

Vulnerability Profile of West Africa

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Contents

List of Figures	iv
Introduction	1
West African Region	1
Vulnerability, poverty and environment in West Africa	2
Sensitivity to environmental stresses	5
Health	6
Water availability	7
Food security	8
Famine	9
Farming systems	9
Urban livelihoods	12
Sensitivity differences within households and social groups	13
Resilience in adaptation and coping strategies	13
Vulnerability reduction strategies	13
Rural farming systems	15
Land tenure and resource management	15
Migration	16
Emerging issues	16
Population and urban growth	16
Scarcity of water resources	17
Conflicts over natural resources	18
Political conflicts	19
Climate change impacts	19
Conclusions	20
References	22
Appendix A Definition of Vulnerability	24
Appendix B HDI ranking of ECOWAS countries	24
Appendix C Environmental Sustainability Index (ESI) total and component scores	25
Appendix D Percentage of urban versus rural populations with access to improved water	26
Appendix E Distribution of farming systems in West Africa	26

Figures

Figure 1	Nations of the Economic Community of West African States	2
Figure 2	Links between the Millennium Development Goals and Environmental Vulnerability	4
Figure 3	Percentage of Undernourished Population by Country within ECOWAS	8
Figure 4	Examples of Vulnerability Reduction Strategies for West Africa at Different Social Scales	14
Figure AB	Human Development Index Ranking for ECOWAS Countries	24
Figure AC	Environmental Sustainability Index. Total and component scores for ECOWAS countries	25
Figure AD	Percentage of urban versus rural populations with access to improved water	26
Figure AE	Distribution of farming systems in West Africa	26

Introduction

The West African region, as represented by the Economic Community of West African States¹ (ECOWAS), is home to over 234 million people. Severe poverty is endemic in the region. Between 1983 and 1999, over 40% of the region's population (93 million in 2000) lived on less than US\$1 per day (UNEP, 2002). The majority of the poor live in rural areas and depend primarily on agricultural production, but increasing numbers are moving to urban areas. Within the rural areas, there are considerable differences in the levels of poverty based on the type of farming practised (IFAD, 2001). In both settings, people depend on sustainable environmental conditions for their well-being, but environmental hazards, resource degradation, scarcity and biophysical changes mean that there are significant risks and uncertainties within this fundamental aspect of their livelihoods.

People's degree of susceptibility to harm from these risks—their vulnerability—varies greatly among regions, social groups and individuals. Usually, because they have the fewest assets and alternatives, the poor experience the greatest losses. Vulnerability to one set of stresses, such as environmental hazards and degradation, adds to the difficulty of dealing with other forms of vulnerability and stress, such as economic shocks or HIV/AIDS. Some environmental risks, like floods, can literally wipe out decades of development work in moments, while other threats, particularly those creating food insecurity, persistently undermine poverty reduction efforts by restricting livelihood choices, contributing to ill health and limiting the pursuit of economic development options.

This report summarizes secondary data on key issues of vulnerability in West Africa, identifying the threats, sensitivities and coping strategies affecting the poor and poverty reduction efforts.

WEST AFRICAN REGION

The diversity of the member states of ECOWAS contributes to the complex array of environmental vulnerabilities that characterizes the region. The countries of this region include many of the poorest in the world. Figure 1 shows the political borders of the region; however, in terms of understanding environmental vulnerabilities, these borders are only a small part of the story. Poverty is predominantly rural, and the main activities of rural livelihoods are agricultural or pastoral. However, these livelihoods draw on many off-farm income sources, including migration. The biophysical patterns of climate, vegetation, soils and watersheds pre-date these political boundaries in their influence on livelihoods, including the movements of people and resources throughout the region. For instance, trade in foods and livestock between the coastal regions and the more arid areas is a long-standing practice. The regional growth of urban poverty is linked to the challenges of rural livelihoods, as the rural economy adjusts to meet urban markets and families attempt to combine urban and rural livelihoods to improve their situations.

The history of West Africa combines periods of greatness with devastating strife. While current circumstances reflect this history in the deep connections among people across the region, there are also divisions due to Anglophone and Francophone differences, political and economic development paths, and other factors. This discussion of contemporary

¹ Benin, Burkina Faso, Cape Verde, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo.

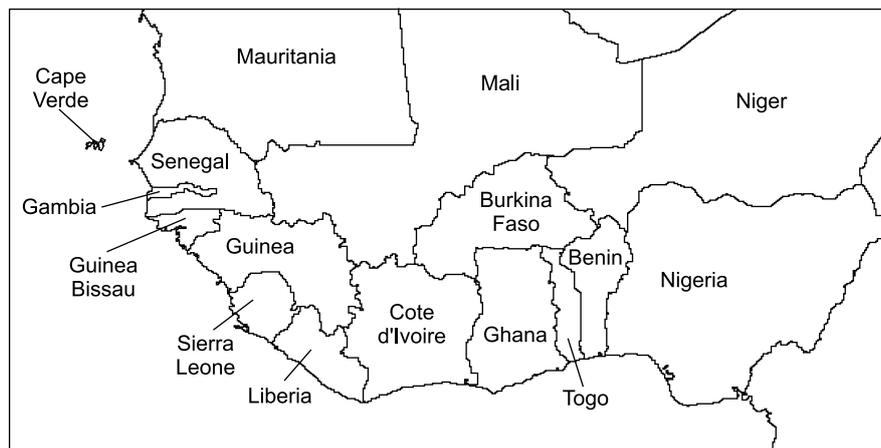


Figure 1 Nations of the Economic Community of West African States

vulnerability issues will not attempt to explain the influence of past economic, political and social relationships; nonetheless, we are aware that the causes of many of the patterns of inequity underlying vulnerability are deeply rooted. We will observe vulnerability issues for which narrow technical approaches, such as techniques to improve crop productivity or water systems, can support vulnerability and poverty reduction goals. We also identify the potential of progress across development sectors (education, health, economic development and governance) to create options, safety nets and a better overall set of resources and supports, both formal and informal, for people to draw on to deal with the challenges of environmental variability.

The challenges of environmental variability in the region are compounded by environmental degradation; these, combined with other stresses, exacerbate the difficulties faced by those trying to improve their livelihoods. Some issues of environmental degradation in this region, such as land degradation, have been the focus of concerted periods of intense investigation, while other environmental issues have only recently come under greater scrutiny, such as sustainability of groundwater supplies.

VULNERABILITY, POVERTY AND ENVIRONMENT IN WEST AFRICA

Vulnerability, as addressed in this report, is the capacity to be harmed or to experience loss through environmental perturbations or stresses. In order to understand who might be affected and to what extent, this analysis looks at patterns of exposure (the contact with different stresses and perturbations), sensitivity (likelihood of being harmed by that exposure) and resilience (the ability to recover) (see Appendix A for definitions). Because vulnerability to environmental stresses can be exacerbated by other stresses, this report considers interactions with several of these other stresses.

Among those exposed to environmental stress, losses vary significantly for many reasons. Vulnerability thus depends on access to resources for coping, or what the sustainable livelihoods approach calls 'forms of capital': human, financial, economic, social and physical assets that individuals can draw on to help them cope with the demands of environmental perturbations and stresses. In West Africa, as elsewhere, sensitivity to environmental stress depends on livelihood practices and options, such as irrigated or rainfed farming, as well as physiological factors, such as old age, chronic illness or disability. People's resilience to stress reflects their assets and their access to family, community, market and governmental arrangements and resources

that may help maintain functioning and recovery. These include such things as agricultural price supports, food price subsidies and loans from family members. Such arrangements are in flux throughout West Africa for many reasons, such as government economic policies and political stability. Vulnerability involves power and entitlement in social relations as well as the sharing of resources across multiple scales of organization in society. Patterns of access or entitlement to these coping resources and the ability to diversify vary within societies. Such variation reflects other social patterns of empowerment and marginalization common to West Africa and most parts of the world, such as gender inequity, ethnic differences or illiteracy, as well as the degree to which a person's health and income relies on environmental conditions. In some cases, poverty and vulnerability can be mutually reinforcing, but poverty is not the same as vulnerability.

Within communities, household vulnerability reflects assets, skills and access to resources. In the West African region, people might supplement household agricultural income through casual labour, making charcoal for sale, or selling handicrafts or homemade beer. Repeated losses deepen both poverty and vulnerability as coping often requires people to sell their assets, such as livestock, and households may be slow to recover those support bases. These losses can move people from better states into poverty, or from temporary into chronic poverty.

The persistent stresses of environmental degradation and shocks divert the many forms of resources, such as labour, cash and time, away from productive opportunities like education or other investments in skilled work. Figure 2 uses the Millennium Development Goals to illustrate how vulnerability to environmental stresses in West Africa can disrupt progress towards poverty reduction. Each issue is discussed in more detail in this report.

In order to represent the region's diversity and its commonalities more fully, most of this report focuses on regional patterns that spread across national boundaries within the region. However, because empirical data for the region are mostly available as national averages, we will first briefly review two summary indices—the UNDP Human Development Index (HDI)² and the Environmental Sustainability Index (ESI) — that reflect the generally high levels of stress and limited coping resources across the region.

