HEALTH AND DEVELOPMENT IN SOUTHERN AFRICA

Volume IV

A Review of Health Care in Malawi: Issues, Analyses, and Recommendations

This sector assessment was undertaken in conjunction with the Southern Africa Development Analysis Project and has been used extensively, but not totally, in the Main Report and Country Papers

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SOUTHERN AFRICA DEVELOPMENT ANALYSIS PROGRAM
Agency for International Development
Washington, D.C. 20523

By:

FAMILY HEALTH CARE, INC.
1211 Connecticut Avenue, N.W. #710
Washington, D.C. 20036

and

AFRICARE
1601 Connecticut Avenue, N.W.
Washington, D.C. 20009

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EXECUTIVE SUMMARY

Malawi deserves attention. Beginning her independence in 1964 as one of the poorest countries in Africa, Malawi has since developed one of Africa's most successful economies and one of its most impressive health care systems.

Malawi is one of the smaller African countries with a population of 5.3 million of which 5 million reside in rural areas. Agriculture is the principal occupation of 85 percent of the labor force. Malawi is a one-party state governed by a National Assembly and by Dr. H. Kamuzu Banda, who has been elected president-for-life. The country is divided into three regions and 24 districts. Local government consists of district and town councils. Development planning is coordinated by the Division of Economic Planning in the Office of the President. Since independence, Malawi's GNP has increased 6.8 percent per annum in real terms and GNP per capita has increased from $48 to $169. There are several factors associated with this economic progress:

- the government's commitment to development and national planning as outlined in its Statement on Development Policies (DEVPOL);
- the high standard of performance and discipline in both government and private workers; and
- the government's attention to fiscal responsibility (inflation has been kept consistently below 10 per cent per year).

Almost all of the increase in GNP and the substantial increases in foreign exchange and domestic savings have come from increased agricultural production. Estate production has increased at a rate nearly double that of smallholder earnings (15 percent versus 7 percent). In order to remedy this situation, the government began four integrated rural development programs which were highly successful, and it now has embarked on a program to expand such programs to cover the entire population.

Although there are serious health problems in Malawi, there are several factors that contribute to physical, mental and social well-being, such as strong maternal-infant bonding, prolonged breastfeeding, and close clan ties. The patterns of morbidity and mortality are typical of many other African countries: Measles, pneumonia, malaria, malnutrition, and gastroenteritis are the five leading causes of death. Other important causes of death or disease are anemia, tuberculosis, tetanus, cancer, cardiovascular disease, pregnancy related causes, neonatal causes, venereal disease, eye infections, schistosomiasis, and leprosy. Despite major increases in agricultural production, malnutrition remains a serious problem with about 25 percent of children under the age of five having weights below 80 percent of standard weight for age. Maternal nutritional depletion also appears to be significant.

Health services are provided in both the government and the private sector. The private sector is dominated

by the mission hospitals and clinics. These institutions provide about 40 percent of health services and there is significant coordination between their programs and those of the Ministry of Health (MOH). To achieve this cooperation, the mission sector maintains representation at the ministerial level through its secretariat PHAM (the Private Hospital Association of Malawi). There are only about 15 physicians in private practice and these do not have significant influence on policy. Approximately 5,000 traditional healers and 7,000 traditional birth attendants (TBAs) are still active, but, except for a recent pilot program for training TBAs, they have no formal relationship with the MOH.

The government's national health goals are stated "to raise the level of health of all the people of Malawi by providing a network of sound health facilities capable of reducing disease, protecting life, promoting better health, increasing productivity, and ultimately promoting well being."

During the past ten years, the MOH has taken a number of important initiatives in health. In 1973 a detailed, comprehensive, long-term health plan covering a 15-year period from 1973 to 1988 was prepared with WHO assistance. Its most important objectives were:

- strengthening of the MOH administrative structure;
- development of a network of basic health services;

- increase in the quantity and quality of health manpower;
- control of infectious diseases.

Significant accomplishments have been achieved in the development of the basic health services network, the expansion of under-five child clinics, antenatal clinics, and maternities, and in the training of medical auxiliaries.

The participation of the health sector in the development budget has averaged about 3 percent and in the recurrent budget 7 percent. This might be considered a small allocation but examination of all relevant factors suggests that the government's development efforts are well-balanced and that significant progress in health is occurring. First, there has been very significant progress in agricultural development, per capita income, transportation, and water supply. These factors are likely in the long run to have much more impact on improved health status than health care services. Second, the priorities of the MOH have been directed towards improved preventive and curative care for the whole population. What is most important, it has been steadfast in allocating its resources to meet these objectives. Third, the MOH is efficient in the use of its resources and its services outputs are less costly than in many other African countries. As a result, impressive achievements have been realized despite modest resources. At the present time, MOH expenditures are $14.7 million

or $2.76 per capita. This represents 4 percent of all government expenditure which is $70 per capita.

Current priorities of the MOH are:

- To continue expansion of the network of basic health services, especially in the main agricultural development projects areas;
- To continue to strengthen the MOH. This will include statistics and health information systems;
- To expand efforts in communicable disease control. This will include an expanded immunization/measles vaccination, schistosomiasis control, and malaria control with chemoprophylaxis;
- To expand urban maternity units;
- To improve the quality of training of clinical officers and nursing personnel;
- To replace several antiquated district hospitals.

MOH services are delivered in two ways: (1) through health care facilities (hospitals, clinics, etc.), and (2) through special categorical programs (e.g., tuberculosis control). The most important aspect of facilities services is the basic health services network. This is a pyramidal structure consisting of a district hospital at the apex, primary health centers serving areas of 50,000 population, and subcenters serving areas of 10,000 population. At the lowest level of the pyramid are the health posts which serve populations of 2,000 persons. Some subcenters are operated by local governments; others by the missions.

The most important categorical services are the MCH services. The expansion of under-fives' child clinics

is perhaps Malawi's most significant achievement in health care and one that has received world wide attention. The program began in 1968 and there are now 848 clinics which are being utilized by 80 percent of the population. The tasks carried out in these clinics are specifically aimed at reducing the problems that are the major causes of childhood morbidity and mortality. There are at least 310 antenatal clinics, and it is estimated that 70 percent of all deliveries have at least one antenatal visit and that 44 percent of all deliveries occur in a maternity. Other important categorical programs include tuberculosis, leprosy, schistosomiasis, malaria control and the new program of expanded immunization.

Outputs of services in Malawi are impressive: There are 3.7 outpatient visits per person (including MCH visits), 2.4 under-fives' visits per child under age five, 41 hospital admissions and 315 bed days per 1,000 population. In fact, nearly 80 percent of the population make use of MCH services. Current costs of services are estimated to be $.19 per outpatient visit, and $2.54 for a hospital bed-day.

Because of the deficiencies in the 1966 census and because the 1977 census is still under analysis, it is not possible to determine if these health programs and other advances in development have had an impact on the major measures of physical health status, such as mortality rates. Nevertheless, there is some evidence that health

status is improving: First, the percent of children seen in under-fives' clinics whose weights are below 80 percent of standard weight for age has fallen between 1968 and 1977; and second, the maternity mortality in maternities has fallen to 1.9 per 1,000 live births, a very low figure for Africa.

The major issues of current concern are:

- The rural health strategy. The development of the most peripheral units of the basic health services network, especially health posts, has fallen behind schedule. This has been due partly to underestimation of capital and operating costs and partly due to changes in plans that take time to effectuate. A combined MOH/Economic Planning Division workshop is needed to resolve outstanding issues and develop a feasible schedule for implementation.

- Recurrent costs. Malawi has been fortunate in attracting a significant amount of foreign donor aid for its health development projects; moreover, a steadily increasing real GNP has allowed increases in recurrent budgets to operate these new programs and facilities. However, it appears that the MOH recurrent budget may not be adequate to support all the programs and facilities planned. The upgraded subcenters will be especially costly components of the basic health services network. It is urgent that detailed and realistic cost studies be undertaken by the planning unit of both current and projected programs and facilities. Appropriate decisions can be then taken as to whether the MOH allocation should be increased, programs scaled back, new strategies considered or whether foreign donors should be asked to support recurrent costs during this limited acceleration phase of health service development. Consideration should be given to instituting standard treatment regimens for common problems in order to reduce drug costs.

- Health planning. Although good health planning has been occurring in Malawi, the MOH and the Division of Economic Planning have recognized

the need for more detailed manpower and recurrent cost projections. We can only reinforce these developments and suggest further that the capability of the health planning unit be increased so that it can fully engage itself in comprehensive health planning. When this is carried out, all foreign donor aid should be rigorously integrated into the comprehensive plan and schedule to avoid overspending recurrent budget funds and creating imbalances in the distribution of services.

- Manpower. There seems to be an overproduction of some categories of health workers and an underproduction of others. There has also been discussion about whether MCH assistants, homecraft workers, or village health workers would be most appropriate to staff village health posts. A proposal has been made to establish two new categories of nurses: Public health nurses and community health nurses. A comprehensive manpower study is needed to resolve these issues and its results need to be integrated into the overall rural health strategy and any cost projections.

- Physicians and health care in Malawi. Because of the low physician-to-population ratio, there will be mounting pressure for Malawi to start its own medical school. One of the reasons that Malawi has been so successful in developing its basic health services has been that these services have not had to compete with a medical school for resources. Therefore Malawi should weigh carefully the problems that a medical school brings with it. Particular attention should be paid to the inevitable high costs--first to operate the school and then to provide the sophisticated services the highly trained doctors will be expected to deliver. Thus the choice is not just about the alternative application of scarce resources; in a very important way, a decision to embark on establishing a medical school will determine the direction of investments in health for decades to come. And the present commitment to, and support for, the development of basic health services network may weaken during any delays a medical school would impose.

  Although there are only 15 private physicians in Malawi, these physicians have an income considerably larger than government doctors. Tensions and jealousies may arise. The government should

monitor this situation and consider remedies that would be appropriate should the problem grow.

Another reason for Malawi's success in the health care field has been that there has not been a significant lobby of highly trained physicians to constantly pressure the MOH to allocate proportionately more resources to urban hospitals. As more Malawians return to practice medicine in urban hospitals, such pressure may arise. Although it may be well-motivated by concern for patient care, such a reorientation of resource allocation would not be cost effective in improving health status nor would it be in the interests of the rural population. Thorough planning will help the MOH to justify its position and remain steadfast in its priorities.

- Role of the mission sector. The mission sector has done a superb job in expanding its ambulatory and preventive health care work in cooperation with MOH programs. As the basic health services expands it is not clear what role the mission sector will play in the future. It would seem that there are cogent arguments for fully integrating the mission sector into this network and it is suggested that any comprehensive health plan consider fully the role of this sector and, where appropriate, involve PHAM in the planning process.

- Population growth. Malawi's population is growing at a rate of 2.6 percent per year. This rate will probably increase. Until now, Malawi's vigorous leadership has enabled it to maintain a real GNP per capita growth of 4 percent. In some areas population density is becoming a factor to be concerned with. To some extent, agricultural yields necessary to support this increased density are being increased by better technology, and it is always difficult to predict the optimum population that an area should support. Nevertheless, it would seem appropriate for the government to begin to formally consider its demographic situation. A population office or study group within the Economic Planning Division might be useful as well as a study of current trends and implications for economic growth. With increased child survival, many women appear to be in need of family planning services and it would be unrealistic in 1978 not to suggest that population growth and family planning will be an issue that the government will have to consider in the decades ahead.

During the team's trip, the government brought forward a number of specific recommendations for U.S. assistance in the health field (see Appendix). After considering these and after further discussion, the team made the following recommendations for assistance.

- Support for planning and management;
- Support for the most peripheral components of the basic health services network. This could include training of community health workers, building of facilities, drugs and supplies, aiding supporting services such as health education or district medical officer training, and supplies for village water and sewerage projects;
- Categorical disease support. Especially for expanded immunization (measles vaccination) and schistosomiasis control;
- Aid for health components of integrated rural development projects;
- Support for water supply development;
- Subsector grant.

Malawi is highly deserving of assistance for its health care system. It is still one of the poorer countries; in the past any assistance has been carefully and appropriately used; and when its development program is fully implemented, Malawi will have a model health care system that many other African countries can view and learn from. In many ways it already does.

I. INTRODUCTION

A. Background and Acknowledgements

This review of the health sector in Malawi was conducted as part of the comprehensive assessment of the health sectors of all Southern Africa countries being undertaken for AID's Southern Africa Development Analysis Program (SADAP). Performing the review and analysis that are contained in this report was a collaborating team comprised of a special consultant as Team Leader and professionals from the staffs of Family Health Care, Inc. (FHC) and Africare.

The field visit phase of the project was conducted from June 19 to June 30, 1978, by the three-member FHC/Africare team. The team was composed of the following professionals (days spent in-country are in parentheses):

David D. Nicholas, M.D., M.P.H., Lecturer, UCLA School of Public Health (Team Leader) (13)

Alan W. Fairbank, M.P.A., Health Economist, FHC (5)

Alameda Harper, M.P.H., Health Specialist, Africare (13)

During the total of 33 person-days spent in-country, the team collected a comprehensive variety of information and materials, and conducted dozens of interviews with providers, planners, and administrators in health programs in both the public and private sectors. There were collaborative discussions with officials of the Ministry of Health concerning the health needs, health resources, and

constraints in the health and family welfare sector, and concerning the priorities of the country's health plan. A list of persons interviewed and institutions visited is included in the appendix, along with a bibliography of materials used and referred to in the preparation of this report. Dr. Nicholas is the principle author of this report. During its preparation in Washington, D.C Robert N. Grosse, Ph.D., School of Public Health, University of Michigan and William Bicknell, M.D., MPH, Health Policy Institute, Boston University, participated in the technical review process.

B. Summary Statistical Profile of Malawi

	1970	Most Recent Estimate
General		
Per capita GNP (US$) at current prices	71.5(a)	157(a)
Per capita GNP (K) at 1964 prices	50.9(a)	67.8(a)
at current market prices	60.1(a)	143.0(a)
Population (midyear, in millions)	4.44(a)	5.31(a)
Land area (thousands of square km)	94.2(b)	94.2(b)
Arable land area (thousands of sq km)	53.1(c)	53.1(c)
Population density per sq km	47.1	56.4
Urban population (% of total)	-	9.5(d)
Labor force in agriculture (%)	85(e)	85(e)
Age structure (5)		
0-4	16.4(f)	-
5-14	27.1	-
15-59	50.0	-
60+	6.5	-
Adult literacy rate (%)	22(g)	N/A
Electrical energy generated (millions Kwh/year)	148(h)	311(h)
Electrical energy generated (Kwh/year/cap)	33.3	58.6
Km paved roads	10,782(i)	13,699(g)
Consumer price index (Blantyre)	100.0(k)	183.8(k)
Annual inflation rate (%)	9.5(k)	9.1(k)
Rate of exchange	1.19	1.19

	1970	Most Recent Estimate
Health Status		
Life Expectancy at birth (years)		
Male	40.9(g)	-
Female	44.2(g)	-
Crude birth rate (per 1,000 pop)	50.5(l)	50.5(m)
Crude death rate (per 1,000 pop)	26.5(l)	28.2(m)
Population growth rate		
Total (natural)	2.4(l)	2.6(m)
Urban	-	6.0(e)
Number of years for population to double	28.8	26.5
Infant mortality rate (per 1,000 live births)	-	163.8(m)
Maternal mortality rate (per 1,000 live births)	2.4(m)	1.9(n)
Nutrition: % children under 5 with weights below 80% Harvard Standard	37.2(o)	29.6(p)
Children 0-4 immunized (%)		
Against tuberculosis	(?)	80(q)
DPT (3 doses)	(?)	40(q)
Polio (3 doses) 1968	0(o)	20(q)
Measles	0	8
Malaria (total new cases per year)	-	1,554,000(r
Measles (total new cases per year)	-	168,000(r)
Bilharzia (% positive)	No data	No data
Leprosy (% pop affected; estimated)	-	1-2(q)
Attended deliveries (% in an institution)	-	44(s)
% all deliveries with 1 or more prenatal visits		70(s)
Tuberculosis (deaths)	154	387(t)

	1970	Most Recent Estimate
Cholera		Still present
Typhoid		379(t)
Health Resources		
Government health expenditures (recurrent only)		
Total (millions of US$)	3.73(u)	8.87(v)
As % of all govt expenditures	6.7	6.7
Per capita ($)	0.84	1.67
Population per physician	68429(1)	39044(w)
Population per nurse	N/A	1188
Primary health worker (pop per worker)	N/A	5619
Hospitals (pop/bed)	647(1)	552(x)
Community water supply (% pop served)		
Urban		69(e)
Rural		30(e)

Units of Valuation

The official unit of currency in Malawi is the Kwacha (K) which is divided into 100 Tambala. K1 = 100 Tambala.

Currency Equivalents

The Kwacha was originally pegged to the British pound at a rate of 2K = Lb (UK). It is now pegged to the SDR (Special Drawing Right: A weighted basket of the currencies). Current value is US 1.185 = 1K or 1K = $0.84 US.

Fiscal Year

The government's fiscal year runs from April 1 - March 31.

