

Demographic trends, resource allocation and climate change in sub-Saharan Africa: Policy implications for sustainability (reference 0137)

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Summary

Projected population growth to 2050 is highly uneven distributed, with 98% of growth expected from less developed regions with 35% from sub-Saharan Africa, the world's fastest growing region. Some 60% of the world's human population live close to the coast, within about 100 kilometers of the shore. In Nigeria, for example, about 20 million people (22.6% of the national population) live along the coastal zone and Nigeria; most of the economic activities that form the backbone of the national economies are located within the coastal zone. The current population indices in south west Niger Delta of Nigeria and the heavy burden it puts on the coastal zone was examined. The paper examines the vulnerability of the affected stakeholders as well as the emergence of coping capacities among the different political groups in the area using the current literature available. It considers the physical structures and land use modification in this conflict-region of Nigeria and the anticipated future developments of the area. The paper shows that the impact of climate change on coasts is and will be exacerbated by increasing human-induced pressures. The paper observes the political and economic impacts on the resources as a result of the tremendous population increase over the years in this region. Coastal population pressures and increasing exploitation of coastal resources-utilizing conflicting exploitation methods-have led to coastal degradation. The paper recommends and reinforces the desirability of managing coasts in an integrated manner and concludes with suggestions for other African countries facing similar problem.

Introduction

Global population is projected to rise to around 9 billion by 2050; if international migration were to remain at a constant 3% of the world's population, it would rise as a result by 40% to 275 million in 2050. Urban growth is projected to occur alongside population growth: around half of the population of sub-Saharan Africa is expected to live in cities by 2030, with a higher proportion in Southern Africa, and the lowest proportion in East Africa. There are also a number of intervening factors that influence the extent and patterns of migration, including aid and immigration policies that seek to stop people moving, but which frequently do not work. In Africa in particular, migration has long been a strategy to cope with adverse conditions for agriculture and subsistence farming. Major poles of attraction in Africa include major cities and resource-rich countries such as Côte d'Ivoire, Nigeria, Gabon, DR Congo,

and South Africa. Nigeria is the most populous nation in Africa. Growth in human population has been a major problem in resource allocation. Unguided use of natural resources as a result of non availability of data to equate the stakeholders and their trend will definitely lead to resource mis-allocation. This has its untold effects on the environment and resource use especially in Africa. The paper examines the vulnerability of the affected stakeholders as well as the emergence of coping capacities among the different political groups in the area using the current literature available. It considers the physical structures and land use modification in this conflict-region of Nigeria and the anticipated future developments of the area. The paper shows that the impact of climate change on coasts is and will be exacerbated by increasing human-induced pressures. The paper observes the political and economic impacts on the resources as a result of the tremendous population increase over the years in this region. Coastal population pressures and increasing exploitation of coastal resources-utilizing conflicting exploitation methods-have led to coastal degradation. The paper recommends and reinforces the desirability of managing coasts in an integrated manner and concludes with suggestions for other African countries facing similar problem.

