

48801  
Distr.  
GENERAL  
E/ ECA/HUS/61

May 1992

Original: ENGLISH

UNITED NATIONS  
ECONOMIC COMMISSION FOR AFRICA  
Industry and Human Settlements Division

**GUIDELINES ON FORMULATION OF  
HUMAN SETTLEMENTS POLICIES AND THEIR  
IMPACT ON THE ENVIRONMENT**

## TABLE OF CONTENTS

	<u>PAGE</u>
I. INTRODUCTION . . . . .	1
II. IMPACT OF THE CRISIS ON HUMAN SETTLEMENTS . . . . .	4
III. POLICIES RELATED TO THE URBANIZATION PROCESS . . . . .	8
IV. POLICIES RELATING TO THE HUMAN SETTLEMENTS DEVELOPMENT PROCESS . . . . .	10
V. POLICIES ON URBAN LAND . . . . .	17
VI. CONSTRUCTION SECTOR POLICIES . . . . .	22
VII. POLICIES ON SHELTER PROVISION . . . . .	25
VIII. ENERGY POLICIES FOR HUMAN SETTLEMENTS . . . . .	30
IX. WATER-SUPPLY POLICIES REFLECTING SUSTAINABLE DEVELOPMENT PRINCIPLES . . . . .	37
X. SOLID-WASTE, SANITATION AND WASTEWATER POLICIES . . . . .	40
XI. TRANSPORT POLICIES . . . . .	43
XII. HOW TO PROVIDE FOR THE IMPLEMENTATION OF HUMAN SETTLEMENTS AND ENVIRONMENTAL POLICIES . . . . .	45
XIII. HOW TO PROVIDE FOR POLICY CO-ORDINATION . . . . .	50
XIV. HOW TO CONSIDER EXISTING SETTLEMENTS CHARACTERISTICS AND THEIR ENVIRONMENTAL SETTINGS . . . . .	53
XV. CONCLUSIONS . . . . .	57
BIBLIOGRAPHY . . . . .	59-60

## I. INTRODUCTION

1. Habitat: United Nations Conference of Human Settlements, held in Vancouver in 1976, recommended that 'A national policy for human settlements and the environments should be an integral part of any national economic and social development policy'. The Conference stated that an integrated human settlement policy should:

- (i) Be formulated through a truly interdisciplinary approach, concurrently with policies relating to other aspects of social and economic development;
- (ii) Be formulated at the highest political level, in co-operation and co-ordination with regional and local levels as appropriate;
- (iii) Be consistent with the preservation, restoration and improvement of the natural and man-made environment, cognizant of the positive role of environment in national economic and social development;
- (iv) Be directed at all settlements, rural and urban, dispersed and concentrated, old and new.

2. Sixteen years later it is possible to report considerable progress in developing national settlements policies in African countries in most key areas of these policies, although their issues relating to the most important environmental concerns have proved somewhat elusive. Human settlements, being the physical and social context in which all life's activities take place have been seriously affected by the continuing ecological crisis.

3. The Lagos Plan of Action calls, inter alia, for concerted efforts to prevent rapid urbanization and rural-urban migration and has identified the following priority areas of environmental

concern requiring urgent action: environmental health, sanitation and the provision of safe drinking water supply; deforestation and soil degradation; drought and desertification; marine pollution and conservation of marine resources; environmental aspects of human settlements planning; mining development; air and water pollution control; and environmental education and training, legislation, and information dissemination.

4. The ECA has proposed an urgent and continuing reorientation of human settlements policies to give them ecological eyes and to shift human settlements development from presently non-sustainable to more sustainable paths. The emerging new realities and issues require a fundamental change in the way policy-makers think and act about human settlements development and environment, and about international co-operation. Until recently, policy-makers main concerns centred on effects of human settlements development on the environment. Today, they need to be just as concerned about the links from environment to human settlements development.

5. Environmentally sound human settlements policy can be seen as a set of media-specific stipulations which aim at the establishment of a political framework focusing on control of the environmental resources and hazards and on technological considerations proceeding investment decision-making thus benefitting the environment through careful use of resources through minimizing costs of raw materials, environmental protection and environmental damage as well as through maximizing settlement sustainability and development efficiency, satisfaction of basic needs for population and equity in the distribution of development costs and benefits.

6. The present policy guidelines critically review current types of policies which appear pertinent and relate to the environmental problems of human settlements in Africa. These relate to:

- a) the urbanization process itself;
  - b) the human settlements development process;
  - c) the urban land situation;
  - d) the construction sector problems;
  - e) shelter provision;
  - f) energy issues;
  - g) water-supply practices;
  - h) solid-waste, sanitation and waste water problems.
- The guidelines suggest innovations with a view to achieving ecological modernization of human settlements. They provide policy-makers with responsibility for managing and controlling the quality of man-made environment in African countries with the tools for the implementation and co-ordination of environmentally sound human settlements policies.

## II. IMPACT OF THE CRISIS ON HUMAN SETTLEMENTS

7. Some of the major long-term inter-related causes and problems for human settlements in Africa may be identified as:

- a) the high rate of urbanization, accompanied by a stagnating rural sector;
- b) over-centralization of service and administrative functions in the capital cities;
- c) inadequate availability of trained manpower and institutions capable of effectively executing development programmes, and
- d) failure of most countries to adopt and implement a national spatial policy providing a framework for balanced development.

8. By far the most important of these phenomena and one with the most ramifying effects is the very rapid rate of urbanization, which in some instances had already become a crisis by itself before the current ecological and socio-economic crisis in Africa. Although a majority of the African population still lives in rural areas, the urban population has continued to increase rapidly since the early 1960's. This rapid growth in urban population was initially a response to the real or perceived economic and social opportunities in the cities. Later on it was accelerated by reduced incomes in traditional agricultural sector in the rural areas. In practically all African countries, for example, the ratio of urban-rural wage income is at least 2:1. In many countries, in fact, this ratio ranges between 4:1 and 8:1 (e.g., Burkina Faso, Lesotho, Swaziland, Kenya, Senegal, Nigeria and Gabon). Thus, the income opportunities in the cities are much brighter, high and pullingly attractive than in the rural areas.

9. The intensification of 'desertification' since the 1970's, especially in the sub-Saharan zones, has had the additional effect of reducing the economic, agricultural and ecological sustainability of much of the rural farm lands, and consequently has been forcing an increase in the rural-urban migration stream, as people continue to desert the devastated and drought-ravaged rural agricultural setting for a life in the cities. About 40 per cent of the countries of sub-Saharan Africa have experienced extreme drought and desertification in recent years, resulting in massive displacements of population.

10. While the overall annual population increase of African averaged 2.92 per cent over the 1980-1985 period and 2.99 per cent is expected by the turn of the century, the urban population had been growing at an average of 6 per cent per annum. It is necessary to note that recent estimates show that squatter settlements and slums are growing at about 8 per cent annually. Thirty-five major African cities are currently increasing at a rate which will be doubling their population size every nine years. There are now 28 African cities of over one million inhabitants which, just 27 years ago, there were only three. By the year 2000, at least eleven African cities will exceed the four million mark. The overall urban population of the continent is expected to increase from 129 million in 1980 to more than 765 million by the year 2000, by which time 52 per cent of the region will be living in towns and cities.

11. Although, the current level of overall urbanization is still much lower in Africa compared to those in the other continents, the African continent has been forced to urbanize and house more people within a much shorter span of time than did either Europe or American over their whole urbanization history. This trend creates not only immediate problems but also urgent long-term concerns, particularly in view of the continuously escalating economic,

social and ecological crisis. These conditions are obviously placing considerable strains on national and local governments, their institutions, machinery and resources, for example, in the production of shelter, the provision of infrastructure and the delivery of other urban public services. An increasing number of residents in African cities live in high density slums and squatter settlements (see Table 1 below).

Table 1. Estimates of the percentage of city population in informal settlements of some African countries in 1980

	Total Population (000s)	In informal Settlements Number (000)	Per cent
Addis Ababa, Ethiopia	1,668	1,418	85
Launda, Angola	959	671	70
Dar-es-Salaam, United Republic of Tanzania	1,075	645	60
Lusaka, Zambia	791	396	50
Tunis, Tunisia	1,046	471	45
Nairobi, Kenya	1,275	421	33

=====

Source: United Nations, Patterns of Urban and Rural Population Growth, Population Studies 68 (New York, 1980), 125-54, Table 48; and numerous country publications and published studies.

12. Population displacements and migration as a result of a lack of spatial policies, in times of economic decline, a mismanagement of agricultural resources, the continuing drought, desertification and armed conflicts in a number of African regions, are

accelerating the growth of these precarious settlements, as many more people leave the rural settlings for accommodation, and the institutional machinery to cope with this influx is weak and largely inexperienced.

13. Rapid urban population growth and the continued influx of migrants to the cities have not only perpetuated poverty, increased unemployment and underemployment, accentuated housing shortages and transportation deficiencies, but it has also aggravated the scarcity and inefficiency of infrastructural facilities and health services. There are few African cities where more than 30 to 40 per cent of urban households have access to treated pipe-borne water supply or proper waste disposal sanitation facilities. In addition, the haphazard spatial growth of African cities has had a negative environmental impact in terms of polluting streams and ground water, absorbing productive agricultural lands and denuding surrounding forests.

