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9. ABSTRACT

Ghana has seven major health problem areas: 1) low life expectancy, with especially high infant and childhood mortality; 2) poor nutrition, especially for young children; 3) a high incidence of communicable diseases; 4) poor and badly distributed environmental sanitation facilities; 5) a shortage and bad distribution of most kinds of health manpower and health facilities; 6) emphasis on curative rather than preventive medicine; and 7) a relatively low level of resources allocated to the health sector. To remedy these, the Ghanaian government already has increased the personnel being trained and has expanded comprehensive health services in rural areas. However, agricultural productivity needs to be improved, with special emphasis on growing more protein-rich crops. Resource allocation should be shifted from curative services to control by prevention in the area of diseases preventable by vaccination and in the provision of potable water supplies. The health care infrastructure must be reorganized, with a more efficient distribution of health personnel, better health education, and more emphasis on maternal and child health and nutrition programs.

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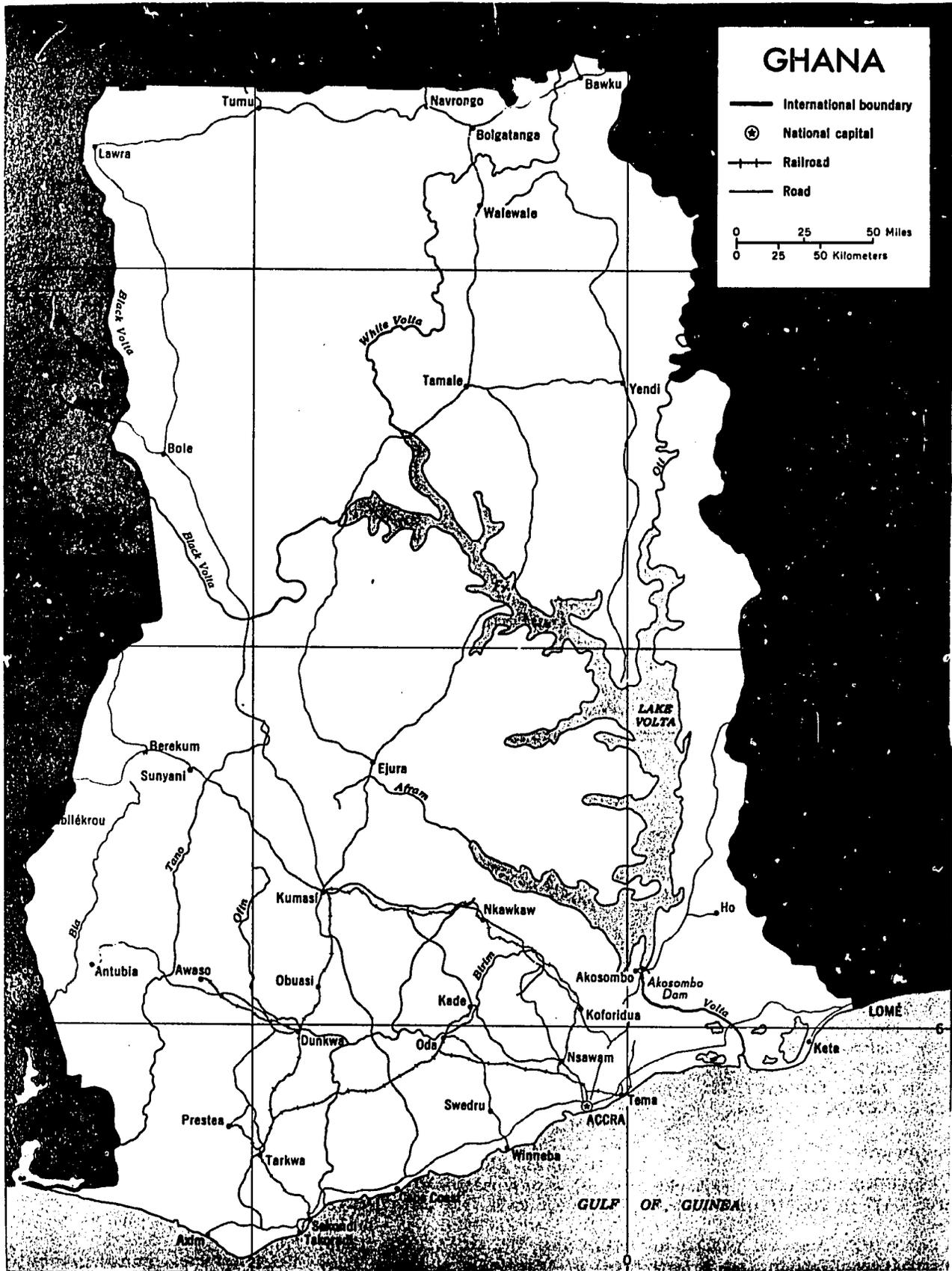
SYNCRISIS
THE DYNAMICS OF HEALTH

*An Analytic Series on the Interactions
of Health and Socioeconomic Development*

X: GHANA

**U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE**

**OFFICE OF INTERNATIONAL HEALTH
DIVISION OF PLANNING AND EVALUATION**



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S Y N C R I S I S

THE DYNAMICS OF HEALTH

An Analytic Series on the Interactions
of Health and Socioeconomic Development

X. GHANA

Lyndall G. Beamer
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PREFACE

This report was prepared by the Division of Planning and Evaluation of the Office of International Health, Department of Health, Education, and Welfare, in response to a request from the Agency for International Development for use by a mission to Ghana. Its purpose is to assist in the identification of the relationship between health and economic development. This is the tenth volume in an ongoing series of studies funded by AID to explore such relationships, and as a tool for planning resource allocations.

Due to time and data constraints this report must be regarded as a preliminary assessment. In the time available attention was directed to summarizing the available information and drawing attention to those areas which seem to require attention.

Preparation of the report has been based upon a number of official and unofficial sources which were available in the United States on short notice. The available information was often incomplete, outdated, and at times even contradictory. Therefore, the opinions and judgements formulated are tentative and must be interpreted and applied with caution.

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LIST OF ABBREVIATIONS

AID	Agency for International Development
FAO	Food and Agricultural Organization
GNP	Gross National Product
IBRD	International Bank for Reconstruction and Development
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
WHO	World Health Organization

FRAMEWORK FOR ANALYSIS

Geography and Climate

The Republic of Ghana lies on the southern side of the bulge of West Africa, just a few degrees north of the equator. It is bordered on the south by the Gulf of Guinea, on the east by Togo, on the north by Upper Volta, and on the west by the Ivory Coast. Ghana is roughly rectangular in shape with an area of 92,100 square miles, slightly smaller than the state of Oregon. The capital, Accra, is on the coast in the east-central part of the country.

The climate is tropical and is influenced by moisture laden trade winds blowing across the Atlantic and by hot, dry winds coming out of the north-east from the Sahara desert. The southern part of the country has high relative humidity during most of the year. Further inland the level of humidity is lower and varies depending upon the prevailing winds. The period from March to October is characterized by heavy rains, especially in the regions influenced by the Atlantic trade winds, while during November to February there is little rain. Mean maximum monthly temperatures range from 74-86 degrees Fahrenheit at Accra, to 64-95 degrees Fahrenheit at Tamale in the north.

These climatic conditions have an effect on disease patterns of the country. During the wet seasons there are ideal conditions for mosquito breeding. The dry periods in the northern part of the country and the dust laden desert air bring an increase in upper respiratory and eye irritations, the incidence of pneumonia and other respiratory infections increases, and epidemics of meningococcal meningitis are more frequent. Especially in the more humid areas of the southern half of the country, the climate is enervating, promotes skin infections, and can have a deteriorating effect on medical supplies and equipment.

The southern half of the country is low lying with altitudes mostly under 500 feet. The exception is a low mountain range in the east along the Togo border, with elevations up to 2,900 feet. From the low coastal lands, the altitude rises in the Ashanti highlands and then slopes downward into the savannas and the plateau of the Volta basin, which extends to the northern border.

There are five geographic regions in the country. The low plains have a strip of coastal savanna with flat or slightly rolling land and include the delta of the Volta river. In the delta the soil is easily worked and palm oil, cassava, corn, and other products are grown. The terrain around Accra is mostly flat and some areas, which receive less rainfall, are generally free of the tsetse fly and suitable for livestock breeding. The plains west of Accra support some agricultural activity but are infested with the tsetse fly and are generally unsuitable for raising cattle. To the west the lowlands of the Pra basin are an important cocoa and food producing region and contains some of the country's most important mineral deposits. Further west in the Akan lowlands there is a large area of tropical rain forest.

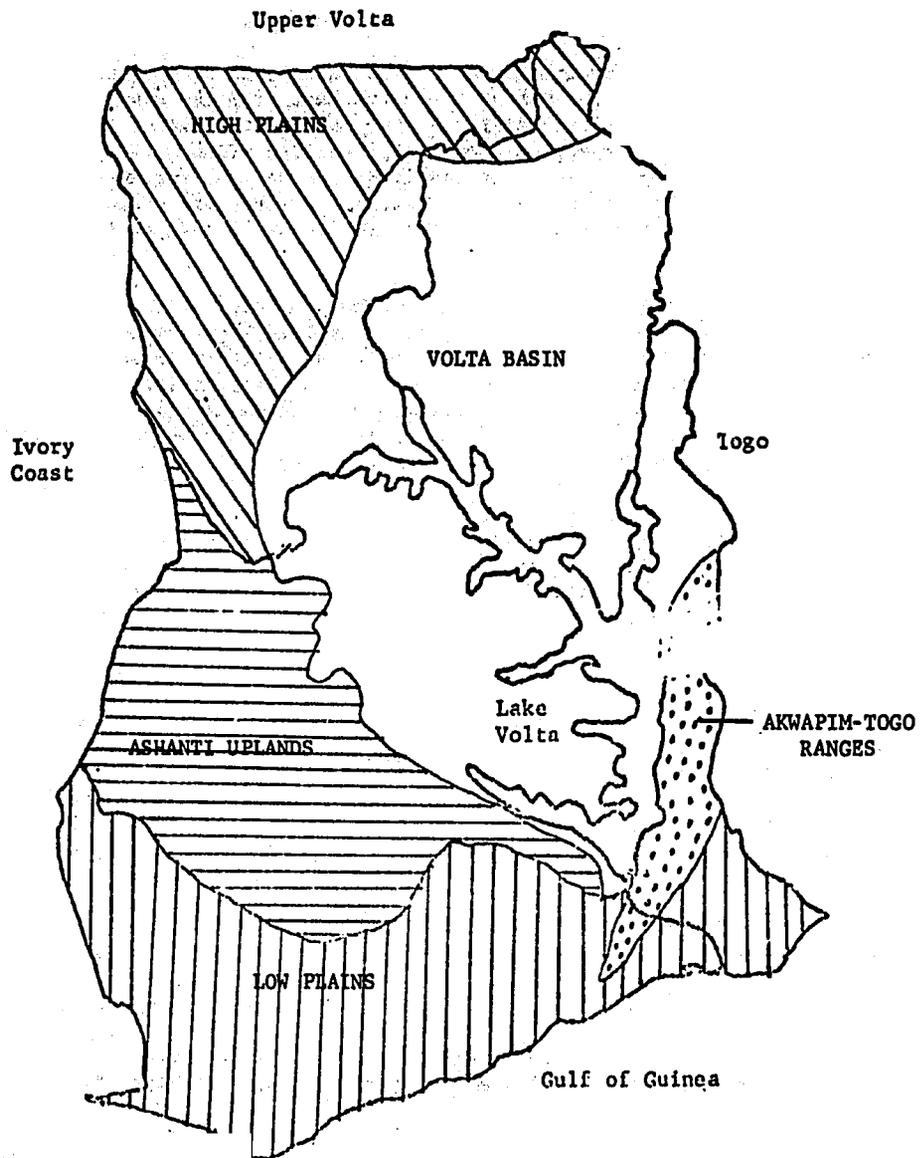
North of the lowlands lie the Ashanti uplands which receive considerable rainfall from moisture laden winds and have important cocoa producing areas and mineral deposits.

The Volta basin covers about one-half of Ghana's total area. The soil is poor, the population sparse and transportation difficult. Lake Volta, created by the damming of the Volta river, is one of the largest man-made reservoirs in the world, covering an area of about 3,275 square miles. An estimate has been made that 80 percent of the children living along its shores have been infested with schistosomiasis.

In the far north and west are the high plains which have elevations between 500 and 1,000 feet and an annual rainfall of 40-50 inches. The soil is more fertile than in the Volta basin and supports greater agricultural activity. Grain and livestock are major products but due to transportation and marketing difficulties, which tend to isolate the region from other parts of the country, production is largely for local consumption. Livestock can be raised because the area is a less favorable habitat for the tsetse fly. The Akwapim-Togo Range of low lying mountains lies in the extreme eastern part of the country. The range is mostly covered with deciduous forests but there is some small-scale subsistence farming.

Table 1

Ghana: Geographic Regions



Population and Society

In 1921, the population of Ghana was just over 2 million. By 1960 it had reached 7.1 million and in 1972 it was estimated to be 9.5 million. The country is not densely populated, with an average of about 105 persons per square mile, but the population is growing at an estimated rate of 3 percent per year. With characteristic high fertility and declining mortality at the current growth rate, the population could double in just over 20 years. It has grown by one-third since the 1960 census.