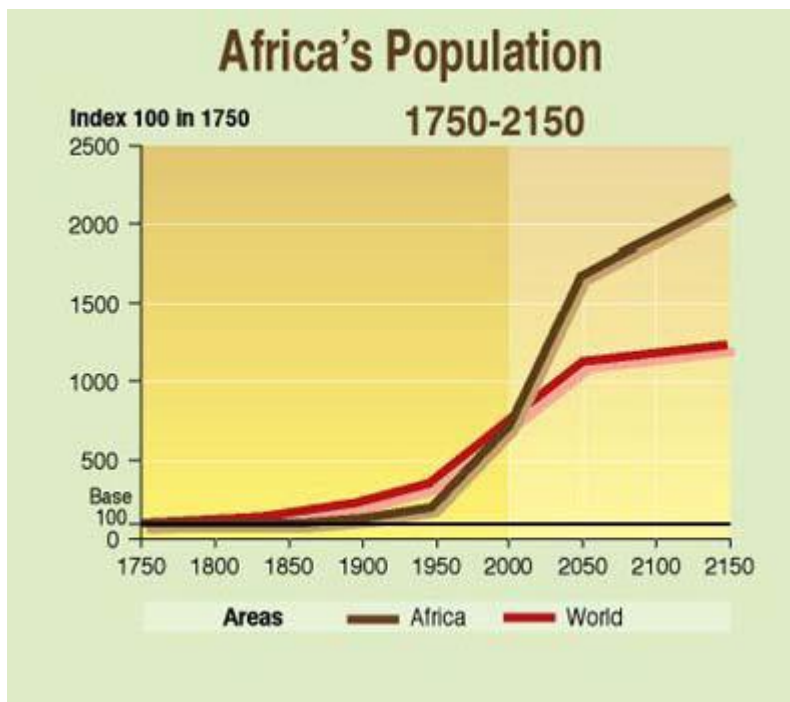
Africa's demographic situation

The high population growth in Africa, rural-rural migration and high urbanization rates interact with climate change to exacerbate her vulnerability to climate change. In the coastal areas, sustained rural-rural and rural-urban migration especially from the drier areas to the moist and humid regions puts undue pressure on land resources both for farming and pasture. This often results in communal conflicts between pastoralists and sedentary farmers, further weakening the economy of the already impoverished rural areas. Africa's population of 851 million (2003) has been shown to be growing at an annual rate of 2.4%, almost twice the world average of 1.2 percent. It has been doubling in 22 years with the high proportion of young people, the population momentum will probably continue for decades to come, even with AIDS reversing decades of gains in life expectancy. This growing population will exert pressure on the provision of safe water, education and health services, as well as threaten food security. The real fact is that 60% of the people over the age of 15 are illiterate. Africa's population has a high under-5 mortality rate of 140 per 1000, and life expectancy at birth of only 54 years. Africa still has one of the highest population growth rates in the world (Figure 1), with a current rate of about 2.4 per year. Three demographic factors that compound Africa's developmental dilemma are: high fertility rate, rapid and unplanned urbanization and migration. Fertility rates, although declining, are also estimated as being some of the highest in the world. It is generally believed that an unmanaged population growth resulting in a sustained pressure on natural resources will act as a catalyst for the propagation of the adverse impacts of climate change in Africa (Nyong, 2005)..

Africa is both a hotspot of human capital and ecological wealth, and a region at the mercy of climate change. Its water resources, biodiversity, agricultural systems, forestry and coasts,

and the health of its people, all face immense pressures from current and future climate upheavals. Much of this is already evident. The Intergovernmental Panel on Climate Change's Fourth Assessment Report says the cost of adaptation to climate change in Africa could be as much as 5 to 10 per cent of the entire continent's GDP. But Africa is poorly equipped to adapt, and international commitment to support the continent's countries in coping with climate change is justified. In Africa, highly productive ecosystems (mangroves, estuaries, deltas, coral reefs), which form the basis for important economic activities such as tourism and fisheries, are located in the coastal zone. Forty percent of the population of West Africa live in coastal cities, and it is expected that the 500 km of coastline between Accra and the Niger delta will become a continuous urban megalopolis of more than 50 million inhabitants by 2020 (Hewawasam, 2002). By 2015, three coastal megacities of at least 8 million inhabitants will be located in Africa (Klein et al., 2002; Armah et al., 2005; Gommers et al., 2005)

Fig 1: Africa's Population, 1750 - 2150



Physical background of Nigeria

Nigeria with a total area of 923,800 sq km occupies about 14% of land area in West Africa. The country lies between 4oN and 14oN, and between 3oE and 15oE. It is bordered respectively in the north, east, and west by Niger, the Cameroon, and Benin Republic, while the Gulf of Guinea, an arm of the Atlantic Ocean, forms the southern

border. The highest areas are in the east, north, and west, where land is generally over 1,500 metres, 600 metres, and 300 metres, respectively. The low-lying areas, which are generally below 300 metres, lie along the coast and along the main river valleys.