14. Most of African countries have experienced a massive deterioration of the essential environment and resource base of their development, with problems associated with sudden industrialization and explosive urbanization being added to those associated with underdevelopment and poverty. The ecological capital with which countries were blessed is being consumed at an increasing rate. It is not being replaced. In these countries, the critical balance between people, economy and ecology has been eroded to the point where environmental degradation has become a major cause of economic decline and social and political unrest and a major threat to national and regional security. Many current paths to development are not only sustainable but also, with the mounting demands for resources built into current trends, they can and in many African regions they have pushed populations over the brink of survival.

### III. POLICIES RELATED TO THE URBANIZATION PROCESS

15 In the countries of Africa policies related to urbanization have often been formulated at the local level, in an effort to limit the growth of a specific urban centre. Not unexpectedly, most of these policies cannot be implemented effectively, since the urbanization process takes place at a national scale and requires decisions to be taken at the national level. In general, the local level of decision-making lacks the political and economic power to control the process.

16. Macro-economic and sectoral policies have not been conceived and implemented within a coherent framework of national urbanization objectives and priorities and as a result they could not influence the nature and location of human settlements development, the rate and direction of urbanization, and on the ability of local governments to cope with the consequences of human settlements change.

17. What is invariably needed, therefore, is a national urbanization policy based on location criteria for economic activities, at least for the main urban centres in each region. In its environmental aspects, a national urbanization policy should be consistent with the preservation, restoration and improvement of the natural and man-made environment, cognizant of the positive role of environment in national and social development. With such a policy, Ministries of Planning, Finance, Industry, Agriculture, Environment, and so on would have clear goals and criteria against which to assess the effects of their policies and expenditures on the process of urbanization. Where policies and programmes act at counter purposes, they could be changed. At the very least, the environmental and spatial biases inherent in macro-economic and fiscal policies, annual budgets, pricing structures and sectoral investment plans could be exposed and assessed. Within such a

policy, the traditional tools of human settlements policy including land use planning and control, would stand a chance of being effective. The dominant models of human settlements development with their heavy reliance on high levels of energy and material use, could gradually be shifted in favour of indigenous models that take full account of local customs, societal priorities, environmental conditions and so on. Reflecting indigenous human settlements forms and architecture, they would be generally more energy and resource efficient.

18. A national urbanization policy, thus, attempts to include a spatial and environmental dimension in plans for economic and social development. Since economic and political forces determine the spatial structure of productive investments and services, and since it is this latter structure which in turn encourages the location of human resources in particular areas of the territory, the political and economic power should determine whether that structure serves the needs of the region or country in terms of a certain defined goals. In other words, it is the special role of central government in African countries to define, elaborate, approve and implement a national urbanization policy as a primary basis for dealing with the environment aspects of its human settlements. In no country of the region did we find such a policy fully elaborated, although a few governments are currently groping in this direction.

#### IV. POLICIES RELATING TO THE HUMAN SETTLEMENTS DEVELOPMENT PROCESS

19. The human settlements development process is the way that space within a settlement is defined, organized, acquired and put to use in the socio-economic system. No settlement, however, can plan its development and provide essential services for the well-being of its inhabitants without the participation of the national government. Indeed, the sectoral policies of central government, especially in the field of industrial and infrastructural development, shape and institutionalize the process of population concentration. Whenever a human settlements development policy has been formulated with an outlook opposite to, or merely different from, that of the sectoral policies of the central government, it has failed to be implemented.

20. The transformation of raw materials into goods, the application of resources to the provision of services and the consumption of energy for industrial, commercial, transport and household use largely take place in human settlements. Thus, human settlements can provide the framework for the conservation and recycling of non-renewable resources, the introduction of technologies using renewable resources and the management of resource-use so that life-support systems are preserved. However, solution of these technical problems must be accompanied by treatment of fundamental human-development problems, since the ultimate purpose of development is to improve human well-being. The expansion of national economies, the creation of job opportunities, the production of goods and services are not ends in themselves but merely means of providing people with access to the basic necessities of food, clothing and shelter, and a life of dignity, self-respect and free choice.

21. There is a large and rapidly growing body of literature about human settlements policies, but little consideration is given to

the environmental aspects of such policies, and such literature as there is tends to concentrate solely on issues related to air quality, water quality or the preservation of national landscapes. These are clearly important issues, but they are not the sole aspects of human settlements which deserve consideration. Human settlements have a central place in economic and social policy-making and in management of interactions between the built and natural environments.

22. Human settlements development policies at present are essentially normative and take the form of regulations and legal instruments issued by the central government and administered at the local level. During the last decades, many of these policies have concentrated on the formulation and implementation of master plans. These plans have been developed for a large number of cities, using different approaches and scope. In many cases, the plans have been supported both by national governments and by various international organizations. But such plans cannot solve any problems if they are not backed by adequate social and political decisions at the national level. Such backing has been very rare, with the result that it has not been possible to implement most of the plans. The investment they required could seldom be afforded and was not usually taken into consideration in the overall national plan. Moreover, traditional master plans are characteristically rigid and detailed, following obsolete criteria for the solution of pressing and constantly changing settlements problems. In order to achieve real solutions to such problems, it is necessary to have more flexible, and continually updated, local and national policies, as well as broader sets of criteria to contribute to two central development goals - productive, innovative economies and high-quality living environments - while also providing an important political framework for sustainably managing natural-resource use. The aim of sustainable development, in establishment a balance between human settlements development

and natural-resource use, is to meet development goals while ensuring that the use of natural resources and systems does not deplete the country's carrying capacity for future generations. Governments in African countries can foresee these problems and encourage resource conservation, recycling and reclamation now, by supporting the use of innovative technologies and by developing integrated settlements management procedures which take sustainability into account in decision-making.

23. One of the great obstacles to the rational allocation of resources, so as to achieve sustainable development, has been the lack of an integrating framework for decision-making on intersectoral resource-use priorities and a co-ordinating mechanism for implementation of decisions, once taken. Human settlements policies, however, is a vehicle for comprehensive evaluation of sectoral inputs to the development process and, particularly, for primary and secondary distribution of resources. Since the purpose of human settlements policy is the improvement of people's living and working conditions, it directly links development goals with sustainable methods of achieving them.

24. It is quite clear that the standard pollute-and-cure or react-and-retrofit approach to human settlements development that was adopted in the early 1970's is no longer working effectively in African countries. The damage effects of development are growing faster than environmental managers can keep up with them in the countries of the continent. It expresses itself in policies targeted on substances and products, on industries a urban regions, and on environmental resources such as air, water, soil, forests, coastal and marine waters, fish ad wildlife and their habitats. These polices are developed and delivered through institutions and laws organized in essentially the same way: i.e. substances [ e.g. air or water pollutants, chemicals, etc.], products (e.g. electrical appliances, aerosol cans], industrial groupings;

decentralized regional or sub-regional officers; and departments or separate agencies for the management of air water, soils, forests, and other environmental resources.

25. Most environment agencies in African countries are very small and weak, with no real political power and with resources that bear no relationship to their broad mandates and rapidly growing needs and responsibilities. Environmental and conservation institutions were given a role separate and distinct from development, a role related directly to the treatment of air and water pollution and to the conservation of nature, parks and species. They were asked to deal with the symptoms -ameliorating environmental and resource damage - because the symptoms had got out of hand. They were not asked to deal with causes.

26. Despite relatively rapid development of legal principles, guidelines, rules and procedures, as a body of law and potential international legal framework, there are still major deficiencies to overcome before it can be considered adequate and effective in relation to the emerging and even present problems of environment and human settlements development:

- (i) it lacks consistency and coherence as it has developed in a largely episodic, incremental and ad hoc manner;
- (ii) it reflects a predominantly react-and-cure rather than anticipate-and prevent approach as it developed largely in response to situations where significant damage ahead already occurred or appeared imminent.

27. In the present context of rapid urbanization and economic crisis facing most of African countries, the developmental role of the local government and of local democracy assumes particular importance. The thrust for local government reform is a critical part of the wider effort to counter the deterioration in human

settlements economies and living conditions, and to develop more livable and sustainable settlements.

28. Most functions and services essential for the efficient performance of an urban economy, and for a healthy and productive city, are best delivered at the urban level. In many instances, national governments have assigned local authorities many of these tasks and responsibilities, but they have not given them the potential power, decision-making capacity, and access to resources needed to give effect to these responsibilities. This leads to frustration, to continuing criticism of local government for insufficient and inefficient services, a to a downward spiral of weakness feeding on weakness. Local government is also the most effective level for mobilizing national resources. Thus national government must work with local officials to build the capacity to play three critical roles:

- (i) represent the needs of local citizens in negotiations for resources and investments from higher levels of government;
- (ii) co-ordinate plans and investments of sectoral ministries and agencies; and
- (iii) mobilize local resources - for instance, extensions to or improvements of local roads or market places, and so on.

