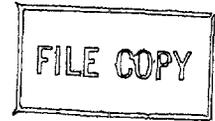


Report No. 4715-ZA



# Zambia Population, Health and Nutrition Sector Review

May 16, 1984

Population, Health and Nutrition Department

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CURRENCY EQUIVALENTS

<u>Currency Unit</u>		<u>Zambian Kwacha (K)</u>
US\$ 1.00	=	K 1.60
K 1.00	=	US\$ 0.625

The Zambian Kwacha is officially valued in terms of a basket of currencies, for which the US dollar is the intervention currency. Since July 1983, the Government has followed a flexible exchange rate policy, making periodic adjustments in the official value of the Kwacha. The rates expressed above are as of January 1984. The following are average annual exchange rates for years shown in the Statistical Appendix:

1970	K 1.00	=	US\$ 1.40
1974	K 1.00	=	US\$ 1.55
1975	K 1.00	=	US\$ 1.55
1976	K 1.00	=	US\$ 1.40
1977	K 1.00	=	US\$ 1.27
1978	K 1.00	=	US\$ 1.23
1979	K 1.00	=	US\$ 1.26
1980	K 1.00	=	US\$ 1.27
1981	K 1.00	=	US\$ 1.14
1982	K 1.00	=	US\$ 1.07
1983	K 1.00	=	US\$ 0.81

FISCAL YEAR

Government: January 1 - December 31

ABBREVIATIONS

ADMS	Assistant Director of Medical Services
CEM	Country Economic Memorandum
CSO	Central Statistical Organization
FP	Family Planning
IEC	Information, Education and Communication
IMR	Infant Mortality Rate
MCH	Maternal and Child Health
MOF	Ministry of Finance
MOH	Ministry of Health
NAMBOARD	National Marketing Board
NCDP	National Commission for Development Planning
NFNC	National Food and Nutrition Commission
NGO	Non-Government Organizations
PHC	Primary Health Care
PHN	Population Health and Nutrition
PPAZ	Planned Parenthood Association of Zambia
SIDA	Swedish International Development Agency
TFR	Total Fertility Rate
UNICEF	United Nations Children's Fund
UNIP	United National Independence Party
UTH	University Teaching Hospital
ZCCM	Zambian Consolidated Copper Mines
ZEN	Zambia Enrolled Nurses



## DEFINITIONS

Crude Birth Rate:	The number of births per 1,000 population in a given year.
Crude Death Rate:	The number of deaths per 1,000 population in a given year.
Degrees of Malnutrition:	A common method of assessing child nutritional state, based on deficit in weight-for age. The Gomez classification scale disaggregates malnutrition into three degrees in comparison to a reference standard, namely: first (mild) - 75-90% of expected weight-for-age (or standard); second (moderate) - 60-75% of expected; third (severe) - under 60% of expected and all children with edema present.
Dependency Ratio:	The ratio of the economically dependent part of the population to the productive part, arbitrarily defined as the ratio of the young (under 15 years of age) and the elderly (those 65 years of age and older) to the working age population (those 15-64 years of age).
Infant Mortality Rate:	The number of deaths of infants under one year of age in a given year per 1,000 live births in that year.
Life Expectancy at Birth:	The average number of years an infant will live if the current age/sex-specific mortality trends prevailing at the time of birth were to continue.
Morbidity:	The frequency of disease in a population.
Mortality:	The frequency of death in a population.
Protein-calorie Malnutrition:	A clinical spectrum of sub-optimum nutritional states ranging from mild undernutrition and growth retardation to kwashiorkor and marasmus caused by a deficiency in the quality and/or quantity of diet.

**Rate of Natural Increase:** The rate at which a population is increasing (or decreasing) in a given year due to a surplus (or deficit) of births over deaths, expressed as a percentage of the total population.

**Rate of Population Growth:** The rate of natural increase adjusted for (net) migration, and expressed as a percentage of the total population of a given year.

**Total Fertility Rate:** The average number of children that would be born alive to a woman during her lifetime if she passed through her childbearing years conforming to the age-specific fertility rates of a given year.

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## ZAMBIA

### SUMMARY <sup>1/</sup>

#### A. Population

##### Demographic Situation and Trends

1. With an average annual growth rate of 3.1%, the population of Zambia increased from 4.1 million to 5.7 million in the eleven year period from 1969 to 1980. The infant mortality rate (IMR) has fallen slightly from 130 per thousand live births in the 1950s to 115 in the early 1970s while fertility appears to have been rising. Regional differentials in mortality are large. The highest rates, found in the provinces off the rail lines, are nearly twice the level of the lowest rates, found in the Copperbelt province. Regional differentials in fertility are also large but are more difficult to quantify because of data quality. In the Western and Northwestern provinces the total fertility rate (TFR) may be less than five while in the Northern, and Copperbelt and Eastern province fertility is between seven and eight. External migration is low and has not significantly affected the population growth rate. Internal migration abetted by the high rate of population growth, led to a 9% per annum rate of urban growth in the 1960s that slackened slightly in the 1970s to 6.7%. Detailed data from the 1980 census will provide a valuable updating of the mortality, fertility and migration trends, nationally and by regions.

2. In the absence of any change in fertility, the 1980 population of Zambia would double by the year 2000 to 11.5 million and would multiply by three and a half times over the next 35 years to 21 million. Even with the kind of spontaneous and gradual fertility decline which could occur as development proceeds, the population would double to 11.3 million in 2000 and triple to 17 million over the next 35 years. As mortality declines, the growth rate would rise from 3.4% to 4% per annum by 2010-15 if there is no change in fertility, and fall only to 2.4% with a spontaneous and gradual decline. This alarming trend could be prevented if Zambia were to achieve a success with family planning programs paralleling that of other countries at similar stages of development. If a strong program were started immediately, the population in 2000 would be 9.3 million, the population in 35 years would be 12 million, and the population growth rate would fall to 1.5%.

##### Burden of Population Growth

3. Continued high population growth threatens the prosperity of Zambia. As Zambia seeks to diversify its economy, promote agricultural growth and deepen the social infrastructure per capita, an increasing proportion of resources---financial, technical, and managerial---will have to be diverted to investment. The current high rate of population growth

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<sup>1/</sup> This report is based on the findings of a PHN mission that visited Zambia in January 1983. The mission was composed of Dr. V. Jagdish, Public Health Specialist (mission leader); Mr. Howard Barnum, economist; Ms. Althea Hill, Demographer; Mr. Ved Kumar, Pharmaceutical Specialist and Mr. James Pines, Nutrition Consultant.

will generate consumption demands that will compete directly for the resources needed for investment. Without a fertility decline there would be 108 dependents per 100 productive adults by 2015. But with a plausible fertility decline, the dependency ratio could fall to between 50 and 75. A fall in the dependency ratio would give Zambia a valuable opportunity to improve the rate of capital accumulation. The need for investment in agriculture is especially acute. The average diet is presently below WHO standards in caloric intake, yet the food supply is currently growing more slowly than population. Population growth also requires public investment for social services. At present growth rates educational funding and expenditures for primary health care would need to double in real terms within the next 20 years.

4. Population growth continues to exacerbate the problem of urban growth and to fuel, through increasing pressure on the land, rural migration to the urban areas. The imbalance of production and consumption between urban and rural areas is aggravated by internal migration, with urban populations consuming a disproportionate share relative to production. Male unemployment approaches 30% in the towns, yet in rural areas agricultural productivity is threatened by the high numbers of female headed households. The stagnation in rural areas, urban unemployment and the increasing dependency burden call for tandem programs of agricultural development and population planning.

#### Present and Future Population Policy

5. Although the Government has not formulated a population policy, it has made a positive start in family planning services as part of the maternal and child health program and plans to provide family planning services as part of the primary health care program. A voluntary agency, the Planned Parenthood Association of Zambia (PPAZ) has also started to provide population services. Data from the MOH and PPAZ on family planning are incomplete and unreliable. The number of acceptors is less than 3% of women of reproductive age, and the family planning program must be greatly strengthened to have a significant effect on fertility and, through increased spacing of births, on maternal child health.

6. A strengthened program can only be achieved with government and public understanding of the problem and concurrence on policy actions. It is recommended that a committee of representatives from various ministries, the Central Statistical Office, University of Zambia, and other agencies be formed to study the population issue and recommend appropriate actions. Local studies on demographic issues should be carried out to support the work of the committee. It is important for policy design and the local studies that a full analysis of the 1980 census should be produced as early as possible. The Bank would consider providing technical assistance for an analysis of the census results if requested.

7. As the family planning program progresses, there will be a need to develop alternative routes for information and service delivery, such as agricultural extension, women groups, and cooperatives, but in the near future the strengthening of the program will be greatly dependent on improvement of the health care system. The immediate need is for the

development of maternal child health care and the promotion of family planning for child spacing as a means of improving maternal health and the health status of neonates and infants. Specific actions recommended include in service training for existing staff in the MCH/FP unit of the MOH, orientation of all health staff to family planning, training and support of PHC workers and financial and technical support for the PPAZ.

## B. Health

8. Development of Basic Health Services. The current pattern of disease can be more effectively dealt with through preventive care and simple curative interventions than with hospital based curative care. Leading causes of morbidity are respiratory illnesses, diarrhea, malaria, and injuries. Mortality data are unreliable and facility based. Leading causes of mortality include measles, pneumonia, malnutrition, malaria and diarrhea. Health services have been biased towards curative care in the past but the MOH recognizes the importance of developing accessible and decentralized preventative and basic curative health care. A strategy for the implementation of primary health care (PHC) was adopted in 1981. The strategy encompasses health education, promotion of nutrition, improvement and maintenance of water supply and basic sanitation, maternal and child health services (including child spacing), immunization, prevention and control of endemic diseases such as malaria, and treatment of common diseases and injuries. Implementation has begun and will be carried out in phases with revisions based on evaluation of pilot activities.

9. Planning. Inadequacies in the planning framework threaten the execution of the primary health care strategy and are hampering the development of the health sector. Investment priorities are not delineated and the primary health care strategy is not reflected in the Third Plan. Timing of plans and coordination of expected operational costs with planned capital outlays is deficient. Current projects to provide urban based, technical, curative care, were formulated outside of the plan and will have substantial recurrent cost requirements even though MOH operating funds are insufficient.

10. A cohesive long run strategy for the development of the health sector, and encompassing PHC, needs to be formulated. Within this strategy, a three to five year plan would need to be set out, describing the geographic and functional distribution of projects and expenditures. The plan needs to detail the recurrent cost implications of capital expenditures and be updated annually on a rolling basis. To guide short term annual planning, priorities among programs should be established with a consideration of cost effectiveness and distributional objectives. Accounting and operational surveillance should contribute to monitoring cost effectiveness and progress towards planned goals.

11. Organization and Management. To facilitate the PHC strategy the government will need to make several changes in the organization of health services; functional lines of management need to be set out, and districts and communities need to be involved with the implementation of PHC. Neither the provincial nor the district level are presently staffed to manage the planned decentralization of PHN. Responsibilities of departments and senior level officials need to be clearly defined at the

central level of MOH, and analysis of job descriptions and responsibilities need to be made at district and health center levels. At all levels of the health system management capabilities need to be improved through institutional development and management training.

12. Manpower. Manpower issues include training, staffing patterns, distribution, and manpower planning. There is a need for a review of manpower requirements that would take into account appropriate staffing patterns by facilities and the requirements of the PHC program. Coordination of manpower development activities could be accomplished through a single unit of the MOH. Pending the review of manpower requirements and reorganization of responsibilities for manpower development within the MOH, it would be advisable to delay manpower expansion and training of teachers. Ultimately, however, the training requirements for the PHC strategy will be substantial and will involve all levels of health personnel.

13. Health Financing. The Government's commitment to the health sector has been firm in Zambia, but deterioration of international copper markets since 1976 has led to stringent fiscal conditions that have affected government revenues and reduced recurrent funds in all sectors. After a period of substantial capital build-up in health between 1970 and 1976, real recurrent expenditures declined from a peak of K85.8 (US\$98.4) million in 1976 to K72.6 (US\$83.3) million in 1981. Thus, the operating costs of capital expenditures undertaken in the period of high copper revenues between 1970 and 1976 have been difficult to meet in recent years. Much of the burden of the shortage of MOH operating funds has fallen on capital maintenance, and deterioration of vehicles, buildings and equipment is impeding service delivery. However, it is also believed that significant economies may be possible (e.g. in pharmaceutical expenditures). Projected expenditures (including recurrent operating costs adequate for maintenance and capital expenditures for the PHC program) for the period 1983-1988 exceed projected revenues by sizable amounts. Although projections are very sensitive to assumptions chosen, the cumulative shortage of funds could total as much as K108 (US\$123.9) million over the six year period.

14. The difficulties in health financing magnify the importance of allocating both existing and new resources as effectively as possible. Planned expansion of services should therefore be severely reduced, and available domestic investment funds should be switched to maintenance expenditures and only replacement of capital. The allocation of the burden of the operating fund shortage should also reflect the greater cost-effectiveness and equity achieved by rural primary health care expenditures. In addition the main use of available external capital resources should be to improve the cost-effectiveness of existing services.

15. The shortage of funds also calls into question the current practice of providing all public sector health services without user charges. Fees for health services are needed not only as a means of raising additional operating funds but as a means of improving equity (through cross subsidization) and efficiency of resource allocation (through equilibrating user benefits and social costs). A phased program of cost recovery including scheduled charges for certain drugs and services and a health insurance scheme is recommended.

