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9. ABSTRACT

This study of the interactions of health and socioeconomic development in Senegal discusses the Republic itself (geography, climate, political structure, education, transportation, communications, language, religion, economy); the population; health status; nutrition; environmental health; health facilities and services; health manpower; national health policy and planning; contributions of international organizations; and the situation in the Sahel.

Excerpts from the thirteen conclusions presented in the author's summary:

1. Several of the most serious diseases formerly prevalent in Senegal have been suppressed by mass immunizations programs. Those include yellow fever and smallpox. However, diseases still present at high levels include malaria, measles, tuberculosis, trachoma, and venereal diseases.
2. Senegal's population is relatively small, compared to the potential carrying capacity of the nation's resources. But short birth intervals, high dependency ratios, and rapid population growth create health hazards for the individual, economic problems for families, and development problems for the nation. There is little overt national concern for family planning or demographic problems.
3. High levels of infant and childhood mortality exist, especially in rural areas. Such illnesses as diarrhea, respiratory complications, and neonatal tetanus contribute significantly to this mortality. Basic health services are dramatically lacking in rural areas.
4. Environmental sanitation services are almost non-existent outside the major cities.

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5. Senegal is developing its water sources through irrigation projects, dam construction, and well-digging, but the work is not well integrated with the planning and implementation of health service programs.
6. Average nutrition in Senegal appears to be good, but seasonal and local variations create conditions for undernourishment, particularly among the young, pregnant women, and lactating mothers. Food storage facilities are inadequate. Health education in basic nutrition is needed.
7. An acceptance of lowered fertility rates would reduce infant and maternal mortality and morbidity. The government now has no policy on this.
8. Health services are inadequate and inefficient, and are not available in rural areas. Mobile health teams lack manpower, vehicles, gas, and passable roads.
9. There is an obvious shortage of all levels of health manpower, particularly in rural areas, where doctor-population ratios reach as high as one to 44,000. The government is taking steps to solve this problem.
10. Senegalese standards for education of physicians are high, but the standards and teaching are oriented toward cures and not prevention, do not promote training of medical auxiliaries, and have not attracted sufficient numbers of Senegalese students.
11. Health and manpower planning is handicapped by an inadequate data base, and the planning ministry lacks sufficient professional staff.
12. The Ministry of Health and Social Affairs plays almost no role in health or development planning, partly because of problems of administrative structure. The government is committed to a central reorganization of the Ministry of Health to solve this problem.
13. The fourth Four-Year Plan has a commitment to improving and expanding rural health services; however, implementation has been slow for lack of funds and an uncertain plan of action.

SYNCRISIS:
THE DYNAMICS OF HEALTH

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

XIX: SENEGAL

**U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
DIVISION OF PROGRAM ANALYSIS**

SYNCRISIS

THE DYNAMICS OF HEALTH

An Analytic Series on the Interactions
of Health and Socioeconomic Development

XIX: SENEGAL

Rohin J. Menes, M.H.S.

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"Our theory consists of democratic socialism, reconsidered by the Senegalese and for the Senegalese, in a purely African context. Our aim is to make the Senegalese people 'happier and better by providing them with health, wealth, and culture.' In more concrete terms, our major goal is to become a part of industrialized civilization by the year 2000 with a per capita income of 600 dollars per year - and we have already reached 263 dollars."

H. Exc. Leopold-Sedar Senghor
President of the Republic of Senegal

PREFACE

This study was prepared within the Division of Program Analysis of the Office of International Health, Public Health Service, U.S. Department of Health, Education and Welfare, at the request and with the support of the U.S. Agency for International Development (AID). It is part of the Syncrisis series, which consists of country profiles describing and analyzing health conditions in particular countries and the impact of those conditions on the country's socioeconomic development.

The primary purpose of these studies is to provide a concise and up-to-date introduction to the health situation in a country, for use by AID and throughout the international health community. The studies do not necessarily reflect United States government policy, and do not include recommendations for specific programmatic actions by AID. They do provide a background against which further analysis and health program development may occur.

Specifically, Syncrisis studies are intended to acquaint the generalist in development administration with (1) interventions in the health system of the country which will contribute to socioeconomic development, and (2) the effects of other developmental activities in health. To the specialist in comprehensive health planning, they will provide both a preliminary document for his work, and an indication of the sources of information available for health planning in that country. For the specialist in a specific aspect of health care, Syncrisis studies are intended to provide insight into the relationship of the subsystem with which he is concerned to the comprehensive health system and the larger society. For each of these professionals Syncrisis studies are intended not as a final definitive document, but rather as a point of departure from which their own professional skills can be applied to develop activities which will benefit the country.

In addition to the principal target audience, which will probably include a few dozen persons for a specific country, it has been demonstrated that Syncrisis studies are useful to others. For this reason the studies are published and made available for sale to the public. Consideration is given in the preparation of the documents to their possible use in health science education in the subject country, in international health education, and by scholars concerned with more general aspects of the country or with closely related sectors.

Syncrisis studies form an unusual resource for the student of comparative health systems. They present, in a uniform format, parallel descriptions of health systems in countries with widely varying cultural, social, economic, and government systems. It is hoped that in the future this aspect of the Syncrisis series can be of increasing value.

The methodology for development of the Senegal Syncrisis consisted primarily in the utilization of existing resource materials, e.g. books, journal articles, releases of international organizations, etc., available within the United States, supplemented by various publications on health and related areas by the formal institutions of the Government of Senegal. The initial data collection and analysis took approximately four months and was completed by a two-week visit to Senegal in April 1976. The country visit permitted verification and expansion of my original draft, and the opportunity to obtain new information and insights, thus filling important gaps in the study through an in-country literature review and personal interviews with key personnel involved in health and health-related activities in both the public and private sectors.

Every attempt has been made to obtain the most accurate and comprehensive picture of the health situation in Senegal. Nevertheless, it was necessary to synthesize data which was often incomplete, dated, contradictory and/or of questionable reliability. Estimates of such important health indicators as morbidity and mortality, health facilities and manpower levels, budgetary allocations, etc., were significantly conflicting. Therefore, the reader should be constantly aware that the analysis and judgments expressed herein are tentative and must be interpreted and applied with caution. More importantly, it should be noted that the varying lengths of sections of this study more accurately reflect the availability of information on the given topic than any conscious attempt to assess the relative importance of the diverse health problems of the country.

I am personally indebted to the USAID Mission in Senegal for their kind assistance and support of my research activities in-country. Special appreciation is due to Dr. Marc Vincent, USAID Health Officer, and Mr. Arthur Fell, Deputy AID Director, for their review of the draft of this paper and their thoughtful comments and suggestions. They also helped schedule the many interviews and personal introductions to people in the health sector in Senegal.

My thanks also go to the other members of the American community in Dakar who showed me the informal side of Senegalese life and culture.

A sincere appreciation is extended to Mr. Dennis Baker, USAID Senegal Desk Officer, and Dr. Joe Davis, Chief of Health Planning, TA/H, for their support throughout the writing of this paper.

I would like to especially thank Dr. John Daly for his critical review of the Senegal draft and the insightful comments and recommendations he made as editor to this paper; and, Ms. Jessica Auerbach and Ms. Kathy Howard, who spent days transcribing my handwritten pages to a beautifully typed manuscript.

Robin J. Menes

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LIST OF ABBREVIATIONS

ADB	African Development Bank
AID	Agency for International Development
BANAS	Bureau of Food and Applied Nutrition
BIRD	World Bank (see <i>Banque Internationale pour la Reconstruction et le Developpement</i>)
BNDS	<i>Banque Nationale de Developpement au Senegal</i>
CCCE	<i>la Caisse Centrale de Cooperation Economique</i>
CEAD	West African Economic Community (<i>Communaute Economique de l'Afrique de l'Ouest</i>)
CETAD	SODEVA's training center
CFAF	(CFA franc) <i>Communaute Financiere Africaine Franc</i> ; currency of the West African Monetary Union - UMOA) US\$1 = 234 CFAF
CILSS	Permanent Interstate Committee on Drought Relief in the Sahel
CIMADE	French Protestant Relief Committee
CM	<i>Circonscription Medicale</i>
CNRA	National Agricultural Research Center at Bambey
CRS	Catholic Relief Services
EEC	European Economic Community
FAC	<i>Fonds d'Aide et de Cooperation</i>
FAO	Food and Agriculture Organization
FED	<i>Fonds Europeen de Developpement</i>
GDP	Gross Domestic Product
GOS	Government of Senegal
ICN	International Congress of Nursing

IDA	International Development Association
IDEP	African Institute for Economic and Development Planning, U.N.
IFORD	Demographic Training Research Institute
IRAT	<i>Institute de Recherches Agronomiques Tropicales</i> at Bambey
IUD	Intrauterine Device
KWH	Kilowatt Hours
LDC	Lesser Developed Country
MHSA	Ministry of Public Health and Social Affairs
MOH	Ministry of Health
MRD	Ministry of Rural Development
MRE	Ministry of Rural Economy
MT	Metric Tons
OERS	<i>Organisation des Etats riverains du Senegal</i>
OMVS	<i>Organisation pour la Mise en Valeur du fleuve Senegal</i>
ONCAD	<i>Office Nationale de Cooperation et d'Assistance au Developpement</i>
ORANA	<i>Organisation de Recherches sur l'Alimentation et la Nutrition Africaines</i>
ORSTOM	<i>Office de Recherches Scientifiques et Techniques d'Outre-Mer</i>
PA	<i>"programme agricole"</i>
PMI	<i>Protection Maternelle et Infantile</i>
SGE	<i>Service de Lutte Contre les Grandes Endemies</i>
SIDOA	<i>Societe Industrielle/Pharmaceutique de l'Ouest Africain</i>
SODEVA	<i>Societe de Developpement et de Vulgarisation Agricole</i> (public enterprise in charge of extension services)
TC	Terminal Continental table (superficial level to dig well)
UNDP	United Nations Development Program

UNFPA	United Nations Fund for Population Activities
USG	United States Government
VHP	Village health posts
VHW	Village health worker
WFP	World Food Program

BASIC COUNTRY DATA

Population	4,100,000	Gross Domestic Product	(1972) US\$ 1.1 billion
Population density	140/square kilometers	Gross National Product, per capita	US\$250
Percent 0-15 years old	42%	Annual public sector health expenditure, per capita	US\$3.79 (1970's)
Population growth rate	2.2%	Percent literate	5-10% (1-14 years)
Crude death rate	23/1,000 persons	Population distribution	70% rural; 30% urban
Crude birth rate	45/1,000 persons	Surfaced roads	2,240 kilometers
Infant mortality	93/1,000 live births	Percent unemployed	70% part-time; 30% fully employed
Maternal mortality	N/A	Currency equivalents	234 CFAF = US\$1.00 (1976)
Average life expectancy	44 years		
Percent attended births	35%		

	<u>Rural</u>	<u>Urban</u>	<u>Average</u>
Percent of population with access to potable water	N/A	N/A	
Percent of population with access to sewerage	N/A	N/A	
Percent of children ages 1-4 with moderate/severe protein calorie malnutrition			9-14%
Population per hospital bed			719.4
Population per physician			14,590
Population per nurse			1,668
Population per allied health personnel			2,901

N/A = Not Available

SUMMARY AND CONCLUSIONS

1. Several of the most serious diseases formerly prevalent in Senegal have been suppressed by mass immunization programs; yellow fever and smallpox have been effectively eradicated. However, such diseases as malaria, measles, tuberculosis, trachoma and venereal disease are still present at high levels. These illnesses cause suffering and death and debilitate the human resources Senegal needs for national development.
2. Senegal's population is relatively small compared to the potential carrying capacity of the nation's resources. However, short birth intervals, high dependency ratios, and rapid population growth create health hazards for the individual, economic problems for the family, and development problems for the nation. Nonetheless, there is little overt national concern for family planning or demographic problems, and consequently, the population program is weak. High rates of internal and international migration complicate the demographic picture, and create a variety of specific health problems.
3. High levels of infant and childhood mortality exist throughout the country but especially in rural areas. Illnesses such as diarrhea, respiratory complications, and neonatal tetanus significantly contribute to this mortality and indicate the poor health environment and the dramatic lack of basic health services including nutrition assistance, health education, and potable water supply in rural areas.
4. Environmental sanitation services are almost nonexistent outside the major cities because of a severe shortage in personnel, health education and financial support for environmental programs. Government investment and/or donor assistance in this area alone could have the single most positive effect on the health status of the Senegalese people.
5. Senegal is in the process of developing its water sources through irrigation projects, the construction of dams, and isolated efforts in well-digging. In several cases, serious investigations into the health impact of these development projects have been conducted; however, there is an obvious void in planning health services and their implementation *vis a vis* these projects. Such an oversight could severely deteriorate the health and living conditions of the populations in these geographic areas.
6. Nutrition in Senegal appears to be good on the average; however, seasonal and local variations create conditions for undernourishment and malnourishment, particularly among the young, pregnant women, and lactating mothers. Adequate food storage facilities might best guard against the vagaries of rainfall and crop production and maintain a sufficient food supply during the *soudure*. The financial incentive to increase commercial agricultural production, to some degree, inhibits the promotion and development of food crops; however, these earnings have a useful purpose in supplying cash for food and non-food purchases.

Health education in basic nutrition, weaning and the promotion of breast-feeding could effect an important improvement in food preparation and eating habits in certain groups in the population. Such a program could result in reduced gastrointestinal illness and nutrition deficiencies in infants and children.

7. An acceptance of lowered fertility rates would reduce infant and maternal mortality and morbidity and might slow the present decline in per capita food intake, thereby improving the health status of the Senegalese. At the present time the Government of Senegal has no official policy on population planning or family planning and does not recognize population growth as a national problem. The large concentrations of people in towns and urban centers are the most pressing population problems and some attempts at resettlement have been initiated. Almost all towns are growing at 4% per year or more and in Cap Vert the figure is as high as 6%. Senegal has a dependency ratio of 0.8, implying a large group of dependent persons which are causing a severe strain on the country's economic resources and its potential for development. There is almost no provision for family planning services in the country; however, the newly created Family Planning Agency may, with government and donor support, be able to promote their development. Until infant mortality rates decrease and Government and religious leaders accept family planning, there will be little chance for success in reducing fertility.
8. Health services are inadequate and inefficient. The health delivery system only extends to the secondary health post and has almost no contact with rural areas. Mobile health teams are the only recognized link between the health system and the rural populations; however, a lack of manpower, vehicles, gas and a passable network of roads make their operation almost nonexistent.

Of the facilities that do exist, many are below acceptable levels of maintenance, supply and personnel. Inadequate and deteriorating services in the periphery result in an overburdening level of referrals to urban health centers and hospitals.
9. There is an obvious shortage of all levels of health manpower, especially dramatic in the rural areas, where doctor-population ratios reach as high as one to 44,000. The Government of Senegal recognizes this manpower deficiency and has taken several positive steps to correct it: mandatory rural service for all medical personnel receiving financial aid has recently been initiated; a new category of village health worker has been proposed under the USAID Rural Health Services Development Project; the Government is promoting the "recycling" of indigeneous health workers into the health system.
10. Physician education in Senegal seeks quality equal to the highest international standards; however, these same standards maintain a curative orientation in teaching, do not promote medical auxiliaries, and have not attracted sufficient numbers of Senegalese students.
11. Health and development planning in Senegal operates under several handicaps, not the least of which is an inadequate data base. Given the rudimentary nature of economic planning performed in Senegal, it has been suggested that the planning ministry could operate far more effectively with a smaller organizational structure. The principal problem is the shortage of professional staff. The policy-making council, in which the President, Prime Minister and Cabinet ministers set the general orientation and global objectives of the plan, meets infrequently and therefore has contributed little to plan development or implementation.
12. The Ministry of Health and Social Affairs plays almost no role in health or development planning, mainly because of an administrative structure weak in planning capabilities. Moreover, the Director of Health has technical responsibility for health programs without having administrative and budgetary authority; these powers are held by the Minister through his Chief of Cabinet. In order to rectify this administrative weakness the Government has placed its highest priority on central reorganization of the Ministry of Health.

13. The Fourth Four-Year Plan has explicitly made a commitment to improving and expanding rural health services; however, implementation has been slow for a lack of funds and an uncertain plan of action. In spite of the Government's commitment to upgrade rural health services, 47% of the Plan's health budget will be invested in hospitals and hospital construction. Economic observers suggest the Government should develop a more rational approach in setting priorities and the allocation of their attendant investments. The magnitude of the Plan should be decided upon in advance of program planning, a determination of the priorities and a ceiling set on expenditures for each Ministry.

CHAPTER ONE

THE REPUBLIC OF SENEGAL IN PERSPECTIVE

Geography

Situated at the western extremity of Africa's tropical zone, the Republic of Senegal (*Republique du Senegal*) has an area of 78,684 square miles and a population of about four million people. It is bordered to the north and to the northeast by the Senegal River which separates it from Mauritania; to the east by the Faleme, a tributary of the Senegal River which separates it from Mali; to the south by Guinea and Guinea-Bissau; and, to the west by the Atlantic Ocean. The Gambia constitutes a finger of territory twenty miles wide and two hundred miles long that thrusts from the coast eastward deep into Senegal.

Senegal is a flat country, lying in the depression known as the Senegal-Mauritanian Basin. Altitudes of more than about 330 feet are found only at Cap Vert and in the southeast of the country. Even in years of average rainfall, vegetation in most of northern Senegal is limited to fibrous grasses and thorn scrub. Southward more trees encroach upon the grassy, open areas and mixed subtropical forests prevail in the extreme south, particularly between the lower reaches of the Casamance River and the border with Guinea-Bissau. Senegal is favored by beautiful sandy beaches along the Atlantic Coast.

Climate

Senegal's climate is characterized by relatively high daytime temperatures throughout the year and a long annual dry season. Because the country lies well south of the Tropic of Cancer, days vary less in length and solar radiation is more intense and persistent than in temperate latitudes. Warm, humid equatorial and maritime air masses shift northward during the first half of the year, generating rainfall in a broad contact zone or intertropical front. The prevailing wind for the remainder of the year is from the northeast - the dry, dusty *harmattan* from the central Sahara. Interaction between these two air masses produces a broad belt of instability and rain, which in late summer covers all the country and then retreats southward in late summer or early autumn. The dry *harmattan* again prevails, killing vegetation and evaporating any accumulation of surface water.

Average annual precipitation in southern Senegal is between fifty and sixty inches and is spread over a six-month period from May through October. In central Senegal precipitation measures twenty to thirty inches and falls during the four months from mid-June to mid-October. The north receives less than twenty inches, almost all of it limited to the three months of July, August, and September.

Temperatures in coastal areas rarely fall below 60°F and daily, monthly and annual ranges are limited. Inland, away from the moderating influence of the ocean, seasonal daily temperatures reach as high as 100°F. The difference between the mean monthly maxima and minima may be 35°F and the daily range can be more than 40°F. A narrow strip along the northwestern coast between Cap Vert and the border with Mauritania is an exception to the otherwise relative homo-

geneous climate. This area, influenced by the trade winds from the Atlantic Ocean and the cool water of the Canary Current, has temperatures somewhat lower and more uniform than those of the interior and the rainy season is a few weeks shorter.

Political Structure

Senegal now has its third constitution since independence in 1960. Adopted by referendum on February 22, 1970, by a majority of 99.9% of the voters, the constitution proclaims its attachment to fundamental human rights, respect for political trade union and religious freedoms, and upholds individual and collective property rights.

This constitution establishes a decentralized Presidential regime. The President rules through the intermediary of a Prime Minister whom he nominates and who is responsible to him alone. However, he retains special powers concerning justice, foreign policy and defense. In other spheres his decisions must be approved by the Ministers who share in the responsibility for Presidential decisions.

The President is elected for five years and cannot serve more than two terms in office. Ministers are appointed by the President, who has the right to dissolve the Government in case of a vote of censure in the National Assembly. Deputies exercise a check on the executive power by means of commissions of inquiry, oral and written questions, and motions of censure.

Senegal is divided into seven geopolitical regions, twenty-eight departments (provinces), and ninety-four *arrondissements* (districts). Each region is administered by a governor, whose role is coordinative; he is assisted by two deputy governors. Several towns operate autonomously with elected municipal councils. National Assembly and municipal council elections are held every five years.

Political party life tends to be dominated by the Governmental party, the *Union Progressiste Senegalaise*. The *Union Progressiste Senegalaise* is committed to the socialization of the economy within the framework of "African socialism" and to the quest for African unity.

Justice is administered in the departments by justices of the peace and in the regions by courts of first instance. Criminal cases are judged by assize courts held at Saint-Louis, Kaolack, Ziguinchor and Dakar. Dakar is the seat of the Court of Appeal.

Education

The Senegalese educational system's curriculum and standards are modeled on those in France. Education is compulsory and free for all children between the ages of six and fourteen years. The number of eligibles in the pool for teacher training is low and teachers' salaries inhibit the selection of this field of study. The training of teachers for technical or other vocational education is especially low. Most teachers continue to be trained abroad and local programs are heavily staffed by expatriate Frenchmen. Unfortunately, this situation makes it very difficult to modify the elementary and secondary programs to a more relevant curriculum for the needs and resources of Senegalese society.

Only 10% of the adult population is literate. Although a 1963 survey showed that less than 1% of the population speak French at home, French is the language of instruction in all primary schools. The Government literacy service is the least well developed of the non-formal programs

comprising *Promotion Humaine*. The literacy service employs fifteen persons total, thirteen of whom are residents in Dakar. Present plans are to launch a vast national program for which the literacy program is seeking significant donor support.

Elementary education is comprised of six years of schooling that includes a one-year initial course, a one-year preparatory course, a two-year elementary course, and a two-year middle course. Students are awarded the certificate of elementary education (*certificat d'etudes primaires elementaires*) at the completion of the program. This certificate is increasingly becoming a prerequisite for salaried employment.

In the 1969-70 school year there were 258,000 students in public and private elementary schools. Although this constitutes an increase of about 100,000 students over enrollment in the early 1960's, population increases have maintained about 40% of the school age children attending elementary schools. Not quite 40% of all elementary school students were girls and about 20% of all students were repeating a year.

Students must pass an entrance examination for secondary school at which time they can enter general academic, technical or teacher-training programs. In the 1969-70 school year there were 48,905 students enrolled in general secondary school programs. This constitutes an increase over five times the enrollment figures for the early 1960's. About 25% of these students were girls and slightly over 10% of the total students were repeating a year.

Comparing the increase of 60% in primary education with the 500% in secondary implies that Government priorities are to serve urban and "middle classes" even at a large cost in development potential - since usually primary education is more cost-beneficial than secondary.

Established in 1950, the University of Dakar is the main institution of higher education in Senegal. Over the years it has gained a good reputation and its degrees, including those granted to medical doctors, are designed to be comparable to those granted in France. Enrollment in the various faculties and institutes providing higher education for the 1969-70 school year totaled 3,000 students.

The Ministry of Technical Education and Vocational Training operates most of the various schools that provide vocational training in technical and agricultural fields.

Communications

Senegal was the first of the former French West African territories to have a press. The *Moniteur du Senegal* was founded in 1854, succeeded by the *Journal Officiel du Senegal*. A non-official press has also long thrived in Senegal. For a long time the principal independent publication was the daily *Paris-Dakar*, which, when Senegal became independent, was renamed *Dakar Matin*. In 1970 both *Dakar Matin* and the publication of the Government party, *L'Unité Africaine*, gave way to a new publication, *Soleil du Senegal*. Other important Dakar newspapers are *Afrique Nouvelle* and *Le Moniteur Africain*, while magazines include *Afrique* and *Bingo*. Radio Senegal broadcasts both in French and in English, as well as in several African languages. There is limited television transmission. Telephone service is available in most large cities; however, service is poor.

Transportation

Development of a transport system has primarily taken place in the western part of the country within the area bounded by Saint-Louis, Kaolack and Dakar. In spite of this limited network, Senegal's transport system compares favorably to that of many other West African countries. Most of the 5,800 miles of roads, of which 1,400 are paved, are concentrated in western Senegal.

The rail system in Senegal suffers from the competition offered by road transport. Two main lines with approximately 640 miles of track extend across the country from the Niger River at Koulikoro with two branch lines running from Diourbel to Touba and from Guinguineo to Kaolack. The two lines meet at the junction of Thies, which is also the site of railroad repair workshops.

Senegal's four ports are Kaolack, Ziguinchor, Saint-Louis and Dakar. Only Dakar is an international port.

One international airport, Dakar-Yoff, at Dakar, serves all of Senegal. Domestic services are provided by Air Afrique to local airports at Thies, Saint-Louis, Ziguinchor, Kaolack, Rosso, Podor, Matam, Tambacounda, Kedougou, Sementi and Kolda.

The Senegal River is navigable all year round from Saint-Louis to Podor by boats drawing about three feet of water. Other reaches are only navigable in the rainy season. Despite the competition of the railroad, fleets of canoes still provide river transport.

Language

The major indigenous languages of Senegal are Wolof, Serer, Pulaar, Diola, Manding and Sara-kole. All Senegalese languages are part of the Niger-Congo linguistic family. In June 1971 the Government endorsed by decree the use of a modified Latin alphabet in transcribing the country's six major languages. In June 1973 a dictionary of basic Wolof containing 6,000 words had been finished in part. A similar work on Serer was well advanced.

French is Senegal's official language and serves as the administrative and technical language for communications inside the country and for inter-African and international relations. About 12% of the Senegalese are literate in French, but a much larger number speak and understand it.

No more than 2% have some knowledge of Arabic. About 80% of Senegalese speak Wolof. The percentage is growing and Wolof is well on the way to becoming a national language.

Religion

In 1973 it was estimated that more than 80% of the people were Muslims and roughly 6% were Christians, mostly Roman Catholics. The remainder still adhere to indigenous religious beliefs.

The republic is defined as a secular state, the constitution providing freedom of religious belief and practice. Citizens are equal before the law regardless of affiliation. Religious institutions are autonomous.

Most Senegalese Muslims are members of brotherhoods that play an enormous political, social, and economic role. The scope of a Muslim leader's influence is usually local; however, those that head larger groups to which local units adhere are national and sometimes international figures.

Economy

Agriculture occupies at least 75% of the economically active population, and provides the basis for industry as well. Although a certain balance between the raising of livestock and peanut cultivation is maintained, it is the peanut production which earns the foreign exchange that the country needs. Before independence, the economy was virtually entirely in the hands of the private sector. Since it depended primarily on the peanut trade, the large French companies which marketed the peanuts also controlled the importation of European manufactured goods. After independence, however, the Senegalese Government created a state agency which is responsible for almost all aspects of the peanut trade. During the 1960's heavy dependence on a single export crop contributed to the radical fluctuations in yearly earnings that retarded the country's economic growth.

At independence Senegal was among the more economically advanced countries in former French Africa. Because of its excellent natural port at Dakar, it had been the commercial and administrative center of French West Africa. Access to the West African market by way of a relatively effective transport network led to the development of manufacturing capacity around the port of Dakar. Processing and handicraft industries account for approximately 15% of the total national revenue. About 90% of the processing industry is located in the Cap Vert region where six oil processing plants are in operation. In addition, there are six fish canneries, one shoe factory, and one cement manufacturing plant. Other industries, all of which are located in Dakar, include two flour mills, a textile plant, a sugar refinery, a tobacco factory, and a brewery, in addition to a naval shipyard, chemical plants, and an automobile assembly plant.

About 40,000 craftsmen are engaged in traditional handicrafts; the more skilled among them are established at Dakar and Saint-Louis.

In 1972 the country's per capita gross domestic product (GDP) was estimated at around the equivalent of US\$250, a relatively high level by African standards; but this included exceptionally high incomes accruing to foreign residents.

Distribution of the 1972 GDP appears as follows:

	<u>Percent of GDP, 1972</u>
Private enterprise	95.5
Government	1.3
Family	3.2

Source: *Marchés Tropicaux et Méditerranéens*, "Senegal 1960-1973: Fourteen Years of Economic and Social Development."

The rural majority approximately 70% of the 1973 population had an average per capita income of US\$130, less than 32% of the national income. Urban dwellers comprising the remaining 30% of the population earned approximately 68% of the national income. The average per capita yearly income of Dakar residents is US\$580.

In 1971 distribution of the national income was as follows:

Income Distribution, 1971	
Population	% National Income
lowest 75% (rural)	27
middle 24% (urban)	60
highest 1% (foreign)	13

Source: Senegal: Tradition, Diversification and Economic Development, November 1974, data from 1971 World Bank, Washington, D.C.

The rate of growth in per capita income was minimal during much of the 1960's, particularly in the rural areas and in much of the western plains where peasant cash earnings had been stagnating even before the drought of 1972. Peasant social malaise and political dissatisfaction has been correlated with this economic decline and inspired the central Government to introduce reforms in farm price policy and central marketing administration and an effort to reduce corruption or indifference in the local farm marketing cooperatives and political party organizations.

In an effort to reduce dependence on groundnut earnings as a source of GDP, the Government is pursuing efforts to diversify the economic base. The primary effort is a long-range program to reduce dependence on rainfall. Besides a program of well-drilling and construction of dams and irrigation channels, a time-consuming program of agricultural extension training has been required to improve cultivation methods. Such methods, within the reach of the average small landholder, could modify if not eliminate the extreme fluctuations in crop output in response to climatic factors.

Somewhat more effective in the short term are the efforts to diversify production by promoting a variety of cash crops and by reducing reliance on agriculture as a source of GDP. By 1970 only about 5% of the country's farmers were thought to have been reached by programs to diversify crop production, but there had been considerable progress in output of rice, cotton and vegetables. Exports of phosphates and of manufactures have increased so that by 1970 groundnut products had a less dominant role in determining the level of export earnings.

The private sector of the industrial economy is still strongly dominated by foreign ownership and management, although there has been a trend toward Africanization. A census in the early 1970's of industry (manufacturing and artisan enterprise) indicated that as many as half of the small enterprises employing from ten to twenty workers and 90% of businesses employing more than twenty workers were foreign owned.

By 1973, the latest year for which the author obtained data, there had been no comprehensive census of the economically active population and data concerning the labor force was consequently suspect. The level of unemployment in the towns was alarmingly high, even before the 1972 drought further accelerated the exodus from the rural areas. Statistics were kept on applications for employment, but it was thought that only a minority of the unemployed registered at unemployment offices. One source estimated that only about 30% of the workers in Dakar had full-time jobs.¹

¹ Cited in Area Handbook for Senegal, Second Edition, 1974, p. 110.

The active population, consisting of people aged fifteen to fifty-nine inclusive, was estimated in 1973 at 2,167,871. The percentage engaged in rural activities - cultivation, herding, fishing or forestry - was commonly placed at around 75% but sometimes estimated as high as 87%. An official source published in 1965 had divided the estimated active population by sector of economic activity as follows: cultivation, 66%; mixed cultivation and stockraising, 8%; stock-raising alone, 2%; fishing, 1%; industry, 5%; artisan activity, 6%; transport, commerce and services, 12%.

Most of the active population consisted of unpaid family workers employed either on family farms or in small family commercial or artisanal enterprise in the towns. This labor force engaged in the traditional economy escaped enumeration but was thought to constitute about 90% of the active population. In the modern economy in 1973 there were 65,000 wage and salary earners in Government employment and 71,447 in private employment. Of those employed in the private sector, 88.8% were Senegalese and other Africans; only 1.4% were women. Africans predominated heavily in middle-level and upper middle-level positions, but in jobs requiring high technical qualifications employment of non-Africans was still high.

As the number of new jobs opening up in Government slowed during the late 1960's, there was increasing concern over employment opportunities in the private modern sector. Senegal was one of the leading countries in Africa in the rate of replacement of non-African employees, having a proportion of less than 7% foreign employees in industry and less than 10% in commerce. More than three-fourths of technical and managerial positions, however, were occupied by Europeans. Only about 27% of employers and upper management and 18% of technicians and cadres were Senegalese or other Africans.

By May 1973 popular dissatisfaction was mounting, and the National Confederation of Labor demanded that Government policy give priority to full employment and to greater pressure on private employers to hire and promote Africans. The Government authorities, in response, publicly accused the private firms of dragging their feet on compliance with Government directives. In a speech entitled "The New Slave Trade, or the Second War of Independence," President Leopold Sedar Senghor asserted that "European neocolonialism" was "attempting a veritable reconquest of Africa." He referred not only to the continued employment of Europeans in African subsidiary firms, but also to employment of low-wage African labor in France and other European countries, a practice in which scandalous abuses had been revealed by several press exposés during the preceding year.

In March and July 1973 the Government launched an accelerated policy of *senegalisation*, as the replacement of foreign employees is called. A predominant share of domestic trade in major consumer goods was to be expressly reserved for Senegalese wholesale and retail traders. All private firms already established in the country would be obliged to submit a written plan for *senegalisation* of their personnel by the end of the year or face prosecution. Potential new foreign investors must make written commitments of the same kind as a part of their application for admission. Private firms were to begin at once to hire African counterparts for all their European employees, to be trained on the job. The official target was to double the number of African employees in the private sector, not only by eliminating residual employment of foreigners, but by expanding foreign investment and Government participation in the creation of new industrial capacity.²

² Area Handbook, Senegal, *op. cit.*, p. 252.

The value of imports is usually greater than the value of exports. In 1971, for example, imports were valued at \$218,000,000, and exports at \$125,000,000. The principal imports are rice, sugar, petroleum products, machinery, textiles, and chemicals. The principal exports are peanuts and peanut products (representing almost 50% of the total), phosphates, leather, and canned fish. About 75% of Senegal's exports go to the franc zone. France is the principal trading partner. A fraction of exports go to Guinea, Cameroon, the Common Market countries (4% of the total), the sterling bloc, the Scandinavian countries, and Japan. Imports are also primarily from the franc zone, with France alone (in 1969) supplying about 40% of Senegal's imports. In 1969, a further 19% came from the Common Market, 6% from the United States, and 7% (primarily rice) from Southeast Asian countries. Other imports came from the sterling zone. Algeria and Venezuela supplied petroleum products.

CHAPTER TWO

POPULATION

Senegal is a country with great economic development potential; however, rapid population growth, short birth intervals, high dependency ratios, and rapid rural-urban migration create a significant drain on the country's resources. This pattern of population growth poses increased health hazards for the individual, strains the economics of the family, and slows the developmental progress for the nation. In spite of these trends, the Government shows little interest in population programs.

Population Dynamics

The population data available to date is based on a demographic inquiry carried out by the Senegalese Government with United Nations assistance in 1970-71. An earlier analysis undertaken in 1960 was limited to a small sample; however, it was judged to be reasonably accurate. Prior to 1960 population figures were based on estimates by local administrators who reported regularly to the colonial administration. Crude estimates indicated a population of 1.5 million in 1930 and approximately 2 million in 1950.

