



UNITED NATIONS

ECONOMIC AND SOCIAL COUNCIL

E

Distr.: GENERAL

E/ECA/CM.19/8
18 February 1993

Original: ENGLISH

ECONOMIC COMMISSION FOR AFRICA

Fourteenth meeting of the Technical
Preparatory Committee of the
Whole

Libreville, Gabon
12-16 April 1993

ECONOMIC COMMISSION FOR AFRICA

Twenty-eighth session of the Commission/
nineteenth meeting of the Conference of
Ministers

Libreville, Gabon
19-22 April 1993

African Strategies for the Implementation of
UNCED Agenda 21: A Proposal

AFRICAN STRATEGIES FOR IMPLEMENTING UNCED AGENDA 21**CONTENTS**

	<u>Page</u>
I. INTRODUCTION	
A. Africa in the present global environment- development momentum	1
B. The evolution of the environment-development problematique in the 1980s and the African response	2
C. Scope and objectives of the proposed strategies for implementing Agenda 21 in Africa	4
II: AFRICAN ENVIRONMENT AND DEVELOPMENT PRIORITY CONCERNS WITHIN THE FRAMEWORK OF UNCED AGENDA 21	
A. Managing demographic change and pressures	7
B. Achieving food self-sufficiency and food security	12
C. Ensuring efficient and equitable use of water resources	20
D. Securing greater energy efficiency and self-sufficiency	34
E. Optimizing environmentally clean industrial production	40
F. Management of ecosystems	50
G. Preventing and reversing desertification	59
III: PRE-REQUISITES FOR IMPLEMENTING THE AFRICAN STRATEGIES ON AGENDA 21	
A. Financial resource mobilization	67
B. Human resources and institution development: The non-government sector	68
IV: CONCLUSIONS AND RECOMMENDATIONS	
A. The agencies of the United Nations and other development partners of Africa	74
(a) The United Nations Economic Commission for Africa	74
(b) United Nations Environment Programme (UNEP)	75
(c) United Nations Development Programme	75
(d) Specialized agencies of the UN system	76
(e) National, subregional and regional development banks and organizations	76
ANNEX: SUMMARY PROGRAMME AND BUDGET	

I. INTRODUCTION

A. Africa in the present global environment-development momentum

1. During the 1980s, the global environmental awareness which was triggered by the Stockholm Conference on the Human Environment in 1972 and propelled by the work of the World Commission on Environment and Development provided ingredients for more organized strategies for ensuring the sustenance of the development process through sound environmental management. Environment and development have increasingly become part of different levels of international dialogue.^{1/} The momentum generated in this direction by the United Nations Conference on Environment and Development (UNCED) is a proof of this.

2. One of the major goals of socio-economic development is to improve environmental quality. There can be no development if the benefits of rising incomes are offset by the costs imposed on health and the quality of life by pollution. Equally, environmental damage can undermine future development because soils that are degraded, aquifers that are depleted and ecosystems that are destroyed in the process of raising present incomes can jeopardize the prospects of future incomes. The focus of contemporary development-environment research is to determine the optimal conditions under which policies for efficient income growth can complement those for environmental protection.^{2/}

3. To be effective, such policies should aim at: (a) underlying causes rather than symptoms; (b) addressing those problems for which benefits of reform are greatest; (c) using incentives rather than regulations; and, (d) supporting those policies that protect the environment as well as strong public institutions. The most important policies relate to poverty alleviation.

4. Since the 1980s, Africa has been going through persistent economic crises which, to a large extent, have had their roots in the severe degradation of the environment. The resulting poverty has perpetuated the underdevelopment of resources in the region with the consequent destruction of fragile ecology. People living in poor or destitute conditions are not to be expected to view environmental concerns with the same priority as development planners.

5. Poverty has therefore made it difficult for a number of countries in the region to develop alternative patterns of livelihood that would reduce the extreme pressure on natural resources. Major environmental and developmental challenges have been to maintain the equilibrium between population, ecosystems and development. In a number of countries, drought has increased the rate of desertification and the rapid crumbling of the carrying capacity of its resources.

6. The first global conference on the human environment (Stockholm, 1972) focused on the conservation and protection of global ecosystems and requested the United Nations Environment Programme (UNEP) to tailor environmental activities to respond to the System-wide Medium-term Environment Programme. Prior to Stockholm, Africa was lacking coherent national, subregional and regional policy instruments for integrating environmental concerns into economic planning and programmes for sustainable development. Agricultural production (especially for food) had been drastically reduced; the rural sector had become poorer; and environmental stress had become very acute. Because industrial programmes had not been planned to meet the medium- and long-term needs of the people, industrial development in the region had been relatively slow. Since Stockholm, there has been an increasing awareness of the need for

^{1/} See UNEP, The State of the Environment, The environment in the dialogue between and among developed and developing countries, UNEP/GC/12/11 (UNEP, 1984).

^{2/} World Bank, World Development Report 1992 (Oxford University Press, 1992).

more organized strategies for ensuring the sustenance of the development process through sound environmental management. Increasingly, environment and development have become part of different levels of international dialogue.^{3/}

7. The dialogue has called for a reassessment of the North-South, South-South and African interdependence. Since the region suffers from many forms of environmental degradation manifested by massive deforestation and extensive desertification which directly or indirectly affects global ecological systems, investment in managing the African environment is admittedly an investment in global security. Therefore, there have been important changes in emphasis beyond ecosystem management the relationship between industrial production and consumption patterns have become more evident in issues such as climatic change and ozone depletion. Presently, the environmental focus includes the whole spectrum of pollution control activities.

8. The Abuja Treaty establishing the African Economic Community (AEC) (June, 1992) offers the framework of African economic interdependence in the aspirations of the Organization of African Unity (OAU), the Lagos Plan of Action (LPA) (1980) and the African Environment and Development Agenda (1991).

9. Under these circumstances, Africa must re-assert itself beyond the ideals of its Common Position on Environment and Development for UNCED in the light of the prevailing global conditions and impose itself as part of a global common future and common security.

B. The evolution of the environment-development problematique
in the 1980s and the African response

10. The LPA, which adopted recommendations for the socio-economic development of member States, devoted a full chapter to environmental issues. Following the establishment of an African NGO Environment Network (1982), the non-governmental organization (NGO) community became a powerful tool for spreading the environment message in the continent. These NGO initiatives are now being fostered under the Forum of African Voluntary Development Organizations (FAVDO). With the endorsement of the Kilimanjaro Programme of Action on Population (KPA)^{4/} and self-reliant development by the ECA Conference of Ministers of Planning and Economic Development at its tenth session (1984), environmental improvement became a fundamental priority and one of the basic conditions for restoring economic and social stability in Africa.

11. The subsequent African Ministerial Conference on the Environment (Cairo, 1985) agreed, with the adoption of the Cairo Programme of Action, on a regional plan to halt the degradation of the continent's resource base and ensure its rehabilitation. The United Nations Conference to review and appraise the achievements of the United Nations Decade for Women (Nairobi, 1985) adopted a series of forward-looking strategies which, among other things, recommended the need to increase the awareness of individual women

^{3/} UNEP, "The Environment in the dialogue between and among developed and developing countries" The state of the environment (UNEP/GC/12/11), UNEP, 1984.

^{4/} The KPA, adopted by the second African Population Conference preparatory to the fourth global Population Conference (Mexico City, 1984), called on African Governments to regard, as a priority, the integration of population factors in African development planning with a view to harmonizing economic and population growth rates.

and women's associations in environmental management and in sustaining the resources that make development possible.

12. At the adoption of Africa's Priority Programme for Economic Recovery, 1986-1990 (APPER), the OAU Heads of State and Government recommended the need to intensify the struggle against drought and desertification and the implementation of measures to improve food security and rehabilitation of agriculture in Africa. The United Nations Programme of Action for African Economic Recovery and Development, 1986-1990 (UN-PAARED) further endorsed APPER by adding to it an international response and commitment.

13. The report of the World Commission on Environment and Development (1987) concentrated on issues of environment and development facing the continent. The UNEP Environmental Perspectives to the Year 2000 and Beyond, adopted by the General Assembly (1987), set the framework to guide national action and international cooperation for environmentally sound development.

14. The first Regional Conference on Environment and Sustainable Development (Kampala, 1989) adopted an Agenda for Action which synthesized all the aforementioned programmes on environment since the LPA. This action was crystallized when they participated in the activities of the World Commission on Environment and Development.

15. The General Assembly of the United Nations in its resolution 44/228 of June 1992, decided to convene a United Nations Conference on Environment and Development (UNCED) at the highest level of policy and decision-making. Africa contributed towards the preparations for this conference through its Common Position on Environment and Development. The most important decision of the Conference was the adoption of programmes of action for sustainable development as embodied in Agenda 21.

16. The programmes of Agenda 21 were intended to address the challenges of environment and development. States had therefore decided that sustainable development should become a priority. The international community recommended the provision of an enabling climate for promoting sustainable development through trade liberalization; making trade and environment mutually supportive; making commitment to provide adequate financial resources and dealing with international debt; and encouraging macroeconomic policies conducive to environment and development.

17. Sustainable development, as emphasized by UNCED, is the responsible management and utilization of resources (in a country) to meet present needs without compromising the needs of future generations.^{5/} Operationally, it is the process in which the exploitation and of resources in a country as well as the direction together with the orientation of technological development and institutional change are made consistent with the present and future needs of the country's population. This type of development enables harmonious human relationships with natural resources to endure over time and to adapt to changing conditions. It also optimizes the capacity of the environment to meet the needs of the population as defined by them, thus generating more security at the highest attainable living standard from generation to generation.

18. The key to sustainable development, therefore, lies in harmonizing economic production functions, environmental carrying capacity functions and the physical laws of thermodynamics. The approach must be multidisciplinary, integrating the social sciences (particularly economics) and the natural sciences (particularly ecology and physics). The path to achieving sustainable development is difficult to identify since each country has its own population, natural resources, environment and economic development issues which require analysis. The challenge to governments of developing countries, particularly those in Africa,

^{5/} See UNCED Agenda 21

is to identify unsustainable populations. These comprise localities and communities where poverty and the persistence of other ultimate causes will render environmental degradation almost inevitable.

19. For Africa, sustainable development requires initiatives at the political level as well as collaboration with NGOs, women and youth organizations and the private sector. This implies a national political commitment to ensure that development processes do not destroy the resource base on which future development will depend as well as a redefinition of national development priorities to alleviate constraints imposed by natural conditions, current international economic conditions and their debt-burden. The creation of an enabling environment for the implementation of sustainable development programmes in Africa involves the full democratization of African societies as detailed in the African Charter for Popular Participation in Development and Transformation. To achieve sustainable, social and economic development through environmental conservation, African countries have to reverse the situation of environmental degradation by, among other things, restructuring the prevailing economic production structure. They must redefine policy orientations and make legal, administrative and institutional arrangements to ensure that all the elements can be orchestrated to achieve sound environmental management for sustainable development.

20. This calls for the effective participation of both government and, the entire population from grassroots level in the recovery with transformation process that includes environmental protection and conservation. The approach offers the best opportunities for popular environmental education and ecological conservation measures by grassroots people, NGOs, peasants, workers, women and youth in their various locations.

C. Scope and objectives of the proposed strategies for implementing Agenda 21 in Africa

21. The African Common Position on Environment and Development provides the framework and scope for the implementation of Agenda 21. Besides analytical convenience, for this exercise to have the necessary impacts in the appropriate sectors of African development, a sequencing of priorities from those indicated in the Common Position is imperative. This sequencing is understood to mean the implementation, à priori, of those priority programmes that enhance mutation, growth and development in the other sectors. It will require the development and strengthening of institutional and manpower capabilities and capacities for programme formulation, implementation, monitoring and evaluation.

22. The third African Population Conference (APC-3) held in Dakar, Senegal from 7 to 12 December 1992 provided additional conditions for achieving sustainable relationship between population (the key beneficiary of this natural endowment), environment and development. It was noted that throughout the 1980s, the regional terms of trade had deteriorated at an average annual rate of about 5 per cent. Unmatched by total external financing assistance, this had accounted for substantial amounts of income foregone. Accordingly, APC-3 noted that the key concern in the strategy for sustainable development is the improvement of the terms of trade. This would be a good alternative to financial support currently given to underwrite acceptance of policy conditionality since the beneficiary countries will be those actually engaged in the production of Africa's main exports.

23. Additionally, economic integration should be fostered between and among countries to build strong collective bargaining power and overcome the small market constraint. A peaceful and enabling environment and an effective management of the economy under democratic governance should be established. National population programmes should be formulated and implemented simultaneously with programmes aimed at addressing environmental degradation and other social concerns such as health and education.

24. There should be greater cooperation between countries with similar problems and characteristics as well as community involvement at the grassroots level in the formulation and implementation of policies and programmes. Infrastructural facilities and national capabilities for formulating socio-economic development

programmes should be improved and expanded. Poverty reduction and increasing employment opportunities could significantly further progress towards the goal of sustainable development while the inclusion of income-generating activities in population and family planning programmes would enhance their success.

25. It is understood that actions must be taken concurrently at the national, subregional and regional levels of development in order to alleviate poverty and hence minimize environmental degradation in Africa. The achievement of sustainable development in African countries in a way would additionally depend on both the national and international communities building upon the initiatives already under way at these three levels:

(a) At the national level, African countries should establish and strengthen institutions responsible for their environmental matters; update and implement environmental legislation; establish and strengthen NGOs as well as youth/women's organizations for conserving the environment; incorporate environmental dimensions in the school curricula; and integrate environmental issues in macroeconomic planning. This calls for integrated physical planning and social cost-benefit analysis of development projects, as well as keeping in view the environmental consequences of fiscal measures. Operationally, this will require taking environmental resources into account at an early stage of formulating development policies, programmes and projects through creating special inter-ministerial committees for environment and development; assessing the environmental impact for development activities; introducing environmental aspects as an integral part of the curricula at all levels of formal and informal education and training; and developing continuous training programmes for responsible personnel and public information programmes on the state of the environment as well as on what can and should be done by all members of society towards sustainable development;^{6/}

(b) At the subregional level, as stressed in the Kampala Agenda, the various intergovernmental organizations which have been established to coordinate environmental management should be fully utilized by African Governments. These include the Permanent Inter-State Committee for Drought Control in the Sahel (CILSS), the Intergovernmental Authority for Drought and Development (IGADD), the Southern African Development Community (SADC) and the Ministerial Conference on Drought and Desertification (COMIDES). Other initiatives include the Abidjan Convention on the protection of marine and coastal areas of West and Central Africa as well as other African regional seas programmes. These establishments should be called upon to implement relevant components of major programmes of action (e.g., the Cairo Programme of Action, 1985); act as focal point agencies in the coordination of activities of international and regional organizations and donor agencies that are active in their respective subregions; and serve, as appropriate, on the main organs of regional conferences and subregional organizations;

(c) At the regional level, it will be recalled that the African Alternative Framework to Structural Adjustment Programmes for Socio-economic Recovery and Transformation (AAF-SAP), developed in the aftermath of the Kampala Agenda, calls for the creation of an enabling environment for sustainable development. This would involve popular participation in decision-making, maintenance of equity and justice and elimination of civil strife and instability. There are the additional desiderata of setting up democratic domestic mechanisms, encouraging inter-State trade (within the region) and ensuring a greater harmonization of the activities of the NGOs with government development policies.

26. The objective of these proposals is, therefore, to evolve the strategies to enable African countries to address the problems of eradicating poverty through sustainable development. In the subsequent sections, an outline is presented on the categorization of the 24 sectors (of the African Common Position) within the

^{6/} ECA, "Towards sustainable development in Africa: Agenda for action", adopted by the African Regional Conference on Environment and Sustainable Development, Kampala, Uganda, 16 June 1989.

aforementioned Kampala Declaration on Environment and Sustainable Development (at a macro level), together with the suggested activities for their implementation at the national, subregional and regional levels.

27. Consistent with the desiderata of integrated socio-economic development planning,^{7/} section II examines the problem areas of each of the major sectors thus identified in relation to environmental issues simultaneous with the associated development objectives of the sector and a programme of action for their realization. Section III, deals with the implementation of the strategies. These include financial implications, estimated at \$US 18 billion, as well as those that derive from the strengthening of the institutional and human capacities of member States to carry out these activities. The last section reviews the major assumptions and conclusions of the document. For implementing the activities of Agenda 21, Summary Programme and budget is annexed to this document.

II. AFRICAN ENVIRONMENT AND DEVELOPMENT PRIORITY CONCERNS WITHIN THE FRAMEWORK OF UNCED AGENDA 21

28. In order to streamline such a large number of sectoral issues presented in Agenda 21 and the African Common Position into cross-sectoral programmes and to facilitate cross-programme mutations, the 24 sectoral programmes of the Common Position have been categorized into seven priority areas. These include the following:^{8/}

- (a) Managing demographic change and population pressures;
- (b) Achieving food self-sufficiency and food security;
- (c) Ensuring efficient and equitable use of water resources;
- (d) Securing greater energy self-sufficiency;
- (e) Optimizing environmentally clean industrial production;
- (f) Management of species and ecosystems; and
- (g) Preventing and reversing desertification.

29. By implementing programmes in these seven cross-sectoral areas, a lot would have been done towards poverty eradication and alleviating the problems of environmental degradation.

^{7/} United Nations, Population policy and development planning: Aspects of technical cooperation (United Nations: DTCD, 1980).

^{8/} Group 1 on "managing demographic change and population pressures" will subsume chaps. 5, 6 and 24 of the African Common Position; group 2 on "achieving food self-sufficiency and food security" will subsume chap. 1; group 3 on "ensuring efficient and equitable use of water resources" will subsume chaps. 2 and 3; group 4 on "securing greater energy self-sufficiency" will subsume chap. 4; group 5 on "optimizing industrial production" will subsume chaps. 7, 13 and 19; group 6 on "maintaining species and ecosystems" will subsume chaps. 8, 9, 10, 15, 17, 22 and 23; and group 7 on "Preventing and reversing desertification" will subsume chaps. 11 and 12. The remaining chapters in the African Common Position (i.e., 14, 16, 18, 20 and 21) are cross-sectoral to these seven major groupings.

A. Managing demographic change and pressures

1. Problem areas

30. Available evidence indicates that whereas annual world population growth rate peaked at 2.1 per cent (1965-1970) and thereafter began the transition towards a lower growth rate reaching 1.7 per cent as at 1990, African regional population growth maintained an annual rate of 2.5 to 3 per cent during the 1955-1990 period. If this rate continues, by the year 2000 the regional population will total 866 million and exceed 1 billion by 2005.

31. The three aspects of population dynamics and sustainable development that are highlighted in Agenda 21, include the development and dissemination of knowledge concerning the linkages between demographic trends and factors and sustainable development; formulating integrated national policies for environment and development taking into account these demographic trends and factors; and implementing integrated environment and development programmes at the local level, again taking these demographic trends and factors into account.

32. A pertinent issue to raise within the context of Agenda 21 is whether the indicated regional population growth rate is an asset or a liability to development, particularly with respect to the implied impact on the regional environment. The African Common Position on Agenda 21 is that the regional population problem is not so much the high growth rate but its distribution. It is posited that a number of African countries are underpopulated and their resources underexploited. This raises the issue with the development of existing resources. Can the objective of reducing the rapid population growth rates implicit in existing population policies of the countries be justified in the circumstances?

33. Against this background, the substance of the population-development debate is that, on one hand, population growth is a real constraint to development and, on the other it is not the real source of low standards of living in the region. The prevailing consensus is that socio-economic development and national population programmes should be implemented simultaneously to ensure that the benefits of each are fully realized.

34. The relevance of the emerging concern is with the extent to which the observed rapid population growth rates in the various countries is linked to environmental degradation.^{9/} The concern is predicated on the idea that although the rapid population growth rates may frustrate governments' efforts at meeting future demands for services and jobs, available evidence indicates that its reduction may not minimize and/or eliminate existing levels of poverty, unemployment and inequality of income distribution.^{10/} While there

^{9/} Shaw, P. R., "Rapid population growth and environmental degradation: Ultimate versus proximate factors", Environmental Conservation, 16 (3), 1989, pp. 199-208.

^{10/} Rodgers, G., "Poverty and population: Approaches and evidence", ILO, Geneva, 1984; McNicoll, G., "Consequences of rapid population growth", Population and Development Review, 10 (2), 1984, pp. 177-240; Blanchet, D., "Estimating the relationship between population growth and aggregate economic growth in LDCs: Methodological problems", Expert group on consequences of rapid population growth (New York, 24-26 August 1988); Ehrlich, P.R., "World population crisis", Bulletin of Atomic Scientists, 42 (2), 1986, pp. 13-19; Myers, N., "Population environment and conflict", Environmental Conservation 14 (1), 1987, pp. 15-22; Shaw, P.R. and Wong, Y., Genetic seeds of warfare: evolution, nationalism and patriotism, Unwin Hyman, Boston-London, 1989; Repetto, R., "Population, resource pressures and poverty", in The global possible: resources, development and the new century (Repetto Ed., 1985); "Population, resources, environment: an uncertain future", Population Bulletin 42 (2), 1987.

is no evidence to demonstrate that reducing population growth rate would lift the veil of poverty and regenerate environments, failure to do so will certainly worsen the situation. The challenge to African Governments is to identify enclaves of unsustainable populations and then determine how they can benefit from population interventions.

35. This is where the formulation and implementation of population policies in the various countries of the region have a role to play. The policies and programmes can provide population education on the interplay between larger family size and over-stressed environments, help to meet needs in family planning and identify those population interventions most likely to enhance the quality of human inputs into development. On a micro level, raising the quality of human capital is an important stimulus to improved land and farm management restoration efforts; it also holds the key to greater receptivity to innovation and the use of new technologies which might help to prevent further environmental degradation.

2. Development goals^{11/}

36. Unless there is integrated planning of population, environment and technological application in these countries, their renewable resources (i.e., land, water, air, vegetation, climate, etc.) are likely to be misused which combined with mineral (i.e., non-renewable resources) depletion may lead to underdevelopment. The main objectives of integrated population-development planning^{12/} should therefore be to increase the availability and widen the distribution of basic life self-sustaining goods, raise levels of living and expand the range of economic and social choices available to individuals and nations by freeing them from the forces of ignorance, servitude and dependence on other countries.

37. However, despite concerted efforts at integrated population-development planning in African countries since the adoption of the World Population Plan of Action (WPPA) at Bucharest in 1974, and the KPA, these objectives are still far from being achieved. The need is to adopt planning techniques that focus on self-sustained development based on the resources. There is also the need to reactivate long-term perspective development planning within the framework of AAF-SAP. African leaders have to develop long-term policies and plans to increase agricultural production, conserve the environment and slow population growth in an integrated strategy.

38. They must have the attributes of will, intellect, authority and personal weight to lead their people to self-reliant development through the creation of indigenous conditions needed to curtail the penetration of foreign economic influence in their societies. They have to build self-sustaining productive capacity through creating the will to survive, research, science and technology and organization. This building of the society's productive capacity must be people-oriented: it has to involve the people as well as meet their needs; they must be trained and the tools they use in their work must be improved.

^{11/} The development goals for Africa, used in this document are those set in the African Common Position on Environment and Development (1991).

^{12/} The ingredients for an integrated approach to population and development planning involve a definition of the conceptual framework, establishing the needed institutional infrastructure, providing the needed training for filling the gaps (if any) in the available needed manpower for fostering the integration process and establishing national focal points for collating and disseminating the information required for operationizing the integration process. The conceptual framework itself involves use of appropriate data (macro or sectoral), research techniques and models to establish interrelationships between population and development related variables, determining the demographic objectives based on such interrelationships and formulating policies and programmes pursuant to achieving such objectives.