Sources for Statistical Summary

a. Source: GOM Economic Report 1978, Table 3.3
(in 1971 1 Kwacha = 1.19 US$)
(in 197[illegible] 1 Kwacha = 1.10 US$)

b. Source: Transition in Southern Africa... Malawi, USAID, 1977 not including inland water (e.g., Lake Malawi).

c. Source: Malawi Statistical yearbook, 1977, p. 83.

d. Source: 1970 Malawi Statistical Yearbook, 1977. WHO/World Bank, ROM Water Supply and Sewerage Sector Study (Draft), p. 6.

e. Source: WHO/World Bank; RCM Water Supply and Sewerage Sector Study (Draft) p. 4.

f. Source: Malawi Statistical Yearbook, 1977, p. 8.

g. Source: World Almanac (LA Times), 1978.

h. Source: Malawi Statistical Yearbook, 1977, p. 117 (1970 and 1976 data).

i. Source: Encyclopedia Britanica; Macropaedia 1978 Ed., p. 364.

j. Source: Malawi Statistical Yearbook, 1977, p.108.

k. Source: Malawi Statistical Yearbook, 1977, p.176 (1977 - Dec. 77).

l. Source: World Almanac (LA Times) 1978.

m. Source: MOH Statistical Table 1978: Table 6 (reason why 2.6 growth rate does not coincide with calculation of 50.5 - 28.2 = 2.23 is not clear).

n. Source: MOH Statistical Table 1978: Table 21: 2.4 is for 1975, 1.9 is for 1977. (Rate is f - institutional births only).

o. Source: S. Cole King. Under-Five Clinic in Malawi Environmental Child Health, August 1975, p. 183.

p. Source: MINIPLAN - MOH, 1976.

q. Source: WHO, Country Profile of Malawi, 1978.

r. Source: MOH Statistical Tables - 1978: Table 12D.

s. Source: MOH Statistical Tables - 1978: Tables 20 and 21.

t. Source: MOH Statistical Tables - 1978: Tables 13-17.

u. Source: Malawi Statistical Yearbook - 1977, p. 159.

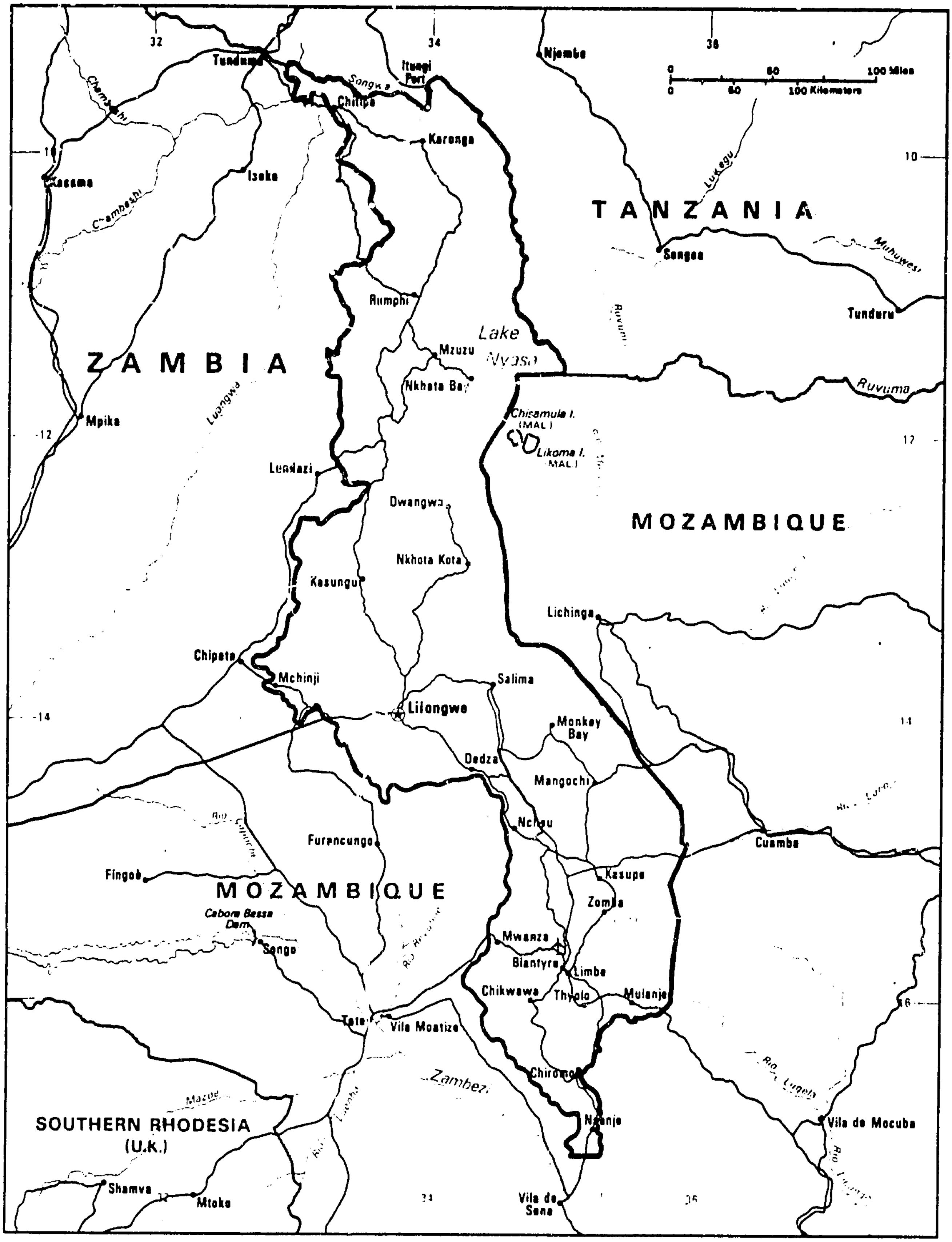
v. Source: GOM Budget Report No. 4, 1978/79, p. 7.

w. Based on MOH figures of 136 physicians currently registered.

x. Source: MOH Statistical Tables, 1978: Table 7.

y. 5.31 million is estimate used by the Economic Planning Division for 1977: Preliminary results 1977 census indicate population of 5.5 million. This report will use 5.31 as population because census analysis is not final yet.

Malawi


TANZANIA
ZAMBIA
MOZAMBIQUE
MOZAMBIQUE
SOUTHERN RHODESIA
(U.K.)
Lake
Nyasa
Tunduma
Itungi
Port
Chitipa
Karonga
Njombe
Songea
Tunduru
Kasama
Isoka
Rumphi
Mzuzu
Nkhata Bay
Mpika
Lundazi
Chisamula I.
(MAL)
Likoma I.
(MAL)
Dwangwa
Nkhota Kota
Kasungu
Lichinga
Chipata
Mchinji
Lilongwe
Salima
Monkey
Bay
Dedza
Mangochi
Ncheu
Cuamba
Furancungo
Fingoè
Kasupe
Zomba
Cabora Bassa
Dam
Songo
Mwanza
Blantyre
Limbe
Chikwawa
Thyolo
Mulanje
Tete
Vila Moatize
Zambezi
Chiromo
Nsanje
Vila de Mocuba
Vila de
Sena
Shamva
Mtoko
Ruvuma
Songwa
Luangwa
Chambeshi
Lukugu
Muhuwesi
0 50 100 Miles
0 50 100 Kilometers
32
34
36
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12
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16

II. A PROFILE OF MALAWI: THE CONTEXT OF HEALTH AND DEVELOPMENT

A. PHYSICAL FEATURES

Malawi is a long, narrow, land-locked country in southeastern Africa, about 350 miles west of the Indian Ocean. It lies between the East African region with its coastal Arab culture and the cutural and economic sphere of Southern Africa.

Topographically Malawi is dominated by the final section of the East African rift valley system which here fractures the high plateau of south central Africa forming a deep trough. Lake Malawi, which is 355 miles long and 10 to 50 miles wide, occupies two-thirds of the fault trough. The lake is drained by the Shire River which, following the line of the rift, joins the Zambezi River some 250 miles from the lake outlet.

Malawi's 45,000 square miles of area (one-fifth of which is lake surface) include a wide range of elevation and relief which gives rise to agricultural diversity ranging through tropical, sub-tropical, and temperate crops. The diversity can be categorized into three topographically different regions. The Central Region consists largely of plateau of about 4,500 feet in height, with a strip of lower lying land along Lake Malawi. The Northern Region is mountainous with altitudes up to 8,000 feet. The Southern Region, which has some scattered mountains, is mostly

low-lying plains of about 1,500 feet above sea level. Malawi's fast-flowing rivers are a source of hydroelectric power.

B. DEMOGRAPHIC PROFILE

Malawi's population of 5.3 million is overwhelmingly rural; only 500,000 people (9.4 percent of the total population) reside in urban areas. The country is divided into Northern, Central, and Southern Regions, containing 12 percent, 38 percent, and 50 percent of the population, respectively. The largest cities are Blantyre, the former capital (estimated population 290,000); Lilongwe, the new capital (estimated population 136,000); and Zomba (estimated population 36,000).

The age distribution is characteristic of a high fertility/high mortality demographic pattern: 16 percent of the population are under five years of age, and 42 percent under age 15. Females outnumber males in all age groups except those over 54. The national rate of natural population increase has been estimated to be 2.6 percent per annum, and the total rate, including in-migration, to be 2.9 percent. The urban growth rate is 6.0 percent per annum, the rural 2.3 percent.

C. HISTORICAL AND CULTURAL CHARACTERISTICS

Because of historical events and various forms of intermixing, ethnic identification is not as important

as in some other parts of Africa. More than 75 percent of the population understands Chichewa, which was declared the national language in 1968. In 1966, only six percent of the Malawian population understood English, the country's official language. Less than 1/2 percent of the population are non-African with Asians numbering 11,299 in 1966, and Europeans, 7,395. More current data will soon be available from the 1977 census now being analyzed.

Seventy-five percent of the population are Christian and 20 percent Muslim, but many people maintain ties to traditional cosmology as well. The dominant culture is still traditional with most people living in small social units under a village chief and supporting themselves by cultivating nearby land. Clan ties are strong with matrilineal descent and inheritance predominant.

D. THE POLITICAL SYSTEM

Under the constitution promulgated in 1966, there is a Parliament composed of a president who is head of government and a National Assembly of 60 members, 15 of whom can be appointed by the president. Elections are held every five years. Malawi is a *de facto* one-party state and in 1971 Dr. Banda was elected president-for-life. The central government is composed of 14 ministries and for purposes of administration, the country is divided into three regions and 24 districts. Although the three regions have ministerial representation at the cabinet level, regional

administration is operative in only limited activities. Local government consists of district councils, city councils, and six town councils. The districts are headed by District Commissioners (DC) and their administration is concerned with law and order, the collection of revenue, the stimulation of development at the local level, and the provision of certain social services. For example, in some areas they provide dispensaries or maternities. They also help to coordinate the activities of government departments at the district level.

National development is the responsibility of the Office of the President and Cabinet, and functions under three divisions:

- The Development Division;
- The Economic Planning Division;
- The Physical Planning Division.

The President is Chairman of the National Development Council. Besides, there exists a National Development and Planning Coordination Committee.

The Development Division is an administrative body, which is responsible for the administration of the National Development Program. Its main responsibility is the annual revision of the Government's three-year rolling public sector development program. For apparent reasons, the Division works closely with the Ministry of Finance. Through the District Development Committees, the Development Division carries responsibility for rural development.

The Economic Planning Division is responsible for advice on national economic policy and priorities, research, planning and evaluation of development projects. This Division issues an annual Economic Report and a monthly statistical bulletin. A "Statement of Development Policies, 1971 - 1980" (DEVPOL) was produced by the Division as a guide to development programming.

The Physical Planning Division is made up of professional planning officers. The Division has been engaged in an integrated development plan for the capital of Leongwe and the infrastructural planning of a variety of development projects.

E. THE ECONOMY

Relative political stability since independence in 1964 has engendered a high level of confidence in the government's development policies and programs. Over the past 14 years Malawi's economic progress has been remarkable. At independence, Malawi was one of Africa's poorest countries, with a GNP per capita of $48. Since that time, the GNP has grown at an annual rate of 6.8 percent in real terms. Domestic savings, which were virtually nil in 1964, amounted to 11.5 percent of national income in 1976.[1] At current rates of increase of population and GNP, real per capita income will double during the next 17 years.

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[1] Source: Government of Malawi Budget Economic Report No. 2, 1978.

Currently, annual per capita GNP is $169. Such sustained growth is especially significant in a country with negligible mineral resources and such a dominant agricultural sector, which occupies 85 percent of the labor force and contributes about 50 percent of the GNP.

There are several factors which seem to be responsible for economic progress. One is the government's commitment to development and to rational planning. The main emphasis of DEVPOL is on growth, which is considered necessary not only to increase employment and income, but also to provide a solid basis for foreign exchange earnings, domestic savings, and government revenue. The private sector is seen as the motor of economic growth, and foreign investment is encouraged. Public expenditure is directed toward smallholder agriculture, infrastructure, public utilities, and social services. The concept of implementing DEVPOL through the three-year rolling program has worked well in practice; short-term targets are revised annually within the broad long-term guidelines of DEVPOL. It gives the executing ministeries a firm yet flexible framework on which to base their work programs.

Another factor associated with economic success has been an apparent high standard of performance and discipline followed by both government and private workers. Misappropriation of funds or supplies is rare. This, coupled with a steady growth in earnings, has resulted in relatively high worker morale.

A third factor is the government's attention to fiscal responsibility. There are two government budgets: The revenue (recurrent) budget financed primarily from tax receipts and used for oeprating expenses, and the development (capital) budget financed by borrowing and from foreign aid grants. Since 1973 the government has managed to generate a surplus in the revenue budget.

F. AGRICULTURAL DEVELOPMENT

Agricultural production accounts for 50 percent of Malawi's GNP, and has steadily expanded since independence, at first by increasing acreage under production, and more recently by increasing emphasis on raising yields on existing acreage. The principal crops and their production are shown in Table 1.

There has been impressive growth in the production of all crops except groundnuts which have actually diminished. This has been true for both estate and smallholder production, although the growth in estate production has lately been growing at a rate nearly double that of the smallholders. Tea and tobacco are the principal export crops but enough has apparently been produced to allow for substantial exports of groundnuts, rice, sugar, and maize as well.

Crops for sale may be bartered in open air markets, or sold to private traders or to the Agricultural Development and Marketing Corporation (ADMARC), a state-owned corporation. Large tobacco and tea growers are allowed

Table 1

PRINCIPAL CROPS & THEIR PRODUCTION

Crop	Acreage Under Cultivation 1978/79 (000s) [a]	Production 1973 (000s) [b]	Monetary Sales		Exported	
			1975 (000s) [b]	1977 (000s) [b]	1973 (000s) [b]	1977 (000s) [b]
Maize	2,638	1,413	69.5	99.1	40.0	-
Pulses	2,079	187	7.5	9.7	7.5	N/A
Millet/sorghum	1,226	106	11.0	N/A	-	N/A
Groundnuts	1,110	136	33.0	20.4	30.2	N/A
Cassava	738	92	6.0	N/A	-	-
Potatoes	446	85	12.0	N/A	-	-
Rice	119	N/A	19.0	26.3	15.8	24.7
Cotton [c]	91	19	17.9	25.0	2.7	1.9
Tobacco	86	36	35.0	56.5	35.0	N/A
Tea	43	26	26.0	35.0	25.0	N/A
Sugar	N/A	54	55.0	102.0	20.0	70.0

Source: Statistical Yearbook of Malawi, 1977. Tables 8.1-8.5, 8.19; and Government of Malawi: Economic Report 1978, Table 4.5 p.16.

Notes:

a. Acreage under mixed stand are included for each crop in the mixture.

b. Short tons (1 short ton = 2,000 lb).

c. Production and sales: Short tons cotton seed; export: short tons cotton lint.

to sell at open auctions. Distribution of food grains is improving as the country's ambitious road development network expands.

Although economic progress has been impressive, the government has been concerned about the relatively slow growth of smallholder agriculture. Since 1968 four integrated rural development projects have been implemented that have been judged very successful. Farm family cash income is said to have increased in the Lower Shire project from $30 annually before the project to $300 annually afterwards. Nevertheless these projects have only reached 13 percent of the population. As a result, the government has launched a National Rural Development Program. This program will utilize the prior experience but will concentrate less on infrastructure and more on inputs and services which will reach a much larger number of farmers in a shorter period of time. It is an ambitious scheme that hopes to eventually reach 100 percent of farm families--50 percent by 1981. Provision of agricultural services will be coordinated with the development of health subcenters and primary schools. The program is to be financed by external loans, the repayment of which will require increased productivity. Results so far give cause for optimism: Malawi's farmers have the remarkable loan repayment rate of 98 percent.

G. INDUSTRY AND MINING

Industrial development is being assisted by the Malawi Development Corporation (MDC) established in 1964, and the Investment and Development Bank (INDEBANK), established in 1973. MDC is government-owned, which gives the government influence over its investment decisions. INDEBANK is owned jointly by ADMARC and three foreign investment agencies, each of which holds a 25 percent share.

Malawi's industrial sector has shown remarkable growth since independence, annual growth rates averaging 13 percent through the first decade. But because there was virtually no industrial base nor physical infrastructure in place in 1964, Malawi's industry still represents a minor portion of the country's total output and total wage employment--about 12 percent in each case. Although growth rates in the industrial sector have slowed since 1973, industrial policy continues to be directed towards developing import-substituting industries, expanding food processing, and establishing small-scale enterprises.