29. In Africa, governments are actively promoting the settlement of forest lands through land grants and resettlements schemes and the opening of precarious roads. These roads and settlements are sometimes financed through international banks and multilateral and bilateral assistance agencies, under policies and programmes that are not assessed to determine whether the development being

promoted is sustainable or not. The banks and multilateral and bilateral assistance agencies are now aware of links between environment and human settlements development, but few have articulated a policy to cover them or reflected that policy in their budgets, organization and staffing. Achieving sustainable development of human settlements will require a common effort of unprecedented proportions to reorient certain economic, trade, aid, energy, agricultural and other policies that underline many unsustainable forms of development.

30. All major international bodies in the United Nation system should be made similarly responsible and held accountable for ensuring that their policies, programmes and budgets encourage and support developments and practices that are sustainable over the short and longer term, especially the UN Economic Commission for Africa, UNDP, UNCTAD, UNFPA and the United Nations Specialized Agencies such as FAO, WHO, UNESCO, UNIDO and others. Each agency should be made responsible for ensuring that the environmental and resource aspects of programmes and projects are properly taken into accounts when they are being planned, and that the financial resources needed are provided directly from its own budget and made an integral part of project funding.

31. A successful transition to sustainable development means revising the current trends of accelerating urban concentration and urban decline in African counties. Of primary importance is the need to re-examine and reorient the central economic and major sectoral policies which now induce and reinforce mega-city growth, urban decline and poverty. This will require adoption of much broader concept to human settlements policy than has yet been reflected in most national institutional frameworks.

32. The capacity of the United Nations to advise and, assist African countries in implementing these priorities also needs to be

Page 16

strengthened. This will require new efforts by and better co-ordination among many of the major United Nations Organizations and Specialized Agencies, with regards to the United Nations Economic Commission for Africa, this could be achieved by increasing support for the United Nations Economic Commission for Africa programme and launching a special and joint ECA/UNCHS/UNEP programme on reducing the environmental impacts in and of human settlements.

## V. POLICIES ON URBAN LAND

33. The lack of a land policy inevitably creates situations where development takes place with no provision for basic public infrastructure. The lack of a supply of serviced land is a guarantee for growth of substandard settlements, for excessive expenditures when regularization and upgrading have to be undertaken, and for high degrees of exploitation in the provision of essential services, such as drinking water for the poor and deteriorating health conditions of low-income population. The lack of a land policy also leads to failure of the land-supply system, with severe impacts on the living conditions of the poor.

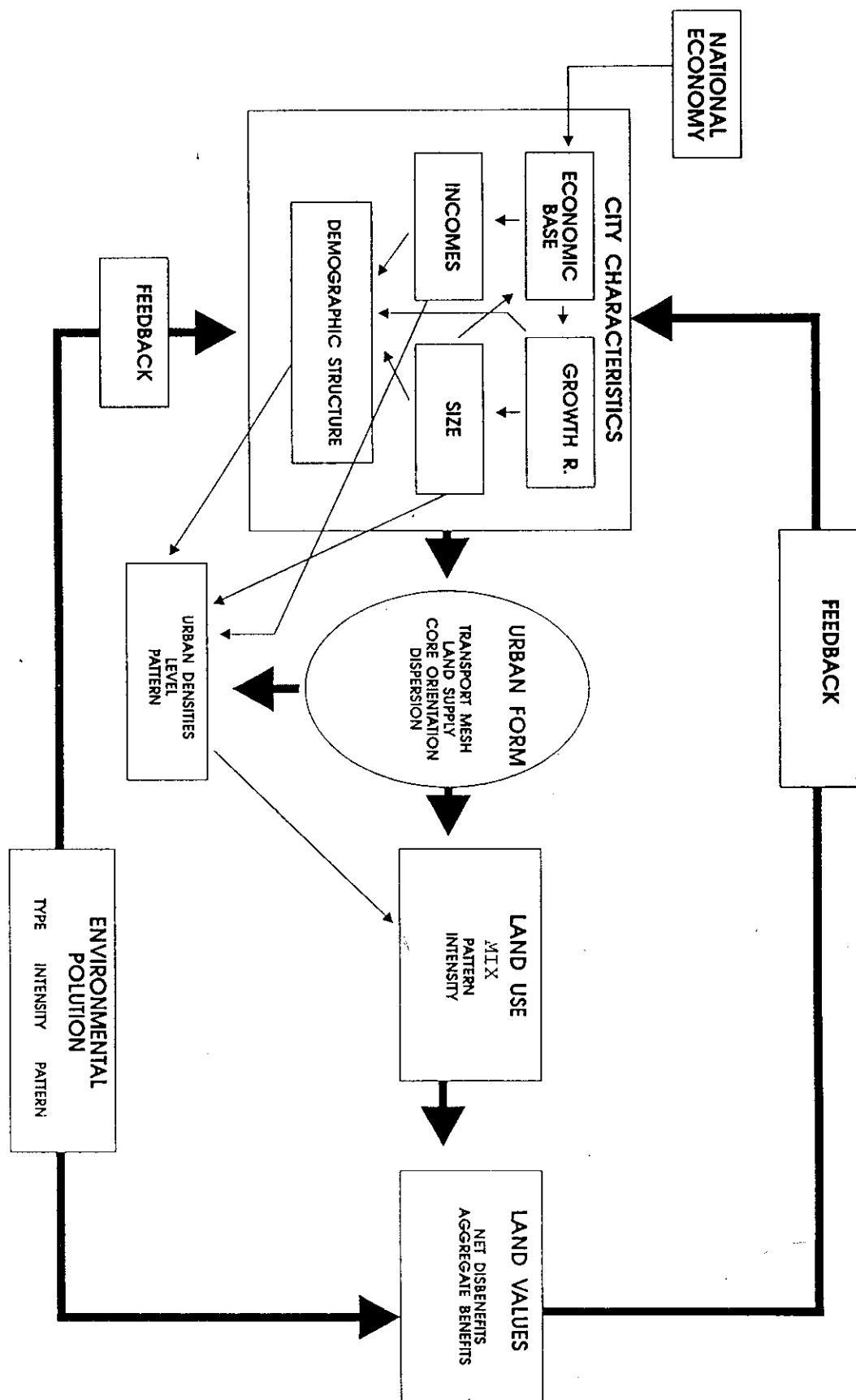
34. Not only is appropriate and adequate quantitative allocation of land resources required for residential, industrial, commercial, institutional, social, recreational transport and other settlement uses, but the assigned locational patterns of these uses should be such that compatibility and complementarity among functions are achieved and negative environmental impacts from them minimized. The links between the urban economy, land use and environmental pollution are shown in Figure 1.

35. In most countries of Africa, the practically-uncontrolled operation of the urban and land market and the process of wealth concentration in the market are the main causes of environmental problems at this level. Three aspects of the current urban land market situation in these countries deserve special mention:

- i) The high price of land in the downtown area of the agglomeration and the increase over time, in price of more peripheral sites as a result of the oligopolization of the market which prevents lower income groups from buying urban land;

- ii) The large number of speculative subdivisions in the main urban centres which have taken place during the last few decades, as the urbanization process has accelerated. The land involved is often of low quality, easily flooded, close to dumps or to noxious or annoying industrial plants. The speculative character of the process also means that plot sizes are minimal and their shapes inappropriate. The land unnecessarily subdivided remains vacant for a relatively long time, as the large owners and speculators hold it back from development in anticipation of appreciation in its value and because of the lack of funds for such investment by many in the low-income bracket. The high social cost that vacant plots represent can best be measured in terms of the unnecessary expansion of the urban area and of the basic infrastructural networks of roads, water and sewage pipes, electricity and telephone cables; and the equally unnecessary high level of transportation costs and travelling time, especially for the low income group, that this low-density patchwork development pattern involves;
  
- iii) The lack of control on the use of urban land leads to high population densities in some areas in the urban centres, as a result of high land prices. This in turn causes serious environmental problems such as air pollution from home incinerators and from motor cars, lack of sunshine in the dwellings and minimal dimensions of rooms. Moreover, this lack of control gives rise to the mixing of incompatible uses, such as the location of offensive or noxious industries next to residential areas.

FIGURE 1  
THE LINKS BETWEEN THE URBAN ECONOMY,  
LAND USE AND ENVIRONMENTAL POLLUTION



36. Appropriate and adequate servicing of urban land has become a serious issue in achieving sustainable urban development. Where unaffordable standards are applied, resources are wasted, and many people are deprived of basic infrastructure. Arising from the rapidity and spontaneity of urban growth over the past decades, from the shortage of resources to attend to this growth from the unplanned manner in which this growth has occurred, much development is not adequately serviced with necessary utilities. The percentage increase in the built-up areas of many cities has been over 100 per cent in the past 20 years, and it has been impossible to plan for and extend essential services. This, in addition to the usually high intensity of land use in informal settlements, leads to degradation of land resources. The result has been deterioration of living and working environments in urban areas.

37. There is need for each country to prepare and implement a national plan for land-resources utilization. It is in the overall context of advance planning that effective protection and optimum use of environmentally sensitive land resources is possible. Encouragement of high-density urban settlements and of settlement consolidation in some rural areas could be an effective mechanism for protection and management of land resources. A concentrated settlement pattern would also economize on the provision and installation of necessary infrastructure, which would make also economize on the provision and installation of necessary infrastructure, which would make a healthy living and working environment.