## C. Nutrition

### Nutritional Consideration in Health Services

16. Interaction of nutritional status with other diseases affects case fatality (for example, of measles) and increased susceptibility to morbidity (for example, of diarrhea) and bears heavily on the composition of PHC programs. High rates of childhood malnutrition in Zambia underline the importance of simple nutrition related interventions, such as growth monitoring, oral rehydration and the promotion of appropriate breast feeding and weaning. In addition, specific micro-nutrient supplements, such as iron, iodine and vitamin A, are valuable PHC measures to reduce anemia, goiter and xerophthalmia. These interventions should be considered in the formulation of the PHC strategy because in a country where malnutrition is implicated as a significant underlying cause of mortality, they are among the most cost effective health measures. These basic nutrition related interventions require the same careful logistics, training and support to achieve their potential impact as do other PHC interventions, and hence improvements in the effectiveness and efficiency of the health care delivery system is of particular significance.

### Nutritional Considerations in Food Pricing and Production Policies

17. Far reaching nutrition improvements can result from the introduction of nutritional considerations in food pricing and production policies. For example, packaging and pricing could be altered to favor the processing of maize into nutritionally superior roller meal rather than breakfast meal. Recent policy changes reducing reliance on maize by encouraging production of millet, sorghum, and cassava may have favorable nutrition effects, if prices offered to producers are high enough. The lack of access to and from the market in off line of rail provinces must also be addressed if production increases are to reach consumers.



## I. POPULATION

### A. Present Demographic Situation and Trends

#### Introduction

1.01 Three dominant features in Zambia's demographic situation underlie the country's present economic and social problems. The first is recent massive urbanization, almost unparalleled in sub-Saharan Africa, coupled with sparse and scattered settlement in rural areas; the second is a high rate of natural increase; and the third is wide variation in fertility and mortality levels between provinces, independent of differences between rural and urban areas.

#### Population Size and Growth

1.02 The population of Zambia was 5.68 million at the time of the 1980 census. It had increased 40% since the 1969 census when the population was 4.06 million--an average annual growth rate of 3.1%. Virtually all the growth was due to natural increase alone; migration or refugee movements were not large enough to be significant at the national level. Provincial growth rates, however, were strongly affected by rural to urban migration (and in some cases, refugee inflows) and varied substantially. There was a major difference between the more developed "line of rail" provinces (through which the south-north railway line passes) and the much less developed "off-line-of-rail" provinces. The two urbanized "line of rail" provinces, Central and Copperbelt, grew at 4.8 and 3.9% respectively, while Southern Province (the third, more rural, "line of rail" province) grew at 3%; by contrast, the other largely rural "off line of rail" provinces grew much more slowly, at rates ranging between 1.6 and 2.4%.

#### Population Distribution

1.03 Population distribution varies considerably. In 1980, with a national population density of 7.5 per km<sup>2</sup>, provincial densities ranged from 2.4 (Northwestern province) to 39.9 (Copperbelt province), though only Copperbelt and Lusaka provinces were above 30 per km<sup>2</sup>. District densities ranged much further, from under 1 to over 400 per km<sup>2</sup>. Much of this variation is the result of urbanization, with high densities generally occurring only around urban centers; rural densities are almost always well below 10 per km<sup>2</sup>, except in parts of the densely settled fringes along the Luapula/Zaire and Eastern/Malawi borders. Roughly speaking, however, the rural areas of the western half of the country are more sparsely settled than those of the eastern half. The normal pattern of rural habitation is in small settlements and hamlets without any large well-nucleated villages.

#### Urbanization and Migration

1.04 Rapid and large scale urbanization has occurred since independence, but now appears to be losing momentum. In 1980, 43% of the population lived in urban areas, double the level at independence; 78% of these urban dwellers (or one-third of the total population), were

concentrated in ten large towns or cities along the Copperbelt. The urban population grew at nearly 9% per annum between 1963 and 1969. During the 1970's the rate slackened though it was still a high 6.7%. In the absence of a dramatic upturn in the mining sector, the pace of urbanization is likely to slacken further.

1.05 Up to 1970 (the latest date for which migration data are available) there was little net movement between rural off line of rail provinces or from urban line-of-rail provinces back to rural provinces, but large net transfers occurred from rural to urbanized provinces together with somewhat smaller net movements among the latter. The greatest drift was out of Northern, Eastern and Luapula provinces, to Central and Copperbelt, with Western, Northwestern and Southern provinces noticeably less affected. Similar data from the 1980 census will provide an invaluable updating when they become available.

1.06 External migration has not been an important factor over the past 20 years. Up to the 1970's there was some net inflow of labor migrants, principally from Malawi, but this has probably largely ceased. Refugees from civil wars in neighbouring countries, although often locally important (particularly in Northwestern province) have never been numerous enough for any national demographic impact; at the end of 1980 their numbers were reported at 60,000.

#### Fertility, Mortality and Natural Increase<sup>1/</sup>

1.07 Estimation of fertility and mortality levels and trends is uncertain because of problems with the quality of existing data. Again, data from the 1980 census, when available, will be vital for evaluation, confirmation and updating. The best estimate of the national total fertility rate in the 1970s is about 6.75; fertility may have been rising due to a drop in the abnormally high incidence of sterility. The national infant mortality rate (IMR) fell from around 130 in the mid 1950's to about 120 in the mid 1960's, and thence to about 115 in the early 1970's; correspondingly, the proportion of children dying between birth and their fifth birthday (childhood mortality) fell from 22% to 20%, and thence to 19%, respectively. No information is available on adult mortality, but the use of a suitable model life table suggests corresponding figures for national expectation of life at birth of 45, 47, and thence 48 years, respectively. The national crude birth and death rates for the 1970's are estimated at 49 and 18, yielding a rate of natural increase of 3.1% for the

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<sup>1/</sup> The analysis on which this section is based was carried out after the deadline for 1983 WDI data had passed, and therefore many of the conclusions reached could not be incorporated in the 1983 WDR. They will be included in the coming annual revision. The earlier estimates, largely from the UN, had been mostly made some years ago and required revision as new data, including those of the 1974 and 1980 censuses, became available.

decade as a whole. Using the model of mortality decline normally employed for Bank projections to extrapolate to 1982, current expectation of life at birth is estimated at 51 years. On the assumption that fertility has remained constant at a TFR of 6.75, the current crude birth and death rates are estimated at 49.5 and 15.5 respectively, yielding a rate of natural increase of 3.4%.

### Regional Differentials in Fertility and Mortality

1.08 The national figures are within the general range of fertility and mortality levels in East and Southern Africa. However they conceal sharp regional differentials in both fertility and mortality, which have clear implications for both health and population policies and programs. Urbanization is a crucial factor in the case of mortality. Childhood mortality estimates for the mid 1960's show a clear general pattern of highest mortality in the rural off line of rail provinces, lowest mortality in the two most urbanized provinces, and an intermediate level in Southern province. The IMR for that period ranged from 82 (Copperbelt) to 175 (Eastern), given a national average of 121. Past trends also differ systematically, with the urbanized provinces showing marked recent declines in infant and childhood mortality, and the rural provinces only very gradual declines or even none at all; the differentials have thus probably widened over the past 20 years.

1.09 This pattern fits well with what is known of background factors such as income levels, general economic development, nutrition, education, and fertility levels. However, there are two puzzling anomalies. One is the exceptionally high IMR found in Eastern province (175 in the mid 1960s) compared to Western, Luapula and Northern provinces (148, 141 and 141 respectively); the other is the relatively lower IMR (98) found in Northwestern province, also combined with a marked past decline similar to the urban provinces, rather than the more gradual decline found in the other rural provinces. Both these features are consistently present in both 1969 and 1974 data. Interestingly enough, the population of Malawi, ethnically akin and geographically neighbor to the Eastern province, is also distinguished by exceptionally high infant mortality (close to 200 in the early 1970s); unfortunately no contemporary data are available for the parts of Angola and Zaire bordering on Northwestern province. Neither anomaly can be explained convincingly by any unique and striking differences among known background factors within Zambia, and further study is required.

1.10 Regional variations in fertility are more difficult to quantify because of greater problems with data quality. Nonetheless, differentials are very marked, though not as closely related to urbanization and development as in the case of mortality. Roughly speaking, fertility increases gradually in level from west to east across the country. The total fertility rate (TFR) is low in Western and Northwestern provinces (possibly not more than 5); moderately high in Luapula, Central and Southern provinces (between 6 and 7); high in Copperbelt and Eastern (between 7 and 8); and very high in Northern (where it is probably around 8). These variations are primarily the result of differentials in levels

of sterility, which are abnormally high in the western half of the country, and lowest in the northeast. The causes of the sterility are not known, but are presumably mainly pathological as in the neighbouring parts of Zaire and other areas in Central Africa with similarly high sterility.

### B. Population Projections

1.11 Three national population projections for the period 1980-2015 were constructed (Table 1, below) based on three variants of fertility trend, unchanging, delayed decline and immediate decline (Annex 1, Table 1.1). The assumption of no change in fertility is not necessarily intended to be realistic, but serves as a baseline, and an indication of what current government strategies in health and population are intended to achieve. The delayed decline represents the possible spontaneous evolution of fertility with continuing development, but no strong government family planning program, it is the path normally projected by the Bank for sub-Saharan African countries, and accumulated experience in other parts of Africa and the world.<sup>2/</sup> The immediate decline represents possible achievements with early institution of a strong government program, with some preceding limited private use.

Table 1: PROJECTED MID-YEAR POPULATION  
(in millions)

Projected Fertility Trend	1980	1990	2000	2015
1. No Change	5.65	7.98	11.52	20.81
2. Belated and gradual decline	5.65	7.98	11.31	17.19
3. Immediate rapid decline	5.65	7.64	9.32	12.04

Details see Annex I

1.12 The results dramatically illustrate the tremendous potential for population growth in Zambia. If fertility does not change, the 1980 population of 5.6 million would double by 2000 to 11.5 million, and would multiply more than three and a half times altogether over the next 35 years to nearly 21 million. Moreover, as mortality declines the growth rate would steadily rise to reach 4% by 2010-15, implying a further doubling to 42 million within the following 17 years. It is conceivable, of course, that the pressure on resources generated by such rapid growth would prevent any future mortality decline, despite the investments made in education, infrastructure and services which would continue to exert a lagged effect on mortality well into the future. However, even on the assumption that mortality remains the same over the next 35 years,

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<sup>2/</sup> For details of the underlying model, see Vu and Zachariah: "Short term population projection, 1980-2000 and long term projection, 2000 to stationary stage by age and sex for all countries of the world." PHNPR, World Bank, July 1983.

uncontrolled fertility will generate huge population growth: the population would still almost double (to 11.1 million) by 2000 and multiply three and a quarter times (to 18.4 million) by 2015, while the constant natural increase rate of 3.4% would produce a further doubling within the following 20 years.

1.13 Reductions in fertility, however, can significantly affect the outcome. Even a belated and gradual decline would reduce population size in 2015 by 17%, to 17.2 million. Under an assumption of immediate and rapid fertility decline the population in the year 2000 would be nearly 20% smaller, and the 2015 population, over 40% smaller; the 1980 total would hence only just double over the next 35 years, to 12 million. Even more dramatic is the effect on the potential for further growth at the end of the projection period. The 2010-15 growth rate would be cut from 4% to 2.4% with the belated fertility decline, and to 1.5% with the immediate decline, thus lengthening the doubling time to 29 years and 46 years, respectively.

#### Projections of Urban and Rural Growth

1.14 Separate detailed projections for the urban and rural populations are desirable. Unfortunately they are not yet feasible, since neither the 1969 census nor the 1974 sample census tabulated data on age structure, mortality and fertility separately by urban/rural residence, nor are the 1980 census results yet available. However, a set of three very simple projections from 1980 to 2000 were made, using the national projection with belated fertility decline as a basis, and three annual growth rates for the urban population of 6.5%, 5%, and 4%; the latter is a reasonable guess of current natural increase in the towns and, therefore, implies no net migration after 1980. It is not impossible (though so far unprecedented in the developing world) that if agriculture can be revitalized and the urban/rural terms of trade turned in favor of the countryside, some reverse net migration will develop out of the towns back to the rural areas. In such a case, the proportion of total population that is urban might not change much from its current level. Any reduction below about 40% urban would imply a very substantial annual net outflow of over .5% from the urban population, quite a new phenomenon at national level.

1.15 These variations produce dramatically different outcomes. With no further immigration, or some reverse emigration out of the towns; the urban population would still be under half the total population in 2000 and the rural population would grow at 3% or more during the next 20 years. With urban growth of 6.5%, nearly 80% of the total population would be urbanized by 2000, and the rural population would decline in numbers by one quarter by then. At a rate of 5% urban growth, perhaps the most probable assumption, the population would be nearly 60% urbanized in 2000, and the rural growth rate would still be 1.7%. These results broadly apply if fertility remains constant, or falls only after 1995. An earlier fertility decline would probably be concentrated among urban dwellers, and therefore is likely to slow down the level of urbanization and allow an appropriate urban economic base to develop. However, it is unrealistic to expect Zambia's level of urbanization to sink much below its present state over the near future, even if it can be prevented from rising still further.

### C. Implications of National Population Growth

#### Implications for the Age Structure

1.16 If continued unabated, high fertility in Zambia will lead to an increasingly youthful age structure that will generate even higher population growth in the future and will also impede investment as the dependency burden increases. Domestic investment is reduced as the economic burden of dependents (measured by the dependency ratio, or ratio of children under 15 years of age plus people aged 65 years and over to working age adults of 15-64) grows and diverts national income from savings to consumption. At present in Zambia the dependency ratio is about 103 dependents per 100 productive adults (Annex 1 Table 1.3). If fertility does not fall, the dependency ratio will rise steadily to 108 by 2015 because of the projected mortality decline, which is concentrated in infancy and childhood and hence raises the proportion of children in the population. However, even a belated decline in fertility, by decreasing the proportion of children, would reduce the 2015 ratio to 75, while the immediate decline would halve it to 52. The effect will be only temporary since if fertility and mortality continue low the proportion of elderly will gradually rise to compensate for the reduction in the proportions of children. However, in theory this dramatic short term alleviation of the dependency burden could provide a welcome breathing space for the Zambian economy, and an invaluable opportunity to improve rates of saving and capital accumulation.