The HDI represents three basic measures of development—a long and healthy life, knowledge and a decent standard of living. It does not aim to represent vulnerability directly, but it reflects how health, knowledge barriers and low standards of living make it difficult for people to cope with day to day stress. These dimensions are represented by indices developed using life expectancy at birth, adult literacy rates, gross school enrolment ratios and GDP per capita (PPP US\$) as indicators (UNDP, 2002). Based on these indices, the countries of this region, with the exception of Cape Verde, are all among the lowest 25% of countries ranked in 2002 (UNDP, 2002). Appendix B contains the HDI ranking of each country.

The Environmental Sustainability Index (ESI) is an effort to represent the goals of sustainable development in concrete measures comparable across 142 countries (Global Leaders for Tomorrow Environment Task Force et al., 2002). It covers all of ECOWAS, except Cape Verde. It is comprised of five core components: environmental systems, reducing stress, reducing human vulnerability, social and institutional capacity, and global stewardship. Each of the core components reflects an evaluation of human pressures on ecosystems, and capacity and willingness to participate in environmental management. These core components are derived from 20 indicators representing 68 variables normalized on a scale from 0 to 100, so

2 We chose the HDI rather than the HPI-1 because the HPI-1 was missing values for four countries. The HDI included all countries except Liberia.

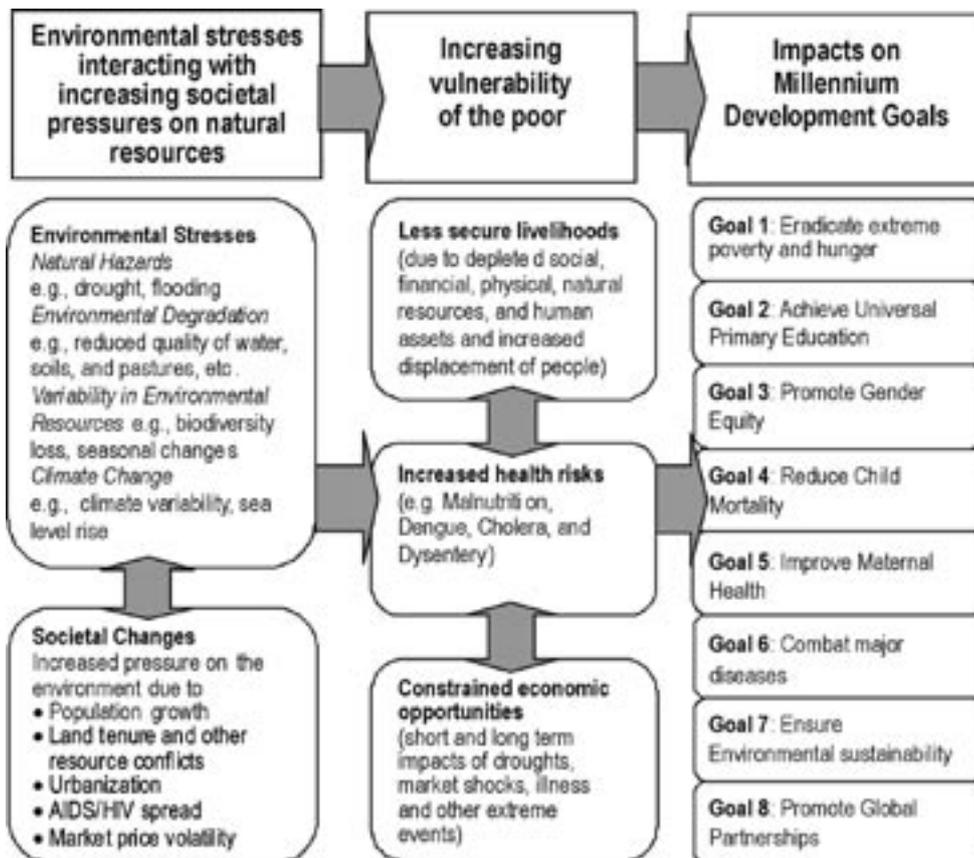


Figure 2 Links between the Millennium Development Goals and Environmental Vulnerability

Source: Based on African Development Bank et al., 2002. (October). Poverty and Climate Change: Reducing the Vulnerability of the Poor. Consultation Draft.

a low score represents high vulnerability. The figure in Appendix C displays each country's total ESI score as well as its score against each of the five components. While there are many issues in the development of such an index that cannot be fully discussed in this report, the high proportion of low scores, between 4 and 40, confirms that vulnerability is a challenge for sustainable development in West Africa.

Vulnerability is linked to environmental conditions: “*A country is environmentally sustainable to the extent that people and social systems are not vulnerable (in the way of basic needs, such as health and nutrition) to environmental disturbances; becoming less vulnerable is a sign that a society is on a track to greater sustainability*” (Global Leaders for Tomorrow Environment Task Force et al., 2002:5). Vulnerability in the ESI index is represented by (1) basic human sustenance: the proportion of undernourished in the total population and the percent of population with access to improved drinking water supply, and (2) environmental health: child death rates from respiratory diseases, death rates from intestinal infectious diseases and under-5 mortality rates. While these indicators do not capture the range of potential hazards in the region, they do allow us to compare people's abilities to cope with common hardships.

Although national averages do suggest major problems, as averages, they fail to capture the complex social, spatial and temporal variations at regional or local levels. Neither do they reflect the cumulative impact of multiple stresses in people's lives. While climate impacts are the most widely distributed across the region, other types of environmental threats and vulnerabilities are often more significant on a local scale. For instance, along the region's humid coast, pollution and declining fish stocks are creating new hardships for fishing households.

Across West Africa, the challenge of addressing chronic environmental stresses is compounded by new and increasing environmental stresses as well as social, economic and political changes which pose threats in their own right. The following topics and their effects on the livelihoods of different groups in West Africa are discussed in more detail in this report:

- patterns of environmental degradation, including deforestation, soil degradation and water pollution, which contribute to declining agricultural productivity and environmental services;
- widespread poverty, which limits access to many important resources including food alternatives during periods of stress;
- health threats, most prominently HIV/AIDS, that diminish the labour capacity of households as productive members are ill and/or needed to spend more time caring for the ill;
- changing systems of land and use rights which restrict access to traditional strategies for coping with climate variability;
- population growth, which exposes more people to the stresses in the region and which places greater demands on all of the region's assets;
- rapid urban growth accompanied by high population densities, inadequate housing and lack of access to natural resources, all of which undermine the quality of life in squatter settlements;
- political conflicts, which drive people away from their farms and increase pressures on receiving areas; and,
- climate change, expected to affect farming in the arid, semi-arid and dry sub-humid areas most severely, and sea level rise which will put great pressure on coastal cities and resources.

Sensitivity to environmental stresses

Throughout West Africa, agriculture is the mainstay of the economy. Over 74% of the region's poor are involved in agricultural production, and exports of agricultural products are the dominant source of foreign exchange in many West African nations. While agriculture is the main livelihood source for most poor people, it is typically supplemented by a wide range of other activities, such as temporary, seasonal and urban migration; handicrafts; small scale trading; growing vegetables for sale; or making and selling beer and wine. Farming livelihoods depend closely on environmental conditions and are thus more sensitive to environmental variability and change. Efforts to maintain productivity may offset degradation in the short term for some people, while over the longer term environmental degradation may cause greater vulnerability.

Of all the natural hazards in West Africa, drought commonly receives the most attention for several reasons. Firstly, a large part of this agriculturally dependent region is repeatedly exposed to drought. Secondly, sensitivity to drought, another dimension of vulnerability, is high among poor farming households and there have been recent widespread famines linked to drought conditions. However, there are other hazards present, such as flooding and pests, which have substantial potential for causing damage and impeding development efforts at a local scale (Munich Re, 2000; CRED, 2003). Because the poor generally rely on agriculture for a major part of their income, drought is a significant direct stress, but by reducing access to water it also has indirect, but significant, impacts on health. While drought often causes periods

of hunger and nutritional stress, it is not always associated with famine, which is an extreme failure of food security systems. Over the past 25 years, drought has affected millions of people in the coastal countries as well as the more arid landlocked nations. Other countries that face extreme drought threats are Cape Verde, Gambia, Nigeria, Niger and Senegal (Munich Re, 2000). In addition to drought, hail, lightning and tornados are pervasive threats to agricultural productivity and livelihoods throughout the region. Other types of environmental hazards include wild fires and insect outbreaks that threaten crops. Ongoing monitoring programmes focus on locusts and agricultural pests while other efforts monitor threats to livestock.

People are better able to cope when they have the opportunity to invest in productive resources, like terraces to control soil erosion; or in ways of diversifying their income sources, perhaps by purchasing tools for a specific job, like construction. Such investments also help reduce vulnerability and improve overall livelihood security.

The relative importance of sensitivity factors depends on how one defines groups for analysis or assistance and how carefully one examines differences within groups. Substantial differences exist among the poor as a population and more differences appear when comparing farming systems, urban and rural livelihoods, gender, households or household members.

HEALTH

Poor households, particularly the rural poor, often depend heavily on their own labour, for example, in farming, fishing or working on plantations. Food security, access to safe water and good health are fundamental preconditions for productive labour. Therefore, the health implications of environmental stresses have broad repercussions and are a key issue in vulnerability. The overall provision of health care in the region continues to improve. However, health care is generally most accessible to urban and wealthier populations, and outcome and prevention levels are below international goals and averages. According to available data, infant mortality rates, under-5 mortality rates and life expectancy at birth all improved between 1980 and 2000 for Benin, the Gambia, Ghana, Guinea, Guinea Bissau, Niger, Nigeria and Sierra Leone. All these measures have, at least, remained constant in Burkina Faso, Mali and Togo. However, in the Ivory Coast, these measures have all declined over the last two decades (UNDP, 2002).

