

Population,
Environment
and
Agriculture
Interlinkages
and
Sustainable
Development



United Nations
Economic Commission for Africa

Population, Environment and Agriculture Interlinkages and Sustainable Development



**United Nations
Economic Commission for Africa**

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Addis Ababa,
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Acknowledgements

The Food Security and Sustainable Development Division, led by Paulina Makinwa-Adebusoye (Director of the Division until February 2001) prepared this publication. Israel Sembajwe coordinated the final draft reviews of the publication.

A consultant, Alemneh Dejene, prepared the first draft of the publication. This was followed by a revised draft prepared by a second consultant, Abiodun Olu Falusi. Then, the Division took the draft and revised it taking into consideration most of the constructive comments arising from both internal and external peer reviews.

Valuable comments came from members of the Advisory Board on Population, Environment and Agriculture to whom we convey our special thanks. These were: George Benneh, C. Delgado, Kamel Esseghairi, Abiodun Olu Falusi, Arthur Getz-Escudero, F. S. Idachaba, Cecile Ndjebet-Ntamag, Ruth Oniango, Rudolph A. Polson and Jeremy A. Ridl.

Finally, we express our special gratitude to the Economic Commission for Africa Communication Team, for the editing, design and production of the report.

Acronyms

ADB	African Development Bank
AIDS	Acquired Immuno-Deficiency Syndrome
ECA	Economic Commission for Africa
ESTNET	ECA Science and Technology Network
FSSDD	Food Security and Sustainable Development Division
FAO	Food and Agriculture Organization
GHA	Greater Horn of Africa
GOK	Government of Kenya
HIV	Human Immuno-deficiency Virus
ICT	Information Communication Technologies
IFPRI	International Food Policy Research Institute
IUCN	International Union for the Conservation of Nature
NGOs	Non-Governmental Organizations
OAU	Organization of African Unity
SRDCs	Sub-Regional Development Centres
UN	United Nations
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
USAID	United States Agency for International Development

Foreword

Sustainable development entails the harmonization of population growth with the utilization and exploitation of natural resources through a redirection and re-orientation of research and development, as well as institutional changes. The basic requirement of this harmonization process is to address challenges posed by the negative synergy arising from rapid population growth, environmental degradation and low agricultural production leading to food insecurity.

Historically, African traditional farming methods were suited to the needs of a slowly growing population living off a fragile, environmental resource base. As long as the rate of population growth was in line with the carrying capacity of the land and the efficiency of available traditional technologies, these farming systems were adequate to meet the subsistence needs of local communities. Most of the increases in food and agricultural production during the period came from area expansion. However, during the past two decades, decreasing levels of mortality combined with high (but gradually or marginally declining) fertility rates resulted in large stable populations, growing at an average annual rate of between 2 to 3 per cent. These led to new stress on indigenous land tenure systems, which were no longer able to cope with increasing population, and prolonged cultivation caused by scarcity of land. In addition, the inability or unwillingness of farmers to adopt new agricultural technologies aimed at intensified production exacerbated the current situation.

The per capita food production index fell from 112 in 1970 to 101 in 1980, 98.4 in 1990 and 97.2 in 1998. About 40 per cent of the total African population (over 200 million people, largely children and women) face mounting problems of poverty and nutrition. The average daily per capita intake of 2,027 calories on the continent is well below the recommended minimum of 2,400 calories. In many African countries, structural food deficits have become a common feature, and chronic under-nutrition is now widespread. It is estimated that if malnutrition is also considered, the number of food-insecure people in Africa is expected to reach over 260 million by the year 2010 if the present trends continue.

Moreover, stagnant or slow economic growth in most countries has led to limited, alternative livelihoods in both rural and urban areas such that increased rural-urban migration is not a viable safety valve for the pressure on the land. Rapid population growth intensifies environmental degradation, as is evident in many African countries experiencing declining soil fertility and rapid depletion of forest and water resources. The negative synergy produced by declining agricultural productivity and related food insecurity, rapid population growth and environmental degradation is the root of Africa's problem, which has trapped most people in poverty. Therefore, social development,

population control and environmental protection are increasingly becoming interdisciplinary in nature and closely inter-linked with agriculture and food security.

This publication places emphasis on dealing with the challenges related to the management of the nexus issues (agriculture, population and the environment) in Africa's sustainable development, and the role of ECA in assisting Member States to factor these constraints when formulating national policies, strategies and programmes. It provides a platform from which we can chart ways for creating increased awareness on the nexus issues, and ensuring that they are placed in the mainstream of national development policies.

P. Makinwa-Adebusoye
Director, FSSDD

SECTION ONE

Introduction

1.1 Background

1. To reduce poverty, the logical and paramount goal of African countries should be to pursue policy objectives of sustainable development. Sustainable development entails the harmonization of population growth with utilization and exploitation of natural resources through redirection and re-orientation of research and development, as well as institutional changes. The basic requirement in this harmonization process is to address challenges posed by the negative synergy arising from rapid population growth, environmental degradation and low agricultural production leading to food insecurity.

2. Historically, African traditional farming methods were suited to the needs of a slowly growing population living off a fragile environmental resource base. As long as the rate of population growth was in line with the carrying capacity of the land and the efficiency of available traditional technologies, these farming systems were adequate to meet the subsistence needs of local communities. Most of the increases in food and agricultural production during the period came from area expansion. However, during the past two decades, decreasing levels of mortality combined with high (but gradually or marginally declining) fertility rates resulted in large stable populations, growing at an average annual rate of between 2 to 3 per cent. These led to new stress on indigenous land tenure systems which were no longer able to cope with increasing population and prolonged cultivation caused by scarcity of land. In addition, the inability or unwillingness of farmers to adopt new agricultural technologies aimed at intensification exacerbated the current situation.

3. Available evidence suggests that environmental degradation such as soil erosion, desertification and deforestation is seriously undermining the capacity of the very same resources on which African households depend for increasing production efficiency. Land degradation is already posing serious limitations to food security in several countries, particularly in areas where population densities are high. The United Nations Environment Program (UNEP) estimates that the area of land prone to desertification worldwide, is approximately 38 million km² out of which 6.9 million km² (23 per cent) is in Sub-Saharan Africa. Put more starkly, nearly a quarter of the African continent is at present in the process of becoming useless for cultivation due to land degradation.

4. Women play a key, but often unrecognized, role in all the important aspects of rural life in Africa. As food producers, carriers of water, collectors of fuelwood, processors of food, caretakers of children and the elderly and, in many communities, the primary earners of cash incomes, their activities and the constraints they face influence and are, in turn, influenced by activities relating to population growth, the environment and food security. In other words, women's roles and activities impact directly on Africa's problems of food insufficiency, environmental degradation, and livelihood insecurity. The pressure on women's time and the gender-specific constraints that women face, and notable limited accesses to the productive resources have serious implications for the environment, agriculture and sustainable development throughout Africa.

5. Rangelands are being destroyed as a result of overgrazing and wasteful and inadequate management of water resources. Consequently, agricultural productivity remains very low. The per capital food production index fell from 112 in 1970 to 101 in 1980, 98.4 in 1990 and 97.2 in 1998. About 40 percent of the total African population (over 200 million people, largely children and women) face mounting problems of poverty and nutrition (FAO, 1999). The average daily per capita calorie of 2027 calories intake on the continent is well below the recommended minimum of 2,400 calories. In many African countries, structural food deficits have become a common feature, and chronic under-nutrition is now widespread. It is estimated that if malnutrition is also considered, the number of food insecure people in Africa is expected to reach over 260 million by the year 2010 if the present trends continue (ECA, 1999).

6. These trends may continue due to, among others, the absence of old age security, which results in dependence on own children thus sustaining the need for having more children. In turn, population will continue to grow without commensurate increases in agricultural production and without effective management of the natural resource base on which such growth depends. Moreover, stagnant or slow economic growth in most countries has led to limited alternative livelihoods in both rural and urban areas such that increased rural-urban migration is not a viable safety valve to the pressure on the land. Rapid population growth intensifies environmental degradation as is evident in many African countries which are experiencing declining soil fertility and rapid depletion of forest and water resources. The negative synergy produced by declining agricultural productivity and related food insecurity, rapid population growth, and environmental degradation is the root of Africa's problem, which has trapped most people in poverty.

7. Therefore, social development, population control and environmental protection are increasingly becoming interdisciplinary in nature and closely inter-linked with agriculture and food security. Hence, it is imperative to identify and deal with the major challenges for addressing the linkages of a rapidly changing population, environmental degradation, low agricultural productivity, poor economic growth, and poverty in Africa. This is important for the achievement of sustainable development. In addition, the issue of human immuno-deficiency virus/acquired immuno-deficiency syndrome (HIV/

AIDS) and its social, economic and demographic impact has emerged as a new challenge to Africa's leadership and the continent's development. We must therefore devise ways to encourage countries to deal with the emerging demographic realities and design appropriate policies. These policies should pay special attention to the linkages of population management, environmental conservation and agricultural productivity.