#### Implications of Urban Growth

1.17 Also of central importance is urban growth. Zambia at present suffers from an acute imbalance of labor. Male unemployment is high in the towns (a recent estimate being at least 30%), while in the countryside there is a shortage of male labor, essential for the frequent land clearance and new cultivation entailed by the shifting cultivation systems common in Zambia; in 1969 between one-fourth and one-third of all households in the rural off-line-of-rail provinces were female-headed. A serious imbalance of female labor also exists. Hidden unemployment is a major problem for urban women, who can no longer farm to support their families but have no well-developed trading networks or pool of salaried jobs to provide substitute income. By contrast, the workload of rural women with husbands or male relatives away has increased dramatically while their ability to feed their families adequately has been affected by the shortage of male labor. The absence of males, particularly heads of families, and the overburdening of women, discourages progress in agricultural development and adoption of new technologies (which may actually result in an increased demand for labor) and hamper general rural development. This in turn increases the relative attractiveness of the towns, thus perpetuating the problem.

1.18 This imbalance of labor is primarily a consequence of the rise and subsequent collapse of copper mining and of government revenues from copper, which together formed the now out-grown economic base for the towns; population pressure on the land in the prime areas of emigration to the towns, and the unfavorable terms of trade between town and countryside created by government's earlier agricultural pricing policies, were also contributing factors. At present it results in an imbalance of production and consumption between rural and urban areas, with the urban population consuming too much relative to their production and the rural population unable to either produce or consume as much as is desirable. In order to revitalize the rural areas, and to allow time for alternative urban economic bases to develop, urban growth must be minimized.

1.19 It may prove difficult to achieve this purely through reduction of migration into towns. Although the rate of migration seems to have been spontaneously slackening recently, the decline may be insufficiently rapid, particularly now that family settlement in towns has become common. Direct restriction of the urban influx, as practiced in China for example, would be politically unpopular and difficult to enforce. Indirect control, through incentives created deliberately by changes in the urban/rural terms of trade and rural development schemes, take time to implement nationwide and their success on any large scale is uncertain. Reduction of the rate of natural increase of the towns by reducing urban fertility is thus of great importance. This should also be much easier to achieve, since urban families are usually particularly receptive to family planning promotion. Indeed, even under conditions of high fertility in Sub-Saharan Africa, the fertility of large urban areas is usually much lower than the rural level. This is at least partly due to contraceptive practice; in Brazzaville, for example, which holds a quarter of the population of Congo, more than half the population of reproductive age report having used contraception,<sup>3/</sup> while in Nairobi one-third of currently married non-pregnant women report current use of contraception, compared with 7% at the national level.<sup>4/</sup> Because Zambia's large towns provide a comparable urban environment, the prospects for acceptance of family planning in the urban areas are good.

#### Implications for Production

1.20 Production in Zambia comes primarily from two sectors, mining and agriculture. The importance of the manufacturing sector is projected to increase, but will be dependent on the performance of the agricultural sector, as the growth envisaged will be largely in domestic processing of

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<sup>3/</sup> Althea Hill: "The Demographic Situation in Congo", PHN Technical Note Series No. Dem. 1, 1983, PHNPR, World Bank.

<sup>4/</sup> The First Report of the Kenya Fertility Survey, 1977-1978: Vol. I Central Bureau of Statistics, Ministry of Economic Planning and Development, Nairobi, Kenya, 1980.

agricultural products such as maize, cotton, oilseed and wheat. Future production in the mining sector will be determined not by population growth but primarily by world demand and remaining mineral resources; it is not expected to grow significantly overall in the foreseeable future.<sup>5/</sup> The agricultural sector will therefore be of crucial importance, for subsistence in the rural areas, for food supplies to the urban population (and hence also a source of cash income for the rural population), for cash crop exports, and for raw materials for the manufacturing sector.

1.21 Recent trends in agricultural production do not indicate that rapid population growth per se has been acting as a stimulus. Data are scanty and conflicting, with detailed evaluation and overhaul of Zambia's agricultural statistics very urgently required<sup>6/</sup>, but according to the figures used by the Bank (Country Economic Memorandum, April 1984, Table 3.1), per capita agricultural production and domestic food supply have not grown over the period 1970-1983. Total agricultural production (expressed in constant 1970 kwacha) grew at 2.8 percent per year over the period 1970-78, and at .4 percent from 1978 to 1983. Total food production grew at 3 percent over the years 1970-78; later figures are not given, but the rate of growth for the period 1978-83 must have been well below 1 percent.<sup>7/</sup> This compares with a population growth rate of just over 3 percent during the 1970s, and a projected rate of 3.4 percent for the period 1980-84. Since even in the early 1970s per capita food consumption failed to meet minimum calorie requirements (see Annex 5), stronger growth in the domestic food supply is required to raise nutrition and health levels. Food shortfalls, of course, can be and have been made up at least partially by imports (particularly in urban areas), but a strategy of dependence on imports of basic foodstuffs is not a viable option for Zambia in the long run.

1.22 The primary constraint to growth of agricultural production is not yet lack of land, at least at the national level (Annex 1, Table 1.3). In 1975 only 16% of the total land area of Zambia was under cultivation

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<sup>5/</sup> Country Economic Memorandum for Zambia, April 1984.

<sup>6/</sup> For example, estimates of total maize production for 1980 from two separate agencies in the Ministry of Agriculture (Provincial Agricultural Officers on the one hand, and the Statistics Section of the Planning Unit on the other), differ by almost 100%, or 7.8 million bags versus 15.0 million bags respectively, while the Food Strategy Study prepared by a Dutch team for the Ministry of Agriculture, gives an estimate of 9.9 million bags, based on estimated demand (Food Strategy Study, Annexes on Nutrition and Food Crop Production, Ministry of Agriculture, October/November 1981). Moreover, the Ministry of Agriculture collects almost no data on the production of cassava or millet, two of Zambia's major staple crops.

<sup>7/</sup> In fact, marketed maize production (in tons) was actually lower in 1979, 1980 and 1982 (no 1983 figure is available) than in 1978---itself a lower level than in 1974, 1976 and 1977 (CEM Statistical Appendix, Table 7.02).

(including fallow); 41% was classified as uncultivated arable land, and hence a potential reserve, with most of the remainder consisting of swamp, flooded or mountain land. Theoretically, therefore, the population, if optimally redistributed, would have room to quadruple, and at the very maximum, sextuple, if the current levels of agricultural productivity and nutritional status are maintained. Therefore, strictly theoretically, land reserves should be adequate to absorb all population increase over the next 35 years or so, by which time productivity could be expected to have risen substantially.

1.23 In practice, however, the margin of safety is much smaller. The best and most productive soils have already been largely occupied.<sup>8/</sup> There are many constraints on the utilization of new land, i.e. sparseness of the population and the cost of access and development. The population is far from optimally distributed at present, partly because of the rural exodus and partly because of differing rates of natural increase between regions. Forcible redistribution is unlikely to be an acceptable option, but spontaneous or indirectly influenced redistribution is inevitably a slow process because of ethnic and cultural diversity, natural inertia, and the time necessary to open up and make attractive the remoter and the more empty parts of Zambia. In fact, although population pressure on the land is already acute in much of north-eastern Zambia, where population density has already surpassed the carrying capacity of the land under traditional shifting cultivation systems,<sup>9/</sup> the response to date has been modification of the systems or urban migration, not movement into more empty lands elsewhere in Zambia. Moreover, as already mentioned, the level of nutrition is at present inadequate, so that raising of the current food intake is urgently required. It is hence unrealistic to expect land reserves to accommodate all population increase over the next 35 years at current levels of agricultural technology. Dramatic changes in agricultural systems and productivity will be required.

1.24 The prime constraints to growth in agricultural productivity up to the present have been policy shortcomings and institutional inadequacies on the part of the Government and the rural/urban labor imbalance. These have been exacerbated by the isolation and poverty of the rural provinces, by periodic bad weather, by the current economic problems of Zambia, and by the lack of suitable new technologies for many of the staple food crops due to inadequate research and development activities. There is, for example, no current research underway in Zambia on sorghum, cassava or finger and

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<sup>8/</sup> See Jurgen Schultz: "Explanatory Study of the Land Use Map of Zambia", Department of Geography, University of Zambia, 1975 particularly pp. 170-176. Also the Agricultural and Rural Sector Survey, 1975: World Bank: particularly Vol. 1, p. 2 and Vol II, Annex 2, p. 2. Also D. Hywel Davies: (formerly Professor of Geography, University of Zambia) "Zambia in Maps" Hodder and Stoughton, 1973, for maps of soils, population distribution and density, agricultural systems, and land use and agricultural potential.

<sup>9/</sup> See Schultz above, particularly Table 5, page 74.

pearl millets, although soil and growing conditions do not permit the substitution of maize, wheat or rice for these staples in much of the country. <sup>10/</sup>

1.25 In recent years, the Government has taken an impressive number of steps to improve agricultural policies and institutions including increases in producer incentives, decontrol of prices for many agricultural products, increases in Government spending on agriculture, some institutional reorganization and a start in the drawing up of long-term strategies and plans for the sector. The agenda for reform has been described in the Bank report, "Policy Options and Strategies for Agricultural Growth." The benefits of these reforms will be realized over time. If population continues to grow rapidly, the impact of agricultural growth will be diluted correspondingly and per capita improvements in food production, export earnings etc. will be reduced.

1.26 Another very important impact of rapid population growth relates to the social services normally provided through government funding such as education and health. The implications of population growth for public expenditure are thus substantial. Two prime examples are expenditure on primary education and MCH services. The population of primary school age children was 1.1 million in 1980 (Annex 1, Table 1.4). If fertility does not decline, numbers will double to 2.3 million by 2000 and nearly quadruple to 4.2 million by 2015. Thus if Government wished to maintain the present near-universal primary school enrollment, educational funding would have to double in real terms within the next 20 years and double again over the following 15 years. The increase in expenditure would have to be even higher to achieve any improvement in the current quality of schooling. A fall in fertility could substantially reduce the rise in needed spending. Even the belated fertility decline would lower the primary-school-age population by 24% in 2015, compared to what it would be if fertility remains at the current level; while the immediate decline would cut numbers by 30% in 2000 and by nearly 60% in 2015.

1.27 Potential MCH clients, (children under 5 years of age plus women aged 15-49) stood at 2.4 million in 1980 (Annex 1 Table 1.5). This group, which makes up over 40% of the population, makes the heaviest demands on the health services. If fertility does not decline the potential clientele for MCH would double to 4.8 million in 2000 and multiply three and a half times to 8.7 million by 2015. Thus, just to maintain the current level of services, government spending on MCH services would have to double in real terms within 20 years and almost double again in the following 15 years. The present level of MCH care is inadequate, with not more than half of children under 5 visiting a clinic in a year and about one third of all births taking place in medical facilities; while there is some scope for improvement by more efficient health planning, most of the shortfall is the result of inadequate funding and inadequate manpower. To achieve almost universal coverage, which is the Government's stated goal, Government

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<sup>10/</sup> See the Food Crop Production Annex of the Food Strategy Study; also Schultz.

expenditure would have to be approximately quadrupled by 2000 and again by 2015. A fertility decline would very substantially reduce the necessary growth in expenditure. Even the belated fall in fertility would lower the MCH client population by 23% in 2015, compared to what the numbers of clients would be if fertility remains at the current level; while the immediate decline would reduce the population to be served by nearly one quarter in 2000 and by almost one half in 2015.

#### D. Policies Regarding Population and Family Planning

1.28 The Government has not formulated a population policy. Given the amount of land available it believes that its population size, levels and trends of population growth are satisfactory. However, while recent statements by the Government indicate no serious concerns, there is growing awareness among government authorities of the socio-economic implications of the current rate of population growth. Family planning services are available to a small proportion of the population as part of the Maternal and Child Health Program. The Government also plans to provide family planning services as part of its primary health care program and it has accepted the establishment of a voluntary group, the Planned Parenthood Association of Zambia (PPAZ), to undertake family planning. Clearly the rapid growth of population is of critical concern and, in view of the serious socio-economic implications needs to be addressed urgently. A broad based multisectoral strategy should be developed.

#### E. Family Planning Activities

##### Organization

1.29 The slowing of population growth will depend to a large extent on the effectiveness of family planning programs which, in turn, depends on government commitment. As mentioned, the Ministry of Health accepts family planning as part of the maternal and child health program (MCH). Beginning in 1981 the MOH incorporated family planning into the curricula of nurses and midwives. There are plans to train 600 midwives in family planning by the end of 1983. Facilities run by the mining and other industries also provide family planning services along with MCH care. This is true of some individual mission facilities as well. The PPAZ has recently initiated a program to encourage communities to build MCH/FP clinics on a self-help basis by providing the materials required. However, these activities are not coordinated with the MOH and, as a result, the Government finds it difficult to provide staff and recurrent cost support. The PPAZ also provides services through existing government or non-government facilities. Nationwide information on the number, distribution and type of facilities offering family planning is not available. Methods available depend on the type of facility. Sterilizations are performed in hospitals only. Injectables, IUD, oral contraceptives, jellies, diaphragms and condoms are routinely available in health facilities and non governmental clinics. Oral contraceptives are the most frequently used contraceptive method (90% of users) but there is no information on continuation rates.