38. Rationalization of land-tenure systems is a prerequisite for effective management and protection of the land resources. Policies and programmes aimed at rationalizing inefficient land-tenure systems and practices should be evolved and put in place, and measures to effectuate such rationalization expedited. This

rationalization should involve, in the main, the individualization of rights and titles to land and the provision of legal instruments to enable transactability of such rights.

## VI. CONSTRUCTION SECTOR POLICIES

39. The spontaneous and, often, uncontrolled pace of human settlements development in many African countries makes it particularly difficult to control the attendant degradation of living conditions. For example, the increasing spread of human settlements into fragile eco-zones is rapidly destabilizing natural eco-systems in many countries. Occurrences of floods, landslides, mudslides etc., caused by construction on delicate hilltops, wetlands etc., testify to the vulnerability of the environment to intervention by human activities. For example, in Lagos, swamp and coastal lands were recently filled to form construction sites. As a result of the landfills, large urbanized area in the city is now periodically flooded. Appropriate land-use policies and planning aimed at eco-sensitive zones, would be required to reverse this trend.

40. The highly dispersed character of construction activities in most African countries makes it difficult to monitor the physical disruption caused by construction. There is a growing concern, in many countries, about increasing land dereliction, caused by quarrying of sand and gravel, extraction of brick clay etc., which ultimately reduces the available land for human settlements development. The degradation of the marine environment, caused by coral mining for production of building lime, and the disruption of wildlife habitats and watertables, by excavations, etc., are now attracting increasing attention of physical planners and coast-conservation authorities.

41. Pollution caused by construction activities, particularly by the building-materials industry, is a topic that needs urgent attention. Production of cement, lime and bitumen claimed a significant share of this pollution. Atmospheric air pollution mainly from cement dust can be observed in areas where cement is

manufactured in Africa. This is aggravated in countries in the Sudano-Sahelian region (Senegal, Mali and Nigeria) by the Sahara dust storms at certain times of the year. The excessive dependence of building materials industries on the use of firewood in African countries adds significantly to carbon dioxide emission and production of 'greenhouse' gases. The use of alternative locally-available fuels, e.g., rice husks, and promotion of gasifiers would not only improve energy efficiency of the production processes but also reduce 'greenhouse' pollutants.

42. Implementation of the policy in the field of construction sector will call for concerted actions at the national level, some of which are described below:

- i) Formulate a coherent strategy for indigenization of factor-inputs in the construction sector, in order to optimize the exploitation of the natural-resource endowment;
- ii) Direct research efforts in national research and development institutions towards the development of energy-efficient, clean technologies which can operate at a small-scale, using indigenous factor inputs;
- iii) Promote appropriate standards, specifications and other regulatory measures, with a view to supporting clean, energy-efficient technologies and environmentally-sound utilization of natural resources;
- iv) Formulate appropriate land-use policies and introduce planning regulations specially aimed at protection of eco-sensitive zones against physical disruption by construction activities.

43. The international community could support national activities to achieve sustainable development, through transfer of : low-waste and non-waste technologies and clean technologies for building-materials production, appropriate technologies for resource management in construction, particularly, for non-renewable resources.

## VII. POLICIES ON SHELTER PROVISION

44. Different patterns of income distribution are reflected in the spatial distribution of the population within the urban area and in the way physical and social services are supplied to various residential districts. In general there is an inadequacy in the collective consumption of these services in a large number of these districts. Owing to the dependent nature of the economy and the limited financial resources, national governments in most countries cannot eliminate these shortages in collective consumption. This is the source of the most challenging environmental problems in these countries, and it provokes a search for new and imaginative solutions in the short and medium run.

45. Growing poverty and environmental degradation are the blunt realities for increasing millions of Africa's people. In many African countries poverty is the principal source of environmental degradation and its principal effect. Poverty-induced environmental destruction is growing in countries throughout Africa, especially in the least developed rural areas where life for many is precariously balanced between subsistence and disaster. Their present and future prospects are circumscribed by a combination of ecological decline, limited options and national and international policies over which they have little influence and no control.

46. There are close, and often obvious, associations between low quality residential environments and poor health. Poor sanitation, insufficient water supply, poor water quality, overcrowding, inadequate garbage disposal, and infestation by rats and flies are commonplace. All these have adverse effects on health, contributing directly to high rates of diseases related to poor sanitation, respiratory infections, and accidents.

47. Given urbanization trends in most African countries, governments can intervene in the process of urbanization and they should be guided by some priorities such as:

- i) supply existing and new housing areas with infrastructure and services;
- ii) set-up neighbourhood offices to provide advice and technical assistance on how housing can be built better and cheaper and health and hygiene improved;
- iii) plan and guide the city's physical expansion to encompass needed land for new housing, parks, childrens' play areas, and on at a reasonable price that allows lower-income groups to have easy access to work and public facilities.

48. Governments have increasingly sought to develop policies that will meet the basic needs of the majority of the population and stimulate local communities to help themselves. Primary health care aimed at strengthening individual and collective responses to health needs is one example; upgrading and improving existing slums and squatter settlements is another. Many governments are now recognizing the realities of their resources limitations and institutional constraints and moving away from their earlier policy emphasis on idealistic schemes of slum/squatter clearance. They are also reducing emphasis on direct housing provision by Government - an approach that has largely proved costly, ineffective and counter-productive. Several African countries are already sponsoring the improvement of slum and squatter settlements through a process which, instead of demolishing such settlements, tries to improve them by providing them with basic facilities and services such as access roads, water supply systems, electricity, waste disposal, sanitation facilities and fire protection. This approach has involved, inter alia, a modification of existing conventional standards, codes and regulations, and is often

complemented with standards, codes and regulations, and is often complemented with sites and services programmes which provide serviced plots to individuals to build their houses at their own pace and consonant with their resources.

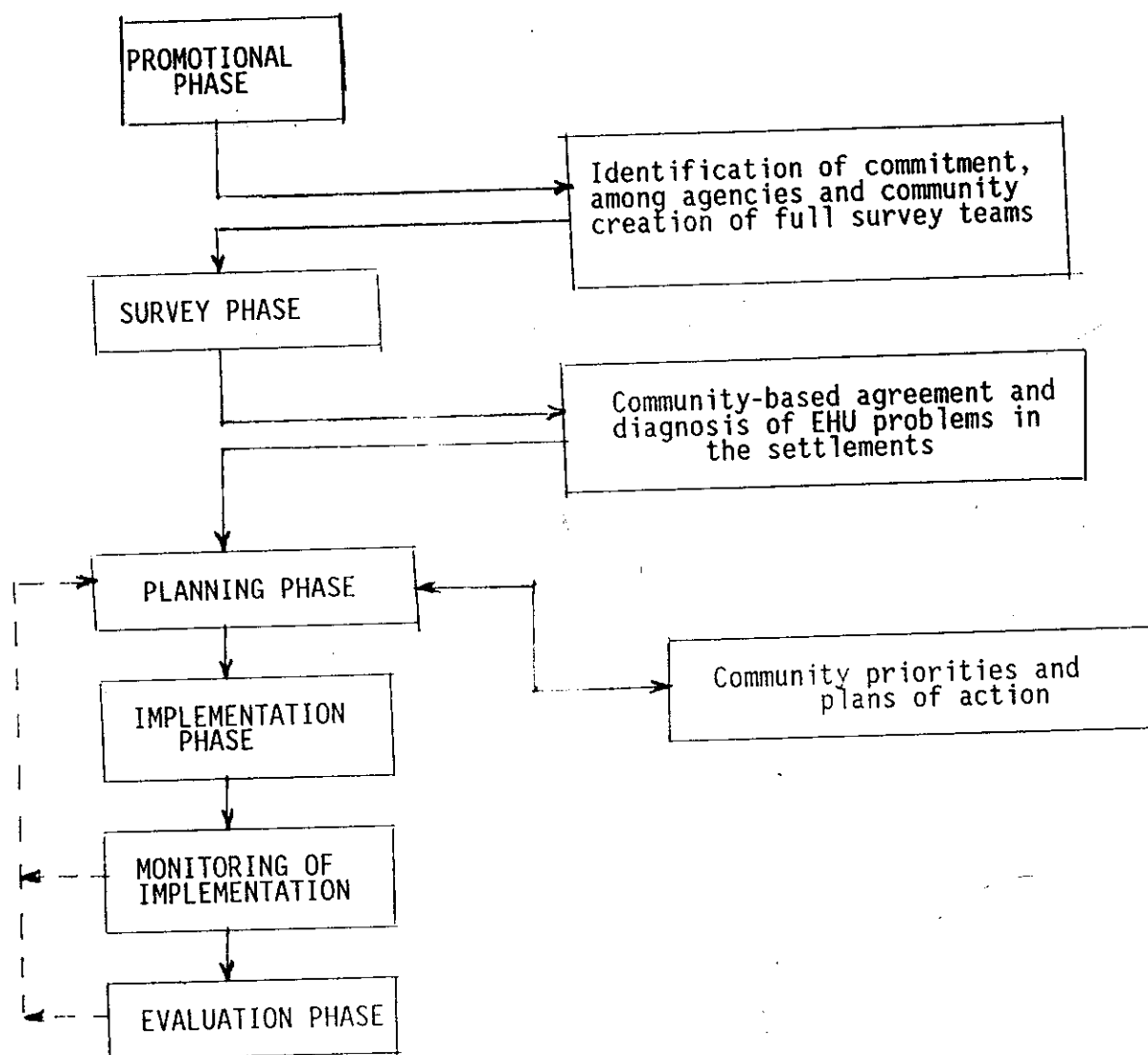
49. In most countries of the African region, existing housing and human settlements planning and building standards, including permissible building materials, are foreign-derived and have been applied without adequate modifications to take account of local weather or climate, materials and technology, culture, etc., and generally in an inflexible manner over the years. Many of these standards are considerably beyond what a majority of the local population can afford, as they tend to require skills and materials that are not readily or commonly available at a reasonable cost. The net result is that these unrealistic standards constitute a serious constraint on legal housing production and on human settlements development and improvement. In some African countries, for example, most buildings, constructed with local materials, are by virtue of that, still classified as temporary buildings. In some places where review, modification and simplification of the standards and requirements have been approved at the policy level, implementation is often held up at the technical level as current executing officials, out of professional inertia, have found it difficult to change. The necessity to revise, modify and simplify building codes, and planning/design standards to take account of local realities and needs cannot be overemphasized. This task is of such recognized importance that it constitutes the major thrust of emphasis of the Lagos Plan of Action in the human settlements sector.

