

know about the components of genomes that could be made available for such restructuring. We know nothing, however, about how the cell senses danger and instigates responses to it that often are truly remarkable.

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The Population Factor in Africa's Development Dilemma

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Africa, south of the Sahara, consists of 45 independent majority-ruled states. These range in size from small island states like Sao Tome and Principe and Seychelles, with populations of 86,000 and 66,000, respectively, to large countries with relatively sparse populations like Sudan, with a land area of 2.5 million square kilometers and a population of about 19 million, to densely populated countries like Nigeria, with a land area of 924,000 km² and a population of 85 million (Fig. 1). The region as a whole is the least developed of the world's inhabited geographical areas. Twenty-three of the 35 least developed countries are in Africa. Despite years of intensive efforts, many of these countries appear to be standing still or even going backward when several accepted indexes of development such as gross national product, education, infant mortality, general health status, and industrial output are considered.

Demographic Features

Africa, south of the Sahara, with an estimated population in 1983 of 400 million, has the fastest growing population in the world. The average growth rate is

about 3 percent per year, with a range of 1.5 percent in Gabon to 4.1 in Kenya (1). The region is growing at a faster rate than the historical peaks achieved in Europe during its most rapid growth.

Summary. Despite several decades of international effort, the development problems of sub-Saharan Africa remain acute. By many of the quality of life indexes, the majority of African countries are standing still or moving backward. A rapidly growing population with an adverse dependency ratio places demands on services that present development strategies cannot satisfy. A reorientation of development is necessary to establish realistic population policies and to implement comprehensive family planning programs.

The crude birth rates are between 40 and 52 per 1000, and the crude death rates from 10 to 18 per 1000 (1). While mortality has been declining slowly, particularly during the 1960's and 1970's, the fertility rates are remaining fairly constant or even showing slight rises in some countries. In a few countries, with problems of sub- and infertility (Zaire, Gabon, and the Central African Republic, for example), the potential for increases in the fertility rates in the short term is high. The populations are rather young: 20 to 22 percent are under 5 years, and 45 to 50 percent are under the age of 15. The dependency ratio is there-

fore very high and contrasts sharply with the ratios of the more developed countries (Table 1). The demographic profile suggests some immediate development needs, including education for the ever increasing numbers of children, more and improved health services, particularly those for mothers, infants, and young children.

Vital statistics in Africa are rather poor, and planners must depend on survey data, figures from a few registration centers in each country, or on pure guesses. However reliable they may be, the available data suggest a rather poor state of affairs. Infant mortality, with few exceptions (Kenya and some urban centers), averages more than 100 per 1000 live births. There are some countries or remote rural areas in which the figures

are between 200 and 250 per 1000. Infant mortality rates have been found to be a rather sensitive index to the level of general development of a community and valuable as a measure of the quality of life. Infant mortality rates in Africa are about 5 to 20 times those for the more advanced countries. Young child (1 to 4 years) mortality in Africa ranges between 25 and 30 per 1000 (2); European and North American rates are usually

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Table 1. Comparison of age structure in developed and developing countries. Data are from 1980 except the fertility rate is for 1981. Source: World Bank, Population, Health and Nutrition Department, 1983.

Area	Age distribution (percent)					Fertility rate
	0 to 4 years	5 to 14 years	15 to 64 years	>65 years	All ages	
All developed countries	7.6	15.5	65.6	11.3	100.0	
Japan	7.3	16.1	67.7	8.9	100.0	1.7
United Kingdom	7.9	15.0	66.3	10.7	100.0	1.8
Hungary	8.0	13.7	64.9	15.9	100.0	1.9
All developing countries	13.6	25.5	57.0	4.0	100.0	
Korea	10.6	22.7	62.2	4.0	100.0	3.0
Colombia	14.0	25.4	57.1	3.5	100.0	3.7
Bangladesh	17.9	24.9	54.6	2.6	100.0	6.4
Kenya	22.4	28.6	46.1	2.9	100.0	8.0

around zero. Maternal mortality rates are also very high: two to six deaths per 1000 live births—that is, 100 to 500 times the western European rates. Thus, the high population growth rates of Africa result from high fertility and relatively high mortality and are therefore achieved at a very high price in the lives and health of African women. In some poor rural areas, by the time women complete their families, 50 percent of the cohort is dead.