39. The challenge to African Governments is to identify population interventions which they can afford. The interventions used in the 1960s and 1970s are no longer recommended; they should focus on the ultimate causes of environmental degradation. Population policies will not provide lasting solutions to poverty and environmental degradation. They are unlikely to deliver long-term improvements in the environment or prospects for self-reliance and sustainable development unless they are implemented simultaneously with measures to tackle the root causes. But a population policy can help "buy crucial time until African Governments determine how to dismantle the more ultimate causes" of environmental degradation.

3. Programme of action

40. The foregoing development strategy calls for the formulation and implementation of an integrated national population programme (NPP). However, the concept of a comprehensive NPP is relatively new in the region. There is still some confusion as to how it should be designed and what should be its contents; there is also very little African experience to draw upon, in both aspects. The NPP should be divided into component sectors, each consisting of a blue-print of projects and activities grouped around a related sub-set of the population policy objectives, targets and strategies.

41. Two approaches can be adopted in designing the NPP. In the first approach, each of the component sectors of the NPP can be designed independently. Specialists drawn from the relevant governmental and non-governmental agencies in the sector as well as relevant officials at lower levels of the government structure (e.g., regions, states, provinces or districts) can constitute a task force to design the sectoral programme. The programme for several sectors may be prepared simultaneously by different task forces, each working on a sector or they may be prepared sequentially at different periods of time.

42. The second approach involves all the relevant specialists in the population-related sectors of the governmental and NGOs to design the entire NPP as one group at the same time. In this case, the outlines and contents of all the sector programmes are prepared in one long session with the participation of everyone in the group. Usually, all participants meet and agree upon the general perspectives of expectations per sector before breaking into various specialist subgroups to work out details per sector programme.

43. Regardless of which approach is adopted, it is necessary to prepare separate programmes for each of the administrative regions of a country, particularly if the country is very diverse socio-economically and culturally. The NPP generally serves as a guide for the preparation of the regional programmes. In terms of scope and coverage, the main key areas that should constitute the component sectors of the NPP include an outline of needs or justification; past, present and overview of proposed future activities in the sector; specification and elaboration of sector programme strategies; assignment of roles and responsibilities; and implementation schedule; and budget.

44. In general, following a formal promulgation of the population policy, an inter-ministerial committee and a multi-sectoral technical committee should be established to work out (and appraise) an implementation plan of the policy strategies. The technical subcommittees on population should then be established simultaneous with the design of sectoral programmes and the master plan for the NPP and its launching. This should then be followed by sectoral programme implementation, programme monitoring and evaluation. This is only a suggested time-table to indicate the work programme. The point to stress is that, in view of the enormous magnitude of the tasks involved, there is need for careful timing.

45. Each sector programme should begin with a statement of justification for action in that sector. This should comprise a concise description of the demographic situation in the country together with its socio-economic development implications but highlighting the aspects addressed by the policies that are relevant to the sector and which if implemented will result in desirable changes. This should be followed with a review of past and present activities of the government and other agencies in the sector so as to provide a benchmark information on the situation with respect to activities and attitudes in the sector. A

comprehensive overview of all relevant activities (in the sector) that the government and private sector have planned for execution (during the plan period) should then be described paying attention to timing of proposed activities, the objectives and targets, where and by whom the activities are to be performed and sources of funding.

46. The objective here is to avoid duplication of efforts and consequent waste of scarce resources. Unlike the national population policy goals, objectives and targets that are long term in nature, sector programmes are prepared for shorter periods. Hence, the quantitative targets to be achieved during the plan should be explicitly specified. This allows for an understanding of the magnitude of work required to achieve the sector's objectives during the plan period. Then follows a specification and elaboration of sector programme strategies for achieving sector objectives. This is because it may be necessary that the sector strategies and activities be phased both over time and space. In such cases, the rationale for such phasing, the criteria for selecting areas to initiate or intensify activities as well as what should happen temporarily in the other areas should be clearly indicated.

47. The major activities, objectives and targets to be achieved in the sector should then be detailed. These should cover management systems, staff requirements and training, IEC activities to promote use of contraceptives and achieve desired targets, procurement and distribution of contraceptives including logistics, types and storage, list of equipment needed, modalities for programme performance monitoring and evaluation and technical assistance requirements. The specification of programme activities and support functions should be followed by an assignment of roles and responsibilities to various organs and levels of government and NGOs for the implementation of the indicated activities. This will enable each agency to know its expected input thereby avoiding duplication of efforts.

48. On the whole, and taking into account Africa's specific population problems, activities should be focused on the following:

(a) Developing and disseminating knowledge concerning the links between demographic trends and factors and sustainable development. This would involve:

- (i) identifying the interactions between demographic processes, natural resources and life support systems, bearing in mind regional and subregional variations deriving from, *inter alia*, the different levels of development;
- (ii) integrating demographic trends and factors into the ongoing study of environmental change, using the expertise of international, regional and national research networks and of local communities to study the human dimensions of environmental change and to identify vulnerable areas; and
- (iii) identifying priority areas for action and developing strategies and programmes to mitigate the adverse impact of environmental change on human populations, and vice versa;

(b) Formulating integrated national policies for environment and development, taking into account demographic trends and factors, involving:

- (i) assessing the implications of national demographic trends and factors;
- (ii) building and strengthening a national information base; and
- (iii) incorporating demographic features into policies and plans;

(c) Implementing integrated, environment and development programmes at the local level, taking into account demographic trends and factors such as:

- (i) supporting programmes that promote changes in demographic trends and factors towards sustainability; and
- (ii) creating appropriate institutional conditions.

49. Within this framework, a detailed time-table (marking the starting and completion dates) for activities implementation should be indicated. A budget should then be prepared for all activities. Any anticipated financial gaps between what is needed to carry out predetermined tasks and what is expected to be generated from both local and external sources should be indicated so that donor agencies can be approached to fill such resource gaps.

4. Resource implications

(a) Financial resources

50. As with all the other programmes areas, the financial resources for implementing this activity should be generated locally. However, UNCED estimated that the average total annual cost of implementing the activities of this programme (1993-2005) will include about \$1.6 billion from the international community on grant or concessional terms. African countries may then negotiate on this basis for a minimum of \$400 million from the international community.

(b) Human resource development and capacity building

51. The capacity of national, regional and local structures to deal with issues relating to demographic trends and factors and sustainable development should be enhanced. This would involve strengthening the relevant bodies responsible for population issues to enable them to elaborate policies consistent with the national prospects for sustainable development. Cooperation among government, national research institutions, NGOs and local communities in assessing problems and evaluating policies should also be encouraged.

52. Understanding of the interactions between demographic trends and factors and sustainable development should be increased at all levels. Demographic and sustainable development aspects should be coordinated and integrated into the formal and informal education sectors. Particular attention should be given to population literacy programmes, notably for women. Emphasis should be placed on the linkage between these programmes, primary environmental care and the provision of primary health care and services.

53. The capacity of the relevant United Nations organs, international and regional intergovernmental bodies, NGOs and local communities should, as appropriate, be enhanced to help countries develop sustainable development policies on request and, as appropriate, provide assistance to environmental migrants and displaced people. Inter-agency support for national sustainable development policies and programmes should be improved through better coordination of population and environment activities.

54. The international and regional scientific institutions should assist governments, upon request, to include concerns regarding the population/environment interactions at the global, ecosystem and micro-levels in the training of demographers and environmental specialists. Training should include research on linkages and ways to design integrated strategies.

B. Achieving food self-sufficiency and food security

1. Problem areas

55. By the year 2025, 83 per cent of the projected global population of 8.5 billion will be living in developing countries with about 1 billion in Africa. Yet the capacity of available resources and technologies to satisfy the demands of this growing population for food remains uncertain. This challenge, has to be met by increasing agricultural production on land already in use and by avoiding further encroachment on land that is only marginally suitable for cultivation.

56. The absence of coherent and comprehensive food self-sufficiency and food security policies and programmes at the national and regional levels is a major constraint to sustainable agricultural and rural development in the continent. Such policies and programmes are required to ensure that the African population has access to the basic food they need. The major thrust of these policies and programmes is to bring about significant increases in food and agricultural production in a sustainable way and to achieve a sustainable improvement in people's entitlement to adequate and culturally appropriate food supplies.

57. Many African countries have undertaken radical policy reforms in recent years yet most of these measures failed to incorporate sustainability considerations into food production programmes. Inappropriate pricing and tax policies have over the years encouraged excessive use of external inputs, over-exploitation of land as well as environmentally degrading cropping and livestock production practices. Furthermore, Africa's debt burden, in the face of dramatically falling values of the continent's raw materials exports has forced many governments to attempt to boost export earnings through an environmentally damaging expansion of cash crop production and timber sales. Furthermore, commercial farming is usually accompanied by forced movements of the poor farmers who hitherto cultivated the land to marginal lands which are already under extreme stress.

58. Poverty and malnutrition are endemic in most parts of the continent. African's poorest people are mostly found in the rural areas. The poor conditions under which they live often forces them to over exploit available natural resources in order to survive. Unable to increase productivity from their limited and often dwindling resources, they are forced to resort to ecologically damaging practices such as bush fires, reduction and, sometimes elimination of fallow periods, the use of trees for fuel wood, the burning of dung for fuel instead of fertilizing the soil, planting annual crops on erosion prone slopes, overgrazing and the destruction of pasture land.

59. It has been estimated that nutrient output from all sources in Africa currently exceeds inputs by a factor of three to four, the net loss amounting to some 10 million metric tons per year. As a result, increasing amounts of marginal lands and fragile natural ecosystems are being put under food production thus aggravating the already severe environmental degradation problems.

60. Inappropriate and uncontrolled land-use practices are a major cause for the degradation and the depletion of land resources in Africa. In the humid and sub-humid zones, soil cover is shallow and the force of the rains causes rapid leaching. Even in perennial crop production systems, which provide better soil cover, there appears to be a problem of long-term fertility decline. In the arid and semi-arid areas of the continent, soil fertility has been characteristically low especially in terms of phosphorous and nitrogen levels and the deteriorating land base is forcing large animals out of the farming system resulting in a decline of animal manure. Furthermore, due to high population land pressures, there has been a virtual disappearance of the traditional system of soil fertility maintenance.

61. In Africa the two main sources of soil nutrients are organic and inorganic fertilizers. The problem, however, is that although many small-farm systems possess good potential for increasing the supply of organic sources of nitrogen through the integration of livestock, green manure, crops and fodder into the

cropping system, the high opportunity costs for the provision of organic fertilization, limits this source of nitrogen. Given the present knowledge, the high demand for increased food production and Africa's severe problem of soil degradation, there is little choice but to depend heavily on external sources of nutrients in the foreseeable future. This has the following implications for sustainable food production:

(a) Most agricultural systems that depend heavily on inorganic sources of nutrients are often not sustainable over the long-term;

(b) The introduction of new technologies into such systems is bound to produce stresses and shocks on the environment which may remove some of the classic advantages associated with the existing ways of farming in the continent;

(c) The advent of the green revolution in Asia has demonstrated the vulnerability of having uniform species. The possibility of a breakdown of the existing ecological balance when the old system is modified or a new one introduced has serious environmental implications; and

(d) If current trends continue whereby access to and the benefits from new technologies accrue mostly to large and more wealthy farmers the tendency could be for farm sizes to increase rapidly which, in turn, would lead to massive land clearing. The more widespread this tendency becomes, the more serious the problem of land degradation is likely to be.

62. A related problem has to do with the notorious inadequacies in the provision of support services for agricultural technologies in Africa. For sustainable food production to take place, these support services must be effectively provided. The markets for the principal food crops in most African countries are very "thin" so that whenever a successful technology finds its way into the hands of many farmers, the resulting increases in production usually lead to sharp decline in prices. This fall in prices leaves many farmers with little surplus for further investment in new sustainable technologies. Furthermore, most extension services are highly centralized and poorly managed by under paid and unqualified extension staff. The result is a typically large inert agricultural bureaucracy with little or no impact on food supply.

63. Most of the other institutions and infrastructures supporting agriculture are also operating inadequately and, therefore, often unable to deliver the services necessary for sustainable food production. Basic literacy is usually low and this often works against the adoption of new and innovative agricultural practices. Poor health also often leads to low productivity while inadequate rural roads and transportation facilities hinder the timely supply of inputs, the effective marketing of produce and the effectiveness of the extension service.

64. Major gaps and weaknesses exist in the capacity of the existing national and international mechanisms to assess, study, monitor and use plant genetic resources to increase food production. These structures and programmes are generally inadequate and largely underfunded. There is genetic erosion of invaluable crop species. Existing diversity in crop species is not used to the extent possible for increased food production in a sustainable way. Plant genetic resources for agriculture (PGRFA) are an essential resource to meet future food needs. Threats to the security of these resources are growing and efforts to conserve, develop and use genetic diversity are under-funded and understaffed. Many existing gene banks provide inadequate security and, in some instances, the loss of plant genetic diversity in gene banks is as great as it is in the field.

65. Conservative estimates put pre- and post-harvest losses caused by pests in Africa between 10 and 90 per cent. Pests affecting animal health are also known to cause heavy losses in livestock production. The trend has been to use chemicals to control these pests. While the amount of chemicals currently being used on farms in Africa is relatively low, their use is bound to increase significantly as increasing numbers

of food self-sufficiency and food security programmes are implemented. This would have adverse effects on farm budgets, human health and the environment as well as on international trade.

2. Development goals

66. Major adjustments are needed in agricultural, environmental and macroeconomic policies, at both the national and international levels to create the necessary conditions for enhanced food self-sufficiency and food security.

67. Well-planned, long-term national and regional land conservation and rehabilitation programmes, with strong political support and adequate funding, are now needed. While land-use planning and land zoning, combined with better land management, should provide long-term solutions, it is urgent to arrest land degradation and launch conservation and rehabilitation programmes in the most critically affected and vulnerable areas.

68. Although macroeconomic policies (exchange rate, trade liberalization, monetary and fiscal policies, etc.) do not specifically address the issue of sustainability they have had important indirect repercussions on it. The opportunities for ensuring a sound policy environment for sustainable food production would be further enhanced if African Governments, at the appropriate levels and with the support of the relevant international organizations, carry out national policy reviews on food self-sufficiency and food security issues with particular reference to policies on foreign trade, pricing, exchange rates, agricultural subsidies, and taxes. More sincere efforts are also needed from the developed countries to avoid protectionist practices which close their markets to African products and to encourage more efficient and environmentally sound use of resources in Africa.

69. There is ample evidence to suggest that Africa's small-scale farmers when provided with well-adapted technologies and appropriate institutional support will adopt sustainable technologies and the complementary inputs that go with these technologies. Agricultural research therefore holds the key to the development of sustainable technological interventions for the various agro-ecological zones of Africa.

70. National and international agricultural research must create the opportunities for improving the technical and economic efficiency in the use of resources and inputs in African agriculture while at the same time reducing the incidence of Africa's food producers to adverse external environmental factors. These opportunities would be enhanced if agricultural research is directed at: formulating and applying techniques that will enhance soil fertility maintenance to meet sustainable food production; integrating organic and inorganic sources of plant nutrients in a system that will sustain soil fertility; and determining plant nutrient and supply strategies and optimizing the use of both organic and inorganic sources, as appropriate, to increasing farming efficiency and production.

71. Genetic resources are essential for meeting the future food needs of an ever increasing African population. As threats to the security of these resources are growing, researchers should step up efforts to conserve, develop and preserve genetic diversity. Germ plasma research would open up new opportunities for sustainable food production by breeding for ecological flexibility and greater yield stability thus achieving significant reductions in seasonal production fluctuations which usually have adverse effects on Africa's small-scale farmers.

72. Research on integrated pest management which incorporates more sustainable methods of pest control by combining biological control, host plant resistance and appropriate farming practices can significantly minimize the use of pesticides. This can open up new opportunities for sustainable food production by guaranteeing yields and reducing costs in an environmental friendly process. Pest and pesticides management should be linked to allow for pesticide regulation, trade, the safe handling and disposal of pesticides particularly those that are toxic.

73. Farming systems research (FSR) efforts in Africa over the last decade have been directed at improving the yield performance of the major crops grown in different countries of the region. This "bottom-up" strategy should be further intensified so as to succeed in bringing researchers and farmers together in the designing of new technologies that are more relevant and appropriate to the African farmers. FSR-tested set of procedures and methodologies should contribute strongly to sustainable research. However, the opportunities that FSR offers to food sustainability will only be fully exploited if the research is articulated within the larger political economy. In this regard, more attention needs to be given to the relationship between poverty, access to resources and environmental degradation in Africa.

74. Biotechnology offers new tools of molecular biology, genetic engineering, cell and tissue culture, microbiology and chemical engineering to help enhance the efficiency and economics of small farm production in Africa. If properly utilized, biotechnology can help promote land, water, energy and cost-saving crop and animal husbandry. Biotechnology, therefore, promises to make a significant contribution towards ensuring sustainable food production through the development of sustainable agricultural practices, improved supply of portable water, more efficient industrial development processes for transforming raw materials and support for sustainable methods of afforestation or reforestation. The promotion of biotechnology for sustainable food production should, however, be pursued with due regard to the characteristics to be modified, the needs of the farmers who would be affected and the socio-economic, cultural and environmental effects of modifications.

75. There is no doubt that for rapid food production growth to be achieved in Africa, concerted action and joint efforts would be required to enable the different countries of the continent to develop within a common framework that takes cognizance of their peculiar needs. African countries working alone would find it very difficult to achieve their food security and food self-sufficiency objectives. Increased trade among them, collaborative agricultural research programmes, the implementation of joint food security strategies, pest control management and natural resource management, particularly river basin development are just a few areas where regional cooperation would be essential in Africa. While the continent's experience with regional cooperation and integration has not been very successful in the past, the recent treaty establishing the African Economic Community opens up new opportunities for cooperation in the development of agricultural, forestry, livestock and fisheries as well as in the promotion of integrated production structures.

76. There is also the need to promote popular participation in the process of food production. Grassroots participation in the development process should create opportunities which will mobilize the continent's resources and ensure that the path to development responds to the interest of the people. A democratic environment which guarantees fundamental human rights is an essential goal of development centred on the people as well as a crucial means of accelerating development. The emerging people-oriented development strategy should pay greater attention to the role of women in sustainable food production, the goal of which will be elusive if half of the continent's population continues to be marginalized and discriminated against. Emphasis has to be on enhancing the productive role of women, reducing drudgery in the household and improving the productive aspects of their life. The self-reliance of farmers in developing and improving rural infrastructure and facilitating the transfer of environmentally sound technologies for integrated production and farming systems, including indigenous technologies and the sustainable use of biological and ecological processes such as agro-forestry, sustainable wildlife conservation and management, aquaculture, inland fisheries and animal husbandry must be enhanced. This should create employment opportunities, particularly for the rural poor and those living in marginal areas, taking into account the alternative livelihood proposal, *inter alia*, in dryland areas.

77. Special emphasis could be placed on the developing of endogenous capacity for characterization, evaluation and utilization of PGRFA, particularly for the minor crops and other underutilized or not utilized species of food and agriculture, including tree species for agro-forestry. Subsequent action could be aimed

at consolidation and efficient management of networks of in situ conservation areas and use of tools such as ex situ collections and germ plasma banks.

78. The priority should be given to maintaining and improving the capacity of the higher potential agricultural lands to support an expanding population. However, conserving and rehabilitating the natural resources on lower potential lands in order to maintain sustainable man/land ratios is also necessary. The main tools of SARD are policy and agrarian reform, participation, income diversification, land conservation and improved management of inputs. The success of SARD will largely depend on the support and participation of rural people, national Governments, the private sector and international cooperation, including technical and scientific cooperation.

79. There is need to harmonize planning procedures, involve farmers in the planning process, collect land-resource data, design and establish databases, define land areas of similar capability, identify resource problems and values that need to be taken into account to establish mechanisms to encourage efficient and environmentally sound use of resources. To do this it will be necessary to establish agricultural planning bodies at national and local levels in order to decide priorities, channel resources and implement programmes.

80. In many African countries, population growth rates exceed 3 per cent a year and national agricultural production has fallen behind food demand. In these countries the goal should be to increase agricultural production by at least 4 per cent a year, without destroying the soil fertility. This will require increasing agricultural production in high-potential areas by the efficient use of inputs. Trained labour, energy supply, tools and technologies, plant nutrients and soil enrichment will all be essential in ensuring adequacy of food supply.

3. Programme of action

81. To ensure and achieve the development goals of food self-sufficiency and food security, the following actions should be undertaken:

(a) Where appropriate, a programme should be established to integrate environmental and sustainable development with policy analysis for the food and agriculture sector and relevant macroeconomic policy analysis, formulation and implementation. Operational multisectoral plans, programmes and policy measures, including programmes and measures to enhance sustainable food production and food security within the framework of sustainable development, should be developed and maintained;

(b) Policy instruments to reconcile long- and short-term requirements must be set by national governments. These should focus on fostering self-reliance and cooperation, providing information and supporting user-based organizations. Emphasis should focus on management practices, building agreements for changes in resource utilization, the rights and duties associated with use of land, water and forests, the functioning of markets, prices and the access to information, capital and inputs. This would require training and capacity-building to assume greater responsibilities in sustainable development efforts;

(c) Programmes should be developed for improving farm production and farming systems through diversification of farm and non-farm employment and infrastructure development. This could be done by:

- (i) developing and disseminating to farming households integrated farm management technologies, such as crop rotation, organic manuring and other techniques involving reduced use of agricultural chemicals, multiple techniques for sources of nutrients and the efficient utilization of external inputs, while enhancing techniques for waste

and byproduct utilization and prevention of pre- and post-harvest losses, taking particular note of the role of women;

- (ii) creating employment opportunities through private small-scale agro-processing units, rural service centres and related infrastructural improvements;
- (iii) promoting and improving rural financial networks that utilize investment capital resources raised locally;
- (iv) providing the essential rural infrastructure for access to agricultural inputs, services and national and local markets, to reduce food losses;
- (v) initiating and maintaining farm surveys, on-farm testing of appropriate technologies and dialogue with rural communities to identify constraints and their solutions;
- (vi) analyzing and identifying possibilities for economic integration of agricultural and forestry activities, as well as water and fisheries, and to take effective measures to encourage forest management and growing of trees by farmers (farm forestry) as an option for resource development;

(d) Collecting, analyzing and disseminating land-resource planning information and education for agriculture. This implies:

- (i) the establishment and strengthening of agricultural land-use and land-resource planning, management, education and information at national and local levels; and
- (ii) the initiation and maintenance of district and village agricultural land-resource planning, management and conservation groups to assist in problem identification, development of technical and management solutions, and project implementation;

(e) Policies, rules and regulations for land conservation and rehabilitation should be introduced and enforced. This requires that governments at the appropriate level, with the support of the relevant international and regional organizations:

- (i) develop and implement programmes to remove and resolve the physical, social and economic causes of land degradation, such as land tenure, appropriate trading systems and agricultural pricing structures, which lead to inappropriate land-use management;
- (ii) provide incentives and, where appropriate and possible, resources for the participation of local communities in the planning, implementation and maintenance of their own conservation and reclamation programmes;
- (iii) develop and implement programmes for the rehabilitation of land degraded by water-logging and salinity;
- (iv) develop and implement programmes for the progressive use of non-cultivated land with agricultural potential in a sustainable way.