1.30 Statistics obtained from both the MOH and the PPAZ on family planning are incomplete because provinces do not provide information on a regular and timely basis. A well organized system for collection, analysis, and utilization of data on family planning services will be essential as part of any efforts to strengthen these services. Present information indicates considerable variation in the number of family planning acceptors by province but data inadequacies preclude a complete analysis. The following figures are quoted to give a general idea of magnitude. For example, out of an estimated national total of about 65,000 users in 1981, Copperbelt, one of the two urbanized provinces, had the largest number of new (21,842) and continuing (16,581) acceptors, whereas the other urbanized province Central had significantly fewer ( 374 new and 874 continuing) acceptors. A partial explanation may be the effect of PPAZ education programs in the most densely populated areas of the country, including the Copperbelt province.

1.31 Foreign agencies donate contraceptives to the PPAZ, which has an independent distribution network. The PPAZ supplies its clinics directly with required contraceptives, and also supplies MOH facilities. However, in the past supplies have not been ordered on time and as a result of stock-outs, program performance was detrimentally affected in 1980. Though there has been some improvement subsequently, the PPAZ remains weak in ordering and distributing contraceptive commodities.

1.32 In addition to conducting person to person education in family planning in densely populated areas, PPAZ has also undertaken seminars to acquaint the senior and mid-level political and government leaders with family planning. However, results were limited due to shortcomings in the training of PPAZ staff. In order for the PPAZ to fulfill its extensive plans for extending education programs in family planning, it would need substantial professional, financial and administrative support.

## II. HEALTH

### A. Health Status

2.01 Over the past decade the health status of Zambia does not appear to have improved significantly. Though the quality of data is inadequate there appears to be evidence of regional differentials in morbidity and mortality particularly in relation to malaria and injury incidence. In general, the levels and trends of morbidity are similar to other low income sub-Saharan countries with infectious diseases as a primary cause of morbidity and mortality. The incidence of injuries and venereal diseases is increasing, particularly in the urbanized provinces.

#### Morbidity

2.02 The leading causes of outpatient morbidity in children under 14 years are upper respiratory illnesses, diarrheas, malaria, fevers, injuries, skin diseases, eye diseases, ear diseases and malnutrition/anemia

(Annex 2, table 2.1). Over 50% of childhood morbidity is due to preventable causes. Differences in morbidity at hospitals and health centers and differences between males and females are insignificant. When the data are analyzed by province, the leading causes remain the same, but there are some differences in their relative importance. Upper respiratory illnesses and diarrhea are the leading causes of morbidity in all provincial hospitals except Luapula and Western provinces, where malaria is the leading cause. Injuries are prominent in Lusaka, the Copperbelt and Central provinces.

2.03 Upper respiratory illness, injuries, fevers, diarrhea, malaria, abdominal conditions, malaria, skin conditions, venereal diseases and dental diseases are leading causes of adult outpatient morbidity at both hospitals and health centers (Annex 2, Table 2.2). The reported incidence of malaria rose from 145.8 per 1,000 in 1978 to approximately 191 per 1,000 in 1981; the reported incidence of sexually transmitted diseases rose from 31.8 per 1,000 in 1978 to 35.3 per 1,000 in 1981. Females tend to have fewer injuries and lower incidence of venereal diseases, the latter possibly because of underdiagnosis. Time trend analysis also reveals some changes in the urbanized line-of-rail provinces. The incidence of venereal diseases and injuries, relatively low before, has been rising since 1978. In the other provinces there are no significant changes in morbidity over the last decade.

#### Mortality

2.04 Mortality data are unreliable. With no effective registration system, hospital and health center deaths alone are not representative of the community at large. Recent community based survey data do not exist. As mentioned, the crude death rate is approximately 18 per 1000 and the infant mortality rate 115 (para. 1.06). The leading causes of mortality at health centers in 1981 were measles (26%), pneumonia (14%), malnutrition/anemias (14%), malaria (10%) and diarrheas (10%). It is not possible to disaggregate the data by sex or age. Time trend analysis shows few changes since 1978, but there are some geographic differences. Measles accounts for 25 to 30% of total mortality except in Southern province (15.38%) and in Copperbelt province (5.20%). Malnutrition and anemia range from nearly 8% in North-western province to over 31% of total mortality in Copperbelt provinces. Given the high rate of mortality from measles, malnutrition is almost certainly an important underlying cause of mortality.

### B. Health Policies and Strategies

2.05 Since Zambia's independence the United National Independence Party (UNIP) and the Government's emphasis has been to develop health services particularly in rural areas. The UNIP manifesto "National Policies for the Next Decade 1974-84" and the Third National Development Plan (1979-83) stress the following objectives:

- (a) Continue development of an effective and integrated national health care system;
- (b) Develop basic health services in rural areas and give priority to those areas where no such facilities exist;
- (c) Examine the distribution of health workers and expand training programs to attain higher levels of Zambianization;
- (d) Move toward integration and expansion of preventive and curative services;
- (e) Provide health protection to an increasing number of mothers, infants, school children and certain vulnerable categories of workers;
- (f) Decentralize basic health services; and
- (g) Contribute to nutritional well-being of the population with particular attention to vulnerable groups.

2.06 In 1981 the Ministry of Health adopted a strategy for the implementation of primary health care (PHC) in Zambia to make essential health care accessible to the entire population. With some variation among the provinces the main activities are expected to be: health education; promotion of adequate nutrition and food supply; promotion and maintenance of a safe water supply and basic sanitation; maternal and child services, including child spacing; immunization; prevention and control of locally endemic diseases, e.g. malaria; promotion of mental health; and, treatment of common diseases and injuries. There is consensus and widespread support in the country for implementation of the PHC strategy, which has begun, and revisions based on recently conducted evaluations of pilot activities are expected shortly.

2.07 The Third National Development Plan broadly outlines targets for major health programs, manpower development and capital projects. The plan, however, does not detail how the chosen activities would relate to major health problems, where resources should be distributed, and what priorities underlie the plan. In other words, the plan does not constitute a statement of current health sector strategies or a guide to investment priorities. Furthermore, expenditures in the health sector have not adhered to the plan. During the years covered by the plan, major donor-financed activities have occurred that had not originally been included. In addition, the primary health care strategy evolved after the Third Plan was published, and plans and programs need to be reoriented accordingly.

2.08 The timing and content of annual plans also present problems. Annual plans are often received by the National Commission on Development Planning (NCDP) after planned expenditures have become a fact. The 1982 Annual Plan was received in May, but approved in February 1983. Neither the NCDP nor the planning unit of the MOH has a detailed picture of plans for the health sector. As a result capital expenditures are approved

annually on an ad hoc basis without any assessment of long-term recurrent expenditures or expected impact. District plans are lists of requested capital projects and are not clearly tied to a national or local long-term health strategy. Neither, the MOH planning unit nor the more recently introduced district level planning units are in a position to provide the necessary analytical backup.

### C. Organization and Delivery of Health Services

2.09 The Ministry of Health, the missions and industry (predominantly mines) are the major providers of health services in Zambia. The private sector is limited to about 100 practitioners in urban areas. Almost 95% of the urbanized and 68% of the rural population live within 12 km of a health facility though physical access is more difficult in the off-line-of-rail provinces. Health facilities are scattered throughout the country but Luapula and Northern provinces are under-served.

#### Organization and Management

2.10 The MOH is responsible for the development of all aspects of health policy and for planning and delivery of health services throughout the country. In urban areas town councils undertake environmental sanitation and preventive health work but provide only minimal clinical services. MOH provided health services are coordinated with mission supported health services through a central coordinating body, the Church Medical Association of Zambia. Provision of health services by the mining companies is restricted to employees and their families.

2.11 The Permanent Secretary, assisted by an Undersecretary, is responsible for the administration of the MOH and is accountable to the Minister of Health. Three Assistant Directors of Medical Services (ADMS) are responsible for preventive services, planning and development and administration. Preventive health services include health education, environmental health, maternal and child health, tuberculosis, leprosy, malaria, sexually transmitted disease control and radiation protection. The ADMS (administration) is responsible for running of the health facilities and implementing the PHC program.

2.12 Health planning is the responsibility of ADMS (Planning and Development). Activities carried out by the planning unit are mainly the preparation of projects under the capital budget. These projects are submitted as the "Health Plan" to the National Council for Development Planning for review and approval. No consideration is given to the recurrent cost implications of the projects proposed. No evaluation or studies of expected impact of projects have been carried out.

2.13 At the provincial level there is a medical officer responsible for the health services. He is accountable to the ADMS (administration), and is supported by professional staff. At the district level, the medical officer in charge of the hospital is also responsible for the district health services. There are no separate staff responsible for public

health. This situation leaves little time for preventive health services as much of the medical officer's time is spent in providing curative services at the hospital.

2.14 The 1981 Primary Health Care strategy emphasizes decentralization, with more authority given to the provincial and district levels. As preliminary steps to decentralization, provincial and district health teams have been established throughout the country. While a formal evaluation of the effectiveness of these teams is yet to be carried out, the MOH feels that definition of roles and responsibilities supported by proper training seminars will be necessary for efficient function of the teams.

2.15 With the adoption of the PHC strategy, there has also been recent emphasis on district level planning. Districts are expected to develop plans and submit them to the Provincial Health Office. District plans are supposed to be reviewed and collated as the provincial plan and sent to the MOH for approval. However, district planning has not yet been introduced throughout the country. A review of available district plans reveals that they are mainly concerned with health center development. In order for district level planning to be effective it will be necessary to train staff in the planning process.

#### Distribution and Utilization of Facilities

2.16 Government health services are provided through central, general, and district hospitals and through health centers, which are the lowest level of facility based care. In 1981 the MOH ran 42 hospitals, 621 health centers and clinics, 38 mobile clinics and 4 leprosaria. The number of government hospitals has risen from 19 in 1964 to 42 in 1981, and the government health centers from 226 in 1964 to 621 in 1981 (Annex 2, Table 2.3). In 1981, the missions ran 28 hospitals, 64 health centers, 14 mobile clinics and 11 leprosaria with a bed capacity of 4,000. Mining companies run 11 hospitals and 62 health centers in the copper producing areas, i.e. Copperbelt and central provinces. The total number of beds and cots per 1,000 population rose from 3.6 in 1969 to 4.00 in 1970 and declined to 3.5 in 1981 as implementation of capital projects slowed. The ratio of hospital beds per 1,000 in 1981 was 2.5. This compares favorably with other countries in the region (1.3 in Botswana and Kenya and 2.4 in Zimbabwe). While provincial distribution of beds is not skewed, there are some urban/rural differences with 5.8 beds per 1,000 in urban and 1.4 beds per 1,000 population in rural areas. Eight districts (6 in the off-line-of-rail provinces) have no hospitals. Of the 621 government health centers and clinics 506 are rural (45 health centers, 491 clinics and 15 flying doctor subcenters). Their distribution ranges from 3 health centers in Luapula to 12 in Eastern provinces.

2.17 Inpatient Services. The distribution of inpatient health services per 1,000 population among provinces appears to be fairly uniform when measured on the basis of beds per 1,000 population or inpatient days per capita. The average for Zambia is 3.5 beds per 1,000 population and 0.9 inpatient days per capita per year. Northwest province has a much higher ratio of beds per 1,000 population (4.8) and higher number of

inpatient days per capita (1.6) than other provinces. With this exception, the inpatient service provisions for individual provinces are close to the national average.

2.18 Implied occupancy rates can be calculated from the number of available hospital and health center beds and annual inpatient days per capita. The result is approximate because of unevenly applied criteria in counting beds and inaccurate reporting of bed days, but provides a useful indicator of the adequate scale (as opposed to quality) of inpatient services. The average implied occupancy rate for Zambia is approximately 70%. Excluding Northwest province (93%), the rates for individual provinces vary between 55% (Luapula province) and 85% (Eastern province). These data suggest that the scale and interprovincial distribution of inpatient facilities are within reasonable margins.

2.19 Outpatient Services. The reliability of outpatient data is questionable. The average number of outpatient visits per capita for 1980 was six. This is a much higher figure than the two to four visits usually recorded for outpatient care in countries with large rural populations. A sample survey that checked the validity of outpatient statistics estimated that the reported data overestimates actual usage by 30-60%

2.20 Accessibility. Interprovincial variations in the accessibility of clinic services are suggested by the number and proportion of rural population living outside of a 12 km radius of a rural health center. The lowest accessibility of health care in rural areas is found in the central, northern and western provinces. For Zambia as a whole, approximately 900,000 people or 27% of the rural population live outside the 12 km radius of access to a health clinic. A 1983 MOH/SIDA report on health services calculates that 150 new health centers would be needed to serve this population.

2.21 Health facilities vary widely in size, catchment area and staffing. The physical condition of facilities varies by province. Maintenance is poor throughout the health system, particularly in the rural provinces. Because proper housing is lacking, there is understaffing in the rural provinces. As in most countries, health staff, tend to be concentrated in urban areas where housing and other amenities are available. Services vary in quality by province and by the level of facility where services are provided.

2.22 Utilization. Health facility utilization in Zambia varies considerably. In 1977 the bed occupancy rate for the central, general and special hospitals was estimated at 74%, whereas the bed occupancy rate for district hospitals was 60% and for health centers 45%. In 1981 it was estimated that bed occupancy rates for the central, general and special hospitals had increased considerably whereas they had declined for district hospitals and health centers, primarily because of lower quality of care at the peripheral facilities. Occupancy rates for mission health centers were higher than for government health centers. The differences in utilization patterns between mission and government services are probably due to differences in the quality of services provided (this is partly

attributable to differences in the quality of trained manpower) and to the availability of drugs. Studies of district and general hospital attendances in Zambia reveal that nearly 80% of outpatients come from a distance of less than 5 km from the hospital.