Accra has a population of 849,000 and Kumasi, the second largest city, has 343,000 inhabitants; four other cities have populations of over 100,000. The population in cities of over 5,000 is estimated to be about 30 percent of the total, but cities are growing more rapidly than rural areas.

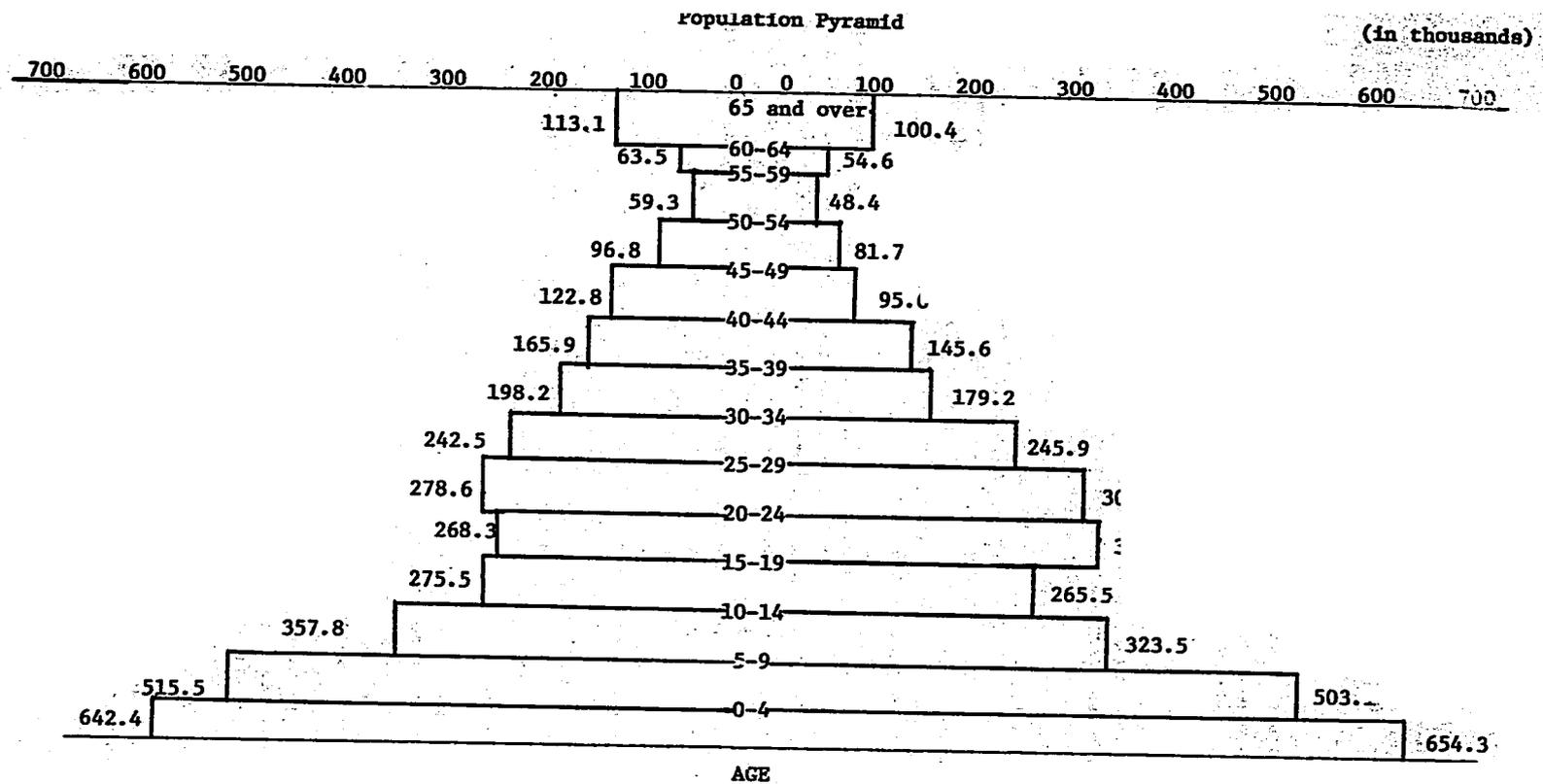
Estimated sex breakdowns of the 1972 population show that females were in the minority and comprised 49.5 percent of the total population, versus 50.5 percent for males. This contrasts with trends in other parts of the world, where more males than females are born, but the males have a higher death rate. The difference in the population of Ghana can be ascribed, in part, to the large preponderance of males in the immigrant population (a ratio of 170 males to 100 females). These immigrants, who made up over 8 percent of the total population in 1960, came mostly from the neighboring countries of Togo, Upper Volta and Nigeria. The sex ratio also varies in different parts of the country, suggesting internal male migration to areas of greater economic opportunity. For example, males are relatively more numerous in the newly developed cocoa planting areas of the west and central lowlands, while females predominate in the more isolated and underdeveloped northern part of the country.

Some inferences have also been drawn regarding the age breakdown. It was estimated that in the late 1960s half of the population was under 18 years of age. This is in general agreement with the population breakdown of Ghana by age and sex which was prepared following the 1960 census. (See opposite chart.) At that time, the population 19 years of age and under was 53 percent of the total (compared to about 39 percent in the U.S.) and the population aged 14 and under was 45 percent of the total. Considered another way, if 45 percent of the population is in the age group between birth and 14 years, and 3 percent in the group aged 65 and above, that leaves 52 percent in the economically active age groups between ages 15 and 64.

Ghana is experiencing the seemingly worldwide phenomenon of a population shift from rural areas to the cities, in addition to the overall increase in population. Available data suggest that the two largest cities, Accra and Kumasi, grew by 22 percent and 39 percent, respectively in the five-year period from 1966 to 1970. Foreign (mostly to the cities) immigration has been largely stemmed by enforcement of the Alien Compliance Order of 1969, which brought about the departure of a number of aliens.

The problems posed by such explosive growth are serious. The available health and social services are strained, the migrants often arrive lacking urban skills. With employment opportunities limited in any event, they find themselves on the fringes of the social and economic society to which they come. Much of the urban growth has been in the form of shanty towns just within or outside the city limits. Dwellings are constructed of any available material and environmental sanitation is often completely lacking. Sometimes the new arrival settles temporarily, or permanently, with a barely established member of the extended family. This results in additional crowding of scarce housing. Such conditions are conducive to the transmission of communicable diseases, with the spread of infections aggravated by poor sanitation. On the other hand, even with deplorable housing and sanitation, the migrant does have some health services available that may have been completely lacking in the areas from which he came.

Almost the entire population of Ghana is Negroid African with a very small minority of Europeans, Asians and other non-Africans. Their numbers in the total population are probably



Source: Adapted from Republic of Ghana, Census Office, 1960 Population Census of Ghana, III, Demographic Characteristics Accra, 1964, pp. 3-7.

not over 1 percent. The indigenous people are grouped into over one hundred native states and tribes. The native states have no well defined boundaries, which sometimes results in rivalries and disputes. The tribal areas do not necessarily conform to administrative demarcations by the government, which resulted from the requirements of the colonial era, based on political or economic considerations, rather than recognition of tribal and traditional boundaries. However, there is probably no part of the country which is ethnically unmixed. There are migrants everywhere, and in some cases representatives of various groups have been long established in areas dominated by other groups. In some cases, settling in an alien area may be temporary and solely for employment or other economic considerations. Local languages, rituals, and customary laws continue to be important aspects of the social scene, especially in non-urban areas.

There is a dual social structure with traditional societies existing side-by-side with the national system of statutory law, legislatures, and the use of English, which is the official and commercial language of the country. While there is no clear-cut demarcation, by and large the traditional society is more prevalent in the rural and northern sections of the country, while the colonial influence is stronger in the southern and especially in the urban areas. Undoubtedly many Ghanians are in both cultures. Traditional society is based to a greater extent on family membership, inherited status, and traditional beliefs. The flow of migrants to and from the rural areas leads to a considerable intermingling of the two social organizations. In the urban setting literacy in English and educational achievement are a measure of social stratification.

In the traditional societies lineage is an important factor in the social structure. It is through lineage that customary law and sanctions are exercised, property is inherited and rights and obligations are incurred. There are a number of examples of both matrilineal and patrilineal structures.

When these traditional patterns of conduct are transferred to the urban setting they are modified but not immediately overthrown. Relations with neighbors who are also immigrants, other employees, and social organizations tend to break down some of the traditional social structure. To a lesser extent, the introduction of cash crops, technology and assistance from the government, and improved communications have tended to change the rural structure to some degree as well.

Religious affiliation of the people, as reported by the 1960 census, showed 43 percent Christians, 38 percent animist and traditional religions, 12 percent Moslems, and 7 percent who claimed no religious affiliation. The Christians are roughly one-third Roman Catholic and two-thirds Protestants of various denominations. The southern part of the country has a relatively high proportion of Christians, while the north shows a larger proportion of Moslems. This reflects the exposure of the south to the colonial powers and the north to Islamic influence.

Traditional religions are closely related to family loyalties and the local mores. Different ethnic groups have their own traditions and sacred places or persons. The spirit world is considered very real and bears a close relation to the living. The living and the dead can affect each other. The worship of departed ancestors is an important element of these religions.

There is a strong element of fate involved in the daily lives of the people. Things do not happen by chance; accidents, sickness and death are the result of spirit influences. The prescribed moral code must be closely observed for fear of angering spirits and bringing about misfortunes. Witch doctors and herbalists are consulted to determine the cause of illness and the steps to be taken to ameliorate it. Thus, good health can be granted by gods who are favorably disposed. Ill health, unhappiness or death can be the result of the bad will of gods or of other humans who bear ill will. These attitudes are apparently accepted in whole or in part by large numbers of the population, even of the higher strata. Many Ghanians will resort to both traditional and scientific medicine to overcome illness. Some groups forbid the use of

medicines in the healing process. The Muslim groups, primarily in the north, have their own set of rules for diet, dress, treatment of disease and family structure. They do not readily accept immunization and aggravate the risk, through their dispersion and attitudes, of the spread of communicable diseases.

Population Growth

In 1973 the International Statistical Programs Center of the U.S. Department of Commerce estimated the crude birth rate for Ghana to be 48 per 1,000 and the crude death rate 18 per 1,000, giving a rate of natural increase of 3 percent per year. These estimates parallel those from official Ghanaian sources. During the 1960s the mortality rate showed a decline. This trend is expected to continue during the 1970s, thereby increasing the population growth rate unless there is an accompanying drop in the birth rate. Such a rate of growth adversely affects per capita income, employment opportunities, and the costs of provision of social services such as education and health.

There are indications that prevailing attitudes toward ideal family size present a real stumbling block to population control. A study prepared by Dr. John C. Caldwell, The Control of Family Size in Tropical Africa, shows that Ghanaian attitudes generally favor even larger families than many of the other underdeveloped countries. The international range of "ideal" family size is 3.2 - 5.0 children, while in rural Ghana it is 7.5. Among the Ghanaian urban elite the range is 4.3-6.1 children. The percentage wanting four or more children in the international range is 25-80 percent; in rural Ghana it is 98 percent, in urban Ghana 94 percent, and among the urban elite 89 percent. Any change in this desire for a large family will require time and the introduction of well planned public education. While studies which seek to determine desired family size can be deceptive, because respondents might answer in one way and act in another, the available data certainly support this strong pro-natalist tendency.

Reasons most often cited for wanting a large family include: additional labor on the farm or in the home, a mark of prestige or honor to the parents, support and comfort to parents in old age, and survival of the family line. Reasons cited for not having many children were most frequently the cost of supporting and the difficulties of raising them, crowding, noise, etc. These responses may indicate possible lines of approach to promote the desirability of smaller families.

The relationship between population growth and other aspects of social and economic development deserve amplification. The following analysis summarizes some of the effects as determined in a recent review by the Population Council and the International Institute for the Study of Human Reproduction.

Relationship to National Income

If there is no net external investment, the per capita income would fall 8 percent at present fertility levels between 1960 and 1985. With a fertility rate decline of 1 percent per annum per capita income would rise by 9 percent and with a decline of 2 percent per annum, it would rise by 24 percent.

Relationship to the Size and Quality of the Labor Force

The labor force of Ghana is about 40 percent of the total population, or about 3.5 million people. This force has been growing faster than job opportunities. During the next five years, about 800,000 persons will be added to the labor force. Making allowances for retirements and deaths, this means that about 130,000 to 140,000 persons will enter an already crowded labor market annually. Most of them will be young, inexperienced workers, many of whom will come from the rural areas to the already overcrowded cities. Projections showed that the increase to the labor force would be on the order of 2.8 percent annually between 1965 and 1970, and 3.7 percent annually after 1970. Even with a decline in fertility there would be little reduction of the labor supply for 15 years.

Relationship to Agriculture

The bulk of Ghana's labor force is employed in the agriculture and related activities sector. This situation will undoubtedly continue for some time. Government plans for the agricultural sector project a growth rate of 3-4 percent compared to a population growth of about 3 percent per year. Even if this agricultural growth rate is realized, it does not mean that employment opportunities will expand by an equal percentage. It is estimated that, under the most favorable circumstances, farm labor will not be able to absorb more than 50,000-60,000 persons per year. The strain on food supplies to meet the need of the expanding population will be serious.