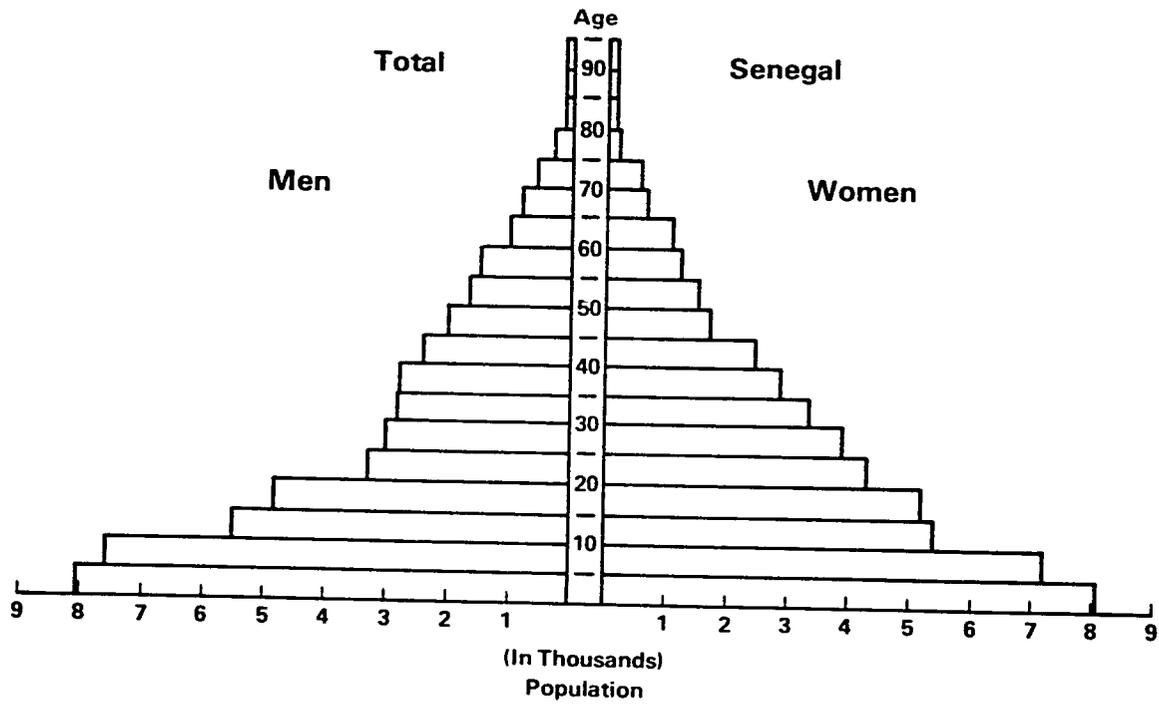
Senegal's population as of January 1, 1974 was estimated at 4,100,000. In January 1960 it was 3,100,000, implying an increase of 32.1% over these years, for an annual average growth rate of 2%. Previous statistical services have counted the growth rate from a low of 1.92 to 2.9% per year. International observers, however, continued in 1972 and 1973 to base analyses of Senegal's population changes on a 2.2% rate. At this rate of increase the population should double in approximately thirty-two years. Growth at such a level is likely to continue in the near future as existing evidence does not suggest any major reversals of the fertility, mortality or migration trends in the early 1970's. A 2% per year growth rate based on population estimates of 4 million in mid-1973 would result in a total population of approximately 5.25 million by 1985.

The dynamics of Senegal's population appear in the comparative table on the following page (Table 1).

As the population pyramid on the following page indicates, Senegal has a large proportion of young people. The age group between zero and fourteen accounts for 42.5% of the total population as compared with 25.9% for the United States in 1975. On the basis of the 1960 census, the zero to fourteen age group accounted for only 20.9% of the total population.

Contributing to the youthfulness of the population are traditional attitudes that encourage all women to marry early and a universal desire for many children. Most women are married by age nineteen and from twenty to twenty-four pass through their most prolific years. The 1970-71 survey data indicate a probability of six pregnancies for the average woman during her childbearing years (nominally fifteen to forty-five years of age). These included a reported fertility

Illustration 1: Population Pyramid



Source: Enquête Démographique Nationale, 1970 – 1971.

Table 1: COMPARISON OF POPULATION INDICATORS FOR SELECTED COUNTRIES

<u>Country/ Population (000)</u>	<u>Births/ 1,000</u>	<u>Deaths/ 1,000</u>	<u>Infant Deaths per 1,000 live births</u>	<u>Rate of increase</u>	<u>Years to double</u>	<u>Percent of Population under 15 years</u>	<u>Life Expectancy at birth</u>
Senegal 3,978	45	23	93	2.2	29	42	44
Nigeria 58,148	49	25	180	2.4	29	45	39
Upper Volta 5,660	49	29	204	2.0	35	43	35
United States 209,123	16	9	19	0.6	116	27	71

Source: Population Program Assistance Annual Report, 1973.

rate of 174 per 1,000 and an estimated national birthrate of forty-three live births per 1,000 people per year.³

The age group above sixty-five accounts for 3.7% of the total population compared with 10.2% in the United States.

The total population has a slight majority of women. In the twenty to twenty-nine age group, women account for 57% of the total. This is the case since practically all the Senegalese workers who have emigrated are males and belong in this age category, and by the fact that certain groups of young people (soldiers and students in boarding schools) are not taken into account. Moreover, the population pyramid is constructed on the basis of a partial survey which did not include the institutionalized, such as convents, hospitals, and prisons. The large number of "absent" population omitted in the survey is particularly noticeable in the semi-urban stratum, less in the rural and even less in the urban.

On the other hand, in the seventy to seventy-nine age group, there is a substantial majority of men (57%). This is unusual because in most countries of the world women outnumber men during these years (59.6% in European countries, 62% in France, 58% in the United States). Furthermore, the difference between the sexes among the elderly is less favorable to the women in urban areas than in rural areas. (For further information see Appendix Table A.)

In fact, the elderly (over seventy years old) only account for a small proportion of the Senegalese population (2.3%). The largest segment of the population is between birth and twenty-nine years old (over 67% of the total).

The estimated population density for the country is shown in Table 2.

The seven regional divisions of population in Senegal also vary in age and sex characteristics. Cap Vert, Fleuve and Thies have the largest percentage of young people, approximately 55% of the total. This can be explained by the large number of grammar schools, high schools and universities in the regional capitals of Dakar, Saint-Louis and Thies, while in the remaining regions young people constitute approximately 50% of the population.

Cap Vert and Sine-Saloum have the smallest proportion of persons over sixty years of age (4%). In the other regions the figure reaches as high as 8%, with an average for all of Senegal at 6% of the total.

Six regions (excluding Casamance) have slight female majorities. Diourbel and Thies show the largest differential in male-female ratios. (See Appendix Table B.)

Migration Patterns

Urban Migration

The largest population change has occurred since World War II in rural to urban migration; after independence in 1960 the trend was accelerated. By 1973 approximately twenty-five towns exceeded the 10,000 figure and more than 1.2 million or 30% of the nation's population were tabulated as urban residents. More than half were in Dakar; most of the remainder were in the

³ The national birthrate may also be described as the crude birthrate, a ratio of a year's registered live births to the total mid-year population.

Table 2: ESTIMATED POPULATION BY REGION, SENEGAL, 1960, 1970 AND 1975

Region	Total Area (square miles)	----- ESTIMATED POPULATION ¹ -----				
		July 1960 ²	July, 1970 ²	Percentage Annual Increase 1960-70 ²	July 1975 ³	People per Square mile
Sine-Saloum	9,243	727	772	0.6	841	91
Cap Vert	212	444	649	3.9	767	3,618
Diourbel	12,949	505	607	2.0	656	51
Casamance	10,943	530	601	1.3	640	58
Thies	2,548	410	527	2.5	575	226
Fleuve	17,053	345	372	0.8	402	24
Senegal Oriental	23,006	151	227	4.1	253	11
NATIONAL TOTALS	75,934	3,110	3,754 ⁴	1.95	4,137 ⁵	54

- 1 in thousands
2 from Government of Senegal demographic enquiries
3 projected, based on 1960-70 growth rate
4 does not total because of rounding
5 some published estimates indicate up to 4.2 million

Source: Adapted from Senegal,

nine next largest towns. Table 3 shows the population for the ten largest urban centers and their annual growth rates.

Table 3: TEN LARGEST URBAN CENTERS, SENEGAL, 1973

<u>Town</u>	<u>Geographic Location</u>	<u>Estimated 1973 Population</u>	<u>% Annual Growth Rate</u>
Dakar	West-central coast	600,000	6+
Kaolack	West-central	113,500	4
Thies	West-central	105,000	5
Saint-Louis	Northern border	99,000	4
Ziguinchor	Southern	57,500	4
Rufisque	West-central coast	54,000	4
Diourbel	West-central	43,500	4
Louga	Northwest	40,000	4
Mbour	West-central coast	30,000	4
Tambacounda	Inland, southeast	24,500	4

Source: Adapted from Senegal, *Ministère de l'Urbanisme et de l'Équipement Rural*, *Le Sénégal, Situation économique*, 1971; Dakar, 1972; and, Senegal, *Équipement Rural, 1970-71*; *Ministère de l'Urbanisme et de l'Équipement Rural*, Dakar, 1971.

Almost all the towns are growing at 4% per year or more, which signals the enormous internal migration to urban areas. Most of the large towns are within 100 miles of the Atlantic Ocean and have grown primarily on an economic basis of commercial agriculture.

The Cap Vert urban complex is estimated to be growing by 6% per year and some observers suggest this figure is nearer 8%. Even at the lower growth rate the region would have more than 1.1 million residents by 1985, which would comprise more than one quarter of the total population projected for that year. The fact that other towns are also expected to grow at a rapid rate reflects the continuing coastward movement and dramatic urbanization of the country.

Health Effects of Urban Migration

From a sample survey taken in the Senegal Collaborative Study on health effects of urban-rural migration, certain demographic and health characteristics were revealed about the nature of such a population movement.⁴

⁴ Quoted from *Health Effects of Urban-Rural Migration in Developing Countries - Senegal*. Dakar University, Office for Scientific and Technical Research Overseas, Dakar, ORSTOM, Pergamon Press, Great Britain, 1974.

Urban migrants tend to be younger than rural dwellers and the proportion of single females aged fifteen to nineteen was twice as high in the urban sample. "Traditional practices" remain important in rural areas, whereas they decrease significantly among migrants in Dakar. Educational levels, measured by schooling, are higher among urban dwellers; however, there is a noticeable difference between male and female adults, favoring men.

The many ways urban life could have deleterious health effects on recent migrants were discussed in the study. Environmental contaminants may cause new diseases or aggravate existing conditions. Crowding and an increase in social contacts affords many more opportunities for the transmission of venereal diseases. Prostitution and illegitimate births rise significantly. In addition, there is a lack of adequate health care in rapidly expanding urban areas.

Investigators found the following health status characteristics among a sample of urban and rural populations:

-- Coronary Heart Disease

- (1) Blood Pressure - Investigators did not find a strong tendency for blood pressure to rise with age, similar to that existing in western industrialized nations in either urban migrants or rural dwellers.
- (2) Cholesterol - A substantial difference between urban-rural levels of cholesterol was found among the sample, although urban levels were low relative to industrialized countries. There was a slight tendency for cholesterol to rise with age; however, little or no difference exists between men and women.
- (3) Weight - Rural men were no different from urban men with respect to weight. Urban women were substantially heavier than their rural counterparts; in fact, virtually as heavy as men. It has been postulated that this may be because nutrition for urban residents is relatively greater for women, and/or urban women may have less physical activity.

The overall coronary heart disease risk is very low although migration may increase it slightly. Possibly ageing and a longer exposure to urban life will increase the risk.

-- Infectious Diseases

- (1) Tuberculosis - Combining suspect and probable with definite cases presenting pulmonary lesions, it appeared that the urban population had fewer TB cases than the rural, especially in men:

	TB Rates (in %)		
	<u>Rural</u>	<u>Urban</u>	
Men	33.8	10.4	(These rates probably reflect positive skin tests.)
Women	24.4	13.8	

Source: Health Effects of Urban-Rural Migration in Developing Countries, *op. cit.*, p. 248.

- (2) Malaria - Rural dwellers were found to be more affected than urban, the highest rates observed in the under-twenty-year-olds in both sexes.

- (3) Schistosomiasis - In both sexes little difference was found to exist between urban and rural residents; the highest rates were in the under-twenty-year-old category. It is possible that infections in the urban population were acquired in the rural area either before migration or during visits back.

-- Mental Health

The state of mental health among urban migrants was measured by an adaptation of methods used to study psychological disorders in the west. The most common conditions, found with similar frequencies among urban and rural people, were: psychophysiological reaction major, psychoneurosis major, and cerebral syndrome. Some exceptions were that urbanites have a greater frequency of psychophysiological reactions and brain syndrome, while rural populations experience more depression and fatigue. There was no difference in the incidence of anxiety.

Seasonal Migration Patterns and Immigration

Migration has been an important factor in the development of the commercial food production area since the nineteenth century before rail or road construction were significant. Transportation improvements since then have greatly increased the numbers that migrate.

In many cases migrants come for seasonal work on farms either from neighboring countries such as Mali, Guinea, Gambia, Upper Volta and Guinea-Bissau, or from inland areas of Senegal. Often they return home after a season or settle in urban areas for the dry periods, then returning to the farms, in a more or less seasonal pattern of migrations.

The annual trek from various parts of the country and elsewhere to farming sectors has been substantial for many decades. The total number of migrants varies greatly, ranging from 10,000 to 50,000. This trend continues in the 1970's after decreases in the 1960's. Droughts in the late 1960's and the disaster conditions in 1973 caused a resurgence of the migration from sub-desert inland areas. No data were available in mid-1973 on the numbers involved. War in then Portuguese Guinea (Guinea-Bissau) also led to migration into Senegal. Sporadic reports indicated in 1965 approximately 35,000 people crossed into Senegal from Portuguese Guinea. News reports quoted an increased figure of 82,000 by 1973.

In 1971 President Senghor referred to the 800,000 non-Senegalese in the country. In the absence of complete records on migration, officials estimate approximately 20% of the people were immigrants.

From estimates available in 1973 the total number of emigrants was much smaller than immigrants although no specific figures for either were available. Most of the native-born Senegalese who have emigrated resettled in France. It was estimated that 21,000 Senegalese were in Paris in May 1973. Statistics for elsewhere in France and other countries are not available.

Another migration trend involving a relatively small number of people is the resettlement from the densely populated west-central regions to new homes and farms in the Terres Neuves (New Lands) of central Senegal.

Ethnic Groups

Senegal is ethnically divided into six major groups constituting nearly 90% of the population according to 1971 estimates. These were the Wolof, accounting for more than one-third of the total, the Serer, Peul, Toucouleur, Diola and Manding. These groups appear in the proportions indicated on the chart following.

Table 4: ETHNIC GROUPS BY NUMBER AND PERCENTAGE

Group (1971)	Number	Percentage
Wolof (Oulof)	1,375,000	36.2
Serer (Serere)	722,000	19.0
Peul (Fulbe, Fulani)	817,000 ¹	21.5
Toucouleur (Tokolar, Tukolor)		
Diola (Djola, Jola)	266,000	7.0
Manding (Malinke, Mandingo)	243,000 ¹	6.4 ¹
Mandinka, Maninka		
Bambara (Bamana)	79,800 ¹	2.1 ¹
Sarakole (Soninke)		
Diankhanke	68,400	1.8
Lebou (Lebu)		
Bassari, Balante, Mandjaque, Mancagne, and others	83,000	2.2
Maures	57,000	1.5
Cape Verde Islanders	30,000	0.8
Europeans (chiefly French)	40,000 ²	1.0
Lebanese	18,000	0.5
TOTAL	3,800,000 ³	100.0

¹ Groups in braces speak same or related languages and are occasionally intermixed; individual numerical size of these groups has been combined to accommodate variations reflected in available source materials.

² French estimates show Senegal's 1970 French population as only 29,000 (27,500 in Dakar alone); Senegalese estimates are higher.

³ Figures do not total because of rounding.

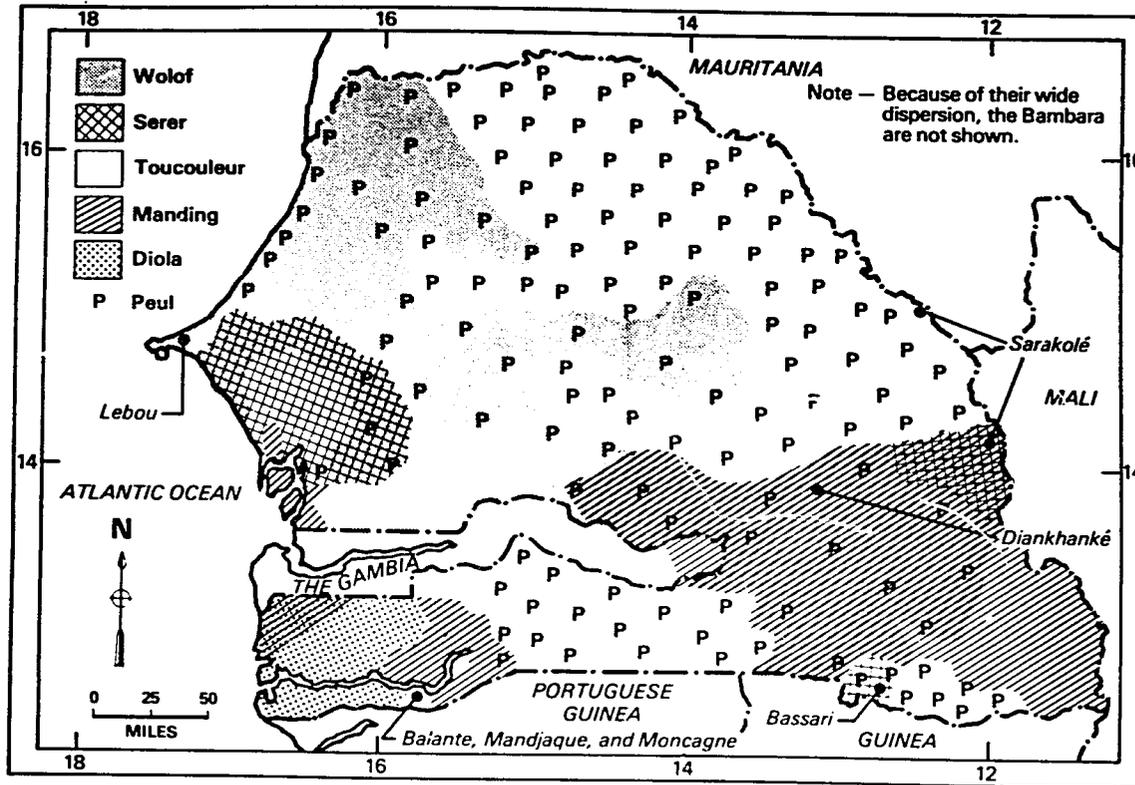
Source: Area Handbook for Senegal, 1974.

Few Wolof, Serer or Diola live outside Senegal, unlike the Toucouleur, Peul, Manding and Bambara, and some of the smaller ethnic groups that make up the remaining 10% (see Illustration 2). The majority of these populations can be found in neighboring countries.

The Wolof, concentrated chiefly in the northwestern portion of the country, constitute the major ethnic group in Senegal. The Wolof absorbed many non-Wolof elements in the course of their history and therefore inherited a variety of cultural characteristics.

The Serer in their present-day location in the Sine-Saloum and Thies regions, are the descendants of those who first refused to accept Islam and later rejected assimilation by the Wolof. The Serer, mostly cultivators, have remarkable farming skills that have led to dense settlements in their areas. Combining the cultivation of millet with stockraising, the Serer also produce groundnuts as a cash crop. The early 1970's found their crop production lagging behind a rapidly increasing population which encouraged an existing trend to new settlements in eastern Sine-Saloum region.

Illustration 2
Ethnic Groups by Geographic Location



Source: Adapted from Senegal, Ministère du Plan et du Développement, *Cartes pour servir à l'aménagement du territoire*, Dakar, October 1965, p. 11; and Souleymane Diarra, "La Population du Sénégal," *Bulletin de l'Institut Fondamental d'Afrique Noire* (Series B) [Dakar], XXXIII, No. 3, 1971, p. 645.

About 10% of the Senegalese population is composed of relatively small segments of ethnic groups whose majority are found in neighboring countries. This is true with the exception of the Lebou who live along the coast of the Cap Vert peninsula, mainly as fishers. Many among this remaining percentage came to Senegal for economic opportunities and have not been deeply involved in the political or modern sectors of the country.

There were thousands of Europeans at the time of independence in the country, including all social classes from high Government officials to middle and lower personnel and artisans. In the decade after independence, most of the Europeans, largely French, were replaced by Senegalese. Some remained as advisors and a few maintained their original positions.

Economic development programs brought many foreign assistance technicians to the country so that by the early 1970's the number of Europeans appeared to decrease only slightly. In 1971 the number of Europeans was estimated at 40,000 or 1% of the total population. French estimates, however, only show Senegal's 1970 French population as 29,000 (27,500 in Dakar alone). Relations between Senegalese and French are usually amicable, in spite of the post-independence efforts of Africanization. Among the highest educated members of both groups some close, informal social relationships exist.

The Lebanese in Senegal for over half a century have played the role of commercial middlemen between the Africans and the rest of the world. They sell imported goods either directly to African consumers or to African retailers, and then in turn buy African agricultural products for export either directly or through larger European-controlled companies.

In spite of the ethnic diversity in Senegal, there is no real problem with inter-ethnic strife. Ethnic memberships and local allegiances are important but are counterbalanced by many relationships that cut across ethnic lines. Moreover, there is a long history of interaction among members of different groups and in post-colonial periods their frequency because of urbanization, education and economic development has increased.

Numerical importance does not relate to the level of participation in the political and economic spheres of life in Senegal by various ethnic groups. The extent of involvement appears to be more a function of urbanization and geographic location. A few people, chiefly the well-educated and the urban, see themselves primarily as Senegalese nationals; identification with the nation-state is still to come. Yet no groups seek autonomy on ethnic grounds. This has been the case because the Senegalese are culturally fairly homogeneous, including dress, diet and language. More than 90% adhere to Senegalese Islam.

Ethnic differences tend to blur even more in town. In 1955 there were 160 ethnic groups represented in Dakar. Another good indication is an exceptionally high incidence of inter-ethnic marriage. For some of the traditional upper strata, differences of caste and class rather than ethnic affiliation continue to be more important barriers to social and marital relations.

Marital Status

In Senegal most women are married by the age of nineteen, while men remain single until their early thirties. In the age group twenty to twenty-four years, 98.9% of the men were still single compared to 12% of the women. As Table 5 shows, it is not until approximately thirty-five years old that a significant proportion of men are married. By the ages thirty-five to thirty-nine, 20.7% of the men were single. This tradition of marriage for the female at an early age contributes significantly to the high levels of fertility as does the Muslim faith, which encourages marriage.

Table 5: MARITAL STATUS

Age	Total		Rural		Percentage Single Semi-Urban		Urban	
	Men	Women	Men	Women	Men	Women	Men	Women
15-19	98.9	47.5	98.4	34.9	99.6	58.3	99.7	64.2
20-24	86.7	11.9	82.7	7.2	86.8	13.4	94.3	20.1
25-29	53.0	2.4	46.1	1.6	53.2	1.9	59.7	4.3
30-34	21.0	1.0	19.2	0.5	19.9	1.7	24.1	1.5

Source: *Enquête Démographique Nationale, 1970-71, Résultats Provisoires du 1er Passage, Juin 1971.*

A new family code, adopted in 1972 but to take effect in January of the following year, set forth new guidelines for engagement, marriage and divorce.

- The period of engagement was restricted to one year; previously, in certain regions of the country, a girl's engagement could take place on the day of her birth.
- The code stipulates that a girl should consent to her engagement.
- Polygamy is not forbidden, but monogamy is encouraged.
- The maximum number of wives a man may have is four.
- The code recognizes religious weddings but couples must register officially.
- Unilateral repudiation as a means of divorce is disallowed.
- Ten causes for divorce are recognized and codified in the code, including divorce by mutual consent and on the grounds of incompatibility.

Population Planning

Technical support for population planning in Senegal suffers because the leadership has not taken an active interest in the demographic training institutions such as IFORD (Demographic Training and Research Institute), and also because institutes like IDEP (African Institute for Economic and Development Planning) do not yet have programs that work with population dynamics and planning.

The government has no official policy on family planning or population. High Government officials have stated that with dams and other improvements, Senegal could support a population of 20 million. Members of the Government speculate that legislation in this area would probably raise public debate and objections from religious leaders. The Government is, however, moving in the direction of encouraging smaller families. In the last two to three years, the evolution of thinking in Senegal on family planning has been noticeable. A recent training course was opened by the Chief of Cabinet, who spoke openly about family planning. A number of articles have appeared in the *Soleil* confirming this tendency. Still no official pronouncement on family planning is expected.

The first organized family planning service in Senegal was provided by the *Mouvement Senegalais de Planning Familial* opened in 1964 in Dakar. Madame Phebean Whest-Allegre, President of the Movement, began by advising wives and husbands of large families on the means of contraception. They inserted the first IUD (intrauterine device) in 1966 and by January 1970 more than 1,000 IUD's had been inserted by trained midwives at the clinic. In the first three months of 1970, 1,287 family planning patients plus 123 infertility patients were seen at the facility. Madame Whest-Allegre's Clinic (*Croix Bleue*) has been receiving AID assistance through the Pathfinder Fund. Over the past few years the *Croix Bleue* has held twenty family planning training courses with ten participants per course. Ten percent of the students were Senegalese.⁵

A new family planning association was established in April 1974 called the *Association pour le Bien-Etre de la Famille*. The fact that it was announced by the Minister of Health, M. Coumba N'Doffene Diouf at a workshop on Population Problems and the Mass Media in Sub-Sahara Africa, was the first indication of a change in the Government's attitude toward the provision of family planning advice and services.

The 1920 French anti-contraceptive law is still on the books, but is not enforced. A comparison of the legal status on fertility control with other West African countries can be seen in the table on the following page. A Government committee has been established to study the whole subject of family planning, including the legal aspects.

Very few people have any knowledge in modern family planning except a tiny minority of Westernized families. It has been suggested that efforts to persuade parents to limit the size of their families would be resisted or disregarded; however, the two family planning clinics in Dakar are well known and highly utilized.

Private family planning services are provided by a few local doctors in the urban areas who give advice on contraceptive methods and insert IUD's.

Abortions are legal only to save the life of the mother. Table 7 shows the number of abortions and related maternal deaths for 1974 by region.

International Assistance to the Family Planning Program

The International Planned Parenthood Fund has offered assistance to the new family planning association once a program and budget have been formulated.

The U.N. Fund for Population Assistance has provided an expert to assist with a sample survey covering the structure of the population, internal migration trends, and fertility patterns.

The Pathfinder Fund helped set up and for several years supported a private family planning clinic in Dakar. Clinic personnel held regular family planning and motivation seminars throughout the country. Two satellite clinics have been established on a permanent basis, one in a suburb of Dakar and another in the interior of Senegal.

⁵ Memo to Arthur Fell, D/RDO Dakar, meeting with James Grief, IPPF.

Table 6: LEGAL STATUS ON FERTILITY CONTROL

	Senegal	Gambia	Mali	Mauritania
PILLS:				
Importation	p ²	(NR)	(NR)	P
Manufacture	P		(NR)	P
Sale/Distribution	p ²			P
display site	P			
Advertisement	P			P
Transportation	p ²			P
IUD:				
Importation	p ²		(NR)	P
Manufacture	P		(NR)	P
Sale/Distribution	p ²		(NR)	P
Display	P			P
Advertisement	P			P
Transportation	P			P
CONDOMS:				
Importation	p ²	(NR)		P
Manufacture	P		(NR)	P
Sale/Distribution	p ²		(NR)	P
Display	P			
Advertisement	P		(NR)	
Transportation				P
VOLUNTARY STERILIZATION:				
General Criminal Law Applicable	X	X	X	X
ABORTION RESTRICTED:				
To save mother's life	X	X ⁴	X ³	X ³
To save mother's health		X ⁴		
For humanitarian reasons; rape				

P = Prohibited RO = Required Prescription PH = Site: Pharmacy NR = No Restriction
 UC = Unclear () = Inference from de facto situation
 1 = Forbidden as contraceptive, but available for health reasons
 2 = Actual practice appears to be different
 3 = Country under former French rule which presumably has enacted or retained a provision similar to that of Senegal (Decree No. 67-147 of February 10, 1967), which permits abortion to save the life of the mother.
 4 = The English case *Rex v. Borne* (1939), 1 KB 687, would presumably apply, thereby permitting abortion to save the life or the health of the mother.

Source: Sahel Country Review, Bureau for Population and Humanitarian Assistance, Office of Population, Population Policy Development, Duncan Miller, October 1, 1974.

Table 7: ABORTIONS RECEIVING MEDICAL ATTENTION

Regions	Number	Maternal Deaths
Cap Vert	386	7
Casamance	346	1
Diourbel	338	3
Fleuve	456	1
Senegal-Oriental	119	-
Sine-Saloum	1,058	3
Thies	292	2
TOTAL	2,995	17

Source: Government of Senegal, 1974.

A training center for paramedical personnel was established at the *Croix Bleue* family planning clinic with Pathfinder support. Each course lasts one month and the program is for French-speaking nurses and midwives of West and Central Africa. There are also Senegalese paraprofessionals being trained in the U.S. by Pathfinder. Additionally, Pathfinder supported a trip to Moslem countries of North Africa and the Middle East for six Senegalese opinion leaders to enable them to visit successful family planning programs and gain a better idea of the role of family planning. Pathfinder funds totaled US\$140,911 for FY 1974-75 and US\$98,741 is planned for FY 1976.

USAID has provided US\$14,000 of Special Population Activities funds to support maternal and child health/family planning programs.

CHAPTER THREE

HEALTH STATUS

Assessing the health status of any country is a difficult and often frustrating task because of the lack of measuring tools, indices, and even a satisfactory definition of good health. In Senegal, the deficiencies in both the quality and quantity of health data are enormous. No estimate of the completeness of morbidity or vital events statistics in Senegal is available. Nor can the number of deaths with medical certification be stated. It can only be assumed that cases of infectious disease and mortality are underreported in the rural population and children. WHO's statistics on the age and sex distribution of infectious diseases shows no figures at all for ages fifteen to forty-four and fifty-five to seventy-five and above. The reason for this data gap is not clear (see Table 9).

Several of the most serious diseases formerly prevalent in West Africa have been suppressed by large-scale immunization programs; however, there are still a variety of communicable and parasitic diseases common in Senegal. In addition to diet deficiency diseases, illnesses prevalent throughout most of the country in 1975 were: malaria, tuberculosis, measles, trachoma, venereal disease, trypanosomiasis, schistosomiasis, dysentery, several strains of influenza and gastrointestinal diseases in children. Less common are leprosy, tetanus, and meningitis (see Tables 8 through 17). Malaria is considered the most prevalent infection, initially affecting almost everyone at an early age. Seldom fatal, it weakens its victims, making them vulnerable to other diseases.

Mortality

There are high mortality rates at all ages. Inadequate diets, disease, and a general lack of medical care take their greatest toll in stillbirths and infant mortality. The leading causes of death in 1973 for children under one, by rank, were: perinatal deaths, measles, diarrhea and gastrointestinal illness, deaths due to undefined causes, avitaminosis, anemia and malaria.

The overall infant mortality rate for the country is approximately ninety-three per thousand, or nearly 10% of all live births. Infant mortality in rural areas reaches as high as 181 per thousand. A significant factor in this urban-rural differential is the predominantly urban location of health manpower and facilities.

For children who survive the first year of life, ages one through five remain a very hazardous period. The traditional taboos and customs of some ethnic groups increase the existing problems of diet and disease that affect younger children. An average of 40% of all children die before reaching age five.

Death rates are also high in the older age groups. The mortality rate for the entire population is approximately twenty-three per thousand persons per year in the early 1970's. In larger towns, the reported rate is ten per thousand. However, the estimate among the rural majority is thirty-six per thousand.

Table 8: REPORTED CASES OF INFECTIOUS DISEASES, 1971

Disease	Cases	Deaths
Cholera	265	60
Typhoid fever	131	4
Paratyphoid fevers	22	-
Bacillary dysentery	15	-
Amoebiasis	2,204	8
Tuberculosis, respiratory system	2,252	102
Tuberculosis, other forms	466	165
Leprosy	1,650	230
Diphtheria	367	22
Whooping cough	17,208	34
Streptococcal sore throat and scarlet fever	6,803	32
Meningococcal infections	1,322	114
Tetanus		183
Poliomyelitis, acute	119	8
Chickenpox	14,864	-
Measles	16,458	306
Infectious hepatitis	1,488	22
Rabies		2
Mumps	7,724	
Trachoma	2,979	
Other rickettsioses	3	
Malaria	499,130	447
Trypanosomiasis	12	2
Syphilis and sequelae	83,952	
Congenital syphilis	1,069	
Early syphilis	1,255	
Gonococcal infections	24,160	
Influenza	18,721	45

Source: WHO Statistics Annual, (*Annuaire de Statistiques Sanitaires Mondiales*, 1971).

Life expectancy at birth, according to estimates based on Government demographic surveys, increased from under thirty-eight years in 1960 to approximately forty-two years in 1970.

Table 9: SEX AND AGE DISTRIBUTION OF COMMUNICABLE DISEASES

Diseases	Total	0	1-4	5-14	15-24	25-34	35-44	45-54	55-75+*
Tuberculosis, Respiratory									
System	2,525	-	2	406				2,117	
Tuberculosis, Other Forms	466	-	3	47				416	
Diphtheria	367	39	114	77				137	
Whooping Cough	17,208	1,767	11,737	3,669				35	
Meningococcal Infections	1,322	27	225	371				699	
Poliomyelitis, Acute	119	-	72	47				-	
Measles	16,458	1,841	11,493	3,124				-	
Infectious Hepatitis	1,488	2	27	237				1,222	
Syphilis & Sequelae	83,952	1,336	6,343	9,415				66,858	
Congenital Syphilis	1,069	359	289	421				-	
Early Syphilis	1,255	-	384	359				512	
Gonococcal Infections	24,160	600	-	-				23,560	
Influenza	18,721	-	1,740	4,779				12,202	

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* WHO statistics list the last three age groups as ages 55-64; 65-74; and, 75+; no information was given for these three age groups.

Source: WHO Statistics Annual, 1971.

Table 10: SEASONAL DISTRIBUTION OF COMMUNICABLE DISEASE, 1971

Diseases	Total	MONTHS											
		J	F	M	A	M	J	J	A	S	O	N	D
Cholera (C) ¹ (D) ²	265	-	-	-	-	-	-	-	131	51	3	77	3
	60	-	-	-	-	-	-	-	39	7	-	14	-
Typhoid fever (C) (D)	131	7	9	10	5	13	11	23	6	10	18	13	6
	4	1	-	1	-	-	1	-	-	-	-	-	1
Paratyphoid fevers (C) (D)	22	-	1	-	3	-	6	6	5	1	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
Bacillary dysentery (C) (D)	15	-	1	-	-	2	-	-	6	6	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-
Amoebiasis (C) (D)	2,204	198	138	166	228	160	174	121	133	178	188	256	264
	8	-	-	1	-	-	-	1	-	-	3	1	2
Diphtheria (C) (D)	367	23	6	25	29	14	46	62	18	38	33	43	30
	2	1	-	1	-	1	5	5	-	2	3	2	2
Whooping cough (C) (D)	17,208	638	1,701	2,174	1,492	1,489	1,597	810	1,659	2,163	777	857	1,851
	34	4	6	9	2	7	1	2	-	1	-	2	-
Meningococcal infections (C) (D)	1,322	115	319	442	159	51	39	29	13	25	21	39	70
	114	10	34	37	8	3	1	4	-	4	2	7	4
Poliomyelitis, acute (C) (D)	119	3	3	8	-	4	5	7	4	11	11	18	45
	8	1	1	1	-	1	-	1	-	1	1	1	-

¹ Cases ² Deaths

Table 10 (cont'd.)

Diseases	Total	MONTHS ---Rainy Season----											
		J	F	M	A	M	J	J	A	S	O	N	D
Chickenpox (C)	14,864	552	897	1,949	2,394	1,971	2,540	1,630	874	835	423	330	469
(D)	-	-	-	-	-	-	-	-	-	-	-	-	-
Measles (C)	16,458	624	966	1,511	1,922	1,984	2,014	1,579	1,174	1,149	925	1,162	1,448
(D)	306	14	18	47	49	27	34	16	2	28	17	32	22
Mumps (C)	7,724	581	660	786	722	751	647	921	674	730	457	357	438
Influenza (C)	18,721	568	991	913	1,104	1,041	466	704	1,086	1,533	2,918	3,957	3,440
(D)	45	-	10	-	1	3	-	-	-	1	1	6	23

Source: WHO Statistics Annual, 1971.

In the city of Dakar, births and deaths have been regularly reported over a number of years.⁶ Between 1961 and 1972, births rose by 102% and deaths by 69%:

	<u>1961</u>	<u>1966</u>	<u>1972</u>
Live births	19,005	27,465	38,523
Infant deaths (0-1 years)	1,697	2,549	2,416
Total deaths	5,199	7,121	8,756

These increases are principally real and to a lesser extent are artifacts of improved reporting. For 1961 the ratio of deaths and births was 27.3%; in 1972 it was 22.7%. The deaths of infants under one year old compared with the overall death rate also dropped from 32.8% in 1961 to 27.5% in 1972.