The spatial distribution of the population is also an important problem area. On the whole, Africa is the least urbanized of the populated continents. About 80 percent of the population is rural. In some parts, settlements are so sparse as to create major problems for the provision of basic services by governments. Nonetheless, urbanization is also proceeding at an explosive rate. The major cities are growing 5 to 7 percent per year. Cities like Lagos, Ibadan, Kinshasa, and Accra, have been growing at an even faster rate. The rush of immigrants to towns increases the stresses on fragile urban services for water, sanitation, electricity, and communications.

Population Changes in Africa

The high population growth rates in Africa began as recently as 1950. There is no true historical comparison with the magnitude of the change, its speed, or the major factors responsible for it. At the time when the populations of Europe were growing most rapidly, the rate was a little over 1 percent per year, and the peak never exceeded 1.6 percent per year (3). Europe's agricultural production was progressing well, and overall development including improvements in environmental sanitation, food produc-

tion, nutrition, and industrial development accounted for and supported much of the change. In the case of Africa, these conditions cannot account for a large fraction of the change.

The true contributions of different factors have not been well analyzed, but a fairly substantial increase is due to the application of biomedical technology. Many of the endemic plagues of Africa have lost their demographic impact. Smallpox has been wiped out; yellow fever is under control in many countries and, when it flares up, it is quickly contained; and malaria can be controlled or limited in its impact. Intertribal wars have all but disappeared from Africa during most of this half of the century. Droughts and famines are not as devastating to human lives as they were in the past. Relief services, although poorly organized, do make a difference in development. All these gains can be increased manifold with a more extensive application of already proven intervention technologies. Thus, unlike the historical situations where economic development led the way to and accompanied population increase in Africa, populations are increasing so fast as to frustrate development efforts.

Urbanization in Africa is more frequently a "push" phenomenon than a "pull" one. The majority of migrants to towns are not being pulled in by the availability of employment as happened in Europe during the Industrial Revolution, but are escaping from the poverty and desperation of rural living conditions. Migrants into towns are at best underemployed and usually unemployed, creating high crime rates in the shanty towns in which many must live. Often these septic fringes to the towns have vital statistics that are much worse than those of the rural areas.

Education

Perhaps in no field of development is a direct relationship between population size and growth rate and national need more obvious than in the field of education. Practically all the African countries have explicit policies for providing education to all citizens of primary school age. Adult literacy rates are extremely low, varying from 8 percent in Upper Volta, to perhaps 60 percent in Lesotho (2).

In the majority of countries, adult literacy is less than 30 percent. Some countries have actually enacted laws for compulsory fee-free primary education. Of the region's school age children only about 50 percent or fewer were in school in 1981 (4). As of 1983, Mauritius and Kenya are the only countries that have approached the 100 percent school enrollment target. Very few countries can provide the places in schools or the trained teachers needed to meet the rapidly increasing school age population in Africa today. In 1960, the number of school age children not in school was estimated at 28 million; in 1980, the estimate was 29 million, and the same is projected for the year 2000.

The primary school situation is serious, but the problems in secondary and higher education are apparently much worse, although figures are hard to compile or interpret. Only about 5 to 20 percent of children who complete the primary grades gain admission to secondary schools and only a very tiny fraction of these find places in universities or advanced training institutions. The tragedy is that some children who pass, at the age of 11 or so, the rather stiff common entrance examination for secondary school find that there are no places available for them.