Relationship to Education

Enrollment and expenditures for public education have grown at a rapid rate during the last decade. Public outlays for education in 1969 were N¢ 79.4 million, up from N¢ 34.4 million in 1961 (1N¢, New Cedi, approximately equal to US\$1 at the time). The figure for 1969 represents over 21 percent of the government's total current and capital expenditure budget. Primary school, middle school, and secondary school enrollments have climbed from about 600,000 in 1960-61 to 1.47 million in 1968-69, more than doubling the load on education facilities in less than a decade.

Relationship to Public Health

Though still rudimentary by developed country standards, efforts in the field of public health in recent years have contributed to reductions in the crude death rate by as much as three-fourths of one percent per year. With the extension of basic health services, particularly in the rural areas, mortality is likely to continue to decline.

Ghanian population growth attracted attention after the 1960 census showed an increase of two-thirds over the 1948 census. Although President Nkrumah believed the economy could support that rate of growth, the 1963 Seven-Year Development Plan warned that the rapid population increase would impede development and strain the economy. After the overthrow of Nkrumah, the 1966-69 Military Government took definite steps toward formulating a population control program. This interest was stimulated by a study sponsored by the Ghana Academy of Sciences and the Ford Foundation, A Study of Contemporary Ghana, which appeared in 1966 and 1967. The study pointed out the economic savings that could be realized by reducing the rate of population growth. The Two-Year Development Plan published in 1968 referred to the intention to establish family planning services. In the same year the Ghana Manpower Board prepared a statement of national population policy which was published in 1969 as an official policy paper, Population Planning for National Progress and Prosperity. This paper recognized the need for a national population policy as an integral part of national social and economic planning. This statement of policy did not include detailed recommendations on how to achieve specific objectives. Some of the major policy recommendations were as follows:

1. Details of the population program are to be developed by participation of national and regional, public and private entities.
2. Reduction of morbidity and mortality should be an important part of the program.
3. Quantitative goals should be set on the basis of reliable demographic data.
4. The Government will encourage and provide information and assistance to persons wishing to space or limit the size of their families, but this will be done through persuasion rather than coercion.

5. Efforts will be made to expand the non-domestic role of women in the economy to reduce pro-natalist influence.
6. Policies will be adopted to regulate internal migration and immigration.
7. Contacts with international public and private organizations will be developed to benefit from their experience and assistance in population programs.

In early 1970, the government approved the National Family Planning Programme (NFPP) and authorized funds to finance it. To reduce the rate of population growth, efforts have been made to provide public access to, and acceptance of the use of, contraceptives. The program is aimed at 200,000 continuing contraceptive users by the end of 1974, about 10 percent of the women of child bearing age.

In recognition of the close relationship between family planning and socio-economic development, the Director and staff of NFPP are part of the Ministry of Finance and Economic Development. To coordinate the efforts of interested agencies and organizations a non-operational, advisory body, the National Family Planning Council, has been established. Its members consist of representatives of all interested government ministries, and of private and volunteer agencies. There is also an Executive Committee, representing the Ministries of Finance and Economic Planning, Health, Labor and Social Welfare, Information, and Youth and Rural Development, which is responsible for directing the implementation of the program.

The intent of the program was to use public and private facilities and personnel. The Ministry of Health has the responsibility for provision of contraceptive services, patient education, and training of the necessary technical personnel. The Ministry of Information has responsibility for public information and education. The Ministries of Youth and Rural Development and Labor and Social Welfare are involved in education and recruitment. The Ministries of Education and Agriculture are also involved in the information and education program.

The initial plan was to provide family planning services through the larger government hospitals. These hospitals are reasonably well distributed, at least in the southern part of the country, are already in existence, and can serve as training centers for medical and auxiliary health personnel. Trained medical personnel are in very short supply in Ghana so every effort has been made to utilize physicians, nurses and midwives to their full professional capabilities. Auxiliaries are to be used to the extent possible; for example, the Ministry of Youth and Rural Development is conducting training courses for 600 rural development workers.

Public information on the available services is channeled through all possible media, including film strips, pamphlets, audio-visual material, lectures, and person-to-person and small group discussions. In short, all means are to be used to publicize the effects of population pressures, and the respectability, availability, convenience and safety of family planning methods.

At the start of the family planning program, oral contraceptives were available in the private sector but their high cost limited their use to the highly motivated middle class. Estimates of sales showed that they probably reached 10,000-12,000 people. The level of use of condoms and IUDs is not known, but an estimate of the total number of fertile Ghanaian women using some form of contraception was probably less than a few percent of the total. Studies have shown that knowledge of some method of contraception is relatively widespread, but many of the traditional methods are ineffective and modern methods are not widely used.

As a result of this policy to promote family planning activities, and the availability of donor assistance, there has been considerable activity among government, educational and private organizations in Ghana. The Secretariat of the NFPP, in addition to its role as coordinator of the Government's program, has been active in mass communications, such as its "family planning week" in which the importance of spacing births is promoted through such mass media advertising

as radio, TV, newspapers, billboards, speeches and displays. In addition the Secretariat has trained about 200 nurses, family planning auxiliaries, and multi-purpose workers. They also operate a subsidized distribution system for contraceptives and support this system through national advertising campaigns. The Ministry of Health has cooperated by making available the staff and facilities of 84 hospitals, clinics, and health posts and in the first two years of the program there were about 40,000 new family planning acceptors. The Planned Parenthood Association of Ghana (PPAG), the Ghanaian affiliate of the International Planned Parenthood Federation (IPPF), has been the most active private agency operating clinics and conducting training programs. Although it operates only 19 out of 134 such clinics in Ghana, the PPAG accounts for over 40 percent of acceptors.

AID has been active in assisting the Ghanians in family planning programs, with the bulk of its financial emphasis on the Danfa Rural Health and Family Planning Project. The main purpose of this project is to determine the most cost-effective method of providing rural health and family planning services. It is being carried out by the Ghana Medical School with the School of Public Health of the University of California at Los Angeles. AID has also provided contraceptives to the NFPP and training for Ghanians. Other assistance has been provided by the British and Canadians (mass-communications-public information programs and mobile vans); the United Nations Fund for Population Activities (vehicles for use by the various cooperating agencies); the Ford Foundation (advisory assistance and travel grants); the IPPF (financial and commodity support); the Population Council (commodity and advisory support for post partum programs in hospitals); and the Christian Council operates four family clinics, conducts information and education programs, and trains personnel. Although the activities of these groups have had considerable success, there have been problems of coordination of so many activities in the field. The sensitivities of the Ghanians, and especially of the Catholic hierarchy, may also have been irritated by some of the population/family planning programs.

The main problems that the NFPP has encountered in its effort to stabilize and reduce population are the lack of trained staff in the Secretariat and the implementing government agencies, administrative and managerial difficulties in planning and implementing the program, and the coordination of the efforts of the various national, bilateral, international and private groups involved. The NFPP has not suffered for lack of government interest and funding. In fiscal year 1970-71 the government budgeted N¢ 320,000* (actual expenditures about N¢ 90,000); for fiscal year 1971-72 N¢ 505,000 was budgeted and a similar amount is anticipated for 1973. Thus the problems are administrative and technical rather than financial. By comparison, USAID obligated about \$400,000 for population and family planning activities through June 30, 1973, and an expected \$345,000 more in the following fiscal year. In addition, the rural health-family planning project had obligated \$1,690,000 through June 30, 1972 and proposes \$790,000 for FY 1973 and \$600,000 for FY 1974.

Economic and Social Overview

Ghana has a variety of natural resources, a functioning agricultural sector, an established infrastructure, and physical plant. In spite of its potential, its financial problems have stood in the way of greater economic development. Since its independence in 1957 its real economic growth has been low, exports have not in general lived up to their potential, and reliance on imports have increased. During the past two and one-half years, however, high world prices for cocoa and gold have brought about a dramatic turnaround in Ghana's balance of trade.

Although there is some mining and manufacturing, agriculture is the mainstay of the economy, with an estimated 55 percent of the labor force engaged. Within the agriculture sector, cocoa is the most important commodity. Cocoa generates an estimated 15 percent of the Gross Domestic Product (GDP), provides employment to about 20 percent of the working population, and was

* Currency exchange rates of U.S. dollars and Ghanaian Cedis (¢) or New Cedis (N¢) are as follows:

July 9, 1965-February 22, 1967	1¢ = \$1.17	December 27, 1971-February 6, 1972	1N¢=\$0.55
February 23, 1967-July 7, 1967	1N¢ = \$1.40	February 7, 1972-February 14, 1973	1¢ = \$0.78
July 8, 1967-December 26, 1971	1N¢ = \$0.98	February 15, 1973-Present	1¢ = \$0.87

responsible for about 60 percent of Ghana's export earnings over the past decade. Although industry is relatively limited it has grown from about 3 percent to 10 percent of the GDP during the 1960s.

In spite of mineral resources and promising agricultural possibilities, the national economy was in a decline during much of the decade of the 1960s. During the period 1960-65 the GDP grew in real terms at a rate of 3.2 percent per year, but with population growth even moderately estimated at 2.7 percent per year, the per capita rate of growth was about 0.5 percent per year. During the following three years, 1966-1968, following the overthrow of the Nkrumah government, efforts were directed toward reducing inflation and containing an unfavorable balance of payments. During this period, the GDP grew at 1.6 percent per year which resulted in an actual decline in per capita income. The growth rate in real terms since 1968 appears to be on the order of 3.5-4.0 percent or just about on a par with the rate of population growth. Still, with a cash economy based on cocoa, the per capita income is higher than that of a number of other African countries and was estimated at \$216 in 1972.

The present government is heir to economic misfortunes that were generated during previous years. Its external debt as a ratio of its GNP is one of the world's highest. Efforts to service foreign debt, coupled with a frequent balance of payments problem, have contributed to a low or negative rate of growth.

Following a trade surplus of N¢48 million in 1970, there was a trade deficit of N¢71 million in 1971. This was largely the result of the dismantling of licensing import controls and an overvalued currency. At the same time export earnings were falling, largely due to lower prices on the world cocoa market. Short-term foreign debt reached nearly \$300 million in early 1972 and due to international uncertainty of Ghana's ability to service this debt, exporting countries suspended insurance coverage, thus forcing Ghanaian importers to operate on a cash-in-advance basis. At the present time Ghana is emerging from this serious balance of payments problem through a combination of import cutbacks, sharply higher cocoa and gold prices, and reduced debt servicing. Due to these factors the 1971 deficit has been overcome and a surplus of £171 million brought about in 1972. Continued strong prices for Ghana's main exports continued in 1973 but the trade balance will be offset to some extent by rising prices of imports, particularly petroleum products.

During the economic crisis the government devalued the Cedi by 26.6 percent, reimposed strict import licensing, established and enforced price controls, discouraged speculation and hoarding, and attempted to forego imports by greater use of national substitutes. There has also been repudiation of some medium term (1 to 5 years) debt and unilateral rescheduling of the rest. The servicing of long-term debt was not affected by this action.

Government economic policy over the years has fluctuated according to political personalities as well as to the needs and interest of the country. In the early years after independence policy was directed toward investment, particularly government investment, at the expense of private consumption and investment. Much of this expenditure was for state-operated enterprises which were often unproductive or inefficient, resulting in a relatively high level of investment but a low rate of growth. With the change of government in 1966, the emphasis on economic development was placed more on the private sector. However, the legacy of a large number of state enterprises of marginal productivity and a heavy burden of debt made progress in the period from 1966-1970 very slow. The One Year Development Plan for the period July 1970 to June 1971 gives priority to stability and solvency, rather than concentrating on short term growth. At the present time Ghana encourages foreign investment but requires part Ghanaian ownership. The percentage of this ownership varies with the type of enterprise and the availability of national capital and technology.

Agriculture and Nutrition

The government of Ghana has selected the agricultural sector and general rural development as areas of top priority. The IBRD and AID share this view of the urgency of agricultural

development. The benefits that could derive from such development are numerous and interrelated with other sectors of the economy. Increased agricultural production could alleviate chronic food shortages and raise the level of nutrition; reduce food imports and contribute to solving the balance of payments problem; lessen severe unemployment; slow rural to urban migration; and increase the incomes of the great bulk of the population dependent on the agricultural sector.

Agriculture has not been a neglected area of government expenditure but much of the attention in previous years was devoted to obtaining heavy agricultural equipment or in payments to urban oriented youth who had no particular skill or experience in agricultural work. Government owned farms absorbed large amounts of machinery and fertilizers but operated at such a low level of productivity that the nation was unable to sustain itself at a reasonable nutritional level. The current emphasis in the agricultural sector is on increasing production, better marketing, and development of more effective extension services.

The agricultural sector is the mainstay of the national economy. It provides employment to an estimated 55 percent of the working population and a livelihood to a large share of the dependent population. Small scale holdings of a few acres are most common and there is a considerable degree of shifting cultivation to nearby land, after a year or two, to allow the generally poor soil to lie fallow. Large scale government owned farms and plantations are of marginal importance. The bulk of agricultural products are provided by independent individual farmers working with simple tools and usually without fertilizer.