Stillbirths should also be taken into account; however, they do not appear in national statistics. In 1972 there were 1,423 stillbirths in Dakar. Infants born alive but dying before they reach one year old, added to the total of stillbirths, gives the sum of 3,839 infant deaths in 1972 or 37.7% of the total deaths in the city.⁷

Studies of death records in Dakar (1951-55) revealed two seasonal patterns of mortality in the city. Deaths in children, excluding newborn, showed a peak in the wet season (July - October), although the same figures for adults and the newborn indicated two less marked peaks, one during the dry season (February, March, April) and another during the wet season. Diarrhea and respiratory diseases are often more prevalent in wet seasons and are a more important factor in child mortality than for adults or nursing infants. These two different patterns of mortality were found, more or less, in all ethnic, cultural and occupational groups.

Another investigation carried out in 1968 and 1969 on causes of death and morbidity showed a very close similarity to that described in the 1951-55 investigation in spite of the introduction of control measures.

Communicable Diseases

Malaria

Approximately 82% of the population in Senegal lives in areas of endemic malaria. The Fleuve region has an infection rate of 56% and 48% in the Ferlo. Generally, 76% of the population below thirty years of age provide positive findings.

A total of 499,130 cases of malaria were reported by WHO in 1971 and 447 deaths. Government statistics show an increase in malaria between 1971 and 1973. Immigrants from drought-stricken areas of Mauritania and Mali passing through the highly malarious regions of the Senegal River Basin probably contributed to the substantial increase in malaria cases over the three-year

⁶ *Marehes Tropicair et Mediternanea*, "Senegal 1960-1973: Fourteen Years of Economic and Social Development."

⁷ The same calculations for 1961 show total infant deaths, i.e., infants born alive but dying before they reach one year old and stillbirths as 41% of total deaths in Dakar.

period. Between January and June 1974 the Government reported 185,000 cases of malaria (see Table 11). In 1975 WHO conducted an epidemiologic study in the Department of Kaolack which yielded the following results:⁸

<u>Age</u>	<u>% Positive for Malaria</u>
0-1	34.6
1-4	59.1
5-14	49.5
	49.7

This study further concluded that almost 85% of children are affected acutely or chronically by malaria.

Unsanitary conditions and the materials from which rural and urban slum dwellings are constructed provide excellent breeding grounds for the vector. Most rural houses are built of natural materials, particularly in the coastal areas where traditional style huts are round and the walls are made of rushes from local swampy areas. Such houses provide inadequate barriers to vectors and poor surfaces for insecticides. In the urban slums, flooding occurs due to a lack of sewerage and drainage thereby providing pools of standing water for vector breeding.

The pathogenic agent is commonly *Plasmodium falciparum*, less frequently *Plasmodium vivax*, occasionally *Plasmodium malariae*. The vectors are first *Anopheles gambiae melas* (an extremely effective vector), *A. funestus* and occasionally *A. nili*. Breeding occurs during the rainy season from July to September. However, some vectors survive and multiply during the dry season.

Since eradication of the mosquito vector is costly and near impossible in tropical Africa, reliance is placed on the utilization of drugs such as Nivaquine to protect the population. These are distributed through fixed health posts and by mobile health teams. Supplies in rural areas are often inadequate and are frequently disrupted because rural health workers fail to keep track of stocks and reorder in time to allow for distribution.

Table 11: CASES OF MALARIA, JANUARY-JUNE, 1974 BY REGION

	Cases	Deaths
Cap Vert	22,108	27
Casamance	62,288	16
Diourbel	19,218	7
Fleuve	23,782	38
Senegal-Oriental	10,425	86
Sine-Saloum	32,655	20
Thies	14,255	10
	184,731	204

Source: Government of Senegal, Statistiques Sanitaires, 1974.

⁸ WHO. *Enquete Epidemiologique D'Evaluation dans le Department de Kaolack, Region du Sine-Saloum, 1975.*

Malaria is likely to be maintained or increased by the development of irrigation projects, continued immigration and unsanitary urban living.

Measles

Measles in less developed countries is highly lethal. In a report on measles in Senegal, mortality rates in various epidemic waves in villages were reported to vary from 2.5 to 33%. The overall case mortality is approximately 13%.⁹ The nutritional state among children plays a paramount role in determining whether the disease is mild or severe.

WHO reported 16,458 cases of measles and 306 deaths (1.8%) in 1971.¹⁰ The fatality rate is usually 5-10% among malnourished children of less developed countries (LDC's) and therefore, these figures probably represent severe underreporting.¹¹ In 1971 69% of all cases occurred in ages one to four. Incidence increased in the months of May and June. The Government of Senegal reports a 34% decrease in deaths from the first semester of 1973 to the first semester of 1974.

Measles is well known in many villages in Senegal and when a child shows symptoms of the disease, quarantine is instituted. Unfortunately, mothers do not realize that the disease is most contagious at the end of the incubation period. Measles infection for women and children often takes place in daily meetings around communal wells.

The density of the child population determines the rate at which the epidemic grows. In Dakar most children have had measles by the time they are three years old and practically all by the time they are nine years old. However, more than half of the children in Senegalese villages that have been studied had not had measles by age nine.¹²

Although much progress has been made in controlling the disease through a U.S.-sponsored measles and smallpox program, vaccinations have fallen off due to the shortages of supplies and the lack of an adequate cold chain. Vaccine distribution was disrupted between 1971 and 1973 as a result of the drought. An increase in the susceptible population and a worsening of living conditions contributed to more than 100% increase in the cases of measles reported. Unvaccinated children born since 1972 already constitute a sizeable population of susceptibles. In the first semester of 1974, the Government of Senegal reported a total of 83,351 vaccinations against measles.

⁹ Mayer, Jean (ed.), Clinical Nutrition - Measles and the State of Nutrition.

$$\text{Case mortality} = \frac{\text{deaths due to the disease}}{\text{cases of disease}} \times 100$$

¹⁰ WHO Infectious Diseases

¹¹ Benenson, Abram S. (ed.), Control of Communicable Diseases in Man, Eleventh Edition, 1970.

¹² Clinical Nutrition, op. cit.

The most deadly and widespread complications of measles in Africa is diarrhea. In cases studied, 90% had diarrhea set in at the onset of the disease. Once initiated by measles, diarrhea can continue for weeks or even months, and often triggers kwashiorkor or marasmus. Over one-third of the children studied with diarrhea as a complication of measles had a weight loss of 10%. Respiratory complications of measles are relatively frequent and serious in African countries.¹³ Deaths may occur from secondary pneumonia mainly in children less than two years old and occasionally from post-infection encephalitis.

Tuberculosis

According to the Government statistics shown below, reported cases of respiratory tuberculosis have declined steadily since 1972. This decrease is probably due to either less active case-finding or less complete reporting.

Several sources report a concurrent slowdown of the BCG vaccination program. This is not because of a lack of supplies; WHO provides the vaccine to Senegal. According to a leading physician in the country, the decline in vaccinations is the result of a general lowering of professional standards among health workers and the lack of adequate supervision.

Table 12: CASES OF RESPIRATORY TUBERCULOSIS BY REGION AND YEAR

Regions	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Cap Vert	647	697	608	703	740	697	823	736	380	312
Casamance	185	112	150	168	177	166	151	155	224	128
Diourbel	47	148	143	93	166	160	191	217	119	185
Fleuve	84	69	93	147	68	104	60	81	127	83
Senegal- Oriental	54	46	55	79	83	52	42	62	24	20
Sine-Saloum	31	44	208	110	66	89	73	123	162	104
Thies	139	162	158	31	40	8	7	12	57	100
Total-Cases	1,187	1,278	1,415	1,331	1,340	1,276	1,347	1,386	1,093	932
-Deaths	12	11	12	34	93	65	54	44	62	62

Source: Government of Senegal, *Statistiques Sanitaires*, 1974.

Meningitis

Meningitis is another major cause of morbidity and mortality in Senegal. Reported cases of the disease showed a sharp increase in 1969 and 1970, followed by an equally sharp decline up to 1973. (See Illustration 2.) Case-fatalities during this period showed a similar trend. The progression of reported meningitis cases by month is shown in the table on the following page.

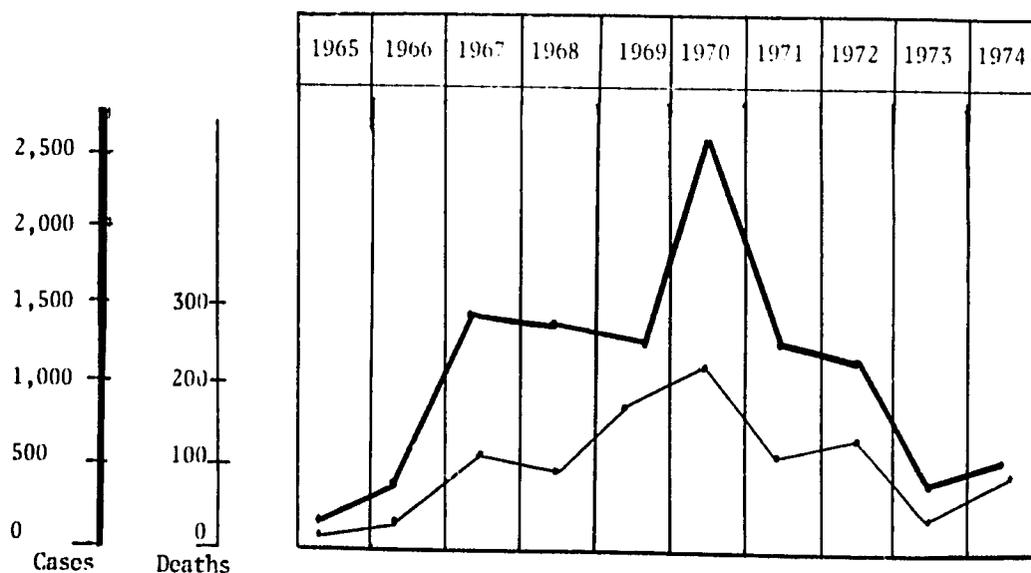
¹³ Besides the rhinobronchial signs that are expected in "uncomplicated" measles, the investigators find serious respiratory complications in over one-quarter of the cases studied.

Table 13: HALF-YEARLY PROGRESSION OF MENINGITIS CASES IN SENEGAL BY MONTH

Year	January	February	March	April	May	June	Total
1965	5	9	14	8	11	4	51
1966	19	42	112	69	32	7	281
1967	73	205	306	459	268	115	1,426
1968	183	365	274	293	143	37	1,295
1969	149	159	305	358	119	96	1,186
1970	294	339	639	645	355	122	2,394
1971	115	319	442	159	51	39	1,125
1972	197	338	251	117	58	46	1,007
1973	55	55	60	34	20	8	232
1974	61	71	65	27	51	42	317

Source: *Statistiques Sennéguaises*, 1974.

Illustration 3: MENINGITIS DURING JANUARY-JUNE, 1965-1974



Source: Government of Senegal, *Statistiques Sennéguaises*, 1974.

Poliomyelitis

Poliomyelitis is a significant cause of morbidity in Senegal and results in severe crippling of many children. Vaccinations against polio have been low. The decrease in reported cases as shown in the Government statistics below, may be a function of less case finding and/or reporting or it may reflect a real phenomenon of cyclic increases in polio infections.

Table 14: POLIOMYELITIS CASES

Regions	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Cap Vert	183	4	34	36	38	17	21	81	12	96
Casamance	2	-	1	1	1	-	-	-	1	9
Diourbel	3	2	2	2	18	-	-	13	2	13
Fleuve	17	-	3	3	-	1	-	2	-	5
Senegal- Oriental	2	-	-	-	2	-	-	-	7	5
Sine-Saloum	12	-	-	2	-	2	-	7	1	24
Thies	4	3	13	2	6	-	2	14	4	31
TOTAL	223	9	53	46	65	20	23	117	27	183

Source: *Statistiques Sanitaires, op. cit.*

Gastroenteritis

Gastro-illnesses remain one of the leading causes of death in children under five years of age in Senegal. One of the primary causes is the practice of weaning children on brews and porridges made with polluted, unboiled water and/or polluted milk prepared with unclean hands. However, the complete lack of environmental sanitation results in high levels of environmental contamination, few measures to break the chain of transmission, and consequent high disease prevalence rates which completes the cycle of high level environmental contamination.

Tetanus

In Senegal tetanus is generally widespread. Among the postnatal infections that play a major role in infant mortality, umbilical tetanus is first. There are many other avenues for infection such as through ear-piercing among the Toucouleur ethnic group and following intramuscular injections of quinine. Observed umbilical tetanus appears to be steadily declining particularly in cities because of the routine preventive serum therapy given to newborns. When umbilical tetanus does strike, it is extremely grave with a case-fatality rate of over 90%. The overall case-mortality rate is 38% but drops to 30% if tetanus in newborns is excluded.

The classical anti-tetanus vaccination done individually and repeated several times is difficult to administer. For this reason a high-powered vaccine was developed that would require two injections or even one for use in the mass anti-tetanus campaign in Senegal in 1970. Five successive drives were conducted from January 1970 to July 1972. A total of 335,000 vaccinations were administered of which 140,000 were to infants six months to four years old. The extent

of coverage for this group was 60-70%. Table 15 shows the number of reported cases of tetanus from 1970 to 1974.

Table 15: TETANUS

Regions	1970	1971	1972	1973	1974
Cap Vert	169	172	162	168	265
Casamance	123	131	125	77	109
Diourbel	13	28	40	50	36
Fleuve	12	27	44	47	55
Senegal-Oriental	10	15	10	14	4
Sine-Saloum	-	1	-	-	21
Thies	47	34	47	52	30
TOTAL	374	408	428	408	520

Source: Ibid.

Veneral Disease

Sexually transmitted diseases still pose one of the main public health challenges in Senegal. They contribute to the high rates of infantile and juvenile mortality. Urbanization and the decline in adherence to traditional religious beliefs favors promiscuity, and the influx of tourists to Senegal has extended the possibilities for transmission. Ignorance of the health risks of venereal disease is almost universal. Even prevention by using male protectives is virtually unknown. According to a 1972 WHO study, the lapse of time between the first appearance of clinical signs and consultation is rarely under ten days.

On the other hand, the number of cases of syphilis and gonococcal infections among prostitutes appears to be small. Information obtained from military authorities (by WHO) confirms more than half of all gonococcal infections are due to casual sexual encounters. Senegal's Law No. 66-21 enacted in 1966 provides for the control of venereal disease among prostitutes. All persons engaged in prostitution are required to be registered and must undergo a medical checkup from the venereological standpoint every fortnight.

In 1971 WHO reported 83,952 cases of syphilis and sequelae, 1,069 cases of congenital syphilis and 1,255 cases of early syphilis in Senegal. The endemicity of yaws may somewhat reduce venereal syphilis. A 1975 WHO epidemiological study stated that venereal syphilis now appears to extend to rural regions of Senegal which have been open to communication and exchange with more urban areas. This increased transmission has raised the numbers of cardiovascular and nervous system accidents and disorders, plus congenital transmissions. Out of 1,000 cases of cerebral vascular accidents observed in Senegal from 1960-1969, 135 were reported to have originated from syphilis.

The prevalence of gonococcal infection has proved as high as 10.6% and even 18.7% in some areas.¹⁴ Frequently additional complications result from the lack or inadequacy of treatment. Among women there is a high incidence of salpingitis and it seems probable that many cases result in incurable sterility. In 1975 inadequate treatment was cited as the cause of 65% of chronic and gonococcal infections which led to the major cause of sterility among men and women. However, an earlier study concluded that some 30% of the gonococcal cases detected among regular attenders at maternal and child health centers presented no symptoms at all. Gonococci were also detected in children, many of whom also suffer from conjunctivitis.

In Senegal, particularly in Dakar, gonococcal infections are more frequent among those of lower socioeconomic groups. Changes in habits due to economic and social progress, as well as migration and urbanization, may explain a higher incidence of gonococcal infections in the last few years among students sixteen to eighteen years of age. A suitable health education program would seem to have every prospect of success in limiting the spread of the disease since in Senegal the gonococcus has apparently not yet developed resistance to antibiotics.

An investigation of female genital infections and male gonococcal infections in urban and rural areas has been started in collaboration with the Experimental Bacteriology Laboratory of the Pasteur Institute in Dakar. This project also provides an opportunity of studying ways of making public information and health education available in semi-rural areas.

The need to launch health education programs for all levels of society has been recognized by the Senegalese health authorities. A recently organized health team in the Casamance region made good progress in covering the area with educational radio programs. The program's director reports a significant decrease in the numbers of gonococcal infections diagnosed and treated since the public information campaign began.

Schistosomiasis (Bilharziasis)

Schistosomiasis is common in most of Senegal. Infection rates approached 100% of the population in eastern Casamance region during the early 1960's. High rates were also reported in central and eastern Senegal. More recent estimates indicate a 10% prevalence in Senegal's delta area increasing to 40% along the Mali border. A U.S. Government study based on 1970 population figures for Senegal showed the following:

	<u>Estimated No. at risk</u>	<u>Estimated No. infected</u>
Schistosoma haematobium	2,792,000	818,000
Schistosoma mansoni	279,000	51,900

Source: 1973 U.S. Government Study

Infection is acquired from water contaminated with cercariae (larval forms) derived from snails. The eggs of *S. haematobium* leave the body mainly with urine, those of *S. mansoni* with feces. The egg hatches in water and the liberated larva enters a suitable fresh water snail host. Contamination takes place usually while the person is working, swimming or wading in

¹⁴ World Health Magazine, May 1975: Research in West Africa by Ridet and Siboulet.

water. Like malaria, schistosomiasis causes general debility and lassitude and is disabling rather than fatal. It is extremely difficult to counteract the spread of the disease. Preventive measures include: treatment of snail breeding areas with molluscicides; the provision of water free from cercariae for drinking, bathing and washing; education of people in endemic areas regarding mode of transmission and methods of protection; and, mass treatment of the infected to reduce transmission.

The mainstream of the Senegal River is the axis of dispersion of the snails. However, secondary streams feed a number of ponds where fresh water favors snail populations. The planned OMVS Senegal River Basin development project may expand the habitat area of the intermediate hosts of schistosomiasis which combined with an influx of new populations could result in a serious health problem. An increased number of small agricultural developments in the Kaedi area may also diffuse the intermediate host of *S. haematobium*.

Hepatitis

A survey of healthy children and adult males in Senegal revealed 11% of all individuals tested carry HB Ag.¹⁵ Such a high frequency, according to the author, reveals a high prevalence of hepatitis B infection among the entire population. In 1975 WHO found the most elevated prevalence in children five to fourteen years, and rarely after sixty years of age.¹⁶ In general, frequency increases with age to reach a maximum between ten and fourteen years, then decreases slowly. Similar prevalence rates (9.3%) were found by Diebolt et. al. among female blood donors from Senegal and by Sankale et. al. (9.9%) among children treated for various reasons (except viral hepatitis) in the largest hospital in the region.

Prevalence rates are close to those found in many other tropical and subtropical areas but are 75-200 times higher than those found among comparable sex-age groups from the United States or other developed countries. In Senegal the ratio of the chronic carrier state among those exposed to infection was found to be 5.5 times higher than in similar populations in the United States and other industrialized countries. The frequent development of the chronic carrier state seems to be related to the fact that in poor hygiene conditions, first exposure to infection occurs during early periods of life. Men are more frequently carriers of the antigen, 11.8% in men compared to 6.21% in women.

The "classical" routes of parenteral virus transmission (blood transfusions, medical infections; circumcision; tattoos; scarifications; insect bites, particularly mosquitos) account for the high efficiency of hepatitis virus transmission in the tropics. A number of additional hypotheses exist.¹⁷

- Blumberg et. al.: the carrier state is closely associated with a genetically inherited susceptibility;
- Prince, et. al., Smith, et. al.: blood sucking arthropods (mosquitos) are involved in the transmission; and,

¹⁵ The Epidemiology of Hepatitis B Infections in Africa: Results of a Pilot Survey in the Republic of Senegal. American Journal of Epidemiology, Johns Hopkins Press, 1973.

¹⁶ WHO Epidemiological Survey, Sine-Saloum, 1975.

¹⁷ Quoted in "The Epidemiology of Hepatitis B Infections in Africa." op. cit., p. 108.

-- Merrill, et. al.: neonatal exposure to mothers with acute HB Ag positive hepatitis may lead to the initiation of asymptomatic carrier state.

The authors believe, as in the case of other infectious diseases, that poor hygiene, crowding and low standards of living may favor and sustain circulation and dissemination of hepatitis B virus.

Yaws, Endemic Syphilis

A chronic relapsing nonvenereal disease, yaws primarily occurs in the rural tropics and subtropics; the lowest social and economic groups have the highest infection rates. Transmission is by human contact or carriers such as houseflies and is commonly found in the central and northern areas among nomads and other groups. The prevalence of yaws could be greatly reduced by basic hygiene practices but few rural people have any formal education nor have learned the importance of sanitation and personal hygiene. This situation is aggravated by the fact that in most of rural Senegal during at least half of the year little water is available for bathing and watering domestic animals. In 1972 a health survey was carried out in Senegal. One aspect investigated yaws in the Casamance Region; the other, endemic syphilis in the Senegal River Region.¹⁸ The project was launched under the auspices of a multinational organization of states bordering the Senegal River. The object of the study was to restore the economy of the River valley. The epidemiological team found positive blood tests for yaws in 4.5% of the adult population. Among the most recent cases of endemic syphilis registered in areas adjacent to the Senegal River, 2.5% were found among children.

Onchocerciasis

Onchocerciasis, sometimes called river blindness, is due to the infection of man by a nematode worm of the *filarioides* family. This is transmitted by a small fly which breeds in rather substantial rivers with fairly swift currents, laying eggs on plants and rocks. Senegal has many small streams which change in volume with the seasons and are capable of harboring the organism. This situation prevents the exact location of foci of infection as well as the proper use of insecticides. One of the most important factors in spreading the disease is the rate of infection by flies which may reach 30% in some areas.

Onchocerciasis received increased attention during the 1960's in Senegal when mobile health teams and other medical personnel became aware of isolated pockets of the disease not previously recorded. In such areas, as many as 20% of the men were blinded. Abonnee et. al. indicated a rate of 85-100% of adults carrying microfilaria in 1963 as compared to 20% in 1955 in Senegal-Oriental.¹⁹ Recent investigations by a WHO team found the population highly infected in eight villages along various streams tributary to the Faleme in the Department of Kedougou. The assumption can be made that during the rainy season, all of Senegal-Oriental is highly infected.

¹⁸ Ridet and Siboulet, "Research in West Africa," World Health Magazine, May 1975, p.16.

¹⁹ Quoted by J. May from Carloz, L.F.M., Geographie Medicale du Senegal. University of Dakar, Faculty of Letters and Human Sciences.

While many areas of Senegal have poor soil, it is the more fertile regions near river waters that harbor the vector larvae and therefore cannot be permanently settled. For example, in Tankande near Kedouge, this dilemma is shown by the migration of villages. Peasants live for fifteen or twenty years near the rivers. Once their population has been greatly affected by the disease, especially blindness, they migrate to higher areas. Decades later, suffering from malnutrition, they return in search of fertile soil. So, the cycle starts over again as it has probably done for centuries.

Prevention of onchocerciasis can be achieved by covering the body and head to avoid bites. This can only be successful with effective health education programs. Control of vector larvae is possible with DDT.

Leprosy

Leprosy, a chronic, mildly communicable disease, is found mostly in the tropics and subtropics. Prevalence rates of five per thousand or higher are found only in the tropics; however, socioeconomic conditions are probably more important than climate. In a study conducted in 1967, it was reported that Senegal had approximately 40,000 lepers out of a population of 2.8 million.²⁰ This constituted a prevalence of sixteen per thousand, a high endemicity by worldwide standards.

The hot and humid areas of Senegal have a prevalence of approximately thirty per thousand. The semi-arid and dry regions of the north have a lower rate of ten per thousand.

In 1971, 1,650 cases of leprosy in Senegal were reported and 230 deaths. By 1972 the Government statistics showed an increase of 167%. This dramatic rise can probably be attributed to more people flocking into urban areas for health support during the drought and consequently better reporting. By the end of 1973 the reported number of cases and deaths had returned to near 1971 levels.

The two major types of leprosy, lepromatous and tuberculoid, are prevalent in Senegal. Tuberculoid is the most resistant and widespread form, comprising 90% of all cases in Senegal. Lepromatous, the better known type, represents approximately 10% of the cases.

Any type-specific medication is preceded by general treatment. Tuberculoid leprosy is treated for a minimum of five years after the disappearance of clinical signs. Lepromatous therapy must be continued indefinitely. Chemoprophylaxes are given to children in constant contact with lepers. The variety of treatment procedures and the extended lengths of therapy are difficult requirements for the Senegalese with little equipment and medical personnel.

The old leprosy hospitals that brought patients in for mandatory segregation have been abandoned. Mobile units have replaced stationary hospitals; however, their routes cover over 100 kilometers a day, therefore giving disappointing results. Their circuits are normally interrupted during the rainy season but even in the dry season setting rendezvous hours for rural Africans is very difficult. The leper colonies remain one solution because this organization allows for medical surveillance. Another alternative is paramedical based treatment and surveillance in the home. Lepers are frequently seen in cities. Sometimes they are collected and returned to leper colonies.

20 A. Basset, "Leprosy in Senegal," Schweiz Med. Wochenschr, Basel, March 1967, Vol. 97.

Leprosy is not purely a medical problem. The causes of this disease are poverty, ignorance and poor hygiene. Paramedics with almost no training have done leprosy screening in other countries. Chemotherapy and case finding have all but eradicated leprosy in some countries.

Typhoid

Typhoid occurs throughout Senegal but is more often diagnosed and reported in the larger cities of Dakar, Saint-Louis, Ziguinchor and Kaolack. In 1971 WHO reported 131 cases of typhoid fever, of which four were fatal. Government health statistics indicate an 18% increase in cases of typhoid fever in 1972, then a return to near 1971 levels in 1974 (see Table 16). Under present conditions Dakar is the only city with a water treatment plant. Mass immunization programs seem not to be indicated due to their high cost and initial efficiency; therefore, as long as the distribution of unsanitary water continues, typhoid fever will remain a public health problem in Senegal. Construction of water treatment plants for other urban areas should therefore be considered.

Table 16: CASES OF TYPHOID AND PARATYPHOID FEVER BY REGION AND YEAR

Regions	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Cap Vert	19	13	35	124	112	66	43	63	24	39
Casamance	34	-	3	5	3	-	-	-	-	2
Diourbel	-	1	-	3	-	-	-	4	1	-
Fleuve	20	17	6	11	1	31	20	10	28	19
Senegal- Oriental	-	-	-	-	-	5	-	-	-	-
Sine-Saloum	-	3	-	-	3	-	2	-	-	-
Thies	-	-	24	-	-	-	-	-	-	-
TOTAL	73	34	68	143	119	102	65	77	53	60

Source: Government of Senegal, *Statistiques Sanitaires*, 1974.

Diphtheria

Reported cases of diphtheria show a somewhat irregular increase from the late 1960's to 1974. Government statistics for 1965 through 1974 appear on the following page.

Cholera

Cholera has not been completely suppressed in Senegal. Data for 1971 indicated that 265 cases had been reported to health authorities, 60 of which were fatal. Incomplete figures showed thirty cases of cholera (six fatal) in Saint-Louis during August and September 1972, and a few cases in other areas. Thirty suspected cases were reported from three small adjacent communities in March and April 1973. Health teams quarantined the area and prevented a wider outbreak.

Table 17: HALF-YEARLY CASES OF DIPHTHERIA BY REGION AND YEAR

Regions	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
Cap Vert	29	18	97	81	104	62	99	162	150	107
Casamance	-	-	-	6	6	-	1	-	1	2
Diourbel	-	-	5	15	14	24	21	8	6	16
Fleuve	32	8	8	12	4	-	10	2	7	7
Senegal- Oriental	-	3	1	-	-	-	-	1	10	-
Sine-Saloum	-	-	2	-	16	2	2	8	40	24
Thies	17	-	13	7	8	4	10	18	15	10
TOTAL	78	29	126	121	152	92	143	199	229	166

Source: Government of Senegal, *Statistiques Sanitaires*, 1974.

The reintroduction of cholera south of the Sahara in 1972 has created a serious prophylactic problem. In the absence of an effective vaccine, protection against the disease must depend upon strengthening sanitary programs such as the creation of potable water and sewerage systems, establishing health education programs and the creation of environmental sanitation services. The open sewers frequently seen in the cities of Senegal indicate that cholera can easily re-appear. The only water treatment plant in the country serves the city of Dakar exclusively.

It has been suggested that until preventive measures have eliminated the disease, Senegal should organize emergency cholera treatment in the form of first-aid units for rehydration of possible victims of the disease.

Trypanosomiasis (African Sleeping Sickness)

The human form of trypanosomiasis has declined in recent years and does not present a serious problem in the lower and middle Senegal River valley. However, the disease has been reported to exist among a large variety of animals, wild and domestic, which leaves a potential source for infection of the human population.

Human trypanosomiasis is caused mainly by two types of trypanosomes. In Senegal the primary agent is *T. gambiense*. The tsetse fly (*Glossina palpalis* and *G. tachinoides*) acts as transmitter of the disease. The main reservoirs are men, wild antelopes and several domestic animals (dogs, pigs and goats). The parasite collected from either man or animal develops in the body of the tsetse fly until it reaches a transmissible form within the salivary glands of the fly.

The main areas of endemicity in Senegal are the Cap Vert region and inland to the village of Pont, and from Rufisque to Lake Tanna. Endemic foci also exist along the Somone River, in the Gambia River Basin, in Casamance Province and in Senegal-Oriental near Tambacounda.

Yellow Fever

The French-speaking countries of West Africa became free from human cases of yellow fever after the institution of systematic vaccinations throughout the region in 1939. However, these efforts were relaxed about 1960 and an unusually virulent form of the disease struck Senegal in

1965 in the Diourbel area, killing mostly children under ten years of age. This was apparently because vaccination of young children had not been continuous. Health officials have speculated that other less serious cases of yellow fever still occur but are unreported. In 1975 WHO reported that sero-protection in the Sine-Saloum area was clearly insufficient. The danger of epidemics does exist because of the presence of the vector in Senegal-Oriental.

Yellow fever has two cycles: a sylvatic cycle (primate-mosquito-primate); and an urban cycle (man-mosquito-man). Endemic foci are kept alive in monkeys by several species of mosquito. Yellow fever exists among primates in the Kedougou area.

Human epidemics can occur when man moves into the forest long enough to be bitten and carries the virus back to an unvaccinated population where transmission takes place through the vector *Aedes aegypti*. *Aedes* live around human habitats where they breed in small pools of water or dirty water containers.

Chronic Diseases

Diabetes Mellitus

Since 1965, 625 cases of diabetes mellitus have been seen in Dakar. The etiology of this disease remains unknown. Although diabetes due to pancreatic disease is not uncommon in Nigeria, it is rarely encountered in Senegal. In African negroes as well as the white population, diabetes increases the frequency and gravity of atherosclerosis. Atherosclerosis is hardly mentioned in rural areas of Senegal by health personnel, but is being found in increasing numbers in Dakar.

Therapeutic measures for diabetes include insulin and oral hypoglycaemic agents fortified by diet. More than 80% receive oral treatment while 16.3% receive injections of insulin. About two-thirds of the patients are reported to improve with treatment and failure is usually due to negligence, ignorance or poverty, rather than to any lack of efficacy of the prescribed regimen. The physical facilities and financial resources of Senegal are unable to support the diagnosis and treatment of most diabetics in the country.

Epilepsy

The first study of epilepsy in Senegal (Collomb et. al.) shows a prevalence rate of approximately three to eight per 1,000.²¹ Known manifestations of epileptic fits in the Senegalese Africans were found to include: symptomatic epilepsy, intra-ranial masses (e.g. tuberculoma) and cerebrovascular insufficiency. The frequency of genetically determined epilepsy is not known but the psychosociological approach to the problem is clearly inadequate.

There is an increasing need here to educate the community as well as doctors, nurses, social workers and others who are in contact with epileptics.

²¹ H. Collomb, et. al., "Epidemiology of Epilepsy in Senegal," African Journal of Medical Services, Vol. 1, April 1970.

Cancer

Cancer does not represent one of the major preoccupations of medicine in Senegal where the population is young and where infectious and parasitic diseases are very frequent and pose the greatest danger. Cancer represents 1.7% of hospital admissions among black Africans in Senegal much of which is the female reproductive cancers. Fifty percent of reported cancers occur in Senegalese between the ages of thirty-one and fifty.

There does not yet exist a cancer registry in Senegal. Cancer treatment is exclusively in Dakar where Sankale et. al. report 3,916 cases of cancer among black Africans in the three hospitals of Dakar from October 1960 to July 1970. The only two pathology lab. are also in Dakar. The cancer epidemiology shows all classes, all regions and all ethnic groups affected.

Some controversy now exists in the scientific community concerning aflatoxins, a mold which forms on poorly stored peanuts and other proteins. Aflatoxins are purported to cause cancer by the action of the liver enzymes on the bacteria. Researchers in Africa took food samples from the family dinner pot and from food sold in markets. They examined the food for aflatoxins and checked the registers for liver cancer. In each case, the more aflatoxin, the higher the incidence of cancer.²²

Dental Health

A health survey conducted in 1959-60 in Senegal used dental caries as one indicator of health status. In the deciduous teeth (baby teeth), dental caries were rampant throughout the country; whereas, in the permanent teeth, the prevalence of dentition caries was negligible except in southern zones. Periodontal disease, osteitis and loss of teeth were all of high incidence.

Malocclusion and malformation lead to considerable open bite in the population and a relationship with malnutrition was postulated. Fluorosis was focal and dental mottling was found in the teeth of persons living adjacent to phosphate mines. Serious oral pathologic change such as noma and cancer was relatively frequent. In 1975 WHO reported the percentage of persons having a natural history of caries in permanent teeth was 46.4%, ranging from 31-57%. The prevalence of dental caries in temporary teeth for young people was relatively weak, 36.2%.

Mental Health

The African community provides a communal and longstanding tradition of explanations for mental illness. Poor mental health is considered the result of a conflict between the sick person and other live or dead persons, the law of his ancestors or the divine law. The illness is considered an affair of everyone - the family, his ancestors, the community. The patient is only the vehicle of a message or sign. The changeover to modern culture, at the present stage, increases the incidence of mental illness without affecting its form.

Collomb postulated that this attitude toward mental health may explain the frequency of acute episodes of delirium, of hallucinations and of ideas of persecution and the rarity of melancholia and obsessional neurosis. The community's involvement with the mentally ill may contribute to the efficiency of traditional therapy which treats the patient and his illness in

²² Brett, Abigail Trafford, "Aflatoxin: The Menacing Mold," The Washington Post, April 30, 1975.

a collective situation using systems of symbolization to which the group as a whole rigidly adheres.

The African typically has seen several traditional healers before he goes to the hospital which is only a last resort and considered a place to calm oneself but never a place to be cured. Therefore, any care given by modern psychiatry must be complemented by traditional medicine where the patient perceives a cure does take place. A modern psychiatric service with 250 beds, of which 100 are reserved for chronic illnesses, has existed in Dakar since 1958.

Zoonotic Diseases

In the *plan sanitaire* the principal effort of the Livestock Service (*Service d'Elevage et des Industries Animales*) is concentrated between October and April during the animal vaccination campaign which since September 1966 has worked against rinderpest. The economic importance of rinderpest is that it reduces the herd; however, it rarely causes human illness. This disease is most prevalent after the rainy season when the water literally washes the disease out of the environment. Between 1966 and 1969 the Livestock Service worked in joint efforts with Mauritania, Mali, Guinea, Gambia, Sierra Leone, Liberia and the Ivory Coast.

During the first year of the campaign, 1966-67, 2,125,426 rinderpest vaccinations were given as compared to an average of 1,200,000 vaccinations in the best preceding years. In the second year of the campaign, 1967-68, use was made of the virus vaccine. In 1967 the majority of local sources of rinderpest were eliminated in the first months of the year. Most of the contaminations were caused by animal imports from Mauritania.