African countries on the whole are already putting 25 to 35 percent of their annual budgets into education, and it is not clear how they could increase these allocations. Restructuring the systems of education or running two streams where feasible (that is, having one group of children attend classes in the morning and another in the afternoon with the same classroom and teacher) may help to a certain extent. But unless the growth in the size of the school age population slows, no country can attain or maintain a 100 percent primary schooling program and expand the secondary and tertiary cycles. The competition for national investment between education and other investments that will be more immediately productive poses a major dilemma to African governments.

Employment and Labor

Unemployment and underemployment are much greater problems in developing countries than in more developed countries. Because agricultural work is seasonal in much of Africa, seasonal underemployment is the normal way of life except for those who have another occupation. Some Fanti fishermen in southern Ghana combine fishing with temporary work in the nearby mines. Others fish the oceans in some seasons and freshwater during others. A large number of fishermen tend to undertake market gardening too. Many peasant farmers get temporary labor on transportation projects, but because the economic recession has hit African countries very hard, public sector employment especially is shrinking.

Unemployment among those with some education is becoming very serious. Before independence, in most of the English-speaking countries, a primary school education enabled one to secure a job as a clerk or a ship assistant. This is no longer the case. Even those with a secondary school education face an uncertain future without further training. Education programs that have tended to alienate students from the land have created some of the problems. But it is also true that, with so much invested in education, countries have little left to invest in agricultural improvement programs and industry. Moreover, few countries can meet the escalating costs of bringing new land into production or creating new jobs in industry.

There are situations in which the types of development approaches chosen—capital intensive—have not helped the problems of unemployment. No one really knows the true number of the unemployed in Africa. Figures ranging from 25 to 30 percent of the labor force are mentioned, but even these are certainly an underestimate. Really drastic reforms in the development approaches are needed if improvement is to be achieved.

Agriculture and Food Production

The recent droughts and food shortages in Africa have drawn attention to the region's serious agricultural problems. The traditional method of farming, slash and burn, was productive when population pressures were small and there was enough land to allow for a fallow period of several years. In many countries, land now can be left for only 1 or 2 years—not enough for full recupera-

tion. Yet intensive farming methods are unavailable or inaccessible financially to peasant farmers. Landlessness is not yet a major problem in Africa as a whole, but as increased privatization of land and property increases, this, too, should be expected.

Deforestation is increasing, with wastage of 50 acres per minute mentioned by some experts. Some of this exploitation is to meet the demand for the export of hardwoods. Most of the wood, however, is converted into charcoal for use as household fuel. The land, deprived of forest cover, is rapidly exposed to erosion, and becomes poor material for food-crop production. In West Africa, such deforestation, together with overgrazing and overcultivation among other factors, is resulting in the advance of the Sahara at an estimated 10 kilometers per year. The conflict between the increasing population, their legitimate requirements and aspirations, and the need to protect the agricultural heritage is not yet clearly appreciated by many African leaders; the need for foreign exchange often receives priority over all other considerations (5).

Many of the African elite maintain that Africa is thinly populated and that it has vast arable land resources and reserves.

This is only partially true. Much of the arable land will be difficult or expensive to bring under cultivation. The World Bank estimated that 22 percent of all potentially arable land was under cultivation in 1975. Major endemic diseases such as onchocerciasis and trypanosomiasis preclude full development of about 45 percent of the rest (6). Moreover, cultivable land with adequate rainfall is estimated at only 19 percent of the potentially arable land. Irrigation is a very expensive alternative; the Bura Scheme in Kenya, for example, cost more than \$25,000 (U.S. dollars) per hectare. And the current rate of ecological damage, if unchecked, will mean destruction of the resource before it is put to proper use. The determination with which some countries defend their sovereignty makes regional use of land difficult.

