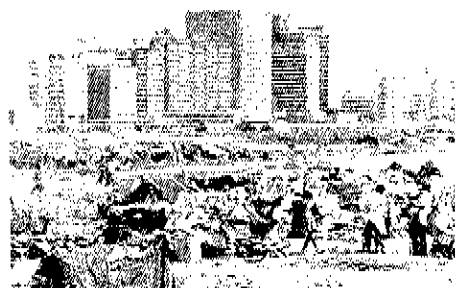
5.1 Urban growth

The rapid and partially unplanned growth of African cities is accompanied by increased traffic, energy consumption, industrial activity and associated air and water pollution. This is creating living conditions, particularly in the poorer sections, that are hazardous to human health.



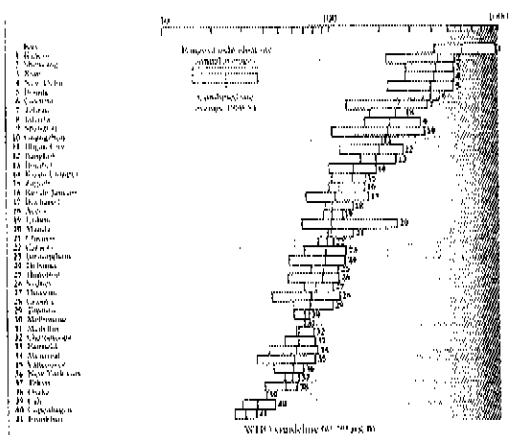
Aside from bringing with it the deterioration of the environment, rapid growth of urban areas may also bring problems in the area of resource utilization and planning. For example, inadequate planning of industrial facilities might cause settlements of workers to be located very close to factories. As a result of this, the impact of an accident, such as a spill of chemicals, for example, may have disastrous effects.

Cities are also major causes of provincial and rural environmental degradation. Demand for fuel wood and charcoal, for example, is mostly from the rural areas increasing the risks associated with deforestation. Another example is the construction of a hydro-electric dam which provides electricity to the cities but may cause exacerbation of waterborne diseases in the rural areas, or disturb agricultural and forestry activities.



5.2 Air pollution

Data from Nairobi, Accra and Ibadan show that average levels of suspended particulate matter average from 100-150 $\mu\text{g}/\text{m}^3$. Sulphur dioxide levels in African cities are generally low in the residential areas but frequently exceed the WHO guideline values in urban industrial and commercial zones. A Nigerian study on carbon monoxide levels in urban areas shows a strong diurnal variation of CO levels with high concentrations, often exceeding the WHO guideline, occurring during daytime hours.



Annual suspended particulate matter averages in city air, 1980-1984

Location	Species	Pb ($\mu\text{g}/\text{g}$ dry wt)
Road side	<i>Barbula lambarensis</i>	66.3-232.3
Road side	<i>Calymperes Palisotii</i>	76.3-248.0
Botanical Garden	<i>Calymperes Palisotii</i>	14.8
Botanical Garden	<i>Pinatelia sp.</i>	29.7

Occurrence of trace metals in the urban atmosphere was studied in Ibadan using mosses as biological indicators. The results (see table, left) show that significantly higher levels of lead occur at roadside locations, compared with the more rural setting (Botanical Garden). This information suggests that lead from motor vehicles is polluting the urban atmosphere.

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There are also various reports that describe the impact of large single sources of air pollution which affect large areas surrounding these plants. Such sources may not be located in the large urban areas, but they affect towns and settlements nearby. Specific reports in this connection refer to SO₂ emissions from gold and copper smelters giving rise to complaints from local residents about health problems and damage to vegetation. In other studies arsenic, emitted from gold ore smelting operations, is implicated in outbreaks of a disease called "black skin disease" in which black spots appear on the palms of hands of local residents.

The results of these various studies, although not representative of all air pollution problems of African cities and surrounding areas, indicate that some serious problems exist. In-depth and systematic air monitoring should be undertaken in the major African cities to provide a better data base for further evaluation.

5.3 Transportation

Increases	No change	Decreases
Botswana	Burkina Faso	Angola
Gen. Afr. Rep.	Cameroon	Kenya
Cote d'Ivoire	Ethiopia	Liberia
Gabon		Madagascar
Lesotho		Rwanda
Malawi		
Mauritius		
Niger		
Nigeria		
Senegal		
Swaziland		
Uganda		

Changes in numbers of automobiles, trucks and buses — 1974-1984

Motor vehicles, including buses and trucks, are substantial contributors to the deterioration of air quality in African cities. Motor vehicle traffic is responsible for almost all carbon monoxide and hydrocarbons emitted and for anywhere up to 50 percent of the nitrogen oxides and particulate matter. Aside from the direct impact of these chemicals on health, they tend to react under the influence of sunlight to form an oxidizing type of air pollution which contains a high percentage of ozone. This substance is also potentially harmful to human health.