Profiting from the infrastructure used against rinderpest, the Livestock Service began a great effort to augment the vaccines against contagious bovine pleuropneumonia. In a campaign in 1967-68 the total antipneumonia vaccinations exceeded 1,400,000.

Given the effort for these two diseases, the vaccinations against anthrax and brucellosis were limited to areas where infections were most serious and, as a result, there was a resurgence of these diseases. Both these diseases are passed to humans by contact or through infected milk.

Trypanosomiasis and malnutrition are also common in animals especially along the Senegalese side of the river. Rinderpest still exists in Mauritania but is now kept under control in Senegal. Ovine schistosomiasis is common in the river valley area and although seldom recognized in the living sheep, is frequently discovered after slaughter. Strongyloidosis (intestinal worm) is common especially in camels but goes undiagnosed and untreated.

CHAPTER FOUR

NUTRITION

Average food consumption in Senegal is significantly above average requirements in terms of both calories and protein. Only in secondary nutrients - principally Vitamin A - are there gross deficiencies in the average values. On the other hand, there are major problems of malnutrition in the country in specific age groups and at specific times of the year. These problems are caused by inequitable distribution of food in the family, by poor utilization of existing foods, and by seasonal lack of food availability in many areas.

The poor nutritional status in the affected populations results both in long-term loss of human potential and in increased vulnerability to disease.

The following pages describe nutritional status in more detail, and then trace the factors in the food chain that impact on nutritional status. Specific problems are noted in terms of dietary practice, food distribution and storage, and food production.

Nutritional Status

Average caloric intake is about 2,500 per day among rural Senegalese. Protein content is slightly higher than the typical African diet which may be due to the availability of fish along the coastline and inland waterways. The primary staple among the rural population is millet which is being replaced by imported and domestic rice for the non-farm population.

There are many variations, geographically, socially and chronologically, from the average caloric intake. The tables on the following page give average per capita consumption estimates compared to norms computed for the people and the area. The general consumption of starches in the diets is tempered by high levels of fats supplied by peanut oil. Lack of Vitamins A and C, calcium and iron is noticeable, especially in children.

There exists widespread malnutrition and a wide spectrum of nutritional diseases. On the basis of growth curves, WHO gathered statistics on the incidence of malnutrition in various parts of Senegal which resulted in an estimate that 9-14% of under-five year-olds suffer from Grade III malnutrition (kwashiorkor and marasmus). These children become susceptible to infectious diseases and dehydration. Grade I malnutrition is reported so commonly that it is considered a normal state.

Malnutrition, especially in the form of kwashiorkor and marasmus, can be divided by two major causes: real food shortages in certain places and during certain seasons; and, poor utilization of existing resources. Malnutrition due to the first cause is prevalent in areas subject to drought and in shanty towns around some cities, especially Dakar, where rural immigrants find themselves in a money economy without money.

The second type is found both in cities and rural areas and could be corrected through nutrition education programs and diversified agricultural production. Encouragement should be

given to the rural and urban populations to consume more pulses or other protein-rich vegetable sources widely available in the country.

Table 18: CONSUMPTION OF NUTRIENTS AND COMPARISON WITH NORMS, SENEGAL (1962)

Nutrients	Norms*	Consumption	Comparison
Calories	2,097	2,214	+ 117
Total protein in grams	40	93	+ 53
Fats in grams	-	40	--
Calcium in milligrams	982	920	- 62
Iron in milligrams	11.5	23.5	+ 12
Vitamin A in I.U.	4,516	3,600	- 916
Thiamine in milligrams	1.2	2.2	+ 1
Riboflavin in milligrams	1.6	1.4	- 0.2
Niacin in milligrams	11.8	20	+ 8.2
Ascorbid acid in milligrams	72	42	- 30

* Norms computed for the people and the area

Source: Boutillier, J.L. et. al., *La Moyenne Vallée du Senegal*, Ministère de la Coopération, Paris, 1962.

Table 19: FOOD CONSUMPTION - SENEGAL VALLEY
PER CAPITA PER DAY (Reported in 1962)
(grams)

Cereals	848.7
Vegetables	27.9
Roots	3.0
Legumes	11.6
Groundnut oil	2.7
Leaves	28.7
Sugar	13.8
Fruits	0.5
Milk and butter	245.9
Fish	114.5
Meats	24.1

Source: Boutillier, J.L. et. al., *La Moyenne Vallée du Senegal*, Ministère de la Coopération, Paris, 1962; quoted in May, Jacques, Ecology of Malnutrition in French Speaking Countries, 1968.

Aside from the shanty towns surrounding Dakar that represent a special internal problem, malnutrition is more widely distributed in the countryside than in the cities. According to some Senegalese physicians, the reasons for the apparently enormous increase in malnutrition among children in recent years are: shortages of foodstuffs in general, the limitations and decline of the quality of personnel dealing with children, and the lack of money to keep nutrition education and rehabilitation programs operating.

Bergouniou states that children below eight months do not show clinical signs of deficiencies.¹ Between eight months and weaning time, 38.8% of the children examined exhibited some sign of nutritional deficiency; 0.5% presented obvious signs of kwashiorkor; 8% gave indications that a pre-kwashiorkor stage had been reached; 18.6% had signs of deficiencies attributable to riboflavin or Vitamin A shortages; 11.7% had lighter stigmata of deficiencies that are probably reversible. In 1975 a WHO study² reported the following percentages of children under five with kwashiorkor or in a pre-kwashiorkor state.

Percentage of Children in Kwashiorkor State

	<u>AGE</u>	
	<u>0-2</u>	<u>3-5</u>
Kwashiorkor	0.5	-
Pre-kwashiorkor	15.0	7.0

After weaning, the situation is worse: over 65% of the children examined were found to show some sign of nutritional deficiencies, regardless of ethnic group or sex. Frank kwashiorkor was seen in 4.6% of the cases, pre-kwashiorkor conditions in 10%, reversible signs in 28.9%, and scattered minimal symptoms suggestive of partial malnutrition in 12.7%. Bergouniou further states, on the basis of these findings, that kwashiorkor is not common among the milk-drinking Peuls, but is found among the fish-eating Lebous.

Masse, Moreigne and Senecal have studied the growth of Dakar children during the first four years of life.³ Findings show that infants pick up weight and length during the first three years faster than European children, then growth stops almost abruptly, to resume at a much slower but regular pace at a later date. It is not clear whether this pattern is a result of diet or some other unrevealed factors.

¹ Bergouniou's study entitled, "*Malnutrition et Sous-Nutrition Chez les Jeunes Enfants de la Presqu'île du Cap-Vert de Dakar*" was published in 1952. This should not, however, invalidate its findings as the general state of nutrition has at best remained constant, or, judging by per capita food consumption, has declined.

² WHO. *Le cas de l'épidémiologie d'insécurité alimentaire dans le Département de Kaolack, Région Sine-Saloum.*

³ Masse, G., F. Moreigne and J. Senecal, "*Le poids et la taille d'Enfants dakarais pendant les 4 premières années de la Vie.*" *Presse Med.* 1962, 70 pp. 241-242.

In spite of the reported balanced diet in the Senegal Valley, Cantrelle and N'Doye found mild forms of kwashiorkor, although severe cases are rare.⁴ Signs of Vitamin A deficiency, such as mild degrees of xerophthalmia are encountered.

Signs of scurvy are reported to be rare although the ration of ascorbic acid is marginal. Dental caries are also rare but loss of dental enamel is frequently observed. Anemia is very common with hemoglobin values appreciably lower than normal in all groups of the population, except perhaps adult men. In very young children, hemoglobin levels may be as low as 50-60% of normal.

Goiter is present in Senegal, but for limited areas. Prevalence rates do not reach the high values found in Mali. The average rate for the entire country is 3.6%. In the Sine-Saloum Region, 30.6% of the men were reported to have goiter and 27.6% of the women. The prevalence of first or second degree goiter in pregnant or lactating women reached 58.2%.⁵ The highest prevalence was found in Patim Kandiaye, a small village in Ziguinchor, where 59.5% of the inhabitants are afflicted. Tambacounda ranks second on the prevalence scale, with rates of 42.5% at Tenda Daniantan. In the remainder of the country the rates do not exceed 10% and are usually below 2%. The high localized rates of goiter suggest that iodization programs should be considered.

Payet, et. al. found beriberi to occur among people from Basse Casamance who had migrated into Dakar.⁶ The cause was probably the exclusive rice diet on which most subsist. The home-pounding process for rice practiced in the Casamance leaves sufficient thiamine to protect against the disorder, unlike the industrial processing in Dakar. Thus, thiamine fortification of processed rice might be considered.

That the night vision of adults in Senegal varied with the time of year, and that symptoms disappeared during the mango season, was discussed in a study by Pales.⁷ Levels of Vitamin A in the serum of pregnant women in Dakar were found to be 2.5% of normal levels. Various possibilities exist to promote improved Vitamin A levels, and might be considered.

More recently, Tourey, et. al. found values of ascorbic acid in the blood of young children from four to twelve years of age fluctuated from high counts in February and March, to the lowest levels in October.⁸ The highs are credited to an increased consumption at that time of cabbage, squash, tomatoes, peppers and onions, and to the fact that the cooking water is consumed. Children, nevertheless, occasionally have bleeding gums which may imply either hypovitaminosis in ascorbic acid and/or some deficiency in Vitamin K.

⁴ *Memento de l'Economie Africaine, Numero Special 458 Ediafrica*, Paris, 1967.

⁵ WHO. *Enquete Epidemiologique*, op. cit.

⁶ Payet, M. et. al., "*Societe Medicale d'Afrique Noire de Langue Francaise, Janvier 1960.*" *Presse Med.* 1960, 68, p. 464.

⁷ Pales, L., *Alimentation Nutrition. Rapport No. 1, 2, 3. Direction Generale de la Sante Publique*, Dakar, 1947.

⁸ Tourey, J., P. Lunven, and R. Georgi. *Aliments de Cueillette et de Complement au Senegal et en Zone Sahelienne*, O.R.A.N.A., Dakar, 1964.

Dietary Practice

The problems of acquiring an adequate diet for the Senegalese has been increasing since the 1960's. Because the growth rate of the population has remained high (approximately 2.2% per year), there was less food produced per person for local use in the 1960's than in the 1940's. One reason is that yields are declining on overworked soils in some areas. There is also an established and growing demand for imported wheat, rice and sugar, and imports of millet and sorghum are expected to increase. All of these factors have been aggravated by the sociological and economic effects of the drought. Millet is popular among some farmers (particularly subsistence) because it is one of the first cereals available in autumn when most of the food stored has been consumed. Planted in May and June after the first rains, some varieties are harvested in November. Other local produce that varies in importance according to the areas and season includes: corn, sorghum, beans, groundnuts, potatoes, citrus fruits, cassava, green vegetables and baobab leaves.

Groundnuts are a good source of protein but are not popular among the Senegalese. Most of the crop is sold for cash and eventually shipped abroad. The foodstuffs imported in the greatest quantities are wheat, rice and sugar. Wheat, which is becoming increasingly acceptable, is used to make bread in each town's one or more commercial bakeries.

Fish, where available, is used in sauces to be eaten with millet, rice or sorghum. Meat is eaten only once a week or less often, even among groups that raise livestock. Peul cattle herders use milk, fresh or fermented. They also trade milk or butter to members of other groups; however, milk and milk products are used in limited quantities throughout the country.

The most favorable element common to all diets is the use of wild uncultivated foodstuffs gathered in the countryside. These plants are rich in protein, minerals, and vitamins.

The Sereres rely on millet which is not available in adequate quantities throughout the year. By growing peanuts, primarily as a cash crop, they can use the proceeds for non-food purchases. The concessionary foods are bought with money earned through the sale of women's crafts. The Sereres also raise livestock - cattle, goats and sheep. Sheep are raised for meat. Cattle are not. Both cow's milk and goat's milk are consumed.

Overweight wives are a status symbol among Sereres, hence obesity is a health problem.

The diet of the Toucouleurs of the Middle Senegal Valley, based on cereals, fish and milk, is one of the best in the country. Sorghum and millet are a good energy source; fish and milk supply proteins and minerals; leaves, cereals and milk provide Vitamin A; and, grains supply thiamine.

The Diolas of the Casamance River Basin eat rice with beans, fish and oysters. Occasionally millet, sorghum and tubers are added to the diet. During the lean months, gathering and hunting become very important. Like the Sereres, the Diolas keep cattle but do not slaughter them for meat. They do drink curdled milk.

Geophagy has been noted, especially among pregnant women and children.⁹ Roasted yams or manioc are eaten as between-meal snacks. Palm toddy is the principal alcoholic beverage and causes considerable intoxication. Sugarcane, carrots and pineapples have been introduced into the area as cash crops.

⁹ Geophagy is the eating of earth, either as a psychotic symptom or to make up for lack of food, as in famine areas.

Once cooked, food is distributed by the husband or wife to the other wives and children. Each person's share is based on sex, age and productivity. First, the dish is served to men and boys above eight years. Then it is given to women and children.

Many young children suffer from these long-established customary eating practices. After weaning infants often develop kwashiorkor, a protein deficiency disease, because parents did not provide them with an adequate share of the family's food. Studies by independent scholars have shown that certain infections extremely prevalent in Senegal such as malaria and intestinal parasites, reduce the efficiency with which the human body absorbs and utilizes food. Thus, a person whose food intake appears adequate may continue to suffer from several debilitating illnesses, for example anemia, which normally are attributed to deficiencies in the diet.

Usually the sexes eat separately. Older women do not eat with the young for fear that sterility of old age is contagious and will impair the fecundity of the young. People with obvious signs of illness eat separately, as do albinos and menstruating women. The host or cook eats first to prove the meal is safe, not from poison but magic charms.

The urban diet consists of three principal meals a day: breakfast, lunch and dinner. Breakfast is consumed between dawn and 7:00 a.m. and is usually porridge with milk, sugar and bread. Some people may eat a pancake bought from the street vendor and brew a cup of tea or coffee, heavily sweetened.

Lunch and dinner basically consist of the same foods, although prepared differently. Fish or meat is added sometimes but the result is always a porridge or couscous.

In Dakar it is estimated that in normal times, 48% of the population consumes 2,000 to 3,000 calories per day. Proteins constitute 11.3-12.3% of the diet; 34-35.6% come from fats. Fairly uniform quantities of food are available throughout the year in Dakar. Foreign cereals, such as rice and wheat, replace sorghum and millet.

In rural areas breakfast is usually made from leftovers of the previous supper. Lunch is often eaten later in the field and consists of flour balls fried or moistened with sauce. The main meal is supper and takes place after dark. Meat or fish is usually missing.

Nutrition Programs

The Government is aware of the malnutrition problem, particularly infant malnutrition at the time of weaning. Programs educating mothers to prepare porridges and other weaning foods based on locally grown protein-rich resources such as *niebe* beans and pulses have been carried out at maternal and child health centers (PMI's).

Efforts have also been made to manufacture a low-cost weaning food primarily for use in urban areas. The history of attempts to produce a protein-rich, inexpensive commercial mixture has been discouraging. A number of products have been developed, tested, and discarded, either because they were unsafe, or too expensive for local markets to support.

The two best local resources, peanut flour and cottonseed flour, are vulnerable to contamination (peanut flour with aflatoxin, cottonseed flour with gossypol) and detoxification adds too much to the cost to make the product marketable. However, a new gossypol-free variety of cottonseed has recently been developed which may solve the problem. Also, text products are being made with *niebe* bean flour or ground shrimp heads.

Since 1964 nutrition education has been provided to students at the School of Medicine, State Teachers College for Midwives, Institute of Pediatrics, School for Social Assistants, National School for Applied Economics, the Center for Teacher Training, School for Sanitary Workers, and the School for Rural Cadres.

The Ministry of Public Health has a Bureau of Food and Applied Nutrition (BANAS) whose responsibilities and activities are not immediately clear.

In 1968 a preschool child feeding program was carried out in rural communities.

WHO has contributed to diet and nutrition studies at the University of Dakar and at other academic and training centers. Research programs and nutrition classes for student nurses and auxiliary health workers, in addition to preventive medicine courses, are also being guided and assisted by WHO.

Technical, organizational, and material assistance is being provided to fifteen public and private nutrition education centers in the regions of Casamance, Sine-Saloum, Thies and Diourbel by the Catholic Relief Services and cooperating organizations and governments.¹⁰ The centers provide instruction in health and nutrition, demonstration meals and discussions on basic hygiene, nutrition and child care to about 3,500 mothers of children under five years of age. High protein foods are distributed. Significant changes have been noted in the habits and attitudes of the mothers attending the centers and their interest is indicated by their financial contributions to the operating costs of each center. Between July 1969 and June 1970, the mothers themselves contributed \$2,500 to the centers.

The U.S. Government donated food to schools, social welfare institutions, and leprosaria, and to mothers of preschool children, refugees from Guinea-Bissau and victims of the drought.

Food Distribution and Storage Systems

In the following pages it is indicated that the acquisition of adequate foodstuffs in Senegal requires the importation of nearly one-third of all nutrients, although land is unused and agricultural production is far less than the nation's capacity. Moreover, there are a number of geographically and seasonally limited problems of food availability. Both of these facts argue the failure of the food chain in the vital steps of storage and distribution.

One basic problem is, of course, the dualistic nature of the society. The rural population lives primarily through subsistence agriculture, entering neither into commerce through the sale nor the purchase of foods. On the other hand, lack of adequately organized distribution channels results in the urban demand for food being met by imports rather than by increased production in the rural areas. Thus the demand for food generated in the more modern sector does not result in development according to the neo-basic model (by increasing demand requiring increased production, and the increase in production in turn stimulating modernization of agricultural practices).

¹⁰ Government of Senegal, U.S. Peace Corps, AID.

The availability of food supplies varies with the season. In the north, the food cycle is dependent upon the regime of the Senegal River. From November to January sorghum, corn and sweet potatoes are in supply. From February to May people live on stores and many use this otherwise free time for collecting and storing salt. During June and July the farmer plants his crops on the dry terrain which will soon be watered by August floods.

By the end of the summer, the stores are exhausted and diets are based on wild leaves and berries. In late August, cereals and beans become plentiful, helping to bridge the gap until the cereal crop is harvested.

This preharvest period is known as the *Soudure* and is a time of serious hunger among rural Senegalese. During the rest of an average year, most adults are able to maintain an adequate caloric intake. Nevertheless, the diets of many remain deficient in animal proteins and in several essential vitamins, thereby resulting in malnutrition and diet-related diseases.

The Casamance Region, south of the Gambia, is most likely to avoid serious hunger during the *Soudure*. This area produces a greater variety of grains, vegetables and fruits than the drier regions further north.

Storage methods vary with the type of food and the region. For example, paddy rice may be stored communally in large cribs of about twelve-ton capacity constructed of millet stalks and bamboo. Dimensions vary considerably even within the same community and are determined by quantity of grain expected to be stored.

Agricultural Production

The chief staple food crops in Senegal are millet and sorghum, followed by cassave, rice and maize. Agricultural production is divided between production of these crops, chiefly for on-the-farm subsistence consumption, and production of export crops - chiefly peanuts. Foreign exchange generated by export of crops (in which Senegal has a comparative advantage) is in turn used to finance extensive imports of foods - chiefly rice. The fact that nearly 30% of the nation's foodstuffs were imported during the 1960's leads one to believe that overall this pattern was dysfunctional, and that a considerable increase in production of crops for domestic consumption is needed.

Drought-resistant sorghum and millet are the only rain-fed staple food crops that can be grown satisfactorily with the low and erratic rainfall and poor soil conditions over most of the country. Both have a short growing period so they can mature during the short rainy season that lasts from mid-June to mid-October in the central plains and from July to September in the north. Millet and sorghum are grown chiefly in association or in competition with groundnuts, all three crops requiring similar soils and climate. More than 90% of all land under cultivation in 1970 was thought to be devoted to these three crops. The official estimate was approximately 2.5 million acres of groundnuts, and 2.5 million acres of sorghum and millet. Production of millet has been declining since 1966, while that of rice and corn has been increasing. The table on the following page shows the projected growth of major agricultural products to 1980.

The field crops are supplemented by kitchen garden crops of *niebe* beans, yams, sweet potatoes, and assorted vegetables and condiments. Expansion of the market gardening industry is one of Senegal's best examples of agricultural diversification. In 1967 approximately 2,700 hectares were used for vegetable gardening. In 1973, despite the effects of the drought, 5,104 hectares of vegetables were planted producing 73,000 tons.

In Sangalkah, the Chinese Agricultural Mission is conducting demonstrations for gardeners of Cap Vert to popularize certain gardening techniques. The SAED, Socas and the Chinese Mission are also active in this enterprise in the Fleuve Region.

In the mid-1960's Senegal ranked fifth among world producers of groundnuts for edible oil after India, the People's Republic of China, the United States and Nigeria. Before Senegal began crushing its entire production of oilseed in 1973, it ranked second to Nigeria in exports of shelled groundnuts. In these years the crop production was generating about 25% of the GDP and providing 70-80% of exports. Groundnuts provided about two-thirds of the money income of the rural population.

In 1970 groundnut yields still provided more than 40% of total exports and an estimated 14% of GDP. Thus, despite the groundnut crisis in the late 1960's and the drought of 1972 the crop retains its importance to the country's economy. Official statistics on acreage under cultivation represent mainly an informed guess, which was that 40% of the total was thought to be devoted to its production. An estimated 85% of production still comes from the groundnut basin. The areas of most rapid expansion are the Terres Neuves of eastern Sine-Saloum and Western Senegal-Oriental Regions.

The *Office Nationale de Coop et d'Assistance au Developpement* (ONCAD) maintains the largest responsibility for groundnut development. At present it controls more than 2,000 cooperatives, 1,600 of which deal with groundnuts.

The limited progress that had been achieved in the livestock sector during the 1960's was wiped out by the disastrous drought of 1972 in the northern and central parts of the country. During the preceding five years, nomadic or semi-sedentary herders were obliged to migrate farther and farther south in search of grazing land and many of these areas were infested with tsetse fly or other disease vectors.

Cattle account for 60-65% of total livestock production and goats and sheep for 23-25%. The rest is mainly from pigs and chickens. As of 1972, the herds of cattle, sheep and goats were more or less distributed as follows among the different regions.

Table 20: HERD SIZES

	(thousands)			
	Cattle	%	Sheep, Goats	%
Cap Vert	12	0.5	15	0.5
Casamance	394.5	15.8	296.7	11.2
Diourbel	582.5	23.2	652.8	24.1
Fleuve	653	26	977	36.2
Senegal- Oriental	261	10.4	158	5.9
Sine-Saloum	480	19.1	390	14.4
Thies	125	5	208.5	7.7
TOTAL	2,508	100.0	2,698	100.0

Source: *Marches Tropicales et Mediterranees*, "Senegal 1960-1973: Fourteen Years of Economic and Social Development."

Table 21: PROJECTED GROWTH OF MAJOR AGRICULTURAL PRODUCTS TO 1980

	Prices	Rate of Growth		Shares in Value added by the Agricultural sector		
		1960-70	1971-80	1959-61	1971	1980
Groundnuts	current	-0.9	0.5	65.0	56.9	42.5
Millet/sorghum	constant	3.8	4.6	15.5	21.5	23.1
Rice	constant	3.5	17.5	3.7	4.0	12.1
Vegetables	constant	2.7	5.5	6.4	7.4	8.3
Sugar	constant	-	-	-	-	3.2
Cotton	constant	infinite	16.2	-	1.2	3.2
Others	constant	<u>2.0</u>	<u>1.9</u>	<u>9.4</u>	<u>9.0</u>	<u>7.6</u>
Agricultural sector		<u>0.8</u>	<u>3.8</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Source: World Bank. Diversification, Tradition and Economic Development: Senegal, 1974. (Data collected in 1971)

Senegal has a large insufficiency of meat and other animal products. Meat and milk production for general consumption, however, is very low since the herds are kept mainly for subsistence purposes and as "wealth." Exports of hides and skins, live animals and meat accounted for less than 1% of the total value of exports in the past four years. Senegal also has a large shortage of milk products; imports amounted to about CFAF 2 billion in 1971.

Experts see prospects for livestock development in Senegal as remarkably good. The Fourth Year Plan calls for US\$20.7 million in investments (82.7% from foreign credits and 17.3% from Senegalese funds) for the livestock sector (see Fourth Year Plan).

Senegal has 360 miles of coastline as well as inland waterways that provide abundant fish resources. An estimated 250,000 tons of fish have been caught annually in Senegalese waters. Fishing accounts for about 5% of the GDP and 9% of exports. The industry employs more than 30,000 persons, including 2,000 in processing activities.

Fishing in the traditional sector (including river fishing) is in the hands of the Senegalese and constitutes 80% of the production. The industrial sector, mainly French-owned, covers trawling and shrimp and tuna fishing. The output of traditional fisheries is, for the most part, consumed locally (fresh or traditionally processed) while industrial production is mainly exported, canned or frozen.

Fishing is one of the most encouraging sectors in the Senegalese economy. Production rose from 100,000 to 250,000 tons in seven years, seen in the following table.

Table 22: FISHING INDUSTRY

	Total production (tons)	Industrial catch
1960	97,201	17,209
1965	100,943	13,605
1967	132,985	27,562
1969	162,149	36,165
1971	221,828	42,094
1972	248,113	51,379

Source: *Marchés Tropicaux et Méditerranées*, "Senegal 1960-1973: Fourteen Years of Economic and Social Development."

Exports of fish have been rising steadily since 1962, as the table on the following page indicates (in tons, values in million of CFA francs in parentheses).

About 85% of the fish caught by traditional fishermen is consumed fresh by the population along the coast, including Dakar, and a substantial portion of the groundnut basin. A good road network makes rapid distribution of fresh fish possible within 100 kilometers of the Atlantic Coast. The remainder of the catch is dry-salted, grilled, smoked, sun-dried and fermented. National consumption of fish is quite high for a tropical country.

Table 23: EXPORTS OF FISH

	(in tons)			
	1962	1970	1971	1972
Fresh fish	724	3,528	5,277	10,105
Shellfish	(50)	(166.4)	(326.8)	(763.4)
Mollusks	(49.2)	(325.1)	(320.2)	(831.5)
Canned fish/ Shellfish	3	15	31	115
Fish flour	(0.4)	(2.3)	(5.2)	(18.7)
	3,340	7,865	9,581	9,095
	(1,095.3)	(1,735.3)	(2,788)	(2,584.6)
	(0.3)	(110.5)	(137.4)	(152.8)
TOTAL	4,255	14,887	18,951	24,698
	(1,195.2)	(2,339.6)	(3,577.6)	(4,351)

Source: *Marchés Tropicaux et Méditerranéens*, "Senegal 1960-1973: Fourteen Years of Economic and Social Development."

Factors of Agricultural Production

Senegal is a small country of family-operated farms numbering about 300,000. Farmers hire some migrant workers in April to help with the harvest. Cooperatives are promoted by the Government and seem to be acceptable in the African culture where property is traditionally collectively owned by the tribe with the head man or chief assigning land to a family or group of families on the basis of their needs and ability to work the land.

Senegal only farms about one-third of the land which could (with improvements) be used for this purpose. The area being farmed in 1972 (25,000 km²) was 31.5% more than (19,000 km²) when the country achieved independence.

Human capital investment in the agricultural sector is a big constraint. Lack of education, poor nutritional history and poor health status all combine with other cultural factors to limit the productive capacity of the Senegalese agricultural worker. Similarly, mechanization is still deficient as compared with developed countries. Most farmers still use the traditional stick and hoe with the improvement of a blade that can be tilted at the angle best suited to the kind of soil being plowed. However, improvements in farm equipment have increased the efficient use of the land. In 1972, 7.5 times more agricultural equipment was in use than in 1960.

Use of mechanical equipment in agriculture is highly developed in Senegal compared with other West African countries. Most of the equipment uses animal power because of the cost and the difficult problem of maintaining mechanized equipment. Since the establishment of SISCOA, virtually all implements used in Senegal have been built by this company in the suburbs of Dakar.

The overall responsibility for agricultural development in Senegal rests with the Ministry of Rural Development (MRD), but semi-autonomous agencies operate in the fields of production, extension and marketing for specific crops or in specific geographic areas (see illustration 4). Three such agencies play critical roles in "Programme Agricole" (PA). They are:

- The National Development Bank of Senegal (BNDS) which provides seasonal and medium-term credit to farmers;
- The National Office of Cooperatives and Development Assistance (ONCAD) which has a monopoly on groundnut marketing and which is responsible for supplying equipment, seeds and fertilizers to farmers and general supervision of the cooperative movement; and,
- The Agricultural Development Agency (SODEVA) which provides basic extension services for farmers in the groundnut basin (see illustration).

Table 24: AGRICULTURAL EQUIPMENT

	1960	1972
Seeders	43,000	141,977
Hoes	4,500	140,346
Carts	1,800	51,045
Plows	1,000	16,051
Peanut harvesters		25,268
Ridger-rafters		162
Polycultivators		16
Miscellaneous tools		3,458
TOTAL	50,300	278,323

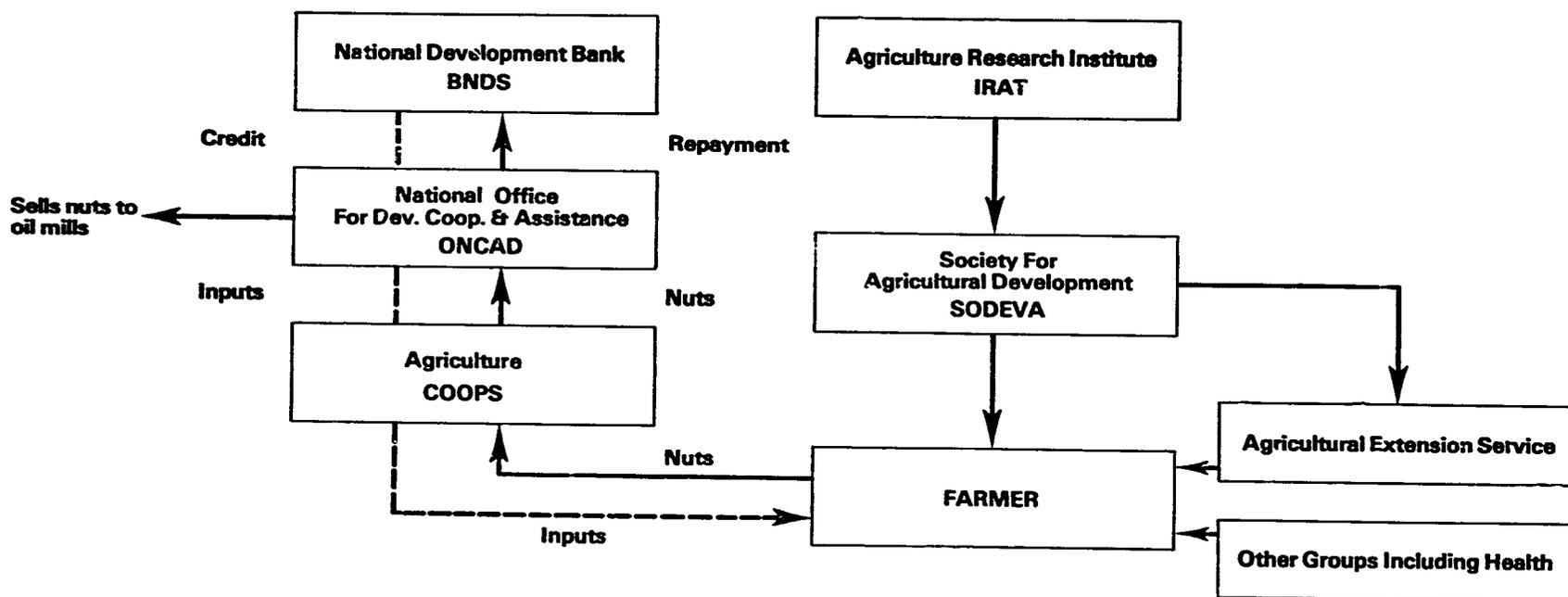
Source: *Marches Tropicaux et Mediterraneens*,
 "Senegal 1960-1973: Fourteen Years
 of Economic and Social Development."

The Government has committed itself in the Fourth Plan to increasing the groundnut and millet production especially in the higher rainfall areas of the groundnut basin. The Plan also promotes diversification of agricultural production such as rice, cotton and fruit in Casamance and southeast Senegal, and in areas with an irrigation potential such as along the Senegal River in the north.

Diversification programs have been underway only since 1969 but already results indicate a favorable future in particular for cotton and rice. These programs, however, extend to only about 5% of the farmers, most outside the groundnut basin. Within the basin, diversification possibilities are very limited due to the low and erratic rainfall. The Government is encouraging development and settlement in climatically suitable regions where more reliable production is possible.

Illustration 4

AGRICULTURAL DEVELOPMENT STRUCTURE — WESTERN SENEGAL



The soil of Senegal is generally poor in nitrogen, phosphates and phosphorus. As a result, the country requires more fertilizer per hectare to meet its production potential than any other country of tropical Africa. Senegal imports tons of fertilizer every year and plans to increase its own production through the *Societe Industrielle d'Engrais* (SIES). As early as 1960, 50,000 tons of fertilizer were used for groundnuts and 7,000 tons for millet. A new fertilizer plant was built in the 1960's at M'Bour near Dakar. The plant has diversified production to many kinds of fertilizer and hopefully will meet all of Senegal's domestic needs, leaving a small amount for export.

Fungicide consumption followed the same trend as fertilizers -- an irregular curve of ups and downs through the 1960's and 1970's. This was the case for a variety of reasons, mainly poor harvests, low prices for peanuts, reduced farm income, and transportation difficulties.

International Donor Assistance to Agriculture

Senegal Cereals Production and Agricultural Program

This program, to be undertaken with USAID financing, will permit the Senegalese agricultural extension agency (SODEVA) to carry out and expand an intensification program in the region of Thies and Diourbel, one of the most heavily populated farming areas of Senegal. With the Senegal Saloum region to the south, it forms the "groundnut basin" where the bulk of Senegal's groundnut and cereal crops are produced. Now in the implementation stage, the project is based on the country's "*Programme Agricole*" which has as its principal objective the increase in cereal and groundnut productivity (see Table 25). Use of better seed varieties, fertilizers, annual rotation, specially adapted farm implements, and more timely planting are some of the new techniques fostered through this program.

Several agricultural activities are financed from other external donors. IDA funds are available for farmer credit and training facilities and equipment. The Iranian financed audiovisual program will directly affect the Thies and Diourbel region projects, and the new CIAM, SODEVA's training center, is being financed from these sources. The National Research center at Bambey, operated under contract by IRAT, has large-scale French financing, while certain experiments for a new millet variety are financed by the European Development Fund (EDF).

The Catholic Relief Services provide financial assistance toward the development of a beekeeping center, poultry cooperatives and a nationwide garden project. They have assisted with the design and production of low-cost granaries and have contributed tools, seeds, agricultural equipment and fertilizers for village projects. By supplying funds for wells and pumps, they have cooperated in an experimental project to improve farming methods.

**Table 25: OBJECTIVES OF SODEVA PROGRAM FOR DEPARTMENTS
OF THIES - BAMBAY AND DIOURBEL**

(1974 - 1977)

	Year	Thies	Bambay	Diourbel	Total
Number of Intensified Farms	1974	93	150	80	323
	1975	190	250	140	580
	1976	400	500	280	1,180
	1977	850	720	400	1,970
Number of Farms Using Oxen Traction	1974	290	350	140	780
	1975	500	600	240	1,340
	1976	960	850	380	2,190
	1977	1,630	950	500	3,080
Number of Semi-Intensified Farms	1974	1,795	1,970	860	4,625
	1975	2,015	2,120	1,040	5,175
	1976	2,395	2,200	1,100	5,695
	1977	2,520	2,300	1,200	6,020
(GROUNDNUTS) Total Area Intensified in Hectares	1974	156	300	160	616
	1975	256	400	220	876
	1976	466	650	360	1,476
	1977	966	970	540	2,476
(MILLET) Total Area Intensified in Hectares	1974	78	150	80	308
	1975	282	250	140	672
	1976	592	750	420	1,762
	1977	1,152	970	540	2,662
(COWPEAS) Total Area Intensified in Hectares	1974	-	5	3	8
	1975	26	20	10	56
	1976	26	70	50	146
	1977	76	80	60	216
Number of Pairs of Oxen	1974	390	500	220	1,110
	1975	690	850	380	1,920
	1976	1,360	1,350	660	3,370
	1977	2,480	1,670	900	5,050

Source: Senegal Cereals Production and Agricultural Extension Program

CHAPTER FIVE
ENVIRONMENTAL HEALTH

The health environment for a majority of the population in Senegal is poor and consequently the incidence and prevalence of dysentery, gastroenteritis, trachoma, intestinal parasites and diarrhea are high. Few people have uncontaminated water supplies or systems for human waste disposal. The absence of such services promotes the transmission of these and other illnesses. The Government appears to have placed its investment priority in water resource development to improve the agricultural and commercial sectors and secondarily to extend water and sewerage services to the urban and rural populations. The Government recognizes the severe shortage in low-cost urban housing, another environmental problem; however, at this time no projects are underway.