50. Self-reliance and local governance by the poor in their own neighbourhood associations has emerged as a notable phenomenon in many cities of Africa; left to their own means, the poor have organized to fill gaps in services left by the local government.

Among other things, community groups mobilize and organize fund-raising or mutual self-help to address security, environmental and health problems within the immediate area. Most house building, maintenance, or upgrading in African cities is already done outside official plans and usually in illegal settlements. Some governments have offered positive support by upgrading conditions to those living in illegal settlements. But few have actually institutionalized such programmes so that public ministries or agencies work continuously with community organizations. Governments should support the efforts of community organizations in developing their neighbourhood. Such cooperation would change the relationship between governments and neighbourhood organizations, creating the possibility for individual citizens and their organizations to participate in decisions about resource allocations that affect their neighbourhood and city. The inhabitants of illegal or informal settlements would become legally entitled to publicly funded infrastructure and services. But government, in return, would be able to tap the energies, resources and inventiveness of these people and their organizations. Governments would become partners and sponsors of the people who are the main builders of tomorrow's cities.

51. The improvement of environmental health in low-income settlements comprises a number of sequential phases and these are presented in Figure 2.

Figure 2. Phases in the process of improving environmental health <sup>1/</sup>



<sup>1/</sup> The methodology.

#### VIII. ENERGY POLICIES FOR HUMAN SETTLEMENTS

52. Some of the key environmental issues stemming from urban energy consumption are:

- a) indoor air pollution, which puts particularly women and children at risk;
- b) sectoral actions at the municipal level, which negatively affect the environment, e.g., transport and air pollution;
- c) land degradation at the regional level, which is exacerbated by urban demand for biomass fuels; and
- d) intensive and increasing consumption of energy in developing cities, which results in growing emissions of greenhouse gases and extra-urban air pollution and crop damage due to acid rain emanating from coal-fired power plants.

53. Reviewing an energy balance is a useful first step in understanding a city's energy-environmental problems. Besides letting one focus on the key fuels and sectors, an energy balance can also point out special features of each sector. For example, in the cities of sub-Saharan Africa, woodfuels constitute a far greater proportion of the balance and are primarily consumed by households. But without additional information, the balance does not allow for much to be said about environmental issues linked to this pattern of energy consumption. For this, one needs to know more about how fuels are provided to and used in the city.

54. Understanding urban demand for energy requires specific information about end-uses and special factors for each fuel-consuming sector. As an example, information is given below about the urban residential sector. As energy is an input to other processes, it is important to have information about these end-uses

for each fuel. Table 2. provides an example of such information about the five principal cities of Senegal. This breakdown allows one to pinpoint that cooking with charcoal is the most important household use of fuel in these areas. One can then proceed to examine the environmental risks associated with this end-use.

TABLE 2: Senegal Urban Household Energy Consumption by End-Use, 1986						
End-Use	Wood	Charcoal	Electricity ('000 TOE)	LPG	Kerosene	Total
Cooking	16.5	370.8	-	10.4	0.5	398.2
Lighting	0.9	-	8.5	-	2.1	11.5
Appliances	-	-	30.7	-	-	30.7
Other a/	0.9	41.2	3.4	1.1	-	46.6
TOTAL	18.3	412.0	42.6	11.5	2.6	487.0
a/ Waterheating, charcoal iron, etc.						
SOURCE: World Bank/UNDP "Senegal: Urban Household Energy Strategy," ESMAP Report No. 096/89, 1989.						

55. Next it is important to assess the factors that influence energy demand, especially if one policy option for environmental intervention is to be demand management. Continuing with the example of the residential sector, the key determinants of demand are : a) the relative price of the energy and the appliance that it will fuel; b) the disposable income of the household; c) the availability of the fuel and related appliance(s) in the market; d) particular requirements related to each end-use, and e) cultural preferences. In addition, urban household fuel consumption generally follows the 'energy ladder' on which residences move from consuming less costly and less convenient fuels (wood, other biomass) to energy of intermediate price and quality (charcoal, kerosene) to more expensive, highly convenient types of energy (LPG, electricity) as their incomes rise and/or habits change over time. The income effect, in some instances, may have downward mobility on the energy ladder, with consumers

switching from modern fuels back to biomass because of declining urban incomes. For example, in sub-saharan Africa, woodfuel demand grew by 3.1 per cent per capita annually from 1975-85 while real GDP per person fell by 1.8 per cent each year.

56. There is an important conceptual issue that needs to be grasped by those focusing on energy-generated urban environmental problems. Specifically, environmental externalities do not exist in and of themselves; they are imbedded in sectors and systems. The implication of this is that one must understand and work through the phenomenon that creates the problem, placing it within the priorities and constraints of that sector. For example, to deal with the environmental consequences of vehicle exhaust, it is necessary to examine the issue of cleaner fuels (reducing/eliminating lead in gasoline and sulphur in diesel), but also encouraging the use of energy efficient and clean vehicles, improving traffic management, improving public transportation, and developing a policy framework (regulatory, pricing, and taxation mechanisms) to reinforce these actions.

57. Options to address urban-driven land degradation include:

- a) a variety of programmes to improve management of woody biomass resources;
- b) dissemination of affordable improved carbonization methods that convert wood to charcoal at greater efficiencies than traditional methods, thus reducing demand on forest resources;
- c) conservation measures in the urban informal sector to reduce woodfuel demand;
- d) accelerated switching to affordable fuels, such as kerosene, liquefied petroleum gas and renewables which can substitute for woodfuels that are used by households, industries and the informal sector;

- e) economic pricing policies for woodfuels and equipment that encourage conservation and substitution.

Again, when considering these options, one should examine the context of the problem. A caveat in this area is that energy demand is, in some cases, not the most important cause of land degradation. For example, the Energy Sector Management Assistance Program urban household energy strategy study for Zambia concluded that only 12 per cent of woodland clearing could be directly attributed to woodfuel production; the major cause of natural vegetation destruction in the urban biomass catchment areas was conversion to cropland.

58. Another aspect of energy use in human settlements concerns the design, construction and operation of buildings. The energy required to manufacture building materials constitutes over 80 per cent of the embodied energy in the cost of a building. Most of this energy is used in only a small number of the materials used in buildings, principally steel and aluminium products, cement and concrete products, paint, plastic products, bricks and wood products and this embodied energy in a building amounts to several times the annual energy consumption of that same building in use. Thus, designers have the opportunity to make a contribution to the reduction of total energy use in the built environment by designing buildings with low-energy materials. They also have to be brought to realize the usefulness of passive solar heating and natural cooling of buildings, and encouraged to design buildings which incorporate these techniques: settlement plans should take into account the need to orient buildings for maximal energy-efficiency.