Malawi has few mineral resources. Low-grade coal and bauxite deposits are known to exist, but it has not yet been found economically feasible to exploit them. Some mines and quarries provide local building materials, including inputs for the cement industry. Malawi's lack of mineral resources is responsible for its inability to attract outside interest or investment as did neighboring countries. Apart from some plantations in the Southern Region,

Malawi was largely a traditional subsistence society at independence.

H. TRANSPORTATION RESOURCES

Malawi has a remarkably extensive network of more than 9,000 miles of roads. Pitched roads link the major cities of Malawi with all neighboring countries, and points along Lake Malawi are now linked by the recently completed Lake Littoral road, which should prove a boon to Malawi's growing tourist trade.

For the transit of foreign trade, Malawi must rely on railroads to the Mozambican port cities of Beira and Nacala. Before the closure of the border between Mozambique and Rhodesia, a substantial railway traffic existed through Mozambique, between Malawi, and Rhodesia and South Africa.

Starting in 1975, when investment in the transport sector tripled and became almost half of development spending, Malawi embarked on major improvements of the transportation infrastructure--about half of spending went toward expansion and improvement of Malawi Railways. The hope is to eventually link Malawi Railways with the Zambian railway system. This goal was prompted by greatly increased Zambian through-traffic after the closure of the border between Zambia and Rhodesia in 1973. Agricultural development of the Northern and Central Regions is also expected to generate a large volume of domestic traffic, requiring an improved transport network.

I. HOUSING

The National Sample Survey of Agriculture (1968/69) found that 92 percent of houses in rural areas were constructed of mudwalls and thatched roof. For the most part, there is no feasible alternative at present to the traditional building techniques and materials. According to a WHO report,[2] the techniques and materials used are "adequate to ensure a satisfactory standard of housing."

Of greater concern to the government is the continuing shortage of housing in rapidly expanding urban areas, particularly for low-income wage earners. For middle income groups, the government has provided funds through the Malawi Housing Corporation, for the development of medium and high density residential areas. External financing has been obtained for this program, which does not contain an element of subsidy.

For lower income groups, the government provides as a social service "site and service schemes" in traditional housing areas. The element of subsidy in this program is confined to the provision of basic amenities, leaving the tenant to provide his own house. In general, the government policy is to concentrate its resources on urban housing.

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2 World Health Organization, "National Health Planning, Malawi, Report of a Mission", WHO Regional Office for Africa, 1972, pg. 224.

J. EDUCATION AND HUMAN RESOURCES

In 1966, 22 percent of the adult population was said to be literate, and 35.8 percent of the population over age five had attended school at some time. In 1976 the population between the ages of 6 and 13 years was estimated to have been 1,148,000 and there were 663,940 children enrolled in primary school (grades 1-8). Thus it would appear that about 50 percent of primary school-aged children are currently enrolled in school. A significantly higher percentage of males are enrolled than females.

Secondary school education is of four years' duration. Examinations are given after two years of secondary education (the Junior Certificate) and after four years (the Malawi Certificate of Education or MCE, which is also called "O" levels). Following the MCE some students study another two years to qualify for "A" level exams. If successful, they are assured university entrance.

In the period 1970-1976, primary school enrollment doubled, secondary school enrollment increased by 36 percent, and the output of civil service trainees from the staff college increased from 157 in 1968 to 420 in 1976. Nevertheless, lack of trained manpower will continue to be a constraint to development. The recommendation has been made that the government increase its expenditures for education, especially for expansion of technical and agricultural education, and for training in specialized

occupations such as accounting and management; that it revise the curricula of the primary schools to ensure relevant education to school leavers; and that it expand training of the adult rural population in practical subjects.

It is estimated that 85 percent of the labor force is engaged in agriculture with women accounting for half of the output. In 1975 there were 244,758 wage employees or about 8 percent of the population aged 15 years or over. Only 10 percent of these wage employees were females. The minimum daily wage rate in 1986 was K 0.25 (US $0.30). The average annual earnings of paid workers was K 334 (US $396) in 1973, but many of these paid workers cultivate some land themselves, the output of which they consume or else sell to increase their cash earnings.

In 1975 there were an additional 250,000 wage earners outside the country employed mainly in the mines of neighboring countries. Following an airline disaster in the Republic of South Africa involving a large number of Malawian workers, the government suspended recruitment of workers to South Africa. Since that time, many of these migrant workers have returned home.

III. THE HEALTH SECTOR

A. A PROFILE OF THE HEALTH SITUATION IN MALAWI

1. Health Status and Patterns of Morbidity and Mortality

Although the health situation in Malawi is influenced by environmental factors and cultural-economic conditions common to the countries of tropical Africa, there are a number of socio-economic factors that have a very positive effect on well-being in Malawi. Strong maternal-infant bonding and prolonged breast feeding provide emotional security to the infant and ideal nutrition and protection from any diseases for the first six months of life. Later, clan ties and customs provide stable role models for the growing child and much personal security through old age. Literacy and GNP per capita have been steadily increasing since independence and can be expected to have a positive impact on physical health. Community support for self-help activities is strong and is evident in the successful gravity water systems being constructed by villagers and in the support of women's groups for under-fives clinics.

Many of the environmental and cultural factors associated with ill health elsewhere in Africa are also present in Malawi. The climate and geography favor the presence of important vectors such as the Anepheles gambiae, which makes malaria so difficult to control; the snails transmitting bilharzia; and the similium flies that transmit onchocerciasis. Except along the border of Lake Malawi and

the river valleys, soils have only moderate fertility. This, coupled with traditional farming methods, means that agricultural output in many areas meets subsistence needs only partially. Food shortages may develop if droughts occur. Traditional weaning foods may also be associated with malnutrition.

Full health includes physical, mental, and social well-being. Unfortunately, it is impossible to measure at this time those aspects of Malawian life that are likely to be the most healthy--mental and social well-being. Nevertheless, one should neither disregard nor underestimate these two aspects since they may be profoundly affected by the types and rates of technological change and social innovations. No single statistical measure of health status can in fact express all of the significant dimensions and determinants of a people's mental, social and physical well-being. As approximate indicators of health status, however, morbidity and mortality rates, while less than adequate, are generally sufficient for broad descriptive purposes.

At independence, Malawi was one of the poorest African countries, far behind many others in GNP per capita, literacy, and health status. The following are the vital rates that the MOH is currently using, derived in part from an analysis of a special enumeration study area:

Crude death rate:	28.2 per 1,000 population
Infant mortality rate:	163.8 per 1,000 live births
Maternal mortality rate:	1.9 per 1,000 live births

The crude death rate and infant mortality rate are now probably somewhat below these high levels, but it remains to be seen whether the 1977 census analysis will confirm this impression. In any event, the most dramatic changes in vital rates might be expected in the next generation following the onset of significant interventions.

Although data reported from hospitals bear an uncertain relationship to actual events, an approximate pattern of mortality among those who reach hospitals can be discerned from the cause-of-death data presented in Table 2. More than half of all reported deaths occurred in children under five years of age; the principal causes in that age group were measles, malnutrition, malaria, respiratory disease, gastroenteritis, and neonatal problems. Malnutrion is, of course, a major contributory factor in mortality due to measles and gastroenteritis.

Although the pattern of mortality is similar to that of many other African countries, there are some variations that may be significant. The measles mortality is extremely high and is associated with high rates of malnutrition. Deaths due to tuberculosis are also high. of 26 African countries examined by WHO, Malawi ranked ninth in tuberculosis prevalence in Africa [Bulla, 1977]. Unfortunately, it is difficult to determine how much of these differences is due to actual higher disease frequencies and how much is due to reporting incompleteness. On the other hand,

TABLE 2

INPATIENT MORTALITY BY CAUSES OF DEATH
MALAWI, 1977

Disease	No. of in-hospital deaths in 1977
Measles	1,547
Pneumonia	950
Malnutrition	813
Malaria	775
Gastroenteritis	591
Anemia	529
Tuberculosis	340
Cancer	228
Cardio-vascular disease	143
Tetanus	190
Pregnancy related	131
Neonatal (including prematurity)	105

Source: MOH Statistical Reference Tables - 1978, Table 13

Note: Some anemia deaths may be due to malaria

pregnancy-related deaths account for only 1.6 percent of all deaths. This is compatible with the low maternal mortality rate of 1.9 per 1,000 live births occurring in institutions reported by the Ministry of Health. Institutional maternal mortality is usually not lower than total maternal mortality in African countries, such as Malawi, that have reasonably good road networks, because women with problem deliveries often make their way to a hospital before death occurs. Many African countries report high institutional maternal mortalities of five to ten per 1,000 live births, accounting for a higher percent of total deaths (e.g., 4 percent in Ghana). Only 23 deaths were reported as attributable to typhoid and 46 to infectious hepatitis. These are rather low figures for Africa.

The diseases listed above are also important causes of morbidity, as are a number of other conditions that kill only rarely. The most important causes of morbidity as indicated by Ministry of Health outpatient statistics for 1976 are shown in Table 3.

Particularly noteworthy among data on disease incidences are the reported incidence of eye infections which cause most cases of blindness in Malawi [Benezra and Chirambo, 1977], and of venereal disease, which is responsible for most cases of infertility. Guinea worm, which can seriously affect agricultural production, does not occur in Malawi. Trypanosomiasis (sleeping sickness) has not been

TABLE 3

DISTRIBUTION OF OUTPATIENTS BY DISEASE GROUPS
MALAWI, 1976

Disease Category	Number of diagnosed cases (First visit only) under five yrs.	five yrs. and over	Percent under five years	five yrs. and over
Malaria	753,549	800,350	25.5	17.9
Respiratory disease	587,794	730,480	19.9	16.4
Diarrheal diseases	361,543	269,709	12.2	6.0
Other Gastro-intestinal	228,092	379,823	7.7	8.5
Eye infections	212,864	187,452	7.2	4.2
Skin infections	182,148	275,199	6.2	6.2
Trauma	109,842	318,305	3.7	7.1
Arthritis	26,645	200,984	0.9	4.5
Venereal Disease	4,175	148,293	0.1	3.3
Intestinal Parisites	50,574	126,444	1.7	2.8
Dental problems	15,933	118,250	0.5	2.7
Genito-urinary disease	10,391	112,880	0.4	2.5
Fever of unknown origin	38,898	135,882	1.3	3.0
Schistosomiasis	20,138	125,529	0.7	2.8
All others	353,559	530,165	12.0	12.1

Modified from MOH Statistical Reference Tables - 1978: Table 12D

observed for some years in Malawi. Another indication of health status among Malawian children comes from a study by Burgess in 1970 in the Lower Shire Valley; those data are summarized in Table 4.

The diseases causing the most morbidity and mortality in Malawi are largely preventable and the government has already begun a number of programs to emphasize their prevention. Among the leading causes of mortality, for example, the following preventive steps could have significant positive impact:

Measles: Immunization of 12-month olds can prevent measles;

Pneumonia: Fatalities can be greatly reduced by improved nutrition, and by immunization against measles and whooping cough. Mass vaccination against pneumococcal disease may be feasible in the next five years;

Malnutrition: Although it is difficult to achieve dramatic improvements in a short period of time, a concerted program of agricultural development, improved weaning foods, health education and immunization will gradually improve the community's nutritional status. Food supplements may be indicated in some cases. Malaria control may also help improve nutritional status;

Malaria: Although eradication is not feasible at this time, childhood prophylaxis with antimalarials seems to be warranted and has resulted in markedly lower parasite rates elsewhere in Africa [Nicholas, 1978; Brubacker, 1978]. However, the issue of delayed immunity to malaria in those receiving chemoprophylaxis is not yet settled [Harland, 1975];

Gastroenteritis: Many of these deaths occur in malnourished children and mortality will diminish as malnutrition is prevented. Other deaths can be prevented through improved water supply, and by rehydration of infants suffering from diarrhea;

TABLE 4

PREVALENCE OF CLINICAL SIGNS AMONG UNDER-FIVE CHILDREN
LOWER SHIRE VALLEY, MALAWI, 1970

Type of Clinical Symptoms	Percent of Under-five children having symptoms
Isolated signs of - vitamin A deficiency	0.4
- vitamin B complex deficiency	2.3
- vitamin C deficiency	0.2
Thyroid enlargement (grades 1 and 2)	1.5 (father 21% mothers 31%)
Bacterial conjunctivitis	20.1
Trachoma	11.9
Skin infection (bacterial 10%, scabies 5%, fungal 4%)	19.0
Discharging ear	1.1
Upper respiratory infection	13.7
Vaccination scar	22.7

Source: From Burgess et al., 1973.

Anemia: Many cases are due to malaria which can be prevented; others can be prevented by administering iron tablets to women especially during and after pregnancies;

Tuberculosis: Many cases could be prevented by BCG vaccination, improved nutrition, case finding, and treatment of infected persons;

Tetanus: Immunization of pregnant women and the training of traditional birth attendants in aseptic umbilical cord care can prevent neonatal tetanus, the most common type;

Pregnancy-Related: Many problems can be averted by adequate prenatal care and by training birth attendants.

In addition, many severe eye infections could be prevented by better nutrition and hygiene, as well as measles vaccination. Onchocerciasis is preventable, but rather major health engineering efforts are necessary. Schistosomiasis is also preventable, but major concerted efforts are needed to produce a significant impact. Venereal disease can be prevented, but special and intensive health education may be necessary. The alarming increase in traffic accidents could be reduced by an intensive program of speed control, vehicle inspections, and road maintenance.

2. Food and Nutritional Status

Malnutrition is still a major problem in Malawi and there are many factors responsible; but the degree to which each is responsible is impossible to know at this time. Local food shortages due to poor soils, inadequate rainfall, flooding, or inefficient farming methods are partly responsible. Another factor is the inadequate

proportion of vegetable or animal protein in the diet, especially of young children, because the foods are not available or because of ignorance of their importance in the diet.

Complete nutritional status data is not available for the entire country nor for all age groups. The most complete study by Burgess (1973) showed that 30 percent of infants and children under five years of age had mild-to-moderate protein-calorie malnutrition (PCM). In the age group 20-79 years, 60 percent of men and 73 percent of women were below 90 percent of the weight-for-height standard (one would expect only about 20-25 percent to be below 90 percent of standard). This may reflect conditions of maternal depletion. Eleven of 23 households examined had an inadequate calorie intake (less than 70 percent of requirement). Fifty-one percent of children between the ages of 36 and 59 months had deficient hemoglobin, and hypochromic anemia was widespread. Iron deficiency was an important factor. The average hemoglobin level of 10.6 percent in babies of one month suggests low stores at birth. Another indication of the prevalence of malnutrition is the high mortality attributed to measles.

A vicious cycle may exist where nutritionally depleted mothers produce small infants who have been undernourished *in utero*. These children are then at higher risk for

both infection and malnutrition because they are constitutionally susceptible and because they may not receive sufficient mothers' milk. Infections, especially in childhood, are important contributory factors, the most important being gastroenteritis, respiratory disease, measles, whooping cough, and malaria. Finally, both the productive land and the food produced must be divided among a rapidly expanding population. While this may not have been an important factor in the past, it may become so in the decades ahead.

There are not great regional differences in foods of diet. A study by Burgess in 1970 in the Lower Shire Valley found that maize and millet were the primary staples. Most families also grew some green vegetables. Burgess reported that half the families raised sorghum, cowpeas, chickens, and goats, while groundnuts and sweet potato were less common. The diet was supplemented by infrequent purchases of fish, beans, meat, drinks, and salt--the expenditure on food during the survey week varying from nothing to U.S. $1.25 per family.

Virtually all children are breast-fed for 18 months, and about half of all children until 48-59 months. Most families have two meals: At midday and in the early evening; but a thin maize gruel is sometimes given to young children in the morning. The most traditional food is a thick maize or millet paste, called nsima, which is

dipped in a relish. Snacks of roasted maize, groundnuts, fruits, etc., may be eaten during the day and may be an important source of nutrients for older children. Other fruits such as mangoes and paw paw may be available seasonally. Food preservation is limited to drying, salting, smoking, and storage in pits or in above-ground storage bins (Burgess, 1973). A special weaning food called likuni phala was developed at a mission hospital and is now available commercially. It consist of 1/2 maize, 1/4 groundnuts, and 1/4 beans. Water, salt, and sugar are added, and it is fed to the infant during the weaning period or during a period of recovery from malnutrition.