Urban Housing

Housing for wealthy urban residents in the larger towns is usually in European-style houses or apartments in or near the town centers. Serving only a small elite segment of the total population, the limited areas of such housing are in most cases on planned streets and receive some services such as electricity, piped water, telephone service and garbage pickup. In central Dakar and the core areas of a few other towns, old sewerage systems still function.

Middle-income, suburban areas, such as the Medina area of Dakar, housing a variety of Senegalese and other ethnic groups, provide some services, for example electricity, that over the years have been extended from the well-to-do sections. A conglomeration of small houses and shops of more or less modern building materials are mixed with cruder shelters. Saint-Louis and Kaolack also have areas of this character.

Every large town has a number of marginal areas of uncontrolled growth where housing is generally inadequate. Most of these unplanned settlements sprang up between 1945 and 1973, a time of the heavy internal migration. These areas consist of shantytowns - collections of huts and improvised shelters crowded along narrow streets and dead-end lanes. Buildings might be crude huts made of reeds or millet stalks or old barracks in disrepair. Others were made of old packing cases or gasoline tins covered with roofing paper held in place by stones.

Most residents of urban centers are recent migrants from rural areas. Hoping to improve their lives, they move to towns and cities where they suffer from crowded conditions, contagious diseases and unemployment.

Water is carried by hand from public fountains. Few people have electricity. Lighting, if any, is provided by candles or kerosene lamps. Sewage and trash are commonly dumped along the streets and periodic flooding increases the already serious problems. Public sanitation measures are almost nonexistent. Residents place better streets at the head of a list of desired improvements. More medical care facilities in the settlements were also listed by residents among their

greatest needs.¹ The Government has made verbal commitments to reorient its housing policy in favor of lower income groups.

Rural Housing

The houses of the rural Wolof are arranged in family compounds along main paths through villages or grouped around an outdoor meeting place or well. Other structures comprising the village often include a mosque and small shops. As a village expands, new compounds are established along paths or streets designated in advance.

The family compound is often enclosed with a five-foot fence of reeds, millet stalks or thornbush. The living area of the hut is usually small and cramped; however, some of the larger structures, covering about 400 square feet, are divided into small rooms. Most houses are built of natural materials and packed earth floors and are abandoned upon deterioration, sometimes after only a few years.

Chiefs and well-to-do villagers often build more permanent structures with walls made of sun-dried bricks, stone or cement, and roofs of corrugated iron. Such houses are not always more comfortable than thatched-roof huts - a metal roof increases the temperature inside the house - but they are more durable and prestigious.

In the coastal areas most of the traditional-style huts are round and have walls made of rushes from local swampy areas. Other structures are built on the European model using imported factory-made materials.

Tradition for most rural dwellers allows the male head of the group of families composing the compound to have a house or room for himself and his older sons. If it is a polygynous household, each wife has quarters for herself and her small children. Members of the group who are married, unmarried young men, old women and servants have their own rooms or areas. Married sons and their wives have their own fenced-off areas within the larger compound.

Also within the compound might be a roof or shelter for horses, sheep, or goats. Harvested crops and food reserves are usually kept in clusters of storage huts at the edge of the village.

Toucouleur, Diola and other Senegalese groups build houses similar to the Wolof. Sites for the family compound appear to be selected by the head of the family, with no influence or planning by village leaders.

The Serer, located primarily in the lower river basins of the west-central areas, are somewhat isolated from other compounds by the fields being worked by the family. The Diola and the Manding of Casamance region also live in compounds built around a meeting ground and work area for members of several households that form an extended family. These villages are formless, often scattered over several hills.

¹ Area Handbook for Senegal, p. 114.

Water and Sewerage

It is estimated that by the end of the century, Senegal's demand for a reliable water supply will increase substantially. Drinking water needed for herds, observers estimate, will reach 110-120 million m³ per year. Agriculture in the long run will be the largest consumer. A hectare requires between 15-25,000 m³ per year of water, depending on the crop, and 35,000 m³ per year for market gardening. At least 700 million m³ of water will be required for this purpose alone by 2000.²

Fresh water can be reached at ten to fifty meters underground almost anywhere in Fatick, Kaolack, Fatick, Fatick and Fatick; however, large portions of Kaffrine and Gossas require deep drillings from 100-300 meters before the potable non-brackish water table is reached. This resource development is essential because the rainy season only lasts three months and the remainder of the year is practically dry.

Several branches of the Government have a hand in water procurement. The main agency is the *Service National de l'Eau Potable* which does not have the resources to respond to the variety of requests it receives simultaneously. Hence, political pressure is an important aspect in the ordering of priorities on which wells are drilled.

The government of Senegal has defined three goals of water resource development:

- Consolidate and hold as much water as possible by coordinating water development with neighboring countries.
- Take advantage of all underground sources by well digging wherever necessary.
- Eliminate water wastage.

Complementing all water development projects will be environmental protection legislation expected to be drafted soon by the Ministry of Industrial Development.

The development of a water supply network will depend heavily on international aid as domestic resources can only finance a modest portion of all these projects. Senegal's Fourth National Development Plan (1973-1977) includes a wide range of water projects with a variety of external donor assistance.

- The M'PASS Barrages (funded by ODA)
- The OWA-arrêté (funding uncertain)
- The BAWOLOU Project (funded by I.D. and UNDP)
- The BAWOLOU Project
- The Casamance Project.

¹ *Senegal 1969-1975: Fourteen Years of Economic and Social Development*.

² *Senegal 1969-1975: Fourteen Years of Economic and Social Development*.

Such development would have serious health implications by increasing possible breeding grounds for disease carriers such as the schistosome cercariae-bearing snails (schistosomiasis), mosquito breeding (malaria), and by widening the possibility of glossina and/or simuliidae breeding (trypanosomiasis and onchocerciasis).

In addition the concentration of a labor force working in these areas where poor or no health services exist can also increase the risk of tuberculosis, venereal disease and malnutrition. At present there is no indication that any health planning is being carried out as a prevention for epidemics or for general health delivery services in conjunction with these projects.

Urban Water Supply

Water resources are very limited and therefore a competition exists between urban, industrial and agricultural users that is bound to increase in the next few years.

All household water for Senegalese cities and towns in the River Basin area is pumped directly from the environment (lakes, rivers, *marigots*³) without being treated, with the exception of the Dakar supply, which comes from Lake Guiers and is favored with a modern treatment plant. The distance between the treatment plant and the consumption center, however, is 280 kilometers which allows the water to be repolluted by the time it reaches Dakar. The lack of a consistently safe source of potable water prompts the more affluent to buy bottled water at a cost roughly 100 times higher than ordinary drinking water.

The aqueduct that brings water to Dakar from Lake Guiers was inaugurated in 1971. Its maximum delivery capacity is estimated at 100,000 cubic meters per day to be reached in 1985. The present capacity of the water treatment plant is 65,000 cubic meters; however, it only delivers 35,000 cubic meters per day. It is estimated that the needs of the city of Dakar will be 350,000 cubic meters per day in the year 2000. Since the Guiers-based system can at maximum use only provide 100,000 cubic meters, an important deficit will have to be filled.

The town of Saint-Louis uses 3,600 cubic meters per day. Its sources are *marigots* surrounding the community which fill with fresh water during floods. The cities of Dagana, Podor, Matam, and others get their supply from the untreated waters of the Senegal River.

There could be severe water shortage problems if there is no further establishment or extension of water systems in some reasonable proportion to the rapid growth rate of Senegal's cities. For example, the Cap Vert urban area in the 1959-60 census showed a population of approximately 380,000. At present some 600,000 people live in this area and it is expected to have a population of 2,500,000 by the year 2000. On the basis of present consumption schedules humans alone in Cap Vert will need 130-140 million cubic meters per year by 1995 as compared with 35 million cubic meters at present.

The same situation prevails in Thies, whose population is expected to quadruple as well as Kaolack, Ziguinchor, Saint-Louis, and Tambacounda, all of whose populations are expected to multiply by five or ten times within the same period. This problem will affect secondary cities also which in fifteen to twenty years time will have a population of 100,000 (Diourbel, M'Bour) or 50,000 (Bignona, Kolda, Louga).

³ *Marigots* are depressions in the earth's surface where water collects.

Thus, in twenty years Senegal's urban water requirements will not be 60 million cubic meters as today, but 250-260 million cubic meters per year.

The average consumption of 76 lcd⁴ as the table below indicates is low compared to consumption in more developed countries: in the 1950's consumption in European countries ranged from 150 lcd (Poland) to 520 lcd (Norway).

Table 26: WATER CONSUMPTION IN SENEGAL - 1968

	All water systems m ³ /day	Liters per capita per day
Water Sales		
Domestic - house connections	20,800	73
Domestic - public taps	13,330	15
Domestic - TOTAL	34,100	88
Government & Industry	34,400	29
Total Sales	68,500	58
Unaccounted for & losses	21,500	18
Average consumption	96,000	76
Required peak production capacity	113,000	96
Installed capacity	115,000	97

Source: IBRD Current Economic Situation and Prospects for Senegal: Water Supply and Sewerage, 1970.

However, the situation is comparable to African countries with similar systems, such as Cameroon (62 lcd). The low level is mainly due to the fact that 75% of the urban population has to fetch its water at public taps and that even in houses supplied with water, lack of modern sanitary facilities prevents higher consumption. In Dakar, where average incomes are much higher than in smaller towns, the level of consumption is much higher: per capita consumption for all users is equivalent to 106 lcd of which domestic consumption represents 42% (54 lcd). In many countries studies have indicated that the major health benefits of urban water supplies accrue with high utilization. Only when water is used extensively for personal and household hygiene are major reductions in gastrointestinal and parasitic diseases achieved. Thus increased availability and accessibility of water are an important element of an urban public health program.

⁴ liters per capita per day

Estimates of urban water consumption for 1980 are shown below:⁵ (in 1,000 m³/day)

	<u>Lower estimate</u>	<u>Higher estimate</u>
Domestic	61	112
Government & Industry	70	86

Rural Water Supply

Shallow wells are frequently the source of water for villages. All these waters are heavily polluted by direct contamination with excreta and dejecta and by underground leaching from surface water returning to the rivers.

A program of well-drilling is now in progress. In 1972 each well was estimated to cost about US\$130 per year. Plans are to charge the consumers in villages of more than 3,000 inhabitants. Well-drilling is expensive and Senegal has sought financial assistance from USAID, FED, FAC (French Aid and Cooperation Fund), West Germany, Iran and Canada (see Environmental Aid Projects).

Following the drilling of several wells in the Ferlo area, a metabolic problem among cattle was discovered in the Peul herds. This condition was a disruption of the phosphocalcic balance in the animal which was soon followed by toxemia that could be traced to *clostridium botul*. The disease is fatal in a high percentage of cases.

The correlation of the disease with the beginning of hydraulic works was soon noted and has since been observed under similar circumstances in Australia and South Africa. The hazard it presents should be kept in mind for future well-drilling projects.

Sewerage

Only Dakar and Saint-Louis have even limited sewerage systems; nevertheless in these two cities large areas are not served, and open storm water drains are used to dump garbage and waste waters. In Dakar only two-thirds of the houses which have private water connections are also joined to the sewerage system. This is an unhealthy situation which encourages rodents and odors and increases costs of maintenance and cleaning of the drainage system.

The drainage system is not designed to handle the yearly floods, and large areas of these cities are periodically flooded by contaminated waters. In Dakar about twenty zones covering 100 hectares are regularly flooded, and as most of this area covers a network of roads, traffic is severely disrupted during these periods.

In the vicinity of sewer outfalls the sea water along the Dakar beaches has a very bad bacteriological quality.⁶ Most polluted are the Soumbédioune Bay (where construction of hotels is

⁵ Water Supply and Sewerage, Vol. VI, IBRD, June 1970.

⁶ Current Economic Situation and Prospects of Senegal Water Supply and Sewerage, IBRD, 1970.

considered) and Hann Bay. Sewerage disposals on Dakar's west coast average about 30,000 cubic meters per day, with a pollution equivalent to that of a population of about 250,000 inhabitants and pollute the west coast of Cap Vert to a distance of one kilometer. This situation will have to be corrected in light of Senegal's wish to develop this area for its tourist industry. Studies of currents undertaken in conjunction with the UNDP/WHO sewerage project will provide the information required for an optimal design and location of sewer outfalls.⁷

The Senegal River Basin

The irregular flow of the Senegal River contributes to the largest waste of a usable water supply in the country. In an effort to regularize the vagaries of the river, two dams are being constructed where neighboring countries can benefit as well. The Senegal River touches, crosses or borders on Guinea, Mali and Mauritania. Therefore, the problems of water regulation are being considered and settled within the framework of an intergovernmental organization. The *Organisation pour la Mise en Valeur du Fleuve Senegal (OMVS)* was established on March 11, 1972, and included Senegal, Mali, and Mauritania. Endowed with technical, economic, administrative and financial resources, OMVS's main goal is to consolidate the results of the mutual investments for the projects under way:

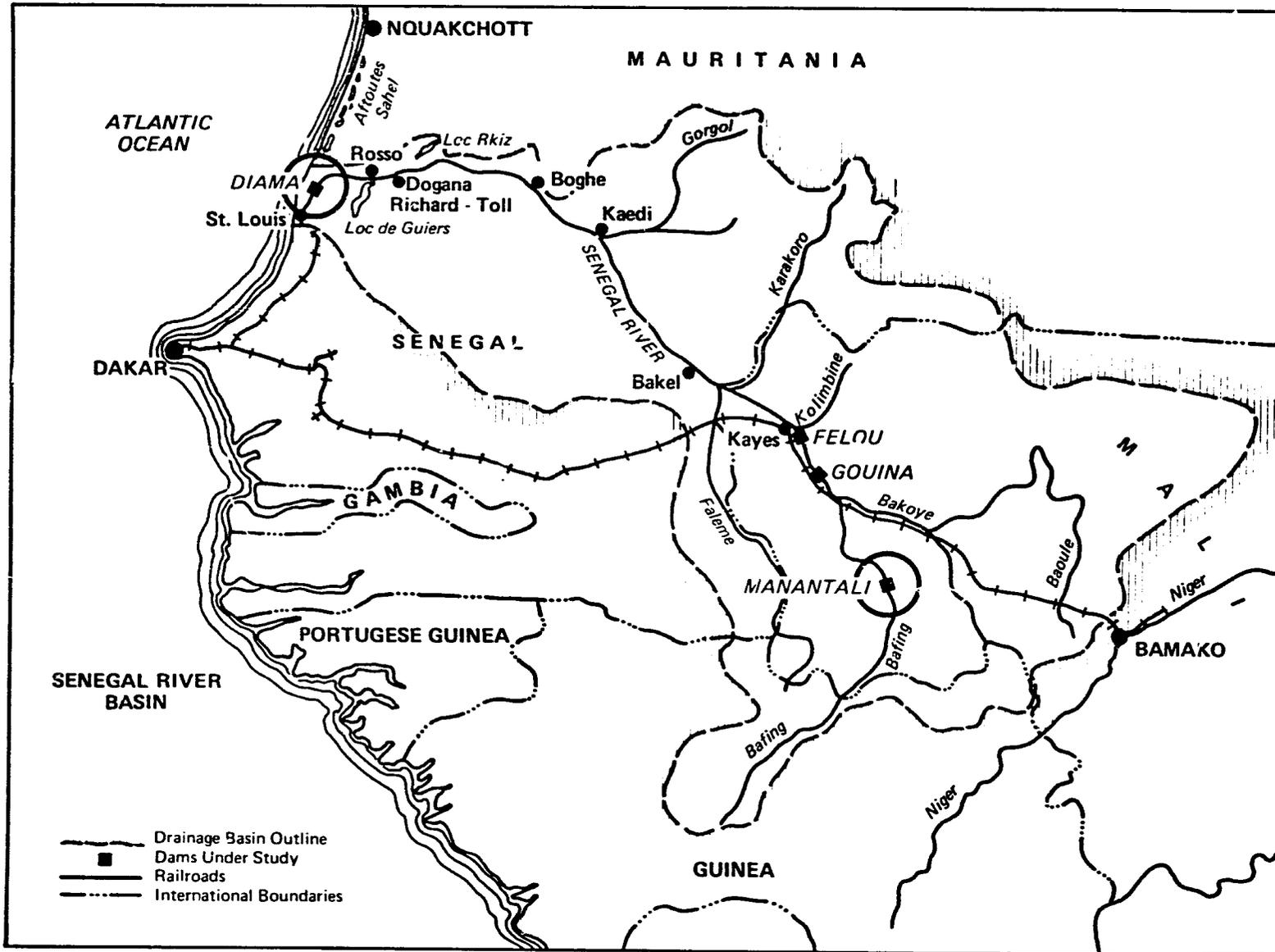
- the Manantali and Diama Dams
- navigability on the Senegal River
- port markings and installations
- agronomic research
- improving stockbreeding techniques.

The Manantali Dam, which is to be constructed on the Baffing River, a principal tributary of the Senegal River, has been considered as a project for a long time. At a conference of the chiefs of state of the OERS held in Bamako in January 1971 (see illustration), the goals of the Manantali Dam project were set as follows:

- retain 10 billion cubic meters of water;
- regularize the river's flow at an average of 300 cubic meters/second at Bakel;
- create each year an artificial flood sufficiently great to maintain non-flood crops;
- maintain a hydroelectric power station with an installed capacity of 144 million watts capable of producing 842 million kwh per year;
- expand irrigated agriculture; and,
- increase the river's freight-carrying capacity.

⁷ The UNDP with contributions from the Senegalese Government financed the study and establishment of a master plan for water supply and sewerage in Dakar and surrounding areas. The plan was approved in 1966 and was to be completed in January 1974.

Illustration 6
MANANTALI AND DIAMA DAMS



It was not until the meeting of OMVS held in Dakar on July 2, 1972, that the complementarity of the Manantali and Diama Dams was discussed and a site for the second dam determined. Constructed in the Senegal River Delta, the smaller structure would prevent salt water intrusion into lower Senegal River reaches and provide fresh water for municipal and industrial water supply and irrigation systems. The dam will also accommodate year-round navigation and will create a fresh water pool extending 400 kilometers upstream.

Other Senegal River Basin projects will include an irrigated perimeter program to increase the yield of agricultural crops. Four hundred thousand hectares of irrigated perimeters will provide sufficient water to allow double and triple cropping within its boundaries.

A river navigation system is also being developed to include a deepwater port at Saint-Louis, a new entry channel, navigation locks at the Diama Dam, river and channel improvements for over 900 kilometers, and establishment of intermediate ports.

The FAC is financing engineering studies for the Diama Dam and several other donors including the World Bank have indicated they would be prepared to finance its construction. An irrigation development at Debi-Lampsar, involving 5,000 hectares for double-cropping is also the subject of the studies. If developed, this project will also be served principally by the Diama Dam.

The Government has also decided to engage the services of a U.S. consulting firm to do health impact studies. Experts estimate that irrigation would produce by 1982. 15,000 tons of paddy rice, 13,000 tons of wheat, 30,000 tons of tomatoes, and 7,000 tons of onions, thereby reducing grain imports. It is believed that the development at Debi-Lampsar would raise the income of approximately 2,000 families now living at a subsistence level.

The plans for the Manantali Dam were completed in 1975 by the People's Republic of China and were approved by OMVS. Financing for the construction is still uncertain.

The OMVS accepted assistance from USAID to conduct a comprehensive environmental assessment program which could be incorporated in the planning and design stages of the River Basin development. The study emphasizes the fact that the whole system of biological and social equilibrium will be upset by these projects and a determination of the positive and negative consequences is essential. The AID analysis defines ten geographical, social and economic areas that may be affected.

Several social and cultural changes are anticipated as a result of the Basin development. Changes in the total population in the surrounding areas are likely to occur either because of people entering or leaving the work areas. The project completion may eventually stabilize these populations. Expected increases in the work force could present situations of ill-health, stress and unrest. A certain amount of cultural and economic disruption for the inhabitants is expected to take place as the ethnic composition of the area changes, and until the inevitable lag in crop and livestock production has passed.

Public Health Impact

The Senegal River Basin is the site of serious endemic and epidemic diseases at risk of being extended and intensified as a result of the environmental changes produced by such development projects. Dr. Jacques May, consultant for USAID, completed a health impact statement for the environmental assessment of the Senegal River Basin on April 12, 1975, from which the following information is taken. He emphasizes that these diseases may create significant public health dangers unless preventive control and/or eradication measures are undertaken.

Schistosomiasis - Schistosomiasis now affects approximately 10% of the population in the Senegal delta area and about 40% along the Mali border. A dam across the river at Diama will provide increased opportunity for snail expansion upstream of the dam because the level of salinity will be reduced; however, snail populations should decrease downstream. Normally during the annual floods, the amount of fresh water increases, resulting in a redistribution and intensification of the prevalence of intermediate hosts. An increased number of disease carriers with an influx of new population could create a serious public health problem.

Malaria - There appears to be little doubt that the creation of new fresh water sources and the construction of irrigation canals will extend favorable conditions for mosquito breeding, potentially making the area hyperendemic (parasitic index above 50% at all times), rather than mesoendemic (parasitic index between 10-50%).

Trypanosomiasis - The human form does not now present a serious problem in the lower and middle Senegal River Valley, but the disease has been reported among a large variety of animals which presents a potential threat to man.

Onchocerciasis - This disease is not important now in the delta of the Senegal River, but should the water conditions change, favorable circumstances for the breeding of *S. damnosum* could be created. Foci of the disease do exist elsewhere: along the Upper Gambia on the Baffing, on the Faleme, and on the Senegal River upstream from Bakel. Thus, onchocerciasis would be a threat.

Cholera - This disease may or may not occur depending upon the introduction of the vibrio at certain times of the year, especially during or immediately after the rainy season. If the disease occurs, emergency measures must be in readiness to circumscribe its area.

Yellow Fever - There is no indication that an immediate risk exists in the delta but a focus of yellow fever virus-carrying primates has been identified in the forested area of Kedougou on the Upper Gambia River. It is possible that there are infected primates in the Manantali region.

If there are virus-carrying primates in the area where the Manantali Dam is to be constructed, a number of consequences may result:

- yellow fever or other arboviruses may be transmitted from the monkeys to the labor force via mosquitos;
- when the labor force returns to villages or towns, yellow fever may be transmitted to their families and neighbors through the urban cycle of the disease;
- as trees are felled and the primate habitat around the river is altered, infected monkeys could migrate elsewhere, thus expanding the foci of virus-carrying primates.

Dracuntiasis (Guinea Worm) - Dracuntiasis is caused by the presence of a female worm in the subcutaneous tissues of man. The eggs fall in the water or step wells or ponds. The water is then drunk by man, whose gastric juices liberate the eggs.

If the increased water supply provided by the regulation of the Senegal River results in expanded use of step wells to store drinking water, the development project dams could lead to an increase in the incidence and prevalence of guinea worm. If, on the other hand, the OMVS project results in the development of alternative means of supplying drinking water directly to

the population, such as fountains or other piped methods, there could be a reduction of the disease.

Zoonotic Diseases - The problems created by the environmental changes resulting from the OMVS project will include, to a significant extent, those of animal diseases. The patterns of these diseases can change because:

- modifications in the ecology of vectors and hosts will be produced;
- the way of life of the animals will be changed; e.g. the diet offered by the new environment may be beneficial or detrimental, forage resources could be improved or made worse under programs. The quality of water from deep-drilled wells is known to be bad, creating metabolic deficiencies with which serious infections have been found to be associated. This situation could be improved by food supplements and/or vaccinations;
- new physical and/or cultural circumstances will impose a new itinerary on the herdsmen and their animals in quest for water and pastures. This could be beneficial if the new routes are shorter, making less demands on energy and diet, or detrimental if the trek from waterhole to waterhole is lengthened.

Other Health Related Factors

Other related factors that may affect public health in the Senegal River Basin are as follows:

- the use of fertilizers, pesticides and other agricultural chemicals affects the quality of water by collecting in depressions used as watering holes for domestic and livestock purposes;
- the controlled river flow will attract all types of animal life including pests and predators;
- modern irrigation techniques will produce higher crop yields and result in more prosperous settlements;
- municipal water supplies of towns dependent on the river may be more plentiful but deterioration of quality due to pollution and salinity may require more treatment facilities;
- new industrial and agricultural processing plants (canneries, rice mills, tomato paste plants, dairies, *abbatoirs*) are anticipated as a result of expanded agriculture;
- closing or changing of traditional migration routes across the river may occur by maintaining high water levels and constructing dikes or other livestock barriers;
- the migration of people into the delta region and the irrigated perimeter may create new urban areas and resultant infrastructure;
- certain groups dependent upon fishing will be affected by changing income due to changes in fish species and abundance. Relocation or development of new income sources may be required.

International Donor Assistance

A study for the establishment of a master plan for water supply and sewerage for Dakar and surrounding areas was undertaken by UNDP and the Senegalese Government in 1966. The study was completed in 1974 and financing of the actual project will be carried out by the African Development Bank and the Senegalese Government. The project will be implemented through the Ministry of Rural Development and Hydraulics and through the Ministry of Public Works, with little or no coordination or consultation by the Ministry of Health. The project is presently in the bidding stages for ADB.

The World Bank is expected to be the major financial source for the development of water and sewerage systems in the surrounding areas of Dakar: Thies, Saint-Louis, Diourbel, Kaolack, Tambacounda, Ziguinchor, Rufisque and Louga. Several external donors are engaged in well-drilling with the Government; however, effective coordination has been lacking.

Peace Corps volunteers teach villagers how to improve traditional agricultural techniques and can construct wells for \$2,500 each where water is found no deeper than thirty meters.

UNICEF, in conjunction with the World Bank, has several well-drilling teams making deep borewells. However, this is a slow and expensive process, sometimes taking six months per well.

The Catholic Relief Service has undertaken a comprehensive well-digging program all over Sine-Saloum.

CHAPTER SIX

HEALTH INFRASTRUCTURE, FACILITIES AND SERVICES

Most health services and facilities in Senegal are operated and financed under the auspices of the National Government. Private health clinics play only a minor role in health care throughout the country. The nation's three largest and best hospitals in the capital provide the highest ratio of hospital beds to population of any region in the country, far above the national average of one bed per 1,000 population. Nationally, there are approximately thirty-six hospitalizations for every 1,000 population. The *maternite* is the primary facility providing prenatal and postnatal care. It is estimated that 35% of all births are attended in Government facilities.

Administrative and Health Infrastructures

Since 1959 the Government health services have been directed by the Minister of Public Health and Social Affairs (MISA). The Minister's departmental staff (to which are attached the Service for General Administration and Equipment and the Central Pharmacy Service) comprise a Directorate of Public Health and a Directorate of Social Affairs. In addition, the Ministry cooperates closely with the Service for Combatting Major Epidemic Diseases (*Service de Lutte Contre les Grandes Endemies - SGE*), the Pasteur Institute in Dakar, and the Service for Protection of Mother and Child (see organizational chart).

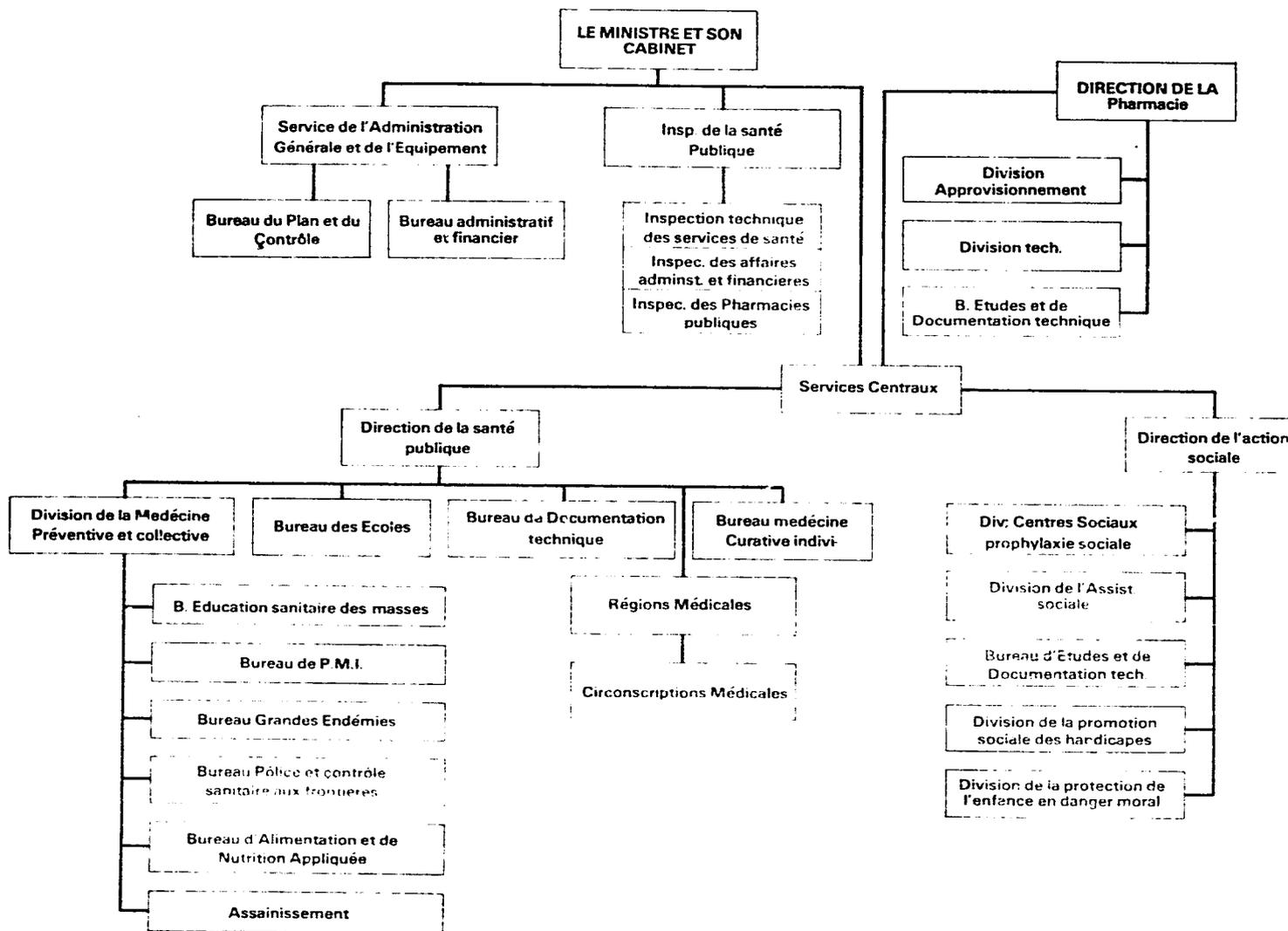
Liaison exists between the MISA and the Ministry of National Education regarding public health services in schools, the Ministry of Rural Economy (MRE) concerning veterinary medicine, and the Ministry of Armed Forces during periods of disaster or other emergencies. The MISA also works with international and foreign agencies (such as WHO, UNICEF, FAO, AID and French organizations), executes international agreements, and participates in international health conferences.

The Directorate of Public Health Services is the agency charged with regional medical services and with some activities of the Central Government. The duties of the Directorate in the field of medical care include the surveillance and coordination of all health agencies, whether public or private, and the operation of services providing free medical care. The organization and control of public hygiene is another of their responsibilities which includes prophylaxis of communicable diseases, maternal and child health and health education. The Directorate is also mandated to enforce national and international environmental health regulations and the organization of sanitary control at the frontiers and among private practitioners of medicine. Demographic studies, statistics and epidemiological reports are generated from this office.

The Directorate of Public Health comprises: a bureau of curative medicine as applied to the individual; a division of preventive and group medicine; a bureau for technical documentation; and, a bureau for training schools for medical and social welfare personnel.

The Fourth Four Year Plan has explicitly made a commitment to improving and expanding rural health services on a priority basis; however, implementation has been slow for lack of funds and an uncertain plan of action. Part of the difficulty has been attributed by observers to inade-

Illustration 7
**ORGANIZATION CHART OF THE MINISTRY OF PUBLIC HEALTH AND
 SOCIAL AFFAIRS (1975)**



quate leadership on the part of the Minister of Health and to an administrative structure weak in health planning capability. A new Minister, appointed in April 1975, is a physician. There is some indication that he is attuned to the importance of preventive medicine at the grassroots level. He has also recognized the administrative weaknesses of his Ministry and recently announced a reorganization which has not yet taken effect. The change under discussion proposes to strengthen the Ministry's planning skills by seeking technical assistance. The Government initiated an Administrative Reform which gives rural communities control over their own revenues and places at their disposal cadres of technicals (Rural Expansion Centers) to assist them in organizing community development projects. While this reform is effectively an administrative one, it has important implications for the organization of the health infrastructure.

Each *arrondissement* now encompasses a number of rural communities based on population distribution. These rural communities, which group several villages within a maximum radius of ten kilometers, offer an institutional framework for extending the health system to the village level. Each rural community, governed by a rural council, will decide what local development projects shall be undertaken with the proceeds of rural taxes, a tax on animals, and the community's share of the National Solidarity Fund.

The upper echelons of the administrative hierarchy operate under a similar structure of consultation and participation according to the same principles of election and representation: the *arrondissement* council under the *sous-prefet*; the department council under the *prefet*; and, the regional council under the governor. Projects proposed by the rural councils must be approved by these divisions.

The deconcentration measures have the effect of reinforcing the responsibilities and powers of the regional governors, the departmental *prefets* and above all, the *arrondissement sous-prefets*. In each *arrondissement* the *sous-prefet* has under his jurisdiction a center for rural expansion which under the direction of an Inspector of Rural Expansion, gathers technicians to aid the process of development. The departmental *prefets* have at their disposal the resources of a team of *formateurs* (trainers) from Promotion Humaine whose essential task is to sensitize, assist and train rural counselors. The Director of Promotion Humaine has expressed an interest in expanding the training capability of these *formateurs* to include health education, and to persuade the rural counselors of the importance of public health and preventive medicine.

The Administrative Reform Law has been implemented so far in the regions of Thies and Sine-Saloum. In 1976 it will be initiated in the region of Diourbel and every two years thereafter it will be applied to another region.

Sine-Saloum was chosen as one of the first regions for this project because its population represents 20% of the national total. Since the application of the Administrative Reform, rural counselors have manifested an interest in improving social, sanitary and cultural conditions in their villages. The first initiatives have been the creation of rural maternities, first-aid posts, school canteens and gardens. It was also chosen because UNICEF has already begun a program of assistance to the rural communities there, including the creation of village pharmacies and rural maternities. Moreover, the fourth plan earmarked Sine-Saloum as the first region in which an attempt should be made to rehabilitate and expand the health infrastructure. USAID has also selected this site for a proposed project which would create a network of village health posts and a cadre of village health workers to strengthen the backstopping system of secondary health posts supported by the Government of Senegal in the region. With present coverage approximately 15%, the Government hopes to reach 100% coverage with secondary health posts by the end of 1978. (See Rural Health Services Development Project).

Health Facilities

The efficient operation of the health facilities in Senegal is seriously constrained by an infrastructure that only extends as far as the secondary health post. The majority of the rural areas are without the benefit of basic health services on a regular basis. Trained personnel are inadequate in number at all levels with weak supervision throughout the health delivery system. There is an increasing tendency to refer even simple cases to Dakar, thus overburdening the hospitals in the capital. The level of cleanliness and efficiency at hospitals, health centers, health posts and maternities is below an acceptable level. The supplies of essential drugs are inadequate and there is a lack of means to preserve them in the field.