Although HIV/AIDS prevalence rates are currently not high in West Africa, if the pattern follows that of Southern Africa, HIV/AIDS will become a major poverty and vulnerability issue. Where disease rates are high, caring for the ill and making up for lost contributions to the household often require substantial changes in labour or migration patterns. Small farming households are particularly vulnerable to loss in agricultural productivity when people are too ill to work because these households typically rely heavily on human labour. Providing food and medicine for the sick places an additional drain on limited assets.

The significance of migration as a livelihood strategy in many West African communities complicates the potential impact of HIV/AIDS. HIV prevalence rates are often particularly high among mobile populations in the coastal part of the region, which includes some important migration destinations. Consequently, HIV/AIDS disproportionately affects sectors that rely heavily on migrant workers, such as agriculture, transportation and mining. Rural communities suffer in turn as many HIV-infected migrants return home when they fall ill, thus overburdening rural social service systems and poor households.

Other serious diseases, many of which are endemic in the region, contribute to household stresses in similar ways. There is a history of epidemics of meningitis (polio), meningitis,

arbovirus (yellow fever), diarrhoea/enteric (acute watery diarrhoeal syndrome), cholera meningitis (acute neurological syndrome), and meningitis (meningococcal disease) (See CRED 2003 for details). Other vector and water borne diseases, particularly malaria, also contribute to health stresses. Tuberculosis is spreading in the region and manifesting itself among the HIV/AIDS population (UNDP, 2002). Environmental conditions can increase disease exposure; for instance standing water creates breeding habitat for malaria-carrying mosquitoes. Drought that reduces water availability for cooking, drinking, washing and sanitation can also contribute to the spread of disease. In urban areas, high population densities and limited infrastructure create unhealthy conditions too.

WATER AVAILABILITY

Assessing water availability at the national level is difficult; however, long term precipitation records indicate that rainfall in the Sahara is declining, further increasing the stress on agriculture and water supply. One of the most commonly used indicators of 'water stress' is per capita water availability (UNEP et al., 2000). When per capita availability drops below 1,700 m³/year, water stress or the potential for disruptive water shortages can frequently occur. 'Water scarcity' is a more serious situation, and is defined as a per capita availability of less than 1,000 m³/year. This has more severe consequences for food production, health, sanitation, economic development and loss of ecosystems. This definition does not reflect the distribution of water across a nation or the adaptive capacity of societies to meet needs with less water. However, according to these definitions and year 2000 data, Benin, Burkina Faso and Ghana are currently experiencing 'water stress' and Niger is facing 'water scarcity' (UNEP et al., 2000). Future water availability projections are discussed in Section 5.

Water supply problems contribute to vulnerability at all scales. Many development plans imply greater, and sometimes competing, demands for water resources in the future. Currently, access to safe drinking water is essential for maintaining people's health and their ability to cope with other stresses. There are substantial differences among the formal and informal institutions handling water supply, water quality, water rights and economics of infrastructure development. Obtaining water often places a major demand on women's time, increasing the length of their working day and preventing them from undertaking other activities beneficial to the household. Contaminated water is a major cause of poor health in the region. Meeting this basic need for safe water is a priority for the Millennium Development Goals and will involve improved infrastructure. Currently, access to improved water sources is limited throughout the region, especially in rural areas. While urban access to improved water is generally over 70% of households, with the exceptions of Guinea Bissau and Sierra Leone (Appendix C), the percentage of access to improved water sources in rural areas varies from approximately 30 to 65%. In urban areas there is some water supply infrastructure, but concern over contamination of shallow wells in the rapidly growing urban areas is increasing.

While access to safe water is a chronic problem, flooding is also a factor for people living near major rivers throughout the region. Even the driest countries in the region—Mali, Burkina Faso and Niger—have flooding risks to about 10% of their land area lying along major rivers (Munich Re, 2000). In the higher rainfall, coastal countries, flooding is a greater threat along rivers with torrential rains adding to flood risks in some areas. In the Gambia and Guinea Bissau, about 90% of the land area faces some degree of flood risk (Munich Re, 2000). The major flood events in the region, recorded by OFDA/CRED (2003) have resulted in hundreds of deaths, left hundreds of thousands of people homeless and destroyed thousands of hectares of crops.

FOOD SECURITY

According to the FAO 'food security' is when all people at all times have access to safe and nutritious food, enabling them to maintain a healthy and active life. Food security, therefore, implies the provision of safe, nutritious and quantitatively and qualitatively adequate food, as well as access to it by all people (UNEP, 2002:288). Food security is a central issue in vulnerability assessments, as hunger and malnutrition are severe immediate and long term threats to well-being. Agriculture in the arid and semi-arid regions of West Africa is particularly sensitive to rainfall variability which can affect crop productivity and cause food shortages. For much of the time, low yields, lack of additional income sources, and many other factors mean that many people are hungry. Hunger and ill health increase sensitivity to environmental stresses and decrease people's ability to develop and maintain coping strategies, such as more intensive soil improvement techniques or collecting wild food over large areas. Assuring food security is also one of the simplest means of helping people live with HIV/AIDS (FAO/WHO, 2002).

While aggregate nutritional status in the region has improved over the past 10 years, and even more dramatically over the past 20 years, many of the countries still rely on food aid. This is despite more than 30 years of extensive efforts to increase food productivity. While total crop and livestock production has increased, in part through changes in types of crops planted, food access and distribution systems and population increases mean that growth in per capita productivity is currently still near 1970 levels (UNEP, 2002:219). Approximately 30.7 million, or 14%, of the people of West Africa are undernourished (FAO, 2002a)³. Figure 3 compares the proportion of people undernourished in 1990–92 with 1998–2000. In most of the countries, with the notable exceptions of Liberia, Senegal and Sierra Leone, the proportion of undernourished people has declined or remained constant. Ghana and Niger have reported significant improvements. However, given population growth, these percentage improvements have not translated into consistent reductions of the actual numbers of undernourished people. The number of undernourished people has increased in all ECOWAS countries, except Côte d'Ivoire and Togo where it has remained constant, and Benin, Ghana and Nigeria where it has decreased (FAO 2002a).

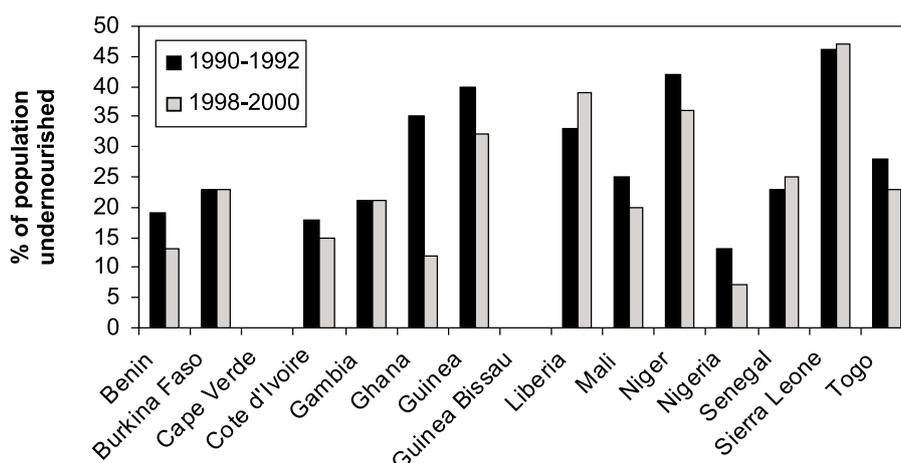


Figure 3 Percentage of undernourished population by country within ECOWAS

Source: (FAO, 2002a)

³ Note, these estimates are collected by the FAO and their coverage of West Africa includes all of the ECOWAS states except Cape Verde and Guinea Bissau, the two have populations of approximately 1.4 million people in total.

FAMINE

Famine is an extreme collapse in both the local availability of and access to food, leading to deaths from starvation and hunger related illnesses. Famine is often caused by a combination of climatic, environmental and socio-economic factors that limit local food production and make it impossible for people to obtain food from other sources. In addition to the chronic stresses of hunger and poverty, more abrupt changes can transform a difficult situation into a catastrophic one. The following situations have contributed to famine stress in West Africa:

- food shortages coupled with inflated food prices, making it increasingly difficult for poor people to purchase food when they need it most;
- rapid decline in the value of assets during times of shortage because market prices fall when many people resort to selling their assets, such as livestock or gold, to buy food;
- limitations in food distribution systems to rural areas, making it difficult to alleviate local shortages and bring prices down; and,
- political conflicts that interrupt planting, maintaining or harvesting crops or cut off food distribution routes.

Over the past 25 years famine has killed thousands of people and affected over 15 million more in West African nations (OFDA/CRED, 2003). Countries directly affected by famine during this period include Burkina Faso, Cape Verde Islands, the Gambia, Ghana, Mali, Niger, Senegal and Togo (OFDA/CRED, 2003). The primary stress is in the drought-prone countries, but refugees move towards regions expected to have better conditions, placing stresses there too.