3. Environmental Impacts on Health

Malawi's living environment is a strong determinant of the disease patterns. Without sanitizing the environment, almost any level of curative clinical interventions by the medical profession on the effects of these diseases would still leave the nature and dimensions of its environmental causes more or less intact. Moreover, broad-scale public health measures and "environmental sanitation" efforts produce limited benefits when they are not accompanied by significant public health education processes integrated into the variety of social services and development programs initiated by the government, and by general socio-economic progress and cultural changes. Although our discussion of the environmental dimensions of health will differentiate between the various elements and facets of the

environment, it is necessary to keep in mind that they have complex interrelationships with a variety of socio-economic and cultural variables.

a. Housing

The indoors environment is possibly the principal source of the causes of respiratory and digestive diseases, especially in young children who are the most vulnerable. Becuase of its high fertility rate, Malawi has a high population density indoors of the youngest age groups--the ones most susceptible to infection and to complications of illness (e.g., due to measles and malnutrition). Malawi has recently made remarkably effective progress in health education and preventive health for mothers and children, yet there can be no doubt that the lack of cleanliness in the indoors environment remains responsible for much of the high infant mortality rate. In a country where over 90 percent of the rural population lives in thatched, mudwall huts, and subsists off the land using traditional farming techniques, there are formidable obstacles to anything but slow and marginal improvements in the indoors environment. As one author described the monumental problems:

> Manipulations of the indoors environment in the absence of other socio-economic change is an immensely more difficult enterprise than the manipulation of the outdoors environment involved in our successful technologies for vector-borne disease control...What is involved here is no less than the successful education in hour-by-hour and day-by-day handling of an infant or young child in a nonsanitized household overrun with young children. It is as yet unknown to what extent such education in health measures can become an

effective instrument when divorced, as it must be in many places, from primary school education and the esthetic pressures involved in ascending the socio-economic ladder. [4]

b. Water

It was estimated by a recent World Bank mission studying the water supply and sewerage sector that about 70 percent of urban residents and 30 percent of the rural population have access to water supply service. Water supply projects currently underway or planned are expected to boost rural coverage to 50 percent by 1980 and urban coverage to 100 percent by 1985. A recent Presidential policy statement declared that one of Malawi's development objectives was to make a water supply available to all of the rural population. And, according to the recent World Bank mission, the possibility of achieving this goal by 1990 appears to be feasible.

Urban water supply development and maintenance are the responsibilities of the Blantyre Water Board and the Lilongwe Water Board (for the two major cities), and of the Ministry of Works and Supplies (for other urban areas). Each of the three agencies are currently engaged in extensive development programs largely financed by external loans and grants.

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[4] Walsh McDermott, "Environmental Factors Bearing on Medical Education in the Development Countries: Modern Medicine and the Demographic Disease Pattern of Overly Traditional Societies: A Technological Misfit," Journal of Medical Education, Part II (Supplement), 1966, p. 153.

Rural water supply is the responsibility of the Water Projects Section of the Ministry of Community Development and Social Welfare (MCDSW). In the past few years, the MCDSW has been implementing a program constructing gravity-piped water systems and shallow wells, largely through the use of self-help labor. The completed projects are handed over to the District Councils, but day-to-day maintenance is carried out by the beneficiaries. Popular interest and participation in this program has been high, and the MCDSW is initiating a new donor-financed program which will build 15 gravity-piped systems and 5,000 protected shallow wells to serve a population of almost one million by 1980.

c. Sanitation and Waste Disposal

Water-borne sewerage systems are available to a very small portion of the population. Nevertheless, due to the relatively uncongested nature of urban development so far and to the MOH's promotional and educational efforts in public sanitation, the urban population appears to be relatively conscientious about waste and excreta disposal.

Parts of the major cities--Blantyre, Lilongwe, and Zomba--are served by water-borne sewerage systems; World Bank estimates are that only 15 percent of their total populations have connections to the system. The remainder use septic tanks (27 percent) or pit latrines (58 percent).

No data are available to indicate the proportion of the rural population utilizing pit latrines. But the

current MCDSW water supply development efforts have been accompanied by educational programs in rural sanitation sponsored by the Ministry of Health, and they may have had a positive impact on the people's health consciousness.

For the current year (1977/78), development expenditures allocated for water supply and sewerage projects amounted to about 10 percent of the total development budget--with about 96 percent of that being provided through foreign loans or grants.

d. Occupational Hazards

In the overall context of Malawi's level of development, there are several areas of environmental and occupational hazards which are cause for concern lest they develop into serious threats to public health. One is the relatively high incidence of intestinal bilharzia which is prevalent in irrigated agricultural areas. The other is the rising incidence of accidents, primarily motor vehicle accidents, which is typically associated with rapid urbanization, industrialization, and modernization.

While these concerns are not as serious in Malawi now as they are in many other developing countries, they represent public policy "blind spots" because the need for preventive measures is at first as invisible as the dynamic causes of the health problem. Thus, the unforeseen and/or inadvertent impacts on health of various development projects and processes must be monitored continuously in

order to assure the design and implementation of timely preventive procedures.

4. Population and MCH/Family Planning

Fertility is high in Malawi. The crude birth rate is estimated to be 50.5 per 1,000 population, and each woman is estimated to have had 7.7 live births by the completion of her child bearing. High fertility and birth rates are responsible along with declining death rates, for Malawi's natural rate of population increase of 2.6 percent per year. This rate is likely to increase to at least 3.2 percent per year before it can begin to decline.

At present there is no official encouragement of any family planning activities, nor any government agency or department engaged in planning or implementing such activities. Nevertheless such activities do take place in the private and, to some degree, in the public sectors. In the private sector, pharmacies stock foam, pills, condoms, and I.U.D.s. Pills and I.U.D.s are dispensed only by prescription. Foam and condoms are sold over the counter. Prices are relatively expensive (one can foam K3.71, one packet condoms K0.65, one cycle pills K1.90). Some private doctors provide family planning advice on request. In the public sector at least some government hospital pharmacies also stock contraceptives free of charge on a doctor's prescription. Some government doctors are prescribing under two conditions:

- Serious medical indication (e.g., recent ruptured uterus)--here the physician can suggest use of a method; or

- On request of the woman--usually she must be married and have the permission of her husband. Tubal ligations are also available under similar conditions. Doctors do not spontaneously advise or suggest family planning unless there is a medical indication. At present the use of modern contraceptive methods seems to be limited primarily to the upper socio-economic strata and their use is probably increasing in these groups.

5. Mental Health Problems

Mental health services are provided only at one central referral institution, the Zomba Mental Hospital. It has 220 beds, but it is usually overcrowded, averaging about 300 patients at any one time in 1972. Occupational therapy, as well as psychiatric care, is provided for the patients. The team did not gather any further data specific to mental health care problems or facilities.

6. Regional Disease Patterns and Special Problems

Onchoceriasis is found primarily in the Southern Region especially in the Thyolo district where 33 percent of the population was found to be infected and where 63 percent of the blindness is attributed to onchocerciasis [Ben-Sira, 1972]. It is estimated that there are 100,000 cases of ocular onchocerciasis in this district, an important and growing problem.

Schistosomiasis is present throughout the country, but apparently is not a problem in Lake Malawi itself. It is becoming more prevalent in agricultural areas using irrigation.

Malaria is also endemic in all of Malawi but at a reduced level in colder, elevated areas. As with the other endemic diseases, disease incidence, that is, number of people presenting symptoms, may be considerably lower than the number infected (but having no symptoms).

B. THE HEALTH DELIVERY IN MALAWI: AN OVERVIEW

1. The Organization and Management of Health Services

a. Historical Perspective[5]

The development of Malawi's Ministry of Health can be traced to the beginning of British colonial rule with the first government doctor's appointment in 1891. Early efforts concentrated on the care of colonial personnel, but between 1900 and 1921 a number of preventive activities were carried out among the African population because of epidemics of smallpox, sleeping sickness, and plague. With the publication of Lugard's Dual Mandate, colonial administration became slowly more oriented to the concept of "the welfare of the native population as the first care of the Government" [Governor of Nyasaland, 1927].

Between 1921 and 1940, 12 district hospitals and 93 rural dispensaries were constructed, much of this financed by the Colonial Development Fund. After World War II, progress continued and although most work was curatively oriented, there were activities carried out in mass smallpox vaccination, bilharzia control, malaria control, health surveys, and health education. Training of African auxiliary personnel was also stepped up. In 1958 the 571-bed Queen Elizabeth Hospital was completed in Blantyre. Since independence in 1964, the staff of the Ministry

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5 Baker, C., "The Government Medical Service in Malawi: An Administrative History, 1891-1974." Med. Hist., 20, 296-311, 1976.

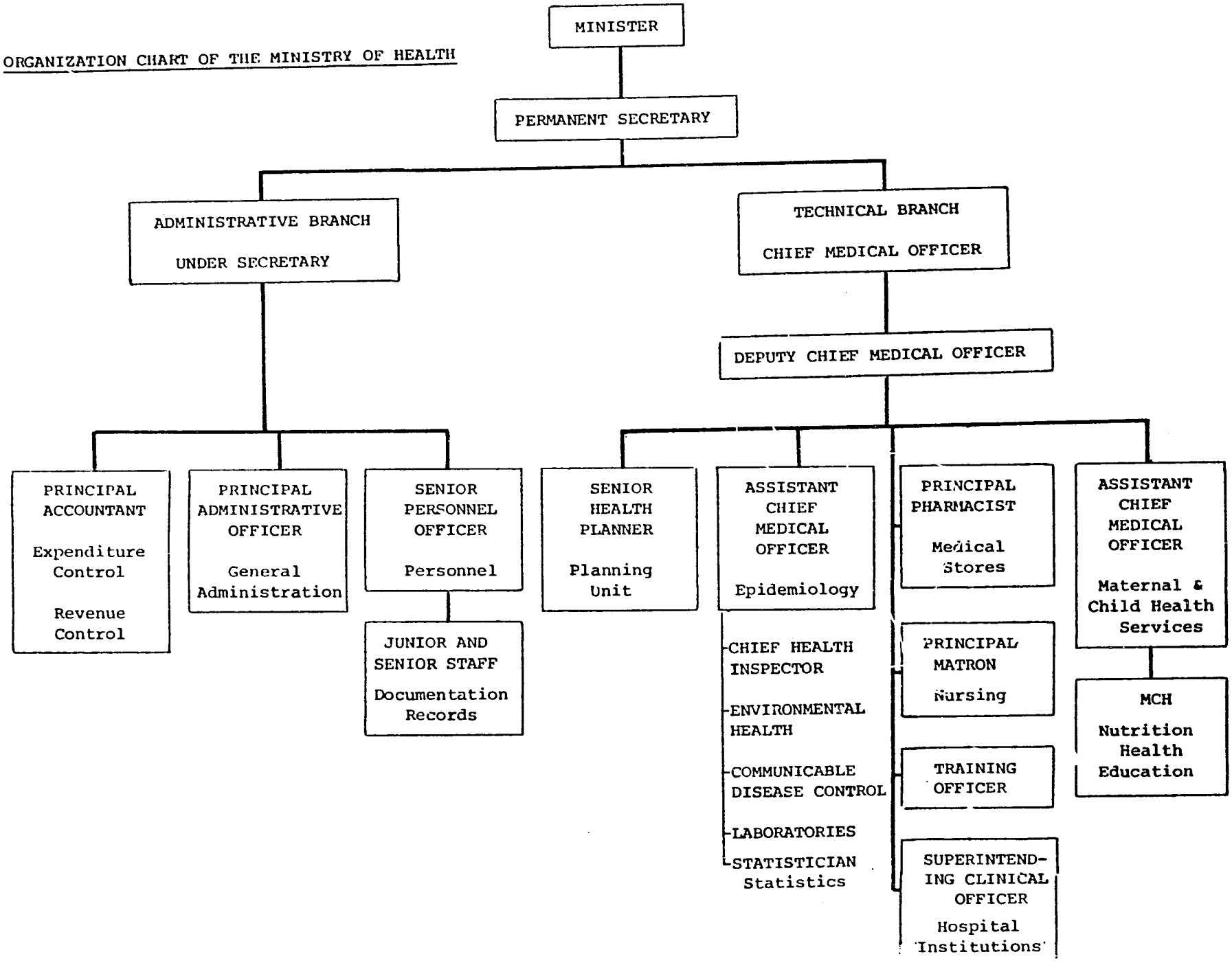
of Health has increased by 50 percent and the share of recurrent expenditure devoted to purely preventive activities has increasesd from around three percent to eight percent. Moreover, more and more preventive activities are being carried out in "curative" facilities.

b. The Role and Functions of the Ministry of Health

The Ministry of Health is organized in a way that is characteristic of many former British colonies in Africa (see Organogram, Figure 1). There is an administrative branch and a technical branch, both under the Permanent Secretary (PS). The administrative branch is concerned with financial and personnel matters. The technical branch, administered by the Chief Medical Officer (CMO), is responsible for the planning and delivery of health services. The District Medical Officers (DMOs) and a number of other senior officers and division heads, report to the CMO or his deputy. These include: The Chief Pharmacist who directs the Medical Stores and is responsible for the purchase, storage, and distribution of all drugs and supplies; the Chief Training Officer; and the Chief Nursing Officer (Principal Matron) and Superintending Clinical Officer, who are responsible for setting and monitoring the professional standards of performance.

The maternal and child health (MCH) division plans and coordinates the Ministry's MCH and nutrition programs, especially the under-fives clinics, antenatal clinics, and

ORGANIZATION CHART OF THE MINISTRY OF HEALTH



maternities. The epidemiology unit plans and supervises the work of the health inspectors and health assistants, plans and monitors programs of communicable disease control, supervises laboratories, and collects, analyzes and reports health data.

Although health statistics have been reported in a timely fashion in the past, they have often been incomplete and inaccurate. With the assistance of a WHO consultant, there has recently been a major reorganization of the health information system. Hospital returns have been simplified and will be handled by electronic data processing. Pilot work is going on in several districts to simplify outpatient returns and to computerize these as well. MCH returns have also been simplified to reduce clerical work.

There is a de facto dual chain of command in the MOH. The first is from the Chief Medical Officer (CMO) to the District Medical Officer (DMO) who is in charge of all health personnel and programs in his district. The second is from the CMO to the technical division chiefs (e.g., nursing, MCH, sanitation, etc.) to individual health workers in the district. Although it might be assumed that these technical divisions would perform primarily a "staff" function (i.e., advice and technical support), in fact the individual health worker reports both to the DMO and to a supervisor from one or more technical divisions with which he or she is affiliated. Although such a dual system

has resulted in conflicts in some countries, this does not appear to be the case in Malawi. The reason may be that most DMOs concentrate their activities in curative work at the district hospital. Usually they have had minimal training in preventive medicine or public health and are not intimately involved with the entire district's health program. As a result it is usually the technical divisions which provide the support and supervision for the preventive and promotive activities and ensure strong program continuity in the face of frequent DMO turnover.

It is the government's policy to place the highest priority on technical competence in its government posions. Expatriates have been gradually replaced as more Malawians have been adequately trained to meet government standards. Most senior positions at the MOH are now held by Malawians, but expatriates (some are WHO staff) continue to serve as advisors in some of the technical divisions (e.g., MCH). Senior medical officers may receive special training in public health, usually the DTMH diploma at the London or Liverpool Schools of Tropical Medicine and Hygiene. Senior administrators are trained at the University of Malawi or at the government's staff training college. Some are sent abroad for special short-term training.

The Ministry of Health holds the major responsibility for developing working objectives, plans, and strategies within the government's overall health goals.

Its plans and budget proposals must be reviewed and approved by the Economic Planning Division, who may conduct further analyses and make modifications. There is a significant amount of coordination with the rural development programs of the Ministry of Agriculture and the expansion of the basic health service network has been closely linked to that of the rural development projects.

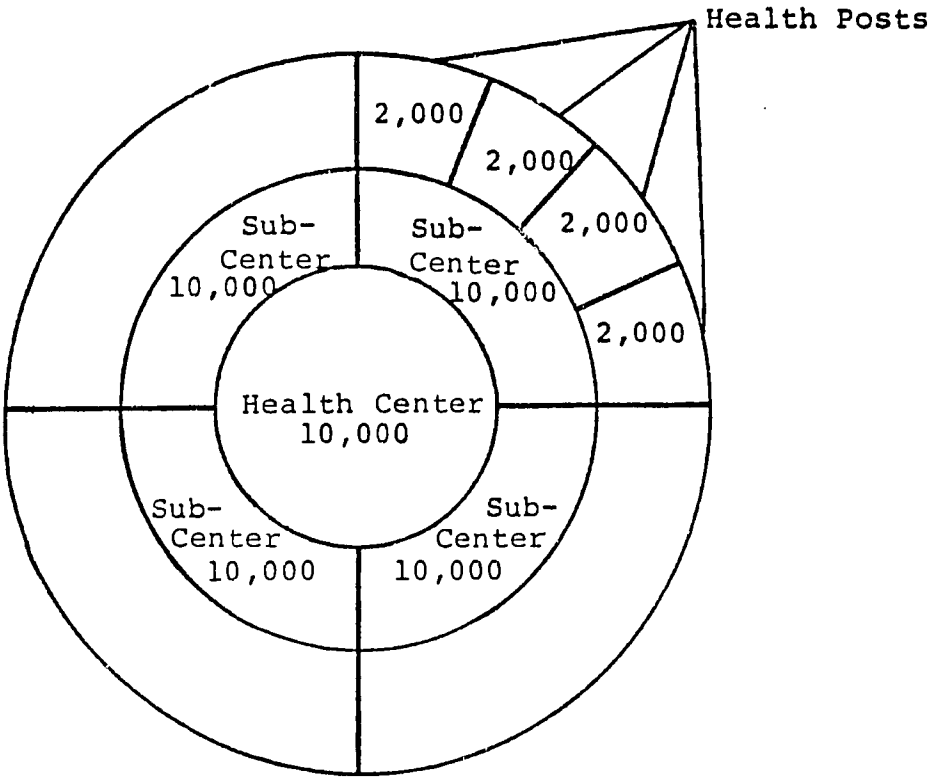
The working objectives of the MOH are derived from the government's national health goal which is stated as being "to raise the level of health of all the people of Malawi by providing a network of sound health facilities capable of reducing disease, protecting life, promoting better health, increasing productivity and ultimately promoting well being." During the past 20 years the MOH has undertaken a number of important initiatives in the health and nutrition field. In 1972 a detailed, comprehensive long-term health plan was prepared with WHO assistance. It covered the 15-year period from 1973 to 1988, and its most important objectives were:

- to strengthen the MOH:
- to develop a network of basic health services (see Figure 2);
- to increase the quantity and quality of health manpower (stressing use of auxiliary personnel); and
- to control infectious diseases.