(f) Programmes for the conservation and sustainable utilization of plant genetic resources for food and sustainable agriculture should be promoted. To do this, governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- (i) develop and strengthen institutional capacity, structures and programmes for conservation and use of PGRFA;
- (ii) strengthen and establish research in the public domain on PGRFA evaluation and utilization, with the objectives of sustainable agriculture and rural development in view;
- (iii) develop multiplication/propagation, exchange and dissemination facilities for PGRFAs (seeds and planting materials), particularly in Africa and monitor, control and evaluate plant introductions;
- (iv) prepare plans or programmes of priority action on conservation and sustainable use of PGRFA based on country studies;
- (v) promote crop diversification in agricultural systems where appropriate, including new plants with potential value as food crops;
- (vi) promote utilization, and research on poorly known, but potentially useful, plants and crops, where appropriate;
- (vii) strengthen national capabilities for utilization of PGRFA, plant breeding and seed production capabilities, both by specialized institutions and farming communities;

(g) The conservation and sustainable utilization of animal genetic resources for sustainable agriculture should be promoted. To this end, governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- (i) draw up breed preservation plans, for endangered populations, including semen/embryo collection and storage, farm-based conservation of indigenous stock or in situ preservation;
- (ii) plan and initiate breed development strategies;
- (iii) select indigenous populations on the basis of regional importance and genetic uniqueness, for a 10-year programme, followed by selection of an additional cohort of indigenous breeds for development; and
- (iv) prepare and complete national inventories of available animal genetic resources. Cryogenic storage could be given priority over characterization and evaluation. Training of nationals in conservation and assessment techniques would be given special attention.

(h) Integrated pest management and control in agriculture must be promoted. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

- (i) review and reform national policies and the mechanisms that would ensure the safe use of pesticides - for example, pesticide pricing, pest control brigades, price-structure of inputs and outputs and integrated pest-management policies and action plans;

- (ii) develop and adopt efficient management systems to control and monitor the incidence of pests and disease in agriculture and the distribution and use of pesticides at the country level;
 - (iii) encourage research and development into pesticides that are target-specific and readily degrade into harmless constituent parts after use;
 - (iv) ensure that pesticide labels provide farmers with understandable information about safe handling, application and disposal.
- (i) Sustainable plant nutrition to increase food production should be practiced. Governments at the appropriate level, with the support of the relevant international and regional organizations, should, therefore:
- (i) formulate and apply strategies that will enhance soil fertility maintenance to meet sustainable agricultural production and adjust the relevant agricultural policy instruments accordingly;
 - (ii) integrate organic and inorganic sources of plant nutrients in a system to sustain soil fertility and determine mineral fertilizer needs;
 - (iii) determine plant nutrient requirements and supply strategies and optimize the use of both organic and inorganic sources, as appropriate, to increase farming efficiency and production;
 - (iv) develop and encourage processes for the recycling of organic and inorganic waste into the soil structure, without harming the environment, plant growth and human health.

4. Resource implications

(a) Financial resources

82. As with all the other programme areas, the financial resources for implementing this activity should be generated locally. However, UNCED estimated that average total annual cost (1993-2005) of implementing the activities of this programme will include \$US 5.075 billion from the international community on grant or concessional terms. African countries may then negotiate on this basis for a minimum of \$US 1.259 billion from the international community.

(b) Human resource development and capacity building

83. Governments, at the appropriate level, with the support of the relevant international and regional organizations, should:

(a) Involve and train local manpower, including economists, planners and analysts, both within and outside government, to initiate national and international policy reviews and develop frameworks for sustainable agriculture;

(b) Establish legal measures to promote access of women to land and remove biases in their involvement in rural development;

(c) Strengthen ministries for agriculture, natural resources and planning;

(d) Establish land-resource mapping and planning units at national, district and village levels to act as focal points and links between institutions and disciplines and between governments and people;

(e) Establish or strengthen government and non-governmental institutions with responsibility for agricultural resource survey, management and development; rationalize and strengthen legal frameworks; and provide equipment and technical assistance;

(f) Ensure people's participation and promote human resource development for sustainable agriculture.

C. Ensuring efficient and equitable use of water resources

1. Problem areas

84. The widespread scarcity, gradual destruction and aggravated pollution of freshwater resources in many regions of the world along with the progressive encroachment of incompatible activities, demand integrated water resources planning and management. Such integration must cover all types of interrelated freshwater bodies, including both surface and groundwater, and duly consider water quantity and quality aspects. The multisectoral nature of water resources development in the context of socio-economic development, the multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low- and flatlands management and other activities must be recognized.

85. Transboundary water resources and their use are of great importance to riparian States. In this connection, cooperation among those States may be desirable in conformity with existing agreements and/or other relevant arrangements, taking into account the interests of all riparian States concerned.

86. Because of its peculiar nature, water has its importance in most socio-economic development activities. The impact of improved water supply on health and quality of life, potential irrigation irrigated agriculture and pastoral activities, industrial development, river and lake transport and its interface with human and land resources and consequently its relation to the environment makes it a common denominator in the development arena and in halting environmental degradation.

87. The distribution of water in Africa exhibits an abundance of rainfall over the equatorial zone contrasted by extensive and extreme aridity of the Sahara desert in the north and the Kalahari desert in the south. Between both extremes are the semi-arid zones where rainfall shows wide fluctuations from year to year and even within seasons in the year. These areas cover about 57 per cent of the land surface area and the soils can hold moisture to support growth up to 180 days.

88. Due to frequent severe and prolonged droughts, the water resources of the African continent have greatly diminished in the last 20 years. This has happened even in the Congo-Zaire basin which receives about 50 per cent of the total water supplied to the entire continent. Consequently, there are chronic as well as seasonal acute water shortages in most African countries. Yet in all of the countries there is a rapidly increasing demand for water generated by the growing population, urbanization, industrialization and irrigation requirements.

89. The dearth of adequate human resources with training skills and experience in the scientific, technical, managerial and administrative functions required for the development, conservation and management of water resources forms a crucial constraint in the strategy proposals of almost all African countries. This aspect calls for concerted effort by all concerned. Water is a commodity that should be paid for by the beneficiaries or by the community in order to guarantee reliability of services and the possibility of adjusting water charges.

90. Water resources assessment, including the identification of potential sources of fresh water supply, is of a prime importance in the carrying capacity of ecosystems. The determination of water sources, their extent, dependability and quality as well as the impact of man's activity on the available water is crucial.
91. While data collection networks in Africa, are satisfactory for surface water only in a few countries of the region, programmes for the collection of groundwater information are often far less adequate compared to surface water. There is a general lack of equipment, laboratories and other components of the infrastructure. Sediment and water quality data collection are largely done on ad hoc basis.
92. The degradation of water quality is primarily one of the fundamental problems resulting from poor management of development schemes. In the past few years the problem of pollution from domestic, industrial and agricultural sources has been growing. Several African countries are faced with problems of bacteriological and contaminating organic water loads, suspended solids and nitrate pollutants. There is a further threat from agriculture by the associated increases in the use of fertilizer and pesticide. Many shallow groundwater resources appear to be contaminated by pathogenic agents largely from fecal sources and there is absence of systematic water quality monitoring. As a result, a negative health impact prevails in a majority of the African population.
93. Experience has shown that uncontrolled groundwater development in the Sahel has been one of the causes of environmental degradation. Past experiences resulted in the lowering of water tables, drying of wells, salt water intrusion in coastal areas and a decrease of pressure in aquifers. The impact of over-exploitation of groundwater has negative economic and environmental repercussions.
94. Climate change is increasingly becoming recognized to have a serious impact on water. High temperatures and decreased precipitation not only lead to decreased water supplies and increased water demand but also cause deterioration to the quality of freshwater bodies putting strain on the already fragile supply in many countries.
95. A persistent difficulty is encountered in creating proper links between the water sector and other sectors such as agriculture and rural development. The weak interfaces between water and irrigation and water and livestock development are good examples of this. The overall sector of agricultural production being the largest contributor to the economy in the majority of African countries, an improvement of its performance will correspondingly generate resources for development in other sectors.
96. In the context of large-scale irrigation in Africa, inter-basin transfer and high-technology desert-irrigation cannot as an alternative be advocated to solve the problem of famine and food-aid dependence because of the high cost involved that is beyond the reach of governments. The record of large-scale modern irrigation has not been good in sub-Saharan Africa, not only because of capital cost which is double those in other continents but also the numerous factors such as planning, management and maintenance constraints that have not allowed the irrigation schemes to fulfil their desired objectives.
97. Often, it is argued that small-scale development aimed at the bulk of the food producers, including pastoralists, will have the greatest impact that would lead to long-term benefits. This needs to be demonstrated in practice in order to evaluate the real impact of the approach on food production and to bring about a change in the orientation of domestic and external funding policies.
98. One of the fundamental problems of African development is its weakness in producing the required food and in meeting food security. Internal market and availability of rain partly account for the problem. With 93.5 per cent of the cultivated area under rain-fed conditions, the annual fluctuation in the size of African food and agricultural production can largely be attributed to the variability in the rainfall regime. This has been amply demonstrated in the years following the drought in the mid-1980s.

99. It is obvious that food shortage is a major crisis. It is also recognized that to save the situation a wide range of policy measures will have to be adopted in the areas of production inputs, price incentives, credit facilities, assured markets, transportation and extension services including the control of water to facilitate irrigation. The contribution of irrigation to food production is significant since 53 per cent of the land area under irrigation in Africa is devoted to cereal production (viz. rice, wheat, maize, barley, millet and sorghum.)

100. The implications and relationship of water and land use on the environment are reflected in a number of ways. In high-rainfall, high-productivity zones, increasing pressure on land and fragmentation of holdings have resulted in fertility decline. In low-rainfall and drought-prone areas, over-grazing and shifting cultivation (in wetter-than-average years) encroaching on marginal lands continue to undermine and upset the equilibrium of the already fragile ecological balance.

101. Over the past two and half decades, Africa's semi-arid lands have come under population and livestock pressure at a considerably faster rate than the available fertile areas. Consequently, conditions of hunger and famine have become increasingly common in these areas as is the occurrence of drought. This sets in train endemic poverty - poverty of land and resources - to continue. The continuing depletion of forest cover in search of cultivable land and/or fuel wood by the poor make the agro-pastoralists and herdsmen appear as both perpetrators and victims of this phenomenon. A root cause of deterioration in most African countries is the struggle for survival since poverty environmental degradation and population growth interact in the dynamics of the chain process.

102. There are about 54 international rivers in Africa and most African countries are riparian to at least one river basin. Although 14 countries, practically falls within the international river basin system yet only a handful (about six) of these basins have some kind of an organizational arrangement responsible for their development. These organizations have been faced with serious financial and institutional problems.

103. One of the reasons for past failures of river basin development in Africa is the problem of applying the concept of multi-purpose planning. There has been overemphasis on hydropower development for urban, commercial and industrial uses at the expense of resilient ecology, human population and agricultural potential including livestock, forestry and fisheries. The historical records of the river basin organizations reveal that most of them started with ambitious programmes that demanded huge capital outlay. It is also observed that invariably river basin planning has been the prerogative of most energy and irrigation agencies and this needs to have a new perception to encompass all other aspects of economic and social elements included.

2. Development goals

104. The problem of water resources development has its root in the lack of clear policy directives acknowledging the high priority that must be accorded to it with due recognition to the need of strengthening the national institutions in which water development is vested. The policies should be cohesive embracing the management, conservation and its use. The usual mention of water with single sectors like agriculture, health or rural development should be discontinued. The case for integrated and multi-purpose development of water should as a priority be convincingly put across to policy makers.

105. The weakest point is the analysis, i.e., the examination and assessment of the resources, needs, problems and opportunities in the sector. The insufficient cross-sectoral harmonization and reconciliation with national development targets at the macroeconomic level should be corrected. The essence of planning should be the integration of sectoral plans and programmes with overall water resources management within the framework of national socio-economic objectives. The water sector programme like other sectors should be reviewed periodically in terms of objectives, targets, plans and resources in order to determine that portion which can be funded from national and external sources.

106. The strategy should focus on the immediate need to launch a systematic programme of strengthening existing networks and establishing new ones for the assessment of surface and groundwater quantity and quality. The data already procured as well as those generated particularly from the numerous boreholes should be analyzed to update the knowledge on this resource. Immediate action is needed to understand the effect of climate change on fresh water resources as well as initiating water pollution control programmes.

107. To improve the management and conservation of ecosystems and address water-related environmental degradation, two main development objectives are recommended, namely the efficient, equitable and sustainable management, use and distribution of national as well as internationally shared water resources and river basins, and the development and strengthening of water resources accounting and data-base.

108. Several African countries are experiencing economic difficulties of maintaining water systems in a state, matching design criteria and meeting operational and efficiency requirements in all sectors. Emphasis on rehabilitation of inefficient systems, reduction in wastage and unaccounted for water, recycling and re-use of waste water and improved operation and maintenance can be more cost-effective approaches that need to be adopted than investment in new services.

109. The supply of water to high-density livestock population in ecologically fragile zones has been one of the root causes of land degradation. To avoid such negative consequences, the proper development and management of rangelands should be adapted as a principle.

110. Major problems affecting the water quality of rivers and lakes arise, in variable order of importance according to different situations, from inadequately treated domestic sewage, inadequate controls on the discharges of industrial waste waters, loss and destruction of catchment areas, ill-considered siting of industrial plants, deforestation, uncontrolled shifting cultivation and poor agricultural practices. This gives rise to the leaching of nutrients and pesticides. Aquatic ecosystems are disturbed and living freshwater resources are threatened.

111. Under certain circumstances, aquatic ecosystems are also affected by agricultural water resource development projects such as dams, river diversions, water installations and irrigation schemes. Erosion, sedimentation, deforestation and desertification have led to increased land degradation and the creation of reservoirs has, in some cases, resulted in adverse effects on ecosystems. Many of these problems have arisen from a development model that is environmentally destructive and from a lack of public awareness and education about surface and groundwater resource protection. Ecological and human health effects are the consequences, although the means to monitor them are inadequate or non-existent in many countries. There is a widespread lack of perception of the linkages between the development, management, use and treatment of water resources and aquatic ecosystems. A preventive approach, where appropriate, is crucial to avoid costly subsequent measures to rehabilitate, treat and develop new water supplies.

112. It is advocated that integrated water resources development and management should base itself by making water an integral ingredient of the eco-system, having social and economic dimensions the quantity and quality of which determines its utilization. For this purpose, using the river basin geographical unit as a vehicle for socio-economic development has been adapted. A preliminary step towards this objective, based on long-term sustainable development in a holistic and integrated manner, is the strengthening of existing organization in terms of capacity building and provision of funds that are needed for the creation of new basin organizations which should start by initiating consultation among riparian States. Considering the time required for the organizations to become operational, negotiations among member States should begin immediately. Each member State should be assured of the economic benefit that will accrue from such cooperative arrangements.

113. The future strategy for the provision and expansion of water supplies should be based on setting realistic targets by governments, promoting population and family planning policies, adapting low-cost

technologies, introducing cost-sharing mechanisms by means of tariff policies and increasing community participation particularly of women in rural areas where the need is greatest. It is necessary to ensure that drinking water and sanitation programmes are fully integrated within the framework of national planning for environment and sustainable development. Privatization of the maintenance and operation of water supply systems and orientation to the rural sector in the packages for rural development and human settlement along with other social services like health and education is perceived as a sound approach that will ensure sustainability.

114. Water use efficiency is a subject of concern to many countries and relates to all sectors, as its excessive demand on the resource itself, implies increased investment in infrastructures and operational costs. The problem is particularly significant to agriculture and irrigation which has a heavy demand for water. For many African countries where irrigation is gaining prominence, the overall rational use of water is key to development. Demand management particularly in North African countries (where irrigation is relatively developed), even if it gives only marginal savings of water, could have profound benefit in the large volumes it provides by avoiding costs for exploration and development of additional sources.

115. Recently, more and more African countries are embarking upon irrigated agriculture. There are also countries in North Africa which have a long history of irrigation and have experienced salination which damages soil property. This latter group of countries need to provide in their national strategy a component to combat the threat and to bring about sustainability and thereby increase production. For those countries newly embarking on irrigated agriculture, the incorporation of drainage facilities will be a cost-effective investment. Where appropriate, irrigation development and expansion should take into consideration the possibilities of adopting necessary design and operational factors to incorporate marginal quality of water from effluent or brackish sources into existing and future systems.

3. Programme of action

116. To improve water quantity and quality through efficient, equitable and sustainable use and distribution of national as well as internationally shared water resources and river basins, several measures should be undertaken by governments, as proposed in Agenda 21. Those measures should include the following:

(a) Integrated water resources development and management

117. The overall objective here will be to satisfy the freshwater needs of all countries for their sustainable development. It is understood that integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization. To this end, water resources have to be protected, taking into account the functioning of aquatic ecosystems and the perenniality of the resource in order to satisfy and reconcile needs for water in human activities. In developing and using water resources, priority has to be given to the satisfaction of basic needs and the safeguarding of ecosystems.

118. To achieve these objectives, all African countries, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations, could implement the following activities to improve integrated water resources management:

(a) Formulation of costed and targeted national action plans and investment programmes;

(b) Integration of measures for the protection and conservation of potential sources of freshwater supply, including the inventorying of water resources, with land-use planning, forest resource utilization, protection of mountain slopes and riverbanks and other relevant development and conservation activities;

- (c) Development of interactive databases, forecasting models, economic planning models and methods for water management and planning, including environmental impact assessment methods;
- (d) Optimization of water resources allocation under physical and socio-economic constraints;
- (e) Implementation of allocation decisions through demand management, pricing mechanisms and regulatory measures;
- (f) Flood and drought management, including risk analysis and environmental and social impact assessment;
- (g) Promotion of schemes for rational water use through public awareness-raising, educational programmes and levying of water tariffs and other economic instruments;
- (h) Mobilization of water resources, particularly in arid and semi-arid areas;
- (i) Promotion of international scientific research cooperation on freshwater resources;
- (j) Development of new and alternative sources of water supply such as sea-water desalination, artificial groundwater recharge, use of marginal-quality water, waste-water re-use or water recycling;
- (k) Integration of water (including surface and underground water resources) quantity and quality management;
- (l) Promotion of water conservation through improved water-use efficiency and wastage minimization schemes for all users, including the development of water-saving devices;
- (m) Support to water-users groups to optimize local water resources management;
- (n) Development of public participatory techniques and their implementation in decision-making, particularly the enhancement of the role of women in water resources planning and management;
- (o) Development and strengthening, as appropriate, of cooperation, including mechanisms where appropriate, at all levels concerned; and
- (p) Dissemination of information, including operational guidelines and promotion of education for water users.

(b) Water resources assessment

119. Water resources assessment, including the identification of potential sources of freshwater supply, comprises the continuing determination of sources, extent, dependability and quality of water resources and of the human activities that affect those resources. Such assessment constitutes the practical basis for their sustainable management and a prerequisite for evaluation of the possibilities for their development. There is, however, growing concern that at a time when more precise and reliable information is needed about water resources, hydrologic services and related bodies are unable to provide information, regarding groundwater and water quality.

120. Major impediments are the lack of financial resources for water resources assessment, the fragmented nature of hydrologic services and the insufficient qualified staff. At the same time, the advancing technology for data capture and management is increasingly difficult to access for Africa. Establishment of national

databases is, however, vital to water resources assessment and to mitigation of the effects of floods, droughts, desertification and pollution.

121. Based upon the Mar del Plata Action Plan, Agenda 21 extended the water resources programme to cover the overall objective of ensuring the assessment and forecasting of water resources in order to estimate the total quantity of water resources available and their future supply potential, predict possible conflicts between supply and demand and to provide a scientific database for rational water resources utilization.

122. For effective water resources assessment, all African countries, according to their capacity and available resources could undertake the following activities:

(a) Institutional framework:

- (i) establish and strengthen the institutional capabilities of countries, including legislative and regulatory arrangements, that are required to ensure the adequate assessment of their water resources and the provision of flood and drought forecasting services;
- (ii) establish and maintain effective cooperation at the national level between the various agencies responsible for the collection, storage and analysis of hydrologic data;
- (iii) cooperate in the assessment of transboundary water resources, subject to the prior agreement of each riparian State concerned;

(b) Data systems:

- (i) review existing data collection networks and assess their adequacy, including those that provide real-time data for flood and drought forecasting;
- (ii) improve networks to meet accepted guidelines for the provision of data on water quantity and quality for surface and groundwater, as well as relevant land-use data;
- (iii) apply standards and other means to ensure data compatibility;
- (iv) upgrade facilities and procedures used to store, process and analyse hydrologic data and make such data and the forecasts derived from them available to potential users;
- (v) establish databases on the availability of all types of hydrologic data at the national level;
- (vi) implement "data rescue" operations, for example, establishment of national archives of water resources;
- (vii) implement appropriate well-tried techniques for the processing of hydrologic data;
- (viii) derive area-related estimates from point hydrologic data; and
- (ix) assimilate remotely sensed data and the use, where appropriate, of geographical information systems;

- (c) Data dissemination:
 - (i) identify the need for water resources data for various planning purposes; analyse and present data and information on water resources in the required form for planning and management of countries' socio-economic development and for use in environmental protection strategies and in the design and operation of specific water-related projects;
 - (ii) provide forecasts and warnings of flood and drought to the general public and civil defence;
- (d) Research and development:
 - (i) establish or strengthen research and development programmes at the national, subregional, regional and international levels in support of water resources assessment activities;
 - (ii) monitor research and development activities to ensure that they make full use of local expertise and other local resources and that they are appropriate for the needs of the country or countries concerned;
- (c) Protection of water resources, water quality and aquatic ecosystems

123. The extent and severity of contamination of unsaturated zones and aquifers have long been underestimated owing to the relative inaccessibility of aquifers and the lack of reliable information on aquifer systems. The protection of groundwater is therefore an essential element of water resource management. Three objectives should be pursued concurrently to integrate water-quality elements into water resource management:

(a) Maintenance of ecosystem integrity, according to a management principle of preserving aquatic ecosystems, including living resources, and effectively protecting them from any form of degradation on a drainage basin basis;

(b) Public health protection, a task requiring the provision of safe drinking-water and the control of disease vectors in the aquatic environment; and

(c) Human resources development, a key to capacity-building and a prerequisite for implementing water-quality management.

124. Within this context, African countries, according to their capacity and available resources, through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, should set the following targets:

(a) Identify the surface and groundwater and other major water-dependent resources that could be developed for use on a sustainable basis and, simultaneously, initiate programmes for the protection, conservation and rational use of these resources on a sustainable basis;

(b) Identify all potential sources of water-supply and prepare outlines for their protection, conservation and rational use;

(c) Initiate effective water pollution prevention and control programmes, based on an appropriate mixture of pollution reduction-at-source strategies, environmental impact assessments and enforceable

standards for major point-source discharges and high-risk non-point sources, commensurate with their socio-economic development;

(d) Participate, as far as possible, in international water-quality monitoring and management programmes such as the Global Water Quality Monitoring Programme (GEMS/WATER), the UNEP Environmentally Sound Management of Inland Waters (EMINWA), the FAO regional inland fishery bodies, and the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention);

(e) Reduce the prevalence of water-associated diseases, starting with the eradication of dracunculiasis (guinea worm disease) and onchocerciasis (river blindness) by the year 2000;

(f) Establish, according to capacities and needs, biological, health, physical and chemical quality criteria for all water bodies (surface and groundwater), with a view to an ongoing improvement of water quality;

(g) Adopt an integrated approach to environmentally sustainable management of water resources, including the protection of aquatic ecosystems and freshwater living resources;

(h) Put in place strategies for the environmentally sound management of freshwater and related coastal ecosystems, including consideration of fisheries, aquaculture, animal grazing, agricultural activities and biodiversity.