One initiative to tackle famine is the Famine Early Warning Systems Network (FEWS NET), which covers 16 African nations, including the West African ECOWAS states of Burkina Faso, Mali and Niger.⁴ Other countries that have experienced famine (Cape Verde, Gambia, Ghana, and Togo), albeit less frequently and less severely over the past 25 years, are not part of this network (OFDA/CRED, 2003). FEWS NET aims to reduce the risks of food insecurity by presenting early warning and vulnerability information to international, national and regional partners. The extensive monitoring system collects data from traditional sources and also conducts some field site monitoring to provide information on biophysical and market conditions affecting food availability and access. Currently, FEWS NET is developing baseline analyses of food security in Mali and Burkina Faso. The aim of this effort is to understand how urban and rural households organize their livelihoods so that the likely effects of different climate, environmental or socioeconomic shocks can be more quickly understood and addressed.

FARMING SYSTEMS

The tremendous diversity in West African agriculture is increased by the many ways households combine their assets, opportunities and skills. To understand vulnerability we need to differentiate types, degrees and causes of vulnerability among the poor. This means looking at farming systems. These systems are based on natural resources, but their success depends

⁴ A further step taken by the international community towards achieving the 1996 World Food Summit goals was the establishment of an international multi-agency programme called Food Insecurity and Vulnerability Information and Mapping Systems (FIVIMS).

on people's ability to cope with economic, political and social stresses as well as variable environmental conditions. A farming system is defined here as "*a population of individual farm systems that have (sic) broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions be appropriate*" (Dixon et al. 2001:9).⁵

While farming systems can be delimited at many levels of detail, the FAO analysis of farming systems and poverty identifies 15 major farming systems in sub-Saharan Africa, nine of which exist, to varying degrees, in the ECOWAS states (Dixon et al., 2001). These farming systems are pastoral, arid land farming, agro-pastoral millet/sorghum, cereal-root crop mixed, root crop, tree crop, coastal artisanal fishing, irrigation and some irrigation in rainfed areas (Dixon et al., 2001). Appendix E maps the distribution of these types across West Africa. Characteristics of households and communities vary greatly between and within farming systems.

Land degradation is both a cause and a result of stresses on livelihoods and farming systems in the region. The loss of forest cover, increasing use of intensive cultivation practices, and natural hazards such as drought and flooding, all contribute to a decline in soil quality and fertility and an associated decline in ecological resilience, as recovery from these traits becomes progressively difficult. Pressure on land resources has been increasing over the past 30 years as population growth, greater demand for fuelwood and charcoal in urban areas, expanded cropland, and continuing poverty have resulted in more demand for, and more intensive use of, land resources. Policies encouraging the growth of export oriented crops, such as cotton, cacao and timber, have also altered land use and displaced previous uses onto more remote or marginal areas. The continuing pressure on and decline in land resources further undermine the resilience of significant environmental services.

On a broad scale, land degradation in the region is increasing through the combined effects of many processes including soil erosion, soil compaction and reduction of organic matter in soils, as well as declining soil fertility and loss of biodiversity (Dixon et al., 2001). For the arid lands, pastoral, agro-pastoral millet/sorghum and cereal-rootcrop mixed farming systems, drought is the major source of vulnerability. Intensive use of good quality land and greater use of marginal lands are key contributors to vulnerability. Cotton, one of the chief export earning crops in Mali and Burkina Faso, is driving farmland expansion in the cereal/rootcrop zones of these nations. As competition for land increases, fallow periods decline in many parts of the region. Greater investments in maintaining soil quality would benefit both intensively farmed and marginal land. Yet the cost and lack of access to credit limit purchase of inorganic materials, while access to organic fertilizers is declining. Poverty is relatively extensive among households of the arid lands, pastoral and agro- pastoral millet/sorghum systems, but less prevalent among those engaged in cereal/rootcrop farming (Dixon et al., 2001:34). Some households are able to maintain food security in good years and bad; those less well off with less productive land, greater numbers of dependents and/or fewer alternative income sources may face food insecurity in the both good and bad years.

In forested areas, loss of forest cover contributes to land degradation and reduces the availability of non-timber forest products used by the rural poor. In 2000 the region contained 72 million hectares of forest, equivalent to almost 12% of the region's land area and 11% cent of Africa's total forest cover (FAO, 2001a). This coverage represents a decline of up to 3% per year in the 1990s (WRI, 2000). Timber production provides substantial foreign exchange to

5 There is a wide variety of definitions of farming systems in the literature. See Dixon for further references.

some of the coastal countries. Forest and savannah products are extremely important to local communities in providing off-farm income and fuel. In 2000, more than 175 million m³ of wood were used in Western Africa for fuelwood and charcoal production (FAO, 2001b). Other forest and woodland resources gathered and used by households, or traded informally amongst villagers, include meat, fruit and vegetables, construction and craft materials, medicinal products, and honey. For instance, bushmeat provides 70 percent of the animal protein in Southern Ivory Coast, 80–90 percent in Liberia and 55 percent in Sierra Leone (FAO 1990 in UNEP, 2002).

Threats to biodiversity pose a problem for livelihoods within the region that rely on forest resources. The species diversity in the region, one of the greatest in the world, is widely incorporated into dietary and household practices. For instance, the Cross River State rainforest of Nigeria is home to over 700 species of plants and animals, over 430 of which are used by local residents (CRSFP, 1994 cited in UNEP, 2002). However, these areas are often cleared to grow tree crops, commonly coffee (robusta), cocoa, oil palm or rubber. While the valuable non-timber forest products that were important to some livelihoods are lost, tree crop owners often hire migrants, or give them farming rights in exchange for caring for newly planted trees. The type of arrangements depends largely on the size of the holdings and their profitability. The food supply for this system tends to be stable, but shocks related to world market prices, changing government support policies for services (like credit, extension, crop production research, and marketing), have decreased the demand for additional migrant labour on farms. As the interest in tree crops falters and need for labour declines, there is growing poverty and increased social conflict between migrants and owners, especially in the Ivory Coast (Dixon et al., 2001:56). Political conflict, such as the 2002–2003 conflict in the Ivory Coast, may also close borders and shut off access to these jobs.

Pastoralism is generally concentrated in the northern arid and semi-arid regions. This farming system depends on the ability to move herds south during the driest times and back north during the rainier seasons. In the northern parts of Mali and Niger, where animal husbandry is the dominant agricultural practice, overgrazing and trampling reduce the vegetation cover, compact the soil and increase the potential for erosion. In addition, seasonal movement is becoming harder to maintain as the amount of land under cultivation is increasing in the south, putting further pressure on grazing areas. Changing land tenure may also pose a challenge to this livelihood type as fixed sedentary uses may receive more support through formal legal interpretations of property and use rights.

Throughout the region, livestock is a household asset that can be sold during times of great need. Some researchers point to the need to increase veterinary services to support livestock as a strategy for livelihood diversification. The distribution of cattle is heavily influenced by the tsetse infestation, which tends to be a particular challenge in the moist sub-humid and humid lowland areas. The potential for trade between farmers and pastoralists in livestock and other locally produced goods, an important aspect of these livelihood strategies, is threatened by increasing land-use conflicts.

The greater opportunities for agriculture and employment in the West African coastal zone place this area under particular pressure from in-migration. Consequently, forests have been heavily cleared to make room for plantations and urban development. In the wet forest regions, heavy rainfall on cleared forest land increases sheet and gully erosion and sedimentation of the rivers. The coastline is also prone to erosion; loss of mangroves creates the potential for

further erosion and destroys nursery habitat for fisheries. Although the last tsunami⁶ was in the 1930s, tsunamis and storm surges can threaten coastal regions, particularly in rivers, bays and estuaries where water builds up. Some stretches of the coast are also subjected to heavier discharges of urban and industrial pollution as infrastructure fails to keep up with growth. Throughout the region, and most heavily concentrated in the coastal areas, there are about 13 million people combining fishing with tree cropping and keeping small livestock (Dixon et al., 2001). A sustainable livelihoods analysis⁷ of artisanal fishing communities distinguished among fishers, fish traders, fish processors, shipbuilders, net makers and mechanics to address differences in vulnerability, gender, key strategies and major constraints to obtaining capital assets (Hussein and Zoundi, 2002:52). While these groups are vulnerable to seasonality in fisheries catch, it is the fishers who are often the most vulnerable. This is because of the significant proportion of their total assets they put into fishing gear and the substantial risks of loss or damages to that equipment, usually without insurance.

URBAN LIVELIHOODS

Across West Africa, the vulnerability of the poor and their ability to cope with stresses depend on household resources and access to support from family, community, government and international sources. But urban and rural vulnerability differs as urban populations have greater access to social services such as health centres, as well as to markets. Investment in infrastructure, such as roads, water delivery, wastewater treatment, pipelines, communications and electricity tend to be concentrated in the urban areas, although even there they are far from universally available to the poor.

At present, the level of urbanization in West African countries ranges between 18.5% and 62.2%, making it one of the least urbanized parts of the world (UNDP, 2002b). Yet urban areas are growing at rates of between 3 and 6% annually. While poverty is still concentrated in the rural areas of West Africa, the number of urban poor is increasing, although those rates are not well documented (UNDP, 2002b).

Most urban residents maintain their connections to rural communities. These connections between urban and rural households include providing food supply and water and patterns of seasonal, temporary or drought-induced migration (where members of a household seek urban employment to reduce pressure on rural household resources and/or provide remittances). Increasing connectedness to urban areas also increases AIDS transmission through greater contact and movement of people. Thus, while there are issues specific to living in urban areas, urban populations' vulnerability and security are still often linked to rural vulnerability and well-being. Rising levels of urban unemployment mean that many migrants do not earn the income they had anticipated. And children who move to the cities are more susceptible to exploitative labour arrangements, homelessness, hunger and illness.