### Services

2.23 All health facilities in Zambia are expected to undertake preventive and curative work. Preventive health includes maternal and child health and family planning; nutrition; expanded program of immunization; health education; environmental health; prevention of tuberculosis, leprosy, malaria and sexually transmitted diseases. No separate vertical programs have been developed for any of these health problems and activities are supposed to be carried out through the regular health care delivery system described earlier. Plans have been prepared but not yet implemented for a malaria control program. The percentage of deliveries conducted in health institutions varied from 20% in Western province to 62% in the Lusaka province, with a national average of 35%. A breakdown of deliveries by hospital and health centers is not possible. Postnatal attendance is generally poor, ranging from 5% in Western province to 34% in Copperbelt. Only 0.06% of pregnant women receive tetanus toxoid (dose II) in Northern province compared to 46% in Lusaka, indicating poor utilization of health facilities for preventive services. Overall utilization is low particularly in the rural provinces where logistics and transportation problems are most severe. Utilization is significantly better at mining company run health facilities because of better quality of care, adequate facilities and drug supplies. Health services are facility based and, due to inadequate transport and appropriately trained staff, outreach services are weak.

### Primary Health Care

2.24 The 1981 primary health care strategy emphasizes decentralization and community participation. The MOH has decided to use the political party structure to develop a strong community base for the PHC program. Community selected health workers would be responsible for carrying out PHC activities in their areas. They would work under the direction of a health committee (the party's selection committee) and in close relation with the health center staff. Because urban health facilities are easily accessible in urban communities, urban health workers would only undertake health education and preventive health activities and would not treat patients.

2.25 Administratively, at the central level, PHC is managed independently of preventive health services. This is unfortunate because most PHC activities are preventive in nature and close coordination with the preventive health programs is critical. A number of preparatory activities for PHC have been carried out. Seminars and workshops have been held at various levels of the health system to familiarize staff with the concept of PHC; provincial and district management teams have been established; and approximately 450 community health workers have been

trained. Preliminary evaluations of the functioning of the workers trained have been carried out and point to the need for revision of both tasks to be undertaken and curriculum content and focus. These evaluations suggest that the number of tasks community health workers are expected to carry out are too many and should be limited to a small number of high priority activities. The PHC strategy provides a cost effective way of providing and expanding health services in rural areas.

#### D. Health Manpower

2.26 The key health care providers in Zambia are doctors, registered nurses, enrolled nurses, medical assistants and health assistants. Indigenous training of physicians was begun in 1966 and the first class graduated in 1973. Physicians training at the School of Medicine of the University of Zambia takes seven years. Classes are small and the average output per year is around 26. The major concern is to maintain international standards. If current output is maintained, dependence on expatriate physicians will continue for a long time. The medical curriculum should be revised to be receptive to Zambia's needs and realities. The question of increasing input and reducing the period of training should also be considered.

2.27 Training of registered nurses takes 3 years and is conducted in four nursing schools. The average output per year is approximately 170. The curriculum emphasizes curative aspects rather than preventive health and hence nurses need retraining to effectively support the PHC program as it gets implemented. After the 3-year program nurses may become registered nurse-midwives with an additional year of training in midwifery.

2.28 Approximately 110 registered nurse-midwives graduate each year from two midwives schools. Basic nurse training is conducted at 17 Zambia Enrolled Nurses (ZEN) training schools and four more schools are expected to become operational shortly. Approximately 500 ZENs graduate annually. Attrition is a serious problem with thirty percent of the students dropping out. The Medical Assistants Training School trains medical assistants through a course of 3 years and health assistants through a course of 2 years. Curriculum for all categories of health workers needs revision in light of the PHC strategy.

2.29 The distribution of manpower in the different provinces of the country is imbalanced. The majority of the manpower is concentrated in the Copperbelt and Lusaka provinces, where over 70% of the doctors and dentists and over 65% of the matrons, registered nurses and midwives are stationed. Doctor/population and registered nurse/population ratios are lower in these provinces than the rest of the country. Because of the imbalance in distribution of manpower, peripheral health facilities are understaffed and, consequently, underutilized. Of all health personnel, 79% work for the Government, 10% for missions and 11% for industry and the private sector.

2.30 Recently the MOH appointed a task force to review the current manpower situation. The task force estimated additional manpower requirements for current and proposed facilities and analyzed the capacity of existing training institutions to cope with demand. This review could form the basis for a manpower development plan provided some further work is undertaken on the following important aspects: adjustments for attrition rates, losses due to retirement, expatriate staff contractual obligations and Zambian doctors' failure to return after training abroad. The suitability of standardized staffing patterns for various levels of health facilities and the needs of the new PHC program, as well as the relevance of the current curative, hospital based training curriculum requires examination. At the conclusion of the third Bank supported education project an evaluation study found that curricula for key health workers heavily emphasized curative care and that technical assistance to revise curricula was not used.

2.31 Physician shortages are overcome by contracting expatriates. The need for trained Zambian doctors and teachers in health institutions to replace expatriates is especially acute. Of over 821 doctors in the country, only approximately 300 are Zambian. Most of the Zambian doctors are in Lusaka. Only 2 of 9 provincial medical officers are Zambian and none of the 53 district medical officers. The Zambian Medical Council feels that the professional standards of expatriate medical officers varies considerably, but has not established procedures for screening the professional suitability of applicants, nor does it require medical officers to undergo refresher training.

#### E. Health Support Systems

##### Health Information

2.32 Data are collected from all health units every month. Peripheral health units send monthly returns and districts send data monthly or quarterly to the provincial medical office. The provincial medical offices in turn send data to the health information unit of the MOH. At present there are about 245 different forms to gather information. Random surveys, however, have shown that data are not reliable and that the actual number of visits to facilities are inflated. Data analysis from the central health information unit is extremely slow, and annual reports, the only source of feedback, are years out of date.

2.33 The poor quality and unavailability of data makes the assessment of health status difficult. The problems associated with data collection and analysis are: (i) too much information gathering; (ii) delays in analysis; (iii) lack of feedback; and (iv) weak staff capability in the health information unit. Similar problems arise with family planning statistics and nutritional surveillance data. In order that data are collected and analyzed in a timely fashion, the MOH should carefully review its data requirements from each level of the health system.

### Pharmaceutical Supply and Distribution

2.34 Overall public sector drug expenditures increased from K 6.1 (US\$7.0) million in 1972 to K 15.4 (US\$17.7) million in 1980. Drug expenditures for the mining sector was about K 8 (US\$9.2) million in 1982. These figures do not take into account substantial donations of drugs received by the Government or missions. The value of drug donations has not been estimated. Private sector drug expenditure is estimated to be approximately K11-12 (US\$12.6-13.8) million annually, with total drug expenditures in 1982 around K 34-35 (US\$39-40) million.

2.35 Public health sector drug expenditure of \$3 per capita in Zambia is much higher than in neighboring countries (\$1 in Malawi and \$1.25 in Botswana). The urban population, receives a disproportionately high share and drugs are in short supply at the periphery. This is despite the fact that drug expenditures have doubled in the past decade. More recently the difficult financial situation and lack of foreign exchange has increased drug shortages. Funds are wasted due to: (a) a tendency to procure and use expensive drugs; (b) overprescribing; (c) limited financial discipline; (d) poorly secured stocks; (e) inadequate procurement system; and (f) the absence of a management and information system.

2.36 There has been a consistent increase in drug expenditures over the years, predominantly at the three central hospitals (the University Teaching Hospital (UTH) and the hospitals at Ndola and Kitwe). Together these facilities account for about 50% of the total consumption. Provincial and district hospitals usually exceed their drug budgets, while rural health centers have only marginal funds at their disposal and are chronically short of drugs.

2.37 Prescribing practices at the hospitals and outpatient clinics are often inappropriate. In general, there is a tendency to overprescribe and also to use more expensive brand name drugs when inexpensive, equally effective remedies are available. The procurement and utilization of generic drugs is minimal.

2.38 The pharmaceutical industry in Zambia is limited to manufacturing formulations from imported raw materials. At present, about 20 pharmaceutical manufacturing units operating in the country manufacture a range of proprietary drugs, veterinary products, surgical dressings, bandages, cosmetics and over-the-counter drugs. Of these, three are public sector companies engaged in manufacture, procurement, wholesaling and distribution of drugs and medical supplies. These companies are poorly managed and do not function effectively. Although 17 companies are licensed to manufacture drugs in the private sector, they do not produce commonly required drugs for PHC. They produce more expensive drugs and over-the-counter items. In addition, shortage of foreign exchange leaves large local production capacities grossly underutilized. Since commonly needed drugs are not locally manufactured, the Government spends large amounts of foreign exchange to meet its drug requirements. No comprehensive drug policy or complete drug legislation has yet been

developed. There is also no definition of the lists of drugs to be used at various levels of the health system.

2.39 Deficiencies in the distribution of drugs and medical supplies are an important constraint to health service delivery. Nearly two-thirds of required drugs are usually not available and shortages exist at all levels, but more acutely at the periphery. All aspects of supply, management, and logistic support for drugs need improvement. This includes demand estimation, procurement, central and peripheral distribution, the support for transport, the quality of storage facilities beyond the central level, inventory control, inventory management and the patterns of drug consumption.

#### Transport and Maintenance

2.40 A shrinking and aging transport fleet, the absence of adequate recurrent budgets for petrol, oil, and lubricants and a lack of regular maintenance have created serious problems of mobility in the health system and constrained expansion of health services. Over the years, neglect, inappropriate use and lack of repair, and the failure to train drivers in proper use and maintenance of vehicles has reduced the efficiency of the transport system. The problem has been further compounded by maldistribution of vehicles, and lack of appropriate spare parts. Because of these problems, currently at least 80% of the fleet needs immediate replacement. In 1982, 144 (or only 26% of 550 vehicles) were operative. During field visits it was observed that even available vehicles were not fully utilized due to lack of funds to buy petrol, oil and lubricants.

2.41 Repair and maintenance problems are further compounded by the fact that the Ministry of Health must use the facilities of the Mechanical Services Department. This workshop, however, is usually overloaded with work from other government departments, and vehicles remain there for long periods awaiting even minor repairs. Routine maintenance is difficult to undertake because of staff shortage and work loads. Major repairs are only possible when the parent department provides the necessary spare parts. This usually proves difficult since there are no budgetary provisions for spare parts and, even if funds are available, spares may be out of stock. Procurement of spare parts from abroad is constrained by a lack of foreign exchange.

#### Private Physicians

2.42 There are a small number of private physicians, concentrated mainly in Lusaka, Copperbelt and Livingstone, Choma, Kajira and Kabwe. The Government regulates private practice through the Medical Council. A team of inspectors comprising a physician, a pharmacist and a health inspector periodically inspects the clinics and recommends suspension of the licence to practice if they observe malpractice or neglect of proper standards. Practice by the 100 active private doctors is limited to outpatient

clinics only; when patients require hospitalization, they are usually referred to government or mission hospitals. Private doctors do not have admitting privileges in hospitals, nor are there any private clinics. The average number of patients seen by a private practitioner ranges from 25 to 50 per day. There is no regulation of the fees that practitioners may charge. It is estimated that poor patients are charged of K 3-5 (US\$3.4-5.7) for consultation and drugs.

#### Traditional Medicine

2.43 Despite rapid expansion of health infrastructure and modern health services, traditional medicine is still the major source of health care in the rural areas. The urban population often consults traditional healers in addition to professionals. During the colonial period, traditional medicine was equated with witchcraft and a legislative ban was placed on its practice. Traditional medicine, however, continued to flourish and, since independence, the ban has been lifted and the Government has recognized the importance of traditional practitioners in Zambian society. The MOH has established a traditional medicine unit in the MOH with a view to gain understanding of their roles and to develop training activities to wean out harmful practices. It has been estimated that there are approximately 10,000 traditional medicine practitioners in the country and approximately 3,000 traditional birth attendants.

2.44 Depending on the location, a traditional practitioner can have a patient load of 5-100 per day. Usual charges for a consultation are between K1-5 (US\$1-5.7) depending on the practitioner's standing in the community and his location, and can be paid in cash or kind. While figures for patient load, average charge per patient and the number of active practitioners may be slightly exaggerated, there is substantial evidence that traditional practitioners contribute extensively to health care delivery. Even assuming that only 50% of the practitioners are active, the average fee is K 2 and the average patient load is only 10 per day, the health expenditure on traditional care may be K 25 (US\$28) million, roughly equivalent to two-fifths of the total government health budget.

### F. Health Expenditures

#### Total Expenditures and Sources of Funds for Health Care

2.45 Estimates of total expenditures on health care in 1981 by type of service provider and by source of funds are presented in Table 2. Total health care expenditures (public plus private and recurrent plus capital) were K162 (US\$186) million or 5.6% of gross domestic product (GDP). This estimate includes in kind or monetary private expenditures for traditional care which has been informally estimated to be at least K25 million (para. 2.44) but omits health expenditures by urban local governments. Municipal expenditure figures are available only for Lusaka, which in 1981

was K9.5 (US\$10.9) million. Even with this exclusion, the total per capita expenditure of K29 (US\$33) is comparable to or higher than the per capita expenditures in the few other countries in the region where estimates of total private and public expenditures have been made (Botswana, US\$41; Zimbabwe, US\$33; Malawi, US\$9).

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Table 2: TOTAL EXPENDITURES <sup>a/</sup> AND SOURCES OF HEALTH CARE FUNDS 1981  
(000,000 K)

Source of Funds	Service Providers			Missions	Mines	Private Sector	Direct Donor Expenditure <sup>b/</sup>	Total
	Government <sup>e/</sup>		Subtotal					
	MOH	Provinces						
Government	64.2	1.3	65.5	6.6	.8			72.9
Missions:								
Monetary				3.6				3.6
In kind				.9				.9
Mines					30.9			30.9
Foreign Donors	4.7		4.7				4.5	9.2
Private Sector								
a. modern					2.7 <sup>c/</sup>	17.2 <sup>d/</sup>		19.9
b. traditional						25.0		25.0
Total	68.9 <sup>f/</sup>	1.3	70.2	11.1	34.4	42.2	4.5	162.4

<sup>a/</sup> Including recurrent and capital expenditures. Sources are noted in Annex 3 tables.