Since that time the MOH has persevered in allocating resources in accordance with plan objectives. Nevertheless,

Figure 2

ORGANIZATION OF
BASIC HEALTH SERVICES FACILITIES
IN MALAWI



One health center covers 50,000 people, and also functions as a subcenter for its immediate catchment area. Each subcenter covers 10,000 and also functions as a health post for its immediate catchment area.

Source: National Health Planning, Malawi, 1973, WHO.

because of the escalating costs of building and of staffing the peripheral facilities, the development of the network of basic health services has lagged behind schedule. On the other hand, the nationwide program of under-fives clinics begun in 1968 has proceeded according to plan. There are now 848 static and mobile clinics. This effort, together with agricultural development, comprises the major part of the government's nutritional improvement program. Parallel to this under-fives clinics program has been the development of the antenatal and maternity services. Seventy percent of child-bearing women now receive antenatal care, and 44 percent of deliveries are attended by professional midwives.

Training of medical manpower was improved with the completion of the Medical Auxiliary Training School in Lilongwe, which has been operating for two years. The first group of 40 clinical officers will graduate in 1979 after three years of intensive training. Prior to this, clinical officers were appointed from the ranks of medical assistants after a short upgrading course, and were thought to be inadequately trained to work independently as medical officers.

Current priority MOH plans are:

- to continue expansion of the network of basic health services - especially in the main agricultural development project areas;
- to continue to strengthen the MOH: important here is a reorganization of the health information and statistics system; shortly, newly revised inpatient and outpatient returns will be handled by electronic data processing;

- to expand efforts in communicable disease control - plans have just been completed for an expanded immunization program that will include measles vaccination; other plans have been made for a pilot schistosomiasis control program, malaria control by chemoprophylaxis, and increased emphasis on tuberculosis control;
- to expand urban peripheral maternity units - to relieve congestion at central hospitals;
- to improve quality of the training of clinical officers and nursing personnel; and
- to replace several antiquated district hospitals.

In accordance with the 1972 plan, a planning unit was also established. It has been functioning fairly well, but has been concentrating its activities primarily in the area of facilities construction. There is reasonably close coordination in planning with the mission health sector represented by the Private Hospital Association of Malawi (PHAM), which has its secretariat in the MOH office building in Lilongwe. Divisions within the Ministry (MCH, epidemiology, health inspectorate, etc.) also engage in planning, and they are the supervisory agencies responsible for program implementation.

Nutrition planning is carried out in the MCH division of the MOH, but there is no overall agency coordinating nutrition policy for the country other than the Economic Planning Division. The Banda Agricultural College of the University of Malawi does have a nutrition studies division which carries out nutrition surveys and trains students. Census and demographic studies are conducted by the National Statistics Office.

c. The Role of the Private Sector and of Other Government Agencies

Although the Ministry of Health is the dominant force in shaping health policy, objectives, and strategies, the private (mission) sector provides about 40 percent of total health services delivered in Malawi. Its plans and programs are being carefully coordinated with those of the government sector. In return, about 10 percent of the mission health facilities' operating expenses are being provided by a MOH subvention of K264,000 per year.

The remainder of the private sector consists of traditional practitioners and private physicians. There is a traditional practitioners' association in Malawi, but as yet it has no close ties with the government. There are about 15 private physicians in Malawi--all but two being of Asian extraction. They practice primarily in Blantyre, Zomba, and Lilongwe, and, although some may work part-time in government institutions or serve on urban health councils, they have little influence in Ministry policy. There is no medical advisory council or physicians' association.

Although other agencies of the government are involved in health-related activities, the only other agency (besides the military) that employs personnel providing some health services are the District Councils which employ homecraft workers, midwives, and enrolled nurses (see Table 5). Apart from the Ministry of Health, the other government ministries and departments involved in health-related activities are:

Table 5

MINISTRIES WITH HEALTH FUNCTIONS &
NUMBER & TYPE OF WORKERS WITH HEALTH RESPONSIBILITIES
MALAWI, 1978

		Ministry with Health Functions					
		Health	Defense	Local Affairs	Agri-Culture	Welfare	(Others)
Number & Type of Worker	Physicians	77	N/A	0	0	0	0
	Nurses	738	N/A	N/A	N/A	N/A	N/A
	Traditional	15*	0	0	0	0	0
	Midlevel Technicians (Health Inspectors)	44	N/A	0	0	0	0
	Community (Frontline) Workers	0	N/A	945**	0	0	0

* Traditional birth attendants (TBAs) training in pilot program.
** Homecraft workers trained by the Ministry of Community Development and Social Welfare; estimated from training output.

Office of the President and Cabinet

- Administration of the national development program
- District development including provision of water supplies
- Training of health and other personnel abroad

Ministry of Agriculture and Natural Resources

- Provision of wells and boreholes in agricultural development areas
- Health education as a part of rural development
- Administration of water resources
- Training of veterinary assistants and farm home instructresses

Ministry of Community Development and Social Welfare

- Family and child welfare services
- Training and rehabilitation of handicapped and blind persons
- Training of homecraft workers
- Promotion of food, nutrition, family health, and health education

Ministry of Education

- School health services and education

Ministry of Finance

- External technical aid

Ministry of Labour

- Labour law administration

Ministry of Local Government

- Management of district maternities and dispensaries
- Provision of sanitation services in urban areas through town councils

- Participation in MCH, nutrition, and health education activities through homecraft workers at the local level.

Ministry of Works and Supplies

- Provision of water supplies in urban areas except in Blantyre and Lilongwe which are under respective Water Boards.

Malawi Army

- Management of military hospitals.

2. Overview Of Health Manpower Development

Table 6 and Table 7 provide summary data on the numbers and types of health manpower in active service in Malawi. Table 6 shows trends in employment by category of worker since 1965; Table 7 shows the relative importance of the Ministry of Health in utilizing Malawi's trained health personnel. What follows is a detailed summary of the development of the major categories of health personnel in Malawi.

a. Production and distribution of physicians

The distribution of physicians in Malawi by sector, specialty, and national origin is shown in Table 8. The ratio of population to physicians is 40,000 to 1. This is much less than the ratio of 10,000 to 1 recommended by WHO. However, it should be remembered that clinical officers are increasingly better trained and usually perform the same duties as physicians. Because there is no medical school in Malawi, all Malawian physicians must train outside of Malawi, primarily in other African medical schools, the U.K., Ireland, and the U.S.A. The number in training outside of Malawi at present is estimated at 20, but the

Table 6

HEALTH MANPOWER IN ACTIVE SERVICE IN MALAWI: PUBLIC & PRIVATE (1965, 1969, and 1976)

Type		Numbers		
		1965	1969	1976
Physicians		84	114	136
Dentists		3	10	10
Nurses****	Enrolled Nurses	16	306	1,396
	State Registered Nurses	20	178	977
	Midwives	112	136	1,550
	Registered Midwives	1	65	547
Pharmacists		5	17	N/A
Lab Technicians		2	56	98
X-Ray Technicians		3	6	16
Physical Therapists		2	4	2
Sanitary Inspectors		106	160	202
Frontline	Traditional	N/A	N/A	12,000 ***
	Basic Health Workers*	0	61	945***
	Advanced Health Workers**	420	496	526
Senior & Midlevel Management & Planning, Statistics		N/A	N/A	60***
Clerical/Junior Administration		N/A	N/A	300
Workers, Aides, Orderlies		N/A	N/A	1,541***

* Homecraft Workers
** Clinical Officers and Medical Assistants
*** Estimated data.
**** Large increase reflected in 1976 MOH data (over 1969) remains to be validated.

SOURCE: 1965 & 1969: National Health Planning, Malawi, WHO Regional Office for Africa, 1972, Annex 1, p. 45.
1978: MOH Statistics Office.

Table 7

MINISTRY OF HEALTH & RELATED GOVERNMENT HEALTH POSITIONS, MALAWI

Health Positions	Number of Positions which are:			
	Approved	Funded	Vacant	Filled
Physicians	107	107	30	77
Dentists	5	5	0	5
Senior-Level Nurses (Matrons)		6		
Mid-Level Nurses (Sisters)	58	68		308
Entry-Level Nurses (State Reg)	228	228	12	
Nurse Midwives	458	458		360
Midwives				70
Health Inspectors	63	63	19	44
Health Assistants	141	141	1	140
Rural Health Workers	48	48	0	0
Lab Technicians	73	73	0	73
X-Ray Technicians	10	10	0	10
Clinical Officers	57			338
Medical Assistants	49			
Clerical/Statistics				587

Source: MOH list of established offices with effect from April, 1978.

Table 8

DISTRIBUTION OF PHYSICIANS IN MALAWI - JUNE 1978

Sector/Specialty	Malawian	Expatriate	Total
Ministry of Health			
Chief Medical Officer (CMO)	1		1
Assistant Chief Med Officer	1		1
Specialists:			
Medicine	1	1	2
Surgery	1	4	5
Pediatrics	1	3	4
OB/Gyn	1	1	2
Ophthalmology	2	1	2
Anesthesiology	1	1	2
Psychiatry	1		1
General Medical Officers			
Senior MO (SMO)	8	] 29	] 40
Medical Officers (MO)	3	]	]
On Study/Leave			
TOTAL MOH	27	40	67
PHAM (mission)	2	40	42
Private Practice	2	23	25
Not Practicing	2	0	2
TOTAL PHYSICIANS - MALAWI	33	103	136

Source: MOH Register of Physicians, June 1978.

Note: Probably only 15 in active practice. Citizenship is not always clear. Some private physicians of Asian extraction probably hold Malawian or dual citizenship. Only two private physicians are black Malawians.

number who will actually return upon completion of training is not always certain. Certainly more physicians could be well-utilized in Malawi and undoubtedly their numbers will increase and the ratio improve. There has even been some discussion about opening a medical school in Malawi.

b. Other Health Personnel (Non-Physician Providers)

The numbers of other health personnel in Malawi is shown in Table 9.

Medical assistants were the first category of physicians assistants in Malawi. They are delegated a number of physician tasks such as screening outpatients. They may also carry out some nursing functions in various hospitals. Since independence another category has been established, the clinical officer (CO). Many more physician tasks are delegated to this person, and in many instances the clinical officer functions as a general medical officer. Some perform surgery (e.g., caesarean section); others have received subspecialty training; and in one very effective program a group of clinical officers were trained to treat most eye diseases. These COs have been able to organize and operate independent eye clinics in many district hospitals, a very important service in this country where eye disease accounts for five percent of all outpatient visits and where treatable eye infections are the major cause of blindness. There are two avenues to appointment as clinical officer:

Table 9

NONPHYSICIAN HEALTH PERSONNEL IN MALAWI
(ALL SECTORS — 1978)

Category	Number
Dentists	10
Physicians Assistants:	
Clinical Officers	176[a]
Medical Assistants	350[a]
Nurses:	
Registered (SRN)	977
Enrolled (EN)	1,396
RN/Midwives	547
Midwives	1,550
Basic Frontline Health Workers:	
Homecraft Workers	945
MCH Assistants	20
Laboratory Technicians	98
X-Ray Technicians	16
Physical Therapists	2
Environmental Health Workers:	
Health Inspectors	48
Health Assistants	154
Aides, Orderlies, Servants	1,540[b]

a. Approximate figures. Total for two types (526) is accurate.

b. Estimated by SADAP team.

Source: Modified from MOH: Statistical References Tables, 1978, Table 9.

through promotion from medical assistant (now required to complete a one-year upgrading training course), and by completion of the three-year training course for clinical officers (open only to secondary school graduates). Eventually all clinical officers will come from the three-year program.

There are two major categories of nursing staff: state registered nurses (SRN) and enrolled nurses (EN). Each of these types may have additional midwifery training. The SRN's are the more senior, and function primarily as hospital ward matrons. The EN's provide the bulk of the nursing service, and are also important in operating maternities and directing under-fives clinics and antenatal clinics. Because the EN's have had limited community health training, there is consideration of inaugurating a new training program for community health nurse-midwives. These women would take over the MCH activities, home visiting, etc. For a short time there was a public health nurse (PHN) training program, but it was abandoned. There has been talk of reinstating it. These PHN's would be senior level nurses (SRN/midwives with additional public health training) who would plan and supervise district MCH and other public health activities.

Originally the frontline worker who was to staff the health posts was the homecraft worker. This person is selected by the village in which she/he works, and is paid by local government. The homecraft worker receives three

months' training, of which two weeks are in health, and is supervised by the community development worker. The MOH now wishes to use MCH assistants by stationing them in health posts. These workers will receive two years of training in agriculture, nutrition and health. A Junior Certificate will be required for entry and, after training, the MCH assistant will be employed by the MOH and could be posted anywhere in the country.

c. Public Health Administrators

There are an estimated 60 senior and mid-level management personnel in the MOH. The nonphysicians of this group received training either at the University of Malawi or at the National Staff College. There are approximately 300 clerical workers. Only one hospital administration has a degree in hospital administration. PHAM has employed an American hospital administrator who has been holding seminars for mission hospital directors.

d. Traditional Practitioners

There are an estimated 5,000 traditional healers (one per 1000 population). Some of these are strictly herbalists, while others use a combination of herbs and magico-religious incantations, rituals, and/or animal sacrifices to effect a cure. There is an association of traditional healers in Malawi, but only a small minority are registered with that organization, which has no official standing with the

MOH. There are also an estimated 7,000 traditional birth attendants (TBAs) (one per 750 population). In contrast to a number of other African countries, many Malawian TBA's deliver ten or more infants per month. The obstetrician at the Kamuzu Central Hospital in Lilongwe has begun a pilot TBA training program in the Lilongwe district with MOH approval, and the first class of 15 has just graduated. It appears that this program will now be expanded.

3. Overview of Health Facilities

Health care services are delivered by the MOH in two ways: through health care facilities (hospitals, clinics, etc.) and through special categorical programs (tuberculosis control, leprosy service, etc.) Service delivered through facilities are organized in a pyramidal system. At the top are the two central hospitals: Queen Elizabeth Hospital (571 beds) in Blantyre and Kamuzu Central Hospital (341 beds) in Lilongwe. Next are the 21 district hospitals. The lower levels of the pyramid were reorganized after 1973 to follow the 15-year plan for a network of basic health services. There structure is as follows: (see also Figure 2):

- Primary Health Centers (PHC)

  Plans are for one per 50,000 population. Staffing is one Clinical Officer, one Registered Nurse, one

medical assistant, one health inspector, two enrolled nurses/midwives, one laboratory assistant, one Driver and servants. This center is able to treat most cases not requiring specialist care. Each PHC also serves as a sub-center for the nearest 10,000 population and as a health post for the nearest 2000 persons.

- Subcenters (SC) (Dispensary plus Maternity)

  Each PHC will supervise four subcenters. A subcenter serves 10,000 people and is staffed by one medical assistant, one health assistant, one enrolled nurse/midwife and one or more servants. It deals with curative and maternity cases and is a base for health education and mobile clinics which support health post activities. Each sub-center serves as a health post for the nearest 2000 population.

- Health Posts

  These are the most peripheral units designed to serve a population of 2,000. Each health post will be staffed by one MCH assistant who will deliver basic preventive care, first aid, and simple treatment.

A number of local councils have also built and maintained from their own budgets a large number of maternities and dispensaries (see Table 10). The plan is to upgrade these into subcenters by adding a maternity or dispensary (whichever is now lacking), but because the district councils have been expected to continue to operate them afterwards, progress in upgrading has been slow due to restricted local council budgets.

The mission sector also operates a large number of hospitals and subcenters (dispensaries and maternities). The 1972 plan proposed that these subcenters be incorporated into the basic health services network. In fact, mission

Table 10

MEDICAL INSTITUTIONS AND NUMBER OF BEDS (DEC. 1977)

CONTROLLING AGENCY	TYPE OF INSTITUTION	NUMBER OF UNITS	NUMBER OF BEDS		
			MATERNITY	OTHER	TOTAL
Ministry of Health	Central Hospitals	2	158	754	912
	General Hospitals	1	32	290	322
	District Hospitals	21	320	1750	2070
	Leprosy Hospitals	1	-	34	34
	Mental Hospitals	1	-	282	282
	Primary Health Centers	15	127	352	479
	Sub-Centers:				
	Dispensaries Only	86	-	39	39
	Maternity Only	1	6	-	6
	Dispensary & Maternity	51	356	84	440
	Total Sub-Centers	138	362	123	485
	Health Posts	20	-	-	-
	TOTAL - MOH	199	999	3585	4584
PHAM	Hospitals	20	636	1778	2414
	Leprosaria	5	-	143	143
	Primary Health Centers	14	196	405	601
	Sub-Centers:				
	Dispensaries Only	21	-	33	33
	Maternity Only	5	29	-	29
	Dispensary & Maternity	68	729	371	1100
	Total Sub-Centers	94	758	404	1162
	Health Posts	1	-	-	-
	TOTAL - PHAM	134	1590	2730	4320
Armed Forces	Hospital	1	-	22	22
	Sub-Centers - Disp. Only	2	-	-	-
	TOTAL - ARMED FORCES	3	-	22	22
Local Government	Sub-Centers:				
	Dispensaries Only	13	-	-	-
	Maternity Only	72	567	-	567
	Dispensary & Maternity	8	59	6	65
	TOTAL - LOCAL GOVERNMENT	93	626	6	632
Others	Hospitals	1	-	26	26
	Sub-Centers:				
	Dispensaries Only	98	-	-	-
	Maternity Only	-	-	-	-
	Dispensary & Maternity	7	33	-	33
	Total Sub-Centers	105	33	-	33
	TOTAL - OTHER	106	33	26	59
TOTALS	Hospitals	46	1146	4620	5766
	Leprosaria	6	-	177	177
	Mental Hospitals	1	-	282	282
	Primary Health Centers	29	323	757	1080
	Sub-Centers:				
	Dispensaries Only	220	-	72	72
	Maternity Only	78	602	-	602
	Dispensary & Maternity	134	1177	461	1638
	Total - Sub-Centers	432	1779	533	2312
	Health Posts	21	-	-	-
	TOTALS	535	3248	6369	9617

programs are now usually coordinated with those of the MOH. No mission hospital, however, is officially designated as a district hospital nor does any mission doctor serve as a DMO. The mission hospitals usually serve the function of additional or auxiliary district hospitals. (There are no for-profit private hospitals or maternity homes.)