Cocoa is by far the most important agricultural crop and the largest export earner, a major source of government revenue, and of course a major source of employment and income. The main cocoa growing areas are in the southern part of the country in clearings in the forested zones. Its production is almost entirely in the hands of small independent farmers who may care for the crop with the help of hired labor, or on a sharecropping basis.

There are three major agricultural areas in Ghana: the coastal savanna, the lowlands in the southern half of the country including the forest zone, and the northern savanna. Crop patterns soil fertility and population pressures vary from one area to another.

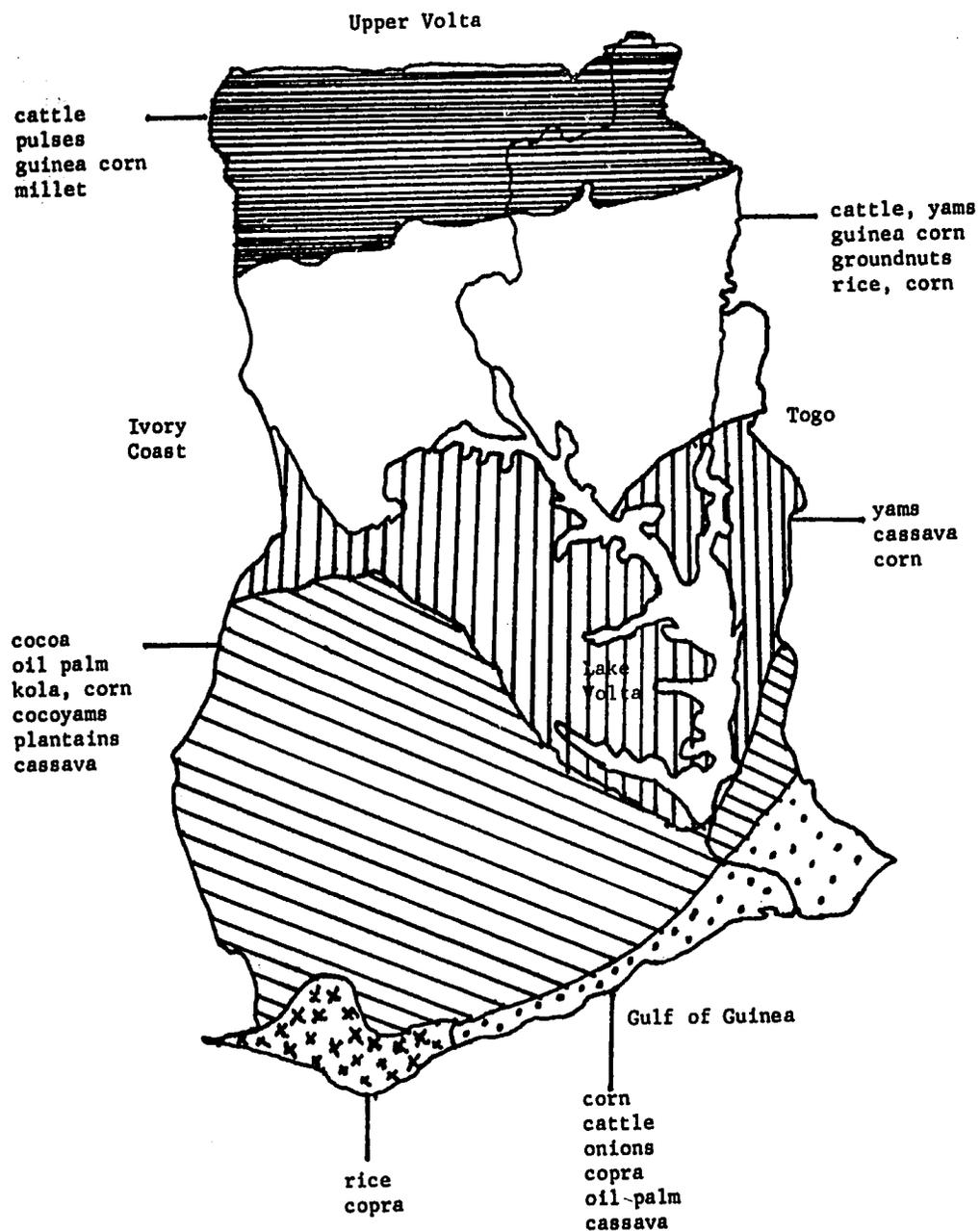
The coastal savanna area is not well suited to agriculture. The principal crops are corn, palm oil, and some garden vegetables. There are some cattle but they are kept more for a "living investment" or prestige purposes than for food use. There are non-food crops (cocoa and to a much lesser extent coffee) which provide income to small farmers to purchase foodstuffs. Small scale fishing provides a good source of protein to those near enough to the coast to enable them to obtain fish while still fresh.

The diet and food availability are probably greater in the coastal savanna area than any other part of the country, due to the nature of the crops grown, the availability of some seafood, and the possibilities for sale of any surplus to provide cash for other foodstuffs. Much of the food is based upon ground corn made into dough and boiled (kenkey), stews with small amounts of meat or fish, and rice to a lesser extent.

In the southern lowlands and the forested zone lies some of the best agricultural land but a considerable amount of it is used to grow cocoa and to a lesser extent kola nuts and coffee for sale. The main food crops are plantain, cassava, and cocoyam, with much smaller quantities of corn, beans, tomatoes, okra, and other garden vegetables. There are sheep, goats, and chickens, but again these are generally kept as a source of money rather than for use as a food supply. The mainstay of the diet is a type of porridge (fufu) made of various boiled tubers or plantains, eaten with a sauce of tomatoes and other vegetables when they are in season. The diet is therefore largely starch, with not more than about 2 percent protein. The diet of town dwellers is probably better and more varied because of the efforts of farmers to market whatever they can for cash.

Table 3

Ghana: Crop Distribution



In the northern savanna area, there is a single harvest around the end of the rainy season. The main crops are millet, corn and yams. Some garden vegetables are grown and cattle, goats, sheep and chickens are raised, but again they are little used in the diet. The diet is based mainly on millet, corn and wild or cultivated vegetables which might be in season. Due to the relatively sparse population and the distance from population centers, there is little cash earnings from agricultural production. Most of the cash expenditure goes for smoked fish. There is frequently a food shortage just before the harvest time. In cycles of about five years, when the rains do not develop, there is famine. One of the effects of the reduced food availability before harvest is that the labor force has the poorest diet just at the time when the need for strength and good nutrition is most acute. The greatest problems in the area are to grow and store more food, have a broader market for cash crops, and to develop a distribution system. The small quantities of fruits and vegetables in this area, and the lack of palm oil, lead to a reduced intake of vitamin A which may be a contributing factor to the high incidence of eye disease in the region.

The level of caloric intake of the population is probably worst in the northern region and better in the central and southern regions. Undernutrition seems especially common in children under age five throughout the country and is partially explained by weaning and family eating habits. Fats, which are a rich source of calories, are uniformly lacking.

The low intake of meat, fish, milk and eggs leads to a protein deficiency in the population as a whole. Pregnant and nursing women and small children are most seriously affected. Nursing children cannot receive the necessary calories after about six months and adequate supplementary foods are not introduced until about one year of age. When supplementary foods are introduced, they generally contain no protein because, in addition to the scarcity of good protein foods (including peas and beans), it is generally believed that such foods cause children to develop intestinal worm infestation or diarrhea. Thus, when children are weaned they are deprived of their only reliable source of protein and fall prey to Kwashiorkor, a name given to medicine by Ghana. There have been estimates that between the ages of 9 months and 5 years, the average Ghanaian child receives only about 50 percent of his protein requirement and 70 percent of his caloric requirement.

In addition to low caloric intake and protein deficiency, there is a shortage of vitamin and mineral intake in some groups. Vitamin A deficiency is most evident in the northern areas but intake is probably adequate in other parts of the country. The Vitamin B complex is in overall shortage but does not show up clinically in many cases. It is mostly observed in pregnant women and small children. Clinical evidence of Vitamin C deficiency is uncommon in spite of a relatively low level of fruit consumption. Exposure of the skin to the sun makes Vitamin D intake adequate. Mild to severe iron deficiency anemia is common although the reason for this is not known, since most of the diets appear to contain enough iron. There is a shortage of iodine in the diet in the north and central parts of the country as judged by the presence of endemic goiter. The intake of calcium is only 50 percent of the required level but clinical evidence of calcium deficiency is generally not evident.

Family eating practices have some effect on the state of nutrition. The usual pattern is for the males to eat what they require and then the children are fed by the women. As the last in line, the women receive what is left over. As previously mentioned, very small children do not receive balanced meals but are fed a starchy gruel in the belief that "rich" foods are harmful to them.

Nutritional surveys made in Ghana show that the average weights of adult males and females in northern Ghana are 128 and 114 pounds, and average heights 67 and 62 inches, respectively. There is a seasonal variation of 1-5 pounds in weight, the lower weight being recorded just before harvest time. These figures give weight to height ratios of 1.9 and 1.8, respectively, with a ratio of 2.0 considered optimum in the area. Similarly, calculated ratios in the lowlands and forest zones are 135/65 (2.1) and 114/62 (1.8). These zones show less seasonal fluctuation. The people in the coastal regions exhibit the best ratios with 2.1 and 2.0 for

males and females respectively, reflecting the higher nutritional status in those areas. When children are evaluated it has been shown that, until the age of six months while they are being breast fed, the growth rate is much the same as in western Europe. From that time until one year, the rate of growth slows and may even stop. After age one, the growth rate is slow until about age five, when it picks up again. It is during this period of poor nutrition when childhood and communicable diseases will have the most damaging effect. From age five the rate of growth is satisfactory until puberty, when increased demands for growth and development cause a depression in the weight gain of the adolescent.

The Government is deeply interested in improving agricultural production and has attracted the interest of international organizations, and bilateral and private assistance. Much of this attention has been directed toward the increased production of rice and corn. AID is working with the Ministry of Agriculture in southern Ghana on a comprehensive corn project, while the World Bank and AID are concentrating on rice production, marketing, and storage in the north.

From a nutritional standpoint it may be possible and more advantageous to introduce greater use and cultivation of nutritionally valuable protein vegetables such as beans. A program of health education may improve the currently unsatisfactory nutrition of infants and small children. Introduction of protein supplements, such as Incaparina, and the use of iodized salt, especially in northern areas, would be beneficial. Improvement in storage and marketing facilities could provide better distribution, to the benefit of farmers and consumers, and reduce crop loss due to spoilage, insects, vermin and weather.

Infrastructure

Ghana has important physical assets which can provide the base for industrial expansion. The largest single capital investment is in the Akosombo Dam on the Volta River, about fifty miles upstream from the Gulf of Guinea. The Volta has three branches, the Black Volta, the White Volta, and the Red Volta, all of which originate in the Republic of Upper Volta. Just inside the Ghanaian border the White Volta and the Red Volta merge. Near the middle of the country this confluence joins the Black Volta. In 1964 the closing of a dam across the Volta at Akosombo created a vast lake of over 3,200 square miles along the former course of the river above that point. In early 1966 a hydroelectric power plant opened at the dam. The total cost of the project was about \$414 million with Ghanaian, U.S., World Bank and British participation. This complex produces virtually all of Ghana's electric power. Power production is now about five times as great as before the Akosombo project.

This has brought abundant power for industrial and private use but it has not yet been fully utilized. The largest power consumer is the Volta Aluminum Company, Ltd., a U.S. controlled industry which uses about two-thirds of the total supply. There is ample power for the foreseeable future, but only about 16 percent of the population have access to it at the present time. A recently adopted rural electrification plan has not yet made significant progress. There are plans to sell power, in excess of national needs, to Togo and Dahomey.

The effects on public health of the dam and consequent flooding of large areas have not been well determined. However, estimates have been made that a high percentage of the people along the shores have schistosomiasis, and the greatly increased internal shore line of the country provides ample and extensive breeding grounds for the tsetse fly and the mosquito, vectors of endemic sleeping sickness and malaria.

The government owned Ghana Airways provides limited international service and national service between the major cities. It has not been economically operated and is of little importance to the vast majority of the population in terms of travel of transport of goods. Passenger and freight traffic have remained relatively static over the past few years.

Ghana Railways operates in the southern part of the country and has a route length of about 600 miles. It is of special importance to the export trade, carrying the bulk of the bauxite, manganese, timber and cocoa. Although it has not proved to be an economically sound operation, new equipment has been ordered over the last three years to improve its freight and passenger carrying capacity.

The road network is probably adequate to serve the needs of the country for the foreseeable future. Of the 20,000 miles of roads about 2,400 are hard surface, 6,800 are gravel or other surfaces, and the balance are dirt or track. The major need of the road network is upkeep and maintenance of feeder roads and village access roads to the most important agricultural areas. This has been a priority consideration of the government for the last three years. For 1973-74 the government has allocated \$8 million to feeder road construction.

Due to rapids, inland water transport is limited and mostly of local importance. There are no natural harbors for commercial shipping but good man-made seaports are located at Takoradi and at Tema, east of Accra. The government owned Black Star Line operates ships which travel to European and North American ports.

Extractive and Other Industries

Timber is the most important export after cocoa. The total value of logs and sawed timber amounted to almost N\$72 million in 1972, versus N\$40 million the year before. The main exports are tropical hardwoods, primarily to European countries. Beside the export of raw hardwoods, there is some production of plywood and veneer. As the more valuable species are cut away the government is trying to follow a conservation and reforestation program.