(d) Drinking-water supply and sanitation

125. Four guiding principles provide for the programme objectives, namely:

(a) Protection of the environment and safeguarding of health through the integrated management of water resources, liquid and solid wastes;

(b) Institutional reforms promoting an integrated approach and including changes in procedures, attitudes and behaviour, and the full participation of women at all levels in sector institutions;

(c) Community management of services, backed by measures to strengthen local institutions in implementing and sustaining water and sanitation programmes;

(d) Sound financial practices, achieved through better management of existing assets, and widespread use of appropriate technologies.

126. Furthermore, past experience has shown that specific targets should be set by each individual country. At the World Summit for Children, in September 1990, heads of State or Government called for both universal access to water-supply and sanitation and the eradication of guinea worm disease by the year 1995. Even for the more realistic target of achieving full coverage in water supply by the year 2025, it is estimated that annual investments must double the current levels. One realistic strategy to meet present and future needs, therefore, is to develop effective low-cost services that can be implemented and sustained at the community level.

127. Within this context, all States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

- (a) Environment and health:
 - (i) establishment of protected areas for sources of drinking-water supply;
 - (ii) sanitary disposal of excreta and sewage, using appropriate systems to treat waste waters in urban and rural areas;
 - (iii) expansion of urban and rural water supply and development of rainwater catchment systems, particularly on small islands, in addition to the reticulated water supply system;
 - (iv) building and expansion, where appropriate, of sewage treatment facilities and drainage systems;
 - (v) treatment and safe re-use of domestic and industrial waste waters in urban and rural areas;
 - (vi) control of water-associated diseases;
- (b) People and institutions:
 - (i) strengthening the functioning of governments in water resources management and, at the same time, giving full recognition to the role of local authorities;
 - (ii) encouragement of water development and management based on a participatory approach, involving users, planners and policy makers at all levels;
 - (iii) application of the principle that decisions are to be taken at the lowest appropriate level, with public consultation and involvement of users in the planning and implementation of water projects;
 - (iv) human resource development at all levels, including special programmes for women;
 - (v) broad-based education programmes, with particular emphasis on hygiene, local management and risk reduction; and
 - (vi) international support mechanisms for programme funding, implementation and follow-up.
- (c) National and community management:
 - (i) support and assistance to communities in managing their own systems on a sustainable basis;
 - (ii) encouragement of the local population, especially women, youth, and local communities, in water management;
 - (iii) linkages between national water plans and community management of local waters;
 - (iv) integration of community management of water within the context of overall planning;

- (v) promotion of primary health and environmental care at the local level, including training for local communities in appropriate water management techniques and primary health care;
 - (vi) assistance to service agencies in becoming more cost-effective and responsive to consumer needs;
 - (vii) paying more attention to under-served rural and low-income peri-urban areas;
 - (viii) rehabilitation of defective systems, reduction of wastage and safe re-use of water and waste water;
 - (ix) programmes for rational water use and ensured operation and maintenance;
 - (x) research and development of appropriate technical solutions; and
 - (xi) substantially increase urban wastewater treatment capacity commensurate with increasing loads;
- (d) **Awareness creation and public information and participation:**
- (i) sector monitoring and information management should be strengthened at subnational and national levels;
 - (ii) annual processing, analysis and publication of monitoring results at national and local levels as a sector management and advocacy/awareness creation tool;
 - (iii) use of limited sector indicators at regional and global levels to promote the sector and raise funds;
 - (iv) improvement of sector coordination, planning and implementation, with the assistance of improved monitoring and information management, to increase the sector's absorptive capacity, particularly in community-based self-help projects.
- (e) **Water and sustainable urban development**

128. All countries, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

- (a) Protection of water resources from depletion, pollution and degradation (introduction of sanitary waste disposal facilities based on environmentally-sound low-cost and upgradable technologies);
- (b) Implementation of urban storm-water run-off and drainage programmes;
- (c) Promotion of recycling and re-use of waste water and solid wastes;
- (d) Control of industrial pollution sources to protect water resources;
- (e) Protection of watersheds with respect to depletion and degradation of their forest cover and from harmful upstream activities;

(f) Promotion of research into the contribution of forests to sustainable water resources development;

(g) Encouragement of the appropriate management practices for the use of agro-chemicals with a view to minimizing their impact on water resources;

(h) Carry out a reconciliation of city development planning with the availability and sustainability of water resources; satisfaction of the basic water needs of the urban population; introduction of water tariffs, taking into account the circumstances in each country and where affordable, that reflect the marginal and opportunity cost of water, especially for productive activities;

(i) Promotion of the adoption of a city-wide approach to the management of water resources; promotion at the national and local level of the elaboration of land-use plans that give due consideration to water resource development; utilization of skills and potential of non-governmental organizations, the private sector and local people, taking into account the public's and strategic interests in water resources; initiation of public-awareness campaigns to encourage the public's move towards rational water utilization; Sensitization of the public to the issue of protecting water quality within the urban environment; promotion of public participation in the collection, recycling and elimination of wastes;

(j) Introduction of legislation and policies to promote investments in urban water and waste management, reflecting the major contribution of cities to national economic development; provision of the necessary seed money and technical support to the local handling of materials supply and services; and encouragement, of autonomy and financial viability of city water, solid waste and sewerage utilities; creation and maintenance of a cadre of professionals and semi-professionals, for water, waste-water and solid waste management;

(k) Implementation of water, sanitation and waste management programmes focused on the urban poor; make of low-cost water-supply and sanitation technology choice available; base the choice of technology and service levels on user preferences and willingness to pay; mobilization and facilitation of the active involvement of women in water management teams; encourage and equipment of local water associations and water committees to manage community water-supply systems and communal latrines, with technical support available when required; and consideration of the merits and practicality of rehabilitating existing malfunctioning systems and of correcting operation and maintenance inadequacies.

(f) Water for sustainable food production and rural development

129. All States, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, should implement the following activities:

(a) Water supply and sanitation for the rural poor supported by national policies and budget priorities with regard to increasing service coverage, appropriate technologies, suitable cost-recovery mechanisms, taking into account efficiency and equity through demand management mechanisms; promote community ownership and rights to water supply and sanitation facilities; establish monitoring and evaluation systems; strengthen the rural water supply and sanitation sector with emphasis on institutional development, efficient management and an appropriate framework for financing of services; increase hygiene education and eliminate disease transmission foci; adopt appropriate technologies for water treatment, wide-scale environmental management measures to control disease vectors;

(b) Water-use efficiency: increase efficiency and productivity in agricultural water use for better utilization of limited water resources; strengthen water and soil management research under irrigation and rain-fed conditions; monitor and evaluate irrigation project performance to ensure, inter alia, the optimal

utilization and proper maintenance of the project; support water-users groups with a view to improving management performance at the local level; and support the appropriate use of relatively brackish water for irrigation;

(c) Waterlogging, salinity control and drainage: introduction, where applicable, of surface drainage in rain-fed agriculture to prevent temporary waterlogging and flooding of lowlands, artificial drainage in irrigated and rain-fed agriculture; encourage conjunctive use of surface and groundwaters, including monitoring and water-balance studies; and practise drainage in irrigated areas of arid and semi-arid regions;

(d) Water-quality management: establish and operate cost-effective water-quality monitoring systems for agricultural water uses; prevent adverse effects of agricultural activities on water-quality for other social and economic activities and on wetlands, *inter alia*, through optimal use of on-farm input and the minimization of the use of external input in agricultural activities; establish biological, physical and chemical water-quality criteria for agricultural water-users and for marine and riverine ecosystems; minimize soil run-off and sedimentation; proper sewage disposal from human settlements and manure produced by intensive livestock breeding, minimize adverse effects from agricultural chemicals by use of integrated pest management; educate communities about the pollution-related impacts of the use of fertilizers and chemicals on water-quality, food safety and human health;

(e) Water resources development programmes: development, where applicable, of small-scale irrigation and water-supply for humans and livestock and for water and soil conservation; formulate large-scale and long-term irrigation development programmes, taking into account their effects on the local level, the economy and the environment; promote local initiatives for the integrated development and management of water resources; provide adequate technical advice and support and enhancement of institutional collaboration at the local community level; promote a farming approach for land and water management that takes account of the level of education, the capacity to mobilize local communities and the ecosystem requirements of arid and semi-arid regions; and, plan and develop multi-purpose hydroelectric power schemes, making sure that environmental concerns are duly taken into account;

(f) Scarce water resources management: development of long-term strategies and practical implementation programmes for agricultural water use under scarcity conditions with competing demands for water; programme water as a social, economic and strategic good in irrigation planning and management; formulate specialized programmes focused on drought preparedness, with emphasis on food scarcity and environmental safeguards; promote and enhance waste-water reuse in agriculture;

(g) Water-supply for livestock: improvement of the quality of water available to livestock, taking into account their tolerance limits; in particular those in extensive grazing areas, in order to reduce both the distance from water sources and overgrazing around these sources; prevent contamination of water sources with animal waste in order to prevent the spread of diseases, in particular zoonosis; encourage multiple use of water-supplies through promotion of integrated agro-livestock-fishery systems; and water spreading schemes for increasing water retention of extensive grasslands to stimulate forage production and prevent run-off;

(h) Inland fisheries: development of the sustainable management of fisheries as part of national water resources planning; study specific aspects of the hydro-biology and environmental requirements of key inland fish species in relation to varying water regimes; prevent or mitigate modification of aquatic environments by other users or rehabilitate environments subjected to such modification on behalf of the sustainable use and conservation of biological diversity of living aquatic resources; develop and disseminate environmentally sound water resources development and management methodologies for the intensification of fish yield from inland waters; and establish and maintain adequate systems for the collection and

interpretation of data on water quality and quantity and channel morphology related to the state and management of living aquatic resources, including fisheries;

(i) **Aquaculture development:** development of environmentally sound aquaculture technologies that are compatible with local, regional and national water resources management plans and take into consideration social factors; introduce appropriate aquaculture techniques and related water development and management practices in countries not yet experienced in aquaculture; assess environmental impacts of aquaculture with specific reference to commercialized culture units and potential water pollution from processing centres; evaluate economic feasibility of aquaculture in relation to alternative use of water, taking into consideration the use of marginal-quality water and investment and operational requirements.

(g) Impacts of climate change on water resources

130. All African countries, according to their capacity and available resources, and through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could implement the following activities:

(a) Monitor the hydrologic regime, including soil moisture, groundwater balance, penetration and transpiration of water-quality, and related climate factors, especially in the regions and countries most likely to suffer from the adverse effects of climate change and the localities vulnerable to these effects should be defined;

(b) Develop and apply techniques and methodologies for assessing the potential adverse effects of climate change, through changes in temperature, precipitation and sea-level rise, on freshwater resources and the flood risk;

(c) Initiate case-studies to establish whether there are linkages between climate changes and the current occurrences of droughts and floods in certain regions;

(d) Assess the resulting social, economic and environmental impacts;

(e) Develop and initiate response strategies to counter the adverse effects that are identified, including changing groundwater levels and to mitigate saline intrusion into aquifers;

(f) Develop agricultural activities based on brackish-water use; and

(g) Contribute to the research activities under way within the framework of current international programmes.

4. Resource implications

(a) Financial resources

131. UNCED estimated the average total annual cost (1993-2005) of implementing the activities of this programme to be \$US 17.04 billion from the international community on grant or concessional terms. African countries may then negotiate on this basis for a minimum of \$US 3.33 billion from the international community.

(b) Manpower and institutional capacity

132. To implement the activities in freshwater resource management, governments and communities need to have adequate capacities. Those who establish the framework for water development and management

at any level, whether international, national or local, need to ensure that the means exist to build those capacities. The means, which will vary from case to case, usually include:

- (a) Awareness-creation programmes, including mobilizing commitment and support at all levels and initiating global and local action to promote such programmes;
- (b) Training of water managers at all levels so that they have an appropriate understanding of all the elements necessary for their decision-making;
- (c) Strengthening of training capacities in African countries;
- (d) Appropriate training of the necessary professionals, including extension workers;
- (e) Improvement of career structures;
- (f) Sharing of appropriate knowledge and technology, both for the collection of data and for the implementation of planned development including non-polluting technologies and the knowledge needed to extract the best performance from the existing investment system;
- (g) Review and development, where there is a clear demand, of institutional capacity for implementing integrated water management. Existing administrative structures will be capable of achieving local water resources management, but the need may arise for new institutions based upon the perspective, for example, of river catchment areas, district development councils and local community committees. Although water is managed at various levels in the socio-political system, demand-driven management requires the development of water-related institutions at appropriate levels, taking into account the need for integration with land-use management.

D. Securing greater energy efficiency and self-sufficiency

1. Problem areas

(a) Low energy access and high wastages

133. Energy used in Africa in 1988 totalled 288 million tons of oil equivalent (Mtoe). Africa's population of 610 million (12 per cent of world population) thus accounted for only 3.5 per cent of world total energy of 8.2 billion toe in 1988. By comparison, South America and Europe with 5.5 and 9.7 per cent of world population accounted for 4 and 22 per cent respectively of world energy use. At 0.48 toe, the yearly average energy access per capita in 1988 in Africa as a whole was only 29 per cent of the world average, 40 per cent of South America's and 74 per cent of Asia's. Per capita energy access which rose in other regions through the 1980s remained stagnant for Africa as a whole indicating the spread of energy scarcities. United Nations statistics indicate that energy access in the second half of the 1980s actually fell in a number of African countries including some that produce and export oil.

134. Traditional energy in the majority of African countries contributes over 70 per cent of total energy use, its share being lowest in the 10 countries at the southern and northern ends of the continent. It contributed only about 4 per cent in the group of countries which are members of the South African Customs Union (SACU) and about 8 per cent in the five African countries on the Mediterranean Sea.^{15/}

^{15/} SACU member countries are Botswana, Lesotho, Namibia, Republic of South Africa and Swaziland; the Mediterranean African countries are Algeria, Egypt, the Libyan Arab Jamahiriya, Morocco and Tunisia.

It accounted for more than 85 per cent of total energy in the 27 least developed countries (LDCs) among the 42 African countries located between the two groups.

135. Petroleum fuels constitute over 90 per cent of commercial energy in the majority of the 42 African oil-importing and the 10 oil-exporting countries. The commercial energy percentage of average per capita energy in the 27 LDCs is 15 per cent and considerably lower in a substantial number among them. In many of the LDCs, imported petroleum fuels absorb 30-50 per cent of export earnings that continue to decline with deteriorating terms of trade. Petroleum supplies in these countries are costly because purchases are made only in small quantities at a time due to shortage of foreign exchange. According to a World Bank study of 10 selected developing countries of which two are in sub-Saharan Africa, electric sector investment in 1975-1985 accounted for an average of 18 per cent of total public debt. The inadequate financial performance of the sector mainly caused by low tariffs and poor operation and maintenance practices, the study notes, increased overall indebtedness and led to a serious drain on government budget.

(b) Energy resources development

136. Africa's endowments of primary energy resources are considerable although unevenly distributed: 55 billion barrels of petroleum and 5 900 billion m³ of natural gas have been identified in Africa's 17.5 per cent share of world sedimentary basin area even though it has received less than 4 per cent of world petroleum exploration/production expenditure; 135 billion tons of coal, peat and lignite (despite very low geological exploration coverage); over 300 000 MW of hydro potential; considerable potential in geothermal energy mainly in the Rift Valley and wind energy potential chiefly on the continent's sea coasts; great potential in solar energy especially in its extensive arid and semi-arid lands and substantial potential in biomass and animate energy, etc.

137. Little of this wide range of fossil and renewable energy resource endowments has yet to be developed in order to benefit the large majority of Africa's rural and urban populations experiencing ever-worsening energy scarcities. Some of the large accessible known African reserves of coal, petroleum and natural gas are being exploited with over 60 per cent of production being exported to other regions. By comparison, South America and Asia utilized 71 and 83 per cent of their respective production of commercial energy commodities. Less than 4 per cent of Africa's hydropower has been harnessed so far while considerable geothermal energy potential has yet to be tapped, except in Kenya. The high levels of year-round solar radiation over the continent and its substantial wind energy potential have also yet to be harnessed.

(c) Costly energy technology imports

138. Most African countries import all (except simple biomass) energy supplies and end-use technologies. Also imported are all conversion technologies for deriving commercial energy supplies from fossil and renewable energy resources and commodities; technologies for transporting and distributing energy supplies as well as all end-use technologies for deriving from supplies the energy services such as heat, light, mechanical power needed for production and consumption purposes.

139. Escalating costs of technology on the one hand and declining foreign exchange earnings from commodity exports on the other, have severely constrained capacity of most African countries to import energy technologies and spare parts. This has contributed to a widening gap between energy availability and requirements, even where ample energy resource endowments exist. Overwhelming technological dependence on imports is thus a major factor in the growing scarcity of energy supplies available for survival and development uses in Africa.

(d) Environmental impacts of energy

140. About two thirds of the African landmass consists of drylands including the Sahara and Kalahari deserts which are inhabited by 400 million people. Their subsistence level livelihood is entirely dependent on biomass not only for food and fodder but also for shelter, furniture, utensils, fuels, farm implements, artisanal and other tools, artifacts and handcrafts, as well as natural products and agricultural commodities. In the fragile ecologies of arid and semi-arid lands, the heavy dependence of increasing population on biomass for daily fuel supplies exacerbates rapid devegetation of the environment due to the cutting of trees and other biomass for various uses in addition to land-clearing for expanded agricultural production of food and export commodities. Devegetated, fragile arid and semi-arid lands ecologies erode rapidly and often desertification follows intensifying the scarcity of biomass fuel. The high level of wastage in biomass energy uses aggravates the scarcity. It is estimated that some 40 per cent of the African population already face acute energy scarcity and insecurity.

141. Excessive wastage of energy is common in Africa in production, transport, distribution and utilization of traditional and commercial energy and its effects increases the burden which the imports of energy and technology impose on meagre foreign exchange resources. The wastage is due to low inherent efficiency of energy technologies and methods applied and old equipment. Widely prevalent improper operation, inadequate maintenance and repair of otherwise energy efficient technologies aggravate energy waste.

142. Severe soil loss and environmental degradation that is a consequence of land devegetation is accentuated by highly wasteful use of biomass energy. Environmental degradation and pollution is commonly induced in production, processing and transportation of commodities exported to earn foreign exchange.

143. Africa's 2.6 per cent share of world total annual fossil fuel use is a measure of its contribution to the build up of fossil carbon in the global atmosphere. All of the biomass burnt in Africa in 1990 has been estimated to have made a net contribution of 80 million tons carbon to the global atmosphere. It has been estimated that annual production of woody biomass in Africa as whole is over twice as much as the consumption of biomass fuels and three times as much if crop residues and dung are added. African net biomass carbon is mostly due to land clearing and burning rather than use of biomass for energy.

(e) Health impacts of energy

144. Biomass combustion produces carbon monoxide, carbon dioxide and other toxic gases. Exposure to these gases above safe levels affects respiratory systems and other consequential health problems especially among females in African families who, by tradition, attend to the household fire place. Worsening scarcity of biomass in their neighbourhoods force the female members of the family to gather and carry fuel from longer distances increasing their already heavy workload and adversely affecting their health. Prices of traditional fuels in rapidly growing urban areas are rising to levels that lower-income households cannot afford. Severe malnutrition in rural and urban areas of many African LDCs is being recognized as partly a consequence of acute scarcities of household fuel that induce cutbacks in the daily number of cooked meals. In the larger urban areas, air pollution resulting from motor vehicle emissions and kerosene used in households are believed to be increasingly inducing acute respiratory and other health problems under certain weather conditions.

(f) Energy under global warming

145. Arid and semi-arid lands are expected to become drier and prone to occurrences of more frequent and more severe droughts and stormy weather under global warming. Biomass growth and survival rates reduced much below current low levels would worsen scarcity of biomass for energy in 37 African countries

partly or wholly located in such areas. Global warming may also be expected to reduce hydroelectric energy potential in the affected countries as a result of reduced rainfall and run-off. Côte d'Ivoire, Egypt and Ghana experienced drastic shortfalls in their hydroelectric outputs during the 1983/84 drought. Zambia and Zimbabwe have also experienced similar shortfalls during the 1991/92 drought. Growing scarcity of biomass and hydroelectricity in Africa under global warming would heighten the need for energy savings and efficiency, for switching to natural gas which releases the least carbon dioxide per unit of energy and for development of alternative energy sources.

146. But global warming would also reduce the capacity of African countries with arid and semi-arid lands to produce agricultural commodities for export earnings essential to finance energy supplies and/or technology imports for improving energy savings and efficiency.

147. Coal energy use in Africa is very low even though the larger coal reserves are being mined to provide about a quarter of the continent's energy at present, mainly in Southern Africa and for export to other regions. The low coverage of detailed geological exploration of much of the continent's area to date means future discoveries of substantial coal reserves can not be ruled out. Numerous small deposits of coal readily minable with simple technology and on small scale are known to exist in many African countries and discoveries of many more small reserves can be expected in future. Coal mined with inexpensive techniques for a variety of uses would be an option for relieving traditional and commercial energy scarcity in many African countries, but such use could be severely constrained by international restrictions on CO₂ emission adopted to mitigate climate change. Carbon emission restrictions could also induce shrinkage of the coal export market and declines in international coal prices as well as in future earnings from coal exports.

148. The bulk of petroleum production in the 10 producing African countries is being exported to other continents to earn foreign exchange for financing development programmes, etc. The prospects of oil discoveries have recently spurred increased oil exploration in many African countries with sedimentary basins. New discoveries would relieve the heavy oil-import burden for the well-endowed and earn foreign exchange from oil exports. African production and use of petroleum as well as prospective future export earnings will however be severely limited by international restrictions on carbon dioxide emissions.

149. Rational energy sector development is severely hampered by technological capacity constraints in the majority of African countries. Among the major capacity constraints are the lack of adequate endogenous capacity to:

(a) Undertake energy policy and planning research essential for the elaboration of coherent, country-specific, resource and needs-specific energy policies, plans and phased strategies for emerging from energy crises;

(b) Explore, survey and assess energy resource endowment, to self-reliantly design the development of each endowment to furnish decentralized and/or centralized least-cost mix of energy supplies and services well-matched to major energy needs at local, national subregional and regional levels;

(c) Implement projects of development of energy supplies from resource endowment as well as efficient energy utilization self-reliantly together with external collaborating partners for mutual benefit;

(d) Efficiently and optimally operate, maintain, repair and manage energy supply and utilization facilities and systems.

150. The inadequacy of technological capacities in the above areas have led to over-dependence on external sources of technological expertise in all aspects of energy supplies and energy utilization which have severely constrained energy development in Africa.

2. Development goals

151. The existing energy patterns and trends in Africa are unsustainable economically, socially and environmentally. A transition to sustainable energy systems is inevitable but could be chaotic with severe social and economic disruptions and irreversible environmental damage. Such an occurrence maybe pre-empted through a planned transition pursued with strong national and international commitment. Implementation of Agenda 21 towards socially equitable, economically and technologically sound and environmentally sustainable development in African countries would crucially depend on greater energy security and self-sufficiency. An orderly and phased transition from the present grossly inadequate and inefficient energy patterns towards sustainable levels of energy security and self-sufficiency would need to be an integral component of the process of implementing Agenda 21 in African countries.

152. The lack of energy security, one of the five priority concerns singled out in the African Common Position of the African Environment and Development Agenda, is a crucial variable in the other four priority concerns, namely:

- (a) The non-achievement of food security which is resulting in famine and malnutrition;
- (b) The non-achievement of sustainable economic growth and productive employment;
- (c) Insecurity and instability of financial resource flows for development; and
- (d) Improvement of the quality of life and habitat.

153. Enhanced energy security and self-sufficiency would over time improve per capita energy access for satisfaction of essential needs for survival and also raise the availability of efficient energy service for development and economic growth.