An important aspect of the National Health Plan 1973-1988 was a schedule for the construction and upgrading of primary health centers, subcenters, and health posts such that all facilities needed for providing basic health services would be in operation by 1988. The government has fallen behind targets (see Table 11).

This is especially true for new primary health centers, upgrading subcenters, and health posts. Many of the new subcenters that have been built were constructed with rural development projects' funds and not with development funds of the MOH itself. Shortages of MOH's capital and recurrent budget funds have forced a slackening of the pace of construction, particularly of health posts. It is notable that such shortages do not appear to have affected hospital construction; four have been built (two replacement, two new ones) in the first five years of the plan.

It is particularly at the periphery, the health post program, where development has lagged. Originally it was planned that these be constructed of local materials using

Table 11

BASIC HEALTH SERVICES DEVELOPMENT, 1972-1977

FACILITY OR PROGRAM	1972 ACTUAL	1988 TARGET	1977 TARGET	1977 ACTUAL	% 1977 TARGET
Central Hospitals	1	1	1	1	100%
Regional Hospitals	2	3	2	2	100%
District Hospitals:					
Old	19	0	19	17	-
Replace	-	19	0	2	-
New	-	5	0	2	-
Total	19	24	19	21	110%
Primary Health Centers:					
Old	69[a]	69	69	69	-
New	-	61	7	1	14%
Total	69	130	76	70	92%
Subcenters:					
Old	110[a]	110	110[b]	110[a]	-
Upgraded	-	90	90[b]	60[a]	67%
New	-	320	28[b]	40[a]	142%
Total	110	520	228[b]	210	92%
Health Posts	0	2080	970	41	4%
Under 5 Clinics Number:	290			890	
First Attendance	165,748			2,113,343	
Percent Coverage	20			50	80%
Antenatal Clinics:					
First Attendance	122,778			196,183	
Percent Coverage	55			70	

a. Approximate figures.
b. Not specified; but estimated at constant 15-year rate to reach target.

Source: Table 8 figures were constructed from MOH data by SADAP team. They are unofficial and preliminary.

village self-help labor and that they be staffed by homecraft workers from the villages in which they were sited. Since the plan was published, the MOH decided that their construction should be upgraded using standard public works materials in order to prevent rapid deterioration and to reduce maintenance. Self-help would still be used in the construction. The MOH also decided to upgrade the staff of the health post. Rather than use a homecraft worker, who they thought had too many other duties, it was decided to establish a new category of health worker to be called an MCH assistant to be trained and paid by the MOH. These persons would not usually be posted in their village of residence. Because both these two modifications entail more capital, training, and recurrent costs, the health post program has fallen seriously behind.

4. Overview Of Financing Health Services

a. Level and Trends in National Health Expenditures*

Current MOH expenditures (1978/79 fiscal year) are estimated at $14,701,000 (including capital expenditures), or US $2.70 per capita. This represents four percent of total government expenditures. Table 12 shows the breakdown of government health budgets between capital and recurrent spending for current and recent years.

The share of health spending in the development budget has averaged about three percent and in the recurrent budget about seven percent (see Table 5). Foreign donors play a major role in providing grants for capital projects.

Table 13 shows the calculation of total national expenditures on health, in both public and private sectors; these rough estimates show that government health spending is two-thirds the national total. The national health spending total currently represents 2.2 percent of the GNP, or US $4.30 per capita per year.

Traditionally the Ministry of Finance has divided the MOH allocation in its revenue (recurrent) budget report into

---

* Source: GOM Budget Document No. 1 pg. 102-104. 1978/79 The government maintains two budgetary accounts, a revenue and a development account. Taxes and other recurrent revenues are paid into the revenue account which finances mainly recurrent expenditures but also a small part of capital expenditures. The development account (into which are paid foreign loans and grants and domestic capital receipts) finances mainly capital expenditures as well as an element of recurrent expenditures associated with capital expenditures.

Table 12

GOVERNMENT HEALTH BUDGETS, MALAWI, 1974-1979

(in 000s U.S. $)

	Fiscal Year					
	1974/75*	1975/76	1976/77	1977/78	1978/79	1979/80
Capital (Development)	2,478	2,079	2,628	1,887	4,075	6,107
% of total	5.1	2.6	4.0	2.0	2.0	3.7
Recurrent (Revenue)	5,752	7,368	7,581	8,306	10,626	N/A
% of total	6.6	7.6	8.0	6.7	6.8	N/A
Total Budget per Capita	1.68	1.92	2.13	2.05	2.70	N/A

* Expenditures (not budgets).

Source: MOH budget documents.

Table 13

TOTAL NATIONAL HEALTH EXPENDITURES IN MALAWI (ALL SECTORS) 1978/79

Sector	$000s
1. Ministry of Health	
Development	4,075
Recurrent	10,626
2. Mission[a]	
Capital	1,000
Recurrent	3,500
3. Other Government	
Local Council Facilities & Military	600
4. Industry	120
5. Private Physicians	
15 active: 60 visits/day X 250 days X K3 per visit=	800
6. Pharmacy (Malawi Pharmacies)	300
7. Traditional	
265,000 births @ K1 = K265,000	
Medical: 1 visit per capita @ K.0.2/visit = K1,256,00	1,802
TOTAL	22,823

Health expenditures as percent GNP[b] = 2.2%

Health expenditure per capita = $4.30 (K3.64)

NOTES:

a. Difficult to estimate: Some data from PHAM but difficult to estimate value of overseas contributions for mission capital projects, and of drugs and supplies. Mission costs seem very low given that they deliver 40% of services.

b. GDP in 1978 estimated to be 1.15 X 1977 GDP or K759 million X 1.15 = K 873.5 million.

Source: MOH data and SADAP team estimates.

(1) administration (including training), (2) prevention and control, and (3) curative institutions. Because so much preventive work is now carried out in "curative" institutions one cannot use this breakdown to estimate the percentage allocation to each kind of activity. In 1977/78 the percentage allocations using the MOF codes were:

- Administration and training 27%
- Prevention and Control 14%
- Curative Institutions 59%

b. Unit Costs Of Health Services

Without long and tedious research it is impossible to determine the actual budget of a particular health institution, or a breakdown of its total expenditures into categories such as curative/preventive care, or inpatient/outpatient care. The MOH in Malawi has retained the budget and accounting system which it inherited from the British colonial administration and which is typical of many anglophone African countries.

There is no budget drawn up nor are there any recurrent budgetary allocations for any particular institution. Rather there are budgetary allocations, first to major activities (administration, curative services, preventive services) and then to certain "payment centers" (medical stores, transportation, salaries, etc.) The MOH then allots a certain amount of funds for drugs, supplies, fuel, rations,

etc. to each institution. The funds do not actually go to the institution; rather, the institution requisitions drugs and supplies from Central Medical Stores in Blantyre or signs vouchers for its suppliers (e.g., of food rations) who then collect money from the government.

Personnel are posted to an institution and paid by central MOH administration. An institution may not transfer funds from one allotted purpose to another. On the other hand, institutions at times exceed their allotments by requesting and receiving more than originally allocated. If one wished to determine the expenditures for an institution one would have to begin by searching the records of each payment center as to the amount expended by each institution.

Even then one could not determine how much was expended by that institution since allocations are usually made to hospitals which must share their allocations with subsidiary units such as health centers and subcenters. The percentage of these sub-allocations may vary and records of them may not be kept accurately. Still further, one could not determine what percentage of an allocation was used for inpatient or outpatient care.

It has not been uncommon in recent years for both the MOH as a whole and individual institutions to exceed their allocations, especially for drugs. A supplemental authorization is then required from the Ministry of Finance. The MOH is trying to avoid this problem by requiring that the

MOH Accounting Division approve drug requisitions for each institution before they are sent to Central Medical Stores to be sure the institution has not exceeded its allocation. This procedure is not working satisfactorily because an institution is "charged" by the accounting office for the requisition even before it is known if the Central Medical Stores is able to fill it.

Despite these constraints in costing services, the MOH has attempted to determine the capital and operating costs of a number of health units (see Table 14). In this table are listed coefficients of recurrent/capital costs (ratios). One should not use these coefficients as a measure of cost effectiveness. Rather the MOH has developed them to help them estimate the future recurrent costs of present capital projects.

Unit costs for health services have been estimated by the SADAP team (see Table 15). The estimated average cost in 1978 for an MOH outpatient visit is equivalent to $0.19, for an inpatient day to $2.54, and for a delivery to $5.09. These figures are based on very rough estimates and should not be considered final.

The government has had a longstanding policy that all health care services delivered in MOH facilities shall be free of charge. Thus, it is important that average costs be kept reasonably low, as these calculations indicate they are.

Table 14

COSTS OF HEALTH FACILITIES & SERVICES (MOH)
MALAWI, 1978

Facility	Capital Cost	Annual Recurrent Cost				Coefficient[a]
		Wages	Drugs	Other	Total	
District Hospital	1,080,000	57,685	50,000	74,400	182,085	0.17
Primary Health Center	100,000	7,000	7,000	15,000	29,000	0.29
Subcenter	40,000	5,000	5,000	8,000	18,000[b]	0.45
Health Post	15,000	700	700	-	1,400[c]	0.09

a. Coefficient = recurrent cost ÷ capital costs.

b. Using new MOH planned staffing pattern which is nearly two times staffing pattern originally proposed by WHO plan.

c. SADAP team estimate based on only one staff member (MCH assistant) using minimal amount of drugs.

Source: MOH health planning unit.

Table 15

ESTIMATED UNIT COSTS OF SERVICES -- MOH

OUTPATIENT VISIT

Formula:

Cost = recurrent expenditure X o.6[a] X 0.5[b] divided by total OPD visits[c]

1976 cost = $8,205,000 X 0.6 X 0.5 ÷ (13,660,053 + 1,314,679 + 436,842)

1976 OPD visit cost = $0.16

1978 OPD cost = $0.19 (assume 20% inflation since 1976)

INPATIENT BED DAY

Formula:

Cost = recurrent expenditure X 0.6[a] X 0.5[b] divided by total inpatient days[d]

1976 cost = $2.12 per bed day ($4.24 for a delivery)[e]

1978 cost = $2.54 per bed day ($5.09 for a delivery)[e], assuming 20% inflation since 1976

NB: Costs do not include central administration, training or capital depreciation.

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a. 0.6 = ratio of expenditure allocated to curative institutions

b. Assume 50% of expenditure in OPD and 50% inpatient

c. Total OPD visits = OPD visits + under five visits + antenatal visits

d. Total inpatient days = inpatient days + 2 X number deliveries

e. Assume delivery cost = 2 X inpatient day cost

The only exception to be "free" services is care in the private-wing hospital beds and private OPD visits in MOH institutions. Charges for private care according to MOH charge schedules are:

- $4.75 per hospital bed-day
- $5.96 first visit at private OPD
- $2.39 subsequent visit at private OPD

Charges by one mission hospital in Malawi are as follows:

- inpatient bed day $0.60
- delivery $4.15
- antenatal care $1.78 (about 4 visits @ $0.45 visit)
- under-fives clinic visit $0.10
- minor operation $3.55
- major operation $5.93

Actual costs of mission unit services may be higher as there are overseas donations and a government subvention which both tend to subsidize operations. Nevertheless it appears that the mission hospital may be undercharging for inpatient care and operations.

Some large corporations (e.g., the Lilongwe City Development Corporation) provide health benefits to their employees and pay the rates allowed by CIMAS (Commercial and Industrial Medical Aid Society), which is based in Rhodesia. Mission hospitals depend on collection of charges for the

large part of their recurrent budgets, since the government subvention and overseas donations account for only a small fraction of operating costs.

5. Overview of Preventive Health Services

The government's principal preventive health care programs are communicable disease control, MCH services, environmental sanitation, and water supply.

a. Communicable disease control

The epidemiology unit monitors communicable disease incidence and the occurrence of epidemics by means of the notifiable disease reports. In addition it engages in specific activities to control cholera, tuberculosis, leprosy, schistosomiasis, and malaria.

The first tuberculosis control program began in 1964 with U.S. Peace Corps assistance and included case finding, treatment, and BCG vaccination. District hospitals serve as inpatient and outpatient review centers, and a number of health center and subcenters serve as outpatient treatment centers. A national register of patients is kept and approximately 4,500 are under treatment at one time. Because of the continued high incidence of tuberculosis, the epidemiology division plans an intensified program of control and BCG vaccination to markedly reduce the problem.

Cholera was first introduced in 1973, but the incidence is very low. The MOH has employed cholera assistants

(similar to health assistants) to help control the disease through case finding, treatment of contacts, health education, and environmental sanitation. Fear of cholera greatly increased motivation for latrine construction.

Leprosy control through case finding and treatment is carried out with the aid of LEPRA (British Leprosy Relief Association). As of 1977 there were 21,991 registered cases.

Schistosomiasis is gaining increased attention because of its growing prevalence. The epidemiology unit has an expatriate/schistosomiasis expert who has been involved in prevalence surveys and who has drawn up a proposal for a pilot control project in the Lower Shire region. Because the project will rely heavily on molluscocides, it was rejected for funding by United Nations Development Programme (UNDP) after the project proposal was reviewed by the U.N. Environmental Agency in Nairobi. Funding is being sought elsewhere.

Because it is not feasible to eradicate malaria at this time, only control measures can be considered. Even here vector control measures can only be carried out in urban areas. As a result, control in rural areas is limited to chemoprophylaxis which is carried out in the under-fives clinics with monthly chloroquine or pyrimethamine tablet administration.

The epidemiology unit is also very interested in preventing childhood illnesses through immunization. To

further improve coverage of the childhood population with diphtheria/pertussis/tetanus (DPT), polio, and BCG vaccinations, and to now add measles vaccination, the epidemiology unit has worked with the MCH division to develop a program of expanded immunization for which it is seeking WHO assistance and other external financial aid.

b. MCH Services

The MCH program is the ministry's strongest health program and probably is the most impressive in Africa. There are three major components: the under-fives clinics, the antenatal clinics, and the maternities. There are now 848 under-fives clinics, of which 531 are mobile--operating from hospitals, health centers, and subcenters. The program is patterned after that of David Morley (1973), and its tasks are designed to deal with the major causes of childhood mortality and morbidity. A child's growth and development are kept under surveillance through periodic weighing, and records are kept on growth charts in a way that will signal if growth increments are falling below standard. Those children who are underweight are given supplements and must attend a weekly malnutritior clinic where their mothers are given instruction in how to prepare proper weaning foods. All children are given routine immunizations, monthly malaria prophylaxis, and treatment for any acute illnesses. A regular schedule of health education talks, usually

involving group discussion, is presented to the mothers. Homecraft workers from the village help with the clinics and the health education.

About 80 percent of the population now have access to these clinics. Sixty percent of all children under five are seen at least once a year and probably 80 percent of children less than two years of age. From vaccinations given, it appears that 80 percent of children receive BCG, 72 percent the first dose of DPT vaccine, and 57 percent the first dose of polio vaccine.

Current problems in operating these clinics include:

- Inadequate comprehension by mothers of the meaning of the weight card. So many mothers attend these clinics that there is often not enough staff time to adequately explain to each mother the weight card and its meaning.
- Three of 20 districts lack an MCH vehicle for supervisory visits. Vehicles must be borrowed.
- Periodic shortages of vaccines, especially polio vaccine.
- Periodic shortages of supplies such as health education materials, BCG syringes, cooking equipment, weighing bags, etc.

There are at least 310 antenatal clinics and maternity wards. Seventy-five percent of deliveries have at least one antenatal visit (1975 figures) and 44 percent of all deliveries occur in a maternity ward staffed with a professional midwife. Antenatal care consists of eliciting previous obstetric history, abdominal evaluation, blood pressure and

hemoglobin determination, urinanalysis and dispensing routine iron, vitamin, and malaria prophylaxis tablets. A new protocol called the labor graph has been introduced. This chart permits careful monitoring of the progress of labor and includes algorithms of steps to be taken if there are variances from normal. This has already been shown to have reduced the numbers of women having prolonged labor and perinatal deaths. A number of new peripheral maternity units have been opened in urban areas to relieve congestion on hospital obsetric wards.