In the early 1960's, most African countries were self-sufficient in food production, and the region as a whole produced enough of its basic staples. By the end of the 1970's, per capita production had fallen by 10 percent, and it is estimated that by the end of the 1980's, per capita production will have dropped by 20 percent. Between 1971 and 1980 population grew at 2.9 percent and food production at 1.8 percent per year. Only Burundi,

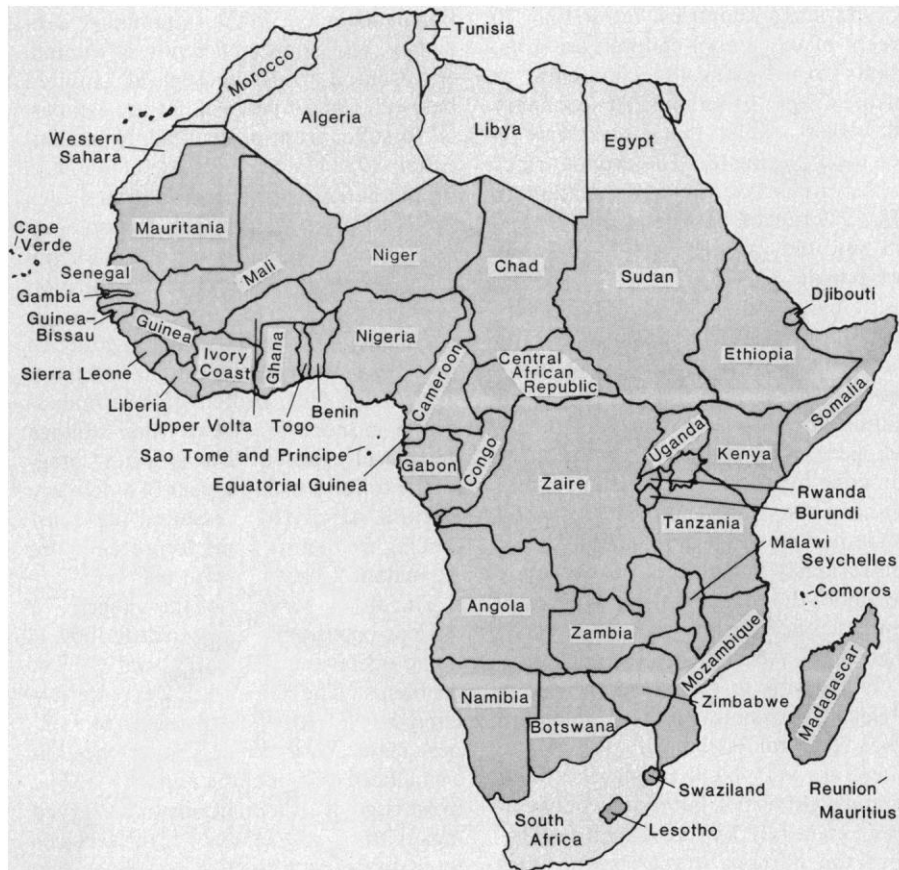


Fig. 1. Africa, with the shaded area showing the 45 independent majority-ruled states south of the Sahara.

Ivory Coast, Rwanda, Tanzania, and Zambia have maintained or improved their per capita food production in the last two decades. This is a serious situation for any region to face; much more such a poor one (7).

Apart from the serious implications for health and nutrition, deficits in food production mean that food must be imported and with scarce foreign exchange. In the last half of 1983, Nigeria is thought to have used 600 million naira (about 900 million U.S. dollars) to import rice. Although it is true that the failure to produce staples is not a direct result of the rapid population growth rate, this nevertheless increases the requirements and the expenditures.

The Status of Women

The status of women is a matter of great concern to Africa. Perhaps the rural African woman is the most underprivileged of all human beings. Various social roles, cultural practices, and the biological tasks imposed by fertility, have combined to keep the average rural African woman close to a beast of burden.

In countries with low educational attainment, the statistics on girls are very poor. In some countries, fewer than 20 percent of the school children are girls. Parents do not make the same effort to educate daughters as sons. At secondary and higher levels, the discrepancy is even more glaring (8). The dropout rates for the primary cycle of education in 1978–1979 ranged between 6 and 72 percent, and the vast majority of dropouts were female.