1.2 Objectives of the Paper

8. The overall objective of this paper is to identify the key challenges related to the management of the nexus issues (agriculture, population and the environment) in Africa's sustainable development, and the role of the ECA in assisting member States in taking these constraints into account in formulating national policies, strategies and programs. Specific objectives are to (i) outline the challenges and major issues of concern to Africa's sustainable development, (ii) present a suggested response and more clearly define ECA's role in supporting such a response based on the latter's comparative advantage, and (iii) provide an action plan on the way forward. In this respect, a key goal of this paper is to serve as a an advocacy and technical platform for the Commission and FSSDD in articulating and creating awareness on the nexus issues, and ensuring that they are mainstreamed in national development policies.

1.3 Outline of the Paper

9 This paper is organized into five sections. Section one is an introduction; section two reviews the challenges and major issues of concern to Africa's sustainable development; section three presents suggested policy, institutional and technological response; section four provides a critical examination of the role of the ECA in dealing with the response; and chapter five provides specific action steps on the way forward.

SECTION TWO

The Nexus Challenges to Africa's Sustainable Development

2.1 General Overview

10 Linkages of population, environment and agriculture are indeed very complex. Nevertheless, properly understanding how they interact is key to the development of any sustainable economic policy on the continent. African leaders (including policymakers and planners) need to fully understand these linkages and the mode of their operationalization, especially with regard to increasing food insecurity in the region. This can be derived and substantiated from empirical evidence of the interrelationships between population growth, environmental degradation and agricultural production in the World today. In doing so, it should be remembered that Africa is not one homogeneous region. It is a continent of contrasts, including (as noted by IFPRI, 1999): i) the Sudano-Sahelian areas whose soils are shallow, highly weathered, and subject to intensive cultivation but with low levels of fertilizer application (in these areas, soils in parts which are more densely populated lose 60-100 kilograms of nitrogen, phosphorus, and potassium; and limited water availability and intensified land use due to increasing population size have restricted crop diversification and the adoption of proper management practices, and promoted short growing seasons); and ii) the sub-humid and humid regions, and the savannas and forest areas where nutrient losses vary greatly (for example, losses range from 30-60 kilograms per hectare per year in the humid forests and wetlands in southern Central Africa to above 60 kilograms in the East African highlands). In West Africa, Benneh (1997) observes that many of the critically degraded areas in the world are in the sub-region where the most persistent problems are de-vegetation and loss of flora, fauna, and soil quality.

11 Indeed, the interactions among population, environment and agriculture have increasingly raised great challenges for the African nations that have featured among important issues of concern for the continent. As we start the new millennium, we can identify five top issues of concern to Africa's development (among all the major issues of concern) as follows: -

- Widespread poverty;
- Low agricultural production and food insecurity (particularly under-nutrition and chronic malnutrition among children);
- Environmental degradation;
- Rapidly changing populations ;and
- Unequal opportunities for women.

2.2 Widespread Poverty

12 Poverty is a national phenomenon that diametrically pervades the African environment and retrogressively affects a lot of people. It leads to serious environmental hazards and subjects the economies of many African nations to a deep gulf of economic recession and lack of growth. Poverty in Africa today is significantly multi-dimensional, and its gravity is greatly compounded by persistently low incomes and inequitable income distribution.

13 A World Bank study (World Bank, 1994a) concluded that the majority of the African poor are rural dwellers. For example, in four key West African states (Ghana, Cameroon, Nigeria and Cote d'Ivoire) at least 71% of rural dwellers lived below the poverty line in the early 1990s. In the case of Senegal, the situation was not very different (World Bank, 1994b). Consequently, in the Thirty-third session of the Commission/Twenty-fourth meeting of the Conference of Ministers/Seventh Conference of African Ministers of Finance in 1999, it was clearly observed as follows: *"After about four decades of independence and numerous development assistance programs, poverty in Africa continues to be widespread, deep and severe. It is estimated to affect the lives of 60 per cent of the population in sub-Saharan Africa, and 27 per cent in the North African sub-region. While there are many important factors in the African poverty profile, poor economic performance is at the root of the problem. For two decades before the mid- 1990s, Africa's economies stagnated"*. Although some kind of improvement is observed to have taken place since the mid- 1990s, this performance is fragile and research has shown that key sustainability conditions are missing in most African countries (a fact partly shown by the inability to sustain the 1995 growth rate in 1997, and even less so in 1998 in the majority of countries).

14 It was further noted that based on the dynamic behaviour of poverty, a growth elasticity of 0.76 was assumed, implying that at least a per capita income growth rate of 5.2 per cent was required for poverty reduction. Assuming an average population growth rate of 2.8 per cent for the sub-Saharan African region, a GDP growth rate of 8 per cent was required to achieve the poverty-reduction objective. The comparable figure for the whole of Africa was 7 per cent, mainly because the incidence of poverty is less in North Africa. The estimates showed that the average annual magnitudes of

external resources (measured as a proportion of GDP) required to reduce poverty by half by the year 2015 in sub-Saharan Africa were 47 per cent during 1999-2000; and are 32 per cent during 2001-2005, and 10 per cent for the period 2006-2010. The magnitudes of external resources are so massive that they are not likely to be attainable, particularly if the bulk of them were expected to come from official development assistance. North Africa only needs 5 per cent of GDP in external resources, which in the light of the present ODA flows averaging about 3 per cent of GDP, leaves a financing gap of about 2 per cent of GDP. The key conclusion is, therefore, that while macroeconomic performance of the recent past has laid the foundation for economic recovery and growth, the job ahead is monumental. Moreover, the macro economic environment is confounded further by globalisation and limited access to markets, debt burden, and poor institutional and communication infrastructure.

15 Until recently, rural areas in Africa, which are the major sources of agricultural crops and products, have been largely neglected. Their tragic situations could be vividly seen from their poor standards of living and deficiency in major rural infrastructures like potable water, electricity and roads. The cumulative effects of their economic predicaments, therefore, has predisposed rural populations to conscious and unconscious actions that have grave implications for natural resource degradation, and declining agricultural productivity.

16 Since rural dwellers largely depend on agriculture as their main source of livelihood, the acuteness of their poverty profile could be traced to the deteriorating natural resource base in their communities. Therefore, there is a need to examine the needs of poor people (the majority of most of Africa's populations) and the role they play in environmental degradation, and low agricultural productivity. There is also a need to seek for strategies to improve the quality of life of every member of the population.

2.3 Low Agricultural Production and Food Insecurity

17 The World Food Summit (FAO, 1996) defines food insecurity as a state of food scarcity that leads to lack of physical and economic access to safe, sufficient and nutritious food to meet the dietary needs and food taste preference for an active and healthy life. Food insecurity and poverty are two sides of the same coin and they are the most severe twin evils befalling African nations today.

18 Although statistical evidence abounds to indicate likely food production increases in many African nations in recent times, millions of people are still affected by hunger and malnutrition. This threat of acute starvation continues to loom over Africa, where some 138 million people (33% of the population) that are largely women and children, were found to suffer from persistent food scarcity in 1994 (IFPRI, 1995; USAID,

1994). In 1999, FAO (1999) estimated that the proportion of food insecure people on the continent had increased to 40 per cent.

19 Between 1986 and 1997, while Africa's population grew by more than 35 per cent, food production per capita declined by about 8 per cent, and agricultural land per capita decreased by about 25 per cent. (ECA, 1999). Communication and distribution infrastructures are very inadequate constituting a major constraint to the efficient exchange of information, labor, goods, services, and capital. Farmers lose between 15 and 25 percent of their crops in the fields and another 15 - 20 percent after harvest due to lack of proper storage and processing and distribution facilities.

20 Table 1 lists negative consequences of rapid population growth on subsistence farming. Most subsistence farmers have a high degree of "risk aversion" that discourages them from investing in agricultural inputs and innovation to improve the traditional farming system. Government policies and institutional factors such as fiscal policy, access to land and other productive resources, availability of markets, provision of infrastructure, and local participation influence the outlook and the actions of farming households in adopting agricultural innovations and managing natural resources.

21 While land in many African societies is one of the crucial factors of production to earn a livelihood, access to it by the rural poor, especially women, is limited. This problem is compounded by high population growth, which leads to environmental degradation and agricultural productivity decline especially where available land is limited. Another characteristic of such situations is that land becomes fragmented resulting in reduced arable land per capita.

22 Commercial farming has also marginalized and displaced some local farmers who are migrating to urban areas or working as laborers on those commercial farms. This creates labor shortages and puts a heavy burden on women's time, thereby lowering the productivity of the small holder sector and possibly increasing the demand for child labor and, thus, the demand for large families.

23 Customary land tenure is the dominant and widely used system in Africa. Despite variations and complexities depending on factors such as population density, social organization, agro-economic conditions and inheritance practices, a common feature of customary land tenure is communal ownership of land and the absence of formal land titling. Yet, security of tenure encourages good management of the natural resource base and investment in agriculture. Customary land tenure has not been able to adjust to population pressures lately and this has resulted in the breakdown of the system leaving a significant proportion of the population, notably the poor who are largely women, landless.