Lead is emitted as fine particles from automobiles which utilize gasoline containing tetra-ethyl lead. Lead can exert effects on the nervous system and children represent a group at particular risk.

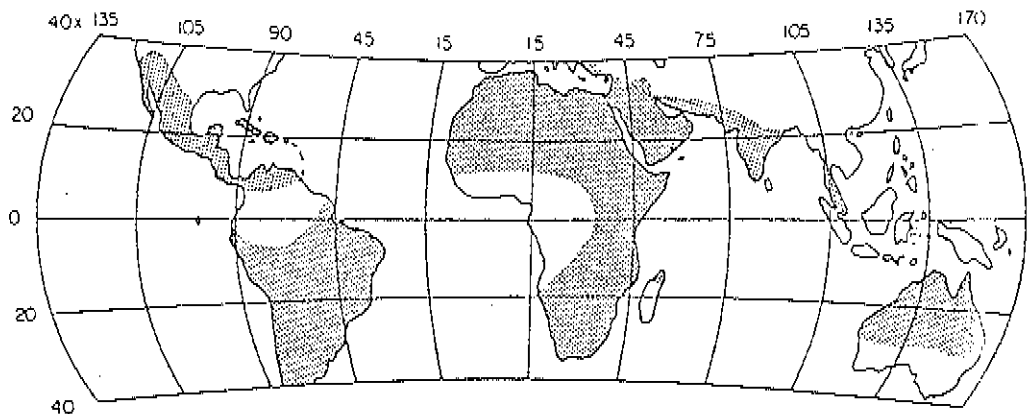
	1974	1984
Africa	0.63-0.84	0.63-0.84
Asia	0.31-0.84	0.17-0.56
South and Central America and Caribbean	0.46-0.84	0.64-0.84
North America	0.58-0.95	0.22-0.77
Europe	0.40-0.84	0.15-0.40

Range of lead levels (g/l) in premium grade petrol in different regions of the world

The table shows that lead in gasoline is gradually being reduced in some regions of the world. In others, including Africa, lead levels in gasoline remain relatively high. This may pose a problem in the future as numbers of motor vehicles and gasoline consumption increase.

5.4 Climate and pollution

Climates in the large densely built urban areas are distinctly different from those prevailing in the surrounding areas. Differences can be found in the diurnal temperature pattern, wind speed near the ground, humidity, air purity, etc. Details of the design of the urban environment, from the scale of groups of buildings, through neighbourhoods and up to the scale of whole metropolitan areas may greatly affect local climatic conditions.



Areas with annual radiant energy received at the surface of more than 200W/m²

5. AFRICAN CITIES

In the cities, climate and pollution are closely linked through the "heat-island" phenomenon. The presence of pollutants increases the absorption of radiant energy and thus contributes to the formation of the urban heat-island. Particularly in tropical areas the heat-island increases the discomfort both indoors and outdoors. Heat as a risk factor has far-reaching effects. Particularly individuals with low tolerance of their cardiovascular system such as infants, elderly persons and patients with cardiac and vascular diseases need protection from heat.

Season	Month	Sky condition	$T_{ur}^{(1)}$
Wet	June	Cloud bands with intermittent sunshine	3.3
	July-August	Uniformly cloudy day, stratiform clouds	0.6-0.8
Dry	December	Dust polluted sky (Harmattan)	1-2.5
	February	Clear cloudless sky	5.0-7.5

⁽¹⁾ T_{ur} is the mean temperature difference (°C) between the urban and its surrounding rural area.

Seasonal variations in the urban heat island effect at Ibadan, Nigeria

The heat island effect is generally more pronounced in lower cities such as Ibadan in Nigeria, when compared with higher cities such as Nairobi, Kenya.

5.5 Air pollution control in cities

Any air pollution control programme normally contains a number of different activities. It is important that such a programme has realistic and achievable goals and is enforced. The approaches outlined in this section are made with African cities in mind and emphasize low cost and relative simplicity.