Although women have traditionally handled most of the family food crop production and have therefore played a major role in agriculture, in many communities they do not own land and do not have access to credit. Very little has been done for and with women in extension services. And wherever cash crop production or modern technology has been seriously introduced, the tendency is to ignore the role of women or actively alienate them from the soil.

The usual African fertility pattern is for childbearing to start as soon as it is biologically possible and stop at menopause. The total fertility rate per woman is therefore very high, ranging between four and eight births, but mostly between six and eight (1). This very high fertility means the African woman spends between 18 and 20 years of her adult life in childbearing (that is, the interval be-

tween the first live birth and the last one) in comparison with 3 to 5 years for many more advanced countries. Her potential for other pursuits is therefore considerably reduced.

Women who receive an adequate education may suffer little discrimination on the job, but the number of women in top administrative and policy positions in African countries is quite small. It is not at all clear that there is much rapid change occurring in the role and status of women in Africa. This could present a serious impediment to Africa's development.

Health and Nutrition

The health status of the populations of Africa is another major development issue. There is high morbidity and mortality from infectious and communicable diseases such as tuberculosis, leprosy, tetanus, malaria, trypanosomiasis, onchocerciasis, and amebiasis. There is also very high prevalence of helminthic infestations ranging from ascaris and hookworm to bilharzia. Apart from these, large populations, especially of children, are subject to malnutrition. The most prevalent nutritional syndromes are protein-calorie malnutrition, nutritional anemias, goiter, vitamin B deficiency, and some deficiency of vitamin A. From 2 to 10 percent of children between 1 and 4 years of age are estimated to suffer from protein-calorie malnutrition (9). Up to 50 percent show a weight deficit considered abnormal.

Quite apart from low purchasing power and low availability of food, in some geographic regions problems of nutrition are related to high fertility itself. There is a tendency for the anemias and goiter to be more prevalent in pregnant and nursing women (10). Protein-calorie malnutrition is more prevalent when siblings are closely spaced. Where a new pregnancy follows within a year of a delivery in rural Africa, the cessation of breast feeding frequently leads to protein-calorie malnutrition and death of the child.

The health services of the majority of African countries have been described as being irrelevant to the size and type of problems. The usual service pattern—clinic-based episodic treatment of sickness mainly in urban areas—reaches but a small proportion of the population. The rapid rise in the populations to be served means that the efficiency of services tends to fall with time.

All African governments have expressed a commitment to primary health

care for all, but very few have really made the budgetary and other resource allocations necessary for implementation. The curative services for less than 30 percent of the population consume 80 percent or more of the health resources. Thus, many African women go through life and bear the six to eight children without any formal health care.

The irony is that even the very inadequate health care available and the narrow-based development efforts make quite an appreciable difference to the survival of children and the extension of life for adults. Without further rational development, health care as it currently stands could compound the problems of population. To the goal of providing the best possible health care, education, and employment to each individual born, Africa's rapid population growth poses a real difficulty.

Perceptions of Population and Development by Governments

Before 1974, only three African countries—Mauritius, Kenya, and Ghana—had produced population policies with a clear expression of concern for the rate of population growth as a factor in economic development. These countries cited the dilemma of a high population growth rate and its demands on educational and health services and employment. Kenya, with particular land needs, relates the problem also to increasing competition for land. About five other countries saw family planning as necessary for health and welfare and had allowed the formation of national family planning associations.

Since the Bucharest Population Conference of 1974, and particularly in the last 5 years, governments' views have changed rapidly. Botswana, Lesotho, and Gambia have joined the countries worried about their population growth rate in relation to their development plans. Senegal has expressed concern about the distribution of its population. Some 25 countries have national family planning associations affiliated with the International Planned Parenthood Federation which get some government support. Only four countries oppose family planning because they want more rapid population growth. The rest permit family planning for health and welfare reasons.