The Udi Plateau which lies to the east breaks the monotony of the surface along the coastal lowlands, which are characterized by coastal creeks and lagoons on both sides of the Niger Delta. West of this Delta the coastal areas consist of lagoons and swamps, separated from the open sea by strips of sandy land, which vary in width from 2 to 6 kilometers. The Niger Delta is cut up by numerous water channels through which the River Niger reaches the sea. Nigeria is located within the tropics and therefore experiences high temperatures throughout the year. The mean for the country is 27°C. Average maximum temperatures vary from 32°C along the coast to 41°C in the far north, while mean minimum figures range from 21°C in the coast to under 13°C in the north. The climate of the country varies from a very wet coastal area with annual rainfall greater than 3,500 mm to the Sahel region in the north western and north eastern parts, with annual rainfall less than 600 mm. Recent studies have revealed declining trends in rainfall. There are generally two seasons in the year: the wet and the dry seasons. The length of the rainy season decreases from 9-12 months in the south to only 3-4 months in the extreme northeast. Nigeria has six main vegetation zones namely; the mangrove swamps the Fresh water swamps, the rain forest swamps and other coastal vegetation, tropical lowland rainforest, Guinea savannah, Sudan savannah, and the Sahel savannah. Along the coast are salt-water and freshwater swamps and other coastal vegetation. Further inland, the lowland rainforest, Guinea savannah, Sudan savannah, and Sahel savannah follow roughly in that orders.

Nigeria's population and settlement: The Coastal Niger Delta scenario

With an estimated population of about 160 million and total area of 923,800 km², Nigeria's dense population makes it a high potential contributor to global warming. Very high population densities are found in the eastern states, the western cocoa belt, the Lagos metropolitan area and the Kano and Sokoto regions of the north. In some parts of the eastern States, the population density exceeds 1,000 persons per sq. km. Large areas of the country are, however, sparsely populated. Out of over 250 ethnic groups the most numerous are Yoruba, Igbo, and Hausa/Fulani. Other groups include Tiv, Ibibio, Ijaw, Edo, and Urhobo. The Niger Delta is a low-lying region, cut up by a complicated system of natural channels

through which the River Niger finds its way to the sea. It is made up of three distinct sub regions. They are (a) freshwater zone (b) the mangrove swamps, and (c) the zone of coastal sands and beach ridges. The freshwater zone, which starts from the apex of the delta, just below the town of Aboh, is essentially an extension of the lower Niger floodplains. The numerous water channels in this zone are bordered by natural levees, which provide the sites for most of the settlements and farmlands in the zone. The mangrove swamps, covering about 10,360 square kilometers and located to the south of the freshwater swamps are sparsely settled. Strips of sandy beaches and ridges, which vary from a few meters to 16 kilometers, separate the mangrove swamps from the open sea. In addition to natural levees, ox-bow lakes are common landforms in the Niger Delta. The high rainfall in the region, coupled with the abundance of surface water and the flat terrain, create a serious drainage problem and makes road construction very difficult.

Migration and population systems

Up to 38 per cent of the African coastline is considered to be under a high degree of threat from developments which include cities, ports, road networks and pipelines. In 1995 projections showed that western and central African coastal populations would double to 50 million by 2020, leading to a continuous chain of cities in the Gulf of Guinea. The demand for resources and infrastructure development in the coastal zones is now putting immense pressure on fragile ecosystems which are under severe threat from development related activities. This is a very serious issue in the Niger Delta of Nigeria. Pollution from major coastal cities is already widespread and has reached alarming levels in many areas, with industrial pollution, mining and oil exploration activities adding to the strain. Although the current level of industrial development in Sub-Saharan Africa remains relatively low, it is accelerating along the coastal zone and many industries still discharge untreated wastes directly into rivers and the oceans.

Political and economic impacts

In Nigeria, for example, about 20 million people (22.6% of the national population) live along the coastal zone; about 4.5 million Senegalese (66.6% of the national population) live in the Dakar coastal area. About 90% of the industries in Senegal are located within the

Dakar coastal zone. In Ghana, Benin, Togo, Sierra Leone, and Nigeria, most of the economic activities that form the backbone of the national economies are located within the coastal zone (Anon, 2005).

The rich and diverse resources of Africa's coastal and marine environments have encouraged rapid population growth, industrial expansion and infrastructure development. Many early colonial settlements in Africa were established on the coast in order to maximise trade opportunities. As a result, all but three of the African countries from Mauritania to Namibia have their capital cities on the coast. In the 32 coastal countries in sub-Saharan African, more than 50% of the population lives within 100 km of the coast. This varies between less than 2% of the population in Ethiopia to 100% of the population in the island states of Seychelles, Mauritius, Comoros and Cap Verde (Anon, 2005). Food production in most of sub-Saharan Africa has been on the decline, and has not kept pace with the population increase. Over the past 30 years, the area of agricultural land has increased (from 166 million ha in 1970 to 202 million ha in 1999) at great cost to the environment. But these efforts have been absorbed by rapid population growth. During the same period, the number of undernourished people has doubled (202 million people in 1999-2001, FAO, 2004). This situation is exacerbated by recurrence of droughts and also by civil wars (Nyong, 2005).