Table 1:
Traditional Farming Systems and Nexus Linkages

Issue	Impact on			
	Defining Characteristics	Agriculture	Natural Resources	Population
Smallholder traditional farming systems in regions with high risk of food insecurity (the Sahel Regions of Eastern and Southern Africa)	Limited arable land; Limited use of improved inputs and technology; Low investment; Poor land quality; Occurrence of labour shortage; Limited use of irrigation; Mixed farming; High population concentrations in the vicinity of water sources; Poor infrastructure; and Low availability of fuel wood.	Intensive exploitation of cropland, rangeland, and forest areas in the vicinity of water sources; Reduction in fallow period; Decline in agricultural yield and food security; and Agricultural extension into marginal areas, especially rangelands.	Decline in soil fertility and land productivity; Deforestation; Reduced water availability Increased extinction of wildlife in progress.	Heavy demand on women's time due to their multiple roles in food production and processing; High fuel wood and water collection labour; High infant and child mortality rates; Acceleration of rural-urban migration; High maternal mortality rates; and Increased poverty.
Smallholder farming close to high potential areas cultivated by commercial farmers (parts of Southern Africa)	Expansion of commercial agricultural and elite groups into communal lands; Good infrastructure; Land grabbing; Smallholders being pushed to less productive areas; Emergence of near landless condition.	Low yields and food insecurity among smallholders	Over-exploitation of land and forest resources for immediate benefits; and Expansion into marginal lands.	Migration into urban areas; More female-headed households; and Demand for large families.

**Table 1:
Traditional Farming Systems and Nexus Linkages (cont'd.)**

Issue	Impact on			
	Defining Characteristics	Agriculture	Natural Resources	Population
Smallholder farming in settlement areas with high risk of food insecurity	<p>Customary land tenure; Ownership of land guaranteed to everyone in community through lineage and inheritance; Clearing and cultivating as means of establishing land ownership; Increasing tenure insecurity due to weakening of customary rights and demand on land; Land scarcity; High population density; and Change in social values and customs on land rights.</p>	<p>Increased risk to invest in inputs and land due to reduced security of tenure; and Low agricultural productivity.</p>	<p>Common property resource increasingly being converted to farming, grazing and meeting energy needs resulting in soil degradation and reduction in vegetation cover; Expansion into marginal lands; and Limited conservation practices due to breakdown of traditional land rights.</p>	<p>Greater need for family labour to expand and gain ownership on land; Increased migration; High fertility rates; and High preference for large families to mobilize labour and expand land holding.</p>

24 In many traditional land tenure systems, clearing new land is a basis for establishing rights to ownership which provides a strong incentive for clearance of virgin forest and pasture land as a means of expanding land ownership. This generates adverse linkages because land is cleared in an environmentally damaging way, exposing such land to various forms of degradation such as erosion and compaction, and leading to decline in crop yield. Moreover, since family labor significantly contributes to the amount of land that can be cleared (thereby expanding land ownership), this, in some cases, creates the demand for large families and contributes to high fertility rates.

2.4 Environmental Degradation

25 The natural resource requirements to meeting the food needs of increasing populations vary considerably among the major agro-ecological zones in Africa such as the Sahelian zones, Eastern African highlands and Central African rain forest. Despite these regional variations, however, it can be succinctly said that Africa is greatly endowed with suitable land for agricultural production, large rivers and lakes, fisheries, wildlife and agricultural bio-diversity. In fact, as observed by Veit *et al.* (1997), economic growth in Africa can be sustained partly because of the natural resource endowments of the continent, many of which are currently under-utilised. Precisely, Africa has 23% of the world's land; although less than 25% of the cultivated land is irrigated. Merely 1% of Africa's approximately 4,500 cubic kilometres of annual internal renewable water resources is currently being put to use, and only a tiny fraction of Africa's range-land is being managed as improved pasture (Veit *et al.* 1997). Africa's forests are almost a third of world's tropical forest cover, and could significantly yield more timber and other products (World Resource Institute, 1994). These resources are loaded with potentials for achieving the long aspired food security status in Africa. In the rural and urban settings, they support the production of food and cash crops such as coffee, tea, cocoa, peanuts, pineapples, and mangoes savoured around the world.

26 Furthermore, Africa's ecosystems and their bio-diversity are very crucial in production of goods and services for the world at large. A recent list of world's centres of bio-diversity compiled by Myers (1993) identified 18 "hot spots" based on high plant endemism and threats from human activity; four of these are in Africa. In fact, the Cape Region of South Africa has one of the largest numbers of endemic plant species of any region of the world and one of the world's richest areas in plant bio-diversity (32 plant species are in Africa).

27 The continent's ecosystems are moreover not only used to provide intra-and inter-continental transport, but also to support vast stocks of fish eaten locally and, increasingly, around the world. Many Africans directly or indirectly depend on these sources for protein and general livelihood. Indeed, three of the nine major oceans of the world are off the coast of Sub-Saharan Africa - Ghana to Nigeria, South Africa,

and Somalia. A fourth occurs off the coast of Western Sahara and Morocco (World Resource Institute, 1994).

28 Many countries in Africa share major rivers, which will need better co-ordination between upstream and downstream users for efficient management. A key to the successful implementation of programs in addressing water and land resource wastage and degradation lies in the motivation and the participation of local land users in the management of these resources and in the fair sharing of benefits. This requires strong local and grassroots institutions, which are lacking in many rural areas of Africa. Since land degradation and water resources management are largely influenced by local ecological and socio-economic forces, it is essential for local people to take concerted action and be involved in the planning and implementation of the management of both land and water resources upon which their livelihood depends. Adverse effects of lack of grassroots institutions for land and water management are listed in Table 2.

29 Most countries in African share one or more International River basin(s). The ten major river basins are presented in Table 3 below. Rapidly expanding populations of both upstream and downstream users and the urgent need to increase food production are expected to generate intense competition for water resources among riparian countries. The potential for conflict has increased in recent years due to inequitable sharing of water among riparian countries, and is likely to intensify in the future. Fresh water will soon be as strategic a resource as petroleum oil and a potential cause for national conflicts.

30 It is quite evident, therefore, that despite these abundant resources, Africa is faced by many socio-economic challenges. One of these challenges is environmental degradation. This problem singly poses great concern to the continent and a great cost to the Africa economy.

31 For example, land degradation is the most crucial environmental challenge facing Nigeria in terms of the large number of people and land area it affects. Land degradation affected an estimated 50 million people in 1990, at an annual cost of US\$3 billion, including costs of food importation. Similar predicament faces the Greater Horn of Africa (GHA) as well as other regions of Sub-Saharan Africa. The impact of soil erosion on farm-level productivity is often severe, with crop yield losses averaging between 2 and 4% across Africa.

32 Enormous pressure is exerted on agricultural land from soil degradation, inappropriate farming and grazing practices, deforestation, population growth, and other institutional and policy failures. About 65% of the cropland and over 30% of the pastureland in Sub-Saharan Africa are affected by degradation as manifested in declining agricultural yields and chronic food insecurity.

Table 2:
Lack of Grassroots Institutions for Land and Water Management in Nexus Linkages

Issue	Impact on			
	Characteristics	Grassroots Institutions	Natural Resources	Population
<p>Classic conservation approach with emphasis on technical solution and expert opinion</p> <ul style="list-style-type: none"> · Top-down policy and management approach; · Weak or non-existent local institutions; and · Conservation /rehabilitation programmes imposed by government and outside agencies. 	<ul style="list-style-type: none"> · Lack of local institutions representing local land users' interests; · Existing local institutions often formed by government and used to enforce government conservation policy; · Little or minimal participation of local land users; · Lack of methods to take account of indigenous knowledge and practices. 	<ul style="list-style-type: none"> · Extension services do not reach farmers and production teams effectively at village level; · One-sided promotion of technological packages with little understanding of indigenous knowledge and practices; and · Limited adoption of improved technologies resulting in low yield and stagnation. 	<ul style="list-style-type: none"> · Little participation by land users in the management of their community resources; · Non-compliance with regulations restricting livestock size and grazing, and use of forest resources; and · Limited adoption of labour intensive conservation and other practices promoting productivity. 	<ul style="list-style-type: none"> · Limited involvement of women in local institutions and decision making; · Limited access of women to extension and other resources to improve productivity; and · High fertility rates.