Statistics on urban living conditions are difficult to collect because of the rapid growth rate and the often illegal or informal nature of housing and services. While improved health care over the past 10 years has decreased childhood mortality rates in the capital cities, large portions of the urban population continue to live in poverty and in squatter or other settlements where access to health care is limited. The UN Human Settlements Programme has developed

⁶ A tsunami is a very large ocean wave produced by submarine earth movement or volcanic eruption.

⁷ Sponsored by the UK Department for International Development (DFiD).

a set of urban profiles which provide some of the few data available on housing and poverty in West African cities. In Abidjan, an estimated 20% of the 4 million inhabitants live in informal settlements (Abou, 2002). In Ouagadougou, with a population of 1.2 million, an estimated 45.3% live in poverty and 15.2% live as squatters (Istanbul+5 Preparatory Committee et al., 2002). The estimated poverty level for Dakar is 38% (Mayacine, 2002).

SENSITIVITY DIFFERENCES WITHIN HOUSEHOLDS AND SOCIAL GROUPS

Household composition (the number of men, women, children, and other dependents), as well as their work skills, help explain how households cope with stresses. Households with fewer dependents and more members able to work in skilled or off-farm jobs typically have a greater diversity of income sources and more options for coping with stress. By investing in education, a household can gain greater access to skilled, better paid, year-round employment, thereby diversifying its economic base and cushioning it from various shocks. Limited access to health, extension and other support services are other important dimensions of vulnerability in rural areas where distance is a barrier to reaching or receiving services. Low literacy levels add to the difficulty of obtaining and communicating useful information.

Combinations of economic, political, institutional and other differences comprise the social dimensions of vulnerability. These dimensions also influence the degree of vulnerability of individuals, households, social groups and communities by determining how they support or restrict access to vital resources. Gender roles are particularly important in this regard as they often limit women's formal legal rights (such as property ownership) and informal entitlements (such as the ability to hire labour), while giving them the responsibility for meeting household needs. It is important to note that while women often have more limited resources and access, their knowledge and skills, for instance in uses of wild plants, are valuable assets in stressful times. A group's status, based on ethnicity or political affiliation, can also affect the degree of government support provided, such as health care facilities, water treatment, roads or extension services.

Some individuals are more sensitive to stress than others for physical reasons. For example, infants; young children; pregnant, lactating, young and mature mothers; elderly and disabled individuals; and those with chronic illnesses, such as nutrition-related problems, malaria, or HIV/AIDS, are especially sensitive to stresses. The physical dimensions of sensitivity are also important in the households' use of natural resources. For instance, some crops are more tolerant of drought or poor soil conditions than others and the range of some disease vectors, like tsetse flies, is limited by biophysical conditions.

Resilience in adaptation and coping strategies

VULNERABILITY REDUCTION STRATEGIES

In West Africa there are many options for reducing the poor's vulnerability and supporting their efforts to increase their capacity to cope with the combination of environmental and social stresses they face. As Figure 4 indicates, these strategies take a wide variety of forms and can be supported through efforts at a number of levels from household and community, to broad sectoral policy initiatives targeted to the poor. Figure 4 highlights the strategies, many

positive but some negative, although there are many more options that might meet current needs while sacrificing other benefits. Some of these strategies, like soil conservation, food security, improved health care, HIV/AIDS prevention, are options that reduce the likely losses to drought and other risks while providing important benefits in average years. Others, like education or access to credit, provide flexible benefits that help people cope with a wide range of stresses. Flexibility is a key characteristic for reducing vulnerability in poor people’s lives. Technical solutions, like the introduction of drought resistant crops, are often much more closely targeted to specific stresses. Many of the strategies discussed in relation to sensitivity also contribute to resilience. Households and communities often have some coping strategies in place and ideas about others. However, other wide reaching strategies, like agricultural extension, pension planning or workfare, require institutional arrangements and resources more often held at the regional or national level of government. It is also important to note that not all strategies are equally beneficial; some, like increasing child labour or increasing pressure on environmental resources, address a short term problem, but entail substantial long term societal costs. Coping with land degradation by moving into marginal lands can sometimes provide short term relief to household pressures by making land available, but creates greater problems in the not too distant future as productivity of that marginal land is difficult to maintain. Converting from temporary to permanent land use can often cause conflict between pastoralists and farmers. Development efforts can support ongoing local efforts at vulnerability reduction.

	Individual and household	Group Based	Market Based	Publicly Provided
<p>Reduce Exposure and Sensitivity To Threats</p> <p>Strategic Options:</p> <ul style="list-style-type: none"> • Adaptation • Reduce risks • Diversify and limit exposure to risks 	<ul style="list-style-type: none"> - Preventative health - Successful migration - More secure income sources - Crop diversification - Income diversification - Investment in physical and human capital - Sharecropper tenancy - Buffer stocks 	<ul style="list-style-type: none"> - Collective action for infrastructure - Common property resources - Occupational associations - Rotating savings and credit associations - Investment in social capital 	<ul style="list-style-type: none"> - Savings accounts - Microfinance - Insurance 	<ul style="list-style-type: none"> - Sound macroeconomic policy - Environmental, Infrastructure, and labour policy - Education - Agricultural extension - Liberalization of trade - Protection of property rights - Pension schemes - Mandated insurance
<p>Increase Resilience</p> <p>Strategic Options:</p> <p>Replace losses through</p> <ul style="list-style-type: none"> • Substitution, i.e. labour effort for income • Transfer of resources from other people and places • Transfer from savings for future 	<ul style="list-style-type: none"> - Intensify labour inputs - Draw on savings - Borrow from kin or neighbors - Sale of assets - Loans from money lenders - Migration to marginal lands - Increase amount of child labour 	<ul style="list-style-type: none"> - Transfers from networks of mutual support 	<ul style="list-style-type: none"> - Old age annuities - Accident, disability insurance - Sale of financial assets - Loans from financial institutions 	<p>Social Protection Programs</p> <ul style="list-style-type: none"> - Social assistance - Workfare - Subsidies - Social funds - Cash transfers

Figure 4 Examples of vulnerability reduction strategies for West Africa at different social scales
 Source: Based on African Development Bank et al., 2002. (October). Poverty and Climate Change: Reducing the Vulnerability of the Poor. Consultation Draft.

RURAL FARMING SYSTEMS

Rural individuals and households manage their vulnerability in many ways. Diversifying income and resources is one of the most common and successful risk/vulnerability management strategies. Diversification is pursued in a variety of ways, by planting a selection of crops, maintaining farming ties in different agroecological zones, and combining urban and rural, or agricultural and trade, livelihoods within a household. The associated reports on Mali and Burkina Faso provide specific examples of how combinations of strategies reflect local factors such as degree of access to markets, amount of land available, amount of labour within the household, security of land tenure, the time involved collecting fuelwood or water, level of access to extension services, and many others. In climatically variable contexts where exposure to environmental stress cannot be easily avoided, common strategies include diversifying resource holdings and income earning options within the household, substituting labour for lost productivity, drawing on savings or borrowing from community and family members. The success of these strategies depends on integration into the ongoing activities of a community so participatory approaches are an important approach in successful identification and adoption. Diversification is a major consideration for households, both over the short term through a growing season, as well as longer term to ensure a family's well-being over generations. Efforts to manage vulnerability reach across many scales of social organization, from the family to cooperatives, to regional government.

In order to reduce the vulnerability of these farming households, Dixon et al. (2001:80) recommend household risk management which includes both narrow technical measures and broader social support strategies. These include both technical solutions involving agricultural techniques including adopting drought resistant and early crop varieties and hardy livestock breeds; improved production practices for moisture retention; insurance mechanisms; and strengthening traditional and other risk spreading mechanisms, such as family support in keeping children, offering loans, helping with farm labour needs and undertaking seasonal migration, either for farming in a different climate zone or for urban employment. Broader major strategies include: diversifying income sources, intensifying productivity by expanding farm size, leaving farming, and increasing off-farm income. To achieve these goals they recommend that resources go to increasing sustainable resource management, improving resource access in relation to land, increasing the market competitiveness of small farms, reducing household vulnerability and responding to the HIV/AIDS crisis (Dixon et al., 2001:80).

LAND TENURE AND RESOURCE MANAGEMENT

The transitions from customary to formalized legal land tenure systems and from centralized government control to decentralized structures of resource management are sources of both opportunity and uncertainty for people relying on environmental resources. As rules of access and entitlement shift, this may affect people's ability to count on these resources in coping strategies. Customary land tenure and usufruct rights systems helped people cope by creating opportunities for temporary and seasonal migration, allowing the use of particular plants for food during periods of stress, and supporting other flexible opportunities for resource use. But, where cooperative agreements once existed, conflicts between farmers and pastoralists over use of lands are currently increasing due to increasing demands by both groups. Other changes in land and resource tenure rights may result in other types of problems. For example, loss of land tenure security often decreases incentives to invest in land care or land improvement, such

as building terraces or protective stone barriers. While decentralization carries the promise of resource management that is responsive to local circumstances, it can also be a pretext for government to withdraw support for some services. As one system of rights and responsibilities is replaced by another, it is important to consider impacts during periods of greater stress, such as drought, as well as under normal conditions.