Physical structures and land use modification

Africa's coastal ecosystems and marine biodiversity contribute significantly to the economies of many coastal countries, notably through fishing and tourism, and also in an uncontrolled way to the economies of developed countries who exploit these resources. Coastal zones in Sub-Saharan Africa are especially important for the tourism industry, which generate significant employment and foreign exchange revenues for an increasing number of countries. These have led to enormous physical alterations on the environment and uncontrollable land use modification. With the growth of coastal cities, rural poverty increases as young people and those with marketable skills are attracted away from their homes and villages in the countryside. For example the influx of youths in search of unavailable jobs in the Oil companies in Port Harcourt in Rivers State, Warri and Effurum in Delta state has its deleterious implication on the housing and physical structures of these states in Nigeria. Sustainable urban regeneration demands an understanding of rural, suburban and peri-urban poverty and the measures required mitigate the effects of the massive exodus to the city. Significant portions of people in African countries depend on fish for protein, thus near-term impacts on the fishery sector may also affect human nutrition and

health. Assessments of impacts of climate change on fisheries conducted by some Africa countries show that in coastal states having important lagoon or lake systems, changes in freshwater flows with more intrusion of salt waters in the lagoons will have consequences on fish species. With climate change, fisheries will be affected by sea level rise through either coastal erosion or inundation, which could destroy fisheries infrastructures and fishing villages and could also affect important ecosystems involved in reproduction and larval growth of fishes.

Vulnerability and coping capacities

In Africa, coastal zones are characterized by the presence of high productive ecosystems (mangroves, estuaries, deltas, coral reefs) which constitute the basis for important economic activities like tourism and fisheries. The concentration of populations and industries with important urban centers (Lagos in Nigeria had 36 million people in 2005) is another characteristic of these coastal zones. For example, 40% of the population of West Africa lives in coastal cities and it is expected that the coast between Accra (Ghana) and the Niger delta (about 500 km) become a continuous urban megalopolis with more than 50 million people by 2020 (Hewawasam, 2002 cited by Nyong, 2005). The pressures of a dramatically growing population are illustrated in changing land use surrounding entire south-south and south-east of Nigeria's coastal floodplains. The impact of a population explosion on farmland and forest is clearly seen in contrasting images of the entire Niger delta with the conversion of large area of forest and riparian woodland to agriculture between 1976 and 2007. Limited productivity and labour opportunities, notably the oil exploration conglomerates in the off-shore areas, and prolonged youth restiveness is a key driver of migration, particularly where climate variability is high. Migration triggered by ecological vulnerability – particularly floods – is significant in number and frequency, but commonly temporary and local/regional in nature.

The way out

Among other ways of seeking long term and short term solutions to most of the impending problems include:

Capacity Building: Capacity building emphasizes the need to build on what exists, to utilize and strengthen existing capacities, rather than arbitrarily thinking of starting from scratch.

Capacity building to adapt to climate change in Africa is about complex processes of changing people's mindsets and behaviour and introducing more efficient technologies and systems. The need for capacity building in Africa on the issue of adaptation to climate change has been collectively and individually emphasised in many fora.

Strengthening the most vulnerable communities

The need to strengthen the most vulnerable communities in Africa can not be overemphasised. In the Niger Delta area of Nigeria, youth restiveness and hostage taking has accelerated environmental disorder and dis-orientation to the point that the various Oil companies in the region are sceptical about their continued operations in Nigeria. The removal of barriers to internal mobility could play a role in facilitating the diversification of rural livelihoods. Given the poorest and most vulnerable are least likely to move, continued attention to pro-poor policies is needed in rural source areas.