154. A priority objective in African energy sector development under Agenda 21 is the attainment as a matter of urgency of greater sustainable energy security and self-sufficiency as prerequisites for rural and urban food security. This would encompass efficient energy supplies and uses for high levels of self-reliance in production of food for adequate per capita nutrition levels. It would similarly encompass energy for stocking, transportation, distribution, processing, preservation and final preparation of food for consumption to maintain adequate nutrition levels for the population of each country.

3. Programme of action

155. The following activities will be undertaken:

(a) Short-term

- (i) attain sustainable energy security required for meeting food security and for other essential needs of the population in rural and urban areas. This would include secure energy supplies and services essential for efficient energy utilization in assuring adequate access to safe water, health care, basic and relevant education, etc. It would also include reliable energy supplies and services for efficient utilization to save labour and time in laborious tasks in households as well as in production and service sectors;
- (ii) reduce excessive energy wastage by application of no-cost and low-cost means and methods that will improve energy efficiency substantially in existing energy supplies and utilization in rural and urban areas in all sectors of production and services;

- (iii) review all levels of energy and energy-related formal as well as informal education and training programmes to improve relevance to national objectives for achieving and maintaining energy security, efficiency and self-reliance.
- (iv) raise standards of operation, maintenance and management of energy supply systems and of energy utilization in all sectors to cost-effective high levels;

(b) Medium term

- (i) build and strengthen endogenous technological capacity in all areas of development of energy supplies, services and in energy utilization in all sectors, and in particular in supplies and services based on local renewable and fossil energy resource endowments;
- (ii) cooperate for mutual benefit with neighbouring and other countries in building and strengthening energy sector technological capacity;
- (iii) cooperate for mutual benefit, with neighbouring and other countries in the cost-effective rationalization of the supply and distribution of indigenous and imported energy commodities and forms;
- (iv) make investments in retro-fitting, refurbishing and otherwise upgrading existing energy supply and utilization facilities and equipment to improve energy efficiency cost effectively;
- (v) design and implement decentralized energy supply projects based on local resources to furnish cost-effective energy supplies well-matched to major local energy needs.
- (vi) design and implement central energy supply projects based on indigenous large resource endowments to furnish cost-effective energy supplies for well-matched energy uses at national and multi-country levels;
- (vii) cooperate for mutual benefit with African and other countries in design, implementation, operation, management and ownership of decentralized and centralized energy projects;
- (viii) cooperate for mutual benefit with neighbouring and other countries in survey and exploration, rational development and utilization of shared energy resources in river basins and sedimentary basins;

(c) Long term: pursue orderly transition to least-cost, efficient, economically, environmentally and socially sustainable energy systems in rural and urban areas. Such energy systems shall be integral components of sustainable human settlement patterns based on efficient energy supplies, and utilization in production in agriculture, forestry, industry, mining, construction, etc., as well as in services such as transport, communications, utilities, education, health care, cultural and social activities and households.

(d) The international community

156. The international community could provide support in the short-, medium- and long-term to speed transition in African countries to sustainable efficient energy supplies, services and utilization. Among the options open to the international community in this regard are the following:

(a) Maintain a national register of technology exports to African countries to monitor and impose sanctions against unfair terms and conditions in the sale and transfer of energy technology; the sale and transfer of sub-standard, low-efficiently energy supply or utilization technology, especially if such technology contributes to excessive environmental degradation and pollution including greenhouse gas emissions into the atmosphere;

(b) Encourage, facilitate and provide priority support to cost-effective, self-reliant African development and utilization of small-, medium- and large-scale energy resource endowments. Such energy development would be destined as appropriate to serve local, subregional regional needs and for export to other regions. The support of the international community would in particular focus on assisting the African countries in rapid building, strengthening and maintaining at high levels, all aspects of endogenous technological capacity in the energy sector; mobilization of new and additional financial resources required for transfer technology on grant-basis and on terms and conditions which African LDCs in particular can afford to apply in the establishment of sustainable, cost-effective and efficient energy supplies and energy utilization towards sustainable development in Africa.

4. Resource implications

(a) Financial resources

157. UNCED estimated the average total annual cost (1993-2000) for implementing the activities of the energy programme to be \$US 20 billion from the international community on grant or concessional terms. African countries may then negotiate on this basis for a minimum of \$US 5 billion from the international community.

(b) Manpower and institutional capacity

158. Education and awareness-raising programmes need to be introduced and strengthened at the local, national and international levels concerning the promotion of sustainable development and the protection of the atmosphere in all relevant sectors.

159. Countries, in cooperation with the relevant United Nations bodies, international donors and NGOs should mobilize technical and financial resources and facilitate technical cooperation with African countries to reinforce their technical, managerial, planning and administrative capacities to promote sustainable development and the protection of the atmosphere, in all relevant sectors.

E. Optimizing environmentally clean industrial production

160. Chapter 30 of Agenda 21 deals with strengthening the role of industry. It emphasizes that business and industry, including transnational corporations, play a crucial role in the social and economic development of a country. A stable policy regime enables and encourages business and industry to operate responsibly and efficiently and to implement longer-term policies. Increasing prosperity, a major goal of the development process, is contributed primarily by the activities of business and industry. All business enterprises, provide major trading, employment and livelihood opportunities. Business opportunities available to women are contributing towards their professional development, strengthening their economic role and transforming social systems. Business and industry, including transnational corporations and their representative organizations should be full participants in the implementation and evaluation of activities related to Agenda 21.

161. The priority area in the African Common Position dealing with industry is also covered in Agenda 21 under chapters 19 and 20 on the environmentally sound management of toxic chemicals, including prevention of the illegal international traffic in toxic and dangerous wastes.

1. Problem areas

162. In many African countries the development of the industrial sector has been problematic at all levels. Investment by governments in industry has been to satisfy the export economy. New incentives are needed to support sustainable industrial development.

163. Industry is still unregulated in most African countries because appropriate health and environmental standards are not introduced. The rising pollution and resource depletion costs are putting additional pressures on limited government resources. If restoration and public health programmes are not expanded the coming generations will face a growing backlog of environmental problems, a diminished resource base and declining economic prospects.

164. National programmes elaborated by African countries themselves that make up the programme of the second Industrial Development Decade for Africa (IDDA II) have stressed the importance of environmental protection. Unfortunately, adequate political commitment - used in the popular meaning of the phrase - has been absent in most cases, or has not been supported by financial commitments. African industry has been unduly over-burdened with heavy taxes and has thus had to operate under very difficult conditions.

165. This has partially contributed to the weak technological base and the dysfunctional state that currently characterizes African industry. Environmental management has consequently been relegated to the background. Emphasis is on the survival of the enterprise and clean methods of production have been sidelined. Most African enterprises are too busy with production schedules which cannot be met because of non-technical constraints like power interruptions, shortage of water supply or even breakdown of government machinery. Furthermore, it is difficult to explain to the timber logger that he is destroying the environment when he sees that tree as his only source of revenue or to expect the rural dweller not to burn wood that can produce charcoal that will sustain the family.

166. For several decades, the indigenous institutions of higher learning and, indeed, the entire scientific and technological community in Africa have limited their interpretation of science and technology to high-powered research and manpower training only. They have been satisfied with publishing their research findings in reputable international journals while neglecting the exploitation of these findings to the developed world where the infrastructures for such activities are abundant. These institutions have only to a limited extent associated themselves with issues dealing with commercialization and utilization of their research results.

167. Thus, the three important institutions (the State, the enterprises and the institutions of higher learning) responsible for the sustained development of the African economy are working at cross purposes. A more coherent programme for balancing industrialization and a sustainable environment must be developed by these institutions.

168. This problem is exacerbated by some unscrupulous industrialized countries that dump hazardous wastes in Africa and sell outdated and environmentally unfriendly technologies. Vigilance, education, rewards and stringent regulations must be introduced by the various countries to control the destruction of the African environment.

2. Development goals

169. While industrialization is an imperative for Africa's economic development, it is necessary while implementing IDDA II that there should be an awareness of the dangers to the environment arising from haphazard and unplanned industrial expansion. Chemical and metallurgical industries are generators of industrial pollution. Forest-based industries could create deforestation and soil erosion. Food processing

industries have to take great care about the levels of toxicity in food processing chemicals. Fisheries can be adversely affected by the discharge of effluents into river waters.^{14/}

170. African industries should be developed with a view to expanding and producing more with less on a self-reliant and self-sustaining basis to meet the growing needs of the increasing population. To become self-reliant will require special support to industries and technologies that better serve local needs by making optimum use of local resources, local manpower and schemes and the choice of appropriate processes and technologies that have no adverse impacts on our environment.

171. Industrialization should include a strong cottage industry as the basis for a self-reliant and self-sustaining development at all levels of the industrial sector. To become self-reliant the industrial sector will require special support from the private and public sector and promotion of consumption patterns that encourage investment.

172. New regulatory measures and economic incentives are needed to support sustainable industrial development. Energy and water pricing policies, for example, can encourage industry to make more efficient use of resources. Special investment tax breaks, low-interest loans, depreciation allowances, pollution or waste charges and non-compliance fees can encourage product redesign and technological innovations leading to safer products, more efficient and safer industrial process and the recycling of raw materials.

(a) The second IDDA: A framework for sustained industrial development in Africa

173. The fundamental goal of IDDA II proclaimed by the United Nations General Assembly in its resolution 44/237 of 22 December 1989 is to achieve self-reliance and self-sustaining development in Africa.

174. This calls for an increased use of local factor inputs in the manufacturing sector and especially the strengthening of linkages between various agricultural activities and industry. To this effect, the development of small-scale industries especially the agro-based industries has been identified as an important component in the development of these linkages.

175. The major objectives of IDDA II as adopted during the meeting of the Conference of African Ministers of Industry in Dakar, Senegal, from 29 to 31 July 1991, include, *inter alia*: strengthening the technological and entrepreneurial capabilities of these countries especially through the development of small- and medium-scale industries, cottage and rural industries; rehabilitation, maintenance and upgrading of existing production facilities; establishing of efficient institutional infrastructures; and the development of physical infrastructures especially those essential for the transportation of products.

176. ECA, in close collaboration with the United Nations Industrial Development Organization (UNIDO), has been active in developing policies, particularly on small-scale industries as well as in agriculture and will thus be providing technical expertise to the project as the executing agency. The participation of the African countries concerned as well as from other relevant institutions, will be necessary for successful completion of the pilot projects.

177. At the Dakar meeting, the African Ministers of Industry examined the situation of industrial development in their respective countries in the overall context of the deteriorating socio-economic conditions in Africa and adopted resolution 1(X) on the programme for IDDA II as well as the Dakar Declaration on Industrialization and Economic Integration in Africa. They committed themselves to the pursuance of

¹⁴ / A programme for the second Industrial Development Decade for Africa (1991-2000): Self-sustained development through industrialization.

policies and measures that will ensure maximum linkages within the industrial sector and increase vertical and horizontal integration of industrial structures.

178. They further recognized the role of the private sector in the development of the industrial sector and decided to contribute to the creation of an enabling environment to facilitate more active participation of private entrepreneurs in the process of industrialization, especially with respect to small- and medium-scale industries.

179. To this end, the creation of an enabling environment that is conducive to investment and sensitive to difficulties facing industrial managers is a goal that must be pursued vigorously if the industrialization of Africa is to be achieved.

(b) Development of industrial and technological capabilities

180. Industrial and technological capabilities are skills that are acquired over a long period of time; and even once acquired, they must constantly be updated because the acquisition and mastery of technology is an extremely dynamic process. Furthermore, the process of acquiring technology is expensive since it calls for large investments in equipment and manpower training. Examples where nations which acquired technological skills sat on their laurels and have steadily been overtaken by nations that invested in new processes. The United States steel industry is an example of such an industry that dominated the world market in the 1960s and early 1970s only to find itself overtaken by the Japanese steel industry that had invested heavily in both new technology and skills.

181. The development plans of many African countries lay emphasis on the industrial sector as a means of expanding and diversifying production structures. This has been translated into a number of import-substitution industries during the 1960s and 1970s. Most of these industries were concentrated on the production of consumer goods using and relying mainly on imported machinery, spare parts, raw materials, technology and even manpower.

182. This situation of heavy dependence on imported inputs has, to a large extent, exacerbated the problem of African countries which have not actually had the chance to be involved in the process of acquiring technological capabilities. It has largely contributed to the poor performance of the manufacturing sector in particular and of other sectors in general during the 1980s. To counter this poor performance, several initiatives were undertaken by African countries, in areas they could easily control. One of these initiatives was to review the policies of strengthening the institutional infrastructures.

183. It is a well-known fact that physical as well as institutional infrastructures in Africa were designed to support the colonial economy and not to promote industrial development in general. It is no wonder that this aspect of development has not been easily mastered by African countries. Efforts have however been made to improve the situation.

184. The existing policies for developing institutional infrastructures in Africa call for:

(a) The government to provide the right atmosphere to do business in the country, which requires that the fiscal, monetary, import-export regulations, investments codes, etc., are introduced to encourage the entrepreneurs to invest in a given country;

(b) The educational system to be improved and strengthened so as to enable it respond to the complex manpower and skills needs of the country;

(c) The improving of industrial support services that include institutions such as industrial research and development institutions and national institutions that promote and support small- and medium-size industries; and

(d) The financing of industrial projects by creating financial institutions.

185. Programmes of institutions for the promotion of technological and industrial capabilities should include policy formulation, planning, programming, collection and storage of data, monitoring and human resource development. They should further focus on developing the research and development capacities of those dealing with private enterprises concerned with the production and distribution of equipment; public and private agencies concerned with technology acquisition, adaptation, development and innovation. Institutions should relate to the development of domestic factor inputs including critical national capabilities.

186. These institutions should also include private and government agencies concerned with the supply of services in support of entrepreneurship and management (information, consultancy, feasibility studies, negotiations, etc.). Private enterprises and government agencies responsible for the mobilization and redeployment of financial and real factor input resources of domestic and foreign origin (banks and financial service institutions, stock markets, labour markets, commodity markets, management of technical assistance) should also be included.

(c) Development of human resources

187. African countries have formulated, within their respective national programmes for IDDA II, programmes for the development of human resources, with special emphasis on:

(a) Development of human resources for accelerated industrialization;

(b) Strengthening of the scientific and technological base for industrial development; and

(c) Development of entrepreneurial capabilities.

188. The building of an industrial base remains one of the greatest challenges facing African countries. Some qualitative factors that have been identified as essential to stimulate the process of industrialization are: careful selection of investments based on sound feasibility studies and project reports; development of entrepreneurial and technical skills; and the mastery of technology management. These can be achieved in part by improving the quality and range of institutional infrastructures that act as enabling conduits for a self-reliant and self-sustained industrialization, which are the main objectives of IDDA II.

189. Within this context, IDDA II will therefore seek to:

(a) Enhance awareness in African countries of industry-related environmental problems and to encourage the formulation of industrial policies and strategies related to the environment;

(b) Ensure the prevention of environmental and resource degradation through the adoption of cleaner technologies, enhanced energy efficiency in industry and the recycling and utilization of industrial wastes;

(c) Integrate the adverse impact of existing industry through effective pollution control;

(d) Continue to improve mutually beneficial inter-country and interagency cooperation in the areas of policy formulation, adoption of cleaner technologies and the control of industrial pollution through such measures as utilizing institutional and industrial capacities for the solution of environmental problems.

3. Programme of action

190. The problem of an environmentally clean production is the joint responsibility of the State, institutions of higher learning and industry. The State should be responsible for the overall policy elaboration; the institutions of higher learning should provide the trained manpower as well as encouraging applied indigenous research; and industry should apply clean production methods. It will be useful to look at the specific responsibilities of each of these bodies:

(a) Government's programme of action

- (i) support for programmes aimed at the prevention and minimization of hazardous wastes including the strengthening of institutional capacities in hazardous wastes management;
- (ii) support for programmes aimed at strengthening capacities in managing municipal solid wastes, waste waters and sewage in conformity with national or international health and environmental quality guidelines;
- (iii) coordination of urban transportation programme and promotion of environmentally sound policies focusing on preparation and dissemination of documentation on less polluting and safer transport systems and technologies;
- (iv) modification of the mandates, policies and budgets of major economic and sectoral agencies (e.g., national planning, finance, trade, technology industry, agriculture) to make them responsible and accountable for ensuring that their policies, programmes and choice of technologies support self-reliant industrial development which is economically and ecologically sustainable;
- (v) introducing new regulatory measures for economic incentives for efficient use of energy and natural resources and the reduction of industrial waste and pollution. Require prior assessment of technology projects likely to have adverse effects on human health, the environment and on future development prospects;
- (vi) adopting investment codes and procedures tailored to the promotion and development of small-scale industries, including rural institutions to support cottage industries and small-scale industries with emphasis on indigenous technology, domestic finance, rural infrastructure and participation of women and youth in order to provide an enabling economic environment for the involvement of local entrepreneurs;
- (vii) developing a clear legal framework on ownership and participation of the different socio-economic groups such as rural cooperatives, artisans, traders and women's and youth groups in order to enable popular participation in production, marketing and the strengthening of the informal sector and its ultimate integration into the development process;
- (viii) the promotion of intra-African cooperation particularly with regard to the development and transfer of appropriate technology, research and development, commercialization of research findings and the development of prototypes;
- (ix) the promotion of industrial cooperation should be accorded high priority, particularly for the African LDCs, the vast majority of which have small

populations. Accordingly, the bilateral and other programmes of the developed countries, international and regional development finance institutions should embody such components that promote cooperation and integration between the LDCs and the neighbouring countries;

- (x) governments should establish a system of scrutinizing the implication of their plans on technological development. This can be done by involving active scientists and engineers, prominent industrialists, educational authorities and social scientists during the development plans. Planning should never be left to economists, it must be an integrated end-product of a multidisciplinary, multisectoral effort;
- (xi) governments should also realize the benefits of a coherent and fully integrated national development plan. Hence, national technology priorities should be clearly identified and their implementation thoroughly and conclusively discussed;
- (xii) there is a deficiency of domestic financial resources for upgrading technologies in the productive sector as well as for supporting scientific research. Governments should look into the possibility of amending some of the financial regulations to make it possible for currently available funds to be utilized in the promotion of industries based on indigenous technology. In the same vein, the practice of being grossly and massively dependent on aid packages results in target groups receiving, according to R. Lalkaka,^{15/} only 20 cents per dollar, while the rest is diverted to lubricate government machinery in the name of technical assistance. The extent of this mode of assistance should be drastically minimized;
- (xiii) government should increase incentives to attract the production sector into the training of professionals and ultimate involvement in risky ventures such as commercializing indigenous innovations and inventions. Some countries have an investment promotion organ which spells out certain concessions, but here again, the level of involvement which was deployed in achieving at the above package will determine the degree to which the enterprises will be tempted to "bite the bait" .

(b) Private sector

- (i) promotion of cleaner production programmes;
- (ii) setting appropriate standards for the protection of human beings and the environment for all major industrial sectors and processes, especially workers safety and health and disposal of hazardous wastes, supported by an effective monitoring and enforcement capability with penalties for non-compliance;
- (iii) it is a known fact that Africa has been the unwilling recipient of technology that is not always environmentally friendly. The programme for IDDA II should therefore be conscious of the type of technology transfer making sure that it is clean. Long-term collaborative arrangements should be promoted between enterprises for the development of environmentally sound technologies;

^{15/} Lalkaka R., "Emerging Organizational Arrangements for Applying Technology to Management", paper presented at the WAITRO 1990 international seminar held in Arusha, United Republic of Tanzania, 17-22 September 1990.

- (iv) effective control of the generation, storage, treatment, recycling and re-use of hazardous waste is of paramount importance. Industry should establish environmental management systems, including environmental auditing of its production sites in order to identify where the installation of cleaner production methods is needed;
- (v) the inextricable link between agriculture and industry has been established. However, the sustainability of inputs to the agro-industry (raw materials) and outputs of agro-industry (fertilizers) has not been adequately explored.

(c) Institutions of higher learning

- (i) strengthening the national and regional capacity for research development, procurement and assessment of industrial technology and processes so that decision makers in government and industry can have more selections and better information on the benefits and risks associated with different products and technologies;
- (ii) projects to increase support to African institutions dealing with the development and adaptation of technology, research and development and specialized technical training, finance and assist in organizing, through UNIDO, special field missions for African technicians to technological, research and development institutions in other developing as well as in developed countries on a selective basis;
- (iii) the scientific and technological community is responsible for the flow of appropriate technical knowledge that is used for industrial development. This community should also, in the context of Agenda 21, be responsible for the integration of environmentally sound and sustainable guidelines and techniques into existing industrial projects. Capacity building for the appropriate skills is also the responsibility of this community;
- (iv) many of the organizational problems of R&D institutes in Africa have their origin in the lack of clear organizational objectives. Very few R&D institutes in Africa are located in close range or within production companies and the statutes that established them are stated in such broad and generalized terms that goal formulation becomes difficult to contextualize in terms of clear-cut strategies and anticipated outputs;
- (v) as a result of these vague and unclear objectives, R&D institutes and universities tend to engage in projects with broad aims (e.g., import-substitution, utilization of local materials, employment creation, etc.) which cannot be used for the evaluation of any results obtained. In addition, immediate industrial application is given insignificant consideration during the initial project conception and formulation. As a result, adequate guarantees for the acceptance and adaptation of the technologies developed are not provided;
- (vi) most R&D institutions in Africa are public institutions affiliated to the government machinery and bureaucracy and usually they lack the necessary resources, especially research funds. Consequently, these institutes are not free and flexible enough to select projects which have ready or potential markets. Meagre funding of R&D institutes leads to difficulties in recruiting competent and qualified staff, or purchasing laboratory equipment and tools, etc. In addition, wages and salaries

generally consume over 75 per cent of their budgets, leaving very little for research expenses;

- (vii) a bottleneck in the commercialization of research results lies in the entrepreneurs' suspicions of state-owned institutes and their tendency to shy away from them. Others find them too expensive or operating in areas which are irrelevant to their needs. Subsidiaries of foreign companies regard results from the local R&D institutes as being of inferior quality. Some of this suspicion is founded because most African engineers have not been able to demonstrate their competencies in solving some of the basic problems that confront the local entrepreneur in his daily activities;
- (viii) a serious problem hindering the process of commercialization of research results in most African countries is the lack of design and engineering capacity which forms the backbone of any industrialization process. Most research institutes in Africa do not have design offices for the translation of their R&D results and prototype production. Hence the capacity to fabricate pilot plants, machinery and equipment is lacking in most African countries. Engineering design organizations such as the Tanzania Engineering and Manufacturing Design Organizations (TEMDO) and the African Regional Centre for Engineering Design and Manufacturing (ARCEDEM) in Nigeria are rare in the continent.

191. There must be a serious and concerted effort to integrate the activities of the three - the State, institutions of higher learning and industry - to facilitate the utilization of clean production techniques for a sustainable economic development. The future of Africa and indeed that of the whole world depends on it.

4. Resource implications

(a) Financial resources

192. Chapter 30 of Agenda 21 on the role of industry neither provides the financial implications involved in the activities proposed, nor does chapter 19 on the environmentally sound management of toxic chemicals, including prevention of the illegal international traffic in toxic and dangerous wastes. However, chapter 20 on environmentally sound management of hazardous wastes, including prevention of the illegal international traffic in hazardous wastes, provides for \$US 1.24 billion from international sources. Africa may negotiate for about \$US 350 million from these sources for investment in clean industrial production including the management of dangerous and hazardous wastes. Furthermore, the programmes for IDDA II and for the second Transport and Communications Decade (UNTACDA II) have earmarked mechanisms for mobilizing resources which could also serve this purpose.

(b) Human resource development and capacity building

193. International organizations, with the participation of governments and NGOs, should launch training and education projects involving women and children in order to enable countries to make maximum national use of international assessments of clean industrial technology.