MIGRATION

Migration is a well established strategy for supporting and diversifying household income in West Africa. Temporary and seasonal migration out of arid/semi-arid regions during dry seasons reduces pressures on food stores in the sending community and, in areas like the Ivory Coast, migrant labour is an important part of tree crop (e.g., coffee or cacao) farming systems. Remittances sent back to rural communities, whether from people working in agriculture elsewhere or in cities, are an important resource for dealing with smaller and larger stresses on rural livelihoods as well as support for investment in other productive assets or opportunities. However, new forms of migration are emerging and changing social circumstances are altering the associated advantages and disadvantages of this strategy. For example, while pastoralists' north-south seasonal movements allow them to take advantage of different climates and trade opportunities, as the area under cultivation increases, conflicts between pastoralists and farmers are increasing (Batterbury and Warren, 2001).

Emerging issues

This section highlights ongoing issues that will influence vulnerability in the region over the coming years. Three of these topics reflect Sida priority concerns in the region: conflict, related refugee movements and management of international water resources. Other topics include continued population and urban growth, forecasts of water scarcity and climate change, all of which are related to current vulnerability patterns.

POPULATION AND URBAN GROWTH

Although national population projections between 2000 and 2015 throughout the region anticipate a decline in growth rates in comparison with the averages recorded between 1980 and 2000, ECOWAS's urban population was estimated at 93.5 million in 2000, and it is forecast to reach 158.5 million by 2015 (UNDP, 2001). The urbanization rate for ECOWAS states between 1990 and 2000 averaged 4.9%. That growth rate is more than twice the average estimated rate for urban growth in less developed regions worldwide for the period 2000–2030 (2.35%) and corresponds approximately to a 14-year doubling time (UNDP, 2001).

A full analysis of the implications of population growth for well-being in this region is beyond the scope of this paper, but the trend in population growth has broad implications for access to environmental resources to support livelihoods and for maintaining the quality of those resources (UNDP, 2001). While the growth rate is slowing, population size will grow at approximately 2% across the region in the coming year. Thus, the numbers of people exposed to risks and stresses, such as drought, land degradation, land and water competition and lack of food security; the demand for health care; and numbers looking for employment in cities

or marginal areas will increase. Greater population pressure will also affect natural resources. Such growth in marginal areas, without additional resources or the capacity to implement more sustainable practices, may result in a decline in household well-being in the long term.

Urban growth in less developed regions is expected to grow in relation to continued rural to urban migration and drive the transformation of rural settlements into cities (UNDP, 2001). 'Megacities' can be particularly vulnerable areas as their tremendous population size, density and growth rate are coupled with poverty, inadequate infrastructure, high resource demands and complex systems for the delivery of basic services. The population of Lagos in Nigeria, currently about 10 million, is expected to reach 16 million by 2015 (UNDP, 2001) and is the only 'megacity' forecast for this region.

Such rapid urban growth brings two sets of challenges, for the cities themselves and for their hinterlands. These cities face a significant planning challenge to meet existing and future demands for services. The already inadequate water supply, sanitation, disaster management and solid waste disposal systems will be further stretched by the risks posed by air pollution and expanding industrial waste in areas where economic development is increasing. Management of groundwater resources is already of concern in several West African cities where current levels of water consumption are unsustainable.

Meeting the food, water and fuel supply needs of large cities is a burden that falls most heavily on the resources of surrounding rural areas. While proximity to urban markets can provide additional sources of income for rural communities, such demand frequently contributes to higher, unsustainable rates of natural resource exploitation, such as for fuelwood. Concerns over urban food security have increased interest in the role of urban agriculture in improving urban food availability, dietary diversity and nutrition, as well as providing employment, particularly for women. Food for Cities, for example, became one of the FAO priority areas for interdisciplinary action in 1998 (FAO, 2002b). While this urban farming is an opportunity, it must be managed carefully so that it does not pose additional health risks, such as through the use of contaminated river water for irrigation.

SCARCITY OF WATER RESOURCES

There are several projected estimates of water scarcity pressures in the region to the year 2025. The International Water Management Institute (IWMI), for example, has projected water scarcity to 2025 based on estimates of future domestic, industrial and irrigation demands in each country, according to the United Nations 1994 'medium' growth population scenario. The IWMI study categorizes countries according to their predicted water scarcity, their projected water withdrawals expressed as a percent increase of annual withdrawals over the 1990–2000 period and their projected water withdrawals expressed as a percentage of annual water withdrawals (IWMI, 2000). It predicts that by 2025 there will be economic water scarcity in all of the West African countries (except Togo and Sierra Leone which were not included in the study). 'Economic scarcity' means that these countries will have to increase water supplies through additional storage, conveyance and regulation systems by 25% or more over 1995 levels to meet their 2025 needs. These broad patterns of water stress are likely to place more pressure on vulnerable, poor groups who are already lacking adequate infrastructure and access. Many of these countries face severe financial and development capacity problems in meeting their water needs (IWMI, 2000). As noted earlier, trends in decreased rainfall in the Sahara could alter these forecasts.

A second study forecast water scarcity and stress by calculating the ratio of renewable water resources used to the average available within a river basin (Alcamo et al., 2000). This method predicts increasing stress on water resources throughout West Africa between 1995 and 2025. The report does not predict change in the amount of territory under high stress. It projects that much of the expanded water use will occur in countries with greater water resources and that infrastructure will be the challenge for those countries. The Senegal basin is the exception among the major West African river basins. Under all scenarios considered, it is consistently expected to be under 'high water stress' by 2025 (Alcamo et al., 2000).

CONFLICTS OVER NATURAL RESOURCES

Transboundary resources and livelihoods, such as pastoralism or seasonal farming migration, are common in West Africa. Attempts to change land tenure and management regimes through legal reform will need to consider how temporary and seasonal rights during times of stress are represented in the tenure structure. Anecdotal reports suggest that growing resource demands are increasing the potential for conflicts among users. For example, the needs of farmers and pastoralists come into conflict when farmers intensify or expand cultivated land; pastoralists continue to seek mobility and flexibility in moving their herds to adequate grazing lands, a territory that shifts with climate conditions and herd sizes. These conflicts have broad repercussions and may result in the loss of livelihoods and increased poverty, as well as a reduced potential for commercial agriculture. Finally, these conflicts may also affect overall community cohesiveness, an important asset in overall well-being (UNEP, 2002:221).

Conflicts over water have local as well as international dimensions; they can escalate into more serious conflicts between nations, although when conflicts involve water there are usually several other important issues at stake. All the countries in the region, with the exception of Cape Verde, share surface water resources. There is potential disagreement over water usage and negative impacts on the livelihoods of poor people in several situations. Agriculture is central to the development aspirations of these nations and increasingly irrigation is a significant consideration in those strategies. In the Sudano-Sahelian zone, only 16% of the estimated irrigation resources has been tapped (UNEP, 2002:182). Alterations of river flow regimes have numerous upstream and downstream impacts, including changing flood regimes, altering erosion patterns and modifying habitat for fish and other aquatic organisms. Such changes may affect livelihoods based on farming, pastoralism or fishing. Thus, while irrigation and increased water availability may create the potential for higher agricultural productivity, the management of arid lands under irrigation is difficult and the allocation of irrigation lands and associated resettlement raise substantial equity issues.

A Sida study of development prospects in the region identified the most important rivers as the Niger, Senegal, Mano, Volta and Benue, the chief tributary of the Niger (Abdullah, 1997). Other major water resources include the internal drainage system that feeds Lake Chad and the man-made Lake Volta on the Volta River in Ghana (Abdullah, 1997). These are major international basins that involve the interests of many nations: the Niger Basin covers parts of 11 countries; Lake Chad, an internal drainage, includes eight countries, the Volta Basin includes six countries; the Senegal and Comoe Basins cover four countries each; and the Gambia Basin includes territory of three countries (Gleick, 2000; Wolf et al., 1999 in Gleick, 2000). The combined demands and transboundary impacts of water use in these basins will need to be managed carefully in a way that is sensitive to community vulnerabilities.

POLITICAL CONFLICTS

The troubled political history and circumstances of this region have displaced hundreds of thousands of people internally and to neighbouring countries. According to the US Committee on Refugees, countries in West Africa hosted approximately 390,000 refugees at the end of 2001. At the end of 2001, the ECOWAS countries each had between 5,000 and 190,000 refugees; the largest number were in Guinea (US Committee for Refugees, 2002). At times during the 1990s, Benin, the Côte d'Ivoire, Guinea and Nigeria each hosted over 100,000 refugees. Also during the 1990s, over 100,000 nationals sought refuge outside their home countries of Ghana, Guinea Bissau, Liberia, Nigeria, and Sierra Leone. Numbers of refugees vary over time, however, and not all refugees leave their country, instead becoming internally displaced. At points, Sierra Leone, Guinea, and Liberia had between 80,000 and 600,000 internally displaced people (US Committee for Refugees, 2002).

Refugees both contribute to environmental vulnerability and are sensitive to environmental stress. Refugees leave their homes quickly and take few resources. In their home communities crops may be left unplanted, untended or unharvested, making return conditions difficult, even if no other property destruction takes place. In refugee camps or other informal settlements, social conditions can be extremely difficult. In addition, the influx of people places heavy demands on local resources. If camps are not well supplied with water, fuel and sanitary facilities, a great deal of pressure is placed on areas surrounding the camps as families are forced to forage for necessities.