C. TRAINING AND HEALTH PERSONNEL DEVELOPMENT

Estimates of the current annual output of training institutions is shown in Table 16. No manpower study has yet been carried out by the MOH, and this team was not able to do one in the time available because data on the rate of retirement of personnel were not readily available. Dr. Maurice King (1968) did a study of health manpower needs based on the type of basic health services network eventually adopted by the National Plan for Health Services. Comparing current outputs with his projected needs, it would appear that there is an excessive production of state registered nurses and enrolled nurses, and that there is only about one-half the required output of clinical officers, health inspectors, and health assistants. If MCH assistants are to be used as planned as health post staff, their output is also far below present needs. The role and functions envisioned for enrolled nurses especially needs study. Most are trained and employed in the mission sector, yet the mission sector is not able to employ all those who are trained.

Table 16

OUTPUT OF HEALTH TRAINING INSTITUTIONS IN MALAWI (1977)

Category	Number of Schools	Qualification for Entry	Duration Training	Annual Output
Clinical Officers	1	MCE	3 years	40
Medical Assts	2 (1 mission)	JCE	3 years	15
State Registered Nurses (SRN)	1	MCE	3 1/2 years	69[a]
Enrolled Nurses (EN)	12 (11 mission)	JCE	2 years	153
Midwives	11 (10 mission)	JCE	2 years	148
Homecraft Workers	1	Primary	3 months	100
MCH Assistants	1	JCE	2 months	N/A[b]
Laboratory Technicians	1	MCE	3 months	15
Health Inspectors	1	MCE	2 months	5
Health Assistants	1	JCE	2 months	12

NOTES: a. Including 27 trained outside Malawi.
b. Training has just started: 20 have been trained thus far.

D. OUTPUT OF HEALTH PROGRAMS AND IMPACT ON HEALTH STATUS

Various measures of the output of health programs (e.g., number of patient visits or numbers of units of services delivered) indicate that Malawi has an effective health care delivery system. (See Table 17 for data on health services delivered.)

Not including traditional practitioners there were 3.2 outpatient visits per person per year in 1976, or 3.7 per person if one includes MCH visits. There were 2.4 under-fives visits per child under age five and 41 hospital admissions and 315 bed days per 1000 population.

Fundamental questions are whether, and the extent to which, these programs may have improved, or are improving, health status.

The most important indicators of physical health status would be:

- infant mortality rate (IMR)
- crude death rate (CDR)
- pre-school mortality rate
- maternal mortality rate
- percent of children under age five who are below 80 percent of standard weights for age
- prevalence/incidence of specific diseases (e.g. measles, malaria, blindness, lameness, etc.)

Although some of these data can be obtained at this time, it is very difficult to get sufficiently accurate

Table 17

OUTPUT OF HEALTH SERVICES BY SECTOR

MALAWI, 1976[a]

Service Category	Sector				
	MOH	Mission	Private	Traditional	Total
Outpatient Visits	13,660,053	2,681,000	375,000[b]	5,300,000[b]	22,016,053
Under-Five Visits	1,314,679	774,000[c]	-	-	2,088,679
Antenatal	436,842	454,673[d]	-	-	891,515
Deliveries	66,785	54,641[e]	-	139,934[b]	121,426
Hospital Admissions	132,174	82,994	-	-	261,360
Hospital Bed Days	1,026,010	645,774	-	-	1,671,784
First DPT Vaccination	128,086	72,050	-	-	200,137
First Polio Vaccination	102.033	57,393	-	-	159,426
BCG Vaccination	172,445	97,001	-	-	269,446
Measles Vaccination	14,152	7,961	-	-	22,113

a. Source: GOM Statistical Yearbook, 1977. Tables 41-49.
b. Estimated by team.
c. Estimated at 36% of total (Source: PHAM 1977 Annual Report).
d. Estimated at 51% of total (Source: PHAM 1977 Annual Report).
e. Estimated at 45% of total (Source: PHAM 1977 Annual Report).

prior years' data to make valid comparisons and to determine if real changes have occurred. The 1977 census has not been fully analyzed and estimates for 1977 IMR and CDR are not available as yet. When they are, they will probably be very accurate. Unfortunately the 1966 estimates were probably not highly accurate and as a result comparisons may not be possible. There are two indicators which suggest that improvement in health status is occurring. One indicator is the maternal mortality rate for maternity deliveries, which fell from 2.4 per 1000 live births in 1975 to 1.9 per 1000 in 1977. This is a statistically significant change ($z = 2.12$, p 0.05). More importantly, 1.9 per 1000 is a very low rate for Africa, where rates are usually 5 to 15 per 1000 live births (in the USA in 1930 the rate was 6.7 per 1000). The second indicator is the percent of under-fives population served in under-fives clinics whose weights fall below 80 percent of standard weight for age. Changes in these percentages are shown below in Table 18. It is difficult to judge how valid these data are statistically, but they appear to show that nutritional status is improving. If it is, it does not necessarily mean that the under-fives program is primarily responsible. Improvement could be due to general economic improvement and other factors.

Although various kinds of health care interventions can produce changes in childhood mortality rates rather quickly,

Table 18

NEW UNDERWEIGHTS AS % OF UNDER FIVES ATTENDANCES

MALAWI

Year	New Underweights as % of New Attendances	% of Total Attendances Classified as Underweight
1969/70	N/A	37.2[a]
1971	32.2[b]	28.8[a]
1972	N/A	29.2[a]
1975	29.6[b]	N/A
1977	23.0[c]	N/A

a. Cole-King, S 1975
b. "Miniplan Report, 1973-1976," Ministry of Health, Blantyre, Malawi, December 1976, Table VIII.
c. MOH: Verbal report.

it may be in the second generation after the onset of such interventions that one sees the most dramatic changes. This may be especially true in countries where maternal depletion has played an important role in childhood malnutrition. Thus, it may be between the year 1985 and 2000 that one will see the most dramatic changes in survival rates.

IV. ISSUES OF CURRENT CONCERN

A. HEALTH PLANNING, POLICY MAKING, AND PROGRAMMING

The MOH and the Economic Planning Division seem to have developed beneficial collaboration in health planning activities. Progress has been made toward setting out policies and priorities by which allocation of resources is expected to be decided. Excessive emphasis appears to be given however, to piecemeal project planning which is more oriented to appealing to donor interests than to developing program alternatives based on assessments of need, potential benefit, and relative cost. Detailed projections of manpower and recurrent budget needs are still lacking. The health planning unit is aware of the needs, and is trying to develop further its analytical and statistical capabilities. We can only reinforce these developments and suggest further that the capability of the health planning unit be increased so that it can fully engage itself in the following activities:

- identification of major health problems;
- identification of health problems amenable to reduction;
- development of alternate strategies for problems reduction and their constraints;
- analysis of cost-effectiveness of alternate strategies;
- decision analysis;
- manpower studies;
- capital and recurrent cost projection;

- development of contingency plans for use in the event there are unexpected reductions or increases in real MOH capital or recurrent budgets; and
- program evaluation

To perform this role the planning unit needs to strengthen the statistical and analytical capability of its staff. It could profitably use the services of a health planner obtained either by employing someone for this new position or by sending one or more of the current staff for postgraduate education.

The team feels that the WHO National Health Planning document of 1972 provides a reasonable framework for health services development. However, careful analysis of capital costs and their future recurrent cost implications will be necessary to develop a foundation for determining if the plan can be carried out successfully within MOH resources. Moreover, health manpower training projections need to be compared with projected staffing patterns applied to the expected pace of basic health services expansion to determine if future manpower availability will meet demand.

Finally, it is very important that, once definite plans and schedules of implementation are developed, all foreign donor aid is integrated into these plans and schedules. Foreign donor aid should not be accepted if it would result in future recurrent expenditures that are beyond projected availability. It would be especially unfortunate if this aid was directed primarily towards urban facilities

because, if they involved excessive recurrent costs, resources would necessarily be drawn away from the rural program.

The SADAP team focused particular attention to two health policy issues: the implementation of a rural health strategy, and the development of appropriately-trained health manpower.

1. A Rural Health Strategy

The government has made a serious and impressive commitment to rural health care and already its coverage of the rural population with health services may be the best of those African countries which gained independence since 1958. Nevertheless the MOH has fallen behind its schedule for developing the network for basic health services outlined in the WHO-assisted National Health Plan of 1973. The greatest reductions in mortality and morbidity may occur as a result of work carried out in health posts, but it is this part of the program that has fallen furthest behind schedule. Fortunately some of the proposed health post services have been carried out by mobile teams who have held MCH clinics in any facilities available.

There are several reasons for the delay in implementing the entire basic health services network according to schedule:

- Because there was underestimation of the cost of constructing and staffing PHC's, SC's, and HP's,

both capital and recurrent budgets were not adequate to proceed according to the schedule;

- Sufficient personnel could not be trained quickly enough to staff those that were originally planned; and

- The MOH modified the original plans by upgrading construction standards (and cost) of the health post facility and by deciding to train and employ an MCH assistant rather than a homecraft worker to staff these health posts. The MOH would also like to increase the number of staff assigned to subcenters from three professionals to five. Additional time is required to effect these changes.

The ability to complete the basic health services network is closely linked to the issue of adequacy of recurrent budget and manpower development. This team does not propose to make recommendations concerning the type of facility or staff most appropriate for a subcenter or health post. We do, however, recommend that a combined MOH and Economic Planning Division workshop be convened to reconsider the rural health strategy, but only after the necessary budget and manpower studies have been carried out.

Such a workshop or committee might consider:

- the priority health problems needing attention in rural areas;

- alternate strategies for problem reduction. (tasks that the community could carry out themselves should receive special attention);

- the cost of alternative strategies including: facilities costs, manpower costs, and other operating costs; this requires detailed cost projections for all program levels and components, with complete capital and recurrent budgetary implications;

- the cost-effectiveness of different strategies;

- whether a higher percentage of the government's capital or recurrent budget should be allocated to health; and
- finally, program and time table for implementation.

2. Health Manpower Development

a. Nurses

As mentioned earlier, Malawi may be experiencing an overproduction of some health workers (enrolled nurses and state registered nurses) and an underproduction of others (clinical officers and health assistants). There has also been some discussion as to whether MCH assistants, homecraft workers, or other types of village health workers are most appropriate for staffing health posts. Undoubtedly there are some health tasks that would be best carried out by villagers themselves. Recently there has been a recommendation to establish two new nurse categories: public health nurses and community health nurses. The last recommendation involves a number of "trade offs". On the one hand, these two new nursing programs would produce nurses more highly trained to carry out the kinds of activities required of nurses in the peripheral basic health services. On the other hand, it means more specialized categories of nurses and less flexibility in assigning nurses to various posts. The public health nurses would not come from the ranks of the community health nurses whom they supervise. In some countries public health nurses have resisted posting to rural areas. A detailed and comprehensive manpower study is

needed to resolve these issues. Such a study should be integrated into overall health planning, especially that of the rural health strategy, and into any cost projections. It would be unwise to attempt to resolve one of these issues without at the same time dealing with all the other manpower issues, as well as with the overall health strategy.

b. Physicians

Malawi has a low physician-to-population ratio (1:40,000), and at the present time only about 35 of 136 physicians are Malawian. It is estimated that 20 are in training outside Malawi but it cannot be predicted how many will return upon completion of training. There has been some unofficial discussion of the need for a medical school in Malawi. It should be realized that in some African countries a medical school and its teaching hospital may account for 40 percent of the entire health budget. One of the reasons that Malawi has been so successful in developing its basic health services has been that these services have not had to compete with a medical school for resources. Malawi should weigh carefully the problems that a medical school would bring with it. Physicians are currently an extremely scarce resource in Malawi, and a medical school would require many to devote less time to service delivery activities. At this stage in its development, Malawi can ill afford the high costs of training physicians who will need hospital settings and equipment in order to function effectively. Costs of

training will be further raised by the subsequently increased costs of building and operating the hospitals which physicians require. It might be better to delay until the entire basic health services network is established before embarking on development of a medical school.

At the present time there are only about 15 physicians actively engaged in private practice, and about 13 of these are of Asian extraction (mostly Indian). The MOH is reluctant to allow Malawian physicians to enter private practice. The investment of the government in training a physician is not fully repaid if the physician enters private practice in an urban area after only a few years of government service. Most physicians currently in private practice earn many times the annual income of their government-employed counterparts, many of whom are better trained. Such a situation could create tension and dissatisfaction among government doctors. Adequate solutions are not easy to come by: one could ban private practice, increase the "private practice allowance" (payment in lieu of private practice) of government physicians, or allow government physicians a measure of private practice during after-hours periods or during working hours in partnership with the government. This problem deserves study. No solution will be ideal but the earlier the problem is dealt with the easier it will be to control the situation.

One of the main reasons why Malawi has been as successful as it has been in its health care program is that there has not been a significant lobby of highly-trained physicians to constantly bring pressure on the MOH to allocate more and more resources to urban hospitals. Such pressure is usually well-motivated, to be sure, and is based on the desire to offer improved patient care in these hospitals. Nevertheless, expensive hospital care is of very low cost-effectiveness in improving the health of the population or in preventing illness. Regardless of where physicians are produced or how they are distributed, there are likely to be more urban physicians and hospital specialists. Pressure will continue to mount to increase the resource allocation to urban hospitals. The MOH will have to remain steadfast in its priorities; a thorough planning process will make it easier for the Ministry to justify its position. This is not to say that the Ministry should reduce its allocation to hospitals, but rather that the major part of budget increases should be used to complete the basic health services network.

B. ALLOCATION AND UTILIZATION OF HEALTH RESOURCES

Up until now Malawi has been fortunate in that there has been significant foreign donor aid for the health development budget. Moreover, a steadily increasing real GNP has meant that increased recurrent budgetary funds could be allocated to operate these new programs and facilities. Because of the ambitious health facilities construction program and the inflation in costs of construction and drugs, it appears that the recurrent budgetary allocation to the MOH may not be adequate in future years to operate all the programs and facilities planned.

For example, the team carried out an analysis of the recurrent costs of operating the new (i.e., added) basic health units that would be required to meet 1988 targets of the National Health Plan. The team used the data in Table 14 as typical operating costs. The results are shown in Table 19. There are several points worth noting. By 1986/87, the total costs of operating just the new units will exceed the 1977/78 level of total MOH expenditures. The increase of staff required for subcenters will result in operating costs of K 18,000 per unit. With 520 units needed, operating the subcenters becomes the most costly program of the entire network (K 9,360,000 annually by 1988/89). If the health posts are staffed and operated at the modest cost of K 1,400 per unit (which seems doubtful), they will be a much less costly component of the network.

If this analysis is correct then it would appear that the question of whether the MOH staffs health posts with volunteers, village workers, or homecraft workers will not be critical in terms of the recurrent budget. If, for example, there were to be one MCH assistant per health post paid a mean salary of K 700 per annum, one would save only 2,080 x K 700, or K 1,456,000, by using unpaid volunteers.

Table 19 shows further that, given the estimated operating costs of these new facilities, even assuming an annual real growth in the MOH revenue budget of 6 percent, there would be an annual deficit of K 3.9 million by 1988/89. To cover that deficit would require that the MOH budget be increased as a share of the national budget from its current 6.8 percent to at least 8.5 percent within five years. If growth in government revenue declined (below an annual real growth rate of 6 percent), this figure would have to be proportionately higher. The actual deficit in fact, would likely be quite a bit more, since this analysis does not include the increasing costs of other programs due to population growth, and increased quality (inflation has not been included in the analysis as it is assumed that increases due to inflation would apply to both costs and budgets).

An assessment of projected costs of construction reveals likewise that the 1988 MOH targets are unrealistic. The health development budget, which was K 1.7 million in

TABLE 19

RECURRENT COST PROJECTION FOR BASIC HEALTH SERVICES UNITS IN MALAWI (MILLIONS OF KWACHA)

A	B[a]	C	D[b]	E[c]	F[d]	G[e]	H[f]	I[g]
Year	Actual MOH Budget	Actual MOH Budget as % of National Budget	Added Recurrent Costs of Investment in Basic H.S.*	MOH Budget Needed to Meet Added Recurrent Costs (No Other Growth)	MOH Budget Projected Thru 1989 (6% Growth)	Projected MOH Recurrent Budget Deficits (6% real Growth)	MOH Budget Needed to Cover Deficits in Column G as % of Total Natl Budget	Real Growth in MOH Budget Needed to Cover Deficits in Column G
70/71	3.2	6.8						
71/72	3.3	6.5						
72/73	3.6	6.3						
73/74	4.2	6.8						
74/75	4.9	6.6						
75/76	6.4	7.6						
76/77	6.1	6.5						
77/78	6.4	6.3						
78/79	9.0	6.8						
79/80			1.0	10.0	9.5	0.5	7.1	11.1
80/81			1.9	10.9	10.1	0.8	7.3	9.0
81/82			3.1	12.1	10.7	1.4	7.7	11.1
82/83			4.0	13.0	11.4	1.6	7.8	7.4
83/84			5.8	14.8	12.0	2.8	8.3	13.8
84/85			6.8	15.8	12.8	3.0	8.4	6.8
85/86			7.9	16.9	13.5	3.4	8.5	7.0
86/87			8.9	17.9	14.3	3.6	8.5	5.9
87/88			9.8	18.8	15.2	3.6	8.5	5.0
88/89			11.0	20.0	16.1	3.9	8.5	6.4

a. These data are in current values; i.e., they are not adjusted for inflation. Since all projections are not adjusted for inflation, all currency values are expressed in Kwacha at current (1978) prices.

b. MOH targets for 1988, for complete coverage by basic health services, require construction of:

Category	Number
General Hospital	1
District Hospitals	3
Primary Health Centers	60
Subcenters	280
Health Posts	2,039

These data assume that 10% of the target number of PHCs, SCs and HPs are constructed annually, and that their staffing costs appear starting in the next year's budget. Operating costs of the hospitals are assumed to be incurred as follows: Central Hospital: starting in 1983/84; District Hospitals: starting in 1981/82, 1985/86 and 1988/89.

c. Column D figures added to the 1978/79 MOH budget of K9.0 million - which assumes no increases in spending for other health programs.

d. If the government's recurrent budget also grew at a real growth rate of 6%, MOH spending would remain constant as a share of that total--6.8%, the projected 1978/79 share.

e. Column E less Column F.

f. Assumes that the government recurrent budget grows at an annual rate of 6% in real terms (not accounting for growth due to inflation).

g. Averages out to just under 9% annually, which is almost 50% higher than the real growth rate of the MOH budget between 1970 and 1978.