Senegal is divided into seven health service regions (Cap Vert, Casamance, Diourbel, Fleuve, Senegal Oriental, Sine-Saloum and Thies). Under the Directorate, the Aristide Le Dantec and Fann hospital centers in Dakar, serving all types of patients, form the nuclei of the hospital systems in the country. These hospitals have a combined capacity of about 1,500 beds. A third hospital in Dakar caters to a higher social class and accepts only paying patients. The Thiaroye neuropsychiatric unit and hospital have almost 100 beds; Casamance, Diourbel, Sine-Saloum, Kaolack, Ziguinchor and Thies have smaller regional hospitals, totalling approximately 3,000 beds. Operating at various degrees of usefulness and adequacy, these regional hospitals are linked through the Directorate to the two nuclei hospital centers in Dakar (see Table 27 and 28). There are also a number of clinics and dispensaries in Dakar. The distribution of these private facilities appears in Table 29.

The nation's three largest and best hospitals in the capital provide a ratio of hospital beds to population in the Cap Vert area of approximately one per 300 people, far above the national average. In large but sparsely settled areas in the eastern half of the country, ratios are as poor as one per 2,000 population. The Government's goal for the 1970's is to provide at least one hospital bed for each 1,000 people in all parts of the country.

Current statistics on admissions and utilization in all health facilities including hospitals, for 1974, appear as follows:

Table 27: UTILIZATION OF HEALTH FACILITIES - 1974

<u>Region</u>	<u>Beds*</u>	<u>No. hos- pitalized</u>	<u>Length of stay</u>	<u>Consulting Physicians</u>	<u>Consul- tations</u>
Cap Vert	2,914	67,441	754,906	840,463	1,863,060
Casamance	478	15,408	99,537	647,829	1,601,824
Diourbel	433	12,025	83,410	433,068	1,057,873
Fleuve	743	11,017	109,568	510,963	1,082,713
Senegal-Oriental	124	2,910	13,556	106,001	334,400
Sine-Saloum	602	24,313	112,238	638,145	1,785,127
Thies	428	16,448	93,134	384,209	1,150,514
T O T A L	<u>5,722</u>	<u>149,562</u>	<u>1,266,349</u>	<u>3,560,678</u>	<u>8,875,511</u>

* Calculation for beds includes hospitals, health centers and maternities.

Source: Government of Senegal 1974.

Table 28: HOSPITAL SERVICES

Services	Beds	No. of Patients	No. of Visits
SURGERY:			
A. Le Dantec	723	19,240	70,329
Principal	210	5,317	60,262
Centre Hosp. Fann	40	204	4,536
Saint – Louis	194	1,351	25,334
Diourbel	51	594	12,471
Kaolack	81	1,398	19,738
Thies	25	573	6,823
Ziguinchor	70	1,675	31,154
TOTAL	1,394	30,352	230,647
PEDIATRICS:			
A. Le Dantec	149	3,848	50,332
Principal	104	1,966	33,043
Saint – Louis	84	1,202	10,000
Diourbel	15	93	1,070
Kaolack	71	3,697	16,812
Thies	25	660	4,198
Ziguinchor	24	337	2,164
TOTAL	472	11,803	117,619
INFECTIOUS DISEASES:			
Centre Hosp. Fann	134	3,275	35,210
Saint – Louis	37	829	10,894
Diourbel	36	533	9,541
Kaolack	94	2,663	9,911
TOTAL	301	7,300	65,556
PSYCHIATRY:			
Centre Hosp. Fann	166	694	19,574
Thiaroye	214	641	40,975
Saint – Louis	80	280	21,674
TOTAL	470	1,615	82,223
HISTOLOGY:			
Centre Hosp. Fann	134	497	14,650
Diourbel	8	33	820
Thies	27	129	8,985
Saint – Louis	19	84	7,560
Ziguinchor	24	81	2,592
TOTAL	212	824	34,607
NEUROLOGY:			
Centre Hosp. Fann	67	661	10,473
OPHTHAMOLOGY:			
A. Le Dantec	36	864	5,022
Principal	22	497	8,496
TOTAL	58	1,361	13,518
EYE, EAR, NOSE AND THROAT:			
A. Le Dantec	49	1,176	10,042
Principal	49	754	1,860
TOTAL	98	1,930	11,902
TOTAL GENERAL	3,072	55,846	566,545

Source: Government of Senegal

Table 29: PRIVATE DISPENSARIES AS OF DECEMBER 1974

Regions	Private Dispensaries
Cap Vert	21
Casamance	17
Diourbel	3
Fleuve	4
Senegal-Oriental	2
Sine-Saloum	16
Thies	20
TOTAL	83

Source: Government of Senegal, *Statistiques Sanitaires*, December 1974.

Attached to each hospital and health center there is supposed to be a maternal and child health center (PMI: *Protection Maternelle et Infantile*). In 1974 official statistics showed sixty PMI totalling 1,501 beds, distributed among the seven regions (see Table 31); under the Fourth Plan, three new PMI are proposed for construction. Approximately 35% of births are attended to in *maternities* (see Table 30).

Table 30: BIRTHS, PER REGION - 1974

Regions	At mater- nities	At home*	Total births
Cap Vert	31,209	1,343	32,552
Casamance	6,785	1,605	8,390
Diourbel	6,378	1,195	7,573
Fleuve	5,144	1,075	6,219
Senegal-Oriental	1,491	368	1,859
Sine-Saloum	8,895	2,418	11,313
TOTAL	67,790	9,164	76,954

* Deliveries in the home are attended by midwives in the urban areas and in other areas by *Matrones*.

It is reported that near 20% of pregnant women and 18% of children in urban and suburban areas are covered by PMI's.

Source: Government of Senegal, *Statistiques Sanitaires*, 1974.

The role of the PMI, manned usually by one male nurse or technician, is to provide consultation in prenatal and postnatal care, including nutrition and personal hygiene, and to make referrals where necessary. Children are expected to be weighed and the results recorded on a health card; however, the significance of the growth curve is not usually explained to the mother, nor is it always understood by the staff.

At the demonstration centers at Fatick, Pikine and Khombole, a greater effort is being made to explain to mothers the meaning of growth curves and it has been found that this increased effort brings about a real interest in the child's progress. Programs have also been organized to teach mothers to prepare protein-rich porridges from local resources, thereby insuring better health and nutrition for infants and children.

The regions are divided into a total of twenty-seven departments, each with a *circonscription medicale (CM)*, also referred to as a primary health center. Some departments have more than one CM, hence there are thirty-three throughout the country (see Table 31). In theory, each health center includes a clinic or small hospital, a primary maternal and child health center, a maternity ward and a dispensary; but, few are ideally structured.

Theoretically, each center is headed by a chief physician; in fact, at least one is known to be headed by a state nurse. More often than not, the center's professional staff comprises the district medical officer and one assistant, who may be the only physician in the district, and a few midwives and nurses or nurses' aides. The *circonscriptions medicales* are reportedly in varying states of deterioration, with the exception of one or two pilot demonstration centers.

An observer of the Fatick demonstration health center describes the facility in the following manner:

The hospital buildings are built on one floor, often with the arrangement of a "railroad flat." The Emergency Room was reminiscent of American emergency services in the relentless waiting of patients, despite a triage system. Mothers are kept five to six days after delivery and there are three to four deliveries a day. We saw the antepartum room and a children's ward with examples of nephrosis, tetanus, protein depletion syndrome and severe lacerations. Tetanus neonatorum is common. Improving midwives' training on the village level will help. The adult male and female wards plus the reported services total 45 beds. No major surgery occurs here - only minor surgery, dressing changes and burn treatment. For major surgery the patients are dispatched 40 kilometers away to Kaolack.

Departments are divided into *arrondissements* (administrative districts) where rural dispensaries or secondary health posts are located. There are eighty-five such divisions with a total of 428 secondary health posts in 1974 (see Tables 32 and 33). Each health post is designed to cover approximately 10,000 people. However, it has been estimated that the entire health post network reaches approximately 20% of the population. Ideally, the secondary health post is staffed by a state nurse, a sanitarian, an orderly and a midwife (often traditional *matrone*). The staff weighs infants, provides advice on diet, hygiene and sanitation, distributes antimalarial drugs and provides simple first-aid. Those requiring more serious medical attention are

**Table 31: COVERAGE BY HOSPITALS, HEALTH CENTERS, MATERNITIES,
HEALTH POSTS, PMI'S AND ENDEMIC SECTORS - 1974**

<u>Region</u>	<u>Hospitals</u>		<u>Health Centers</u>		<u>Maternities</u>		<u>Health Posts</u>	<u>PMI's</u>	<u>Endemic Sectors</u>
	<u>No.</u>	<u>Beds</u>	<u>No.</u>	<u>Beds</u>	<u>No.</u>	<u>Beds</u>			
Cap Vert	4	2,207	1	94	17	613	62	24	1
Casamance	1	70	6	249	8	159	86	7	2
Diourbel	1	176	6	102	9	155	44	6	1
Fleuve	1	548	4	61	6	134	65	6	1
Senegal-Oriental	-	--	3	95	3	29	30	3	1
Sine-Saloum	1	250	8	114	10	238	83	10	-
Thies	<u>1</u>	<u>116</u>	<u>5</u>	<u>139</u>	<u>7</u>	<u>173</u>	<u>57</u>	<u>10</u>	<u>1</u>
TOTAL	9	3,367	33	854	60	1,501	428	66	7

Source: Government of Senegal 1974.

referred to the nearest CM. Some dispensaries have secondary PMI's attached to them. In 1972 there were seventeen primary PMI's and twenty-three secondary PMI's in Senegal, none actually located in the rural areas.¹

Like the *circonscriptions médicales*, the dispensaries are in varying states of disrepair. The limited capabilities of the subcenters and other local units and even of some of the district centers are further reduced by transportation difficulties. In many instances poor roads, sometimes interrupted by heavy rains and long distances, make it impossible to move a critically ill or injured patient to a hospital or to call in a physician to treat him at the medical center.

Table 32: HEALTH POSTS OR DISPENSARIES AS OF DECEMBER 31, 1974

<u>Region</u>	<u>Administrative Dispensaries</u>	<u>Municipal Dispensaries</u>	<u>Private Dispensaries</u>	<u>Closed for lack of per- sonnel or materiel</u>	<u>Operating as of 12/31/74</u>
Cap Vert	18	23	21	--	62
Casamance	68	2	17	1	86
Diourbel	39	2	3	--	44
Fleuve	56	5	4	--	65
Senegal-Oriental	27	1	2	--	30
Sine-Saloum	61	6	16	--	83
Thies	<u>33</u>	<u>4</u>	<u>20</u>	<u>3</u>	<u>54</u>
T O T A L	302	43	83	4	424

Source: Government of Senegal 1974.

¹ Among the health statistics tables issued by the Government of Senegal for 1974, there are several discrepancies in the number of *maternités* and PMI's registered. This may be a function of no standard definitions for these types of facilities or it could be real counting errors.

Table 33: RATIO OF HEALTH POSTS TO POPULATION, BY DEPARTMENT - SENEGAL 1973

	Primary Health Centers			Secondary Health Posts		
	Density/ Population	Density/km ²	Radius of Activity in km	Density/ Population	Density/km ²	Radius of Activity in km
Cap Vert	1/324,500	1/314	10	1/13,250	1/98	5.6
Casamance	1/100,000	1/5,672	42.5	1/7,700	1/452	12
Diourbel	1/100,000	1/5,539	42	1/12,914	1/707	15
Fleuve	1/93,000	1/11,304	60	1/7,914	1/754	15.5
Senegal-Oriental	1/75,000	1/22,156	84	1/8,407	1/2,289	27
Sine-Saloum	1/96,500	1/2,826	30	1/10,157	1/315	10
Thies	1/105,000	1/1,520	22		1/154	7

Source: *Groupe Technique de Planification No. 8 de la Sante Publique et des Affaires Sociales. Elaboration du 4 eme Plan Quadriennal de Developpment: Sante Publique et Affaires Sociales - Rapport Provisoire, Vol. 1, January 1973.*

Almost all secondary health posts have a water source in the vicinity. Most rely on a village well, located some distance from the post, and water is brought by bucketfuls for only the most essential uses, e.g. washing needles and examination tools. Because of the difficulty of getting water, the general level of cleanliness is poor.

At the Tataguine rural health post it was observed that the *infirmier* treats illnesses such as fever, diarrhea, tuberculosis, malaria, schistosomiasis and leprosy; operates a MCH clinic with an assistant from Fatick once a week; and performs minor surgery. There are no hospital beds or latrines and no potable water supply. A Peugeot pickup truck is modified to carry a litter; however, there is usually no gas and the patient must buy it at the prevailing rate of US\$1.50 a gallon.

Some health posts are or should be supplemented by mobile teams which represent the only link between the health delivery system and the rural areas. On paper there are twelve such teams planned, three or four of them serving the rural areas. A health assessment team estimated that as high as 50% of the population was covered by mobile teams making circuits covering 150,000 to 200,000 population. This figure appears completely out of line with other available health statistics. The number actually operating is questionable due to vehicle maintenance problems and fuel shortages.

In addition to the general infrastructure, there exists the SGE (*Service de Lutte Contre Les Grandes Endemies*) which is the Senegalese unit of the centrally controlled Organization for Coordination and Cooperation in the Control of Major Endemic Diseases (OCCGE).⁴ Headquartered in Upper Volta, the OCCGE through the SGE continues mass health campaigns started in French West Africa in 1932 to combat the major endemic diseases that threatened the territories.³ Teams of specialists visited the villages in the federation to detect diseases, determine incidence rates, isolate reservoirs of infection and give mass immunizations. At the same time the teams spread knowledge of elementary hygiene and of the capabilities of modern medicine.

At independence the former French West African territories arranged for the work to continue virtually unchanged by organizing in 1960 the multinational OCCGE as a central agency for coordination and technical cooperation; the French continue to participate with funds and personnel, and since 1956 UNICEF has also assisted.

For SGE administrative purposes, the country is divided into sectors; eight existed in 1972. Theoretically, SGE operations cover the entire country but actually they focus on the fields of greatest need. Leprosy and trypanosomiasis were the main targets in the early 1960's; however, sectors are kept under surveillance for other diseases, too, such as tuberculosis. A continuing immunization program against yellow fever is carried out. In addition to mobile teams, the sector have a few fixed posts at leper villages and trypanosomiasis centers.

The Government of Senegal plans to establish new *Grandes Endemies* sectors in Sine-Saloum and Cap Vert regions where presently none exists.

² *Organization de Coordination et de Cooperation pour la Lutte Contre Les Grandes Endemies.*

³ Diseases such as yellow fever, smallpox, cholera, leprosy, tuberculosis, schistosomiasis, ocular diseases and trypanosomiasis were among those under OCCGE surveillance.

Laboratories

Laboratory facilities are virtually nonexistent even though in rural areas, the *infirmier's* role includes making smears for malarial diagnoses and collecting sputum for tuberculosis examinations. The central lab in Dakar is supposed to coordinate all other facilities in the country (total number unknown) to establish standards and to backstop in the fight against TB. Regional laboratories are reported to exist in the seven regional hospitals. The Fourth Four Year Plan provides for the creation of nine additional labs.

Pharmacies

The Central Pharmacy Service is responsible for supplying medicaments and medical and surgical equipment to the health services; the inspection of the pharmacies of public health units, dispensing pharmacies, wholesale pharmaceutical establishments and privately owned stores of medicine; the implementation of the pharmaceutical legislation in force; and, the implementation of international conventions on narcotic drugs.

The Service comprises a medical supplies bureau; a bureau for inspection of the pharmacies of public health units, a dispensing pharmacy system, and, a bureau for investigations, technical documentation and certification. The Central Pharmacy is, in fact, inadequate to supply and supervise regional pharmacies.

In April 1976 a new pharmaceutical company was established called *La Societe Pharmaceutique Senegalaise "Senepharma"*. The company apparently a quasi-public enterprise, produce, package and distribute medicines. Unlike the other pharmaceutical distributors in Senegal, "Senepharma" will be owned and managed by Senegalese and has been promised the financial assistance of the Government of Senegal. A small private laboratory (*Societe Industrielle Pharmaceutique de l'Ouest Africain - SIOA*) manufactures a number of pills from imported products. Also, the Pasteur Institute which is operated by the French, produces yellow fever and tuberculosis vaccines. Antibiotics and biologicals are sometimes offered to the Government at reduced prices or as gifts from the pharmaceutical firms; these are usually near or past their effectiveness. The Fourth Four Year Plan provides for new pharmaceutical dispensaries at Kaolack, Ziguinchor, Tambacounda and Diourbel.

A few village pharmacies are established which are supposed to distribute simple drugs. One pharmacy serves several villages and many villages have no pharmacy within reasonable distance (there are about 15,000 villages, some very small).

According to observers, in 1974 the pharmacy at the Tataguine rural health post carried injectable quinine, injectable vitamin C, coramine, cholopromazine, camphor, cmetine, isoniazid chloroquine, dapson, potassium permanaganate, niraquine, camoguin and ferrous sulfate. For 8,000 to 10,000 people, the *infirmier* receives one kilogram of cotton every three months, 250 cc of alcohol every three months, 10 ampules of penicillin once a month and one three-meter box of adhesive tape every three months. His medicine budget is US\$600 per year or 6-7.5¢ per capita. Some periodic visits by a physician are scheduled but rarely occur. A district *infirmier* supervisor makes rounds regularly from Fatick.

Cold Chain

The cold chain in Senegal is still very weak and often vaccines, such as those for measles and smallpox requiring refrigerated containers, lose their potency because they have to be transported 800 to 1,000 miles away from the last available refrigeration. The Government has expressed an interest in strengthening and increasing the effectiveness of the cold chain.

Dental Services

In Senegal dental services are virtually nonexistent. Some care may be offered at a main hospital such as in Dakar. People outside of the capital obtain dental extractions, usually without benefit of local anesthesia, by medical auxiliaries at outpatient centers and dispensaries. For example, in 1968 official statistical reports in Senegal showed 149,236 persons or 4.5% of all outpatients had dental attention, mostly extractions.

Rural Health Services Development Project

The purpose of the proposed USAID Rural Health Services Project is to create within the region of Sine-Saloum a network of staffed village health posts supported by local communities and to strengthen a backstopping system for secondary health posts supported by the National Government. With the exception of a few village pharmacies and maternities, the present Government of Senegal health delivery system serves primarily the urban centers and lacks the infrastructure needed to penetrate the rural areas. The secondary health post is the last link to the health system and little or no care extends into the village except in one or two demonstration centers where mobile health teams make a circuit over limited areas. Moreover, because of the deterioration of these health posts, the facilities of the primary health center, the regional hospitals and especially the hospitals of Dakar are overburdened with referrals.

The proposed project will attempt to remedy this situation while responding to both USAID's and the Government of Senegal's health sector goals of a preventive medicine-oriented health system for rural areas by:

- Creating a cadre of village health workers (VHW's) and a network of village health posts (VHP's) where basic health services (first-aid, environmental sanitation, simple health and nutrition education, and preparation for vaccination campaigns) will be provided and vital statistics collected. Cases requiring medical attention will be referred to higher echelons. This new cadre of village health workers will be of the nature of an *Agent itinérant* within the Senegalese health system. The agent's primary role will be as an outreach worker to make periodic visits to each household, refer cases to the health clinic and carry out health education.
- Upgrading and expanding the secondary health posts in the region (rehabilitate fifty-two existing posts and construct fourteen new ones)⁴ so that the VHW's will be adequately backstopped and there will be one secondary post per 10,000 to 12,000 inhabitants.
- Organizing a system of surveillance and supervision of the village health workers by mobile teams working out of secondary health posts.
- Providing technical assistance to the Government of Senegal Ministry of Health in project planning, implementation and evaluation.
- Coordinating establishment of VHP's with UNICEF's creation of village pharmacies and rural maternities.

⁴ It is estimated that seventy-six secondary posts are needed to provide the desired coverage. Sixty-two now exist of which fifty-eight are in need of repair. The Government of Canada has expressed an interest in working in the Department of Gossas where there are six secondary posts. The fifty-two remaining will be remodeled by AID in the other departments and fourteen new ones constructed.

This three-year project, including a six-month end of project surveillance and evaluation period, will have an initial target group of the rural population of Sine-Saloum numbering 600,000 people scattered over an area of 23,945 square kilometers. At the end of the three years it is hoped that the region will have basic health coverage in the rural areas at the rate of one village health worker per 2,500 inhabitants and one secondary health post per 10,000-12,000 inhabitants.

Social Security⁵

In 1973 a voluntary program of social security, providing life insurance and retirement or disability benefits covered most industrial and commercial employees. This is a nongovernmental program initiated in 1958 and managed by the West African Welfare and Retirement Institute. A separate system provides old-age benefits for civil service employees.

No national program of unemployment benefits was in effect in the early 1970's, but injury and temporary disability benefits were available to employed persons through government agencies. The provisions were based on laws enacted in 1932 and 1957. The employer paid the costs, which varied according to the level of risk in various industries, through a special tax levy on the firm's payroll.

Disability benefits begin from the day after the injury and extend until full recovery, providing 50% of earnings for the first twenty-eight days of disability. Other benefits are paid in accordance with complex formulas established in the social insurance laws. Permanent disability benefits are authorized, as pensions for widows and orphans of workers whose injuries were fatal.

Data covering the 1970-71 period indicated that a lump-sum grant equivalent to about US\$28 was being paid as a birth grant to wage earners for each of their first three children. This was relatively high in relation to the average wage. Limited pre-natal and maternal health services were also provided for by law. Employed women who became pregnant received cash maternity benefits of 50% of their earnings for a maximum of fourteen weeks. Family allowances for wage earners who had one child or more had been provided for by law since 1953. Employers contributed funds equal to approximately 5% of their payrolls, which covered about two-thirds of the cost of such allowances. The Government paid the remainder from tax funds. In 1970 and 1971 the allowance was equivalent to approximately US\$2.50 per month for each child under fourteen years of age. Funds for disability, birth grants, and family allowances were maintained by the Government in its Family Allowance and Employment Injuries Equalization Fund.

Formal systems of social security and welfare are well developed only among the minority of Senegalese who are on a monetary wage, working for the Government or for private enterprise. Few if any people living in the rural economy can participate in these programs. Traditional and informal systems of mutual support among families provides the only welfare or social security known to most of this rural majority.

Among the various rural groups the ill, the disabled and the elderly are cared for by the family and continue to share in whatever food or other necessities are available. Most rural people of any age have no other source of aid. Rural dwellers who migrate to the towns tend to retain ties to their families and villages. Some send money to help support the rural family and return to their villages to help with the farmwork during the busy planting season.

⁵ Area Handbook for Senegal 1974.

Urban dwellers often receive food from their rural relatives and bring young members of the family into their homes to attend school or to learn urban ways. In these and other ways, people who live primarily outside the money economy or who were only partially established in the urban or wage-earning milieu, continue the mutual self-help and support programs that have been practiced for many generations.

Health Financing

There is a general lack of information available on the financing and cost of medical care in Senegal. Therefore, the following information has been gleaned from several sources and constitutes only the most cursory discussion of the health financing system.

It appears that national health expenditures are allocated through both the national budget and the budgets of local administrations.

Health expenditures from the central budget of the National Government totalled 3.65 billion francs US\$20,000,000 in 1973/74. This represented 7.8% of the national budget, second only to the Ivory Coast in the percentage of funds devoted to health (see Table 34). What portion of the total was allocated directly to the Ministry of Public Health and Social Affairs is not available.

Table 34: HEALTH BUDGET AS PERCENTAGE OF THE NATIONAL BUDGET
(Francs)

Year	National Budget	Health Budget	Percentage
1965/66	36,049,000,000	2,706,720,000	7.50
1966/67	35,548,000,000	2,834,475,000	7.95
1967/68	36,065,000,000	3,250,505,000	9.00
1968/69	36,750,000,000	2,251,580,000	9.10
1969/70	37,850,000,000	3,491,168,000	9.20
1970/71	39,000,000,000	3,555,750,000	9.10
1971/72	41,440,000,000	3,727,000,000	9.00
1972/73	44,000,000,000	3,793,874,000	8.60
1973/74	47,000,000,000	3,656,818,000	7.80

Source: Government of Senegal. *Statistiques Sanitaires*, 1974.

The health budget as a percentage of the national budget and in real dollars has shown increases from 1963 until 1972 at which time the percentage fell noticeably. These amounts clearly underrepresent total health expenditures, as the private sector is not included. In 1973/73, 67.9% of total health expenditures went to personnel, about 26% to materiel and the remaining 5.7% to transfers (see Table 35).

**Table 35: BREAKDOWN OF THE HEALTH BUDGET SINCE 1965-1966
(Francs)**

Year	Personnel	Materiel	Transfers	Total
1965/66	1,665,200,000	1,041,520,000	-	2,706,720,000
1966/67	1,923,375,000	911,100,000	-	2,834,475,000
1967/68	1,999,605,000	936,300,000	314,600,000	3,250,505,000
1968/69	2,098,260,000	932,920,000	320,400,000	3,351,580,000
1969/70	2,250,580,000	917,043,000	317,545,000	3,491,168,000
1970/71	2,290,727,000	949,737,000	315,286,000	3,555,750,000
1971/72	2,367,307,000	1,042,148,000	317,545,000	3,727,000,000
1972/73	2,519,937,000	943,063,000	330,874,000	3,793,874,000
1973/74	2,482,354,000	964,090,000	210,374,000	3,656,818,000

Source: Government of Senegal *Statistiques Sanitaires* 1974.

According to WHO reports, government health expenditures per capita in the early 1970's were US\$3.49, a relatively high figure for most developing countries. They similarly report that the health budget as a percentage of the Gross National Product was 1.4%.⁶

Almost no information is available on the nature of hospital financing. Table 36, provided by the Government of Senegal, shows total expenditures broken down into personnel and materiel by hospital.

With the initiation of the Administrative Reform in 1972, rural communities will be given greater control over their locally collected revenues. The village community, headed by a rural council, will use proceeds from rural taxes, a tax on animals and a share in the National Solidarity Fund to carry out local development projects, many of which include health programs. It has been estimated that the rural councils allocate 8% of their budgets to health services and many have already financed the construction of village maternities and first-aid posts.

⁶ Calculated by dividing "per capita expenditure" figure by estimates of per capita GNP for 1971 as published in World Bank Atlas 1973.

Table 36: FISCAL YEAR 1973/1974
(Francs)

<u>Establishments</u>	<u>Personnel</u>	<u>Materiel</u>	<u>Total</u>
Hospital A. LE DANTEC	435,420,000	121,000,000	556,420,000
Centre Hospitalier FANN	178,478,000	60,000,000	238,478,000
Hospital at Thiaroye	21,691,000	10,000,000	31,691,000
Saint-Louis	111,124,000	37,000,000	148,124,000
Diourbel	49,543,000	26,000,000	75,543,000
Kaolack	67,549,000	27,200,000	94,549,000
Ziguinchor	23,990,000	8,000,000	31,990,000

Source: Government of Senegal *Statistique Sanitaire* 1974.

CHAPTER SEVEN

HEALTH MANPOWER

The limited number of fully trained medical personnel in Senegal has meant that a major responsibility for the provision of health services in rural areas has fallen to para-professionals. Medical training and race under the French colonial rule coincided as a criterion for personnel placement in the colonial public health service. Even as late as 1950 all physicians were European while subordinate manpower were largely African.

Today trained medical personnel prefer to practice in the urban centers where adequate facilities exist. This dilemma is aggravated by the strong French influence on medical education in Senegal which cannot attract an adequate number of Senegalese students, and tends to be theoretical and curative in nature.

Regardless of the location or type of practice, all doctors in Senegal, except for active members of the military health service and technical assistance personnel, are required to belong to the national medical association. The conditions for practice, the definition of the illegal practice of medicine, and a medical code of ethics have been established by statute since 1966.

Health Manpower Under French Colonial Rule

It has been remarked that, "the French tackled the battle for health as a military operation." Health services under the French were hierarchically organized and, in fact, a large number of European medical personnel in Senegal were members of the army. Including military doctors, the total number of medical personnel was inadequate. The post-1925 quota of 165 doctors for the French West African Federation provided an average of only one European doctor for 72,000 people.

In the colonial system, the major responsibility for health care rested upon subordinate personnel. In 1918 a school for African medical auxiliaries, or auxiliary doctors, opened at Dakar in connection with the hospital there. The *Ecole de Medecine de Dakar* was divided into medical, veterinary, pharmaceutical and obstetrical sections. Teachers were drawn largely from doctors at the hospital. Students were chosen based on a competitive exam; the number of potential entrants was small. Medical students at Dakar, after finishing approximately eight years of prior education, were required to complete either a four-year course for auxiliary doctors or a three-year course for midwives, veterinary students and pharmacists. The courses emphasized practical work and graduates were placed in charge of rural dispensaries under the general supervision of European medical officers, while midwives were given responsibility for maternity centers.

Medical education at Dakar covered only the first three years of six required by the French system. Therefore, until independence, the *Ecole Preparatoire de Medecine et de Pharmacie* was, as the name implied, "an institution for preliminary studies." Advanced studies necessary for qualification as a full-fledged physician had to be continued in France. This policy institutionalized a distinction between those medical personnel fully trained by French medical education standards, and those whose training, partial in French terms, channeled them into

subordinate roles in the colonial medical hierarchy.¹ During the colonial period the former group was almost exclusively European and the latter Africans. Thus, the policy on training Africans for medical positions was consistent with the general French colonial policy of meeting the needs of the colonial administration with subordinate personnel and concentrating on vocational education.

In addition to pharmacists and midwives, the *Ecole de Dakar* provided courses for male and female nurses and *gardes sanitaires*. Male nurses could gain access to a specialist grade by further training in pharmacy and medical or laboratory work. The *Ecole Jamot* in Upper Volta, after 1949, incorporated in the *Centre d'Etudes des Trypanosomiases Africaines* at Bobo-Dioulasso, provided special training for mobile medical service work through a nine-month course and short courses of two or three months. Leprosy training was available at the Institute Marchoux in Bamako, Mali.

By 1951 French Africa had a total medical personnel composed of 216 registered physicians and 376 medical assistants, pharmacists and midwives. All physicians as of 1950 were Europeans.

After independence the national health policy set forth under the goals of the First Plan (1961-1964) called for revamping the training of medical personnel to better suit the needs of the country. Special emphasis was to be given to rural preventive medicine and rural health education. To complement this reorientation of medical training, the Plan called for the restructuring of health facilities. So far, the country has not been able to achieve these goals; medical personnel are still trained in the French tradition and most of the rural population are without basic health services.

Distribution of Health Manpower

Health workers are inadequate at all levels in either number or distribution, and their quality often does not correspond with the country's medical needs. The majority of trained health manpower are oriented toward curative medicine since preventive and public health courses are not well integrated into the curriculum of medical schools and other training institutions. Most physicians are concentrated in Dakar and the Cap Vert region. Elsewhere, an administrative region may have only a few doctors, while many communities have no contact with fully trained physicians unless one visits as a supervisor of a local health program.

According to the Government Statistics, in 1974 there were 281 doctors in Senegal, of which 54 were private, compared to 287 at the end of 1973. This diminution was due to the departure of some technical assistance physicians, the closing of a private practice in Diourbel, and the loss of two doctors. The regional distribution of physicians appears as follows:

Table 37

<u>Region</u>	<u>Percent of Total Physicians</u>
Cap Vert	76
Casamance	3
Diourbel	3
Fleuve	6
Senetal-Oriental	2
Sine-Saloum	5
Thies	100

Source: Government of Senegal

¹ Francis G. Synder. Health Policy and the Law in Senegal.

Of the 76% that practice in Cap Vert, 20% work in conjunction with the *Centre Hospitalier Universitaire* and 17% with the private sector. The population of the Cap Vert area is estimated by the Government to be 804,657 in 1974 or 19% of the entire population. Table 39 shows a breakdown of physicians by affiliation.

Nationwide, there is approximately one doctor for every 14,000 people. This compares to one for 4,370 for the capital area and about one for 44,300 for the remainder of the country. In 1968 of Senegal's twenty-seven departments, six had a ratio of one doctor for every 100,000 to 150,000 inhabitants; two have one doctor for 150,000+ and five departments, whose total population is approximately 500,000 (or about 15% of the population of 3.2 million) had no doctors. According to Government of Senegal 1972 statistics, there are approximately 5.2 nurses (all types) to one doctor.

The target set for Africa as a whole was one doctor for every 10,000 by 1970. Although Senegal is more fortunate than many other developing countries in manpower resources, that target was far from reached. To attain this ratio would mean having about 400 doctors. That implies that the 1967, 1968 and 1969 graduating classes would have had to turn out a total of 150 physicians.² At present levels (1974) the school turns out about twenty graduates per year. Certainly at the current population growth rate, and with an average rate of retirement, the doctor-population ratio will not improve; in fact, the manpower situation may very likely deteriorate.

The Government of Senegal reports that between 1973 and 1974 the number of pharmacists increased from seventy to ninety-one. This increase was reportedly due to new licenses issued in the private sector and the fact that the pharmacists in the *Centre Hospitalier Universitaire* were not counted in 1973. The regional and functional distribution of pharmacists in Senegal appears as follows:

Table 38: Distribution of Pharmacists

Regions	Administration				Private		Total
	S ¹	A	C.H.U. ²		S	A	
Cap Vert	11	7	3	12	18	21	72
Casamance	-	-	-	-	2	1	3
Diourbel	1	-	-	-	-	1	2
Fleuve	-	1	-	-	-	3	4
Senegal-Oriental	-	-	-	-	-	1	1
Sine-Saloum	-	-	-	-	2	2	4
Thies	-	-	-	-	2	3	5
TOTAL	12	8	3	12	24	32	91

¹ S = Senegalese; A = Others

² *Centre Hospitalier Universitaire*

Source: Government of Senegal 1974.

² Report on Medical Personnel in Senegal. African Medicale 1968.

Table 39: DISTRIBUTION OF PHYSICIANS IN SENEGAL
(as of 12/31/74)

	N U M B E R		<u>Total</u>
	<u>Senegalese</u>	<u>Other</u>	
PHYSICIANS			
General Physicians	43	8	51
Military Physicians	1	37	38
Technical Assistance Physicians	-	24	24
National Voluntary Service Physicians	-	26	26
*African Physicians	32	-	32
T O T A L	<u>76</u>	<u>95</u>	<u>171</u>
PHYSICIANS - CENTRE HOSPITALIER UNIVERSITAIRE			
Professors	3	11	14
Lecturers	14	6	20
Chiefs of Clinics	12	5	17
Supervisors	3	2	5
T O T A L	<u>32</u>	<u>24</u>	<u>56</u>
PRIVATE PHYSICIANS			
Generalists	11	30	41
Specialists	-	13	13
T O T A L	<u>11</u>	<u>43</u>	<u>54</u>
G E N E R A L T O T A L	119	162	281

Source: Statistiques Sanitaires 1974.

* pre-independence French-trained Africans.

Table 40
HOSPITAL PERSONNEL
 (as of 12/31/74)

Hospitals	Doctors	CHU	Pharmacists	Dentists	Midwives	Nurses	Welfare Agents	Technical Personnel	<i>Personnel d'Exploitation</i> *	Others
A. Le Dantec	13	49	2	3	69	202	4	305	140	82
Principal	28	—	2	1	14	82	—	284	96	41
C. H. Fann	13	6	2	—	3	128	6	184	86	57
Thiaroye	2	—	—	—	20	20	2	19	13	6
Saint - Louis	7	—	1	1	10	109	2	60	31	11
Diourbel	4	—	1	1	3	50	1	19	24	23
Kaolack	5	—	—	4	54	54	—	45	26	20
Thies	2	—	—	1	18	56	4	47	47	20
Ziguinchor	4	—	—	1	2	35	—	14	14	12
TOTAL	78	55	8	8	123					

* General Health Workers

Source: *Government of Senegal, Statistique Sanitaires 1974*

There were twenty-nine dentists in 1974 of which seventeen were private, compared to twenty-seven in 1973. As the following table indicates, the region of Senegal-Oriental and Sine-Saloum were not provided for at all.