CLIMATE CHANGE IMPACTS

The Intergovernmental Panel on Climate Change (IPCC) (McCarthy et al., 2001) concluded that Africa is particularly vulnerable to the impacts of climate change. They have identified six aspects which will be especially affected by climate change, all of which are already sources of stress in West Africa, that are likely to increase vulnerability (Allai, 2001:489):

- Water resources, especially in international shared basins, where there is a potential for conflict and a need for regional coordination in water management;
- Food security, which is at risk from declining agricultural production and uncertain climate;
- Natural resource productivity is at risk and biodiversity might be irreversibly lost;
- Vector- and water-borne diseases, especially in areas with inadequate health infrastructure;
- Coastal zones vulnerable to sea-level rise, particularly coastal roads, bridges, buildings and other infrastructure that is exposed to flooding and other extreme events; and,
- Exacerbation of desertification by changes in rainfall and intensified land use.

In the arid, semi-arid and dry sub-humid farming systems, an increase in the frequency and severity of droughts would likely exacerbate current problems such as crop failures associated with high and rising cereal prices, distress sale of livestock assets and other assets, impoverishment, hunger, and sometimes, famine. During periods of food stress, households turn to other income sources, such as cutting and selling firewood, which increases pressure on other environmental resources. In drought circumstances, pastoralists travel further with their

herds and this increases opportunities for conflict with farmers over land (Dixon et al., 2001:43). Sea level rise will threaten the coastline. Major cities, such as Banjul, Abidjan, Tabou, Grand Bassam, Sassandra, San Pedro Lagos, and Port Harcourt, will be threatened and, depending on adaptation decisions and the amount of sea level rise, inundation of these cities could result in varying degrees of damage to infrastructure and displacement of populations (UNEP, 2002).

Conclusions

Vulnerability to environmental hazards and degradation in West Africa poses a substantial challenge to the poor, who are more dependent on environmental resources, and to efforts to reduce poverty. Vulnerability to one set of stresses, such as environmental hazards and degradation, adds to the difficulty of dealing with other forms of vulnerability and stress, such as economic shocks or HIV/AIDS. The loss of resources or access to other assets due to a disaster or chronic stress can move people from stable better-off positions to temporary, seasonal or chronic poverty. Therefore, vulnerability reduction strategies need to be integrated into poverty reduction plans.

Steps to decrease vulnerability can be taken at all levels. They can be further supported by targeted interventions to support specific social groups, such as women and children, community based initiatives, as well as broad sectoral improvement strategies oriented towards the needs of the poor more generally. While sectoral approaches are possible, their feasibility at the local level, implementation and ultimately, benefits depend on how the additional resources and opportunities fit within specific local circumstances. Participatory approaches to developing these vulnerable reduction strategies are key to these efforts.

Diversifying income and resources is one of the most common and successful risk/vulnerability management strategies adopted by poor people in the region. Diversification reduces the degree of exposure to one particular stress, such as crop failure, and allows flexibility in coping with different combinations of stresses and changing livelihood circumstances. Vulnerability can also be reduced by complementing support approaches that focus narrowly on one dimension of livelihood, such as agricultural productivity, with broader efforts that support flexibility and increase options, such as education, increased job or marketing opportunities, food security and health care. Progress across development sectors, such as education, health, economic development and governance, can contribute to creating new, successful strategies for coping with the challenges of environmental variability.

Decreasing vulnerability through a combination of (1) reducing stresses and avoiding additional pressures; and (2) increasing adaptive potential and supporting sustainable coping strategies will be important dimensions to regional poverty reduction strategies. Key issues to target include:

1) Reducing further stresses

- Drought and famine are the most widespread risks, and despite efforts to improve food security, health and soil conservation, the Famine Early Warning System and similar national efforts are needed to mitigate the ongoing threat of famine in the region.
- If HIV/AIDS follows the pattern of spread and impacts seen in Southern Africa, it will place severe stresses on existing livelihood and coping strategies, indeed coping with food security issues through migration may contribute to the spread.

- Many future development plans for the region involve increasing use of water resources, which will need international coordination in order to avoid upstream–downstream impacts on livelihoods and conflicts.

2) *Increasing sustainable coping strategies and adaptive potential*

- Given that the ability of the poor to work is often their single most important livelihood asset, health problems due to malnutrition, unclean drinking water, lack of sanitation, and/or limited access to health care are serious limitations to coping effectively with stresses from environmental and other sources.
- While poverty in the region is primarily rural, maintaining rural–urban connections through trade and migration is a major component of household strategies to cope with stresses and disasters which affect farming income.
- Migration, whether seasonal, annual or more temporary, is an important coping strategy in the region. However, it is at risk from political conflict, changing land tenure institutions and limited urban employment opportunities.
- Climate change presents major uncertainties and threats to livelihoods and infrastructure in arid and semi-arid areas, as well as coastal zones in the coming decades.

Another strategy for reducing vulnerability is to focus on those groups, regions and institutions facing combinations of multiple stresses, high risk and high vulnerability. Within West Africa, this type of priority setting should give particular attention to the following issues:

- In the more humid coastal countries, continued pressure on forests is decreasing biodiversity and reducing availability of non-timber resources that provide protein, raw materials for handicraft, medicines, and other household needs.
- Pastoralists living in the less populated arid northern areas are especially vulnerable as they often have poor access to resources like extension services, medical care, education and infrastructure investment.
- Population growth in urban areas places the poor under greater stress as growth outpaces the availability of housing, employment and infrastructure. This results in shortfalls in access to safe drinking water, sanitation and the jobs that migrants seek to support families in rural areas. In Lagos, the only megacity in the region, these challenges are amplified.
- In heavily populated and industrialized sections of the coast, pollution, coastal erosion and loss of mangrove habitat are increasing the vulnerability of fishers.
- While new formal land tenure systems have not been firmly established across the region, traditional land-use and land tenure relationships are less stable. In the cotton growing region and the areas where farmers and pastoralists intersect, increasing pressures on land use, both in reducing fallow periods and extending into marginal areas, are fuelling local conflicts.

Throughout the region, targeting the most vulnerable members within poor populations can also help reduce vulnerability. Women, children, the disabled, chronically ill, elderly, and families with many dependants find it particularly difficult to cope. Although circumstances vary widely across the region, women often lack customary control over resources, such as land or cash crops, and new legal rights are not universally recognized. Children have few broadly recognized entitlements to resources, except through their parents. As they depend primarily on their mothers, the vulnerability of women is a dimension of children’s vulnerability.

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Appendix A

DEFINITIONS OF VULNERABILITY TERMS

Vulnerability

Vulnerability is the degree to which a system or unit (such as a human group or a place) is likely to experience harm due to exposure to perturbations or stresses. It is comprised of three dimensions:

Exposure

The exposure of people, places and ecosystems to stresses, perturbations and shocks.

Sensitivity

The degree to which people, places and ecosystems are affected by stress or perturbation, including their capacity to anticipate and cope with the stress.

Resilience

The ability of the exposed people, places and ecosystems to recover from the stress and to buffer themselves against and adapt to future stresses and perturbations.

(Source: Kasperson, J.X. and R.E. Kasperson. 2001. International Workshop on Vulnerability and Global Environmental Change. Stockholm Environment Institute, SEI Risk and Vulnerability Programme, Report, 2001:1. 36pp).

Appendix B

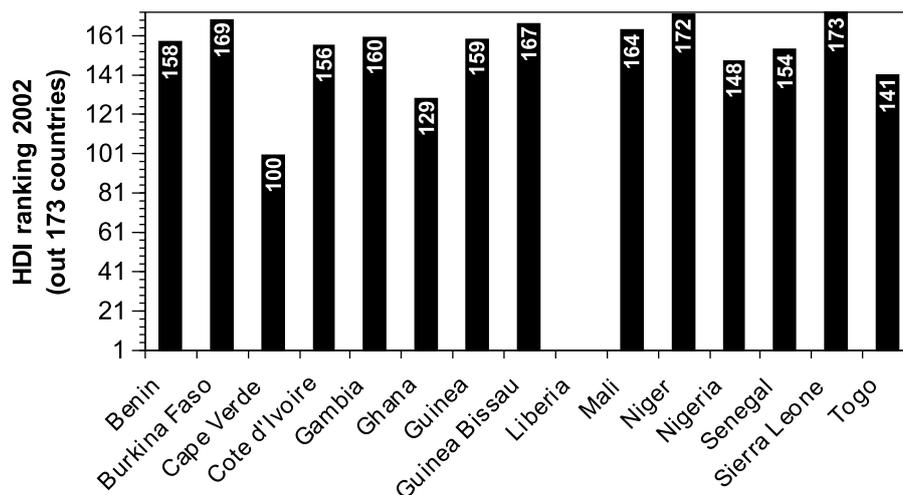


Figure AB Human Development Index Ranking for ECOWAS Countries
 Source: UNDP 2002