Fishing is an important industry with the great bulk of the catch staying in Ghana to provide a much needed source of protein. Although figures vary, the estimated availability is on the order of 150-200,000 metric tons per year, less waste and spoilage. This would provide 35-45 pounds per person per year. Most of the fish is smoked, both for flavor and preservation and its consumption probably exceeds other meat, which is in scarce supply and not widely used. In spite of a substantial catch, imports of fish and fish products amounted to \$23 million in 1972.

The bulk of the fish are taken from the sea rather than from inland waters. About 25 percent of the catch is estimated to come from private fishermen working with canoes or small motor boats. The balance is provided by private national companies, state owned companies, foreign vessels under contract, and foreign companies. The Ghanaian Fisheries Department estimates that 50-60,000 people earn their living in the fishing industry. Although there is good refrigeration capacity around the major cities, there is little or no retail trade in frozen fish, due to transport and storage difficulties and the preference for smoked fish. Much of the retailing of fish is conducted by wives and other female relatives of independent fishermen. This industry has promising possibilities for expansion and could provide a greater employment and revenue, increase the level of protein available in the diet, and reduce the loss of foreign exchange required to buy seafood from abroad.

According to 1968 data there were 43,600 persons engaged in mining of all types. This represents a slight decline from the 1960 census. In terms of the value of exports, gold is the most important, with diamonds, manganese and bauxite following in order of importance. Although production in the mining sector has been at a standstill or on the decline in recent years, strong world prices for metals and diamonds have sharply increased revenues and exchange earnings by this industry in 1972 and 1973.

There is a broad range of light manufacturing in Ghana but little heavy industry. The estimated employment in 1967 was 9.2 percent of the total labor force. Much of this sector is consumer oriented and involves individual artisans working with immediate family members. These artisans are especially important in making clothing, footwear, textiles and in food production of various kinds. Of the total number of manufacturing entities in Ghana in 1967, there were

only 91 firms employing over 100 persons and 230 more with 30 or more employees. These larger firms were mostly engaged in production of beverages, tobacco products, chemicals, and wood products. The most significant growth areas have been in textile manufacturing and food processing.

The largest single industry, the Volta Aluminum Company (Valco) smelter, is owned by Kaiser Aluminum (90 percent) and Reynolds Metals (10 percent). Valco has a reported smelting capacity of 145,000 tons accounting for exports valued at \$57 million in 1972. Much of the return will appear as value added in the electric power sector rather than manufacturing. Valco imports alumina and exports aluminum. If the Ghanians realize plans for an alumina plant using domestic bauxite, the impact of the Valco smelter on the economy will be much greater.

Housing

In rural areas families usually construct and maintain their own houses of mud and wattle or adobe, with a roof of thatch or corrugated metal. A common method is to have several huts arranged into a compound. The water supply and sanitation are generally primitive.

It is in the urban areas, however, where the housing problem is most acute. The heavy flow of migrants from the rural areas plus the natural population growth have made housing scarce and dangerously crowded. This situation promotes the spread of communicable diseases and increases the risk of enteric infections, due to the lack of potable water and food sanitation.

A better conception of the housing plight may be drawn from government statistics which showed that in 1969, in the cities, there was an average of 23 persons per house while in the towns there was 21.1. To reduce the level of occupancy per house to ten persons will require about 26,000 units per year, versus an estimated 6,000 currently being produced. This former figure, while making modest allowance for population growth, does not allow for replacement of the large number of deplorably substandard units currently occupied.

Funds available to the two housing agencies of the government, the State Housing Corporation and the Tema Development Corporation, have been limited and the surface of the problem barely scratched by these agencies. There is some encouragement of low cost housing through banks and building societies and some promising possibilities in construction, through prefabricated prototypes using locally available materials.

Education

In 1960 an estimated 21 percent of the total population over age ten had attended school. By the end of the decade this figure had probably increased to over 30 percent. School enrollments and literacy for males are about twice as high as for females. Literacy rates are probably about 50 percent in the major cities and towns, about 33 percent in the rural south, and under 10 percent in the north.

In 1961 education was made free and compulsory after age six but the duration of required school attendance was not fixed by the legislation. Until the start of the 1962 school year, the primary school course was six years, followed by four years of middle school. After that time primary school was extended to eight years with an additional two years of pre-vocational training. In the 1970-71 school year both of these systems were in use.

Following the compulsory education legislation of 1961 the enrollment for primary, middle and secondary schools increased dramatically from about 600,000 in 1960-61 to 1.47 million in 1971-72. During the last few years there has been a slight decline in primary school enrollment but an accompanying increase in middle school pupils. National expenditures for education have been at a relatively high level, averaging about 16 percent of the government's total budget of the last few years. Unfortunately the number of students completing school has grown at a faster rate than job opportunities.

An outsider can probably do no better than accept the Ghanaian government's view of the shortcomings of the educational system. They are, "...weaknesses in administration, planning, and coordination of educational development; imbalances in the structure of education and maldistribution of facilities; low quality of instruction and facilities at many levels; a lack of relationship between the school curriculum and the demands of work and life after school; and the excessive cost in terms of time, manpower and money of many of the courses currently provided."

In recognition of the need for persons with some technical training, and greater employment opportunities available to such people, the government is trying to increase the very low level of expenditure for technical training (currently about 2 percent of the total). Technical schools have been developed at four locations and there is expected to be increasing emphasis on technical training.

The availability of qualified teachers has been another pressing problem for the educational system. With a big jump in school enrollment in the mid 1960s, the proportion of trained and qualified teachers fell as low as 35 percent. To overcome the teacher shortage the government stated that 35 teacher training colleges were opened in 1965. With a sizeable increase in enrollment of teacher trainees, the number of training institutes is being cut back and consolidated as more graduate teachers are available. In September 1973, 88 percent of the school teachers were reported to be qualified.

Higher education is provided by three institutions: the University of Ghana outside of Accra, the University of Science and Technology at Kumasi, and the University College of Cape Coast at Cape Coast. The University of Ghana has six faculties: agriculture, arts, law, science, social studies, and medicine, and a total of 27 departments. The medical school awarded its first degrees in 1969 to 35 students and was expanded to offer postgraduate courses in 1972. The total enrollment in these three institutions stood at 5,990 in the 1971-72 school year, about three times the number enrolled earlier in the decade.

Expansion of higher education facilities has been very costly. The universities have absorbed about 25 percent of the current budget and 50 percent of the capital budget since 1965. For fewer than 5,000 students in 1969-70 there were 1,068 teachers and 7,517 other employees in the three universities. In fact, in 1969-70 there was more spent under the capital budget on the universities with a few thousand students than was spent for primary, middle, secondary and teacher training institutions with nearly one and one-half million students.

The extent to which the schools provide health education as a part of the curriculum and their use as a means of delivery of health services is not known. The schools could be used as a vehicle to present courses on nutrition and sanitation, and basic information on communicable diseases, especially enteric infections.

The Health Sector

Any attempt to review the health sector of Ghana will eventually have to rely on a certain level of individual judgment in assessing actual health conditions. There are qualitative statements from national government officials, international organizations and scholars stating that health is a major problem and that certain areas should be emphasized. When it comes to quantifying problems, or stating how a problem in one area of health relates to another, the scarcity of reliable data is an immediate handicap.

Neither the 1960 census nor preliminary material available from the 1970 census include any health data. National Statistical Yearbooks provide information of only the most general and rudimentary nature. The data that are available appear to be derived from scattered samplings of hospital records, which may provide a skewed and unreliable view of the total problem. The attempt here, then, will be to integrate some of these scattered fragments of information and attempt to provide a reasonably comprehensive view of health conditions, in the full knowledge of the defects and hazards implicit in the analysis.

The estimates of vital statistics that are available provide no surprises. Life expectancy at birth is low; it is variously estimated between 40 and 48 years. The crude birth rate and rate of population growth are high; estimated at 47 to 52 per 1,000 and 3-3.5 percent, respectively. The crude death rate is high, about 17-20 per 1,000. Infant mortality is high: estimates range from 122 to 160 per 1,000 live births.

Communicable Diseases

Communicable diseases play a dominant role in the health sector. Transmission is maintained at a high level through a wide variety of insect vectors (e.g. fourteen known species of malaria vectors) common to the tropics. Poor sanitation and malnutrition escalate the most commonplace illness or injury into a serious threat to life. The following is a general survey of some of the more important communicable diseases:

Malaria is a major problem in Ghana and causes an estimated 10-15 percent of all deaths in children and only a slightly lower percentage in all age groups. Those that survive the disease in childhood develop some level of immunity. Plasmodium falciparum is the parasite in 95 percent of the patients; A. funestus and A. gambiae are the principal vectors. Cases are found in all parts of the country but there are seasonal differences in incidence. As several studies have shown, a reduction in the incidence and severity of malaria would assuredly increase worker productivity. Although the extent of the disease is not precisely known, there is no doubt that it is a serious problem. The Third Report on the World Health Situation provides a figure of 812,916 as the number of reported cases; the actual number can therefore be reasonably expected to be a multiple of that figure. At the 27th World Health Assembly (May, 1974) the Ghanaian delegate stated: "Malaria is foremost as a cause of high morbidity among all age groups and as a cause of infant mortality."

Over the last 15 years the World Health Organization has helped Ghana in anti-malaria projects. These have included a pilot survey and eradication program, treatment by use of medicated salt, and more recently a pre-eradication program which attempts to integrate anti-malaria activities into the basic health services. During the period 1957-68, WHO spent on the order of \$1.28 million (regular budget and technical assistance funds, plus the Malaria Eradication Special Account which was largely provided by AID) on advisors, technicians, supplies and fellowships. The project was terminated in 1968 and the emphasis was shifted to regional control activities.

The exact status of anti-malaria activities in Ghana is not known but the central government budget for 1973-74 explains that pre-eradication buildup of the health infrastructure will be required before any eradication campaign can be successful. The level of national funding for anti-malaria activities for that period is only \$30,000.

The difficulties facing malaria control in Ghana are numerous: increased mosquito breeding sites created by water impoundments for the development of the Volta river basin; increased mobility of the population facilitating the extension of transmission into new areas not subject to control measures; the resistance of some mosquito vectors to DDT and/or dieldrin (in 1967 a WHO Expert Committee on Malaria reported that 24 vector species of Anopheles are resistant); and the limited resources that the government can bring to bear.

Smallpox does not appear to be a major problem at the present time. There has not been a case reported to WHO since 1968. In 1960 WHO helped the government establish a smallpox vaccination campaign to vaccinate 80 percent of the population within five years. A large part of the assistance has been provided by AID in the form of vaccines, equipment, and personnel. Through 1970, 7.25 million smallpox and 1.42 million measles vaccinations had been given. The most recent information on national efforts shows that the combination smallpox-measles vaccination campaign is very modestly funded (\$40,000 for 1973-74), but considerable effect is claimed; for each \$1 spent, 40 people are immunized against smallpox and 9 against measles. Unfortunately

there seems to be a resurgence of measles in part attributed to better reporting and in part to preoccupation with cholera: in the third quarter of 1971, there were over 17,000 cases, nearly double the number reported in the corresponding quarter of 1970 and nearly triple the number in the same quarter of 1969. Yellow fever is reported to be largely under control following mass vaccination.

Tuberculosis is regarded by several sources as a major disease in Ghana with a stated prevalence of 9 cases per 1,000 population. Projections from the early 1960s suggest that 8-12 percent of all deaths reported are due to tuberculosis and it has been estimated that 3 percent of the urban population is infected. Studies made in Africa have shown the highly unfavorable effect of urban crowding and slum living on the prevalence of the disease, the infection of migrants to the cities, and the subsequent spread of the disease to rural areas when the migrants return home.

WHO's assistance to Ghana's tuberculosis program began in 1957 with a survey to determine the best means of organizing a campaign under local conditions. A pilot project began in the Volta region in 1962 to tuberculin test and vaccinate the population, and to identify and treat those infected on an outpatient basis. WHO provided assistance for ten years. At the end of 1970 over 300,000 susceptibles had been vaccinated and detection and treatment facilities had been expanded from two to nine health posts. The program has apparently been retarded by a shortage of funds, vaccine, and doctors, according to Ghanaian sources. For the budget year 1973-74, the nominal sum of \$30,000 was allocated to tuberculosis control.

Records show that nearly 600,000 cases of yaws were treated in hospitals and clinics during the five years ending in 1950. A mass campaign against the disease was carried out in the period 1955-66, with the assistance of WHO/UNICEF during the first five years. By the end of the campaign, the prevalence of infectious yaws had been reduced to zero in most places and to two-tenths of one percent in the worst affected areas. There are indications now of a resurgence of the disease. There were 5,343 reported cases in 1969; 9,704 in 1970; 12,757 in 1971; and an annual rate (based on first quarter data) of 19,400 cases in 1972. After the great progress achieved against yaws surveillance and maintenance have deteriorated to the point where there is increasing danger of infection.

Cholera was reported in Ghana for the first time during the third quarter of 1970. Intensive vaccination and surveillance activities were undertaken. By the end of the year there had been 2,733 cases reported, with 180 deaths. For 1971 there were 13,059 cases and 641 deaths. During the period January-March of 1972, the Ghana Medical Journal reported 259 cases and 18 deaths; but in May of that year the Ghanaian delegate of the World Health Assembly reported that the disease had been brought under effective control and there were very few cases. However, the national budget devotes the bulk of its communicable disease budget (\$500,000) to cholera control.