Concentrate air pollution control on major sources of particular pollutants

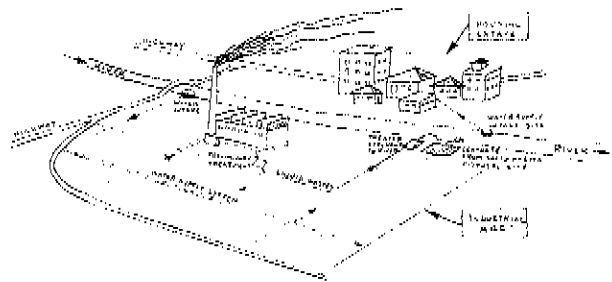
The identification of major sources can be conveniently made through the application of a procedure entitled: *Rapid Assessment of Sources of Air, Water and Land Pollution*, which was published by WHO in 1982. Care should be taken that various toxic substances associated with certain industries are included in such assessments. It is also important to advocate the need for regular inspection of air pollution control devices in the cement industry, fertilizer industries, thermal power plants, etc.

Reduce air pollution impact from motor vehicles.

The most immediate results can probably be achieved in most African countries with stricter controls on diesels. Such programmes would involve training of mechanics and spot checks on in-service vehicles. Both governments and manufacturers should get involved in the training and certification of mechanics. More long-term solutions would involve routine certification of motor vehicles for roadworthiness, development of new vehicle standards, fuel composition regulations and guidelines for urban and regional planning.

Place industry in designated areas away from populated areas and downwind from the city.

This approach involves the development of industrial areas at suitable locations. The sites should be carefully selected and developed with due regard for transportation facilities, energy and water requirements, etc. The figure to the right shows how the incorrect location of an industrial area can adversely affect a nearby housing estate as a result of solid, liquid and gaseous emissions.



WHO OFFSET PUBLICATION NO. 22

RAPID ASSESSMENT OF SOURCES OF AIR, WATER, AND LAND POLLUTION

World
Health
Organization
Geneva 1982



6. SITUATION ASSESSMENT

The adverse air pollution conditions in African rural areas and cities relate to a set of circumstances which range from a serious wood supply imbalance to very rapid growth of urban areas in the tropical zone. The problem is aggravated by general poverty, and illiteracy. This situation is serious as, because of its relatively low cost, dependence on wood as a fuel will continue well into the next century. Also, migration to the cities is expected to continue at an unabated pace beyond the year 2000.

To break this spiralling trend towards greater imbalance between man and his environment, solutions will have to be introduced which are affordable and sustainable. Sustainability in this case means introduction of measures that are technically and socially feasible, and which meet the need of the present without compromising the requirements of future generations.

Some solutions are available now, others will take time to develop. Improved ventilation of houses, using existing proven chimney designs, could, for example, have a major impact on the incidence of respiratory diseases among women and young children. Stove improvement programmes are already producing some encouraging results and more can be expected as designs improve and information campaigns convince users of the benefits of change. Land use planning which includes consideration of environmental pollution risks can prevent unnecessary air, water and soil pollution, and so reduce the threats to human health. Training of motor mechanics and legislative controls on diesel-powered vehicles will help to hold back the threat of worsening air pollution in burgeoning cities.

Achievement of the goal of sustainable development will certainly involve some very difficult political decisions at the national level in most African countries and a very substantial technical support from various international agencies, including WHO.

7. WHO PROGRAMME DEVELOPMENT

The main approach through which WHO can assist member countries on these various problems is by Technical Cooperation among Developing Countries (TCDC). The reasons for this are that most solutions required already exist in the developing world and only need to be made available to others and that these solutions are "tried out" and are economically and technically feasible. The following approaches and mechanisms should be developed and strengthened for air pollution control in villages and cities in the African Region:

- **Development of an adequate infrastructure among relevant African Institutions to encourage cooperation and improve information exchange;**
- **Development of an adequate network of WHO Collaborating Centres;**
- **Development of an adequate information basis of existing relevant data and projects as well as of any pertinent statistics in the African countries;**
- **Development of pilot demonstration and research projects on various aspects of air pollution control in Africa linked to and funded by agencies and institutions in industrialized countries;**
- **Development of training materials and training programmes on health aspects of integrated rural development, and on the planning aspects of African cities to control air pollution.**

The overriding goal of this programme of activities would be to show that improvements can be brought about with the means, both technical and financial, that are readily available and to motivate decision makers and community leaders to bring about the changes required. More detailed information on these approaches is given in *Control of Environmental Health Hazards: A WHO Strategy for Technical Cooperation with Member States*, which was published in 1987.

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