Table 3:
The Largest River Basins in Sub-Saharan Africa

River Basin	No. of Countries	Basin Countries	Basin area '000 Km ²
Congo	9	Dem. Rep. of Congo, Central African Republic, Angola, Congo, Zambia, Tanzania, Cameroon, Burundi, Rwanda	3,720
Nile	10	Ethiopia, Sudan, Egypt, Uganda, Tanzania, Kenya, Zaire, Rwanda, Burundi	3,031
Niger	9	Mali, Nigeria, Niger, Guinea, Cameroon, Burkina Faso, Benin, Cote d'Ivoire, Chad	2,200
Zambezi	8	Zambia, Angola, Zimbabwe, Mozambique, Malawi, Botswana, Tanzania, Namibia	1,420
Orange	4	South Africa, Namibia, Botswana, Lesotho	950
Okavango	4	Botswana, Angola, Namibia, Zimbabwe	529
Limpopo	4	South Africa, Botswana, Mozambique, Zimbabwe	385
Volta	6	Burkina Faso, Ghana, Togo, Cote d'Ivoire, Benin, Mali	379
Senegal	4	Mali, Mauritania, Senegal, Guinea	353

33 In addition, due to the lack of other sources of household energy, rural people increasingly rely on fuelwood as the main source of energy. Fuelwood accounts for over 90 percent of primary energy needs in rural areas. Unfortunately, indiscriminate harvesting of fuelwood and forest products results in deforestation and loss of plant and animal biodiversity. Moreover, as already indicated, very little of the great potential of the continent in water resources has been harvested as water for drinking, irrigation and hydropower.

34 Water is generally perceived as a free good and there is a tendency to waste it. Socio-economic forces and government policies influence this tendency to misuse water. In addition, market and institutional failures as well as limited human and technical capacity for effective management compound the problem.

35 In addition, land degradation contributes to low efficiency in using rainwater as it reduces water retention capacities of soils. This results in increased floods (as there is little resistance to slow the runoff resulting from the intensity of heavy rains) and vulnerability to droughts. Vegetative cover is fundamental in harnessing water from the rains, as it determines the rate of infiltration, surface runoff, and the amount transpired to the atmosphere.

36 Fuelwood is a major source of energy for a majority of the African population. The fuelwood problem becomes serious when the demand exceeds the natural regeneration ability. Fuelwood extraction is a major cause of deforestation in the Sahel, semi-arid areas of Eastern and Southern Africa, densely populated areas of East African Highlands and the densely populated Savannah zones of West Africa. The majority of urban people as well as the rural poor use fuelwood and charcoal as energy sources. The destructive method used in extracting fuelwood by most users adversely affects re-growth of indigenous trees and accelerates the rate of soil erosion and landscape degradation. It also adversely affects ground water and hydrological regimes and threatens habitat for wildlife and non-food forest products such as medicinal plants (Table 4).

37 On the whole, trees are seen as a “public good”. In many countries stumpage fees are non-existent or extremely low, and public institutions are weak to enforce existing regulations. As a consequence, there is “free-access” to woodland resulting in depletion of forest resources and breakdown of the regeneration cycle. This problem is particularly acute in areas close to major urban centres where charcoal producers and middlemen selling fuelwood are exploiting these market and institutional failures.

38 In some rural communities vegetative cover, crop residue, roots, and grass that were used as livestock food, are now being used as fuelwood leading to rangeland destruction and lower productivity of livestock. In some areas, particularly in many parts of the East African highlands and Sudano-Sahelian zones, dung (a major source in replenishing the soil organic matter) is being used as a source of energy. Women have to travel longer distances to collect wood and children (particularly girls) have to accompany them in this demanding task. In some communities, in order to conserve fuelwood, women have shifted to a lower nutritional food, which utilises less fuelwood, thus affecting the nutritional, and health status of the family.

2.5 Population Growth and Changing Demographics

39 In the World Population Prospects for 2150, the United Nations (1999) states that according to the medium-fertility scenario, which assumes fertility will stabilize at replacement levels of slightly above two children per woman, the world population will grow from 5.7 billion persons in 1995 to 9.4 billion in 2050, 10.4 billion in 2100, and 10.8 billion by 2150, and will stabilize at slightly under 11 billion persons around 2200. The growth of the major areas of the world is far from homogeneous. For example, the population of Africa will nearly quadruple over the 155 years period (increasing from 0.7 billion persons in 1995 to 2.8 billion in 2150). Within the same period, Europe’s population will decline from 728 million in 1995 to 595 million in 2150. Yet in 1950, the population of Europe was more than twice that of Africa. The pace of change for the other regions falls somewhere between these two extremes.

Table 4:
Fuel Wood Scarcity and Nexus Linkages

Issue	Impact on		
	Defining Characteristics	Agriculture	Natural Resources
<p>Fuel wood scarcity in arid, semiarid highland areas, localized high population density areas, and areas near urban centres.</p>	<ul style="list-style-type: none"> High dependency of urban poor on fuel wood; Fuel wood extraction far exceeds regrowth (a primary source of deforestation); Clearing of forest in environmentally damaging way; Loss of vegetative cover in grazing areas and shortage of livestock feed; and Use of dung and crop residue as energy sources. 	<ul style="list-style-type: none"> Decreased use of dung as fertilizer; Shortage of pasture and rangeland degradation; and Limited processing options for food. 	<p>Natural Resources</p> <ul style="list-style-type: none"> Intense soil erosion and landscape degradation; Adverse effects on ground water and hydrological regimes; Threats to wildlife and biodiversity; Rangeland degradation; and Decreased biodiversity leading to loss of medicinal plants and herbs. <p>Population</p> <ul style="list-style-type: none"> Increased women's time/energy spent in fuel wood collection; Adverse effects on the health of women; Fewer meals being cooked to save fuel; Increased malnutrition and infant mortality rates; and Increased demand for large families.

40 Thus, Africa which has the most serious socio-economic problems in the world, is also the continent with the most challenging population problems. As UNFPA (1999) puts it, population is growing fastest in the poorest countries, those least able to provide for basic needs and create opportunities. Within countries, the poorest families also tend to be the largest ones. The people and countries most affected are concentrated in Africa and South Asia. Apart from rapid population changes, Africa is also faced with rising mortality rates in countries affected by HIV/AIDS, internal instability, natural disasters and social disruption. Many of the HIV/AIDS worst-affected countries are among the poorest in the world and will depend heavily on outside help to combat the disease. The same countries are affected by political instability and refugee movements that cause grave social and economic disruptions. In many of these countries, urban-to-urban migration and rural-to-rural migration have become as significant as rural-to-urban migration. These flows respond and further contribute to stress on the environment and on service delivery systems.

41 Maintaining high fertility levels is a rational response of people, particularly in rural areas, who seek to ensure the survival of a sufficient number of children to provide adequate labor and old age support. Indeed, as forest resources and soil fertility have declined and agricultural productivity per unit has stagnated, family labor appears as the only sure resource available to rural families for expansion of cultivated land and agricultural production. Therefore, harmonizing population growth with the capacity of the land area to produce sustainable amounts of food poses serious challenges. Under prevailing low-input levels of production, many African countries already find it difficult to feed their populations. The food situation will worsen markedly in another 20 to 23 years when the population of many African countries is expected to double with the effects of HIV/AIDS resulting into increased morbidity and mortality rates especially among the working age group. This environment will put more demand on African countries to put greater effort in managing their populations for sustainable development.

42 To date, however, the supply-side effort to reduce population growth rates through family planning and contraceptive use has not yet achieved the desired result in Africa. This is largely due to socio-economic and cultural factors encouraging large family size. Children are a major source of labor for all kinds of domestic and farming activities (such as water and fuelwood fetching, cropping and livestock tending). In addition, the high levels of food insecurity and infant mortality also increase the need for large families, such that the Total Fertility Rates are highest in Sub-Saharan African countries which have poor agricultural performance, high levels of natural resources degradation, high infant mortality rates, low levels of female education, and widespread poverty.

2.6 Unequal Opportunities for Women

43 African women have remained marginalized at both policy and decision making levels. There has also been little appreciation of their several contributions to the continent's development over the years. African women are key actors in the management and the use of soil, crops, water, forests, and indigenous plants and wildlife on which many local communities depend. Many recent studies have concluded that women's vital roles, both as crop producers and as environmental and resource managers, are often unrecognized, despite the vitality of these functions to the survival and well being of rural people. For example, it was observed that although women play major roles in farm-level managerial decision-making, they nevertheless continue to have limited access to extension services, capital markets, and new technologies (Birkhaeuser et al, 1991; Bindlish and Everson, 1993; Quisumbing, 1994).

44 Seven key constraints to women's efficient role as resource managers are as follows: (i) heavy labor burdens; (ii) economic constraints; (iii) land tenure bias and legal injustices; (iv) lack of institutional support; (v) technological inadequacy; (vi) policy and power inequalities; and (vii) natural resource degradation.

45 Saito *et al.* (1994), in her study on *Raising the Productivity of Women in Sub-Saharan Africa* observed that women were working for considerably longer hours than men both in agricultural production and other tasks. It was also noted that the range of tasks on and off the farm that sub-Saharan African women farmers (especially those who are heads of households) were required to perform was very broad, and calls for a diligent application of time, energy, great endurance and human resourcefulness. In the four countries studied (Burkina Faso, Kenya, Nigeria and Zambia) analysis showed that women were working 50 percent more hours per day than men.