<sup>b/</sup> Total foreign assistance (not including missions) to health in 1981, including both direct donor expenditures and expenditures disbursed through government accounts, was K 9.2 million (see Table 3). The foreign sources noted in MOF records total K 4.7 million. The difference of K 4.5 million is implied to be direct donor expenditures. Source UNDP/Zambia and MOF records.

<sup>c/</sup> Based on a sample of ZCCM employee contributions for services at Rokona and Konkola hospitals.

<sup>d/</sup> There are no recent household surveys on which to base an estimate of private expenditures but a survey for 1974/75 estimated that household expenditures for private modern services and pharmaceuticals were about 1% of the total household budget. Similar results have been found by more recent, small, urban-based surveys of low income households. The figure in the table represents 1% of estimated 1981 private consumer expenditures. Republic of Zambia, Household Budget Survey 1974/75, Preliminary Report, 1980.

<sup>e/</sup> MOH and province expenditures only, defense and other government secretariat expenditures are not available.

<sup>f/</sup> The total MOH budget is K 76.3, K0.8 are transferred to mines and K6.6 to missions.

2.46 Of the total sources of funds used in the health sector, the Government provided 45%, the Zambian Consolidated Copper Mines (ZCCM) provided 19% and missions 3%, with the private sector providing 27% and foreign donors 6% of the remaining 33%. Of the total expenditures of funds, government services accounted for 43%, ZCCM for 21% and mission services for 7%. The difference between external contributions to missions and the total mission expenditures is covered by government transfers. The pattern of expenditures among the three major service providers has been fairly stable over the last 10 years and is expected to remain stable in the future except for a possible decline in the percentage of total expenditures through mission facilities.

2.47 Unusual features of health services financing in Zambia include the important role of the state mining corporations which provides 19% of funds but serve only 6.1% of the population, and the government support of 59% of the total cost of mission service facilities. It is also notable that all government services including drugs are free and that almost all local government funds - provincial and district - come from central government disbursements. Also, the private sector expenditures on services and pharmaceuticals (with the exception of private expenditures on traditional medical care) provide only about 13% of health services and accounts for about 11% of total health expenditures. With the addition of traditional care, the private sector reaches 26% of total health expenditures.

#### Trends in Ministry of Health Expenditures

2.48 In nominal terms (Annex 3, Table 3.1) annual Ministry of Health (MOH) total expenditures have increased from K27.2 (US\$31.2) million in 1970 to K76.3 (US\$87.5) million in 1981, but the nominal increase has masked a substantial decline in the real value of health expenditures over the same period. Deflated by a price index for gross domestic expenditure and measured in 1981 kwacha, total MOH expenditures in real terms (Annex 3, Table 3.2) have fallen from K91.4 (US\$104.8) million in 1970 to K76.3 (US\$87.5) million in 1981 or a decline of 16%. The decline is especially marked when measured in real per capita expenditures (Annex 3, Table 3.3): from 1970 to 1981, real expenditures per capita fell from K21.9 (US\$25.1) to K13 (US\$14.9) or 41%.

2.49 The difficulties faced in the health sector reflect a general reduction in available government revenues that affects all sectors. The burden of the fiscal constraint since 1975 has been shared across sectors with only slight annual fluctuations. MOH recurrent expenditures as a percentage of total government recurrent expenditures (Annex 3, Table 3.4) were 5.2% in 1970, reached a peak of 7.8% in 1976, and declined to 5.9% in 1981. As a percentage of gross domestic product (GDP), MOH expenditures have fluctuated narrowly around the 2.5% level from 1970 to 1981. In contrast, for an average middle income country included in the World Development Report, government expenditures on health are 1.2% of GDP and 4.9% of total government expenditures. From this perspective, the Government support of health in Zambia has remained firm in spite of the reduction in revenues that has caused general problems with financial planning. But the high proportion of resources devoted to health with only a modest payoff in terms of reduced morbidity and mortality also argues for a reexamination of the efficiency of resource allocation and planning.

2.50 Financial planning problems in the health sector can be separated into short-term (problems occurring within the budget year) and medium to long-term (problems occurring over several budget years). Annual differences between budgeted and actual expenditures (Annex 3, Table 3.6) over the last ten years have not been large compared to other developing countries, and short term fluctuations in revenue within the budget year provide only minor problems compared to the difficulty of long-run revenue forecasting. However, unplanned short-term fluctuations in government revenues may have created modest difficulties in meeting budget commitments in recent years. Prior to 1978, actual expenditures annually exceeded the budget by small amounts. More recently, expenditures have fallen short of budgeted amounts. In 1981, reductions in actual revenues, as compared with budget forecasts, resulted in actual expenditures that fell short of planned expenditures by K3.6 (US\$4.1) million in the recurrent budget and K3.8 (US\$4.4) million in capital budget.

2.51 Medium to long-term fluctuations in the pattern of government health expenditures are more serious and are closely linked to copper revenues as is illustrated in figure 1, showing the relationship between an index of real mining revenues and an index of real recurrent government expenditures in the health sector between FY70 and FY81. The relationship emanates from the fact that exports represent over one-third of the Zambian gross domestic product and 95% of export revenues are earned from copper mining. Dependence of the economy on the state of world copper markets has created wide fluctuations in government revenues that have rendered planning difficult in the health sector as well as in other sectors of government. Capital expenditures undertaken in the period of high copper prices and elevated production between 1970 and 1976 created requirements for operating funds that have become difficult to meet in recent periods of low prices and depressed production.

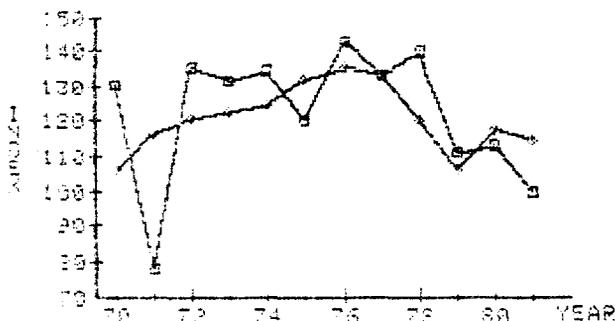


Figure 1: Relationship Between Mining Revenues ( ) and MOH Recurrent Expenditures ( )

2.52 The implication of fluctuation in real health expenditures over the last decade is better understood when total expenditures are separated into recurrent and capital expenditures. Between 1970 and 1976 investment in the health sector was large, with an average capital expenditure of K14.9 (US\$17.1) million per year. In contrast, between 1977 and 1981 capital expenditures were substantially reduced, with an average capital expenditure of K3.8 (US\$4.4) million per year. The capital build-up between 1970 and 1976 increased the need for operating expenditures after 1976, but in spite of this need, real recurrent expenditures declined from a peak of K85.8 (US\$98.4) million in 1976 to K72.6 (US\$83.3) million in 1981. Measured in per capita terms, the decline over the five-year period amounted to 29% of the 1976 level of recurrent expenditure. The magnitude of this decline makes it increasingly important for the Government to ensure that it uses its available resources in the most equitable and particularly cost efficient ways.

2.53 Distribution of Health Expenditures. Analysis of available information on spatial and functional distribution of health expenditures indicates that the current dispersal and quality of services is inequitable. Distribution of health expenditures by province, including government, mission and mine facilities, is not closely related to the level of outpatient and inpatient care (see Table 3). This suggests that there is considerable variability in the quality of health services, measured by expenditures per unit of care. In the Copperbelt, which benefits from large expenditures on health care made by ZCCM, the total per capita expenditure is K38 (US\$43.6). At the other extreme, in the northern province, the annual expenditure per capita is K9 (US\$10.3). Excluding ZCCM and mission expenditures, government expenditures vary from less than K8 (US\$9.2) in the northern and eastern provinces to K18 (US\$20.6) in the primarily urban Lusaka province. Maldistribution of services would be further underlined if it were possible to include private expenditures. The geographic distribution of private expenditures is not available but, as in many countries, most private expenditures for modern care take place in urban areas and disproportionately among higher income groups. In contrast to the relatively higher public and private expenditures in urban areas, 27% of the rural population, primarily in low income areas, is not covered by the government or mission health services and must rely primarily on traditional medical care.

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Table 3: HEALTH EXPENDITURES AND VARIOUS MEASURES <sup>b/</sup> OF THE DISTRIBUTION OF HEALTH SERVICES BY PROVINCE

Province	Total <sup>a/</sup> Expenditure Per Capita (K)	Beds Per 1000 Population	Inpatient Days Per Capita	Outpatient Visits Per Capita	Percent Population Outside 12KM <sup>c/</sup>
Central	14	2.8	.6	4.4	39
Copperbelt	38	3.1	.9	8.5	17
Eastern	10	3.7	1.1	5.2	11
Luapula	12	3.4	.7	5.2	19
Northern	9	3.3	.8	3.7	23
Northwest	18	4.8	1.6	8.1	43
Southern	14	4.1	1.0	5.2	26
Western	12	3.9	1.1	6.6	19
Lusaka	18	3.3	.9	6.1	38
Zambia Average	19	3.5	.9	6.1	27
Standard Deviation	8.3	.6	.1	2.3	10.6

a/ Disaggregation by MOH, Mission and Mine Expenditures and MOH Expenditure per capita is given in the Annex, Table 12. Source: MOF, Financial Reports, 1981; unpublished records, Zambia Churches Medical Association, ZCCM.

b/ Additional detail in Annex, Table 10. Service usage information is for 1980. Source: unpublished MOH records.

c/ Rural population outside a 12km radius from a health center. Source: CSO data as reported in L. Bygren (editor), Health and Health Services in Zambia, MOH and SIDA, 1982.

2.54 Cost Effectiveness of Health Expenditures. The conclusion reached above through a consideration of equity is reinforced by a consideration of the cost effectiveness of alternative programs. A ranking of programs by their efficiency in achieving decreased morbidity and mortality would place primary health care, especially basic services delivered through outreach or rural health centers, near the top, and large urban-based institutional facilities near the bottom, with regard to both cost effectiveness and equity. This ranking derives from the fact that the

health problems targeted by PHC are epidemiologically the most important, especially to low income groups, and can be ameliorated by low cost interventions delivered through community based facilities. The leading causes of morbidity are upper respiratory illness, diarrhea, malaria and fevers. The leading causes of mortality are measles, pneumonia, malnutrition, malaria and diarrhea. Detailed analysis of programs in other countries has demonstrated that preventive measures, such as immunization, malaria control and growth monitoring, and simple curative measures such as oral rehydration can be delivered efficiently through rural health post and outreach programs and are only a fraction of the cost of the alternative inpatient care.

2.55 Analysis of the functional distribution of health expenditures is hampered by inadequate detail in the formulation of budget accounts. The present budgeting classifications by economic category of expenditure (salaries, supplies, travel) primarily contribute to accountability and control and are useful for day-to-day bookkeeping requirements but do not contribute the information needed for an evaluation of the cost effectiveness of expenditures. Annex 3, Table 3.09 gives the distribution of MOH expenditures among the three central hospitals, missions, provinces and special units. At the limited level of disaggregation permitted by the government budget categories, the table is not very informative. The most it shows is that the distribution among the major categories has been stable over time with the three large central hospitals absorbing about 29% of the MOH recurrent budget; mission, 7%; administration and special units, 23%; and province, 41%. Distributional impact of province expenditures is hidden by the fact that general hospitals, district hospitals, health centers, and provincial and district administration are all included under the heading "provinces."

2.56 Recent studies have tried to circumvent the problem of aggregated budget categories by the judicious use of assumptions. Although the extent and weakness of the assumptions needed restricts the usefulness of the results for short-term budget adjustments, broad, long-range, implications for planning seem possible. It is estimated <sup>11/</sup> that only 7% of total MOH expenditures are currently used for preventive care. It is also estimated that only 11% of province expenditures are used for health centers and that this amounts to slightly more than K1 per capita within health center catchment areas (compared to K11 (US\$12.6) per capita total Government health expenditures for all Zambia). These figures suggest that the cost effectiveness of government health expenditures could be substantially increased through better resource allocation towards PHC.

2.57 In addition to allocatable inefficiencies, there is also some evidence of operational inefficiencies. Mention has already been made (para. 2.35) of significant wastage in pharmaceutical expenditures; and in addition other capital resources (such as vehicles and skilled manpower) are often underutilized for want of operating funds (for example, for fuel or basic items of equipment). The broad conclusion of this analysis is therefore that there may be considerable scope for improving the

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<sup>11/</sup> L. Bygren (editor), Health and Health Services in Zambia, MOH and SIDA, 1982

operational and allocatable efficiency of health expenditures, and also their equitable distribution, through increasing the relative emphasis on preventive services, rural health centers and primary health care.

### III. NUTRITION

(The following is a summary of the nutrition sector; a comprehensive review is presented in Annex 5.)

#### A. Current Nutrition Status

3.01 Protein-calorie malnutrition is a serious public health problem in Zambia. The 1970-71 National Nutrition Status Survey established that more than 20% of children under five had second or third degree malnutrition, with greatest prevalence among children between seven and twenty-four months. Smaller recent surveys and a review of less direct indicators show that the nutrition status has either remained the same or deteriorated, especially in urban areas. Though most protein-calorie malnutrition reflects chronic deficiencies, seasonal and drought-induced episodes of acute malnutrition occur frequently in more deprived areas. Malnutrition in Zambia resembles that of Cameroon, Lesotho, and Zimbabwe in numbers and severity.