194. Building on the past, member States should develop and strengthen risk assessment capabilities at national and regional levels to minimize and as far as possible control and prevent risk in the manufacturing and use of toxic and hazardous chemicals. Technical cooperation and financial support or other contributions should be given to activities aimed at expanding and accelerating the national and international assessment and control of chemical risks to enable the best choice of chemicals.

195. Governments should:

- (a) Increase public awareness and information on hazardous waste issues and promote the development and dissemination of such information that the general public can understand;
- (b) Increase participation in hazardous waste management programmes by the general public, particularly women, including participation at grassroots levels;
- (c) Develop training and education programmes for men and women in industry and government aimed at specific real-life problems, for example, planning and implementing hazardous waste minimization programmes, conducting hazardous materials audits and establishing appropriate regulatory programmes;
- (d) Promote the training of labour, industrial management and government regulatory staff in Africa on technologies to minimize and manage hazardous wastes in an environmentally sound manner.

196. Governments and institutions and NGOs, with the collaboration of appropriate organizations and programmes of the United Nations, should also launch training courses and information campaigns to facilitate the understanding and use of a new harmonized classification and compatible labelling system for chemicals.

197. In strengthening national capacities for management of chemicals, including development and implementation of, and adaptation to, new classification and labelling systems, the creation of trade barriers should be avoided and the limited capacities and resources of a large number of countries for implementing such systems should be taken into account.

198. The following activities should be undertaken:

- (a) African Governments should:
 - (i) develop, in cooperation with industry and with the cooperation of appropriate international organizations, inventories of hazardous waste production, in order to identify their needs with respect to technology transfer and implementation of measures for the sound management of hazardous wastes and their disposal;
 - (ii) include in national planning and legislation an integrated approach to environmental protection, driven by prevention and source reduction criteria, taking into account the "polluter pays" principle, and adopt programmes for hazardous waste reduction, including targets and adequate environmental control;
 - (iii) work with industry on sector-by-sector cleaner production and hazardous waste minimization campaigns, as well as on the reduction of such wastes and other emissions;
 - (iv) take the lead in establishing and strengthening, as appropriate, national procedures for environmental impact assessment, taking into account the cradle-to-grave approach to the management of hazardous wastes, in order to identify options for minimizing the generation of hazardous wastes, through safer handling, storage, disposal and destruction;
 - (v) develop, in collaboration with industry and appropriate international organizations, procedures for monitoring the application of the cradle-to-grave approach, including environmental audits;

- (vi) according to their capacities and available resources and with the cooperation of the United Nations, NGOs, and other organizations collaborate in developing and disseminating educational materials concerning hazardous wastes and their effects on environment and human health, for use in schools, by women groups and by the general public;
- (vii) according to their capacities and available resources and with the cooperation of the United Nations and other organizations, establish or strengthen programmes for the environmentally sound management of hazardous wastes in accordance with, as appropriate, health and environmental standards, and extend surveillance systems for the purpose of identifying adverse effects on populations and the environment of exposure to hazardous wastes;
- (viii) according to their capacities and available resources and with the cooperation of the United Nations and other relevant organizations, promote centres of excellence for training in hazardous waste management, building on appropriate national institutions and encouraging international cooperation, *inter alia*, through institutional links between developed and African countries;

(b) Bilateral and multilateral development assistance agencies should substantially increase funding for cleaner technology transfer to the region, including small- and medium-sized enterprises;

(c) International organizations should provide assistance to member States in assessing the health and environmental risks resulting from exposure to hazardous wastes, and in identifying their priorities for controlling the various categories or classes of wastes.

F. Management of ecosystems

199. Activities for the management of ecosystems are spread through chapters 11, 12, 15, 16 and 17 of Agenda 21. They deal with:

- (a) Combating deforestation;
- (b) Managing fragile ecosystems: combating desertification and drought;
- (c) Conservation of biological diversity;
- (d) Environmentally sound management of biotechnology; and
- (e) Protection of the oceans, all kinds of seas, including enclosed and semi-enclosed seas and coastal areas and the protection, rational development of their living resources.

200. These same issues are dealt with in the African Common Position under programmes 3, 8, 9, 10, 11 and 13. They concern:

- (a) Management of the marine and coastal environment;
- (b) Management of biodiversity and biotechnology;
- (c) Activities to mitigate global warming and climate change;
- (d) Rational management of forest resources;

- (e) Reversing desertification in Africa; and
- (f) Environmentally sound development of mineral resources.

1. Problem areas

201. There is abundant evidence of considerable environmental awareness in Africa, as regards the conservation and management of ecosystems, even if this is not supported by adequately coordinated programmes whose impacts could be easily measured. The peoples and their economy depend on the carrying capacity of their natural ecosystems. Agriculture, pastoralism and even the socio-cultural systems are all related in one way or the other to the natural environment.

202. Tropical forests in Africa are being lost at the rate of 3.7 million ha per annum with over half of that deforestation in West Africa alone. Over 30 per cent of the original forest cover in Côte d'Ivoire has already disappeared. The situation is becoming critical in Madagascar, south-eastern Guinea, the Fouta-Djallon massif, south-western Cameroon, Bas Zaire, Kenya and the United Republic of Tanzania. The main causes are clearing for agriculture and shifting cultivation and timber exploitation. The loss of plant cover leads to other problems such as decreasing soil fertility, erosion and the loss of genetic resources and diversity. In Madagascar, it is estimated that the loss of over 90 per cent of the original primary forest led to the extinction of half of the original endemic species.

203. The maintenance of species and ecosystems has wildlife conservation as a strong component and requires transnational efforts as animals, birds and other wildlife generally roam across countries and regions. This makes it necessary to coordinate wildlife conservation among countries by pooling financial resources, harmonizing legislation and other practices.

204. These problems are worsened by deepening poverty and population pressures, inadequate analytical and institutional capacity in the area of environment and development, irrational management of tropical forest and wooded savannas resources, water resources and the adverse effects of anthropogenous and natural disasters which have perpetuated the deterioration of African economies and the environment.

205. Member States of the region have made a number of initiatives and have adopted plans of action for the conservation of ecosystems. However, despite considerable efforts made by African countries to address the above priority concerns by enhancing the efficiency of their economies through policy reforms and the search for alternatives to structural adjustment programmes, the overall performance of the region has remained generally poor and unsteady. The living conditions of the poor and vulnerable groups of African society have deteriorated during the period.

206. The following key factors which are major constraints to economic development in the region were identified in the Common Position as linked with, among other things, the degradation and the consequent loss of the carrying capacity of ecosystems:

- (a) Declining agricultural production as a result of a variety of factors;
- (b) Inappropriate production techniques in agriculture, livestock, mining and industry;
- (c) High dependence on primary commodities and the collapse of commodity prices as well as the prevailing unfair trade practices in international markets;
- (d) Inappropriate policies and measures to address the African economic crisis;
- (e) The external debt burden and debt servicing;

- (f) Activities of transnational corporations with high financial as well as ecological costs;
- (g) The net resource outflow from Africa to the rest of the world;
- (h) The impact on natural resources of demographic changes and population pressures;
- (i) Negative impacts of natural and man-made disasters; and
- (j) Environmental and developmental problems encountered by land-locked countries.

207. All these have mitigated against practices and programmes aimed at conserving the carrying capacity of African ecosystems.

- (a) Marine and coastal ecosystem management^{16/}

208. African countries, particularly the coastal countries, have been participating in the UNEP Regional Seas Programme, in the conservation of their coastal and marine environments. Africa has rights over a considerable proportion of the Atlantic and Indian Oceans, the Mediterranean and Red Seas, parts of which are shared by non-African countries. This issue is, therefore, not only relevant to Africa but is of vital importance to the continent. The bordering areas of these water systems are fragile ecosystems that provide the life-support resources for food species living therein.

209. The proper protection of these waters and their living resources requires the development of human resources with the requisite technology for detecting and eliminating water pollution. Effective international actions and cooperation are also required for the elimination and control of the major threats of pollution, depletion and poaching of these waters and their living resources. Africa must, then, demonstrate its contribution to their management for regional and global sustainability of these resources. Furthermore, there has been considerable marine resources pillage by non-African countries which have a higher technological capacity.

210. The socio-economic aspects of marine and coastal areas have not been documented enough to place them within the perspectives of national accounting. In other words, methodologies have not been adequately developed in Africa to enable identify and quantify how (a) these activities and resources contribute or may contribute toward their overall gross national product and (b) their inter-dependency. There is, therefore, the need to develop environmental policies in this field in order to achieve sustainable development in the countries' coastal areas.

211. The African Common Position and chapter 38 of Agenda 21, include, common priority areas on which development agencies should concentrate. They are:

- (a) Developing and promoting the use of techniques such as natural resource accounting and environmental economics; and
- (b) Further development and promotion of the widest possible use of environmental impact assessment.

212. In order to formulate an integrated coastal zone management strategies, pooling cross-sectoral resources, activities should focus on socio-economic surveys in the relevant sectors of the marine and coastal

^{16/} African Environment and Development Agenda (1991).

areas of the selected States and incorporate the results in the development and implementation of integrated coastal zone management plans.

213. Within the context of the activities of the regional seas programme, the Intergovernmental Oceanographic Commission and the coastal and marine sciences programme activities should aim at:

- (i) Promoting the ratification of international and regional conventions related to the protection and development of the African marine environment;
- (ii) The development of capabilities in this field through the organization of seminars on technical and scientific, as well as training programmes related to the protection and development of the African marine environment in order to facilitate the exchange of information, experiences and data between African countries and among regional seas programmes relevant to Africa; and
- (iii) Promoting the ratification of international and regional conventions related to the protection and development of the African marine environment; and to have a fully operational regional seas programme for the region.

(b) The ecosystem friendly development of mineral resources

214. Africa as a region possesses a vast variety of mineral resources. However, these minerals remain underdeveloped due to social, economic and technological constraints which have prevented several countries from transforming these resources to products which could be used internally for the advancement of the living conditions of the majority of their people. Hence, it is imperative for the countries of the region to create the necessary environment.

215. Small-scale mining of such minerals as gold, diamonds and other precious minerals, in several African countries is contributing to the deterioration of physical environment through inappropriate and wasteful working practices and non-rehabilitation of exploited areas. Similarly there are social environmental problems associated with these operations resulting from lack of infrastructure for those working in the industry. The development of workable small-scale mining policies, the provision of training and technical assistance to small-scale mineral development operators, the provision of the necessary physical infrastructure, by government institutions are some of the areas that need improvement.

216. African countries are faced with two related environmental problems in the mineral resources development sector: alleviation poverty through the development of their mineral resources while seeking ways and means to prevent the environmental deterioration.

217. Information regarding measures taken to conserve and protect the environment in the process of mineral resources development in Africa, is very scanty. This information must be generated in order to stimulate environmental awareness in mineral resources development in the region.

(c) Biodiversity and ecosystem conservation

218. Genetic material in wild species has significant economic value in improved crop species, new drugs and medicines and as raw materials for industrial products as well as a major attraction for the growing tourist industry in Africa. The protection of habitats such as mangrove swamps and coastal wetlands is important for maintaining the productivity of coastal fisheries, a major source of protein and income for many African countries.

219. In a more comprehensive approach, the African Ministerial Conference on Environment adopted the Cairo Programme of Action under which a regional network for genetic resources has been established.

220. At the subregional level, the Southern African Development Community (SADC) formulated the "Natural Resources and the Environment: Policies and Development Strategies" in 1988 as a holistic framework for economic development and environmental protection. The framework recognized the need for establishing protected areas to preserve selected samples of floral and faunal communities and areas of scenic beauty or of special importance.

221. While CILSS has a number of activities relating to the management and protection of genetic resources, IGADD adopted the "Strategy on Environmental Protection and Desertification Control" under which the biodiversity programme is formulated to ensure the continuous genetic richness of the subregion, and to explore ways of utilizing it for sustainable economic development.

222. To promote the conservation and protection of biological diversity it is important for member States to:

(a) Develop and sustain the institutional and legislative capacity and capabilities required for the conservation of biological diversity through research and development; and

(b) Harmonize and coordinate programmes and activities relating to the protection, of the biological diversity in the region.

(d) Biotechnology

223. Biotechnology is becoming a key tool for maintaining a sustainable natural resources base, diversifying and enhancing the productivity and carrying capacity of ecosystems as well as in other areas of environmental management.

2. Development goals

224. As indicated earlier in section II-B, the concept of carrying capacity which relates to the space available for expansion in terms of population and economic growth has been used to link population with the natural resource base of a country.^{17/} This constitutes a frame representing the physical potential for a nation's development and is particularly important in economies whose mainstay is agriculture and agro-related activities.

225. Programmes in ecosystems management and conservation should ensure the use of ecosystems as an integral part of renewable resources. Activities in all sectors of development that impose ecological pressures and lead to environmental degradation should not be promoted.

226. Activities for the management of ecosystems should be aimed at the conservation, protection where necessary and management of a sustainable basis of endangered species and ecosystems. They should also be geared to maintaining biological diversity as a major part of the natural heritage and future economic development.

3. Programme of action

227. Against the background of these initiatives and goals as outlined above, new programmes can be developed to increase the impact of ongoing activities. This would then create or reinforce the enabling environment for achieving sustainable national, subregional and regional social and economic development

^{17/} Gilbert, A. J. and Braat, L. C., Modelling for population and sustainable development (Routledge: London, New York, 1989).

with sustainable carrying capacity for the ecosystems and to ensure the impact of Africa's participation in global environmental management for global sustainability.

228. Within the context of existing national and international activities, such as that of the Biosphere Reserves and the Convention Concerning the Protection of the World Cultural and Natural Heritage, programmes should be promoted to:

(a) Capacity building

- (i) developing and sustaining institutional and legislative capacity and the capabilities required for the conservation of biological diversity through research and development;
- (ii) harmonizing and coordinating programmes and activities on the protection, on a sustainable basis, of the biological diversity of the region;
- (iii) strengthening wildlife management programmes; contribute to global activities on conservation of biological diversity; promote, collection, evaluation and conservation of gene pools through the establishment of gene banks in institutions concerned;
- (iv) disseminating information and results from pilot projects; support and strengthen networks for the conservation of genetic resources;
- (v) promoting popular participation in environmental protection and sustainable development should also be pursued collectively. Just as OAU has adopted the African Charter for Popular Participation in Development and Transformation, it should also work collectively to implement it so that popular social groups like workers, NGOs, grass-roots people, women, peasants and youth are mobilized to deal with ecological problems that are manifested everywhere;
- (vi) developing of mechanisms for global/regional/national afforestation and reforestation including provisions for large-scale global funding for forests;

(b) Forest and savannah woodlands

- (i) updating of national inventories of endangered species and threatened African terrestrial habitats; review of major local and national programmes for reforestation and agro-forestry;
- (ii) protection of tropical forests and savannah woodlands through appropriate legislation as well as promoting the implementation of the tropical forestry action plan;
- (iii) developing and promoting the management including use of guidelines for assessment of forestry projects, reforestation evaluation and assistance to African countries by the inclusion of environmental impact assessment in forestry training;
- (iv) continuous assessment and monitoring of potential impacts of climatic change on forests and initiating indepth studies on the carbon cycle relating to different forest types.
- (v) support to existing and encouraging the expansion of programmes for the protection of selected forest ecosystems;

- (vi) encouragement and supporting large-scale tree planting programmes.
- (vii) developing and encouraging expansion of community and social forestry in the region;
- (viii) encouraging national/regional rehabilitation of degraded forest and woodlands.
- (ix) encouraging industry and trade and trade in forest products based on sustainably managed forest resources.
- (x) developing national programmes on forest accounting and mechanisms for assessing the economic value of forests;

(c) Biological diversity

- (i) assistance to countries for the formulation and implementation of national biodiversity strategies and action plans to integrate biodiversity conservation into national planning and management of biological resources;
- (ii) review the mandates, policies and budgets of the relevant economic and sectoral departments of government to ensure that their activities enhance rather than undermine the biological diversity and ecosystems needed to meet their own economic development objectives;
- (iii) establishment of gene banks and biosphere reserves and operationalize the African Ministerial Conference on the Environment network for the conservation of genetic resources to link together those responsible for nature reserves, protected areas and germ-plasm banks and to facilitate exchanges of information, experience and germ-plasm material and also promote biotechnology to enhance sustainable development;
- (iv) marine ecosystems (promotion of the implementation of the four regional seas programmes covering Africa (the Mediterranean, the Red Sea and Gulf of Aden, for West and Central Africa and for Eastern Africa, especially measures to protect the marine ecosystems from land and marine based pollution and unregulated dumping dangerous of wastes, coastal erosion and the over-exploitation of coastal resources;
- (v) participate in the establishment of an integrated marine pollution monitoring and assessment programme;
- (vi) environmental economics: application of environmental economics based on natural resources accounting for coastal areas;
- (vii) encourage traditional practices for the conservation of biological diversity;

(d) Ecologically sound mineral resource development

- (i) strengthen national mineral development and related environment management programme activities including institutional, science and technology and manpower capability for enhancing R&D programmes in the mineral sector;

- (ii) develop and strengthen national mineral related industrial capacity and capabilities, including manpower required for sustaining industrial development within the context of IDDA and promote clean industrial production technology research and development;
- (iii) promote the harmonization, coordination and location of mineral-related industrial production programme activities at the subregional and regional levels through technical cooperation on the basis of relative advantage;
- (iv) contribute to global activities in the environmentally sound development of mineral resources;
- (v) the programme also aims at facilitating Africa's participation in the International Geological Correlation Programme and the Geology and Natural Hazards Programme of UNESCO and the International Union of Geological Sciences;
- (vi) the updating of inventories of the geographical distribution of all types of mineral energy resources; the promotion of integrated mineral and energy development with emphasis on ecosystem conservation; development and strengthening of mineral energy technology for domestic and non-domestic uses; promotion of research and training including pilot projects on mineral and energy resources management; and
- (vii) development and implementation of environmental impact assessment methodologies for mineral and energy resources development programmes.

4. Resource implications

(a) Financial resources

229. As with all the other programme areas, the financial resources for implementing this activity should be generated locally. However, UNCED estimated that a total annual cost \$US 24,337 billion for the period (1993-2005) of which Africa may negotiate for \$ 6 billion will required for implementing all aspects of desertification.

(b) Human resource development and capacity building

230. The following will effectively contribute to human resources development:

- (a) Launching of graduate and post-graduate degree, specialization and research programmes;
- (b) Strengthening of pre-service, in-service and extension service training programmes at the technical and vocational levels, including training of trainers/teachers and developing curriculum and teaching materials/methods; and
- (c) Special training for staff of national forest-related organizations in aspects such as project formulation, evaluation and periodical evaluations.

231. There is a need, where appropriate, to:

- (a) Increase the number and/or make more efficient use of trained personnel in scientific and technological fields relevant to the conservation of biological diversity and the sustainable use of biological resources;

(b) Maintain or establish programmes for scientific and technical education and training of managers and professionals on measures for the identification, conservation of biological diversity and the sustainable use of biological resources; and

(c) Promote and encourage measures required for the conservation of biological diversity and the sustainable use of biological resources at all policy making and decision-making levels in governments, business enterprises and institutions.

232. In building new and existing capacities, there is need to:

(a) Strengthen existing institutions and/or establish new ones responsible for the conservation of biological diversity and to consider the development of mechanisms such as national biodiversity institutes or centres;

(b) Continue to build capacity for the conservation of biological diversity and the sustainable use of biological resources in all relevant sectors;

(c) Building capacity, especially within Governments, business enterprises and bilateral and multilateral development agencies, for integrating biodiversity concerns, and opportunity cost calculations into project design, implementation and evaluation processes;

(d) Enhance the capacity of governmental and private institutions, at the appropriate level, responsible for protected area planning and management to undertake intersectoral coordination and planning with other governmental institutions, NGOs and, indigenous people.

233. Training of professionals in the basic and applied sciences at all levels is one of the most essential components of this programme. Training programmes should be developed to include managerial training and within the context of specific projects, to meet regional or national needs for comprehensively trained personnel capable of using advanced technology to reduce the "brain-drain" from developing to developed countries.

234. Collaboration between training of scientists, extension workers and users should be encouraged to produce integrated systems. Furthermore, special consideration should be given to the execution of programmes for training and exchange of knowledge on traditional biotechnologies and for training on safety procedures.

235. Institutional upgrading or other appropriate measures will be needed to build up technical, managerial, planning and administrative capacities at the national level to support the activities in this programme area. Such measures should be supported by international, scientific, technical and financial assistance to facilitate technical cooperation and raise the capacities of Africa.

236. Cooperation should be extended, upon request, to coastal States in their capacity-building efforts which should include bilateral and multilateral development cooperation. Coastal States may consider, inter alia:

(a) Ensuring capacity-building at the local level;

(b) Consulting on coastal and marine issues with local administrations, the business community, the academic sector, resource user groups and the general public;

(c) Coordinating sectoral programmes while building capacity;

- (d) Identifying existing and potential capabilities, facilities and needs for human resources development and scientific and technological infrastructure;
- (e) Developing scientific and technological means and research;
- (f) Promoting and facilitating human resource development and education;
- (g) Supporting "centres of excellence" in integrated coastal and marine resource management; and
- (h) Supporting pilot demonstration programmes and projects in integrated coastal and marine management.

G. Preventing and reversing desertification

1. Problem areas

237. The global assessments of the status and rate of desertification conducted by UNEP in 1977, 1984 and 1991 have revealed insufficient basic information on desertification processes. Adequate world-wide systematic observation systems are helpful for the development and implementation of effective anti-desertification programmes. The capacity of existing international, regional and national institutions, particularly in Africa, to generate and exchange relevant information is limited. An integrated and coordinated information and systematic observation system based on appropriate technology and embracing global, regional, national and local levels is essential for understanding the dynamics of desertification and drought processes. It is also important for developing adequate measures to deal with desertification and drought and improving socio-economic conditions.

238. In African countries affected by desertification, the natural ecosystem is the main resource base upon which the development process must rely. The social systems interacting with land resources make the problem more complex, requiring an integrated approach to the planning and management of land resources. Action plans to combat desertification and drought should include management aspects of the environment and development.

239. In areas prone to desertification and drought, current livelihood and resource-use systems are unable to maintain living standards. In most of the arid and semi-arid areas, the traditional livelihood based on agro-pastoral systems are often inadequate and unsustainable because of the effects of drought and increasing demographic pressure. Poverty is a major factor in accelerating the rate of degradation and desertification. Measures are therefore needed to rehabilitate and improve the agro-pastoral systems for sustainable management of rangelands, as well as alternative livelihood systems.

240. Drought, in differing degrees of frequency and severity, is a recurring phenomenon throughout the developing world, especially Africa. Apart from the human death toll - an estimated 3 million people died in the mid-1980s because of drought in sub-Saharan Africa - the economic costs of drought-related disasters are also high in terms of production, inputs and diversion of resources.

241. Early-warning systems to forecast drought that will make possible the implementation of drought-preparedness schemes are poorly developed or non-existent. Integrated packages at the farm and watershed level, such as alternative cropping strategies, soil and water conservation and promotion of water harnessing techniques that could enhance the capacity of land to cope with drought and provide basic necessities, thereby minimizing the number of environmental refugees and the need for emergency drought relief are inadequate.

242. The experience on the successes and failures of programmes and projects points to the need for popular support to sustain activities related to desertification and drought control. It is necessary to focus on obtaining actual active popular involvement, rooted in the concept of partnership. This implies the sharing of responsibilities and the mutual involvement of all parties. In this context, this programme area should be considered an essential supporting component of all desertification-control and drought-related activities.

243. Poverty and persistent economic crises have compounded these problems, accounting, by and large, for the failure of the United Nations Plan of Action to Combat Desertification (1977).