Table 41: Dentists

Regions	Public		Private		Total
	S	A	S	A	
Cap Vert	3	5	3	12	23
Casamance	-	1	-	-	1
Diourbel	-	1	-	-	1
Fleuve	-	1	-	-	1
Senegal-Oriental	-	-	-	-	-
Sine-Saloum	-	-	-	-	-
Thies	1	-	1	1	3
T O T A L	4	8	4	13	29

Source: Government of Senegal 1974.

The Government reports the number of midwives in 1974 as 330, compared to 311 in 1973. Among the total of 330, the private sector accounts for 18. Regional distribution is as follows: Cap Vert, 64%; Diourbel, 6%; Senegal-Oriental, 1%; Thies, 10%; Casamance, 5%; Fleuve, 6%; Sine-Saloum, 8%.

According to the Government, male and female nurses³ totalled 2,457 in 1974, of which 86 are in private practice. They are distributed among the seven regions as follows: Cap Vert, 35%; Casamance, 13%; Diourbel, 10%; Fleuve, 13%; Senegal-Oriental, 5%; Sine-Saloum, 12%; and, Thies, 12%. This would provide a doctor-nurse ratio of approximately 1 for 8.7. Based on a population of 4 million, there is about one nurse for every 1,600 persons.

Other personnel in health-related activities number as follows:

- 152 Social Agents (*Agents Sociaux*)
- 1,597 Technical Personnel (*Personnels techniques*)
- 474 Administrative Personnel (*Personnels d'Administration*)
- 1,510 Other (*Personnels d'exploitation*)

On the next page is a comparative table of manpower-population ratios which gives an indication of how Senegal's manpower resources fare on a worldwide basis. These figures were reported by the respective countries to WHO in 1971 and must be considered with the understanding that manpower category definitions may not be precisely the same and in light of the completeness and accuracy of the country's reporting system.

³ *infirmiers et infirmieres*

Table 42: POPULATION/MANPOWER RATIOS FOR SELECTED COUNTRIES

<u>Category</u>	<u>Senegal</u>	<u>Zaire</u>	<u>Ivory Coast</u>	<u>Thailand</u>	<u>U.S.</u>	<u>Norway</u>	<u>Brazil</u>
Physicians	14,000	29,650	12,310	7,250	620*	690	2,070 ^H
Dentists	160,880	1,021,680	170,000	53,300	1,990	1,120	45,890 ^H
Pharmacists	67,030	182,740	48,570	17,930	1,580	2,980	2,180 ^H
Nurses	2,030	5,130	2,110	2,950	.180	200*	2,920 ^H
Aux. Nurses & Midwives	1,740	4,380	1,930	1,400	180	190*	2,740 ^H

*-Preliminary or estimated data

H-Hospital personnel

Source: 1971 WHO Health Personnel & Hospital Establishments. Geneva.

Below is the distribution of health professionals by region that practice in the private sector.

Table 43: DISTRIBUTION OF HEALTH PROFESSIONALS IN THE PRIVATE SECTOR BY REGION

Professions	I	II	III	IV	V	VI	VII	Total
Physicians	47	1	-	2	-	2	2	54
Pharmacists	39	3	1	3	1	4	5	56
Dentists	15	-	-	-	-	-	2	17
Midwives	13	-	1	-	-	3	1	18
Nurses (female)	12	11	1	-	-	11	17	52
Nurses (male)	-	-	5	8	-	9	12	34
Physical Therapists	2	-	-	-	-	-	-	2

Region I = Cap Vert; Region II = Casamance; Region III = Diourbel; Region IV = Fleuve; Region V = Senegal-Oriental; Region VI = Sine-Saloum; Region VII = Thies.

Source: Government of Senegal 1974.

Most of these fifty-four physicians are foreigners and are working on contract with firms.

<u>Private Physicians</u>	<u>Senegalese</u>	<u>Others</u>	<u>Total</u>
Generalists	11	30	41
Specialists	-	13	13
TOTAL	11	43	54

Training of Health Manpower

The first Four-Year Plan emphasized the reorientation of health training and a wide range of statutes were instituted for the establishment or reorganization of educational facilities for medical personnel. A school for *agents itinérants* was organized at Saint-Louis and a training course was established for specialized male and female nurses. At Saint-Louis, the schools for nurses and midwives were reorganized and a school for social welfare workers was established. Each school provided for three categories of students: those supported entirely by the Senegalese Government, those who were self-supporting or who were supported by the Government of another state, and those already employed by the Senegalese administrative bureaucracy. Students in the first and third categories were required, upon entrance to the school, to sign an understanding to serve after graduation for ten years in the national public health service including the first five years in rural areas.

At the same time a school for training dental specialists was established and a one-year course leading to a diploma in applied tropical medicine was created at the University of Dakar.

Under the second Four-Year Plan (1965-1969) the Institute of Public Health was established at the University of Dakar. Under the direction of the Joint Faculty of Medicine and Pharmacy at the University, its basic task is to provide instruction in the disciplines of public health. Health and social administration courses at the Institute are designed for the training and reeducation of medical personnel, both at graduate and paraprofessional levels. The World Health Organization is collaborating with the Institute in the recruitment of teaching staff, the award of fellowships and the exchange of literature. According to the Government, courses at the Institute of Public Health are intended for:

doctors of medicine, doctors of pharmacy and doctors of veterinary medicine who are to hold responsible posts in the national institutions of African countries; physicians occupying posts in public health administration but who have been unable to pursue recognized studies in public health; persons undergoing in-service training at the Institute of Applied Tropical Medicine who wish to devote themselves to public health; technicians in the various branches of public health (sanitary engineering, health education, etc.). The instruction given is both theoretical and practical, the principal subjects of the curriculum being divided into the following six sections: health planning, general and public health administration, epidemiology and statistics, nutrition, sanitary engineering, preventive medicine and occupational health.

Examinations are held at the end of the course of studies, the arrangements governing the examination being prescribed by the University Council. A diploma in public health is to be awarded by the Institute.⁴

Under the third Four-Year Plan nearly all the statutes with respect to health services and manpower supplemented or provided for the application of provisions of previous legislation. Processes were designed for automatic promotion of doctors, pharmacists and dentists in the public health sector.

Physicians

Generally, medical instruction, curriculums and prerequisites are designed to be equivalent to those of French institutions of the highest prestige. The result has been that Europeans select Senegal's medical school for specialized training, particularly in tropical medicine. However, the maintenance of these standards must be questioned in light of the differences between Senegalese and French circumstances, and particularly in terms of Senegal's critical needs for trained manpower to organize and supervise its health care. In fact, these standards have had the deleterious effect of discouraging Senegalese students from competing with better-trained Europeans, and therefore students tend to choose other disciplines such as law, science and letters. Compulsory service with the MISA in exchange for grants and aid further dissuades students from choosing medicine. The dropout rate for medical school has been quoted as between 25 to 50%, but 50% may be conservative according to a census taken of several classes.

⁴ *Journal Officiel de la Republique du Senegal*, 18 May 1967, No. 3882.

Attempts to alter the school's policies have met with severe criticism by those favoring quality above all, and others who claim the school will offer second-rate education to black Africans. According to a study at the University of Dakar medical school in 1970-71 (Sankale), students study medicine with the motivation to serve the collective benefit and to contribute to the betterment of public health and development.

Candidates for admission to the medical school must hold the *baccalaureat* diploma (obtainable after six years primary school and six years secondary school) or pass an entrance examination, be at least twenty-one years of age, have a vaccination certificate, and have successfully completed one year of premedical training in physics, chemistry and biology. The six-year curriculum is divided into preclinical, clinical and internship periods. Le Dantec Hospital in Dakar serves as the teaching and research center for medical students.

Upon satisfactory completion of final examinations and the presentation of a thesis, the student receives the degree of Doctor of Medicine. Licenses are issued by the MISA. Graduates must work for the government health service for ten years unless they are among the few able to pay their tuition. According to J. Bryant, as reported by the World Bank, the cost per medical doctor graduated in Senegal is US\$84,000, compared to US\$19,000 in the United States.⁵

The annual output of Senegalese physicians is expected to increase under the fourth Four-Year Plan, according to the Government, so that 100 new M.D.'s will have been graduated by 1977. Present estimates of medical school graduates are approximately thirty students per year, of which ten are Senegalese. The remainder are from other West African countries. It is not immediately clear why this number is expected to increase.

Military Health Service School

The Military Health Service School was established at the French-operated military facility (Hospital Principal) in Dakar, "to insure the recruitment and training of doctors, pharmacists and dental surgeons destined to serve in the Military Health Service." Although the school was designed to train military medical personnel, it was also attached to other relevant specialized faculties and institutes at the University of Dakar. Following graduation, students are required to serve the period equal to that of their schooling and an additional ten-year period. This includes one year of service in the military health corps, additional service in the military or public health corps, and possibly some further professional training.

No information is available on length of courses, standards, number of graduates, enrollment, and diplomas awarded.

State Nurses

In 1953 the State School of Nursing of Dakar was founded. Opened to all students from independent countries of West Africa, the school's entrance requirement was ten years of general education and successful completion of an entrance examination. Its two-year educational program was the same as that given in French schools of nursing. The minimum age for admission is eighteen years.

Courses cover both theory and practice and are given by professors and doctors of the Faculty of Medicine and Pharmacy of Dakar (part-time basis) and by nurse educators (full-time). In 1967 the course was extended from two to three years. This additional year is devoted to public health instruction and includes four months' service in a rural area. According to

⁵ Obtained by dividing total recurrent costs assignable to medical education by the number of students graduating. J. Bryant, Health and the Developing World, Cornell University Press, 1969, p. 81.

J. Bryant, the cost per nurse graduated in Senegal is US\$835.

To meet the demand for an increased number of nurses to staff health centers proposed under the Fourth Plan, the Government is planning a second school of nursing at Fann (Cap Vert). The project is viewed as an urgent activity by the Government; however, a funding source has not been secured. The proposal submitted gives no indication of the type of curriculum to be developed or the number of students.

A post-basic education level, formerly obtainable only in French schools, is at present offered at the Centre for Post-Basic Nursing Education (CESSI). Nurses having a minimum of two years experience are eligible for the admission examination. The Centre offers a two-year program focusing essentially on the human sciences, nursing administration and education, as well as public health statistics. Graduates of the Centre hold supervisory and teaching posts.

Senegalese nurses also go to the Advanced School for Post-Basic Nursing Education in Lyon, France, for further studies. This program leads to a diploma equivalent to a university degree from the University of Lyon. The diploma is awarded following a final examination and completion of a thesis.

Dentistry

There is one dental school in Dakar whose courses are taught by the combined faculty of the schools of Medicine, Pharmacy and Dentistry. Opened in 1964, the school replaces sub-professional training started in 1950 which was closed because of the lack of recognition by the French authorities. Dental training lasts five years. Candidates must hold the *baccalaureat* diploma, the preparatory certificate for medical studies, and pass a physical examination. Prior to 1964, the dental course consisted of a three-year curriculum in Senegal and two more years of training in France. At present only holders of the French dental diploma or equivalent qualifications are authorized to practice in Senegal; the license to practice is issued by the MISA. Senegalese nationals are obligated to serve the government health service for five years before they can engage in private practice.

In 1968 the average annual output of dentists was one to two persons. The cost of dental education parallels those of medical students in Senegal, approximately US\$85,000 per graduate.⁶

Agents Itinerants

Agents d'Assainissement. *Agents d'Assainissement* receive one year of nurses training at the *Ecole des Agents Sanitaires de Saint Louis* and then attend a one-year course at the Khombole School for Sanitarians. According to the Government of Senegal, eleven *agents d'assainissement* were graduated in 1974 (see Table 44). There are seventy-six places available for students in the Khombole School, however, the Minister of Health limits each class to ten persons. Women have been denied admission to this school. A total of 1,307 sanitarians were reported to be working in Senegal in 1973.

Agents Sanitaires (auxiliary nurses): Nursing education in Senegal was formally initiated at the end of World War I as a result of widespread deadly epidemic plagues. It was not, however, until 1924 that the first class of nurses, educated in schools of higher primary education, were graduated. These students took a two-year program which followed completion of elementary primary studies (six years). This two-year course emphasized, above all, practical concepts of hygiene and was oriented towards the fight against trypanosomiasis, smallpox and other common communicable diseases. Only male personnel were recruited for

⁶ Dental Manpower Requirements in Emerging Countries, N.R.E. Fendall, Public Health Reports, Vol. 83, No. 97, September 1968, p. 780.

Table 44: HEALTH AUXILLIARY GRADUATES, 1970-1974

<u>School for:</u>	<u>Years</u>	SENEGALESE		<u>Total</u>
		<u>Men</u>	<u>Women</u>	
Midwives	1970	-	17	17
	1971		18	18
	1972		18	18
	1973		25	25
	1974		27	27
Nurses (male & female)	1970	20	3	23
	1971	31	13	44
	1972	35	9	44
	1973	38	7	45
	1974	36	12	48
<i>*Agents Sanitaires</i>	1970	24	19	43
	1971	17	19	36
	1972	10	21	31
	1973	17	17	34
	1974	15	27	42
<i>Agents d'Assainissements</i>	1970	10	-	10
	1971	10		10
	1972	6		6
	1973	6		6
	1974	11		11

Source: *Statistiques Sanitaires*, Government of Senegal 1974.

**Auxilliary Nurses*

Table 45: YEARLY GRADUATION OF AUXILLIARY HEALTH PERSONNEL
SENEGAL 1969-1973

<u>Years</u>	<u>Midwives</u>	<u>State Nurses</u>	<u>Supervisors</u>	<u>Social Workers</u>	<u>Education Workers</u>	<u>Agents Itinerants</u>	<u>Garbage Collectors</u>
1969	18	10				41	10
1970	19	33	5			53	10
1971	18	49	5			46	10
1972	18	47	5			37	10
1973	?	?	5	15	5	40	6
TOTAL	73	139	20	-	-	217	36

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Source: *Groupe Technique de Planification No. 8 de la Sante Publique et des Affaires Sociales. Elaboration du 4 eme Plan Quadriennal de Developpement: Sante Publique et Affaires Sociales - Rapport Provisoire, Vol. I, January 1973.*

this program. The more traditional nursing tasks were the responsibility of the missionaries and the colonial military nurses.

In 1938 the training school was transferred from Dakar to Saint-Louis (former capital of Senegal) and a professional program of education for nursing personnel was defined. On the eve of Senegal's independence in 1961 the school in Saint-Louis and the study program for native nurses were reorganized. The school thus became the "School for Health Agents" (*Ecole des Agents Sanitaires*). Recruitment remained on the same basis, but the program was increased to two years and ended with a final examination and the awarding of a diploma. The Saint-Louis School graduates forty to fifty nurses per year (see Table 44) and provides practical training for the students at the Saint-Louis hospital which is reported to be in a very bad state of deterioration with a low level of hygiene. In 1974 forty-two *agents sanitaires* were graduated.

Pharmacists

Pharmacy training consists of a five-year course. Candidates must hold the *baccalaureat* diploma or pass a special entrance examination and a physical examination. In addition to formal instruction, the student must devote three months (during vacations after the second and before the fifth year of study) to practical training in a pharmacy. Candidates who pass the final examination at the end of the fourth year must complete, during the fifth year, another three-month period of practical training in a pharmacy. Fifth year students must specialize in two of the following fields: biological techniques; industrial pharmaceutical techniques; health education and social hygiene; applied analytical chemistry or techniques of physical chemistry.

After passing final examinations, candidates are awarded the State Diploma of Pharmacist; the license to practice is then issued by the MISA. Pharmacy graduates are not obliged to work for the State. Post-graduate training is not available.

Midwives

Midwifery is taught in the State School for Midwives in Dakar. The school graduates approximately twenty-five midwives a year (see Table 45). A very stiff entrance exam is one barrier to a larger number of students. The core curriculum consists of courses in pathology, local nutrition, and health education.

First-year students must take several of the following courses: general medicine, surgery, pharmaceuticals, maternal and child health, hospital legislation, social welfare, and professional ethics.

Second-year students choose from: obstetrics, normal and pathological pregnancies and confinements, pediatrics, pathology of the newborn, and legislation relating to civil status and the medical profession.

In the third year students take several of the following courses: prenatal and post-natal child care, accidents occurring during pregnancy and confinement, prepartum counseling, pathological baby care, detection and diagnosis of ailments, exotic pathology, and public health and health education. Also in the third year students are sent for one week's training to the Khombole rural center. After the diploma is awarded, all graduates are required to work in rural areas for five years.

In an effort to improve the services of traditional midwives, the Government has undertaken with UNICEF to retrain traditional *matrones*. Participants are put through a one-month training program in simple sanitary delivery techniques. In 1973 fifty students had completed the program.

UNICEF contributes to the midwifery program at the State School for Midwives by providing vehicles for transportation of school staff and students to the hospital and practice stations. They have also donated materials for demonstrations on dietetics and child care. Support is also extended for a new teachers college for health services personnel which opened last year in Dakar.

Village Health Workers (VHW)

At present there is no formal training for village level health personnel. A total of US\$480,000 has been written into the budget of the Fourth Four Year Plan for training and recycling⁷ but at present time no such work has begun.

Under the concept of community-supported village health posts, as described in the proposed USAID Rural Health Services Project and in conjunction with the Administrative Reform now carried out in two regions, the VHW will be nominated for training by the rural councils from each village.

Trainees will be expected to initiate community educational activities in addition to those in basic health care. Ideally, bi-weekly contact will be made with a mobile team for moral and technical support and continuing education.

Rural councils will be encouraged to nominate traditional healers or *gueriisseurs* as VHW's so long as they are willing to learn new techniques. It has been found that supervision is the key to success for "recycled" healers.

Promotion Humaine

The Government of Senegal has established a special agency called the *Promotion Humaine* (PH) whose objectives are to increase rural productivity, education and training, and to maintain standards of public health and hygiene. PH will play an integral role in community organization under the Administrative Reform. The Director of *Promotion Humaine* has expressed an interest in providing training in health, sanitation and nutrition for a cadre of *animateurs* who will be working with the rural populations under the new organization.

The *Promotion Humaine* program will receive 7.4 billion francs in investments distributed as follows:

Table 46: EDUCATIONAL TRAINING INVESTMENTS BY PROMOTION HUMAINE (1974-1977)

	<u>Million CFA</u>	<u>Percent</u>
Primary	2,007	27.2
General middle and secondary	1,247	17.0
Technical and professional secondary	1,200	16.2
Higher	1,664	22.6
Human Promotion	1,250	17.0
TOTAL	7,368	100.0

Source: Government of Senegal, 1974.

⁷ Recycling refers to the retraining of indigeneous practitioners.

Professional Associations and Licensure

Basic legislation in 1966 established the conditions for medical practice, defined illegal practice, provided for the private practice of medicine by public health personnel, and established a Medical Association (*Ordre des Médecins*) for its internal organization and functioning. Under these provisions, the profession of medicine is limited to persons fulfilling three conditions: possession of a Senegalese State diploma of Doctor of Medicine or of a foreign degree recognized as equivalent; Senegalese nationality or nationality of a State with which Senegal has concluded an international agreement according to which nationals of that State the right to practice medicine in Senegal; and enrollment on the list of doctors of the section or sections of the Medical Association corresponding to their type of practice. Any person not fulfilling these conditions or falling into one of the specified exceptions is engaged in the illegal practice of medicine. Such illegal practice is punishable by a fine of 20,000 to 100,000 francs or imprisonment for one to six months or both. African medical assistants holding degrees from the former *École Africaine de Dakar* are recognized as possessing the necessary educational qualifications for the practice of medicine. None of these statutes speak to the issue of indigeneous practitioners or how they fit into the legal conditions for medical practice.

With the exception of teaching and hospital personnel at the *Centre Hospitalier Universitaire de Dakar*, the private practice of medicine by public health service personnel is subject to exceptional authorization by the administrative authorities. Such authorization is conditional upon a determination of insufficient medical personnel in a given area and, if granted, is limited to practice after normal hours of service.

All doctors except for active members of the military health service and technical assistance personnel, are required to belong to the Medical Association. The Nurses Association of Senegal, founded in 1965, became a member of the International Congress of Nursing (ICN) in 1973.

CHAPTER EIGHT

NATIONAL HEALTH POLICY AND PLANNING

Planning Infrastructure

The principal planning organ in Senegal is the Ministry of Planning and Cooperation. Until 1973 this body was known as the Secretariat of State for Planning, attached to the Office of the Prime Minister. Under the reform of 1973 the President retained full control over international and cultural affairs while the Prime Minister oversees economic matters.

The Ministry of Planning and Cooperation has the functions of preparing studies conducive to the elaboration of national plans and of providing the means necessary for their execution. It is also responsible for following up the execution of each project within the different sectors, for controlling the direction of the plan, and for evaluation of the results. In addition, the organization and administration of technical assistance is directed from this office.

The planning functions of the Ministry are divided by three directorates: (a) the Directorate for Planning, (b) the Directorate for Plan Financing, and (c) the Directorate for Physical Planning. A fourth directorate, the Directorate for Scientific and Technical Affairs, which is responsible for research policy and which is physically located outside the Ministry, is attached to it as a matter of organizational and administrative convenience. The Directorate of Cooperation is concerned with day-to-day management of technical assistance. In addition, there is the *Bureau d'Etudes*, which performs an economic advisory function for the Ministry and reviews legislative and regulatory proposals submitted by the Government.

The Planning Commissions and the Supreme Planning Council do not form part of the Ministry *per se* but have basic roles in plan coordination and policy formulation. The Planning Commissions are of two categories: vertical and horizontal. The vertical commissions are serial in number and correspond to branches of economic activity: rural development, industry, power and mines, commerce, handicrafts, tourism, health and social affairs, infrastructure, urbanization, and education. The commissions examine project proposals which the operating Ministries submit through the Ministry of Planning.

The horizontal commissions are charged with the integration of the work by the vertical commissions about a general problem. There are five horizontal commissions: physical planning, finance, regionalization, research and synthesis. The finance commission, therefore, reviews provisions for the capital budget for the entire plan period. Both the vertical commissions and the horizontal commissions suffer from a lack of expertise.

The Supreme Planning Council is a policy-making body whose principal responsibility is to set the general orientation and the global objectives of the plan. It also concerns itself with plan implementation. The council is presided over by the President of the Republic and consists of the Prime Minister, the Ministers, and the regional governors. The Council meets infrequently and thus has contributed little to solve problems of plan implementation.

The Government has been trying to improve its planning methodology, but a lack of basic data, staff and planning expertise makes the task difficult. Many of the planning units within the administrative structure are reportedly either nonexistent or too weak to have any real

impact. The principal problem is the shortage of professional staff. Indeed, with the rudimentary nature of economic planning performed in Senegal, it has been suggested that the Planning Ministry could operate far more effectively with a less elaborate body. Since 1972 a UNDP team of several professionals has been working to improve national planning.

The Planning Process

Development planning in Senegal is carried out through a series of four-year plans. The First Plan covered the fiscal period 1961/62 to 1964/65; the Second, 1965/66 to 1968/69; the Third, 1969/70 to 1972/73. The Fourth, which lasts from 1973/74 to 1976/77, is now being implemented. The first three plans tended to list projects without much order of priority. Of the many projects listed, most have been either "pre-projects" or "ideas of projects."

The present Plan's medium-term objectives project an annual growth in the GDP of 5.7% and somewhat less than equilibrium in the balance of payments as called for under the Third Plan. The planners envisage Senegal in the year 2000 as an industrial state with per capita income of more than triple that of 1969, calculated on an estimated population growth of 2.2% per annum. The GDP is projected to reach 1,100 billion CFA, assuming a continued rate of growth of 5.5% per annum. Growth patterns since 1969, according to the World Bank, do not support these projections. Projected growth rates for the three economic sectors are:

	<u>Over 4 Years (%)</u>	<u>Annually</u>
Rural	+19.75	+4.6
Industrial	+28.65	+6.5
Tertiary	+26.25	+6.0

Investments required to fulfill this program amount to approximately 179 billion CFA francs, 73% of which come from public sources and 27% from private. Table 47 shows a breakdown of the total investments under the Fourth Plan and Table 48, a summary of health investments under the same plan.

Health Policy

The Fourth Plan for Economic and Social Development (1973-77) states two primary objectives for the health sector:

- Maintenance of the present coverage of the population in the rural areas by making every existing health post operational.
- Increasing coverage to 200,000 additional inhabitants per year. This expansion can take place only by yearly stages at the rural level while at the intermediate regional level, it will take place at an accelerated pace.

The Plan's goals in the health field are:

- to give priority to rural over urban areas
- to favor medicine for the masses over medicine for the individual
- to emphasize preventive rather than curative medicine
- to give priority to health education
- to develop a network of integrated services capable of supporting massive attacks against transmissible diseases while providing the population with a basic health system which meets their essential needs.

Table 47: SUMMARY OF INVESTMENTS OF THE FOURTH PLAN

<u>Sector</u>	(in millions of CFA)			
	<u>State</u>	<u>Autonomous Public Or- ganizations</u>	<u>Private Sector</u>	<u>Total</u>
Industry	2.3	--	17.7	20.0
Trades	0.3	--	--	0.3
Power	--	6.4	--	6.4
Total Secondary Sector	2.6	6.4	17.7	26.7
Tourism	3.5	8.3	9.7	21.5
Commerce ^{1/}	0.5	4.0	3.0	7.5
Transportation ^{1/}	0.4	6.1	8.0	14.5
Total Services	4.4	18.4	20.7	43.5
Roads	7.5	--	--	7.5
Ports and Navigable Channels	0.2	3.1	--	3.3
Airports	1.0	1.1	--	2.1
Mail and Telecommunications	--	3.5	--	3.5
Total Infrastructure	8.7	7.7	--	16.4
Urbanization, Housing ^{1/}	0.9	9.9	3.7	14.5
Urban/village Water Systems and Sanitation	10.2	--	0.9	11.1
Human Resources	7.4	--	--	7.4
Culture, Youth, Sports	3.1	--	--	3.1
Information	3.1	--	--	3.1
Health	3.6	--	--	3.6
Total Social Sector	25.2	9.9	4.6	39.7
Studies and Research ^{2/}	9.5	--	--	9.5
Administrative Supplies	2.5	--	--	2.5
TOTAL	87.6	43.3	48.7	179.6

Source: USAID Development Assistance Program, 1971.

Table 48: HEALTH INVESTMENTS UNDER THE FOURTH PLAN - SENEGAL 1973 - 1977

<u>Title of Project</u>	<u>Possible Sources of Funding</u>	<u>1973/74</u>	<u>1974/75</u>	<u>1975/76</u>	<u>1976/77</u>	<u>Total</u>
Central reorganization of MOH		--	--	--	--	--
Remodeling of existing facilities	BN*-UNICEF	50	63	83	13	209
New facilities - health posts and health centers	BN-UNICEF URSS	47	54	93	123	317
Logistic support	BN-UNICEF FAC	38	35	34	32	139
Basic health service development	BN UNICEF	15	11	13	16	55
Fragile vaccines	USAID-FR USSR	14	16	17	16	63
114 School of nursing	Unknown	--	250	--	--	250
Fight against Grandes Endemies	FAC	25	35	10	10	80
Nutrition protection program	BN-UNICEF	19	6	3	2	30
Central public health laboratory and fight against TB	BN-Canada	121	--	--	86	207
Regional Pharmacies	BN-Unknown	4	4	18	18	44
Regional Public health laboratories	BN-FAC	--	32	16	22	70
Blood bank	BN-FAC	17	9	8	--	34
Dental care	BN	9	2	11	14	36
Psychiatric assistance	BN-ENAS Royar, club	20	16	--	--	36

* Banque Nationale

Health Investments Under the Fourth Plan - Senegal 1973 - 1977 (cont'd.)

<u>Title of Project</u>	<u>Possible Sources of Funding</u>	<u>1973/74</u>	<u>1974/75</u>	<u>1975/76</u>	<u>1976/77</u>	<u>Total</u>
Social centers	BN-UNICEF	2	55	44	55	156
Cobalt bomb	FAC	--	16	--	--	16
Environmental sanitation - Sonioc and Nougouma	BN-FAC FAO or FED	5	11	25	14	55
Kaolack hospital	BN	--	29	--	--	29
Hospital complex Fleuve area	FED-BEN	490	244	195	112	1,041
Tambacounda hospital	FAC	--	--	--	150	150
Diourbel hospital	W. Germany	--	--	--	60	60
Zinguinchor hospital	FAC	--	--	--	150	150
LeDantec hospital - stomatology	BN	7	--	--	--	7
Pediatric ward at FANN	BN-Canada	261	--	--	--	261
Doctors' offices, hospitals at Thies and Diourbel	?	--	20	15	--	35

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Source: Development Assistance Programme FY 1975, pg. A-91.

1/ With the exception of 700 million francs in the urbanization sector, private investments are included in the national budget but are not earmarked for specific projects.

2/ Does not include energy research (1.5 million CFA).

As a means to these goals and objectives, the Government has placed its highest priority on the central reorganization of the Ministry of Health. One example of the inhibiting nature of the structure is the fact that the Director of Health has technical responsibility for health programs without having administrative and budgetary authority. These powers are held by the Minister through his Chief of Cabinet. All external aid is channeled through the Cabinet, which limits and delays the Director's ability to implement projects.¹ A study of the reorganization has been made but no steps to implement the recommendations have been taken.

The following table illustrates the priority regions for health development according to Senegal's national plan.

Table 49: SPATIAL PRIORITIES OF THE CURRENT AND FUTURE HEALTH PLANS IN SENEGAL

	4th Plan	5th Plan	6th Plan	7th Plan
Regions for Restructuring	Sine-Saloum and Thies	Thies and Diourbel	Casamance and Fleuve	Senegal-Oriental and Cap Vert
Regions Maintaining Status	Senegal-Oriental and Fleuve	Cap Vert and Senegal-Oriental	Sine-Saloum and Thies	Diourbel and Casamance

Source: Government of Senegal

In light of the Plan's priority of rural health services with an emphasis on preventive care, it is notable that considerable hospital construction will be continued throughout the four-year period. Top-level physicians and medical school professors visited by a USAID team, as well as other high functionaries, concurred in recognizing that the traditional preeminence of curative over preventive medicine should be changed in view of the fact that health care does not reach the rural areas where approximately 80% of the population live. Several forces seem to be contributing to the continuation of the present system. Resistance to change on the part of some political personnel is evident, as is the demand for curative care by the urban populations. Some observers feel the leadership does not know how to reverse the situation or how to find the assistance needed to do so.

The Plan itself states: "Appropriations in favor of hospitals are on the increase, both in personnel and supply of drugs, while the preventive medicine infrastructure receives a decreasing amount of health appropriations." A total of 3.4 billion CFA in investments is planned in the health sector over the four-year period; hospital projects alone will account for 1,612 million CFA, over 47% of the total. In hopes of changing this situation, the Plan recommends reform of the method of training future sanitary personnel and the recycling of existing job holders.

A major impediment to the effective delivery of health care to the rural areas is the lack of vehicles and the shortage of gasoline for mobile units. The Fourth Four Year Plan calls for the purchase of such equipment.

¹ In cooperation with drought relief activities, the USAID insisted that relief funds bypass the cabinet and go directly to the Director of Health.

CHAPTER NINE

INTERNATIONAL ORGANIZATIONS

Because of limited national financial and human resources for the implementation of health and health-related activities, Senegal is largely dependent upon multilateral, bilateral and private voluntary agencies for financial, technical and administrative assistance. French government aid and French private investments contribute significantly to the development activities in Senegal. Financial commitments for health-related projects in 1974 appear in Table 50 on the following page. Table 51 shows a breakdown of estimated financial assistance by source for the period 1974-1976.

Bilateral Assistance

France

There are over a thousand French cultural and technical personnel currently working in Senegal. Moreover, many French public, semi-public and private agencies carry on activities in the country. French aid is considerable compared to other bilateral agreements.

Agency for International Development (AID)

The United States Agency for International Development has provided considerable aid to Senegal in both its development projects and the Sahel relief and rehabilitation activities. Most of the U.S. Government donations during the recent drought were in animal feed and food grain contributions. The largest U.S. commitment for Sahel rehabilitation in Senegal was for range management, livestock and water. Lesser commitments were for agricultural production and health. U.S. emergency shipments of protective foods made up a significant portion of the relief assistance. Instant corn-soy milk was donated by the Government through UNICEF. Soy-fortified grits were contributed directly by the United States Government. AID has launched a new rehabilitation and recovery program for the six Sahelian countries. The new funds are in addition to \$109 million the United States has donated for emergency relief, bringing the total U.S. drought assistance for Sahel Africa to more than \$129 million. The recovery program will concentrate on four major economic areas: food storage and transport; range management and irrigation; agricultural production; and, health.

One of the first goals of the program is to construct warehouses in production-deficient areas to hold emergency food during periods transport is not possible. Another priority project covers transportation improvements, including repairing roads to isolated areas for emergency food distribution and increasing grain shipment by barge on the Niger River.

Because some of the countries lost as much as 40% of their national livestock during the drought, another recovery activity is aimed at rehabilitating and developing livestock. AID will assist nomadic herders in establishing small mixed farms with cooperative pasture development. In addition, AID will help expand the use of draft animals and construct and equip permanent training centers. AID also proposes to aid in the development of surface water sources for animals as well as expand animal health improvement programs by the use of vaccines and other medicines.

Table 50: EXTERNAL ASSISTANCE IN HEALTH, 1974

<u>Project</u>	<u>Source of Assistance</u>	<u>Commitment in US \$</u>	<u>Nature of Assistance Furnished</u>
Establishment of sanitation plan for Dakar and surrounding areas	PNUD/WHO WHO	849,000 292,500	Personnel, grants, equipment
Development of health services	WHO	203,500	Personnel, materiel; scholarships
Institute of Odontology and Stomatology at the University of Dakar	WHO	62,800	Personnel, materiel, scholarships
CESSI	WHO	240,300	Personnel, materiel, scholarships
Field studies on clinical, sero-epidemiological and immunological aspects of venereal diseases and treponematoses	WHO	115,000	Personnel for field surveys, consultants, materiel
Health services	UNICEF	18,900	Health services to combat communicable diseases, sanitation education, environmental sanitation, auxiliary training, and vaccinations

Source: UNDP, 1974.

Table 50: External Assistance in Health, 1974 (cont.)

<u>Project</u>	<u>Source of Assistance</u>	<u>Commitment in US \$</u>	<u>Nature of Assistance Furnished</u>
Environmental sanitation in the Gulf of Soumbédioune	FED	106,500	Contract for completion of the PNUD/WHO study
Technical assistance	Belgium	32,000	Three doctors
Dakar-Fann University hospital	Canada	25,000	Studies, pediatric pavilion, and National Center for Tuberculosis and "Grandes Endemies"
Basic health services	Canada	15,000	Studies in the Sine-Saloum region (Gossas)
FAC Technical assistance	France	1,040,000	Seventy-two technical assistance personnel for the health service
Assistance to the leprosarium at Peykoug	Italy	--	Five volunteers, Peykoug
Diourbel hospital	W. Germany	75,000	Materiel, medicines
Babak dispensary	Switzerland	2,000	Two voluntary nurses
Vaccines - USAID	United States	320,000	Smallpox and measles vaccines
Dispensaries	CARITAS	3,400	Nutritional rehabilitation at 71 private health posts

Source: UNDP, 1974.

Table 50: External Assistance in Health, 1974 (cont.)

<u>Project</u>	<u>Source of Assistance</u>	<u>Commitment in US \$</u>	<u>Nature of Assistance Furnished</u>
Dispensaries (cont'd.)	CARITAS	20,800	Milk
		5,400	Administrative funds for dispensary operations
CARITAS Sanitary Bureau, Dakar		5,800	Furniture, two vehicles
Equipment	CARITAS	116,200	Four vehicles for dispensary use
Census	FNUAP	260,000	One expert, equipment, salaries for local personnel
Demographic studies	Centre de Recherches pour le Developpement International (CRDI/Canada) •	70,000	Grant to the Statistical Directorate to conduct a pilot study on household consumption patterns

Source: UNDP, 1974.