59. At the level of the individual project, urban energy sector or energy-intensive projects (e.g. industrial, transportation) that are likely to have significant environmental impacts should be subjected to an environmental assessment at an early stage of their development. The assessment process should begin with a

preliminary comparison of the basic energy production/distribution/use options on environmental grounds in order to possibly reduce the range of alternatives. Next, an optimal variant of each basic alternative should be compared in terms of environmental impact. At the detailed planning level, the environmental assessment should generate information on the chosen alternative so that a project can be designed that takes into account economic aspects, properties of the energy system, and environmental factors. Some of the project and policy-oriented options that were presented for key issues are listed in Table 3 below:

TABLE 3: Selected Options for Key Issues

<u>Energy-Related Environmental Problem</u>	<u>Project Options</u>	<u>Policy Options</u>
INDOOR AIR POLLUTION	<ul style="list-style-type: none"> <li>- efficient cookstoves</li> <li>- improved ventilation</li> <li>- consumer education</li> </ul>	<ul style="list-style-type: none"> <li>- substitute fuel pricing</li> <li>- building codes</li> <li>- taxing hazardous products</li> </ul>
TRANSPORT-RELATED POLLUTION	<ul style="list-style-type: none"> <li>- improved public transportation</li> <li>- unleaded fuels catalytic converters</li> <li>- Improved traffic management</li> <li>- para-transport</li> </ul>	<ul style="list-style-type: none"> <li>- zoning and land-use planning</li> <li>- emissions standards</li> <li>- fuel pricing and taxes</li> <li>- restricted driving days</li> <li>- vehicle inspection standards</li> </ul>
PERI-URBAN LAND DEGRADATION	<ul style="list-style-type: none"> <li>- biomass resource management programs</li> <li>- improved carbonization</li> <li>- industrial energy conservation</li> </ul>	<ul style="list-style-type: none"> <li>- woodfuel taxes</li> <li>- interfuel substitution pricing</li> <li>- land use planning</li> </ul>
GREENHOUSE GAS EMISSIONS	<ul style="list-style-type: none"> <li>- reducing losses in energy supply</li> <li>- more efficient end-use technologies</li> <li>- substitution (cleaner fuels and technologies)</li> <li>- transport measures (listed above)</li> <li>- land measures (listed above)</li> </ul>	<ul style="list-style-type: none"> <li>- economic efficiency pricing of fuels</li> <li>- removal of market imperfections which impede efficiency</li> <li>- technology standards, e.g., for appliances</li> <li>- transport measures (listed above)</li> <li>- land measures (listed above)</li> </ul>

60. The key conclusions from this section of the paper are:

- i) National action programmes should promote integrated production of agricultural-waste and biomass energy outputs, and support reforestation and natural-forest regeneration, with a view to a sustained provision of biomass energy to meet the needs of poor households;
- ii) Large-scale dissemination and commercialization of mature renewable energy technologies should be promoted through fiscal measures and internal and external technology-transfer mechanisms, to encourage local manufacture and commercialization of products which make use of these technologies;
- iii) Designers and builders should be encouraged, through building regulations, standards and codes of practice, to use low-energy locally produced building materials;
- iv) African countries should be provided with an access to research and development results, to increase energy-use efficiency levels, especially in human settlements. International organizations should promote the transfer of state-of the art technologies for improving energy conservation and fuel efficiency in human settlements.

# **IX. WATER - SUPPLY POLICIES REFLECTING SUSTAINABLE DEVELOPMENT PRINCIPLES**

61. Although the proportion of water utilized in human settlements of Africa is modest in comparison with other uses, such as agriculture, (see Table 4 below), the uncontrolled use of water for human settlements can have far-reaching negative impacts. These impacts can vary from the direct degradation of contiguous water bodies receiving untreated wastewaters to desertification and the upsetting of ecological balances around remote dam sites. For example, in North Africa, small dams and new wells to supply human settlements are also used for livestock watering and bring them the risk of sharp increases in herd size and consequent overgrazing, soil erosion and eventual desertification in and around the settlements.

Table 4: Sectoral withdrawal of freshwater by some of African countries (percentage)

Country	Domestic/commercial	Industrial	Agricultural
Algeria	23	5	72
Botswana	8	17	75
Cape Verde	8	0	92
Egypt	7	-	88
Ghana	44	3	54
Mauritania	2	0	98
Uganda	43	0	57

Source: The World Resources Institute and Institute for Environment and Development, World Resources 1988-89 (New York, Basic Books, Inc., 1988) Table 21.1, pp.318.319.

62. As African countries increasingly rely on industrialization for economic growth, water demands in urban areas will not remain at present levels but will increase exponentially. Failure to meet this demand will increase the cost of producing goods, thereby, damage threatened national economies in the countries.

63. Urbanization heightens the relationship between available water quantity and water quality. Cities are faced with the mounting cost of water shortages, water treatment, well deepening and development of remote new sources. The cities in Africa, therefore, face a dilemma: they have limited means with which to expand the supply of water and maintain its quality but they need to expand water-supply services to meet the ever-increasing needs of industry and to support the population which makes up the industrial workforce, if economic growth is to be sustained. The result is that urban authorities have both assumed a laissez faire attitude to water pollution and accepted the right of industries to be provided with water supplies on a first-priority basis. This policy, first, threatens local water resources and, secondly, deprives the urban poor of access to even the minimum quantities of safe water essential for survival. There is consequently an alarming widening of the gap between water demand and supply - between consumption and potentially available safe water resources - in many of the urban areas of African countries.

64. While sound water-management policies are essential for economic development and urban growth, policies are not sufficient by themselves: African managers must be provided with the tools and capacities with which to make such policies work. This will require the development of appropriate planning, implementing and management tools, the introduction of mechanisms to generate and manage increased revenue for water-resource development activities and the creation of a cadre of professionals who can address such critical areas as water and waste management, pollution control,

municipal finance, integrated water-resource planning and operation and maintenance of water-related infrastructure and services.

65. In most African countries urgent action is necessary to:

- i) Implement programmes to conserve water resources, reduce service costs and manage water demand in human settlements, through protection of water sources, use of economical water-treatment technologies, use of water-saving plumbing fixtures, appropriate pricing policies that discourage wasteful uses and public education;
- ii) Enforce water-quality standards and use of financial instruments, based on the 'polluter pays' principle, to prevent water-quality degradation;
- iii) Implement programmes to recycle and re-use wastewater in industry and agriculture.

66. In developing and using water resources, African countries should give priority to the satisfaction of basic needs. Beyond basic needs, governments should charge for water at its true marginal cost.

67. The international community should :

- i) Provide assistance in gathering and disseminating information on environmentally sound policies, techniques and approaches to managing water resources for development;
- ii) Provide assistance to enable national governments to assess their water resources, to monitor water quality and use this information in national development plans and settlements plans.

**X. SOLID-WASTE, SANITATION AND WASTEWATER POLICIES**

68. Solid wastes cause serious and long-term pollution of land, air and water. Large areas of land in or near urban areas of many African countries have been spoiled by careless dumping of waste, and soil on many disused industrial sites has been made unusable and toxic by careless deposition of process wastes. Housing near past and active disposal sites has been threatened by explosive gases that are generated by decomposing wastes.

69. Progress in the provision of sanitation to rural and urban communities in African countries has not been as rapid as expected over the period of the International Drinking Water Supply and Sanitation, 1981-1990. There is still a tendency among decision-makers in African countries to prefer advanced technology, on the assumption that low-cost appropriate technology is inferior, but current appropriate waste management and sanitation technologies are not inferior to the conventional systems widely used in industrialized countries, and decision-makers must come to realize that high-cost sophisticated systems are neither necessary nor affordable and are, often, inappropriate. Low-income groups living in rural communities and in urban slums and squatter areas are now poorly served with solid wastes and sanitation management, and institutional attitudes preventing progress must change, if improvements are to benefit the whole population. The provision of solid wastes, sanitation and wastewater services is usually a governmental prerogative, and institutional deficiencies have often been a constraint on progress. Fragmentation and unclear delineation of management responsibilities among too many governmental agencies have been a great impediment in the past, and lack of integration with national development planning has resulted in low priority being given to the sector.

70. In most African countries important measures are necessary to:

- i) Develop and utilize planning tools for solid waste and sanitation services, including risk-assessment and impact-evaluation methods, based on environmental accounting;
- ii) Undertake a detailed evaluation of sources of domestic, commercial and industrial solid wastes, sanitary wastes and their impact on the environment, especially the human living environment, and prepare a comprehensive, time-structured and affordable national plan to abate, if not eliminate, urgent problems associated with solid wastes and sanitary-waste management;
- iii) Incorporate in national operational programmes the recycling and re-use of solid wastes, sanitary wastes and wastewaters in both agriculture and industry;
- iv) Provide incentives for the development and use of innovative technologies in solid wastes, sanitary wastes and wastewater management.

71. African governments should give priority to the provision of basic solid-waste disposal practices, sanitary waste-disposal facilities to low-income groups. They should upgrade solid-waste disposal practices, with the aim of reducing their negative impact, including the use of sanitary land filling instead of open dumping and the use of apparatus, such as particulate removers and gas scrubbers, on emission stacks. These governments should develop national programmes for the provision of sanitary-waste-disposal facilities, based on the wide use of upgradable low-cost technologies, on the use of innovative forms of revenue generation, on community and, particularly, women's participation and on non-governmental organization and private-sector involvement.

Page 42

72. The international community can support national actions by transferring appropriate technologies for solid wastes and sanitary-waste management, especially technologies that favour recycling and re-use.

## XI. TRANSPORT POLICIES

73. National policies on transport in many human settlements of Africa are usually lacking, and transport planning at local levels tends to adopt, for the sake of simplicity, a strictly sectoral approach. Broad social, economic and environmental objectives are, often, beyond the concern of transport planning which normally takes no account of any external effects likely to be produced.

74. Investments in transport infrastructure have, often, been made in many African countries without considering their impact on the environment. Not only was the impact of expected air pollution on the regional environment not considered but also local impacts, such as smog and noise generation, land consumption, soil contamination, disturbances in water systems, deterioration of the built environment and visual intrusions, were not given appropriate attention. This practice needs to be changed, by requiring each project to contain an integral environment-impact assessment.

75. Policies aimed at bringing transport in human settlements into harmony with principles of sustainable development should respond to national and local development objectives and reflect specific local conditions. At the same time, they should contribute to sustainability of development in regional dimensions. The following set of recommendations may be of help in devising such policies in African countries:

- i) National, regional development planning and local land-use planning should be deeply concerned with the implications of transport and of transport-related environmental effects; they should be effectively used for decreasing the demand for transport, preventing its excessive concentration and mitigating its ecological

impacts, e.g., by encouraging rather than dispersed development patterns.