46 In addition, throughout sub-Saharan Africa, women are solely responsible for fetching water for the use of the households. In Kenya, for instance, the time needed to fetch water by women was an average of four hours in 1988 (GOK, 1988). The pressure on women becomes significantly unbearable and greatly excessive if we take into account the traditional setting and cultural inclinations of some societies in Africa. These include regarding men's participation in some activities as taboos, regarding the kitchen as a woman's main office, and discriminating against the girls in some cogent matters like education.

47 The traditional role of women as child bearers coupled with gender specific constraints in agricultural production and post-harvest activities, employment in non-farm sector and fuelwood and water collection, increase the pressure on their time thus encouraging high fertility rates since children are women's helpers. In fact, women have primary responsibility in food production, spending over 70% of their time on this

activity alone. In addition, they perform several other gender-specific tasks, which negatively affect their productivity. Hence, enhancing the status of women is important for effectively addressing the nexus issues (rapid population growth, progressive environmental degradation, and stagnating agricultural production).

48 Reducing the proportion of women's time spent on fuel-wood and water collection are vital components that would contribute to the transition to increased agricultural productivity and efficient management of natural resources, and towards the enhancement of women's status. Fetching water and fuel-wood collection are highly demanding tasks which consume a great deal of women's time, reduce the time they have left to spend in farming, income generating activities, and family care, while also exposing them and their families to health risks. These tasks increase the demand for child labor and adversely affect child welfare, leading to child morbidity and mortality which contribute to the desire to have large families as reflected in prevailing very high fertility rates of many African women.

2.7 Addressing the Linkages

49 Population is both the producer and consumer of social and economic goods and services. Poor economic growth which does not match the pace of increase in population numbers puts more pressure on the limited capacity by Governments to provide for basic socio-economic needs. Consequently, the population is forced to increase its utilisation of land. This is due to the fact that land use is the basic accessible route to food security. Yet, if good land, marginal lands as well as forest and water resources are used unsustainably, the consequence is poor productivity, food insecurity and deepening poverty. Consequently, with lack of an environment to innovate and improve their socio-economic well being, poor people are forced to put more pressure on the environment to satisfy at least their basic food needs. Therefore, identifying and dealing with the major challenges for addressing the linkages of population, environment and agriculture (the nexus issues) in Africa, is a daunting task that requires simultaneous action on several fronts. The major issues of concern are to be addressed together in order to totally weaken the reinforced synergy that leads to food insecurity, and widespread poverty in Africa. This requires a concerted and integrated response from all partners in Africa's development. In doing so, lessons can be learned from other developing regions. For example, UNESCO (1996) provides a rich bibliography and abstracts of publications on the linkages between environmental degradation, population growth and sustainable development in the Asia and Pacific region. The studies provide an overview of how problems of population, environment and sustainable development are inseparably linked and interrelated to problems of poverty, income disparities, and wasteful consumption.

SECTION THREE

The Proposed Response

3.1 The Need for a Strategic Agenda

50 To adequately address the negative effects of the linkages between population, environment and agriculture in Africa, policies and strategies in the following areas are needed: 1) Appropriate macroeconomic and sector policies that also cover the environment; 2) Sound resource management policies and strategies; 3) Broadening partnerships on nexus issues; and 4) Empowerment and information dissemination.

51 To adopt appropriate strategies for this purpose will require the development of an overarching strategic agenda with ECA taking the lead according to its comparative advantage in the region. More specifically, in the areas of population, environment and agriculture, there will be a need to develop an agenda with a focus on assisting member States to slow down population change, protect the environment, increase agricultural productivity, and ease women's time constraints and build their capacity to utilize appropriate technology. Therefore, before examining ECA's role in the next chapter, let us discuss the suggested response.

3.2 Macroeconomic and Sector Policies

52 The 1999 Conference of Ministers of Finance noted that in order to move forward, a comprehensive framework for concerted action and strategic interventions is needed on the part of African governments, civil society, foreign bilateral donors, multilateral institutions and private sector actors. The aim should be to implement a mix of macroeconomic and structural policies and programs for enhancing investment, growth, poverty reduction and social development. The focus should be on the simultaneous need to increase the impact of ODA, attract more private capital, stem capital flight, raise the domestic savings effort, and to release resources from debt service for application to development and social programs.

53 In order to meet the food demand of Africa and satisfy the minimum requirements of calories and protein consumption expected of a nutritionally balanced economy as already recommended by the Food Agriculture Organization (FAO), African agriculture must be significantly transformed into the dimension of full efficiency for in-

creased productivity. The path of this production intensification must, however, be sought with a strict concern for natural resource conservation so as to avoid sacrificing the benefits of tomorrow for the needs of today. Major policy interventions that would address the constraints and bring a positive synergy to enhance both crop and livestock productivity of the traditional farming system must be found.

54 Hence, as put by IFPRI (1999), a necessary though not sufficient step in combating soil degradation is to implement policies that support broad-based agricultural development and enhance farmers' incentives and capacity for land improvement policies. In some areas, a policy environment that promotes information dissemination about already existing good land husbandry practices and supports research on technologies to reduce conservation costs may be sufficient for addressing degradation concerns. But policies and investments targeted to specific development pathways, farming systems, soil types and degrees of degradation are also necessary.

55 It is further emphasized that national governments and donors should address the threat of nutrient depletion and land degradation through policies and programs that promote increased productivity of land resources and conservation of the resource base. Significant policy changes will be required to establish an environment that makes agricultural inputs easily available, that encourages farmers to use these inputs more efficiently, and that helps improve local extension services and farmer support. Structural adjustments, market development, trade and price policies, credit systems, infrastructure improvement, and institutional support services should be reevaluated and assessed for their impact on the resource base and the sustainable expansion of agricultural production and productivity.

56 It is also noted that, countries need to integrate natural resource management with economic and sector policies. More economic and environmental impact analyses at the country level are needed to help set priorities for agricultural land issues, to assess the costs and benefits of policy decisions, and expedite identification of the type of investments that will be required to prevent land degradation and increase production. Prevention of nutrient mining through sound economic policies, research, information dissemination, and human resource development should be actively developed.

57 It has been universally observed that the rapid growth of population and the extension of agricultural activity on marginal lands to support this growth have profound consequences for environmental degradation. The resulting loss of bio-diversity is considerable. The challenge is to prevent, halt, and reverse environmental degradation. There is, therefore, the need for governments of member States to provide a framework for evaluating the depletion of national natural resources through soil erosion, deforestation, range land degradation and bio-diversity loss so as to underscore the importance of better management of the environment. Environmental accounting

will awaken decision makers to the importance of rationally weighing alternative options and making sound decisions when allocating resources among competing needs.

58 The farmers (who are the sole managers of the natural resource endowments of a nation) must be adequately educated on the need to conserve natural resources. This could be done by adopting environment-conserving cultural practices and government actions aimed at passing some judiciary and legislative laws in strategic areas of natural resource degradation. Such areas as illegal forest and wildlife harvesting, government's land encroachments, water and environmental pollution, and land tenure must be adequately looked into. It is, therefore, expected that environmental protection in African nations will take on a holistic approach of welfare provision, legislative and judicial acts, technological innovations, and appropriate institutional settings.

3.3 Sound Resource Management Policies

59 Advocating and implementing policies that could contribute to strengthening grassroots institutions and local participation for efficient land and water management is central to halting the downward spiral into poverty. There is a need for instituting incentives and regulation mechanisms to influence and create awareness about conserving land and water resources. Institutional reform that could provide incentives for efficient land and water use and bring the gradual devolution of authority to the local and village levels (such as water users' associations) is crucial. Providing public and external assistance to local initiatives through matching funds, training community leaders, para-professionals and participatory groups will also contribute to strengthening grassroots institutions for efficient land and water management. This can also control land degradation, increase water availability for agriculture and other purposes and, thus, reduce demand for large families.

60 Policies and actions that address the security of land tenure will vary among countries. However, they should have common elements such as respect for customary rights when introducing reform, provision of land titles on demand, and ensuring that they are acquired fairly instead of large-scale titling. Policies to reform customary land tenure should also include ensuring rights of land ownership to women, and controlling open-access conditions which have resulted in over-exploitation of pasture and forest land.

61 Increasing wood supply through tree planting, particularly agro-forestry at village and farm level, and providing markets for wood products is central in addressing the fuelwood crisis. Agro-forestry complements the crop and livestock system and can help meet fuelwood needs while, at the same time, it increases livestock feed, and enhances soil organic matter. However, tree planting is not only a technical, but also a political problem. Absence of clear guidelines for tree ownership creates ambiguity

about the benefits and is a potential impediment to increasing wood supply at village level. Hence, the agro-forestry policy should include appropriate incentive mechanisms for rural households with regard to the utilisation of trees planted by individuals and groups. In addition, efforts should be made to involve women in afforestation activities and ensure that they receive fair benefits. This would increase wood supply as well as women's time to be involved in other food production and income generating activities, which would enhance food security. It would also improve the status of women, which is a crucial linkage in facilitating the demographic transition.