Table 51: ESTIMATED TECHNICAL AND FINANCIAL ASSISTANCE RESOURCES FOR THE PROGRAMME PERIOD (1974-1976) IN MILLION US DOLLARS*

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>Total</u>
Bilateral Programmes:				
France (1)	38.09	38.09	38.09	114.27
Others	20.41	22.45	24.69	67.55
Subtotal	58.50	60.54	62.78	181.82
Multilateral Programmes other than UNDP and the UN organizations:				
EDF (2)	14.4	14.4	14.4	43.2
IBRD Group (3)	11.9	15.8	14.4	42.1
Subtotal	26.3	30.2	28.8	85.3
UN organizations Regular Programmes				
WFP (4)	0.44	0.44	0.44	1.32
WHO	0.24	0.24	0.24	0.72
UNFPA	0.53	0.14	--	0.67
UNICEF	0.12	0.12	0.12	0.36
UNIDO	0.07	0.07	0.07	0.21
UNHCR	0.07	0.07	0.07	0.21
UNESCO	0.04	0.04	0.04	0.12
IAEA	0.02	0.02	0.02	0.06
Subtotal	1.53	1.14	1.00	3.67
UNDP (see note)	2.80	0.85	0.32	3.97
GRAND TOTAL	89.13	92.73	92.90	274.76

* The amounts are calculated on the basis of the 1972 average exchange rate: US\$1 = 250 CFA francs (United Nations official rate on August 1, 1972).

Source: UNDP Country and Intercountry Programming: Senegal, 11 September 1973.

AID plans to provide funding for seed, tools and other farming equipment to increase agricultural production.

In public health, AID will provide funds to equip mobile medical teams to assist with public and maternal/child health programs. The teams will visit nomads in remote areas and carry out a rural health surveillance and disease control program, including vaccinations, maternal and child health, and nutrition.

USAID is joined by EDF, FAC, Canada, Sweden, and several UN agencies in the recovery program.

World Food Program (WFP). The World Food Program supports four types of projects in Senegal:

- school feeding programs
- socioeconomic projects of three to five years' duration
- semi-emergency projects
- emergency projects

WFP's school feeding programs reach approximately 3,000 children in 280 schools. The foodstuffs supplied vary according to the contribution of the donor country. The main difficulty is to adapt donated foods to local tastes; food habits play an important role in implementing well-intentioned programs.

The socioeconomic projects in Senegal include rural works in cooperation with *Promotion Humaine*. For example, in a pilot project in Tambacounda, where the Government is resettling 2,000 families, each family is provided with 40,000 CFA worth of construction materials, tools, seeds, etc., and WFP-provided foodstuffs..

Semi-emergency projects are short-term and include food-for-work activities. WFP provides food in lieu of a salary to villagers who participate in construction projects.

Emergency projects include providing relief food supplies to drought-stricken areas and furnishing food for the nearly 15,000 refugees from Portuguese Guinea who have immigrated to Southern Senegal.

Development Projects. In addition, USAID has two major projects in the proposal stage which, if successful, should significantly contribute to the improvement of health conditions in Senegal. The Rural Health Services Development project is aimed at providing preventive medicine services to rural areas. AID will contribute to the training and organizational components of the Senegalese program. This program is described in more detail in Chapter Six. The United States also plans to join with several other bilateral donors and international organizations in the Senegal River Basin development. AID is now in the process of selecting a site for the development of an irrigated perimeter project of between 8,000 and 9,000 acres within the basin. The features of this project are basically similar to those of other irrigated perimeters now being financed by the IBRD and FED (see Chapter Five).

OMVS is also seeking technical assistance and training from AID; therefore, an OMVS management and staff support project is expected to emanate from a study undertaken in FY 1975 to : (1) assess current OMVS organizational, manpower and training requirements; and, (2) design an overall management and staff support program to meet these needs.

On a much smaller scale, USAID is providing technical, organizational and material assistance to fifteen public and private nutrition education centers in Sine-Saloum, Thies, Casamance, and Diourbel.

In addition, USAID has provided \$6,067 of Special Population Activities funds to support maternal and child health/family planning programs.

Peace Corps

In March 1975 the Peace Corps recruited sixteen volunteers to participate in *Promotion Humaine* programs. Settled in Senegal's south, east and northern parts, the volunteers will be active in projects such as well-drilling, crop production, environmental sanitation, construction of dispensaries and maternity wards, and the development of small irrigation systems.

An estimated ten additional volunteers may be recruited to help train village health workers for the proposed USAID Rural Health Services Development project.

Other Donors

- China has made a tentative offer to finance the Manantali Dam construction
- Kuwait is making investments in the extension of feeder roads from the coast inland
- Canada is helping finance the motorization of canoes for the fishing industry and is expected to contribute toward the development of a trucking fleet for fish transport.

Multilateral Assistance

European Development Fund (EDF)

EDF assistance can be assessed at approximately 3.6 thousand million CFA francs per year until 1976, and can be broken down as follows: 85% non-reimbursable and for operations in all areas affecting the economy of Senegal; 5% non-reimbursable and for technical assistance, fellowships, and various small-scale undertakings; 10% loans on special terms.

World Health Organization (WHO)

From 1970 to 1973 WHO helped carry out the smallpox eradication program in Senegal and organized the maintenance phase and epidemiological surveillance. They assisted in reimbursing local costs, especially for maintenance of vehicles. Consultant services, equipment and vaccine were provided by USAID until 1972. The attack phase, launched in 1967, was carried out by the endemic disease service teams, together with measles and a BCG vaccination campaign for children. No cases of smallpox have subsequently been reported. WHO continues its assistance under the health service development project.

Since 1970 WHO has helped Senegal develop its dentistry manpower. Its objectives in this area are to: (1) develop teaching at the Institute of Odontology and Stomatology, (2) teach dentistry students, (3) train dental assistants, and (4) train teachers. WHO has provided the continued services of two teachers (odontology, periodontics) and equipment. Theoretical and practical instruction and field training at the Pikine centers was provided by WHO for twenty-seven dentistry students (twelve in the third year, twelve in the fourth, and three in the fifth) and eight trainee dental assistants.

WHO provides several fellowships for Senegalese students:

- Medicine: A 48-month fellowship for study in the Ivory Coast
- Periodontics: A 15-month fellowship for study in France
- Bacteriology: A 12-month fellowship for study in France
- Statistics/Epidemiology: A 2-month fellowship for study in France

UNICEF

In 1968 UNICEF initiated a program to assist in the development of health services in Senegal. Objectives of the project were to: (1) develop a network of integrated health services, starting in the Fatick area, (2) extend the integrated activities to other rural districts, by stages, (3) carry out MCH and nutrition work in the Fatick area, and plan its extension, (4) control endemic diseases including malaria and tuberculosis, and (5) train personnel.

WHO provides the services of four medical officers (public health, MCH, nutrition, tuberculosis), two nurses, a laboratory technician, and supplies and equipment. Geographical reconnaissance was completed in Fatick, Kaolack, Diakhao and Niakkar, and itinerant services are now being extended gradually from the Fatick area.

Development of regional laboratory services continues by UNICEF and an inventory of resources and needs was made with a view to reactivating the laboratories of the Khombole sanitation school and at Fatick, Kaolack and Gossas. Assistance was given in planning and implementing health measures to deal with the drought. Cooperation is maintained with ORANA in developing nutrition activities within health services and solving health problems arising from the drought.

UNICEF gave assistance in teaching at the post-basic nursing education center (CESSI) and the nursing school, and in refresher training of health service personnel including laboratory assistants.

UNICEF activities in the field of rural health in Thies and Sine-Saloum have consisted primarily of:

- Providing short-term training for traditional *matrones* to staff rural maternities; kits for the *matrones*; and, furnishings for the facilities
- Providing basic drugs for rural pharmacies and training for pharmacy operators

UN Development Program (UNDP)

In 1966 UNDP started a project to develop master plans for water supply and sewerage for Dakar and the surrounding area. The objectives of Phase I were to: (1) draw up a master plan for water supply in Dakar and the surrounding area², (2) draw up a master plan for sewerage in Dakar, (3) determine the administrative, legal and financial conditions necessary for implementation of the program, and (4) train personnel.

Plans for Phase II were to: (1) continue the sector studies, (2) recharge the aquifer with waste water and (3) carry out sanitation schemes.

The objectives of Phase I were attained except in regard to water resources. The sanitation schemes, studied in Phase I, are under way. Phase II activities include sector studies on rural water supply and recharging of the aquifer with treated waste water. These projects are due to be completed in 1975. Geophysical surveys and the study of groundwater resources on the north coast continue.

WHO provides the services of a sanitary engineer (project manager), a water engineer, consultants and subcontractors, fellowships, supplies and equipment.

² The responsibility for the implementation of this project was transferred to ADB, and is now in the bidding stage.

UN Fund for Population Activities (UNFPA)

The Government of Senegal is aware of some of the population problems with regard to the economic and social development of the country. Therefore, it undertook in 1974, with UNFPA assistance, a general population census, comprising a complete and simple count of the population by a more detailed sample survey.

The assistance requested from UNFPA amounts to US\$834,220. The financing of activities will extend over the years 1973 to 1975.

World Bank

The World Bank has several projects in Senegal which will only indirectly affect the health sector. The overall objectives of the Bank group project lending in Senegal are:

- rural development including development of irrigation in the Senegal River Valley region (Debi Lampsar project) and intensification of groundnut production, diversification into new crops (Sine-Saloum project and Eastern Senegal Livestock project);
- promote diversification of economy by lending for tourism and industry;
- investment for modernizing and expanding the country's infrastructure;
- expand education system (Second Educational project).

The Bank has offered to finance the water and sewerage project for the surrounding areas of Dakar as outlined in the UNDP study. They are also engaged in an urban sites and services project in the periphery of Dakar.

International Voluntary Organizations

Catholic Relief Services (CRS)

Since 1960 the Catholic Relief Services have been active in health and health-related programs in Senegal. CRS, in cooperation with its Senegalese counterpart CARITAS, has sponsored food-for-work projects to build roads, bridges and water works, dig wells and latrines, and carry out land reclamation efforts.

In the area of nutrition, CRS/CARITAS has provided technical, organizational and material assistance to 15 public and private nutrition education centers in the regions of Casamance, Sine-Saloum, Thies, and Diourbel. The centers provide instruction in health and nutrition, demonstration meals and discussions on basic hygiene, nutrition and child care to about 3,500 mothers of children under five years of age. High-protein foods are distributed.

U.S. government-donated foods were distributed by CRS/CARITAS to schools, social welfare institutions and leprosaria and to mothers of preschool children, refugees from Portuguese Guinea, and victims of drought. The agency also ships medicines and medical supplies for distribution through dispensaries operated by various organizations.

New Tribes Mission

In coordination with linguistic studies and literacy campaigns, mission personnel are trained in first-aid and the diagnosis and treatment of common tropical ailments. Members provide basic medical care and education for the people in their program. The agency operates a clinic at Simbandi-Brassou.

United Church Board for World Ministries

Operating under the auspices of CIMADE, the French Protestant Relief Committee, the United Church Board for World Ministries contributes to an international team providing medical, nutritional and social services at the Bopp Community Center in Dakar. The Center, originally a dispensary, has expanded its activities to include literacy training, courses in home economics and child care, youth clubs, and community seminars.

CHAPTER TEN

THE SAHEL

The Setting

The Sahel, whose name is derived from the Arabic word *Sahil* meaning shore or borderland, lies in a band stretching 2,600 miles across West Africa. The Sahel begins at approximately 15° north latitude and extends northward in most areas for about 300 miles to 20° north latitude. The southern portion of the region receives from ten to twenty inches of rainfall per year, whereas the northern portions receive less than ten inches per year. Rainfall is seasonal, occurring during the months of July through September, after which ensues a long dry season characterized by relatively cool temperatures from October through January, and extremely high temperatures from February through June. The *harmattan*, a dry wind, blows southward out of the Sahara, increasing the aridity of the Sahel from December through June.

The vegetation of the Sahel consists primarily of date palms found along the river banks and oases, several species of thorn trees and seasonal grasses. The density of vegetation and its average height decrease gradually towards the north. During the rainy season, much of the Sahel supports an abundant growth of grasses, but during the dry season grasses become scarce, except along the river banks and permanent water sources.

The population density in the Sahel varies greatly. Most of the sedentary population of the Sahel is found along the Niger River, just south of the Niger Bend. Population densities in this area reach 125 per square kilometer. Along the remainder of the Niger River, between Mopti and the Niger Bend, the sedentary population density averages twenty per square kilometer. In Western Sahel densities range from thirty-five per square kilometer around certain permanent water sources, to five per square kilometer or less in other areas.

The density of the nomadic population is also variable. In areas of the Western Sahel (inhabited by Mauves) the density varies between 0.5 and 2.0 per square kilometer. In most sections of the central and Eastern Sahel (inhabited by Tuaregs) the density varies from 0.5 to 1.0 per square kilometer. However, population densities of the nomads at dry season pastures often reach fifty per square kilometer during the months of May and June. These areas of the highest population densities have important implications for annual mass vaccination campaigns in addition to surveillance of communicable diseases among these groups.

The economy of the Sahel is primarily pastoral, but farming and fishing also comprise significant economic activities. Subsistence farming is also practiced by large groups of sedentary cultivators; however, not to the exclusion of livestock raising. Most keep herds of cattle, camels, goats and sheep.

Fishing in the Sahel is a significant activity on the Senegal and Niger Rivers and their tributaries. During the past decade, the traditional fishing industry on the Middle Niger in Mali has adopted modern techniques and equipment and organized successful cooperatives for the pooling of equipment and financial resources and the marketing of dried and smoked fish.

The traditional Sahelian economy is essentially characterized by interdependencies among farmers, herdsmen and fishermen. The economic diversification of individual ethnic groups has

resulted in a lessened dependency on other parties; however, it has also placed stress upon fine ecological balances which the traditional interdependency system has helped maintain. The massive population explosion of cattle, sheep and especially goats in the Sahel in recent years, due to both the intense application of modern veterinary techniques and the increase in the number of farmer herd owners, has led to a steady deterioration of the environment through overgrazing. Few animals are ever slaughtered, but rather represent the pastoralists' capital investment with which he can barter and sell its dividends. In addition, livestock is a symbol of a man's social station, through which he accrues prestige in the community.

1971-1973 Drought

The Sahel has been subject to periodic droughts of varying duration, the most intense during this century having been the 1916-1917 drought and the recent drought in 1972-1973. From contemporary records, it appears that the drought of 1916-1917 was the more catastrophic since it also severely affected the cereal producing areas of the savanna.

According to experts, the Sahel has experienced profound ecological transformations that may not be reversible. While it has been known for years that the Sahelian Desert was slowly expanding southwards, the events of 1972 and 1973 showed a sudden and unprecedented expansion that destroyed vast areas of pasture land, decimated livestock herds, caused extensive deforestation and forced thousands of people to flee south in search of food and water.

It has been estimated that from 1972-1973, 60% of the population living north of an east-west line going through Kebemer migrated southward. All are thought to have returned for the sowing season. A movement of Senegalese toward southeastern Mauritania also apparently reversed itself and many Mauritians, reportedly settled near Saint-Louis, are pursuing stockraising.

Similarly, some internal migration has taken place toward Cap Vert and Casamance.

The six countries most severely affected by the drought are: Chad, Mali, Mauritania, Niger, Senegal and Upper Volta. The areas in a state of emergency comprise almost 5.3 million square kilometers with a population of approximately 24 million. The coordination and cooperation of these governments has significantly aided the area's recovery. Regional meetings have been held intermittently and a permanent organization, the Inter-State Commission on Drought Control in the Sahel (CILSS), with a coordinating office in Ouagadougou, Upper Volta, was established. It was agreed that CILSS would not abrogate responsibility of individual states to make their own decisions about disaster relief or recovery programs, nor would CILSS replace bilateral arrangements these states may already have with any and all donors.

Member states see CILSS as serving three purposes:

- to facilitate contacts with donors interested in providing immediate relief assistance;
- to provide a forum through which the African states can collectively elicit international donor interest and commitments for major long-term investments to help solve national and regional problems;
- to suggest a framework for the way individual Sahelian countries and others suffering from drought and underdevelopment can interrelate with the donor community.

Within Senegal the definition of drought zones was drawn up by the Agricultural Services Directorate on the basis of damage to crops and cattle, as well as food shortages. Regions whose losses were estimated to exceed 80% were declared particularly affected. Areas so designated in Senegal include: Diourbel (Kebemer, Louga and Linguire departments), Fleuve (Dagana department), Senegal-Oriental (Bakel and Tambacounda departments), Sine-Saloum (Fatick department), and Thies (Thies, Tivouane and M'Bour departments). The total population of these departments is approximately 1,400,000. In several of these zones it is likely that agricultural shortages consisted primarily of lowered production of industrial crops and not the total disappearance of food crops.

Medical Situation - Sahelian Senegal

On July 1, 1973, a mission was sent to evaluate the repercussions on health and sanitation in Senegal and other Sahelian countries brought about by the drought. The members visited the Diourbel region in Senegal, from which most of the following data originates.

Measles was found to be in epidemic proportions. Numbers of reported cases were as follows:

	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>Jan.-May 1973</u>
Cases	8,036	16,458	31,185	25,480
Deaths	--	--	2%	2%

According to completed evaluations, vaccination coverage did not exceed 50% of the susceptible population, even though the vaccination services for major endemic diseases completes a circuit every two years. Visits to Diourbel and Kaolack in Sine-Saloum showed that no vaccinations against measles appear to have been given for two years in Diourbel and four years in Kaolack. Furthermore, the freezers had broken down.

Cholera was present in the Fleuve and Diourbel regions. In early August 1973, 1,378 cases were reported in Diourbel with 121 deaths. The extent of countermeasures varied from region to region, and the epidemic was later reported to be decreasing in intensity. The entire population of Diourbel was vaccinated with 95% coverage between March and August 1973.

Available statistics showed no appreciable change in recorded cases of gastroenteritis since the early months of 1972 and 1973, particularly in the Diourbel region. Later in 1973, however, the physician in charge of the region reported an increase in cases of gastroenteritis, with severe dehydration among children and adults. Similarly, medical service statistics at Fatick indicated an increase in cases of dysentery in June and July of 1973, compared to the same months in 1972 and 1971.

An epidemiological study conducted on a sample of the Senegalese population showed a drop in the spleen index for malaria in 1973 compared with the previous year. The annual campaign of preventive chloroquine distribution began somewhat late in 1973. It started in Thies and Casamance where populations were only slightly affected by the drought.

The same study also found higher prevalence of anemia compared to 1972. The chief medical officer of Diourbel region indicated infrequent cases of kwashiorkor but growing cases of marasmus.

Health Services in the Sahel

Virtually all of the West African Sahel lies in Francophone Africa and the health infrastructure present today was largely developed during the colonial era. The French consistently placed an emphasis on mass campaigns since it was the most effective technique in dealing with the endemic diseases of the savanna and forest areas of West Africa. These programs, however effective, primarily reached the sedentary populations and only to a lesser extent the nomadic population of the Sahel. Among the sedentary populations, a high degree of receptivity for health programs was initiated because of the successes of the static and mobile health services. This, however, was not the situation in the Sahel. There, people were long accustomed to a high prevalence of infectious diseases and were unfamiliar with modern medical services. As some preliminary studies in 1968 demonstrated, there was little receiver recognition of the desirability of health services on the part of nomads and in many instances, active resistance.

The delivery of health services to Sahelian nomads poses serious logistical problems because of their mobile lifestyle. However, pilot studies indicate four other major areas of difficulty.¹

- Nomads are generally unfamiliar with the services being offered, consequently there is no recognition of their desirability.
- Nomads traditionally view themselves as a separate polity and they approach Government as an adversary. Hence, they are not overly friendly nor cooperative with Government and Government-related activities.
- All Government agents are suspected of being tax collectors, even health workers. This is understandable, since in the past, Government tax collectors often attached themselves for convenience to mobile health teams.
- Nomads avoid traditional congregations of any size, even in order to receive a health service. Thus, attempts at assembling nomads in one place for the purpose of delivering a health service have generally been unsuccessful.

Mobile teams, comprised of drivers, *infirmiers*, vaccinators, assistants and guides, are the nomads' only link to the health system. The teams work out of an administrative center taking supplies and logistical support to sustain them in the bush for two weeks. No administrative authorities are permitted to travel with the health personnel.

Smallpox, measles and yellow fever immunizations to the nomads were carried out between 1968-1971 in programs coordinated among Mali, Mauritania, Niger, Upper Volta, and Senegal.

Social and cultural effects of the drought still have not been completely reported. The immediate effect, however, was in bringing large groups of nomads into the camps and around administrative centers, where they received food and medical care. If, over the long term, the impact of the drought reduces the isolation of these people, modifies their style of life, and increases their dependence on the larger society, there will be major repercussions both in health status, and in their need and use of health services.

¹ Imperato, Pascal James, M.D., "Nomads of the West African Sahel and the Delivery of Health Services to Them."

Donor Assistance

UNICEF

Requirements for UNICEF emergency assistance were estimated at \$7.3 million in 1974 and for rehabilitation assistance at \$4.1 million in 1974 and 1975. These sums include extraordinary local expenses for the operation of relief and welfare services, probably amounting to some \$5.6 million for 1974. Medium- and long-term rehabilitation plans were examined by the six countries at a conference in Ouagadougou. It is within UNICEF's normal assistance policy to contribute well-digging and health and education services in the context of their rehabilitation plans.

UNICEF foresees substantial need for special assistance in basic high-protein foods, nutrition supplements, drugs, and health supplies for children and pregnant and nursing mothers. This type of assistance was required throughout 1974, with a peak demand during the period of *soudure* the critical months before the next crop is harvested in November (see table 1).

Rehabilitation assistance by UNICEF for the last months of 1973 and ending December 1975 took three directions: rural drinking water supply, long-term health services, and assistance to other children's services in areas of long-term resettlement (see table 2).

The UNICEF assistance program is being conducted with FAO, WHO, and the UN Special Sahelian Office.

Table 52: PROPOSED EMERGENCY RELIEF ASSISTANCE 1974 (US\$)

	<u>Senegal</u>
Childfeeding: CSM and freight	262,500 ² (500 tons)
Supplements to donated items (CSM sweetening) ³	22,000
Child health supplies	100,000
Distribution costs (foods; child health services)	700,000
Support costs (overseas and internal transport)	<u>80,000</u>
TOTAL	902,000

CSM = Corn-soy milk

¹ Some sweetened by local purchases of sugar charged to UNICEF; remainder delivered in 1974 sweetened in the U.S. at 2¢/pound.

² Amounts in parenthesis are contributions in kind from USAID.

Source: UN Children's Fund. Executive Board, 1973.

Table 53: PROPOSED REHABILITATION ASSISTANCE, 74-75

	Senegal	Mali
Child health (drugs, vaccine, equipment, transport, freight)	136,000	153,000
Water supply (equipment, vehicles, freight and local costs)	337,000	550,000
Education (estimates only)	200,000	200,000
TOTAL	673,000	903,000

Source: UN Children's Fund. Executive Board, 1973.

United States Agency for International Development (USAID)

The United States was a major contributor to drought relief efforts. The U.S. provided 40% of the total food donated by the international community. In addition, U.S. assistance included U.S. Air Force airlifts, which were particularly crucial in 1973 and 1974. The United States contributed \$26 million in assistance (including \$21 million in food aid) in FY 1973 and \$115 million in assistance (including \$90 million in food aid) in FY 1974.

The United States has sponsored a large number of small Recovery and Rehabilitation (R&R) activities whose aim is to fund short-term activities which could have immediate impact on the recovery and rehabilitation of the region from the effects of the drought. Some \$14 million was provided in FY 1974 for these R&R efforts.

In addition, between March and June 1974, USAID teams working with local Governments designed a series of medium-term projects in food and livestock production which can be expected to have payoffs in increased farm goods and revenues within three to five years.

Congress authorized \$85 million on July 6, 1974 for the drought-stricken peoples of Africa. Of this FY 1975 amount, an estimated \$63 million (plus \$5 million in operational costs) will be used in the Sahel for additional R&R activities, mid-term activities, and continuing emergency actions. The remainder of the \$85 million is being used in other areas of Africa affected by drought.

Based on the requirements of Section 639B of the FAA, AID has begun a range of long-term planning actions concerning the Sahel and its contiguous areas. In October and November 1974, multidisciplinary planning teams visited the entire Central and West Africa region to develop with host governments, a five-year, post-drought U.S. assistance strategy. The major means and objectives of this strategy are discussed below in terms of the proposed FY 1976 program. If accepted and implemented, this strategy will form the basis for a longer-term program of U.S. assistance to the region.

The development strategy review of October-November 1974 concluded that:

- Because of the poverty of the Sahel and its contiguous areas, U.S. aid should continue to be offered on concessional terms.
- Aid must be offered to the most impoverished countries solely on grant terms.
- U.S. assistance, if it is to have real impact on actual policies and practices in the area, must be extended through both bilateral and regional programs.
- Bilateral programs should be designed to complement regional undertakings where local national programs may provide the resources, the training sites, and the delivery systems essential to achieve the key development objectives.

AID requested \$24,315,000 (including \$15 million in loans) for FY 1976 for new and continuing Sahelian programs.

Some activities for which new funds are requested will seek:

- to rebuild part of the basic agricultural and community infrastructure necessary for resettling persons displaced by the drought;
- to enable farmers and herders to make maximum use of all available water resources, whether from rain, surface or underground sources, e.g. the Sahel Water Data Network project;
- to provide an inventory of land resources, based according to alternative-use capabilities, e.g. Mali Land Use Capability Inventory, currently planned for Fifth Quarter funding;
- to improve the present limited capability of the Sahel states to control common annual crop pests, e.g. Sahel Crop Production, now scheduled for Fifth Quarter funding;
- to increase food production through investments in irrigation and better dry land management practices, e.g. the Mali Crop Production project;
- to begin to assist the expansion of the area's productive resource base through river basin development, e.g. the capital loan for the Senegal River Basin Development (OMVS).

Table 54 : TOTAL PROGRAMMED U.S. GOVERNMENT ASSISTANCE TO THE SAHEL
1973 and 1974

FY 1973 Disaster Relief Contingency Funds:	\$ 4,696,916
FY 1973 Grains (156,000 metric tons):	21,600,000
FY 1973 - TOTAL	26,296,916
FY 1974 Emergency Non-Food Assistance:	2,318,100
FY 1974 Grains (350 metric tons):	77,621,000
FY 1974 Support to International Organizations:	1,055,000
FY 1974 Studies:	1,450,000
FY 1974 Recovery and Rehabilitation:	12,025,000
FY 1974 Reserve for Contingencies:	8,233,984
FY 1974 - TOTAL	\$102,703,084
TOTAL U.S. GOVERNMENT ASSISTANCE TO SAHEL, 1973/1974	\$129,000,000

Source: U.S. Government, 1974.

Table 55 : U.S. RECOVERY/REHABILITATION ACTIVITY (\$000)

Sector	COUNTRY						Total
	Niger	Senegal	U. Volta	Mali	Mauritania	Chad	
I. Range Management, Livestock and Water	725	940	475	1,480	395	280	4,295
II. Agricultural Production	975	350	1,040	0	1,135	305	3,805
III. Storage/Transportation	400	--	550	950	350	600	2,850
IV. Health	200	100	225	200	100	250	1,075
TOTAL	2,300	1,390	1,290	2,630	1,980	1,435	12,025

Source: U.S. Government Summary of Assistance to Sahel as of March 19, 1974.
(unpublished)

Table 56 : UNITED STATES FY 74 NON-FOOD AID TO THE SAHEL

During FY 1974, \$2,550,000 has been made available to meet emergency needs of the six countries of the Sahel. Funds have been expended as follows:

<u>REGIONAL</u> :	Grant to ARC, support for crop survey	US\$154,000	US\$154,000
<u>CHAD</u> :	Short-Term Emergency Programs (STEPS)	75,000	
	Feedsacks	<u>13,100</u>	88,100
<u>MALI</u> :	STEPS	75,000	
	Airlift	800,000	
	Blankets	88,000	
	Tarpaulins	42,000	
	Trucks (36) and spares	500,000	
	POL for river barges	<u>75,000</u>	1,580,000
<u>MAURITANIA</u> :	STEPS	75,000	
	Water trucks	50,000	
	Medicine and vitamins	112,000	
	Seeds and transport	<u>15,000</u>	252,000
<u>NIGER</u> :	STEPS	75,000	
	Medical supplies	7,500	
	Transport of CSM	4,500	
	Crop projection	<u>3,000</u>	90,000
<u>SENEGAL</u> :	STEPS	75,000	75,000
<u>UPPER VOLTA</u> :	STEPS	75,000	
	Ground water survey	<u>4,000</u>	79,000
<u>TOTAL EXPENDITURES:</u>			\$2,318,100
<u>BALANCE:</u>			231,900

On February 4, 1974 the U.S. Government announced the donation of \$1,000,000 to FAO's Sahelian Trust Fund. This donation is not included in the above figures.

Source: Summary of the USG Assistance to the Sahel as of March 19, 1974. (unpublished)

Table 57: U.S. FOOD GRAIN CONTRIBUTIONS TO THE SAHEL
(CROP YEARS 1973 - 1974 OCTOBER - SEPTEMBER)

	Metric Tons	\$000
<u>CROP YEAR 1973:</u>		
Total	256,000	\$42,479
Mauritania	33,250	4,933
Senegal	45,000	5,405
Mali	55,250	8,555
Niger	68,250	12,982
Upper Volta	41,250	8,368
Chad	8,000	1,421
Gambia	3,000	489
Guinea	2,000	326
<u>CROP YEAR 1974</u>		
Total	250,000	\$54,228
Mauritania	30,000	5,570
Senegal	10,000	1,662
Mali	65,000	12,492
Niger	78,000	17,775
Upper Volta	20,000	4,400
Chad	22,500	5,360
Regional	22,500	6,070
Gambia ¹	2,000	899

1 = Probable donation

Source: Summary of U.S. Government Assistance to Sahel as of
March 19, 1974. (unpublished)

Table 58 : SOURCES AND ALLOCATIONS OF PROTECTIVE FOODS
CROP YEAR 1973-1974 (OCTOBER 1973-SEPTEMBER 1974)

(Metric Tons)

	Total	Senegal	Mauri- tania	Mali	Niger	Upper Volta	Chad	Gambia	Unallo- cated ¹
TOTAL	46,707	1,415	3,509	5,325	6,811	3,897	1,650	100	24,000
U.S. (bilateral)	1,096	--	249	249	249	249	--	100	--
U.S. (UNICEF)	4,757	500	260	1,800	1,497	--	700	--	--
EEC	25,200	--	3,000	3,200	4,650	3,400	950	--	10,000
France	8,000	--	--	--	--	--	--	--	8,000
Germany	3,900	900	--	--	--	--	--	--	3,000
WFP	594	15	--	66	265	248	--	--	--
Netherlands	110	--	--	10	100	--	--	--	--
Austria	50	--	--	--	50	--	--	--	--
Norway	3,000	--	--	--	--	--	--	--	3,000

¹ Tentative and not yet announced

NOTE: Protective foods include oils, soy-fortified grits and corn-soy milk. FAO has cited area protective food needs at 64,860 metric tons.

Source: Summary of U.S. Government Assistance to Sahel as of March 19, 1974. (unpublished)

Table 59: FAO NET FOOD GRAIN NEEDS AND PROJECTED DONOR COMMITMENTS
CROP YEAR 1974 (OCTOBER 1973-SEPTEMBER 1974)
(Metric Tons)

	Total	Senegal	Mali	Mauritania	Chad	Niger	Upper Volta	Regional or Unallocated
FAO Food Grain Need Estimate	650,000 ¹	Nil-20,000 ²	166,000 ³	57,000 ⁵	22,000 ⁵	196,700 ⁶	12,300-98,100 ⁷	50,000
Total Expected	550,414	35,000	134,000	65,000	46,150	129,000	56,264	85,000
U.S.	250,000	10,000	65,000	30,000	22,500	78,000	20,000	24,500 ⁸
EEC	110,000	15,000	20,000	10,000	10,000	20,000	15,000	20,000
France	74,500	6,000	10,000	7,000	8,000	10,000	9,000	24,500
Germany	36,650	--	10,000	6,000	1,650	10,000	3,000	6,000
Canada	28,940	3,000	6,000	4,000	4,000	6,000	5,940	--
USSR	10,000	--	10,000	--	--	--	--	--
PRC	8,000	--	--	8,000	--	--	--	--
WFP ¹⁰	(24,210)	(5,060)	(6,000)	(--)	(2,500)	(8,150)	(2,500)	--
Belgium	12,324	1,000	3,000	--	--	5,000	3,324	--
Other	20,000	--	10,000	--	--	--	--	10,000

- 1 = The original FAO grain deficit estimate was 505,000-611,000 MT. This has been raised to a working estimate of 650,000 MT, due to further reports of poor harvests.
- 2 = Senegal estimates food grain need of 110,000 MT.
- 3 = Includes 60,000 MT in imports under special conditions. Not yet secured.
- 4 = Mauritania estimates needs at 100,000 MT.
- 5 = Actual Chad needs are 50,000 MT. FAO doubts more than 25,000 can be moved prior to rainy season.
- 6 = Includes 80,000 MT in imports under special conditions. Not yet secured.
- 7 = Upper Volta has used high figure in making requests from donors.
- 8 = Includes 2,000 MT tentatively allocated for Gambia.
- 9 = Canadian food aid not yet announced.
- 10 = World Food Program donations all from U.S. Does not count against total. U.S. donation to WFP may be increased to 43,000 MT.
- 11 = Other donors known to date are UK (10,000 MT: Mali), Sweden (5,000 MT), Hungary (5,000 MT).

Source: FAO/O.R.O., February 1974. Quoted in Summary of U.S. Government Assistance to Sahel as of March 19, 1974.

APPENDIX TABLE A
POPULATION BY REGION, BY AGE, 1970

Age Groups	<u>URBAN</u>		<u>SEMI-URBAN</u>		<u>RURAL</u>		<u>TOTAL</u>	
	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>	<u>Number</u>	<u>%</u>
0-19	664,267	56	289,899	54	1,125,000	51	2,077,574	52
20-59	477,596	40	209,802	39	961,506	45	1,648,904	42
60+	52,368	4	37,327	7	140,279	6	229,974	6
Undeter- mined	150	-	14	-	-	-	164	-

POPULATION DISTRIBUTION BY SEX, BY REGION

<u>Regions</u>	<u>Men</u>	<u>Women</u>	<u>Total</u>	<u>Percent of Total</u>
Cap Vert	303,653	384,150	767,803	18.55
Casamance	322,467	317,554	640,021	15.47
Diourbel	317,701	339,155	656,856	15.88
Fleuve	194,699	207,734	402,433	9.73
Senetal-Oriental	125,954	127,600	253,554	6.13
Sine-Saloum	416,253	425,153	841,406	20.34
Thies	277,139	297,956	575,095	13.90
TOTAL	2,037,866	2,099,302	4,137,168	100.00

Source: *Enquete Demographique Nationale, 1970-71.*

APPENDIX TABLE B

POPULATION DISTRIBUTION BY REGION

<u>Regions</u>	<u>0-19</u>	<u>20-59</u>	<u>60+</u>	<u>Undetermined</u>	<u>Total</u>
CAP VERT					
Number	385,336	287,969	25,557	85	698,947
Percentage	55.0	41.0	4.0	-	100.0
CASAMANCE					
Number	318,464	271,179	29,039	-	618,682
Percentage	51.0	44.0	5.0	-	100.0
DIOURBEL					
Number	325,196	262,879	47,130	-	635,205
Percentage	51.0	41.0	8.0	-	100.0
FLEUVE					
Number	215,446	147,555	26,090	-	389,091
Percentage	55.0	38.0	7.0	-	100.0
SENEGAL-ORIENTAL					
Number	125,852	107,569	11,684	43	245,148
Percentage	50.0	44.0	5.0	-	100.0
SINE-SALOUM					
Number	410,237	353,543	49,717	15	813,512
Percentage	50.0	46.0	4.0	-	100.0
THIES					
Number	297,043	218,210	40,757	21	556,031
Percentage	54.0	39.0	7.0	-	100.0

Source: *Enquete Demographique Nationale*, 1970-71.

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