- ii) Fiscal policies and other economic instruments should increase the share within the transport sector of transport modes with high energy-efficiency and low emissions;
- iii) The role of public transport in making urban transport compatible with the requirements of sustainable development should be fully recognized and be adequately reflected in urban transport plans and development programmes. High-occupancy public-transport vehicles should be given preferential treatment in traffic-management policies. Co-ordinated transport and land-use planning should make provisions for gradual improvements to public-transport systems, so as to enable them to respond to a fast-growing demand for transport.

## **XII. HOW TO PROVIDE FOR THE IMPLEMENTATION OF HUMAN SETTLEMENTS AND ENVIRONMENTAL POLICIES**

76. Human settlements policy which is consistent with the improvement of the natural and man-made environment should be implemented by using tools for intervention in ongoing settlements activities. The task of putting agreed human settlements policies into practice and achieving the desired objectives is not easy, yet it is often the aspect of environmental planning and management that receives least attention. Lack of legal authority, cross-purposes at different levels of government, or lack of control over private actors limit the ability of government agency to achieve environmental objectives.

77. Although the objectives, form and capacity of administrations vary greatly from country to country, the tools available for government intervention in settlements development can be grouped into the four basic categories:

- i) Provision of information and public education;
- ii) Taxation, charges and other economic incentive/disincentive mechanisms;
- iii) Regulatory mechanisms;
- iv) Strategic capital improvements, maintenance and operation.

78. Each of these tools can be used individually or in combination with others within the framework of long-term, cross-sectoral, and area-wide strategies for the implementation of environmentally-sound human settlements policies.

79. Public education and information is one of the government's most important tools for achieving settlements objectives. It improves public awareness of settlements problems and means for

solving them. This tool is also effective for implementing environmental policies.

80. Taxation, charges and other economic incentive/disincentive mechanisms provide opportunities for using government-controlled market forces to influence settlement development towards optimum use of environmental resources. Application of economic mechanisms is most effective for the implementation of human settlements policies that are directed at managing resource use, when resource availability is understood, and when resource consumption can be measured as with ground-water use. Ideally, these mechanisms are designed so that each activity pays for the complex social cost it imposes by consuming or degrading resources or by increasing natural hazards. Aside from encouraging compliance with environmental policies this tool promotes the most economical overall use of environmental resources and it provides revenues that can be used for regeneration of the environment and for assisting those who carry the burden of environmental degradation.

81. Regulations are important instruments for dealing with high priority environmental concerns, such as protecting drinking water from hazardous waste. Establishment of codes and regulations is a relatively easy administrative task. Specialists can readily translate policies into plans, codes, and performance standards that apply to specific environmental settings. Such standards can then be used during project development as input to cost/benefit analyses for construction and operation at alternative locations and using alternative technologies.

82. Regulations for settlements development generally take the form of zoning, subdivision and building regulations and permits. These often encompass or are supplemented by standards of environmental performance such as effluent or emission standards to

control, pollution, or ambient standards, such as minimum water quality standards, to prevent use of unsafe resources.

83. Strategic use of public funds for capital improvements maintenance, and operation is perhaps the single most effective instrument of government intervention in most African countries. This instrument can implement environmental policies while facilitating and stimulating, rather than inhibiting, badly needed private development activities.

84. Construction, maintenance, and operation of physical infrastructure, of facilities for public services, and of projects in other settlements sectors such as housing, industry and transport, is perhaps the single most important determinant of environmental soundness in settlements development. This is not only because of the directness and magnitude of the effects on the environment of public projects, but also because such projects usually have powerful indirect effects by influencing direction, scale and nature of private development activities. Public investments, such as roads and water supply systems, shape settlements development.

85. In general, for settlement governments, there are, at least, four key policy requirements:

- i) Respond to citizen demands for basic infrastructure and services, and ensure that there is an effective legislative and regulatory system to protect citizen from exploitation;
- ii) Penalize polluters and charge both households and businesses, which benefit from investment in infrastructure, the full price of services;

- iii) Give special attention to reducing air pollution and fuel consumption by road vehicles, through a judicious mix of taxes and physical restraints of private vehicles and the development of effective public transport;
- iv) Provide the framework within which settlement-generated wastes can be handled effectively, including the control and monitoring of disposal of toxic wastes.

86. Legislation needed for implementing human settlements policy often exist. The appropriate nature of a local framework for comprehensive policy will depend upon the legal structure of the country. The matrix below is an example for summarizing existing local legislation and its applicability for enforcing recommended development controls. Environmental concerns to be addressed through regulatory mechanisms are listed on the left. Existing legislation and the year of its enactment is listed at the top. The size of the bullets at the intersection points indicate the degree of applicability of a specific piece of legislation to a specific environmental concerns. Most pieces of legislation are pertinent to many environmental concerns, and, conversely, each environmental concern may be addressed through a variety of existing laws.

	(78)	(73)	(58)	(78)	(56)	(74)	(74)	(76)	(13)	(76)	(38)	(16)
	LAND USE DECREE	TOWN AND COUNTRY PLANNING EDICT	PUBLIC HEALTH ORDINANCE	ENVIRONMENTAL SANITATION EDICT	FEDERAL FACTORIES ACT	LABOUR DECREE	FOOD AND DRUGS DECREE	GENERAL POLLUTION CONTROL BY-LAWS	WATER ORDINANCE	RIVER BASIN DEVELOPMENT AUTHORITIES' DECREE	FOREST ACT (+ STATE EDICTS)	WILDLIFE ANIMALS PRESENTATION DECREE
PRESERVATION OF WATER SUPPLY SOURCES	●	●	●	●	●	●	●	●	●	●		
PRESERVATION OF marginally DRY LAND	●	●								●	●	
PRESERVATION OF FISHING POTENTIAL	●	●	●	●	●	●	●	●	●	●		●
PRESERVATION OF AGRICULTURAL POTENTIAL	●	●	●	●		●	●	●	●	●	●	●
PRESERVATION OF RECREATIONAL POTENTIAL	●	●	●	●				●		●	●	
PRESERVATION OF AIR QUALITY	●	●	●	●	●	●	●	●				
AVOIDANCE OF UNCONSOLIDATED LAND	●	●				●						
AVOIDANCE OF UNSTABLE SOILS	●	●				●						
AVOIDANCE OF FLOOD-PLAINS	●	●				●				●		
AVOIDANCE OF UNSTABLE SLOPES	●	●				●				●		
AVOIDANCE OF NOISE IMPACT ZONES	●	●		●	●	●						
AVOIDANCE OF AIR POLLUTION IMPACT ZONES	●	●	●		●							
AVOIDANCE OF CONTAMINATED WATERS	●	●	●		●	●	●	●	●	●		

### XIII. HOW TO PROVIDE FOR POLICY CO-ORDINATION

87. Human settlements policy should be based on an understanding of options for managing resources and hazards. In order to use decision-making capacity efficiently and to obtain informed and sound environmental policies, decision-makers must be presented with environmental policy issues and balanced arrays of options that describe actions to be taken and the consequences of these actions for each of the parties concerned. This requires environmental information and technical support to the decision-makers. This support should encompass the collection and analysis of information, identification of policy issues, and preparation of policy options for decision-making. After policies have been established, technical support is required for their implementation.

88. Environmental information should describe natural resources and environmental hazards in the study area and their compatibility with settlements activities. It should also describe land uses and networks and their compatibility with resources and hazards. Figure 3 gives examples of these information requirements. Environmental information should be presented on maps showing geographic areas that are significant for the management of natural resources and the avoidance or control of environmental hazards.

89. Formulation of environmentally sound human settlements policies requires co-operation with decision-making bodies that co-ordinate development activity among levels of governments and sectors in the national, regional and local administrations. Participants in decision-making should represent all agencies and interest groups significantly affected by the resulting policy and whose co-operation is necessary for policy implementation.

90. In order to obtain authoritative and broadly supported policies a consensus among all those concerned must be established. Such consensus typically involves compromises and balance among parties with diverse interests, responsibilities and powers. It is likely that additional decisions will need to be made as general policy is translated into specific directives and co-ordinated action plans. This may require recycling an environmental issue through the policy formulation process several times until general environmental policy (e.g., to preserve the coral ecosystem at the Red Sea coast as natural heritage for future generations, and as tourist attraction) is translated into project level standards (e.g., industrial cooling water returned to the Sea must not be more than 3 degrees centigrade warmer than the waters of this Sea).