African leaders generally accept the role of family planning for birth spacing. The majority, however, still do not accept the developmental need for slowing

down the population growth rate. Even some countries likely to double their populations within 20 years, such as Nigeria, do not see their growth rates as posing a problem. Apart from Mauritius, no African country has a family planning program that is really reaching the people and that can make a demographic impact in the next decade or so.

A very important recent development is the overwhelming endorsement of population and family planning policies and programs contained in the Kilimanjaro plan of action (11). There is need for a greater effort to make African leaders much more concerned about the population growth rates. A careful international campaign based on historical analyses, demographic projections, graphic presentations of development pathways, and the effects of rapid population growth on the attainment of development goals could make a difference. Leaders might then put more support and resources behind family planning programs as a component of overall development plans.

No one believes today that family planning and population programs are a substitute for development or that they can attain their best impact in the absence of development. However, their contribution to development should be understood so that they receive adequate support. Development for populations with a natural increase of 3 to 4 percent per year poses problems many orders of magnitude greater than approaches based on growth rates of 1.5 percent or less. In order to harmonize the perceptions of families about their need for children and society's view of the costs of children, certain aspects of development will need to be given very high priority.

Approaches to Population and Development

It would be difficult to say anything new about what the possible approaches to development should be. The subject is vast and complex and the solutions to problems must be locale-specific. However, certain major issues reasonably common to all countries warrant consideration. Education, especially for women, employment creation, both in the urban and rural sectors, improvement of health services, and the initiation or strengthening of family planning and

population activities deserve urgent attention.

Education for all is a noble goal, but it should incorporate skills that make individuals employable as well as useful in society. When the Basle Missionaries brought their primary education to the then Gold Coast, their graduates after 10 years could read and write the local language and English, and many could speak German. Some were also trained as masons, carpenters, or mechanics. Those who went into trades and public service had acquired the necessary elements. If such an approach was possible in the early 1900's, surely a similar effort based on the national development strategies should be possible today.

Particular attention needs to be given to the education of women. Not only should the literacy balance be achieved, but efforts should be made to eradicate discriminatory education and enable girls to achieve their full potential. In the fields of nutrition, health care, and family planning, education of females has been found to contribute more positively and effectively than education of males.

Development of both rural and urban areas that will generate employment commensurate with the educational opportunities seems elusive to many African countries. To a certain extent, agricultural policies, including overcapitalization, discriminatory support of cash crops as opposed to food crops, and pricing policies that make farmers subsidize townsmen, are to blame for the declining food crop production. These should be altered, and more relevant production and pricing policies adopted. Many countries also need "opening up." Funds for roads and other public works are scarce, but such development will not only create employment but will also build a better infrastructure for delivering health care and other services.

The expansion of health services is a major need. The orientation to more basic strategies that meet the immediate health needs of the majority of the population is necessary. No African country can expand its health services on the present pattern. UNICEF has identified growth monitoring, oral rehydration, prolonged breast-feeding, comprehensive immunization, targeted food supplementation, family planning, and female literacy as areas that will make an immediate and major impact on the lives of women and children. Appropriate mixes of these interventions should be given

priority and implementation strengthened.

Countries need to give appropriate emphasis to population and family planning. Where development efforts are progressing well, strong family planning programs also apparently do well. If African governments adopt and implement comprehensive development strategies in which the total population can participate, family planning programs should be an integral part. It is a rather baffling situation to find so many countries engaged in national development planning without considering the total numbers and the rate of increase of the people for whom the plans are being made.

The Role of International Assistance

International assistance agencies need the patience to understand that Africans have many reasons for wanting larger families. The insecure hold on life, the deprivation of rural life, and the need for family as an insurance in old age, are but a few. African governments are increasingly realizing the negative impact of rapid population growth on the attainment of national goals. The only way to resolve the conflicts and to have meaningful population and family planning programs is to put the programs firmly within people-oriented development programs and activities. The assistance agencies should show a sensitivity to provide their help for population within an appropriate framework.

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