3.02 Protein-calorie malnutrition is concentrated among children under five, especially between six and twenty-four months. It occurs more widely and acutely in provinces off-the-rail-line and among the poor in urban squatter settlements. Rural malnutrition, concentrated among subsistence small holders, exceeds urban malnutrition in prevalence and severity. More than half the country's pre-school children are at risk of malnutrition. Seasonal changes aggravate malnutrition problems, with increased incidence and severity during the rainy "hungry season", January through March, before harvest. Little documentation of adult malnutrition exists, but consumption data and the prevalence of malnutrition suggest that all age groups are affected.

3.03 Though infant morbidity and mortality data are not available by underlying cause, clinical impressions corroborate the extent of malnutrition. At least 20% to 40% of child deaths after the first week of life are at least partially caused by malnutrition. Cases of measles, malaria, and diarrheal disease combined with inadequate food intake illustrate the classic nutrition-infection interaction resulting in high mortality.

3.04 Vitamin A deficiency, with resultant blindness, continues to be a serious problem in Luapula and Northern provinces. Cases of vitamin A deficiency exist throughout the country. The severity and extent of the problem is not known. Anemia, heavily influenced by malaria, is a serious overall public health problem. According to the 1970-71 survey, hemoglobin values were deficient in more than 70% of all Zambian children under five, more than 45% of adults, and 22% of pregnant and lactating women. Pockets of iodine deficiency and endemic goiter have been reported in many parts of the country. The 1970-71 survey indicated an overall prevalence of endemic goiter of 8.1%.

## B. Causes of Malnutrition

### Agricultural and Economic Factors

3.05 Malnutrition has historically been most severe in rural households away from line-of-rail and in urban squatter settlements. Difficulties in transporting and marketing agricultural produce to and from remote areas is one cause of malnutrition. In addition, male migration to the Copperbelt and Lusaka provinces left the rural provinces with 25-30% of households headed by females. Severe agricultural labor shortages at peak demand periods are typical, while urban unemployment exceeds 30%. The history of Zambian policies on production and pricing of maize, perpetuates the foregoing pattern: marketing board producer prices are too low to encourage optimum maize production and require costly consumer subsidies. A uniform maize price throughout the country and during the entire crop year has resulted in further distortions of production and storage patterns. The consequences of these policies have been examined comprehensively in the 1981 Food Strategy Study of the Ministry of Agriculture and Water Development. The lack of adequate transportation and marketing systems, fragmented landholdings, labor constraints, and the absence of basic services have turned the off-line provinces into perennial food deficit areas, highly vulnerable to drought, and dependent on emergency foreign relief for survival.

3.06 Absence of male labor and resulting increased burdens on females, first order outcomes of the foregoing process, aggravate malnutrition. Adequate family food supply, if achievable at all, often imposes excessive burdens on mothers. This has led to increased cultivation of cassava instead of maize, for example, primarily to spread labor requirements more manageably and to reduce famine risk. The macroeconomic context, within which nutrition status unfolds, includes a tenuous food availability situation that increases sharply the difficulties of improving nutrition. The level and distribution of income adds to these difficulties.

3.07 In 1974-75, a national urban household budget survey found 26% of households with less than K50 (US\$57.4) income per month. By spending 58% of that income with concern only for nutrition, they could have afforded a model balanced diet. By 1980, the same diet would have required 80% of equivalent low income. In February 1983, government removed price controls from everything but maize meal, candles, and flour. Supply response may moderate ultimate price increases, but initial newspaper reports make it clear that poor urban consumers will suffer severely. Current price trends and wage controls clearly aggravate the already difficult nutritional situation of poor urban consumers.

3.08 Agricultural subsidies reached 80% of total spending on agriculture in 1975 and 1976, and totaled K 195 million (US\$224 million) in 1979. Declining copper prices increased pressures on the national budget, and called for a reassessment of subsidy policies. The National Agriculture Marketing Board has currently fixed the retail maize price at a level intended to cut losses by half and has, simultaneously and for the first time, established producer prices for sorghum, millet, and cassava. It is too early to say what the consequences of these major changes will be for food production, farm income, and consumer food purchases, but

reduced reliance on maize should have favorable nutrition consequences. Inadequate producer incentives, intermittent drought, and the rapid expansion of demand forced resort to food imports since 1978. It is clear that domestic food production cannot keep up with demand unless productivity of smaller farmers receives more attention. The Government, with encouragement from the Bank and others, now acknowledges this, though policies and resource allocations are changing slowly. More consideration of small farmers should have positive nutritional impact through effects on income distribution and food availability. National agricultural and economic policies contribute substantially to malnutrition, and budgetary, foreign exchange, and other constraints limit sharply the options available for modifying them.

### Nutrition-Specific Factors

3.09 Measles, malaria, bronchial and diarrheal infections, linked with low calorie intake, produce an interaction of malnutrition and infection that accounts for most infant hospital admissions and deaths. An analysis of 6,543 admissions to the Arthur Davidson Childrens Hospital in Ndola showed measles incidence increasing during the seasonal peak of malnutrition, with 30% of cases occurring among children under a year. The pattern of infant deaths and weaning age malnutrition is a classic example of the interaction with malnutrition on infection in Zambia.

3.10 Recent studies confirm that frequency and content of feeding, rather than timing of introduction, make supplementation of breast-feeding inadequate. Maize, millet, sorghum, or cassava serve as the base for a porridge (diluted "nshima", the adult staple) that, though introduced early enough (3-6 months), fails to provide enough calories.

3.11 Distinctive consumption patterns have been identified for urban and rural groups and, within rural areas, for subsistence farm families and others buying half or more of their food. Further differences occur between those earning wages for farm work and others employed in towns. Maize meal dominated all diets, providing 60% of all calories, with the rural poor consuming even more. In the "cassava belt", coinciding with the deprived subsistence sectors in Northern, Luapula, and North-western provinces, maize is the secondary staple. Maize meal continues to be the major energy source among the urban poor, despite influx of wheat. The new availability of cassava and millet at reasonable prices in urban markets should replace the more expensive maize consumption among the poor.

### C. Nutrition Activities

3.12 The National Food and Nutrition Commission (NFNC) is a parastatal organization attached to the MOH. The commission brings nutrition concerns to the attention of agricultural and financial institutions that decide key macroeconomic issues. However, food production and pricing policies continue to reflect primarily the influence of shortage of foreign exchange, urban preference, and concerns other than nutritional improvement. Higher priority for nutrition also depends on some lessening of economic pressures. No comprehensive nutrition policy has been developed.

3.13 The NFNC works closely with other divisions of the Ministry of Health, primarily on nutrition surveillance and nutrition education. With SIDA and UNICEF help, the Ministry has begun to develop a national surveillance system that will include weighing and arm circumference measurement by volunteer community health workers as a part of the PHC program. The transportation and other logistic problems that hamper Ministry operations also affect surveillance and the system is unlikely to provide useful data to the central ministry for several years. Rapid processing, analysis and interpretation of data, and prompt feedback are necessary to enhance use of the surveillance system.

3.14 In addition to weak administration of vitamin A prophylaxis and oral rehydration therapy, the absence of any intermediate step between hospital care for malnutrition and routine treatment at health centers or under-fives clinics produces a gap in nutrition services. Rehabilitation centers receive little attention from MOH whose few such facilities are attached to hospitals.

3.15 The National Food and Nutrition Commission discourages regular supplementary feeding with donated food. The emphasis is on emergency relief rather than prevention. The Ministry of Agriculture, Ministry of Community Development, and other agencies carry on a limited number of programs with nutritional implications. Volunteer nutrition groups have been established in a number of cities. Encouragement of home gardens, a promising activity, receives some attention but deserves more. In urban squatter settlements, gardening is promoted and most families are eager to plant crops if land is available.

3.16 Although the National Food and Nutrition Commission has been quite successful in sensitizing the Zambian public and Government to nutritional problems, these remain of low priority. No programs exist directed specifically at reducing malnutrition among the urban poor and rural off-rail-line subsistence families. Very little action has been taken to integrate nutrition considerations in broader government policies. The emphasis of the Third National Development Plan continues to favor urban and copper-producing areas.

3.17 The Ministry of Health's reliance on hospital care for the acutely malnourished rather than on preventive measures is both costly and ineffective. Most undernourished children are not afforded appropriate nutritional interventions, with the result that there are more acute cases than necessary, cases which require costly hospital care, and often result in death. Sufficient attention has also not been given to developing such alternatives to hospital care as oral rehydration, and nutrition rehabilitation.

#### IV. ISSUES AND RECOMMENDATIONS

##### A. Population

4.01 At current fertility levels combined with declining mortality the rapidly growing population of Zambia will have nearly doubled by the year 2000 and nearly quadrupled to 21 million by 2015. The rapid population growth in Zambia will produce a substantial increase in national

consumption needs, notably in food supplies and government-funded social services. Production from the mining sector is not expected to grow significantly; growth in agricultural production has lagged behind population increase in recent years and as yet shows no sign of any substantial rise. Over the next 30 to 35 years, therefore, very rapid population growth will impede Zambia's economic progress. It will worsen the dependency burden on the working population, discourage savings and capital accumulation, intensify the problems of urban growth and labor imbalance (both through high urban natural increase and through the stronger impetus to urban migration from greater pressure on the land in key sending areas), and hold back the country's progress in feeding and caring for its people. The rapidity of present population growth, more than the ultimate population size, is the main constraint to steady socio-economic progress; it needs to be restrained to a level consistent with growth in agricultural productivity and general economic development if the standard of living of the Zambian people is to continue to rise in the future.

4.02 The rate of population growth can be reduced in three ways, a rise in mortality, mass emigration, or a fall in fertility. Increases in mortality have historically been the natural self-limiting mechanism by which overpopulation was checked, and could be a real danger in Zambia if population growth were to continue to outstrip the country's food supplies and capability to provide adequate health and education services. Large-scale emigration is not an option open to Zambia at present, and in any case, is liable to have mixed effects on the society and the economy even if tightly controlled; such problems are well illustrated by the current difficulties of countries supplying migrants to Ivory Coast and to South Africa. The reduction of fertility is the most humane and practical solution in the long-term. Fertility reduction can only be achieved with government and public understanding of the problem and the development of policy actions to be carried out through a strengthened program of family planning services.

#### Development of Population Policy

4.03 It is recommended that a committee be set up under the chairmanship of National Commission for Development Planning to study the population issue and to recommend a plan of action. The committee would consist of representatives from the Ministries of Finance, Health, Agriculture, Labor and Social Services and Education; the Central Statistical Office; University of Zambia; Planned Parenthood Association of Zambia; and the United National Independence Party. This committee should review the capability of the Government to undertake demographic analyses including the gathering of fertility related data. It should also explore the possibility of introducing population related activities into other ministries and agencies. The committee's report would form the basis of a dialogue with the party, Government and interested groups. Local studies on the implications of population growth, (for example for agricultural reserves and capacity, urban growth, and social infrastructure) would support the work of the committee and would act to focus government and public attention on the magnitude of the problem and coalesce policy support.

4.04 It is essential for policy formulation and local studies that the full results of the 1980 census should be produced and analyzed at the earliest moment possible. The census results should contribute to an understanding of levels, patterns and trends in fertility, mortality, urban migration, natural increase and growth and produce up to date demographic estimates.

#### Strengthening Family Planning Services

4.05 The MOH has made a good start in accepting the concept and initiating family planning services as part of the MCH program. Particularly important is the initiation of family health in-service training for nurses and midwives. The effectiveness of these prime service providers will be limited, however, unless all members of the professional health community are oriented to the need for family planning. The dearth of information about the effectiveness of current efforts represents a second constraint. There is some evidence of an increase in the number of family planning acceptors at clinics where staff have been trained. This increase needs to be confirmed, however, and the issue of acceptability of various methods and approaches analyzed on a broad basis if family planning efforts are to be fully effective. Effectiveness of family planning efforts will depend greatly on improvement of the health care delivery system (paras. 4.15-4.20) and encouraging the utilization of health facilities for post-natal visits (para. 2.23), which often represents the best opportunity to present women with birth control options. By increasing child spacing, family planning can improve the health status, especially the nutritional status, of infants. Expansion of family planning to the village level through the new PHC strategy may well be an essential element in the ultimate success of family planning endeavors in Zambia. Initially, however, the greatest gains are apt to be made by concentrating on the urban population because of receptiveness, easier logistics, and unmet demand for family planning services.

4.06 Specific actions which the Government could take in the short-run to improve family planning service delivery within the health care delivery system are: (a) the MCH/FP unit of the MOH should be strengthened by training existing staff in the organization and implementation of family planning programs; (b) in addition to the training of nurses and midwives already underway, orientation of all health staff in family planning should be undertaken; (c) PHC workers should receive adequate training and support by the health care delivery system.

4.07 The Planned Parenthood Association of Zambia, being a non-government organization, provides an excellent opportunity to implement additional family planning activities to complement the government program. The PPAZ could play a major role in the procurement and distribution of contraceptives. In many countries NGOs are able to test pilot IEC programs and innovate in method mix and delivery strategies such as contraceptive retail sales or work place programs without requiring full government participation. Such activities, although private, can take place within a coherent government plan. At present, however, the PPAZ does not have adequate professional nor financial resources to meet its full potential, particularly in regards to supplying contraceptives. The PPAZ should be strengthened by providing financial and technical support.

The PPAZ should be encouraged to expand its activities outside the urbanized provinces and to strengthen its training programs for political and government leaders.