2. Development goals

244. It is clear that afforestation, conservation of soils and water are closely interlinked. Moreover, it is the same individuals who are involved in the management of these resources. It would, therefore, be unrealistic to focus attention on the development and management of one specific resource at the expense of others and hence the need to integrate anti-desertification measures in development plans.

245. Since UNCOD, African countries are at various stages of implementing their anti-desertification campaigns depending on the ecological, socio-economic and political conditions prevailing in each country as well as the availability of resources. Countries will, therefore, need to set up their own priorities and timeframe for the implementation of the national plan of action to combat desertification, bearing in mind the need to fully integrate such activities in the long-term development plans of the nation, as well as involving the populations of the areas affected in the socio-economic development activities.

246. With respect to international trade and the fall in commodity prices, which have constrained economic and social growth of the African countries, the issue must now be vigorously and effectively addressed through GATT. African countries are among the most indebted or debt stressed in the world. Repayment of external debt results in reduction in reinvestment, thus affecting the management of the African environment. Although the debt-for-nature-swap has been suggested as a means of financing environment programmes, most foreign debts have, however, been negotiated bilaterally, and may, therefore, be difficult to finance subregional environmental programmes such as desertification control.

247. To address the problems of desertification control in Africa, the development objectives and strategies for achieving the goals of Agenda 21 should aim at:

(a) Promoting the establishment and/or strengthening of national environmental information coordination centres that will act as focal points within Governments for sectoral ministries and provide the necessary standardization and support services; and

(b) Ensuring that national environmental information systems on desertification and drought are linked through a network at subregional, regional and interregional levels.

248. Strengthening regional and global systematic observation networks linked to the development of national systems for the observation of land degradation and desertification caused both by human impact and climatic changes will be a major objective. It will therefore be necessary to:

(a) Establish a permanent system for monitoring desertification and land degradation with the aim of improving living conditions in the affected areas;

(b) Encourage village communities and pastoral groups to develop and manage their land resources on a socially equitable and ecologically sound basis;

(c) Improve production methods in order to achieve higher productivity within approved programmes for conservation of national resources and in the framework of an integrated approach to rural development; and

(d) Provide opportunities for alternative livelihoods as a basis for reducing pressure on land resources while providing additional sources of income, for rural populations, by improving their standard of living.

249. At the institutional level, the programme objectives will be to strengthen their capabilities in order to develop appropriate anti-desertification programmes and integrate them into national development planning.

250. The programme is aimed at initiating a long-term process for implementing and monitoring strategies related to natural resources management; and developing and integrating drought-relief schemes and means of coping with environmental refugees into national and regional development planning.

251. Popular participation is important for combating desertification. This programme will, further, aim at:

(a) Developing public awareness concerning desertification and drought, including the integration of environmental education in the curriculum of primary and secondary schools;

(b) Establishing and promoting partnership between government authorities, executing agencies, non-governmental organizations and land users stricken by drought and desertification, giving land users a responsible role in the planning and execution processes;

(c) Ensuring that the partners understand each others needs, objectives and points of view through means such as training, public awareness and open dialogue; and

(d) Supporting local communities in their efforts in combating desertification, while drawing on their knowledge and experience.

3. International convention on combating desertification

252. Agenda 21 underscored that desertification had become one of the world's most pressing environmental problems. It was now very clear that international concerted action must be taken to halt this degradation of the world's land. UNCED therefore recommended in Agenda 21 that the United Nations General Assembly should establish an intergovernmental negotiating committee to elaborate by June 1994, of a convention on desertification and drought.

253. The General Assembly in its resolution 47/188 of 22 December 1992 decided to establish under its auspices an Intergovernmental Negotiating Committee for the elaboration of an international convention to combat desertification in those countries experiencing drought and/or desertification, particularly in Africa with a view to finalizing such a convention by June 1994. The organizational session of the negotiating committee has recently been held in New York.

254. Paragraph 60 (e) of the African Common Position called for "the formulation and signing of an international convention on halting desertification in Africa by the creation, through collective international effort, of green-belts north and south of the Sahara and the Kalahari deserts". The African Group at PrepCom IV fought hard to ensure that the text that was submitted to Rio Conference contained the proposal of the African Ministers as spelt out in the African Common Position. The desertification convention issue,

therefore, featured prominently at most of the meetings held by the African Group in Rio. The issue was finally resolved by including the convention on desertification as one of the post-UNCED activities.

255. African member States will have to actively participate in negotiations on the convention on desertification in view of the fact that the resolution specifically mentions Africa as one of those regions which is adversely affected by drought and desertification. Moreover, the request for a convention on desertification emanated from the African Common Position.

256. Quite clearly the problem of drought and desertification in Africa is not just a technical one. Africa's human and environmental crisis is also about social, economic and political factors, both internal and external. It is influenced by the state of the world economy, commodity prices, interest rates, energy imports and inappropriate and misplaced aid".^{18/}

257. As African countries are likely to be the main actors at the various sessions of negotiations, it is essential that serious thought be given to the raison d'être of the convention.

258. It should be borne in mind that a convention is an agreement between parties to carry out given activities jointly towards the achievement of a particular goal or solving a common problem. It is a legal framework which, among other things, is binding, provides repercussions on any party which infringes it. It sets out a legal and administrative framework to handle issues of contention between parties, a framework for arbitration, the legal framework for redress, compensation to victims from non-adherence by a party, etc.

259. This makes a convention very distinct from a plan of action adopted by member States. Plans have no legal framework that would impose adherence, resolve conflict and provide arbitration.

260. The importance of ecosystems which lend them to management through conventions arises when their unscrupulous use endangers their conservation and survival which are of priority concern to other people elsewhere. There must be a mutual acceptance of these dangers between the parties concerned to accept mutual legal restrictions on their exploitation.

261. Katerere^{19/} proposes a number of actions by African countries which should be central to any discussion on the African approach to negotiations of the convention. It should also be borne in mind that it is a global convention where regional peculiarities have to be placed side by side in order to have the maximum benefits from global action. Which include the need to:

(a) Argue and agree on the principle of consensus on the responsibilities of all nations to address poverty in order to achieve sustainable development;

(b) Establish the likely benefits of a convention; the causes of desertification can be linked to the unequal terms of trade and the independence of Africans in on exporting basic commodities into markets they have no control over, etc;

^{18/} Katerere, Y. M. (1993), "Why a convention on desertification?" in NETWORK, No. 22, January, 1993 (Centre for Our Common Future, Geneva).

^{19/} See NETWORK, No. 22, op.cit.

(c) Argue convincingly that "desertification is neither drought, soil erosion, the destruction of vegetation cover, the cutting of trees, nor the degradation of living conditions it is much more";^{20/}

(d) Promote appropriate instruments of good governance and display a commitment to the principle of popular participation;

(e) Take decisions on promoting alternative livelihoods for their people and in so doing make commitments to long-term goals;

(f) Reach a consensus on the role of multilateral institutions and how to relate to them; the multiplicity of institutions, decisions and programmes make it difficult for poor nations and people to achieve maximum benefits resulting in marginalization;

(g) Organize a broad-based lobby by involving NGOs and the private sector in the process and activities leading to the negotiations, during the negotiations and post-convention; and

(h) Assess the process of desertification and its interaction with climate change.

262. Regional and international cooperation should be encouraged to adopt legal and other instruments for combating drought and desertification.

4. Programme of action

263. To achieve the above-mentioned development goals in desertification control, governments with the support of the relevant international and regional organizations, should:

(a) Establish and/or strengthen environmental information systems at the national level;

(b) Strengthen national, state/provincial and local assessment and ensure cooperation/networking between existing environmental information and monitoring systems, such as Earthwatch and the Sahara and Sahel Observatory;

(c) Strengthen the capacity of national institutions to analyse environmental data so that ecological change can be monitored and environmental information obtained on a continuing basis at the national level;

(d) Participate actively in the negotiations for the international convention on combating desertification.

(e) Adopt policies at the national level regarding a decentralized approach to land-resource management, and to rural organizations;

(f) Create or strengthen rural organizations in charge of village and pastoral land management;

(g) Establish and develop local, national and inter-sectoral mechanisms to handle environmental and developmental consequences of land tenure expressed in terms of land use and land ownership. Particular attention should be given to protecting the property rights of women and pastoral and nomadic groups living in rural areas;

²⁰ / Grainger, Allan (1990), cited by Katerere.

(h) Create or strengthen village associations focused on economic activities of common pastoral interest (market gardening, transformation of agricultural products, livestock, herding, etc.);

(i) Promote rural credit and mobilization of rural savings through the establishment of rural banking systems;

(j) Develop infrastructure, as well as local production and marketing capacity, by involving the local people to promote alternative livelihood systems and alleviate poverty;

(k) Establish a revolving fund for credit to rural entrepreneurs and local groups to facilitate the establishment of cottage industries/business ventures and credit for input to agro-pastoral activities.

264. Governments at the appropriate level, with the support of the relevant international and regional organizations, should:

(a) Conduct socio-economic baseline studies in order to have a good understanding of the situation in the programme area regarding, particularly, resource and land tenure issues, traditional land-management practices and characteristics of production systems;

(b) Conduct inventory of natural resources (soil, water and vegetation) and their state of degradation, based primarily on the knowledge of the local population (e.g., rapid rural appraisal);

(c) Disseminate information on technical packages adapted to the social, economic and ecological conditions of each; and

(d) Promote exchange and sharing of information concerning the development of alternative livelihoods with other agro-ecological regions.

265. Regarding grass-roots organizations, governments at the appropriate level, and with the support of the relevant international and regional organizations, should:

(a) Establish or strengthen, national and local anti-desertification authorities within government and local executive bodies, as well as local committees/associations of land users, in all rural communities affected, with a view to organizing working cooperation between all actors concerned, from the grass-roots level (farmers and pastoralists) to the higher levels of government;

(b) Develop national plans of action to combat desertification and as appropriate, make them integral parts of national development plans and national environmental action plans;

(c) Implement policies directed towards improving land use, managing common lands appropriately, providing incentives to small farmers and pastoralists, involving women and encouraging private investment in the development of drylands;

(d) Ensure coordination among ministries and institutions working on anti-desertification programmes at national and local levels.

266. In drought-prone areas, governments at the appropriate level, with the support of the relevant international and regional organizations, should:

(a) Design strategies to deal with national food deficiencies in periods of production shortfall. These strategies should deal with issues of storage and stocks, imports, port facilities, food storage, transport and distribution;

(b) Improve national and regional capacity for agro-meteorology and contingency crop planning. Agro-meteorology links the frequency, content and regional coverage of weather forecasts with the requirements of crop planning and agricultural extension;

(c) Prepare rural projects for providing short-term rural employment to drought-affected households. The loss of income and entitlement to food is a common source of distress in times of drought. Rural works help to generate the income required to buy food for poor households;

(d) Establish contingency arrangements, where necessary, for food and fodder distribution and water supply;

(e) Establish budgetary mechanisms for providing, at short notice, resources for drought relief;

(f) Establish safety nets for the most vulnerable households.

5. Resource implications

(a) Financial resources

267. As with the other programmes of Agenda 21, resources for implementation are to be generated nationally. However, UNCED estimated the average total annual cost (1993-2000) of implementing the activities of this programme to be \$US 6.285 billion from the international community on grant or concessional terms. Of this, African countries may negotiate \$US 1.575 billion.

(b) Human resource development and capacity building

268. Governments at the appropriate level, with the support of the relevant international and regional organizations working on the issue of desertification and drought, should develop the technical and professional skills of people engaged in monitoring and assessing the issue of desertification and drought. They should:

(a) Train members of rural organizations in management skills and train agro-pastoralists in such special techniques as soil and water conservation, water harnessing, agro-forestry and small-scale irrigation;

(b) Train extension agents and officers in the participatory approach to integrated land management.

269. Governments at the appropriate level, with the support of the relevant international and regional organizations, should undertake nation-wide major anti-desertification awareness/training campaigns within countries affected through existing national mass media facilities, educational networks and newly created extension services. This should ensure people's access to knowledge of desertification and drought and to national plans of action to combat desertification. They should:

(a) Promote the training of decision makers and land users in the effective utilization of information from early-warning systems;

(b) Strengthen research and national training capabilities to assess the impact of drought and to develop methodologies to forecast drought;

(c) Support and/or strengthen institutions involved in public education, including the local media, schools and community groups; and

- (d) Increase the level of public education.

270. Governments at the appropriate level, with the support of the relevant international and regional organizations working on the issue of desertification and drought, should:

- (a) Strengthen national and local institutions by providing adequate staff equipment and finance for assessing desertification;

- (b) Promote the involvement of the local population, particularly women and youth, in the collection and utilization of environmental information through education and awareness-building;

- (c) Promote international and regional cooperation and coordination;

- (d) Strengthen regional programmes and international cooperation organizations such as CILSS, IGADD, SADC, UMA and other regional organizations, as well as such organizations as the Sahara and Sahel Observatory;

- (e) Establish and/or develop a comprehensive desertification, land degradation and human condition database component that incorporates both physical and socio-economic parameters. This should be based on existing and, where necessary, additional facilities, such as those of Earthwatch and other information systems of international, regional and national institutions established for this purpose;

- (f) Determine benchmarks and define indicators of progress that facilitate the work of local and regional organizations in monitoring progress in the fight for anti-desertification. Particular attention should be paid to indicators of local participation;

- (g) Support programmes of the World Meteorological Organization (WMO) on agro-hydrology and agro-meteorology, the programme of the Regional Training Centre for Agro-meteorology and Operational Hydrology and their Applications (AGRHYMET), drought-monitoring centres and the African Centre of Meteorological Applications for Development (ACMAD), as well as the efforts of CILSS and IGADD;

- (h) Support FAO programmes and other programmes for the development of national early-warning systems and food security assistance schemes; and

- (i) Strengthen and expand the scope of existing regional programmes and the activities of appropriate United Nations organs and organizations, such as the World Food Programme (WFP), the Office of the United Nations Disaster Relief Coordinator (UNDRO) and the United Nations Sudano-Sahelian Office as well as of NGOs, aimed at mitigating the effects of drought and emergencies.

III PREREQUISITES FOR IMPLEMENTING THE AFRICAN STRATEGIES ON AGENDA 21

271. The African Common Position re-asserts that one of the main reasons that Africa lags behind the rest of the world in terms of economic development is the inadequate advancement in institutional and manpower capacity as well as the inadequate use of the available African manpower competence both within and outside the continent. Although nearly all African countries have a university or a training and/or research institution that can handle issues relating to environmental education, training and research at a level to promote environmental awareness and meet the developmental needs of the continent the impact of these institutions are not apparent.

A. Financial resource mobilization

272. Agenda 21 emphasizes that, "In general, the financing for the implementation of Agenda 21 will come from a country's own public and private sector". The question then arises as to how the financial mechanisms identified in Agenda 21 be used to implement the African strategies outlined above?

273. The African position is understandably concerned that it would be meaningless to adopt an Agenda 21 in Rio without making the necessary commitment, particularly by the North, to allocate the financial resources to Africa for its implementation. This should take the form of direct financial contribution towards environmental conservation and management on a regional basis, bilateral environment and development assistance and reduction of the debt burden.^{21/}

1. Direct financial contribution towards environmental conservation and management

274. Before Rio, the average ODA stood at 0.35 per cent which is only 50 per cent of the agreement reached in 1980. Consequently, a separate fund is required to implement Agenda 21. This will ensure predictability of the flow of resources, funding of programmes of relevance to national priorities and speedy disbursement of funds for agreed programmes. In this regard, Africa was more inclined to support the proposal from the Nordic countries for a package deal on the subject which may form a useful basis for further negotiations even after Rio.

275. As concerns the proposal on the Global Environment Facility (GEF), as the major funding source for Agenda 21 programmes, Africa notes that in its operations so far, only six programmes had been approved for the African region out of the numerous requests by African countries. Accordingly, GEF needed to be reviewed and modified in order to be more accessible to African countries. This review should take into account Africa's priority concerns by expanding the scope to include desertification control and drought mitigation as a global environmental issues. It is, therefore, important that:

(a) Its governance and management should be transparent, democratic and broad-based to include developing countries, particularly Africa; ²²

(b) Its present \$US 4 million membership fee should be reviewed downwards to enable participation by developing countries, particularly Africa;

(c) It should review the criteria for the selection of programmes to be funded and subsequently take into account issues of national priorities in the implementation of such programmes.

2. Bilateral environment and development assistance, including reduction of the debt burden

276. Apart from a required increase in bilateral environment and development assistance, the African Position was that the following measures should be taken to: ²³

(a) Cancel official bilateral debts;

^{21/} African Common Position, op. cit. para. 33.

²² African Common Position, op. cit. para. 63.

²³ African Common Position, op. cit., para. 33.

(b) Cancel semi-official/export credit debts;

(c) Substantially reduce, with the assistance of donor countries, debt owed to multilateral financial institutions which now account for 40 per cent of sub-Saharan debt-servicing obligations;

(d) Allocate new and additional resources for the implementation of Agenda 21.

277. Chapter 33 of Agenda 21 stresses, among other things, that "economic conditions, both domestic and international, that encourage free trade and access to markets will help make economic growth and environmental protection mutually supportive for all countries, particularly for Africa which must be considered to be undergoing the process of transition to a market economy".

278. International cooperation for sustainable development should also be strengthened in order to support and complement the efforts of Africa, particularly its least developed countries.

279. All countries should assess how to translate Agenda 21 into national policies and programmes through a process that will integrate environment and development considerations. National and local priorities should be established by means that include public participation and community involvement, promoting equal opportunity for men and women.

280. For an evolving partnership among all countries of the world, in particular, between Africa and the economically more developed countries, sustainable development strategies and enhanced and predictable levels of funding in support of longer term objectives are required. For that purpose, Africa should articulate its own priority actions and needs for support while the developed countries commit themselves to addressing these priorities. In this respect, consultative groups and roundtables and other nationally based mechanisms can play a facilitative role.

281. The implementation of the huge sustainable development programmes of Agenda 21 will require the provision to Africa of substantial new and additional financial resources. Grant or concessional financing should be provided according to sound and equitable criteria and indicators. The progressive implementation of Agenda 21 should be matched by the provision of such necessary financial resources. The initial phase will be accelerated by substantial early commitments of concessional funding.

B. Human resources and institution development: The non-government sector^{24/}

282. The African Common Position reaffirms that sustainable development requires for its implementation initiatives at the political level as well as collaboration with NGOs, women and youth organizations and the private sector. These initiatives will facilitate the elaboration and implementation of regional and subregional programmes. In this context of sustainable development, concrete measures to achieve common objectives should be defined for an effective management of different ecosystems, economic sectors and geographic regions.

283. Addressing environmental issues, in Africa, has been largely a monopoly of the government. Due to inadequate awareness, by the policy and decision makers, of the importance, in the fact determining role environmental factors play in sustaining social and economic development, there has been a significant neglect of these considerations in development planning. Consequently, there has not been the maximum mobilization of available national resources for environmental management as should have been.

^{24/} See Agenda 21, chapters 23, 24, 25, 26, 27 on major groups.

284. The African Common Position and Agenda 21 on capacity-building are unanimous that there is the need to improve or restructure the decision-making process so that consideration of socio-economic and environmental issues are fully integrated and a broader range of public participation assured.

285. The creation and sustenance of environmental awareness at all levels is an important aspect of the drive to integrate environmental dimensions into social and economic development planning. The OAU Declaration of 1991 as the African Year of the Environment is a major step towards this direction. All schools in Africa, from primary to university, offer disciplines, both in the social and natural sciences that relate directly to the environment and environmental management.

286. Popular participation and the democratization of environmental action presuppose the situation wherein there is consultation and involvement of the people in all actions. This includes the identification of local or national environmental problems, the solutions for those problems, paving out the modalities for action and participating in the implementation of those modalities.

287. Communal activities such as land terracing which were very popular during the first half of this century are no longer encouraged. This significantly reduced popular participation. One of the key reasons is that soon after independence such organizations were given more political interpretations than developmental ones. Consequently, and unfortunately too, they were quickly stifled by those who were either politically threatened or used them for political rather than developmental ends. NGOs and other independent organizations, either working on environmental matters or related activities, were driven to the background, even underground. The role of women in development was not fully appreciated; they were considered only in terms of child support and agricultural activities.

288. One of the fundamental prerequisites for the achievement of sustainable development is broad public participation in decision-making. Furthermore, in the more specific context of environment and development, the need for new forms of participation has emerged. This includes the need of individuals, groups and organizations to participate in environmental impact assessment procedures and to know about and participate in decisions, particularly those which potentially affect the communities in which they live and work. Individuals, groups and organizations should have access to information relevant to environment and development held by national authorities, including information on products and activities that have or are likely to have a significant impact on the environment and information on environmental protection measures.

289. Any policies, definitions or rules affecting access to and participation by NGOs in the work of United Nations institutions or agencies associated with the implementation of Agenda 21 must apply equally to all major groups.

1. The role of women^{25/}

290. The international community has endorsed several plans of action and conventions for the full, equal and beneficial integration of women in all development activities, in particular the Nairobi Forward-looking Strategies for the Advancement of Women, which emphasize women's participation in national and international ecosystem management and control of environment degradation. Several conventions, including the Convention on the Elimination of All Forms of Discrimination against Women, and those of ILO and UNESCO have also been adopted to end gender-based discrimination and ensure women access to land and other resources, education and safe and equal employment. Effective implementation of these programmes will depend on the active involvement of women in economic and political decision-making and will be critical to the successful implementation of Agenda 21.

^{25/} See Agenda 21, chapter 24.

2. Children and youth in sustainable development

291. Youth comprise nearly 30 per cent of the world's population. The involvement of today's youth in environment and development decision-making and in the implementation of programmes is critical to the long-term success of Agenda 21. There is, therefore, the need of advancing the role of youth and actively involving them in the protection of the environment and the promotion of economic and social development.

292. It is imperative that youth from all parts of the world participate actively in all relevant levels of decision-making processes because it affects their lives today and has implications for their futures. In addition to their intellectual contribution and their ability to mobilize support, they bring unique perspectives that need to be taken into account.

293. Each country should, in consultation with its youth communities, establish a process to promote dialogue between the youth community and government at all levels and mechanisms that permit youth access to the other major outcomes of the United Nations Conference on Environment and Development and provide them with the opportunity to participate in the implementation of Agenda 21.

294. Also relevant are the 1990 World Declaration on the Survival, Protection and Development of Children and its Plan of Action. Children not only will inherit the responsibility of looking after the Earth, but in Africa they comprise nearly half the population. Furthermore, children in both developing and industrialized countries are highly vulnerable to the effects of environmental degradation. The specific interests of children need to be taken fully into account in the participatory process on environment and development in order to safeguard the future sustainability of any actions taken to improve the environment.

3. The role of NGOs in sustainable development

295. NGOs play a vital role in the shaping and implementation of participatory democracy. Their credibility lies in the responsible and constructive role they play in society. Formal and informal organizations as well as grass-roots movements should be recognized as partners in the implementation of Agenda 21. The nature of the independent role played by NGOs within a society calls for real participation; therefore, independence is a major attribute of NGOs and is the pre-condition of real participation.

296. One of the major challenges facing the world community environment with development patterns is the need to activate a sense of common purpose on behalf of all sectors of society. The chances of forging such a sense of purpose will depend on the willingness of all sectors to participate in genuine social partnership and dialogue, while recognizing the independent roles, responsibilities and special capacities of each.

297. NGOs, including those non-profit organizations representing groups, possess well-established and diverse experience, expertise and capacity in fields which will be of particular importance to the implementation and review of environmentally sound and socially responsible sustainable development, as envisaged throughout Agenda 21. The community of NGOs, therefore, offers a global network that should be tapped, enabled and strengthened in support of efforts to achieve these common goals.