62 Many African countries have come to the realization that population policies must be integrated into long term planning for sustainable development. In turn, population policies and programs should be sensitive to specific local concerns and prevailing social, cultural and political circumstances in order to be effective in attaining set objectives.

63 Distinguishing between family planning programs and population policies compels and conventionally dictates the adequacy of the policy frameworks. Abalu (1998) submitted that population policies must include a range of other policy goals that invariably network with family planning in promoting population management and enhancing sustainable utilization of natural and agricultural resources. Economic hardship is not a good teacher in the field of population management. It only makes people see the need to adjust to situations. The people must be well informed about the effects of their present actions on the welfare of future generations and the world at large. This must be done without outright disregard of their cultural beliefs on large family size as a measurement of wealth and societal dignity.

64 UNFPA (1999) states that despite the demographic uncertainty, faltering development in many countries and the decline in international resources for development, the climate for choice is better in two crucial ways than it was in the past: 1) Countries have reached a broad global consensus on population and development, and agreed on an agenda (ICPD-PA) for implementing it (the agenda is based on the understanding that each sovereign country will implement the agenda according to its own priorities and perceptions; that reaching slower and more-balanced population growth depends on the free and informed choices of individual men and women; and that women and men must be empowered to make those choices); and 2) There is growing practical evidence that this agenda meets the needs of people and nations and that despite all obstacles, it is being put into practice.

65 It can be conspicuously realized that there is an urgent need to relieve women of their great burden. This demands addressing the economic and socio-cultural constraints they are facing. There is also the need to provide better and more widespread education, development and popularization of effective and appropriate technologies such as fuel-efficient and timesaving stoves, and provision of gender-relevant farming and crop processing techniques and tools. In addition, there is a need for institutional

reforms, which build female capacity through better access to credit and improved rural transportation networks to remove the drudgery of long distance treks to markets, and to fetch water and fuelwood. As Amoako (2000:65) states, supporting a stronger role for African women will boost the economy, reduce fertility, improve child survival and stem rapid population growth. Amoako states further that data show that returns to investment in women's education and health are significantly greater than those for similar investments in these services for men. It is emphasized that this is largely because of the strong interaction among factors such as women's schooling, health, nutritional status and fertility, on the one hand, and the synergistic effects of this combination of factors on Africa's future education, health and productivity, on the other. These are all proven ways to help achieve and maintain family stability and national development.

66 It is expected that governments, at all levels, should also place great emphasis on direct support (in the form of technical assistance, training, and financial flows) to rural communities for natural resource conservation. These should include practical training and environmental education on the link between resource management and farm productivity, as well as on the range of ecological benefits of environmental management. Basic social amenities like potable water, electricity and good roads must be brought to the reach of the rural farmers. This will reduce their natural tendency to resource over-exploitation, and enhance their productivity.

67 Generating alternative livelihood systems through non-farm employment will enhance access to food, reduce poverty and, eventually, the demand for large families. It will also result in better management of the environment. Expanding opportunities in the non-farm sector will have an important role in absorbing excess labor, reducing migration as well as diversifying income sources. This approach and linkage area is crucial given the fact that the population structure of many African countries consists largely of youth that cannot all be absorbed in the agricultural sector.

68 At the core of the alternative livelihood production system is the promotion of small-scale and labor-intensive enterprises that use local resources and skills as much as possible. Small-scale enterprises usually have low capital base and are, therefore, readily accessible to the poorer segment of the society including women. They also generate forward and backward production and consumption linkages to the farm and non-farm sectors, and foster participatory development. Small-scale enterprises include handicrafts, blacksmithing, grain mills, food processing, leather works, carpentry and masonry.

69 In expanding an alternative livelihood production system, the first step involves developing or improving the marketing of primary products for which a particular geographic area has a comparative advantage. This includes activities such as bee keeping, poultry raising, vegetable gardening, aquaculture, and wildlife tourism, which are part of the existing rural production system. The second step involves small-scale

processing enterprises using primary products, and cottage industries. The key policy thrust here is the promotion of local processing ventures, such as grain milling, oilseed pressing, and leather tanning which will increase household income and, therefore, access to food, while enhancing the value-added benefits to the local community and improving women's status. This may reduce the demand for large families and ultimately reduce poverty.

70 Some of the policies for successful implementation of an alternative livelihood strategy, based on small-scale enterprises depend upon how they are suited to the local ecological conditions, productive potential (availability of land, labor and capital), social factors (ensuring the participation of women, landless and disadvantaged groups), and access to markets and infrastructure. In addition, efforts have to be made to promote organizational and investment support for credit and saving schemes, to strive to be labor-intensive (creating jobs at less cost), to use and disseminate clean technologies that use local inputs and skills, and to promote participation of women and the poor.

3.4 Broadening Partnerships on Nexus Issues

71 International Partners should provide advocacy addressed to African political and community leaders on issues of sustainable development. Most of the African policy makers are aware of the whole context of inter-linkages among population growth, agriculture and environment that result in poverty, environment degradation and food insecurity. They know also that if each sector may contribute to breaking up the vicious cycle of inter-linkages, a comprehensive strategy viewing all these aspects together is likely to be more successful. Nevertheless, achieving simultaneously agriculture growth, poverty alleviation, environment sustainability and demographic transition, cannot be taken for granted in the current short-term political strategies. Moreover, current evidence indicates that policies and plans have not been implemented vigorously enough to seriously tackle the fundamental issues. Therefore, International Partners still have to advocate for sustainable development stressing how the political will is fundamental in order to make successful choices for medium and long-term sustainable development.

72 International Partners should also stress the importance of education on sustainable development targeting adults and school children. Programs for adult education should focus on agriculture and environment practices and on their impacts on short, medium and long-term sustainable development and survival strategies. Concepts and practices affecting sustainable development should also be integrated in school curricula. The fact that until now sustainable development in African countries has not been implemented should be stressed. As current generations have plundered on the

heritage of future generations to pay for current unsustainable practices, we should at least provide future generations with awareness and knowledge of why and how to ensure sustainable development for them and for their children.

73 International Partners should provide technical assistance to African governments in the formulation of strategic plans ensuring sustainable development and in monitoring the implementation of policies. On the basis of what has been learned from past experiences, the focus should be on development issues addressing the need for medium and long-term strategies. In doing so it should be ensured that poverty alleviation policies are always formulated and implemented in a framework of rural sustainable development. Plans should be integrated and aimed at increasing agricultural productivity, slowing down population growth, protecting the environment, and easing women's time constraints and increasing their capacity building.

74 International Partners should provide technical assistance on the formulation and implementation of clear strategic plans for sustainable rural development with indicators for performance (environmental costs and benefits should be integrated into national economic policies). International Partners should also play an advocacy role in resource mobilization and allocation for sustainable development policies because the formulation and implementation of strategic plans requires financial resources.

75 The first source for resource commitment must be domestic. International Partners should stress in all political and technical fora that in the framework of multi-sectoral strategies, sustainable development programs should be prominently reflected in every ministerial budget. Nevertheless, foreign donors and international financial institutions must greatly increase their financial commitments to sustainable development programs. Moreover, International Partners and African governments should work together to seek a common position on the issue of loans versus grants for programs targeting the world-wide important issue of sustainable development. International Partners should also support African countries in exploring other sources of financing such as private sector corporations, foundations, individual philanthropist, African Diaspora associations, and innovative ways of generating revenue.

76 Countries that are seen by partners to be addressing their sustainable development problems seriously as outlined above must be encouraged by writing out their debt obligations. Such a proposal should be based on a case by case situation.

3.5 Empowerment and Information Dissemination

77 IUCN (1987) recommended that national population policies should take into account both rural and urban dynamic structural compositions. They must, therefore,

promote balanced development that aims at enhancing the qualitative initiatives of local governments and the potential offered by technological advancements. It was further submitted that efforts should be made by governments and voluntary organizations to increase awareness of the interactions between population, national resources and development. Such awareness should provide adequate information on availability of family planning services, maternal and child health care services, along with other important aspects of national population programs. Realizing that the bulk of African population growth comes from rural areas, it was recommended that efforts should be made to enlighten the rural dwellers, especially the women, on this crucial issue. This education should focus on the disadvantages of overpopulation, and inform them about choices that are open to them during the crucial decision making process on family size. In addition, with regard to the major challenge presented by HIV/AIDS, we must devise ways to provide more information on the pandemic and to encourage countries to deal with the likely future demographic realities of relatively slower population growth (due to HIV/AIDS) and the related severe distortions of age distribution and dependency ratios while at the same time defending the continuing importance of family planning for maternal and child health, basic human rights, sexual and reproductive health, empowering women, and creating a balance between family and resources.

78 Technological innovations that are environmentally conducive are needed for sound transformation of the African economy. Identification of best technological practices, disseminating appropriate technologies and promoting the utilization of these technologies will facilitate growth in food and agricultural output, water harnessing, and protection of natural resources. The traditional setting of agriculture that is still prevalent in some African societies must be transformed to eliminate its crude farming tools and the low efficiency (output) of its production systems.