Public awareness

Institution of educational and information mechanisms that highlights human activities that aggravate negative climate change scenarios should be well programmed and delivered in all African countries. The most important response is the strengthening of adaptive capacity of affected populations, including agricultural diversification and investment in disaster risk reduction and early-warning systems, including speedy and efficient humanitarian responses

Use of Appropriate Technology

Appropriate research and research technology is needed by all African countries in climate change issues. There is a need for further research evidence on the role of migration in adapting to climate change in particular national and regional contexts, and on the impact of climate change on "pull" factors of migration in destination areas.

Conclusion

Poorly planned and managed coastal cities, the lack of adequate sanitation treatment, as well as pollution from land-based activities such as agriculture and industry, threaten human health and the quality of habitat for fish and other marine life (UNEP 1998; O'Toole and others 2001). Human-induced activities such as construction, dredging and mining for sand, and harvesting corals have led to severe problems of coastal erosion. The Niger River Delta is losing 400 hectares of land a year to erosion (Hinrichsen 2007). The Intergovernmental Panel on Climate Change (IPCC) projects that toward the end of the 21st century, climate change will have caused sea-level rises that will affect Africa's highly populated low-lying coastal areas. Adaptation costs could amount to at least 5-10 per cent of GDP (Adger *et al*, 2007). The most important response is the strengthening of adaptive capacity of affected populations, including agricultural diversification and investment in disaster risk reduction and early-warning systems, including speedy and efficient humanitarian responses

Attention needs to be paid to urban planning, service provision and human security in areas where people are already migrating – especially in slum areas of major coastal cities where population growth is likely to accelerate. The capacity of urban labour markets to absorb large and youthful migrant populations needs particular attention if secondary migration is to be avoided. Support could be provided to initiatives to defuse tensions and encourage peaceful cohabitation of both internal and intra-regional migrants and local populations.

References

Adger, N. and others (2007). Summary for Policymakers. Working Group II Contribution to the Intergovernmental Panel on Climate Change Fourth Assessment Report Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability. IPCC WGII Fourth Assessment Report. [http:// www.ipcc.ch/SPM6avr07.pdf](http://www.ipcc.ch/SPM6avr07.pdf)

Anon (2005) Climate change, arts and politics in the sustainable growth of Sub-Saharan African Cities. Second Conference on Coastal zones in sub-Saharan Africa (CoZSSA II. November 7-9, 2005, Accra, Ghana. Pp 17

Armah, K.A., G. Wiafe and D.G. Kpelle (2005) Sea-level rise and coastal biodiversity In WestAfrica: a case study from Ghana. *Climate Change and Africa*, P.S. Low, Ed., Cambridge University Press, Cambridge, 204-217

Gommes, R., J. du Guerny, F.O. Nachtergalle and R. Brinkman (2005) Potential impacts of sea-level rise on populations and agriculture. *Climate Change and Africa*, P.S Low, Ed., Cambridge University Press, Cambridge, 191-203.

Hinrichsen, D. (2007). Ocean planet in decline. Peopleandplanet.net, 25 January, <http://www.peopleandplanet.net/doc.php?id=429andsection=6>

Klein, R.J.T., R.J. Nicholls and F. Thomalla, (2002) The resilience of coastal megacities to weather-related hazards. *Building Safer Cities: The Future of Disaster Risk*, A. Kreimer, M. Arnold and A. Carlin, Eds., The World Bank Disaster Management Facility, Washington, District of Columbia, 101-120

Nyong, A (2005) Impacts of climate change in the tropics: The African experience. A keynote presentation at a Scientific Symposium on Stabilization of Greenhouse Gases, Met Office, Exeter, United Kingdom, 1-3 February, 2005. Pp 24.

O'Toole, M.J., Shannon, L.V., de Barros Neto, V., and Malan, D.E. (2001). Integrated Management of the Benguela Current Region. In: *Science and Integrated Coastal Management*, ed. B. von Bodungen and R.K. Turner, Dahlem University Press. pp. 231-253.

UNEP (1998). Overview of Land-based Sources and Activities Affecting the Marine, Coastal and Associated Freshwater Environment in the Eastern African Region. UNEP/Institute of Marine Sciences, University of Dar es Salaam/FAO/SIDA, [/www.unep.org/ regionalseas/ Publications/rsrs167](http://www.unep.org/regional seas/Publications/rsrs167).