Due to various parasitic infections, trachoma, and to some degree congenital syphilis, blindness is a major problem. One report states that in some areas of the country the incidence of blindness is 10 percent or more. In these areas onchocerciasis (river blindness) is responsible for 90 percent of the cases. This disease is caused by a parasitic filaria carried by a species of black fly. As the parasite spreads through the body lesions form under the skin and eventually the eye is affected. People in some areas have developed enough immunity to slow down the progress of the disease and if a diet rich in vitamin A is available, this too seems to retard the process; yet the level at which the disease causes blindness is high. The presence of this black fly along rivers and bodies of water has led to abandonment, at great economic loss, of large areas of potentially productive land so that the population may live outside the flight range of the vector.

There have been some successful pilot control projects in Africa, but onchocerciasis still prevails over the greater portion of its area of original endemicity. Indeed, the extension of water resource projects may have made the affected area larger. The problem is regional rather

than national; the whole savanna region from Senegal in the east to the Sudan and Ethiopia in the west is affected. Several international organizations (WHO, UNDP, FAO, the IBRD, and AID) are cooperating with seven African countries in various aspects of a regional project to develop and analyze epidemiological, entomological, and vector control information, and to take cost effectiveness into consideration in formulating a regional control project. This project is expected to last 20 years and cost an estimated \$120 million; Ghana has pledged an initial \$200,000.

At present the control of onchocerciasis depends upon control of the vector because no therapeutic agent sufficiently safe for mass administration is yet available. Project work done thus far has contributed to control by the knowledge gained of the resting habits of adult flies. This improves the possibilities of attack by adulticides as well as larvicides. The Ghanians have done some aerial spraying which has given good results in limited areas, but the funds available have been modest.

Schistosomiasis (bilharziasis) is caused by a parasite which penetrates the skin of man (and certain animals) coming into contact with water which harbors the intermediate snail host. The two main types are: urinary or vesical (due to Schistosoma haematobium) and intestinal (due to Schistosoma mansoni). The latter infection tends to be more severe.

One of the means of agricultural development of Ghana, as in other parts of Africa, has been the control of water resources by irrigation and dam construction. Unfortunately this greater availability of controlled water creates an excellent network for spreading the snail vectors. The World Health Organization has commented on this problem: "The incidence of bilharzia has increased but it is of man's doing. As he constructs dams, irrigation ditches, etc., to alleviate the world's hunger, he sets up the ideal conditions for the spread of the disease." In addition to providing a medium for the spread of snails, such water development projects tend to attract increased population, drawn by employment opportunities and arable land.

The incidence of schistosomiasis in Ghana is not known although estimates that 5-20 percent of the population are affected have been made, with some areas showing a much greater incidence. Surveys made in other underdeveloped countries with similarly favorable environmental conditions for snails may give some indication of the extent of the disease. One estimate shows that in 35 countries where the disease is endemic, with one billion people at risk, there are on the order of 250 million persons infected. Data collected in the early 1960s on 14 west African countries, with a total population of 100 million, indicated that 34 million persons were infected. Egypt, with its vast network of irrigation canals, had an estimated 14 million infected cases in a population of 26 million at the time of the survey.

Prior to the construction of the Akosombo Dam a team of experts advised the Ghanians that there could be serious environmental effects if preventive measures were not applied. Their recommendations were not implemented. As a consequence the three major snail vectors of S. haematobium, the preponderant form of the disease in Ghana, have spread widely.

A debilitating disease such as schistosomiasis, which has such wide areas of endemicity, has large costs in economic terms (decreased productivity, cost of treatment) as well as human suffering. One estimate places the annual loss worldwide at \$641 million. Arguments can undoubtedly be leveled at any attempt to quantify the cost of disease, especially in underdeveloped countries with substantial labor surpluses, but it would not be unrealistic to say that the loss is large, even if it cannot be accurately quantified.

Control measures consist of sanitary protection of water supplies and control of sewage, use of molluscicides, and chemotherapy. Sanitary measures are costly, take time, and may be especially difficult where they are contrary to local tradition and habits. The use of chemical molluscicides, either in single or repeated applications, is a partial but incomplete answer to the problem. Fragmentary data on the use of molluscicides have given a cost range of

\$0.60 to \$0.80 per year per person at risk using copper sulphate; \$0.88 using pentachlorophenate; and up to \$1.39 for other substances. Although there are no chemotherapeutic measures that are entirely satisfactory for general use, hycanthone has been administered at a cost of about \$1.11 per year per person. Experience in Tanzania has shown that a comprehensive program to control the spread of the disease has been conducted for \$4.39 per person per year.

The World Health Organization has been assisting for over fifteen years in attempts to control this disease. There have been epidemiological studies, testing of control methods, and attempts to coordinate water-borne parasitic disease control with general public health programs. In recognition of the regional impact of this program, similar programs are being conducted in other African countries. Although the government is well aware of the problem the financial support it has been able to provide has been minimal. In the 1973-1974 fiscal year there was \$30,000 devoted to schistosomiasis control.

Trypanosomiasis (sleeping sickness)

Ghana, like a number of its African neighbors, is infested with the tsetse fly over large areas of its territory. The disease carried by these flies is not only debilitating and potentially fatal to man, but to his cattle as well. This seriously limits economic development and the use of livestock as a much needed source of protein. The cattle that can be raised are a more disease resistant variety of shorthorn. However, this variety is slow to mature and has a low milk and meat yield.

Data for recent years show an average of 325-350 reported cases per year. Medical field units have made progress in treating victims in the early stage of the disease. Attempts have been made to reduce the flies breeding areas by burning or pruning brush and spraying larvicide along bodies of water. The flies have proved adaptable, however, by moving to resting areas that are less accessible or to plants resistant to fire. Studies have shown that they are readily transported on vehicles traveling in infested areas. The WHO and UNDP have conducted country and regional studies to develop the best methods of combating this disease.

Leprosy

Estimates of the incidence of leprosy vary from 60-70,000 cases, with an estimated 30 percent receiving treatment at one of five leper colonies, a major treatment center, or mobile field units. WHO/UNICEF provided drugs and other assistance until 1965.

Environmental Sanitation

In August 1973 the government stated that approximately 40 percent of the population was supplied with piped water. The distribution of safe water is uneven, however, as nearly 60 percent is provided for Accra while the central and northern provinces receive only 10 percent of the national total. Residents of the larger cities have per capita water availability approaching that of the developed countries, while people in towns of less than 20,000 have only 10 percent of their requirements supplied. Villages have scarcely been touched by the national effort to provide safe water supplies.

For the greater part of the country waste disposal facilities are entirely inadequate. None of the cities has a modern sewerage system although one is under construction in the Accra-Tema municipal area. Some areas are served by septic tanks or pit latrines, in others, ditches beside the street serve as open sewers. Human waste and garbage are collected in the cities and buried on the outskirts. Collection is irregular and piles of waste provide breeding places and shelter for insects and vermin.

Ghana has received assistance from WHO and UNDP (over \$4 million in the last ten years) and from AID (about \$700,000 in technical assistance) to improve environmental sanitation. The

initial purpose of the WHO/UNDP assistance was to develop a water supply and sewage disposal plan for the Accra-Tema metropolitan area. Recently, in an effort to equalize development and facilities in the urban and rural areas, assistance by outside groups and the national government's efforts have been directed more toward rural water supplies. In the 1970-71 budget the breakdown of expenditures for water supplies shows 19 percent slated for the cities, 22 percent for towns, and 59 percent for rural areas. The plan is to provide wells in 800 rural communities which have no safe and reliable water supply at present. However, the overall level of national funding for environmental sanitation is very modest. In the 1973-74 budget \$2.438 million is allocated (4.5 percent of the total health budget) for all environmental sanitation services including: sanitary engineering, sanitation services, enforcement of public health regulations, port health services, and mosquito control in Accra.

The low level of sanitation is responsible in large part for the high incidence of dysenteric and parasitic diseases. Hookworm infestation is common, with 40-80 percent infection reported in some areas. Round worms and several types of tapeworm are widespread, especially in the northern part of the country. Guinea worm is a serious infestation and is probably one of the major disabling diseases; whole villages may be unable to carry on normal activities as a result of it.

The incidence of diseases related to poor environmental sanitation is not known with any certainty but there is wide agreement that it represents a serious problem to a population already weak and malnourished, and results in a reduced ability to work effectively in the fields or at school.

Health Services

Health manpower of most types are in short supply in Ghana. Data provided the World Health Organization shows that in 1970 there were 667 physicians in the country, up slightly from the number reported for each of the five previous years. Included are physicians associated with mining company health services, missionaries, and the University of Ghana. Of the total number of physicians, 391 were in government service.

In the mid-1960s, less than half of the physicians in the country were Ghanians. At the same time there were 600-800 young Ghanians (estimates vary) receiving medical training abroad. Thus, at least until the last few years, there were more medical students abroad than there were physicians of all types in the country. Unfortunately, the total number of physicians in the country has not increased markedly. It is evident that the "brain drain" has worked to Ghana's considerable disadvantage. After 1967 students were no longer sent abroad but instead trained at the University of Ghana Medical School. The school graduated its first class in 1969.

The medical school uses the Korle Bu Hospital in Accra as its teaching and training facility. At the time of its establishment in 1964 the school proposed the following objectives:

1. To produce generalists rather than specialists.
2. To emphasize preventive and social medicine, maternal and child health, and medical, surgical, and obstetric emergencies.
3. To give students the experience and skill in dealing with emergencies that a doctor will face working with limited facilities in a rural area.
4. To expose students to the conditions under which they will work by carrying out part of their clinical training in health centers and village dispensaries, as well as in urban hospitals.

5. To encourage individual self improvement after graduation.
6. To train students to coordinate and direct a health team of auxiliary personnel who can operate at the rural health center level.

During the 1969-1970 academic year there were 263 students at the medical school. The government hopes to increase the size of each class to 100 in five years. In 1972 a post-graduate course was established. Costs of medical education are divided about evenly between the student and the government.

Although there is no breakdown of the location of physicians, some inferences can be drawn. About 60 percent of the total number are government employees and presumably available for assignment at the government's discretion. The remaining 40 percent are in "private service" but this includes mining and missionary services which are known to be located outside the major cities, in many instances.

Other registered health personnel available in 1970 were: midwives - 2,808; qualified nurses - 7,354; laboratory technicians - 76; and X-ray technicians - 82. As with physicians, about 60 percent of these personnel are in government service. Assuming the data are accurate, in terms of the estimated 1970 population there was one physician per 12,800 people; one midwife per 3,043 people; and one nurse per 1,163 people. In addition there is an auxiliary health field staff of 1,015 in the leprosy service, medical units, health education and health inspections. There were only 41 dentists in the country and that number has remained virtually constant for several years.

It is interesting to note that the total number of trained nurses and auxiliary personnel increased by 60 percent between 1967 and 1968. It is not known whether this was an error in reporting or was the result of a crash program to develop more trained personnel. A state registered nurse is equivalent to a registered nurse in the United States and receives a four-year training course, after completing secondary education. A qualified registered nurse is equivalent to a practical nurse. There is no breakdown of the total number of trained nurses previously cited into these two categories. The nursing profession is open to both men and women and about 40 percent of the nurses are male. A school for medical assistants has been established which provides a one-year course for male nurses with ten years' service.

After an initial survey of needs and resources, WHO began to assist Ghana in training nurses for community health work in 1962 and providing some fellowships in post-basic nursing education for teachers. This work continued until 1973 at a total cost of about \$600,000. Training for state registered nurses is available at two hospitals; three schools provide a two-year auxiliary nursing course. The training period for midwives is eighteen months, followed by a four-week post-graduate training period. The Midwives Board supervises training and midwives must be registered before practicing.

There are no training facilities for dentists; they must receive their education abroad. The University of Ghana has a school of pharmacy. There were 350 pharmacists in the country in 1970 and the number has remained relatively constant for the past several years.

Although data vary from source to source, it appears that there are about 157 hospitals in Ghana with approximately 10,000 beds or a little over one bed per 1,000 population. Of this number, the 114 government maintained had 5,876 beds, mission hospitals 2,950, and mine hospitals 511. The distribution is uneven, however, with about one-half of the number of hospitals and beds in Accra-Tema, Kumasi, and Sekondi-Takoradi. There were outpatient facilities available at 119 hospitals as well as 40 health centers, 80 medical aid posts and 250 mobile health units.

Of the total number of hospitals the Ministry of Health administers nine regional ones (with two more under construction) and 33 in districts. In the 1970-71 budget there was a capital investment allocation of N¢1.747 million for health centers and rural health posts, versus slightly over N¢7 million for hospitals including N¢1.7 million for a new mental hospital in Accra. The allocation to health centers and health posts is, however, almost four times the previous year's allocation.