298. To ensure that the full contribution of NGOs is realized, the communication and cooperation between international organizations, national and local governments and NGOs should be promoted in institutions mandated and programmes designed to carry out Agenda 21. NGOs will also need to foster cooperation and communication among themselves to reinforce their effectiveness as actors in the implementation of sustainable development.

299. The organizations of the United Nations system and intergovernmental organizations and forums, bilateral programmes and the private sector as appropriate, will need to provide increased financial and

administrative support for NGOs and their self-organized networks contributing to the monitoring and evaluation of Agenda 21 programmes and provide training for NGOs (and assist them to develop their own training programmes) at the international and regional levels to enhance their partnership role in programme design and implementation.

300. Governments will need to promulgate or strengthen, subject to country specific conditions, any legislative measures necessary to enable the establishment by NGOs of consultative groups and to ensure the right of NGOs to protect the public interest through legal action.

4. Local authorities' initiatives in support of Agenda 21

301. Since many of the problems and solutions being addressed by Agenda 21 have their roots in local activities, the participation and cooperation of local authorities will be a determining factor in fulfilling its objectives. Local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations and assist in implementing national and subnational environmental policies. They play a vital role in educating, mobilizing and responding to the public to promote sustainable development.

5. Strengthening the role of workers and their trade unions

302. Efforts to implement sustainable development will involve adjustments and opportunities at the national and enterprise levels, with workers foremost among those concerned. As their representatives, trade unions are vital actors in facilitating the achievement of sustainable development in view of their experience in addressing industrial change, the extremely high priority they give to protection of the working environment and the related natural environment and their promotion of socially responsible and economic development. The existing network of collaboration among trade unions and their extensive membership provide important channels through which the concepts and practices of sustainable development can be supported. The established principles of tripartism provide a basis for strengthened collaboration between workers, governments and employers in the implementation of sustainable development.

6. Strengthening the role of business and industry

303. Business and industry, including transnational corporations, play a crucial role in the social and economic development of a country. A stable policy regime enables and encourages business and industry to operate responsibly and efficiently and to implement longer-term policies. Increasing prosperity, a major goal of the development process, is contributed primarily by the activities of business and industry. Business enterprises, large and small, formal and informal, provide major trading, employment and livelihood opportunities. Business opportunities available to women are contributing towards their professional development, strengthening their economic role and transforming social systems. Business and industry, including transnational corporations, and their representative organizations should be full participants in the implementation and evaluation of activities relating to Agenda 21.

304. Business and industry, including transnational corporations, should recognize environmental management as among the highest corporate priorities and as a key determinant to sustainable development. Some enlightened leaders of enterprises are already implementing "responsible care" and product stewardship policies, openness and dialogue with employees and the public and carrying out environmental audits and assessments of compliance. These leaders in business and industry, including transnational corporations, are increasingly taking voluntary initiatives, promoting and implementing self-regulations and greater responsibilities in ensuring their activities have minimal impacts on human health and the environment. The regulatory regimes introduced in many countries and the growing consciousness of consumers and the general public and enlightened leaders of business and industry, including transnational corporations, have all contributed to this. A positive contribution of business and industry, including transnational corporations,

to sustainable development can increasingly be achieved by using economic instruments such as free market mechanisms in which the prices of goods and services should reflect the environmental costs of their input, production, use, recycling and disposal subject to country-specific conditions.

305. The improvement of production systems through technologies and processes that utilize resources more efficiently and at the same time produce less wastes - achieving more with less - is an important pathway towards sustainability for business and industry. Similarly, facilitating and encouraging inventiveness, competitiveness and voluntary initiatives are necessary for stimulating efficient and effective options.

7. Strengthening the role of farmers

306. "Farmers" and "farming" include all rural people who derive their livelihood from activities such as farming, fishing and forest harvesting. Agriculture occupies one third of the Earth, and is the central activity for much of the world's population. Rural activities take place in close contact with nature, adding value to it by producing renewable resources, while at the same time becoming vulnerable to over-exploitation and improper management.

307. The rural household, indigenous people and their communities and the family farmer, a substantial number of whom are women, have been the stewards of much of the Earth's resources. Farmers must conserve their physical environment as they depend on it for their sustenance. Over the past 20 years there has been an impressive increase in aggregate agricultural production. Yet, in some regions, this increase has been outstripped by population growth or international debt or falling commodity prices. Further, the natural resources that sustain farming activity need proper care and there is a growing concern about the sustainability of agricultural production systems.

308. A farmer-centred approach is the key to the attainment of sustainability and many of the programme areas in Agenda 21 address this objective. A significant number of the rural population in Africa depend primarily upon small-scale, subsistence-oriented agriculture based on family labour. However, they have limited access to resources, technology, alternative livelihood and means of production. As a result, they are engaged in the over-exploitation of natural resources, including marginal lands.

309. The key to the successful implementation of programmes as addressed in Agenda 21 lies in the motivation and attitudes of individual farmers and government policies that would provide incentives to farmers to manage their natural resources effectively in a sustainable manner. Farmers, particularly women, face a high degree of economic, legal and institutional uncertainties when investing in their land and other resources. The decentralization of decision making towards local community organizations is the key in changing people's behaviour and implementing sustainable farming strategies.

8. Scientific and technological community

310. Member States and others concerned should focus on how to enable the scientific and technological community including, engineers, architects, industrial designers, urban planners, policy-makers and others to make a more effective contribution to the decision making processes concerning environment and development. It is important that the role of science and technology in human affairs be more widely known and better understood, both by decision makers who help determine public policy and by the general public. The encouragement of cooperative relationship between the scientific and technological community and the general public should be enhanced to facilitate greater use of scientific and technical information and knowledge in policies and programme implementation.

311. Decision makers should create conducive conditions for improving training and independent research in sustainable development. Existing multidisciplinary approaches will have to be strengthened and

interdisciplinary studies developed between the scientific and technological community and policy-makers and the general public to provide leadership and practical know-how for sustainable development. The public should be communicating their sentiments to the scientific and technological community concerning how science and technology might better be managed as they affect their lives. The independence of the scientific and technological community to investigate, publish and exchange their findings without restrictions should be guaranteed.

9. National mechanisms and international cooperation for capacity-building

312. The ability of a country to follow sustainable development paths is determined by the capacity of its people, institutions and its ecological and geographical conditions. A fundamental goal of capacity-building is to enhance the ability to evaluate and address the crucial questions related to policy choices and modes of implementation among development options.

313. Building endogenous capacity to implement Agenda 21 will require the efforts of the countries themselves in partnership with relevant United Nations organizations, and the developed countries. Skills, knowledge and technical know-how at the individual and institutional levels are necessary for institution-building, policy analysis and development management, including the assessment of alternative courses of action with a view to enhancing access to and transfer of technology and promoting economic development. Technical cooperation, including that related to technology transfer and know-how, encompasses the whole range of activities to develop or strengthen individual and group capacities and capabilities.

314. UNCED emerged at a time when a number of international events are taking place in Africa which have legal implications on national environmental management. The creation of the European single market and the end of the cold war era will completely change the negotiation process in terms of technology transfer, resource flows and international economic relations which will demand that every aspect of the reciprocity principle be applied.

315. The development of environmental legislation should therefore constitute one of the major post-UNCED activities. This, in turn, should be supported by the establishment of the relevant administrative infrastructure.

316. The strategies proposed in this submission take into account assumptions of positive reaction by member States and the international community. Which include:

(a) At the national level, it is presumed that African countries will establish and strengthen institutions responsible for their environmental matters. This calls for integrated physical planning and social cost-benefit analysis of development projects, as well as keeping in view the environmental consequences of fiscal measures;

(b) At the subregional level, the various intergovernmental organizations such as CILSS, IGADD, SADC and COMIDES established to coordinate environmental management should be fully utilized by African Governments. Other initiatives include the Abidjan Convention on the protection of marine and coastal areas of West and Central Africa as well as other African regional seas programmes;

(c) At the regional level, it will be recalled that AAF-SAP, calls for the creation of an enabling environment for sustainable development. Which would involve popular participation in decision making, maintenance of equity and justice, and, the elimination of civil strife and instability.

IV. CONCLUSIONS AND RECOMMENDATIONS

317. The aspirations of the Lagos Plan of Action are being challenged by Agenda 21 and the Abuja Treaty establishing the African Economic Community. Member States should therefore provide an enabling environment through their political, planning and administrative structures as well as the basic resources to facilitate the implementation of these activities. As it is emphasized in the African Common Position, sustainable development requires of member States the following:

- (a) A national political commitment to ensure that development processes sustain the resource base on which future development will depend;
- (b) Redefinition of national development priorities to alleviate constraints imposed by natural conditions, current international economic conditions and the debt burden; and
- (c) Foster the democratization process so as to maximize the mobilization and use of national resources.

A. The agencies of the United Nations and other development partners of Africa

1. The United Nations system

318. In the follow-up to the Conference, in particular the implementation of Agenda 21, all relevant organs, programmes and organizations of the United Nations system will have an important role within their respective areas of expertise and mandates in supporting and supplementing national efforts.

(a) The United Nations Economic Commission for Africa

319. ECA should play the lead role in coordinating subregional, regional and, where necessary, national activities in the implementation of Agenda 21. The development objective will be to enhance national, subregional and regional capacity and capability of African countries, Intergovernmental Organizations and NGOs to manage resources and the environment for sustainable development. In order for the African countries to formulate and implement effective environment programmes, the following areas should be addressed:

- (a) Development and ensuring the use of the relevant and required manpower capacity at the policy level that would increase the access to techniques and know-how in the formulation and implementation of environment programmes. To this end, training materials for the subprogramme (manuals, guidelines, aids, etc.) will be provided and training workshops conducted at the institutional level in each of the five ECA MUPLOCs;
- (b) Promoting environment and development activities in the private sector, including business and industry, in order to ensure their full participation with government as partners in environmental management for sustainable development;
- (c) Undertaking an overall assessment of programme orientation in order to determine the impact of subprogramme activities with the view to recommending any changes that will ensure the success of the subprogramme;
- (d) Ensuring that the activities of the subprogrammes reach the highest policy level within the government and to conduct regional evaluation conference at ministerial level;

(e) Strengthening the capacity of the science and technology policy institutions of the selected countries in technology assessment, choice, acquisition, application and diffusion. Periodic reports on the progress of this aspect of Agenda 21 and the African Common Position will be prepared and submitted to member States;

(f) Promoting, supporting, encouraging and fostering those technologies which have the least negative impacts on resources and land use utilization, conservation, protection and rehabilitation;

(g) Improving the prospects of the African mining sector through the harmonization of mining development policies, establishment of appropriate small-scale mining equipment facilities and environment prospective regulations;

(h) Expanding the capacity for raising rural productivity in the subregions;

(i) Developing and expanding the skills of technical personnel and decision makers on various aspects of solar energy development.

320. UNCED did not allocate resources for activities by institutions. However, to carry out the above activities effectively during the period (1994-2005), the ECA secretariat estimates that \$US 15 million from extrabudgetary sources, including UNDP, UNEP and the regional development banks, will be needed.

(b) United Nations Environment Programme

321. UNEP and its Governing Council, should within its mandate continue to play its role with regard to policy guidance and coordination in the field of the environment, taking into account the social and economic development perspective.

322. In order for UNEP to perform these functions, while retaining its role as the principal body within the United Nations system in the field of environment and taking into account the development aspects of environmental questions, it will require more expertise, provision of adequate financial resources, and closer cooperation and collaboration with development and other relevant organs of the United Nations system.

(c) United Nations Development Programme

323. UNDP, like UNEP, has a crucial role in the follow-up to UNCED. With the close collaboration of ECA and through its network of field offices, it would foster the United Nations system's collective thrust in support of the implementation of Agenda 21 at the national, subregional, regional and global levels, drawing on the expertise of the specialized agencies and other United Nations organizations and bodies involved in operational activities.

324. Regional and subregional cooperation will be an important part of the Conference outcome. The United Nations regional economic commissions, regional development banks and regional economic and technical cooperation organizations, within their respective agreed mandates, can contribute to this process by:

(a) Promoting regional and subregional capacity-building;

(b) Promoting the integration of environmental concerns in regional and subregional development policies;

(c) Promoting regional and subregional cooperation, where appropriate, regarding transboundary issues related to sustainable development.

(d) The specialized agencies of the United Nations system

325. The specialized agencies of the United Nations system should continue to provide financial and technical support to programmes as indicated in chapter 38 of Agenda 21.

(e) National, subregional and regional development banks and organizations

326. The implementation of Agenda 21 within the framework of the African strategies should be an integral part of the work programme of the subregional economic groupings. ADB should provide the needed financial support to countries and organizations participating in implementing the African strategies directly or through national development banks and other financial institutions.

327. Inter-agency joint programming exercises and coordination is promoted from the initial stages of programme conceptualization with member States; this will ensure that the funding mechanisms indicated in Agenda 21, particularly the Global Environment Facility should increase the access to funding by member States through a more broad-based and transparent approach.

328. Finally, a supportive international and domestic economic climate conducive to sustained economic growth and development will be crucial in the implementation of the African strategies for implementing Agenda 21 within the framework of the African Common Position on Environment and Development.

ANNEX
AFRICAN STRATEGIES FOR IMPLEMENTING UNCED AGENDA 21
SUMMARY PROGRAMME AND BUDGET

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
1.	Managing demographic change and population pressures	(a)	Developing and disseminating knowledge concerning the links between demographic trends and factors and sustainable development.	National governments, IGOs, NGOs, business and industry	\$400 million
		(b)	Formulating integrated national policies for environment and development, taking into account demographic trends and factors.		
		(c)	Implementing integrated, environment and development programmes at the local level, taking into account demographic trends and factors.		
2.	Achieving food self sufficiency and food security	(a)	Integrate environmental and sustainable development with policy analysis for the food and agriculture sector and relevant macroeconomic policy analysis, formulation and implementation.	National governments, IGOs, NGOs, business and industry	\$1.259 billion
		(b)	Develop policy instruments to reconcile long-term and short-term requirements.		
		(c)	Programmes developed for improving farm production and farming systems through diversification of farm and non-farm employment and infrastructure development.		
		(d)	Collecting, analyzing and disseminating land-resource planning information and education for agriculture.		
		(e)	Policies, rules and regulations for land conservation and rehabilitation should be introduced and enforced.		
		(f)	Programmes for the conservation and sustainable utilization of plant genetic resources for food and sustainable agriculture should be promoted.		
		(g)	The conservation and sustainable utilization of animal genetic resources for sustainable agriculture should be promoted.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
3.	Ensuring efficient and equitable use of water resources	(a)	Integrated water resources development and management.	National governments, IGOs, NGOs, business and industry	\$3.33 million
		(b)	Water resources assessment.		
		(c)	Data dissemination.		
		(d)	Research and development.		
		(e)	Protection of water resources, water quality and aquatic ecosystems.		
		(f)	Drinking-water, supply and sanitation.		
		(g)	Water and sustainable urban development.		
		(h)	Efficient and equitable allocation of water resources.		
		(i)	Water for sustainable food production and rural development.		
4.	Securing greater energy self-sufficiency	(a)	Attain sustainable energy security required for meeting food security and for other essential needs of the population in rural and urban areas.	National governments, IGOs, NGOs, business and industry	\$5 billion
		(b)	Reduce excessive energy wastage by application of no-cost and low-cost means and methods that improve energy efficiency substantially in existing energy supplies and utilization in rural and urban areas in all sectors of production and services as well as in households.		
		(c)	Review all levels of energy and energy-related formal as well as informal education and training programmes to improve relevance to national objectives for achieving and maintaining of energy security, efficiency and self-reliance.		
		(d)	Raise standards of operation, maintenance and management of energy supply systems and of energy utilization in all sectors to cost-effective high levels.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
4.		(c)	Build and strengthen endogenous technological capacity in all aspects of development of energy supplies, services and in energy utilization in all sectors, and in particular in supplies and services based on local renewable and fossil energy resource endowments.		
		(f)	Cooperate for mutual benefit with neighbouring and other countries in building and strengthening energy sector technological capacity.		
		(g)	Cooperate for mutual benefit, with neighbouring and other countries in the cost-effective rationalization of the supply and distribution of indigenous and improved energy commodities and forms.		
		(h)	Design and implement decentralized energy supply projects based on local resources to furnish cost-effective energy supplies well-matched to major local energy needs.		
		(i)	Design and implement central energy supply projects based on indigenous large resource endowments, to furnish cost-effective energy supplies for well-matched energy uses at national and multi-country levels.		
5.	Optimizing environmentally clean industrial production	(a)	Support for programmes aimed at the prevention and minimization of hazardous wastes including the strengthening of institutional capacities in hazardous wastes management.	National governments, IGOs, NGOs, business and industry	\$350 million Also Second IDDA and Second Transport Decade sources
		(b)	Support for programmes aimed at strengthening capacities in managing municipal solid wastes, waste waters and sewage in conformity with national or international health established standards and environmental quality guidelines.		
		(c)	Coordination of urban transportation programme and promotion of environmentally sound transportation focusing on preparation and dissemination of documentation on less polluting and safer transport policies, systems and technologies.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
5.		(d)	Modification of the mandates, policies and budgets of major economic and sectoral agencies (e.g. national planning, finance, trade, technology, industry, agriculture) to make them responsible and accountable for ensuring that their policies, programmes and choice of technologies support self-reliant industrial development which is economically and ecologically sustainable.		
		(e)	Putting in place new regulatory measures for economic incentives for efficient use of energy and natural resources and the reduction of industrial waste and pollution. Require the prior assessment of technology projects likely to have adverse effects on human health, the environment and on future development prospects.		
		(f)	Adopting investment codes and procedures tailored to the promotion and development of small-scale industries, including rural institutions to support cottage industries and small-scale industries with emphasis on indigenous technology, domestic finance, rural infrastructure and participation of women and youth in order to provide an enabling economic environment for the involvement of local entrepreneurs.		
		(g)	Developing a clear legal framework on ownership and participation of the different socio-economic groups such as rural cooperatives, artisans, traders and women's and youth groups in order to enable popular participation in production, marketing and the strengthening of the informal sector and its ultimate integration into the mainstream of development.		
		(h)	The promotion of intra-African cooperation particularly with regard to the development and transfer of appropriate technology, research and development, commercialization of research findings and the development of prototypes.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
5.		(i)	The promotion of industrial cooperation should be accorded high priority, particularly for the African LDCs, the vast majority of which have small populations. Accordingly, the bilateral and other programmes of the developed countries, international and regional development finance institutions should embody such components that promote cooperation and integration between the LDCs and the neighbouring countries.		
6.	Management of species and ecosystems	(a)	Develop and sustain institutional and legislative capacity and the capabilities required for the conservation of biological diversity through research and development.	National governments, IGOs, NGOs, business and industry	\$6 billion
		(b)	Harmonize and coordinate programmes and activities on the protection, on a sustainable basis, of the biological diversity of the region.		
		(c)	Strengthen wildlife management programmes; contribute to global activities on conservation of biological diversity; promote, collection, evaluation and conservation of gene pools through the establishment of gene banks in concerned institutions.		
		(d)	Disseminate information and results from pilot projects; support and strengthen networks for the conservation of genetic resources such as AMCEN's.		
		(e)	Popular participation in environmental protection and sustainable development should also be pursued collectively. Just as the OAU has adopted the African Charter for Popular Participation, it should also work collectively to implement it so that popular social groups like workers, NGOs, grassroots people, women, peasants and youth are mobilized to deal with ecological problems that are manifested everywhere.		
		(f)	Development of mechanisms for global/regional/national afforestation and reforestation including provisions for large-scale global funding for forests.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
7.	Preventing and reversing desertification	(a)	Establish and/or strengthen environmental information systems at the national level; strengthen national, state/provincial and local assessment and ensure cooperation/networking between existing environmental information and monitoring systems, such as Earthwatch and the Sahara and Sahel Observatory.	National governments, IGOs, NGOs, business and industry	\$1.575 billion
		(b)	Strengthen the capacity of national institutions to analyse environmental data so that ecological change can be monitored and environmental information obtained on a continuing basis at the national level.		
		(c)	Adopt policies at the national level regarding a decentralized approach to land-resource management, delegating responsibility to rural organizations.		
		(d)	Create or strengthen rural organizations in charge of village and pastoral land management.		
		(e)	Establish and develop local, national and intersectoral mechanisms to handle environmental and developmental consequences of land tenure expressed in terms of land use and land ownership.		
		(f)	Create or strengthen village associations focused on economic activities of common pastoral interest.		
		(g)	Promote rural credit and mobilization of rural savings through the establishment of rural banking systems.		
		(h)	Develop infrastructure, as well as local production and marketing capacity, by involving the local people to promote alternative livelihood systems and alleviate poverty.		
		(i)	Establish a revolving fund of credit to rural entrepreneurs and local groups to facilitate the establishment of cottage industries/business ventures and credit for input to agro-pastoral activities.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
7.		(j)	Conduct socio-economic baseline studies in order to have a good understanding of the situation in the programme area regarding, particularly, resource and land tenure issues, traditional land-management practices and characteristics of production systems.		
		(k)	Conduct inventory of natural resources (soil, water and vegetation) and their state of degradation, based primarily on the knowledge of the local population.		
		(l)	Disseminate information on technical packages adapted to the social, economic and ecological conditions of each.		
		(m)	Promote exchange and sharing of information concerning the development of alternative livelihoods with other agro-ecological regions.		
		(n)	Establish or strengthen, national and local anti-desertification authorities within government and local executive bodies in all rural communities affected.		
		(o)	Develop national plans of action to combat desertification and as appropriate, make them integral parts of national development plans and national environmental action plans.		
		(p)	Implement policies directed towards improving land use, managing common lands appropriately, providing incentives to small farmers and pastoralists.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
8.	Enhancing the capacity of ECA for the implementation of Agenda 21 in member States	(a)	Developing and ensuring the use of the relevant and required manpower capacity at the policy level that would increase the access to techniques and know-how in the formulation and implementation of environment programmes. To this end, training materials for the subprogramme (manuals, guidelines, aids, etc). Training workshops to be conducted at the level of institutions in each of the five ECA MULPOCs.		About \$15 million from extrabudgetary sources
		(b)	Promotion of environment and development activities in the non-government sector, including business and industry, in order to ensure their full participation with government as partners in environmental management for sustainable development. In this respect, subregional training workshops will be conducted for participants from the non-government sector.		
		(c)	An overall assessment of programme orientation in order to determine the impact of subprogramme activities with a view to recommending any changes in focus that will ensure the success of the subprogramme. Subregional evaluation workshops will be conducted.		
		(d)	Ensure that the activities of the subprogrammes reach the highest policy level within government at the Ministerial level and conduct regional evaluation Conference at the Ministerial level.		
		(e)	Strengthening the capacity of the science and technology policy institutions of the selected countries in area of technology assessment, choice, acquisition, application and diffusion. Periodic reports on the progress of this aspect of Agenda 21 and the African Common Position will be made and submitted to member States.		
		(f)	Promote, support, encourage and foster those technologies and best-practices which have the least damaging impacts on resources and land use utilization, conservation, protection and rehabilitation. Periodic reports on the progress of activities will be made.		

PROGRAMME AREA		ACTIVITIES		REGIONAL RESOURCES	GRANTS OR CONCESSIONAL SOURCES
8.		(g)	Improve the prospects of the African mining sector through the harmonization of mining development policies, establishment of appropriate small-scale mining equipment facilities and environment prospective regulations.		
		(h)	Expand the capacity for raising rural productivity in the subregions, particularly in rural areas.		
		(i)	Create and expand the skills of technical personnel and decision makers on various aspects of solar energy development.		
					\$17.929 billion