79 The primary responsibility of implementing at country level the recommendations listed above rests with member States themselves. However, in implementing their socio-economic objectives and strategies, Governments need to know whether they are making progress and whether these strategies are having the desired effect on improving the quality of life of the people. Therefore, a proper monitoring and evaluation mechanism, including a data information system, should be established so as to better monitor the flows in programme inputs/outputs, ensure improved coverage and quality for nexus-related data, better identify constraints and improve the revision of the socio-economic objectives and strategies.

80 In this regard, there is need for setting up monitoring mechanisms at the national, sub-regional, and regional levels. The monitoring should be participatory and all players (Government, national stakeholders and donors) should be able to assess the effects of their actions. Hence, there is a need to forge a consensus on the methodology and indicators to be used in the monitoring efforts. For example, program managers should introduce transparent and objective built-in monitoring and evaluation methodology at the program design stage as part of the management of the country's socio-

economic development process. A built-in strategy for impact and progress evaluation facilitates the assessment of the socio-economic objectives and strategies.

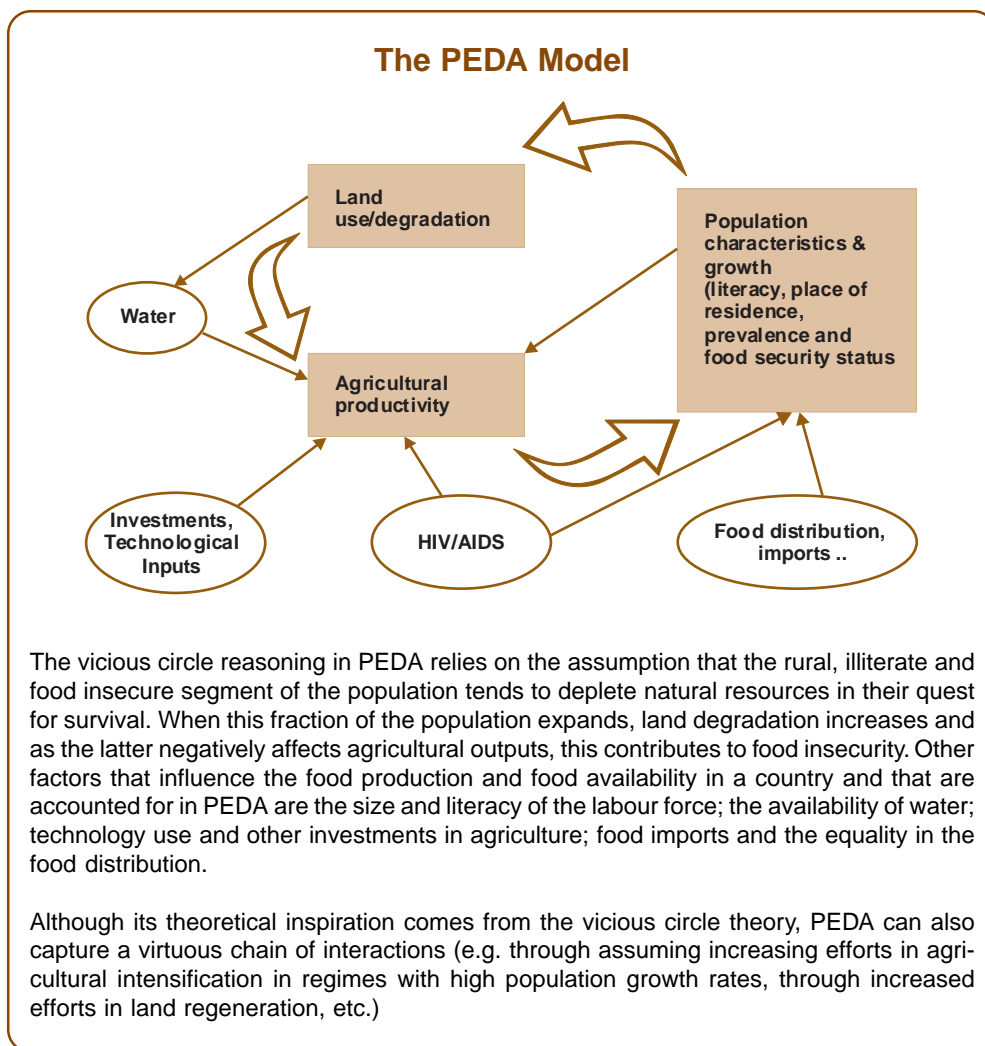
81 Governments and their partners are invited to provide program managers with the technical and financial means and opportunity for effective monitoring and evaluation of progress in program implementation

82 In view of the common monitoring and evaluation process, there is a need to forge a consensus on the methodology and indicators to be used. For example, in order to improve quality, coverage and time frame for data on nexus issues and to improve the monitoring of the flows in program inputs and outputs, member States may:

- Set up and develop a national data base system so as to provide base line data and information that can be used for assessing periodically the progress made in each sector;
- Prepare and publish national reports on assessments made, outlining successes achieved as well as problems and obstacles encountered; and
- Establish management information systems and base the selection of program input and output indicators on identified variables which are highly responsive to change or to control by policy-makers.

83 More specific indicators which may be used to monitor and evaluate progress will depend on proposed objectives in the population, agriculture and environment sectors. Generally, however, the following indicators may be used:

- *Transparency and accountability* (non-conditionality in donations, use of donations towards the objective, degree of participation of international supervision mechanism, etc.);
- *Policy-related indicators* (degree of cross-sectoral concern during policy formulation and adoption, long-term vision adopted at the time of the formulation of policies, degree of government support and commitment for project activities, institutional arrangements such as establishment of an inter-ministerial committee to follow-up the implementation of policies, priority given to human development in any policy related to socio-economic development, etc.);
- *Management-related indicators* (holistic and integrated approach to the management of nexus issues, priority given to national resources such as human and financial, cost-effectiveness of projects, appropriate use of science and technology as well as traditional practices to attain higher development goals, women's participation and their empowerment in the development process, community-based initiatives, degree of participation of local people in the implementation of projects, use of ICTs and other media to create and improve awareness of the inter-linkages of nexus issues, etc); and
- *Impact-related indicators* (degree of contribution of specific actions to achieving policy goals such as low fertility and food security).



4.2.2. Publications

95 To promote and publicize its work in population and allied areas, the Division will over the next five years and beyond continue to generate a number of publications on: (i) poverty, food security and environmental linkages; (ii) integrated water resources management; (iii) science and technology; (iv) indigenous technologies and sustainable food security; (v) female reproductive health and sustainable development; and (vi) emerging issues such as HIV/AIDS.

4.2.3 FSSDD Web Pages

96 Since 1998, information on FSSDD's activities is featured on the Division's home page within the ECA website. The FSSDD home page is located at <http://www.un.org/>

depts/eca/divis/fssd/index.htm. FSSDD's home page contains background information on the establishment of the Division; its goals and its strategies to address the inter-linked issues of population, agriculture and environment. This is followed by the five thematic areas of focus; namely: (i) transition from high to low population growth rates; (ii) transition from low to high productivity agriculture; (iii) transition from poor to better stewardship of the environment; (iv) the application of science and technology for sustainable development; and (v) indicators and best practices.

97 There is a plan to publish and update, on a regular basis, Africa's population information on the Internet site and facilitate access to population literature and data produced within the region at national, sub regional and regional levels. From these web pages, researchers, policy-makers and other interested stakeholders will be able to get a comprehensive and up-to-date data-base on African population experts; age-sex distribution of the population of ECA member States; and statistics on fertility, mortality, migration, and contraceptive prevalence rates. The web site will have such features as traffic monitoring and links to related sites including the Global POPIN, sub-regional institutions and the national population focal points.

4.2.4 Networking through the ECA Science and Technology Network (ESTNET)

98 ESTNET is a collaborative effort and resource center for information and communication on science and technology policies, issues and management in Africa. Its objective is to provide virtual space where science and technology policy makers and policy making institutions can network, share information dynamically and build important databases on relevant issues on science and technology. The ECA/FSSDD aims at improving the existing website, developing and expanding the data bases further, promoting connectivity, marketing the network, updating and maintaining the site, managing the network, and assisting member States to use and benefit from the network.

99 The ESTNET will contribute to (1) a rationalization of information exchange and communications on science and technology management issues in Africa; (2) a speedy and timely access to critical knowledge not easily available in Africa, (3) a reduction of reproduction and dissemination costs of documents; (4) an increased productivity and efficiency of science and technology policy staff in member States; (5) a convenient source of support to African expatriate scientists wishing to stay in touch and contribute to African development; and (6) an opportunity to participate in and interact with a learning community of science and technology policy makers, analysts and managers in Africa.