1977/78 and is projected at K 3.4 million this year, would have to be K 4.8 million annually for ten years to construct the system of PHCs, SCs, and HPs as planned (at construction costs shown in Table 14). Planned hospitals would add another K 6.3 million to those costs, for a ten-year total of about K 56 million (U.S. $66.4 million). If donors provide that much assistance, they may find it necessary in future years to subsidize the recurrent budget just to prevent deterioration of the physicial plant they originally invested in. These data raise serious question about the feasibility of the timetable of the total basic health services plan.

This analysis was obviously limited by the time available and may overlook other important factors known to the MOH. Therefore it is urgent that detailed and realistic cost studies be undertaken by the planning unit of both current and projected programs and facilities. The development and revenue budgetary allocations required to construct and operate these facilities and programs should be estimated. If the budgets required (especially recurrent) exceed the normal increases allotted to the MOH, then a decision should be made whether the government should increase its percentage allocation to health, whether foreign donors should be asked to support recurrent costs, or whether programs should be scaled back or alternate strategies considered. Of course, any combination of these three alternative solutions

would be feasible. Foreign donors hesitate to support recurrent costs because this implies an indefinite commitment. However, such support might be reasonable if the recurrent budgetary aid was to be clearly limited in time because the purpose for which it was being used was limited, for example, for an acceleration of training or staffing to "catch up" on underserved areas. Because this implies a deceleration later on, the government's own resources might be adequate to maintain the program in years hence, if its real GNP continued to grow. Our analysis indicated that after 1988 the deficit calculated in Table 19 would begin to diminish, since, by that time, all needed facilities would be in place; in other words, a deceleration phase would begin. It is noteworthy that for the first ten years after independance Malawi required direct recurrent budget aid from the British government. As of 1973 Malawi was able to do without it.

Finally, studies elsewhere have shown that recurrent costs could be reduced considerably if standard treatment regimens were used to treat common conditions. For example, an adult with partial immunity to malaria usually can be treated with one dose of antimalarials rather than with a five-day course, or a child with cough can be effectively treated with one or two drugs rather than with four or five, as is often the case.

C. THE ROLE OF THE MISSION SECTOR

The mission sector (as represented by PHAM) has recently sought to expand its ambulatory and preventive health care work in close cooperation with the programs of the MOH. The mission sector accounts for about 40 percent of health care services and most is delivered in rural areas. It is not clear what the role of this sector will be in the future especially as regards the basic health services network. The issue is complicated by the fact that the missions must charge for services to meet operating costs; the government services are free.

It would seem that the mission institutions should be integrated as fully as possible into the basic health services network. In some instances where mission groups are unable to support programs or facilities the MOH might take them over in full or in part. It is suggested that any comprehensive health planning consider fully the role of the mission sector and that, where appropriate, PHAM be involved in the planning process.

D. POPULATION POLICY

Fertility is high in Malawi. The crude birth rate is estimated to be 50.5 per 1000 population and each woman is estimated to have 7.7 births at the completion of her child bearing. High fertility and birth rates are responsible, along with declining death rates, for Malawi's natural rate of population increase of 2.6 percent. This rate is likely to increase to at least 3.2 percent per year before it can begin to decline. Malawi has been fortunate in that vigorous leadership has enabled it to maintain a real GNP per capita growth of 4 percent per year despite a population growth rate of 2.6 per year.

It appears that in some areas population density is becoming a factor to be concerned with. To some extent the agricultural yields necessary to support this population are being increased by better farming methods, fertilizers, and irrigation. Moreover, it is always difficult to predict the maximum population that an area can support or to predict the technological development that may be forthcoming to permit even greater population densities to be accommodated. Nevertheless it would seem appropriate for the government to begin to formally consider its demographic situation. We would suggest that the government sponsor a study of current demographic trends and implications of current and near-term growth rates on future development. A population office or study group within the Economic Planning Division might be useful.

Many women are faced with delivering 8 to 12 infants during their lifetime. Some of these women become nutritionally depleted and enter a marginal state of health. Some cannot afford the school fees for all their children. It is likely that many would prefer to space their births to wider intervals and that some would like to limit their offspring to a number they feel they can adequately care for. If given the opportunity many would choose to use contraceptives as many of the more fortunate women do in urban areas. It is likely that many of their husbands would agree. It is of course difficult to raise this issue in Malawi where past history of perhaps improper promotion of family planning forced the government to restrict the availability of family planning information and methods. Still, it would be unrealistic in 1978 not to suggest that population growth and family planning will be an issue that the government will have to consider more seriously in the decades ahead.

V. RECOMMENDATIONS

Malawi is highly deserving of assistance for its health care system. It is still one of the poorest countries. Foreign assistance has so far been carefully and appropriately used. When its development program is fully implemented, Malawi will have a model health care system in Africa. In many ways it already does.

There is a danger perhaps of an excess of foreign aid to Malawi's health sector if Malawi's long-term recurrent budget could not support the operation of completed capital projects. For this reason it is important that the MOH's rural health and manpower strategy be finalized and that its planning capability be strengthened. Once this is done only that foreign aid which falls within the overall health strategy and schedule should be accepted.

A. SUPPORT FOR PLANNING AND MANAGEMENT

Good planning is occurring but capabilities need to be augmented. Participant training in health planning, statistics, health information systems, and evaluation can be recommended, as well as in-country consultation. It would be most useful for the senior MOH and Economic Planning Division staff to meet in a short workshop in order to decide how the planning unit could best function, what its objectives should be, and what skills are needed. In-country consultants might help organize such a seminar/workship and, as a result, more specific recommendations made as to assistance needed to strengthen the unit.

B. SUPPORT FOR THE MOST PERIPHERAL COMPONENTS OF THE BASIC HEALTH SERVICES NETWORK

Again it would be most appropriate to conduct a comprehensive health planning exercise to "finalize" rural health strategy and the role for foreign assistance, as there are a number of issues that should ideally be resolved. Even without such an exercise, support for the most peripheral component of the basic health services network would be appropriate. This could include:

- training of community based workers - MCH assistants and any other community based workers who will carry out health related activities in the health posts or the community such as homecraft workers, traditional birth attendant, or other village health workers.

- drugs and supplies - (during acceleration phase of program development)

- building of facilities - especially subcenters and health posts (the latter involving self help). If a significant development is occurring at the periphery then aid to construct one or more district hospitals could be considered as these are truly rural hospitals and provide important services to the rural poor.

- supporting services - This could include support for the training or orientation of clinical officers, public health nurses and district medical officers, and health education. Orientation programs or short term training of district medical officers could be very important as these physicians must in the long run support and supervise the district health program. The team would also suggest funding the previous health education request and consider providing professional health education assistance at the central level either through resident or short-term consultation assistance.

C. CATEGORICAL DISEASE SUPPORT

- Bilharzia - (schistosomiasis) program support has been requested from the British Government. Additional support will be necessary to implement an effective

program. The problem appears to be growing rapidly, but since there is some question of the true incidence of disease, which is usually much lower than the incidence of infection observed in surveys, this would be a fruitful area for prior study and research.

- Expanded immunization program - any assistance to the effort would be fully justified. Provision of measles vaccine would be an extremely cost-effective contribution.

D. HEALTH COMPONENT OF AN INTEGRATED RURAL DEVELOPMENT AREA

- This could be done by loan or grant as separate health assistance or as a part of a loan to a specific rural development scheme.

E. SUPPORT FOR WATER SUPPLY DEVELOPMENT

- (see WHO/World Bank report). This is a model program and any assistance would be highly cost-effective.

F. SUB-SECTOR GRANT

Malawi has acted responsibly in its allocation of resources and is a country where a broad sub-sector grant to support some aspect of its development program would be justified. This might be a grant that did not demand the usual intense donor auditing procedures nor purchasing requirements. Such a grant would be far easier for the donor and the government to administer. A broad statement of intended use might be required and then the money could be used to support current development plans, under specified limits. Such a grant might be even more justified after

certain outstanding planning issues are more clearly defined. For example, any decision to go forward in establishing a medical school would appear to prejudice the potential utility and effectiveness of a subsector grant, and thus would make it an unattractive method of assistance.

BIBLIOGRAPHY

Amer, John. 1978. "Malawi, physical and social geography" in Africa South of the Sahara. 533-551.

Baker, Colin. 1976. "The government medical service in Malawi: an administrative history," 1891-1974. Med. Hist. 20:3, 296-311.

Ben Ezra, D. and Chirambo, M.C. 1977. "Incidence and causes of blindness among the under 5 age group in Malawi," Brit. J. Opthamol. 61, 154-157.

Ben Sira, Ticho, U. and Yassur, Y. 1972. "Onchocerciasis in Malawi: prevalence and distribution." Trans. Royal Soc. Trop. Med. & Hyg., 66, 296-299.

Brubaker, G. 1978. Personal communication to Dr. Scheyer.

Bulla, A. 1977. "Global review of tuberculosis morbidity and mortality in the world." World Health Statistics Report (WHO), 30,2.

Burgess, H.J.L. et al. 1973. "Results and appraisal of a nutritional survey in Malawi." Trop Geogr. Med. 25, 372-380.

Chanock, M. "Agricultural change and continuity in Malawi" in The Roots of Rural Poverty in Central and Southern Africa: Perspectives on Southern Africa. 396-407.

Cole-King, S. 1975. "Under-fives clinic in Malawi. The development of a national program." J. Trop. Ped. and Environ. Child Health, 21, 183-91.

Encyclopaedia Britanica, 1978. "Malawi," Macropaedia, Vol. M, 360-365.

Government of Malawi, 1978. Economic Report.

Government of Malawi, 1978. Budget Report Nos. 1, 2, and 3.

Government of Malawi, 1977. Annual Statistical Yearbook, Government Printer, Zomba.

Government of Malawi, Office of Economic Planning, 1978. Development Maps.

Government of Malawi, Ministry of Health, 1976. Statistical Reference Tables.

Government of Malawi, Ministry of Health, 1976. Miniplan Report, 1973-76.

Harland, P.S.E.G. et al. 1975. "Some effects of partial malaria suppression in Ugandan children during the first 3 years of life." Trans. Roy. Soc. Trop. Med. and Hyg., 69:2, 261-262.

Joseph, Stephen, 1973. Medical Education for Community Health Care: A Plan for Wyoming. University of Wyoming, Laramie, Wyoming.

King, Maurice, 1969. The Development of Health Services in Malawi 1970-1985 (mimeographed report).

Likuni Hospital. Annual Report for 1977. Likuni, Malawi.

Private Hospital Association of Malawi, 1977. Annual Report for 1977, PHAM, P.O. Box 30378, Lilongwe 3, Malawi.

Rampen, F. 1976. "The geographical distribution of onchocerciasis in Malawi." E. Afr. Med. Jour. 53:4, 251-254.

USAID. Southern Africa Task Force, 1977. Transition in Southern Africa...Malawi.

World Bank, 1977. Economic Memorandum on Malawi, World Bank, Washington, D.C.

World Health Organization, 1972. National Health Planning for Malawi, 1973-1988.

World Health Organization, 1978. Country Profile, Malawi (typewriter document prepared by WHO representative, Malawi).

World Health Organization/World Bank, 1978. Water Supply and Sewerage Sector Study of Malawi. (Draft).

PERSONS VISITED

1. Mr. Gilbert Scheinbaum, Deputy Chief of Mission, American Embassy, Lilongwe, Malawi
2. Mr. Chadwick Mphande, Undersecretary, Ministry of Finance
3. Mr. B.H. Kawonga, Permanent Secretary, MOH, Lilongwe
4. Dr. Chilemba, Chief Medical Officer, MOH, Lilongwe
5. Mr. H.M.S. Chunga, Undersecretary, MOH, Lilongwe
6. Dr. A.C. Mkandawire, Chief of Epidemiology, MOH, Lilongwe
7. Mr. Joseph Manda, Senior Health Planner, MOH, Lilongwe
8. Mr. M.G. Nyrongo, Economist, Planning Unit, MOH, Lilongwe
9. Mr. H.G. Funsani, Administrative Officer, Health Planning Unit, MOH, Lilongwe
10. Mr. O.H. Mtawali, Acting Principal Personnel Officer, MOH, Lilongwe
11. Mr. S.M.C. Jere, MCH Coordinator, MOH, Lilongwe
12. Mr. S.S. Chigwenembe, Director, Auxiliary Personnel Training, MOH, Lilongwe
13. Mr. P.A. Chendamba, Director, Environmental Sanitation, Lilongwe
14. Mrs. C. Mkandawire, Asst. Registrar Nurse/Midwifery Council, MOH, Lilongwe
15. Mrs. S. Sagawa, Registrar, Nurse/Midwifery Council, MOH, Lilongwe
16. Sister Marie Stack, Nurse/Midwife Consultant to Private Hospital Association of Malawi, MOH, Lilongwe
17. Dr. Yun, WHO Representative to MOH, Lilongwe
18. Mr. Christiansen, WHO Advisor on Statistics, Lilongwe
19. Dr. Teesdale, Schistosomiasis Program Director, MOH, Lilongwe
20. Dr. S. Otoo, WHO, Director, Medical Auxiliary Training School, Lilongwe

21. Dr. Lundgren, WHO, Medical Officer in Charge of MCH, MOH, Lilongwe

22. Dr. Anne McAdams, Pediatrician, Our Lady of Africa Hospital, Likuni

23. Dr. Joseph McDougal, Medical Officer, Our Lady of Africa Hospital, Likuni

24. Dr. Kynders, Medical Officer, Our Lady of Africa Hospital, Likuni

25. Sister Marielle, Director, Our Lady of Africa Hospital, Likuni

26. Mr. Nsanja, Urban Peripheral Health Center, New City, Lilongwe

27. Chitedze Agricultural Station and Rural Health Center of Lilongwe Land Development Project

28. Mitanda Rural Hospital, Central Region

29. Mrs. Mphaya, Lilongwe Hospital

30. Dr. Celia Goldberg, Nutritionist, Banda Agricultural College

31. Dr. Wanda Montgomery, Home Economist, Banda Agricultural College

32. Mr. A.B. Zindawa, Superintending Clinical Officer, MOH, Lilongwe

33. Sr. Medical Assistant, Nathenje Sub Health Center, Central Region

34. Mr. Chineola, Medical Assistant, Mlangeni Subcenter

35. Mr. Bomba, Chief of Health Education, MOH, Lilongwe

36. Dr. Lungu, District Medical Officer, Dedza

37. Mrs. Mhango, Matron, Dedza Hospital

38. Mr. Yohamni Nyasulu, Southern Region Health Inspector

39. Ms. M.D. Field, Sister-in-Charge of Zomba School of Enrolled Nursing, Zomba

40. Mr. Likukuta, Clinical Officer-in-Charge of Domasi Health Center

41. Dr. Kondowe, District Medical Officer, Mangochi

42. Mr. Msosa, Medical Assistant, Mangochi Hospital

43. Medical Assistant, Namitambo Health Center

44. Mr. Chirwa, Senior Planning Officer, Ministry of Agriculture, Lilongwe

45. Mr. Kumwenda, Principal, Medical Auxiliaries Training School, Lilongwe

46. Mrs. Kawonga, MCH District Coordinator, Lilongwe

47. Mrs. Chiunjiza, Nurse-in-Charge, Malingunde Hospital

48. Rural Under Fives Clinic, Lilongwe District

49. Mr. Chiwaya, MCH Coordinator, Central Region

50. Dr. Susan Cole-King, former Director of MCH, MOH, Malawi (now at University of Sussex, England) - visited in England

51. Dr. Geoffrey Mwaungulu, Specialist in Internal Medicine Kamuzu Central Hospital, Lilongwe

52. Dr. Bullough, Chief of Obstetrics, Kamuzu Central Hospital, Lilongwe

53. Dr. Vunde Pemba, Chief Pharmacist, Kamuzu Central Hospital, Lilongwe

54. Mr. Banga, Chief Accountant, MOH, Lilongwe

55. Mr. Ronald Benham, Soil Conservation and Construction Supervisor, Lilongwe Land Development Project

56. Mrs. Lindsey Kamtengeni, Community Development Officer, Ministry of Community Development and Social Welfare

57. Dr. Kharodia, private physician, Lilongwe