FIGURE 3: TYPE OF ENVIRONMENTAL INFORMATION

<p>Natural resources and their compatibility with settlements activities</p> <ul style="list-style-type: none"> <li>- water supply sources (e.g. surface water and its catchment areas, ground-water and its recharge areas)</li> <li>- agricultural land (e.g. suitable land for traditional farming, mechanized farming, rainfed farming, irrigated farming)</li> <li>- forest and pasture land (e.g., primary forests, timber, firewood, grasslands)</li> <li>- fishery and aquatic resources (e.g., lakes, rivers, estuaries, wetlands, coastal waters)</li> <li>- recreation and tourism areas (e.g. scenic areas, natural settings, beaches, lakes)</li> <li>- natural heritage resources (e.g., species diversity, abundance and distribution of species, ecosystem functions)</li> <li>- minerals (e.g., areas where gravel for road construction can be found)</li> </ul> <p>Environmental hazards and their compatibility with settlements activities:</p> <ul style="list-style-type: none"> <li>- floods (e.g., flash floods, sheet flow)</li> </ul>	<ul style="list-style-type: none"> <li>- earthquakes (e.g., land threatened by seismic shocks, land slides, liquefaction)</li> <li>- cyclones</li> <li>- slope and soil-related hazards (e.g., land prone to subsidence, land slides, erosion, engineering constraints)</li> </ul> <p>Land Uses and their compatibility with environmental resources/hazards</p> <ul style="list-style-type: none"> <li>- agricultural and other extractive uses (e.g. farming, forestry, grazing, fishing mining)</li> <li>- industrial uses (e.g., manufacturing, storage, services)</li> <li>- residential uses and services (e.g., shelter, social services, recreation, tourism)</li> </ul> <p>Networks and their compatibility with environmental characteristics</p> <ul style="list-style-type: none"> <li>- water supply and drainage (e.g., agricultural, industrial, municipal supplies, flood control)</li> <li>- waste disposal (e.g., solid and liquid waste from municipal and industrial sources)</li> <li>- transport</li> </ul>
--	---

#### XIV. HOW TO CONSIDER EXISTING SETTLEMENTS CHARACTERISTICS AND THEIR ENVIRONMENTAL SETTINGS

91. Institutional provisions for policy co-ordination, implementation of policy, and technical support should respond to settlements priorities and critical environmental concerns.

92. An initial analysis should identify the key settlements development activities, both current and proposed. It should also appraise the main environmental conditions that constrain or provide opportunities for settlements development. The following are some examples:

- i) Increasingly larger areas of built-up land are experiencing service and frequent flooding (such as in the case downtown Ibadan, Nigeria);
- ii) The supply of prime agricultural land in the vicinity of the city is diminishing (such as is the case in Cairo, Egypt);
- iii) Air pollution is reaching intolerable levels;
- iv) Rapid industrial development is expected to result in general environmental degradation;
- v) Ground water is becoming brackish, rendering it unusable for domestic purposes in areas that depend on it (such as is the case in Lagos, Nigeria);
- vi) Water demand for municipal supplies are expected to exceed existing resources, which, in addition, are increasingly threatened by siltation, organic and

chemical pollution (such as is the case in Lagos, Nigeria).

93. Having set a list of priority concerns, it is necessary to organize the concerns into systematic framework that permits relating them to each other, and treating them in co-ordinated and efficient fashion. Each issue should be clarified in terms of cause and effect interactions between specific settlements sectors and specific environmental resources or hazards. This process should be organized and structured through a simple interaction matrix (see Figure 4). Environmental resources/hazards and settlement sectors are listed along the axes of the matrix. The resources/hazards and sectors shown in Figure 4 are illustrative only, and may not be appropriate for any particular country. Each cell of the matrix field represents a potential interaction between the environment and development. Once filled out, the matrix constitutes an easy understood and powerful representation of the environmental challenge.

94. The important environmental issues that require attention are likely to make specific demands on the mechanisms for co-ordinating polities, implementing policies, and providing technical support:

- i) Different types of policy issues will require different linkages and procedures for achieving agreed policies are needed.
- ii) Different policy decisions will require different instruments for their implementation. Thus implementation tools will reflect the nature of the dominant conflicts and their amenability to control and mitigation;

- iii) The technical support function will be tailored to the information, analysis techniques and expertise needed for the priority issues, identified and the co-ordination requirements that they imply.

**FIGURE 4-3: THE ENVIRONMENTAL INTERACTION MATRIX, A TOOL FOR ORGANIZING INFORMATION AND ANALYSES**

METROPOLITAN SECTORS		LAND USES	ENVIRONMENTAL RESOURCES AND HAZARDS																
		NET- WORKS		NATURAL RESOURCES					ENVIRONMENTAL HAZARDS					MAN MADE HAZARDS					
				WATER SUPPLY SOURCES (SURFACE/UNDERGROUND)	LAND WITH AGRICULTURAL/RANGELAND POTENTIAL	FOREST RESOURCES	FISHERY AND OTHER AQUATIC RESOURCES	LAND WITH RECREATION AND TOURISM POTENTIAL	NATURAL HERITAGE RESOURCES	FLOOD PRONE AREAS	AREAS SUBJECT TO SEISMIC IMPACT	AREAS SUBJECT TO HIGH WINDS (e.g. CYCLONES)	AREAS SUBJECT TO CLIMATIC EXTREMES (DROUGHT)	STEEP SLOPES	UNCONSOLIDATED LAND AND UNSTABLE TOP SOILS	UNSANITARY ENVIRONMENTAL CONDITIONS	AIR POLLUTION (PARTICLES, GASES, ODOR)	NOISE POLLUTION	AREAS PRONE TO FIRE AND CONFLAGRATION
	RESIDENTIAL LAND USE AND SERVICES			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	INDUSTRIAL LAND USE			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	RECREATIONAL LAND USE AND TOURISM			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	AGRICULTURAL LAND USE			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	WATER SUPPLY AND SANITATION			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	WASTE DISPOSAL			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	TRANSPORTATION			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

MAJOR INTERACTIONS AND POTENTIAL CONFLICTS AND OPPORTUNITIES

●

●

DEVELOPMENT AFFECTING THE ENVIRONMENT  
(Very Severely, Severely)

☒

ENVIRONMENT AFFECTING METROPOLITAN DEVELOPMENT

MAJOR INTERACTIONS AND POTENTIAL CONFLICTS AND OPPORTUNITIES

- DEVELOPMENT AFFECTING THE ENVIRONMENT (Very Severely, Severely)
- ✕ ENVIRONMENT AFFECTING METROPOLITAN DEVELOPMENT

## XV. CONCLUSION

95. A clear policy guidance and directions presented in this paper constitute a vital prerequisite for policy-makers with responsibilities for managing and controlling the quality of man-made environment in African countries in order to enhance environmental conditions in settlements. The present guidelines bring forth the fact that human settlements policies cannot be addressed reasonably without accounting for the environmental resources and hazards that supply or diminish the basic goods and services upon which they depend. These basic goods and services include such things as water, clean air, fuel, buildable land, drainage, flood control, etc.

96. It is hoped that these guidelines will serve as a basis for the formulation of national human settlements policies taking into account ecological goals in a long-term perspective. The implementation of such policies will make it possible for many African countries to:

- i) devise settlement systems and settlement plans which lead to resource-efficient and affordable transport patterns, e.g., by promoting short-distance access in preference to long-distance mobility;
- ii) develop programmes for economizing on the use of non renewable energy sources and for adapting settlements to the use of renewable energy systems;
- iii) provide water-supply, sanitation and water-processing and recycling systems which meet basic needs in a resource-conserving manner;

- iv) promote the use of indigenous building materials and appropriate construction technologies, inter alia, by revising building and planning codes and supporting small-scale production process.

97. The ECA is aware that reorientation of human settlements policies to more suitable paths requires strengthening present decision structure and institutional arrangements. It also requires that the implications of development policies for environment and resources management be considered at the same time as human settlements policies themselves, on the same agendas and by the same institutions, nationally and internationally.

BIBLIOGRAPHY

- Brain J. L. Berry. Do Variations in Urban Form Affect Environmental Quality? International Institute for Applied Systems Analysis. Research Memorandum, Austria, 1974.
- D. E. Dowall. The Land Market Assessment. A New Tool for Urban Management. The World Bank, UNCHS, UNDP, April 1991.
- J. Leitmann. Energy-Environment Linkages in Urban Sector. The World Bank, UNCHS, UNDP, April 1991.
- A. L. Mabogunje, J.E. Hardoy, R. P. Misra. Shelter Provision in Development Countries. John Wiley & Sons, Chechester, New York, 1978.
- United Nations Centre for Human Settlements. Human Settlements in the Critical Economic and Social Situation in Africa. The Responses of UNCHS (Habitat), 1985, Nairobi, Kenya.
- United Nations Centre for Human Settlements. Global Report on Human Settlements, 1986. Oxford University Press, 1987
- United Nations Centre for Human Settlements. People, Settlements, Environment and Development, Nairobi, Kenya, 1990.
- United Nations Economic Commission for Africa. Population Studies Series,  
No. 7. Population Distribution and Urbanization, 1983.
- United Nations Environment Programme, United Nations Centre for Human Settlements. Environmental Guidelines for Settlements Planning and Management. Volumes 1 and 2, Nairobi, Kenya 1987.

Page 60

United Nations Environment Programme. Policy Guidelines for the Control of Environmental Pollution, in Urban Areas of Developing Countries, UNEP, Nairobi, Kenya, 1987.

The Vancouver Declaration on Human Settlements, United Nations Conference on Human Settlements, Vancouver, Canada, 1976.

World Health Organization. Improving Environmental Health Conditions in Low-Income Settlements. A Community Based Approach to Identifying Needs and Priorities, WHO, UNEP, Geneva, 1987.