Although there are no data immediately available on the utilization of government hospitals and their outpatient load, there is information on some of the missionary hospitals giving an indication of the level of care they provide. For example, the Holy Spirit Missionary Sisters operate a clinic, dispensary, and 90 bed hospital, which treats more than 90 outpatients a day at NKawKaw; a maternity clinic with 12 beds and care for 70 outpatients a day at Tafo; a 12 bed clinic/maternity center which sees 200 patients daily at Agomanya-Krobo; and two centers for care of leprosy patients. The Southern Baptist Convention operates a 77 bed medical center at Nalerigu which had 2,564 inpatients and 104,000 outpatients in 1969. The Medical Mission Sisters have three hospitals in different locations with a total of 180 beds, satellite clinics, health and maternity centers, certified education programs in nursing, midwifery, and laboratory techniques and provide outpatient as well as inpatient care. Although largely supported by foreign religious and philanthropic organizations, mission health facilities are to receive ¢1,250,000 of government support in 1973-74.

In addition to the government and private hospitals and clinics there are about 40 rural health centers spread throughout the nine administrative regions of the country. These centers are in the charge of a "superintendent", generally a nurse, and have a midwife, health inspector, and sometimes a mobile field unit. They operate as outpatient facilities and provide some maternity care and health education. Cases requiring a higher level of care are referred to the nearest hospital. These centers have assisted in special campaigns against communicable diseases such as yaws, onchocerciasis, bilharziasis, tuberculosis and malaria. There were plans to build 22 more centers in 1970 and N¢1.747 million was allocated for this purpose by the Ministry of Health.

In the mid 1960s it was estimated that about 25 percent of the population, primarily in the urban areas, had access to some kind of health care. The majority of the population probably still relies most heavily on traditional treatment due to the inaccessibility of modern medicine and faith in traditional methods. When medical help is sought the practitioner is often expected to provide medicine, an injection, or some other visible form of treatment, so the patient believes healing will take place.

The traditional treatment practitioners are usually persons who are believed to possess powers which will counter the supernatural forces causing illness. Cures include the use of fetishes or amulets to be worn or displayed, potions or salves, and the burning of incense. Bleeding is a common practice, as well as rubbing herbs into wounds or sores. The infection or pain which may result is considered to be essential to the cure.

The medical value of traditional treatment varies. In some cases it is harmful and may result in serious infections and death. A tea made from a wild plant that is often used to cure illness has been found to induce liver disease that can be fatal in one-third of the cases. Some practices, however, have been useful and sound. For example, some northern tribes have long used pus from infected persons to provide a form of smallpox vaccination. Some of the herbs and other remedies used are under study to determine whether they may have medicinal powers.

The native doctors are people of considerable prestige and status in the community. Many of their herbs and treatments are secret and passed on only to selected apprentices. Any attempt to extend modern health services should include an evaluation of the current and potential future role of these native healers, with a view to utilizing their prestige and status to the greatest extent possible.

The government's top priority for development of rural areas has resulted in a comprehensive rural health and family planning project in a group of villages centered at Danfa, just north of Accra. The endeavor was conceived by the University of Ghana Medical School as a teaching and research project. In 1970, AID and the University of California, Los Angeles, joined with Ghana in this program to strengthen national health services. Some of the goals are to:

1. Evaluate the resources of the community, its social organization, the ways in which health programs might best be provided, and develop reliable data.
2. Determine the best way to utilize available manpower.
3. Train doctors, nurses, midwives, sanitarians and other health personnel both individually and in teams, so that they are capable of working in rural communities.
4. Provide comprehensive health care and preventive health services, emphasizing maternal and child health, nutrition, health education, infectious disease control, improved environmental health, and family planning through the Danfa Health Center.
5. Undertake cost analysis as a guide to development and health planning.
6. Examine the role of traditional medicine and traditional midwives in providing health and family planning services.

The region around Danfa includes over 200 villages and hamlets and has been divided into four areas of approximately 12,000 people each. These groups are used to study different ways of presenting family planning in rural areas: by showing the population that existing children will survive if provided adequate nutrition and care; by an intensive campaign promoting family planning and good health practices; by simply making family planning services readily available; and by focusing on education and economic growth as the catalyst in changing attitudes toward family size.

The Danfa Center has a few beds for maternity and emergency cases but primarily provides outpatient care without a physician in residence, and sends health teams to outlying satellite clinics. It is an experimental model for a facility intermediate between a health post with two or three auxiliaries and a health center with surgical facilities. It is hoped that this model will be a prototype to divert patients from overcrowded hospital outpatient departments. If this center can provide prompt, effective primary health care, then scarce physicians can devote their talents to the provision of professional services in hospitals.

The cost of this project to the government is estimated at ₵100,000 per year. The cost to AID through the 1973 fiscal year was \$2.48 million.

Ghanian health authorities have reached preliminary agreement with WHO on an interesting regional research project which will study the best means of achieving active community involvement in solving local health problems. The project will be centered in a 5,700 square mile area around Kintempo. This area was chosen because it is a rural district with health problems and existing health services that are typical of the country. Community development workers, with the professional backing of mission hospitals and government health centers in the area, will work with community leaders to identify local health priorities and develop plans of action. To carry out these plans, government health personnel will train, equip, and supervise these community leaders.

Related to the government's emphasis on rural development and increased agricultural production is the recognition of the importance of better nutrition. Outside sources have been providing foodstuffs and other assistance until the goal of self-sufficiency in food production

can be met. Through PL 480 Title I sales and Title II grants, administered by Catholic Relief Services and Church World Services, AID has provided rice, wheat, corn, powdered milk, eggs, etc. Canada has scheduled grants of wheat. FAO has provided assistance for improving vegetable and fruit production and poultry raising. The U.S., Canada, and Denmark have provided technical advisors. The World Food Program and UNICEF have also provided supplies.

Organization and Financing of the Health Sector

The Ministry of Health is headed by the Commissioner of Health who is assisted by a Director of Medical Services, in charge of technical matters, and a Principal Secretary in charge of administration. The Ministry has five administrative and eleven technical divisions which include: health legislation, health planning statistics and documentation, control of communicable diseases, nutritional health service, medical care, health laboratory services, dental health services, mental health services, health education, medical manpower and training. There are nine administrative regions in the country, each headed by a regional medical officer. All public health activities within the region are the responsibility of this officer.

The budget support of the health sector is a function of the total amount available in the national budget. Although the total budget has been rising over the past few years, the level of increases has been erratic with very small changes followed by substantial increases. The following table illustrates the trend:

<u>Fiscal Year</u>	<u>Total National Budget* (Million ₦)</u>	<u>Percent Increase</u>	<u>Percent Allocated to Health</u>
1966/67	302.3		5.5
1967/68	370.5	22.4	5.8
1968/69	382.4	3.2	7.2
1969/70	457.7	19.7	7.2
1970/71	486.7	6.3	7.1
1971/72	581.8	19.5	6.3
1972/73	603.4	3.7	6.7
1973/74	759.3	25.8	7.2

* From Summaries of Economic Data of the Economic Commission for Africa, July 1973. Amounts shown include current and capital budget funds.

As shown in the preceding table the funds available for the health sector represent a modest but slightly rising percent of the total national government budget. More importantly, the per capita expenditure (neglecting inflation) is currently about ₦4.2, double the level of seven years ago.

The table on the following page shows the breakdown of expenditures within the health sector for the 1973/74 fiscal year. Some observations can be made concerning these budget classifications:

Table 4
 Ministry of Health, 1973/74
 Current and Capital Expenditures Budget

<u>Program</u>	<u>Allocation (¢)</u>	<u>Percent of Total Health Budget</u>	<u>Percent Chan From Previous Year</u>
General Services			
General Administration	7,384,310	13.6	385
Budget Planning	23,740	.1	-14
Common Services	1,818,550	3.3	42
Regional Health Administration	1,068,950	2.0	6
Stores	1,113,530	2.0	30
Health Education	277,800	.5	344
Medical Documentation	66,090	.1	-
Training	3,299,850	6.1	23
Health Department	272,310	.5	-4
Internal Audit	9,440	.1	-
Herbs Research	55,000	.1	-
Total	15,389,570	28.2	103
Korle Bu Management Board			
General Administration	633,400	1.2	28
Medical/Dental Services	4,100,000	7.6	56
General Services	1,680,450	3.1	60
Total	6,413,850	11.9	53
Ministry of Health, Medical/Dental Services			
Dental Services	673,940	1.2	14
Environmental Health	2,438,590	4.5	15
Epidemiological Division	2,420,000	4.5	4
Health Laboratories	843,110	1.6	-11
Maternal and Child Health	1,183,850	2.2	10
Medical Care	20,412,720	37.5	11
Mental Health	4,197,000	7.7	53
Nutrition Services	408,270	.7	7
Total	32,577,480	59.9	14
Grand Total	54,380,900	100	26

Source: The Annual Estimates for 1973-74, Part I, Vol. IX, Health, Ministry of Finance and Economic Planning, July, 1973.

1. The category, General Administration, which shows such a dramatic increase over the previous year (385 percent), is not mainly "administrative" as that term is generally understood. Rather, it covers the contributions to various health organizations and the subventions to the mission hospitals. The great bulk of the increase (¢5,745,280) is to provide drugs and medical equipment.
2. The total budget of ¢54,380,900 is broken down into Current Expenditures - ¢44,882,900, and Capital Expenditures - ¢9,489,000. Thus, 17.5 percent of the total budget is scheduled for construction and other capital projects.
3. There is a component for Central Administration in virtually all of the programs scheduled for the nine regional areas. This component totals about ¢7 million. Central Administration and Capital Expenditures therefore, account for about 30 percent of the total health budget.
4. Composite expenditures for Health Education, Environmental Health, Epidemiology, Nutrition, and Maternal and Child Health, which are problem areas of such vast scope, receive only 12.4 percent of the total budget, including the component for Central Administration. Mental Health, on the other hand, is allocated 7.7 percent of the total.
5. The Korle Bu Hospital is the largest hospital in Ghana and is the teaching hospital for the Ghana Medical School. Funds for it absorb 11.9 percent of the total health budget.
6. The budget for Medical Care absorbs 37.5 percent of the total. This expenditure, although partially directed to health centers and health posts, is mainly devoted to urban hospitals and curative services. Between this portion of the budget and that part devoted to Korle Bu Hospital, almost one-half of the total budget is directed toward curative services.

At the request of Ghanaian health authorities, USAID sent two consultants to Ghana to advise on administrative, organizational, and management aspects of the health sector. The consultants' report stressed the importance of organizing the health services to best meet the present and future needs and priorities of the country. This would best be accomplished by restructuring the health services along the following lines: (1) disease prevention and health promotion; (2) medical care services; (3) health manpower development; (4) health planning, research and evaluation; and (5) administrative management. Of these, the first two are primarily line or operational functions which are concerned with delivery of services. The last three are primarily support activities. A critical aspect of this structure is that the staff functions be organizationally close to the Director-General. The report stresses the need for organization to meet the major health problems of the country: communicable disease control, environmental health maternal and child health, nutrition, and health education, along with the curative services. In keeping with the commitment of the Government of Ghana the emphasis should be upon the decentralization of services and greater attention to the rural areas.

Conclusions and Recommendations

Ghana is faced with a number of difficult problems:

1. Heavy external debt in spite of a recently improved balance of payments.
2. High inflation coupled with a slow rate of economic growth and low or declining real per capita income.
3. Heavy unemployment aggravated by internal migration from rural areas to the cities.
4. Crowded cities with strained and deficient social services; overcrowded schools which cannot provide students the skills they need to enter the very competitive labor market; an extreme housing shortage, poor environmental sanitation, and crowded and limited health facilities.
5. Low level agricultural productivity and a shortage of food.
6. Poor storage, processing, and marketing facilities which isolate the produce of the agricultural sector from the urban areas.
7. A high population growth rate coupled with strong pro-natalist attitudes which make efforts to control population growth difficult.

Closely related to and interrelated with these conditions are a wide variety of health problems:

1. Low life expectancy with especially high infant and childhood mortality.
2. Poor nutrition, especially of young children.
3. A high incidence of communicable diseases which take a heavy toll: malaria, schistosomiasis, onchocerciasis, tuberculosis, trypanosomiasis and enteric infections that further reduce the resistance and productivity of an already malnourished population.
4. Poor and maldistributed environmental sanitation facilities which aggravate the spread of diseases.
5. A shortage and maldistribution of most kinds of health manpower and health facilities.
6. Emphasis on curative rather than preventive medicine.
7. A relatively low level of resources allocated to the health sector.

In spite of many problems there are positive aspects of Ghana's current status, not the least of which is the apparent recognition that problems exist.

1. There is sufficient land with adequate rainfall, as well as irrigation potential, to increase agricultural production.
2. There is adequate electric power available for the foreseeable future both for personal use and for the small but viable industrial sector.
3. There are promising unexploited mineral resources. Rising commodity prices have contributed to exchange earnings and national income.

4. The road transport net, though requiring maintenance, should be adequate for the near term.
5. The fishing industry is reasonably well developed and can contribute to greater national income and to an increased availability of food.

There are also some pluses in the health sector:

1. The ratio of available health manpower to population is better than in many underdeveloped countries and there is a willingness to use them for delivery of basic health services.
2. The numbers of auxiliary personnel being trained has increased.
3. There is a significant amount of missionary and philanthropic health services which supplement national efforts.
4. Attention has been directed to delivery of comprehensive health services in rural areas where the need is great.