Appendix C

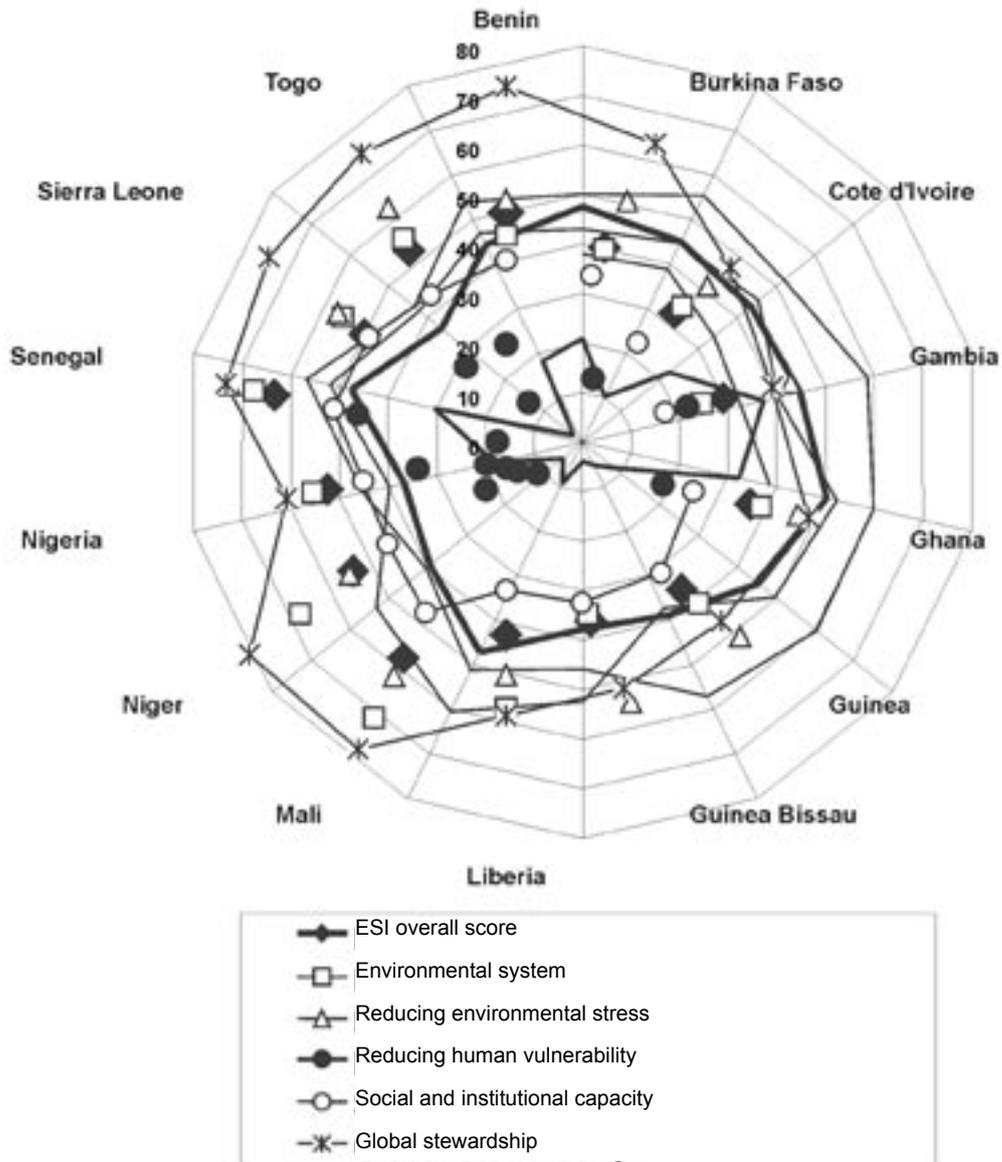


Figure AC Environmental Sustainability Index. Total and component scores for ECOWAS countries

Source: Global Leaders for Tomorrow Environment Task Force et al., 2002

Appendix D

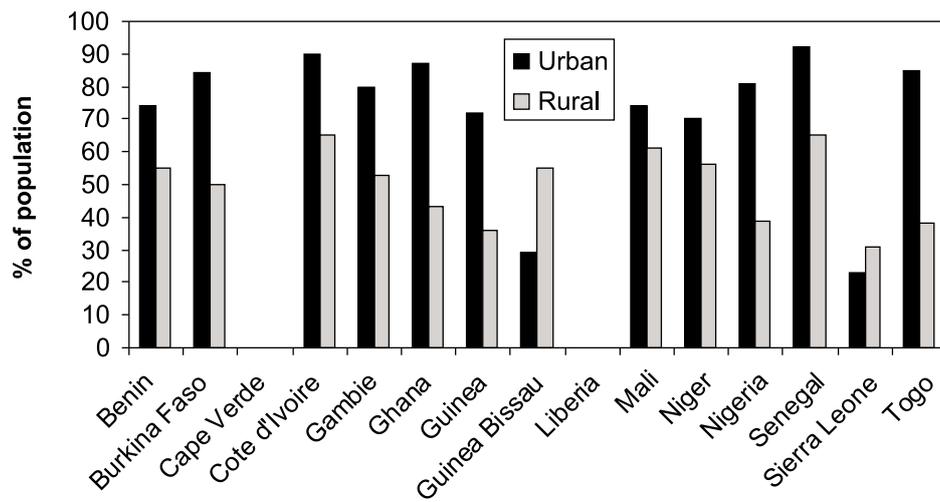


Figure AD Percentage of urban versus rural populations with access to improved water
Source: UNDP 2002

Appendix E

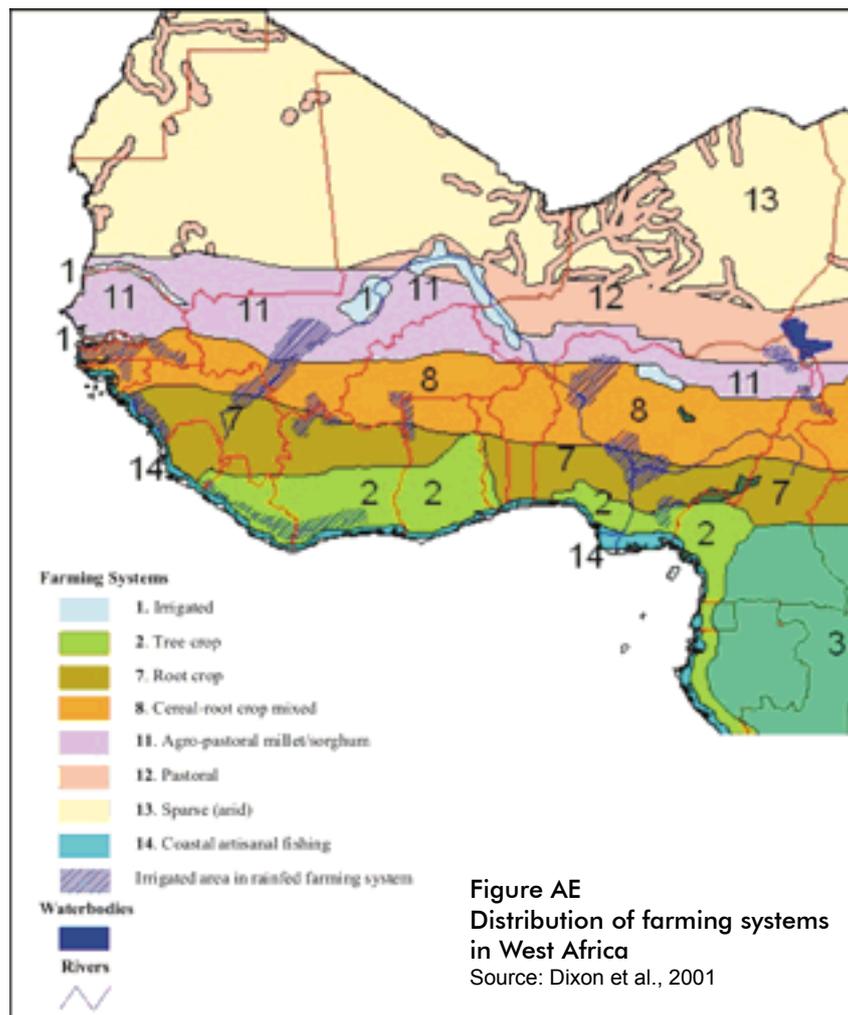


Figure AE
Distribution of farming systems
in West Africa
Source: Dixon et al., 2001

The Stockholm Environment Institute (SEI)

SEI is an independent, international research institute specializing in sustainable development and environment issues. It works at local, national, regional and global policy levels. The SEI research programmes aim to clarify the requirements, strategies and policies for a transition to sustainability. These goals are linked to the principles advocated in Agenda 21 and the Conventions such as Climate Change, Ozone Layer Protection and Biological Diversity. SEI along with its predecessor, the Beijer Institute, has been engaged in major environment and development issues for a quarter of a century.

Mission

SEI's mission is to support decision-making and induce change towards sustainable development around the world by providing integrative knowledge that bridges science and policy in the field of environment and development.

The SEI mission developed from the insights gained at the 1972 UN Conference on the Human Environment in Stockholm (after which the Institute derives its name), the work of the (Brundtland) World Commission for Environment and Development and the 1992 UN Conference on Environment and Development. The Institute was established in 1989 following an initiative by the Swedish Government to develop an international environment/development research organisation.



Risk and Vulnerability Programme

This programme conducts research on environmental and technological hazards and global environmental change. Expanding on ongoing and previous work on risk analysis, risk perception, and risk management, research now also focuses on the differential vulnerability of people, places, and ecosystems. The hallmark of this programme is integrated analyses that seek to bridge the best of the social and ecological sciences. A major priority is the development of policies and initiatives that hold promise for enhancing human security, adaptive capacities, social equity, and resilient societies.

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