4.2.5 Support in Generation and Dissemination of Research Findings

100 The Division shall continue to collaborate with other Divisions, and organizations and institutions outside the ECA to support the generation and dissemination of research on identified critical areas of its work program. For example, the Division is currently embarking on a research agenda that will document and explain the social, cultural and environmental factors affecting women's reproductive health and the ways in which women's reproductive health affects the attainment of household food security needs. Research will examine the pivotal role of women in human reproduction and household food security and focus on the analytical approach of the linkages between women's reproductive health and household food security in Africa. The implementation of the research agenda would facilitate the formulation of relevant policies for women empowerment, food security and family wellbeing. The process involves: (i) Establishment and organization of a panel of experts to review research proposals and research methodologies; (ii) Implementation of research projects including data collection and analysis; and (iii) Publication and dissemination of research findings.

101 Another area of research interest will focus on assessing factors that have facilitated or prevented the demographic transition in Africa. In doing so, there will be a need for dealing with the major challenge presented by HIV/AIDS and related socio-economic development issues. Member States should be assisted to devise ways to encourage countries to deal with the emerging demographic realities of relatively future slower population growth (due to HIV/AIDS) and the related severe distortions of age distribution and dependency ratios while at the same time defending the continuing importance of family planning for maternal and child health, basic human right, sexual and reproductive health, empowering women, and creating a balance between family and resources.

SECTION FIVE

The Strategic Agenda for Action

5.1. The Issues

102 This paper has demonstrated that the issues of population, environment and agriculture are intrinsically linked to one another. As a result, there is a need for multidisciplinary approaches, which take all of these factors into account at all levels. The weaknesses of the traditional sectoral approaches have been clearly demonstrated. The disappointing performance of sub-Saharan Africa over the last 20 years is a result of the synergy between these issues, which has resulted in a negative spiral, reflected in the worsening social and economic conditions. To redress this negative synergy, appropriate policies, plans and programs that consider these factors in an integrated and multidisciplinary manner should be adopted.

5.2. The ECA's Comparative Advantage

103 The ECA has a comparative advantage in the region of Africa. It has the convening power of bringing together Africa's leadership (including policy makers, planners, civil society and the private sector) and all stakeholders in the continent's development and progress to address key emerging issues. It can also directly provide or canvass sister regional institutions (such as ADB and OAU), other UN agencies, bilateral donors, NGOs and the private sector to provide badly needed technical assistance in areas of pressing need for each member State.

104 This paper, therefore, provides one of the Commission's building blocks in the advocacy process to African governments and non-governmental organizations (including the UN) working in population, environment and agriculture. The FSSDD aims at sensitising all the stakeholders on these issues. Under the United Nations Development Assistance Framework (UNDAF) and other frameworks, the UN agencies should work together at country level to promote multisectoral and multidisciplinary approaches. Similarly, the NGOs should depart from producing their excellent work in development in a sectoral form and turn to multisectoral, integrated and collaborative approaches. The government departments should not only learn to collaborate and generate

multisectoral plans and programs, but also to ensure that the implementation of policies, plans and programs draws on the comparative advantage of each sector in a multisectoral environment, clearly showing the linkages of each sector's activities to those of other sectors. In all these efforts, the private sector should be recognised as an important development partner.

5.3. The Way Forward

5.3.1 Future Strategies

105 The ECA is ready to continue to take the lead in advocating for multidisciplinary approaches to policy making, planning and programming. In the medium and long term, the contribution of the Commission and the Division will be realized through strengthening policy analysis and advocacy mechanisms; encouraging the sharing of information (especially on best practices) through information communication technologies (ICTs); supporting the harnessing, sharing and utilization of new information for policy formulation, implementation, monitoring and evaluation; and identifying indicators on sustainable development in relevant areas such as the areas of population, environment and agriculture and using them in the region to monitor and evaluate sustainable development. Table 5 provides a strategic matrix for action on the nexus issues. To achieve its objectives, FSSDD will work closely with other Divisions within the Commission, Sub-Regional Development Centers (SRDCs), regional and sub-regional organizations and institutions as well as other UN agencies and international organizations.

5.3.2. Concluding Remarks

106 It is clear that Africa's future development agenda should be driven by collaboration and multidisciplinary approaches. Much has been learnt from previous successes in Asia and South America from which we can draw some useful practices. But it must be recognised that, despite some similarities, the African scenario is fundamentally different. Therefore, whatever we learn from elsewhere needs to be tailored specifically to Africa (if it has to be replicated) and cannot be applied without significant modifications. Additionally, Africa is not a single uniform entity. Within Africa there is much diversity, in terms of culture, geography, society, family, economy, gender relations, natural resources and others. There is not one formula that can simply be applied in every case. Every community has to make its individual needs heard and this should form part of the development objectives, in accordance with the wider national and regional objectives. Generally, the most successful method for achieving this is through bottom-up, grassroots people-oriented development planning rather than top-down oriented development planning; as well as multisectoral and multidisciplinary planning. Another important factor is that Africa is not static. It is a continent in flux and is undergoing fundamental changes at a rapid speed. Some examples are seen in

**Table 5:
Strategic Matrix for Action on the Nexus Issues**

Key issues

Population:

- Poor health;
- Large families;
- Intensified internal migration;
- Internally displaced people and refugees; and
- New emerging issues such as HIV/AIDS.

Environment:

- Soil degradation;
- Deforestation;
- High pressure on marginal lands; and
- Poor water resource management

Agriculture:

- Persistent food scarcity;
- Declining food production per capita;
- Poor communication and distribution infrastructure;
- Customary land tenure; and
- High demand for family labour

Challenges/Opportunities

- Reducing poverty;
- Empowering every member of the population (especially women);
- Reducing food insecurity;
- Increasing public awareness of major problems such as HIV/AIDS;
- Harmonizing population growth with the capacity to provide social and economic requirements;
- Improving social and economic amenities in rural and urban areas;
- Reducing indiscriminate harvesting of fuel wood and forest products
- Increasing equitable utilization of water resources;
- Improving rural distribution and communication infrastructure;
- Promoting titled land tenure;
- Adopting appropriate technology; and
- Generating and disseminating information widely.

Key measures

- Initiation of multi disciplinary strategies for poverty reduction;
- Promotion of access to equitable distribution of resources regardless of gender;
- Increased advocacy and public awareness on key issues including
- HIV/AIDS;

**Table 5:
Strategic Matrix for Action on the Nexus Issues (cont'd.)**

- Intensification of public awareness campaigns as well as advocacy at policy levels;
- Promotion of appropriate technology for alternative energy sources;
- Motivation and promotion of local land users as management partners;
- Sharing benefits with local communities;
- Equitable sharing of water among riparian countries;
- Intensification of advocacy by international partners addressed to African political and community leaders on issues of sustainable development;
- Intensification of advocacy by the same partners on education and sustainable development;
- Provision of technical assistance by international partners to African governments in the formulation of strategic plans ensuring sustainable development and in monitoring implementation of policies;
- Mobilization of domestic resources as the first source of resource commitment;
- Advocacy and promotion of the advantages of smaller and healthier families; and
- Search for technological innovations that are environmentally friendly.

Policy Response

- A mix of macroeconomic and structural policies and programmes for enhancing investment, growth, poverty reduction and social development;
- Policies for transforming African agriculture into the dimension of full efficiency for increased productivity;
- Policies for land improvement and conservation of the resource base;
- Structural adjustment and market development policies;
- Trade and price policies;
- Credit systems, infrastructure improvement and institutional support services policies;
- Integrated natural resource management, economic and sector policies;
- Policies aimed at strengthening grassroots institutions and local participation;
- Policies that address the security of land tenure;
- Agro-forestry policies that include appropriate incentive mechanisms for rural households;
- Population policies that are integrated into long-term planning for sustainable development;
- Policies aimed at bringing to the reach of rural farmers potable water, electricity, good roads and other basic social amenities; and
- Policies aimed at generating alternative livelihood systems through non-farm employment.

**Table 5:
Strategic Matrix for Action on the Nexus Issues (cont'd.)**

ECA's Role

ECA's specific services and associated modalities for partnership and implementation are:

- Advocacy and policy analysis;
- Convening stakeholders and building consensus;
- Technical cooperation and capacity building; and
- Enhancing the UN's role in Africa.

The Commission's work revolves around the following themes:

- Supporting effective poverty reduction policies;
- Expanding trade and investment opportunities;
- Raising gender awareness;
- Addressing population, environment and agricultural linkages;
- Harnessing information technology for development;
- Promoting regional cooperation and integration;
- Promoting the capable state; and
- Forging partnerships for Africa's development.

For the theme on addressing population, environment and agriculture linkages, the Commission focuses on:

- Planning and implementing activities to raise policy makers' awareness of the urgency of the nexus issues, while offering Members States feasible solutions drawn from best practices within Africa and around the world;
- Encouraging member countries to develop and take full advantage of their activities to foster and utilize science and technology in addressing the nexus issues; and
- Providing analysis support and dissemination services through workshops, training seminars, information exchange, and technical advisory services to enhance the understanding and management of the nexus issues.

the growth of urban populations, the deterioration of the environment and increasing desertification, the deterioration of living standards, the growing dependency on world markets, the increasing numbers of young people and children, and civil strife and conflict. Development policies, plans and programs must, therefore, be flexible enough to react to these changes and respond accordingly.

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