The government's priority budget areas are: agriculture, fisheries, forestry, roads, rural water facilities, and low cost housing. Of prime concern is agricultural improvement to reduce the flow of migrants to the cities, cut food imports and raise exports and exchange earnings, and improve nutrition. There are implications for the health sector in development efforts in these sectors:

1. Improvement of agricultural productivity can have an important effect on health but in view of the already serious spread of water-borne diseases, great care should be taken especially in projects which call for irrigation or flooding.
2. Certain health activities such as control of disease vectors like the tsetse fly, the black fly, mollusk intermediate hosts of schistosomiasis and anopheline mosquitos, are necessary prerequisites of agricultural development activities.
3. In view of the serious protein deficiency in the diet, agricultural schemes should include consideration of the introduction of more protein rich crops, such as beans and peas.
4. Budgetary stringency and the national decision to emphasize rural development should have the effect of diverting scarce resources from urban hospitals to the development of rural health services, utilizing experience gained in the Danfa project.

There also exist some areas specific to health and health sector activities which seem to warrant more intensive effort than they presently receive. These include:

1. Diseases such as tuberculosis, yaws, diseases preventable by vaccination, such as tetanus, diptheria, and whooping cough. They are such important causes of morbidity and mortality that they warrant a shift in resource allocation from curative services to control by prevention.
2. The provision of potable water supplies may, over the long run, prove to be a most efficient method of decreasing morbidity and mortality in the Ghanian population.
3. The problem of maldistribution of health manpower may prove too difficult to solve using traditional health sector personnel and patterns of delegation of responsibilities for patient care must receive consideration. This reorganization of the health care infrastructure should take cognizance of indigenous healers as a source of manpower.

4. Greater efforts at health education should be made among the large school population and at outpatient treatment facilities.
5. Greater emphasis should be given to programs of maternal and child health and nutrition to reduce the high level of maternal, infant, and childhood mortality.

T A B L E S

Table 5

Medical and Public Health Personnel in Government and Non-Government Services

	1962	1963	1964	1965	1966	1967	1968
Total							
Doctors	516	525	560	567	573	497	539
Government service	363	379	353	365	296	258	310
Specialists	120	130	133	106	71	72	55
General duty	243	249	220	259	225	186	255
Private service (1)	153	146	207	202	277	239	229
Specialists	—	—	38	10
General duty	—	—	169	192
Dentists	29	29	36	35	39	35	37
Government service	17	17	23	22	24	25	29
Private and military	12	12	13	13	15	10	8
Midwives	1,104	1,235	1,489	1,601	1,894	1,981	2,334
Government service	611	954	929	1,011	1,231	1,307	1,548
Private service	493	281	560	590	663	674	786
Trained nurses	2,191	2,290	2,378	2,660	3,078	3,173	5,095
Government service	1,344	2,218	2,274	2,543	2,944	3,018	3,569
Private service	769	72	104	117	134	155	1,526
Public Health Nurses (Health Nurses)	78	61	80	115	139	157	176
Para-medical field staff	621	435	476	523	567	594	1,015
Leprosy service	150	60	66	71	77	78	53
Medical field units	206	216	216	217	224	224	139
Malaria service	27	28	33	33	55	59	57
Health educational officers	17	10	11	11	11	9	9
Health inspectors	221	121	150	191	200	224	757
Qualified pharmacists	342	355	355	355	342	357	357
Attached to Government hospitals	75	130	133	133	125	126	126
Attached to non-Government hospitals	11	14	15	15	14	20	20
Non-attached to hospitals	256	211	207	207	203	211	211

(1) Including doctors of mining, missionary establishments and the University of Ghana.

Source: Ministry of Health.

Table 6

HOSPITAL BEDS PER 10,000 (Dec. 1968)

Region	Population 1	Number of Beds 2	Beds per 10,000
Total	8,545,600	9,628	1.13
Accra-Tempra	848,800	2,230	2.63
Western	768,300	994	1.29
Central	892,600	656	.74
Eastern	1,262,900	1,402	1.11
Volta	947,000	1,201	1.27
Ashanti	1,477,400	1,502	1.02
Brong-Ahafo	762,700	449	.59
Northern	768,600	443	.61
Upper	857,300	751	.88

Sources: 1 Area Handbook for Ghana, Table 1, page 37.

2 Republic of Ghana, 1967-1968 Statistical Year Book, page 73.

Table 7

Notification of Infectious Diseases

	1961	1962	1963	1964	1965	1966	1967	1968
Group A diseases								
Yellow fever								
Cases	11	21	—	—	—	—	—	—
Deaths	—	7	—	—	—	—	—	—
Small pox								
Cases	131	231	23	9	7	12	114	24
Deaths	16	13	—	1	—	2	17	6
Relapsing fever								
Cases	—	49	—	—	—	—	—	—
Deaths	—	7	—	—	—	—	—	—
Typhus								
Cases	8	35	—	—	—	—	—	—
Deaths	—	—	—	—	—	—	—	—
Acute Poliomyelitis								
Cases	141	90	5	30	10	8	7	10
Deaths	11	8	2	—	1	2	6	8
Cerebro-Spinal Meningitis								
Cases	2,112	1,063	114	109	51	123	80	27
Deaths	230	178	32	33	22	22	32	8
Influenza								
Cases	47	74	—	—	—	—	—	—
Deaths	—	—	—	—	—	—	—	—
Group B diseases								
Pulmonary T.B.								
Cases	8,347	8,326	6,166	7,602	8,688	6,734	5,863	— ^(*)
Deaths	118	224	—	—	850	411	418	393
Typhoid (E.N.9) Fever								
Cases	734	664	738	590	332	244	352	224
Deaths	39	63	48	33	99	141	148	43
Diphtheria								
Cases	7	20	—	29	14	9	6	2
Deaths	2	3	—	4	1	—	—	2
Sleeping Sickness								
Cases	290	256	409	356	324	324	235	— ^(*)
Deaths	12	17	6	6	1	1	3	—
Rabies								
Cases	21	36	—	—	—	3	12	20
Deaths	12	17	—	—	—	3	12	20
Anthrax								
Cases	2	21	18	46	48	2	15	8
Deaths	—	4	—	—	12	—	2	2
Febrile Pyrexia								
Cases	307	286	—	62	18	23	47	58
Deaths	4	10	—	5	—	—	8	—

(*) Notification given to the Ministry of Health by medical officer-in-charge of hospitals and private practitioners
 (†) No returns.

Source: Ministry of Health.

Table 8

Reported Measles Cases in Ghana by Region, Jan-Apr, 1970 and Jan-Apr, 1971

REGION	Month, 1970								TOTAL	
	Jan		Feb		Mar		Apr		Cases	Deaths
	C	D	C	D	C	D	C	D		
Western	137	0	132	1	573	3	655	1	1,497	5
Central	207	0	151	0	127	2	112	0	597	2
Accra	321	2	414	2	437	6	317	7	1,489	17
Eastern	670	0	732	0	932	0	852	2	3,186	2
Volta	287	1	311	0	301	0	345	0	1,244	1
Ashanti	516	5	671	4	1,020	1	924	1	3,131	11
Brong Ahafo	213	9	219	13	466	5	227	10	1,125	37
Northern	15	0	71	0	127	4	248	2	461	6
Upper	729	1	872	0	967	2	643	1	3,211	4
TOTAL	3,095	18	3,573	20	4,950	23	4,323	24	15,941	85

REGION	Month, 1971								TOTAL	
	Jan		Feb		Mar		Apr		Cases	Deaths
	C	D	C	D	C	D	C	D		
Western	494	0	638	0	913	0	1,067	2	3,112	2
Central	309	0	375	2	458	0	405	1	1,547	3
Accra	1,587	11	1,537	14	924	5	743	7	4,791	37
Eastern	951	1	1,475	2	1,966	1	1,800	4	6,192	8
Volta	480	0	830	0	1,844	3	1,898	10	5,052	13
Ashanti	1,668	4	2,567	9	3,701	6	3,617	26	11,553	45
Brong Ahafo	401	12	647	9	653	12	643	12	2,344	45
Northern	1,177	4	1,274	7	2,069	3	1,122	3	5,642	17
Upper	304	0	628	6	806	4	934	11	2,672	21
TOTAL	7,371	32	9,971	49	13,334	34	12,229	76	42,905	191

Table 9

Cholera Cases and Deaths by Region and Month, Ghana, 1971

Region	Month								Total	
	Jan		Feb		Mar		Apr		Cases	Deaths
	C	D	C	D	C	D	C	D		
Western	842	26	407	18	258	8	251	4	1,758	56
Central	1,987	95	673	25	672	25	529	21	3,861	166
Accra	426	46	162	4	91	0	112	1	791	51
Eastern	490	36	431	16	279	31	120	15	1,320	98
Volta	503	12	135	5	55	4	48	7	741	28
Ashanti	21	3	11	2	6	2	70	5	108	12
Brong Ahafo	23	3	6	0	1	0	0	0	30	3
Northern	12	3	0	0	0	0	0	0	12	3
Upper	0	0	0	0	0	0	0	0	0	0
TOTAL	4,304	224	1,825	70	1,362	70	1,130	53	8,621	417

The decline in case fatality ratios in Accra is interesting, and indicates the success of the effort undertaken to establish and maintain treatment centers there.

Table 10
National Government Expenditures by Sector

<u>Ordinary Revenue</u>	<u>1966/7</u>	<u>1967/8</u>	<u>1968/9</u>	<u>1969/70</u>	<u>1970/1</u>	<u>1971/2</u>	<u>1972/3</u>
Indirect taxes	162.1	197.1	200.6	264.9	380.0	300.7	253.1
Direct taxes	54.8	57.5	59.5	69.1	63.4	75.1	70.6
Sales	11.3	13.0	12.9	15.6	18.0	24.5	2.7
Interest and profits	6.1	14.7	6.2	8.0	14.7	24.5	53.9
Other	7.2	17.3	12.0	11.6	19.5	13.4	21.8
Total	241.5	300.2	291.2	369.2	495.6	438.2	402.1

<u>Recurrent Expenditures</u>	<u>(million new cedis)</u>					<u>(million cedis)</u>	
Education, culture, sport	44.0	45.5	49.3	59.1	65.2	69.1	73.0 ^f
Youth, rural development ^a	7.8	8.4	6.8	7.4	3.7	5.7 ^d	6.4 ^d
Health	15.8	19.8	25.2	28.1	28.8	27.2	33.4
Agriculture	10.2	11.3	12.8	13.9	18.4	26.8	30.4
Lands and minerals	5.3	2.5	3.4	4.8	5.1	4.5	5.8
Construction	11.3	13.1	13.4	11.4	12.2	15.5	22.1
Transport and commerce	28.0	7.5	8.7	9.8	10.7	11.0	2.7
Defense	25.7	36.2	41.4	35.0	36.0	31.4	38.0
Internal Affairs	16.7	16.8	20.7	27.7	24.8	27.3	23.5
General Administration	32.2 ^b	35.8	39.6 ^b	44.4	50.3 ^b	58.4	47.0 ^f
Public Debt Interest	25.1	26.7 ^b	29.2	39.3 ^b	57.3	153.5	220.7
Other ^c	24.8	74.5	66.6	93.3	65.8		
Total	226.9	298.1	317.1	373.7	378.3	430.4 ^e	503.0

^a Youth, Rural Development and Social Affairs

^b From earlier publications

^c Mainly Financial Services, Fiscal Administration and Foreign Affairs

^d Labor, Social Welfare and Cooperatives

^e Revised to 394.3 million cedis

^f Modified to make comparable

Table 10 (continued)

<u>Capital Expenditure</u>	<u>(million new cedis)</u>					<u>(million cedis)</u>	
	<u>1966/7</u>	<u>1967/8</u>	<u>1968/9</u>	<u>1969/70</u>	<u>1970/1</u>	<u>1971/2</u>	<u>1972/3</u>
Education, etc.	2.37	3.55	2.64	4.34	7.48	18.98	6.91
Health	0.75	1.66	2.16	4.75	5.67	9.24	7.18
Youth, rural develop- ment ^a	0.17	0.20	0.19	0.96	1.76	15.84 ^c	4.25 ^c
Agriculture	8.14	7.86	7.55	7.26	9.07	6.43	8.91
Lands and minerals	3.71	3.59	2.74	4.46	4.90	3.99	5.07
Industries	9.72	6.26	4.88	2.90	0.90	0.20	0.22
Construction	11.97	24.10	22.64	30.11	36.53	46.87	42.56 ^e
Transport and commerce	3.15	2.85	2.44	3.76	5.38	11.46	2.31
Defense	8.03	8.02	8.74	8.33	6.69	8.15	7.30
General Administration	13.90	9.31	7.13	10.60	17.98	11.66	5.21
Other ^b	<u>13.52</u>	<u>4.99</u>	<u>4.18</u>	<u>6.49</u>	<u>12.04</u>	<u>19.98</u>	<u>10.43</u>
Total	<u>75.43</u>	<u>72.42</u>	<u>65.29</u>	<u>83.96</u>	<u>108.40</u>	<u>151.40^d</u>	<u>100.35</u>

^a Youth, Rural Development and Social Affairs

^b Mainly Fiscal Administration up to 1970/71

^c Labor, Social Welfare and Cooperatives

^d Revised to 87.40 million cedis

^e Includes 9.3 million for low cost housing (2,300 units)

Source: Summaries of Economic Data of the Economic Commission for Africa, July 1973.

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