## B. Health

### Planning

4.08 The survey of the health sector in part II noted that deficiencies in long and short term planning are impairing development of the health sector. The current long term development plan does not detail where resources should be distributed nor what priorities should be used as criteria. Neither annual planning or district level planning reflects government priorities or a long run strategy for health. A variety of problems are linked to planning deficiencies. For example, as a consequence of a lack of planning, there is no basis for coordination between mission and government activities, nor is there a functional criteria for the allocation of government contributions to missions. Donor activities and expenditures in the health sector are not coordinated and the Government is unable to assure that donor expenditures cover identifiable segments, horizontal or vertical, of a national health plan in accordance with national priorities. Perhaps the most serious deficiency is the lack of reconciliation of planned capital expenditures and projected recurrent costs.

4.09 In the short-run, Government actions should be initiated to devise a cohesive strategy for the development of the health sector. Consistent with the strategy, a medium-term (3-5 years) plan should be formulated. The plan should detail the geographic and functional distribution of expenditures and give careful consideration to the recurrent cost implications of capital expenditures. Priorities among programs should be established on the basis of demographic, epidemiological, and operational information including a specific consideration of cost effectiveness and distributional objectives.

4.10 The medium-term plan should be updated annually on a rolling basis. An annual plan, broadly allocating estimated revenues for the coming year in accordance with priorities and consistent with the medium-term plan should be drafted. The draft annual plan should be made prior to the preparation of budget estimates. The capacity of the planning unit to undertake planning, monitoring and evaluation needs to be developed. Districts should prepare budget submissions based on the guidelines set forth in the annual plan, but should be allowed discretion in setting the content of expenditures within the guidelines. The districts should be given spending authority. The ability of districts to undertake planning needs to be developed.

4.11 Modest revision in the budget categories used by the MOH would contribute significantly to the planning process. Although more detailed revision might be important in the long term, the immediate revision in budgeting should not be more elaborate than necessary to allow the identification of expenditure by institution and major programs. It should be possible following a study, to develop budget headings that would conform to specific MOH needs and be implemented with a minimum of

disruption by the accounting units, yet be subsumed within the budget headings required by the MOF. Such a revision in budget categories would be of greatest benefit if it was carried out with strengthened surveillance and measures of program performance related to planning objectives. Together the surveillance and cost information would make it possible to monitor cost effectiveness and distribution of services to determine the best allocation of resources to achieve planning objectives.

#### Organization and Management

4.12 Decisions at the MOH are highly centralized. Senior officials spend a substantial proportion of their time attending to routine activities and have very little time to address major policy issues and to follow the decision making process. As a result, internal coordination at lower levels is virtually non-existent. Lack of coordination is compounded by the inadequacies of second-level staff, whose performance suffers as a result of lack of management by objectives, poor training and vague job descriptions.

4.13 Neither the provincial nor the district level are presently equipped to manage the planned decentralization of primary health care. Provincial health officers have neither the organization nor the professional skills to plan, implement and evaluate health services for the province. At the district level, the medical officer is not only not trained for these major administrative duties; he is also burdened with the job of managing the district hospital.

4.14 In response to these problems the responsibilities of departments and senior level officials should be more clearly defined at the central level of MOH and second-level staff should be better trained to carry out the responsibilities assigned to them. Administration of the plan strategy and monitoring of operational activities within the framework of the plan would be facilitated if the responsibilities and relationships of MOH departments were rationalized along functional lines.

4.15 An analysis should be made of the managerial requirements of the new PHC strategy on the provincial health officer, including the responsibility for coordination with other provincial and district authorities, for plan formulation, and for supervision and support. Training and staffing one additional staff member at the provincial level to carry out PHC planning and coordination activities is needed. A similar analysis should be made of the job descriptions and training needs at district and health center levels, with particular emphasis on the need to stimulate community participation.

#### Manpower

4.16 The main issues related to health manpower are: (i) training for various types of personnel; (ii) staffing patterns for different types of facilities; (iii) plans to expand health manpower; and (iv) distribution of existing manpower. Specifically: (i) training for most levels of health workers is mainly focused on curative medicine, and does not have adequate emphasis on prevention. Also, the curriculum does not include management training. Physician training deserves special mention. Not only is the

need for local doctors particularly urgent, the emphasis on achieving the highest international standards seem misplaced given the country's immediate needs; (ii) staffing patterns have been established for different types of facilities without analysis of the level of treatment feasible at each level or projections of expected work loads. It is, therefore, difficult to determine whether numbers and types of suggested staff are appropriate; (iii) the initial manpower study by the MOH task force needs further work, particularly in regards to the implications of the new PHC program; and (iv) the underlying causes for regional imbalances in staffing patterns need to be addressed. The University of Zambia has begun a review of nursing education.

4.17 It is recommended that: (i) a review of medical education be undertaken with a view to increasing output and to producing graduates whose skills are more relevant to Zambia's needs; (ii) a manpower analysis be carried out which would take into account appropriate staffing patterns for various types of facilities and the needs of the new PHC program; (iii) the entire expansion of the manpower program, including curriculum revision and training of teachers, be delayed until a long-term manpower plan is drawn up; (iv) coordination of manpower development activities be carried out through a single unit in the MOH; and (v) attempts be made to reduce the shortage of health manpower in the rural provinces by addressing issues such as availability of staff housing and other incentives.

#### Financing Issues

4.18 The stringent fiscal conditions that have developed since 1976 with a deterioration in international copper markets have forced a reexamination of MOH recurrent expenditure patterns and development policy. In addition the government policy of providing health services without charge is also called into question. The shortage of operating revenues is expected to grow over the next five years. The first section below gives the results of projections of MOH costs and available funds and draws implications for future capital expansion. The second section considers the possibilities for cost recovery from the client population.

#### Availability of Operating Funds

4.19 Estimated recurrent cost/capital ratios have been used to project required recurrent expenditure. When needs are compared to projections of available funds from 1983 to 1988, the result is a total shortfall of recurrent funds of K70.6 (US\$81) million over the six year period. (Annex 3, Table 3.13). If past experience continues, this shortfall will result in undermining maintenance and distributional needs (see the discussion in paras. 2.55 and 2.56). The projected shortage of recurrent funds assumes that the capital stock grows at a sufficient rate to implement the MOH plan for primary health care. Capital cost of the PHC program will add to the shortage if not covered by additional external sources. The capital cost of the scheme would be K37.4 (US\$42.9) million over the period from 1983 to 1988, giving a total (recurrent and capital cost included) shortfall of K108 (US\$123.9) million.

4.20 Projections of expenditures based on recurrent cost/capital ratios are unreliable because the relationship between variable costs,

fixed costs and outputs that underlie the ratios may not be stable. Alternative projections using a variety of assumptions produce widely varying results. For instance, the K108 (US\$123.9) million shortfall in the preceding paragraph was based on an estimated recurrent cost/capital ratio of .28 and projected growth of GDP of 2% per annum. With a recurrent cost/capital ratio of .26 and projected growth of GDP of 3% per annum the net shortage of funds falls to K55.7 (US\$63.9) million. In spite of the sensitivity to assumptions, the projections are uniform in implying that available resources are insufficient to cover the recurrent costs of planned capital expansion.

4.21 The conclusion drawn from the projections is that planned capital expansion should be reduced and available domestic investment funds should be switched to maintenance expenditures and only replacement of capital, and capital expenditure needed to improve the services. In this way the allocation of the burden of the operating fund shortage would also reflect the greater cost effectiveness and equity achieved by rural primary health care expenditures. In addition, the main use of available external capital resources from bilateral and agencies should be to improve the cost-effectiveness of existing services.

#### Cost Recovery

4.22 The constitution of Zambia stipulates that basic health services are to be provided free to all persons. The provision of all health services involves the use of national resources of infrastructure, manpower and funds. Ultimately, there are no free services; all costs, if not met through foreign financing or grants, must be met by the Zambian people either indirectly in the form of inflationary financing, semi-directly in the form of taxation or diverted mining profits, or directly in the form of user charges or insurance schemes. The severe financial constraints on the Government call for an examination of possible means of recovering a part of operating costs directly from users to avoid possible future curtailment or stagnation of health service provision to a growing population.

4.23 The use of prices for selected health services can be justified (1) as a means of raising additional revenue to cover operating costs; (2) as a means of improving the efficiency of resource allocation; and (3) as a means of improving the equity of health service use. In general, efficiency is served if the price paid by the user reflects the additional benefits to society from consumption of the service and the additional cost to society of producing the service. Services provided without charge may be consumed beyond the point of economic optimality, i.e., the marginal cost to society exceeds the marginal benefit of the excess consumption. It is probable that this has occurred in Zambia where the number of outpatient visits per person in selected regions (primarily urban) is 2-4 times the number that would be required to provide adequate care in most countries while in still other regions (primarily rural) outpatient services are unavailable. Equity is served if higher income consumers are required to pay the cost of services they receive while basic services received by lower income households are free or subsidized. A well designed system of fees and insurance scheme coordinated with a properly functioning referral system can allow cross subsidization to promote a more equitable distribution of services.

4.24 These simple criteria can be used to describe a possible core list of services to be provided free in the context of the Zambian constitution. First, preventive services have substantial benefits that accrue not only to the individual receiving the service but to society at large. Thus, user charges paid by individuals would result in a level of consumption that is less than socially desirable. Services of this type should be provided without user charges and include (1) most disease control programs such as malaria, communicable childhood diseases, venereal disease, leprosy and tuberculosis; (2) antenatal care; (3) nutritional programs; (4) well baby services (growth monitoring, immunizations, instruction in oral rehydration therapy); and (5) family planning services. Second, equity as implied by the Zambian constitution and manifesto would require that primary health care would be provided without user charges to low income households.

4.25 Beyond the core group of PHC services, there are considerable possibilities for cost recovery that could be implemented in phases over the next few years. During the first phase, a schedule of charges for drugs and supplies and charges for non-referred use of physicians and higher level care would be drawn up. Pharmaceuticals accompanying essential treatment of basic health services or preventative care would continue to be provided free of charge but other pharmaceuticals would be provided at full cost or subsidized cost according to government schedules. Also, referred use of physicians and higher level care would continue to be allowed without charge but patients who desired to enter the health system at levels above primary health care and who are not emergency cases would be required to pay fees. This would help prevent misuse of higher level facilities and would shift a part of the cost of higher level care to upper income groups that are more apt to try to circumvent entry into the health system at the primary health care level.

4.26 In a second phase, the use of an insurance scheme to cover the households of government employees and other groups in the formal sector should be considered for introduction. A study, commissioned by the Zambian State Insurance Corporation, was carried out in 1981 to consider the possible use of health insurance plans in Zambia <sup>12/</sup>. The study concluded that the Government should make it compulsory for all private employers, self-employed and government employees to contribute into a health fund to be used to offset MOH recurrent expenditures. While it may not be practical to adopt the suggestion that the scheme cover the self-employed, it may be feasible to design a scheme for government employees and the employees of private sector businesses with more than 25 employees. The scheme would cover scheduled services above the level of primary health care. Unfortunately, the 1981 study was inadequate to provide the basis for a formulation of an insurance scheme and an additional study be required to develop a scheme appropriate to Zambia. In tandem with the introduction of an insurance scheme, full cost charges should be levied for the use of government facilities by patients of private doctors or patients covered by private health insurance. In urban

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<sup>12/</sup> R. T. Freeman, The Feasibility of Financing Health Care Cost in Zambia through Health Insurance Plans, Zambian State Insurance Corporation, LTD., November 1981.

areas there are private practices and also a small number of private schemes of pre-paid health insurance that refer patients into the higher level government services. These patients tend to have above average incomes and to enter the government system at a higher level than poorer patients using the government basic health care system. Equity and efficiency would be improved if such patients were charged user fees for government services.

4.27 In a final phase nominal fees should be levied for first visits to outpatient clinics to discourage unjustified use of services. The present number of outpatient visits per capita in Zambia is too high, especially considering the limited access of rural areas to such services. Reduction of excessive use of outpatient facilities would free clinic resources for preventive care outreach programs which are relatively more cost-effective. Basic preventive services should remain free. Additional payments for the consequential items of outpatient visits would not be required; the quantities of such items are determined by health staff rather than patients, and there is no presumption that a charge for these items would improve resource allocation.

4.28 The annual revenue which could be obtained through cost-recovery can be estimated in two ways. First, if it is assumed that private health expenditures grow at the same rate as per capita incomes, and if it is assumed that the Government could direct 25% of these expenditures to the treasury through an appropriate pricing policy for public health services, then taking into account expected economic and population growth, the revenue obtained in 1988 could be in the region of K 13 million (see Annex 3, Table 3.15). This would be about 15% of the projected MOH budget in that year. Alternatively one can make assumptions about possible fee levels and utilization rates. For example, in 1981 there were about 470,000 inpatients and about 3,770,000 inpatient days. If a K 5 admission fee had been levied (and assuming no decrease in utilization as a result of it), then the revenue obtained would have been about K 2.3 million. If, on the other hand, there had been a charge of K 1 per inpatient day, then the revenue obtained would have been about K 3.8 million. In 1981 there were also about 12.4 million outpatient first attendances--if a charge of K 0.50 had been levied on 50% of these patients (assuming that the other 50% were attending for preventive services), then the revenue would have been about K 3.1 million (again assuming no decrease in utilization rates). Although these figures are purely illustrative, they reinforce the conclusion that a 15% cost-recovery could be a minimum target realistically achievable.

4.29 The problems of cost recovery must be recognized. User fees can discourage the use of health services by indigent patients with legitimate needs. Poorly designed collection systems can prove bureaucratically cumbersome or costly to enforce. Political difficulties can be encountered if the public is not sufficiently informed of the need for cost recovery. Many of these problems can be met through a well designed system and careful implementation.

### C. Nutrition

4.30 The main issue is how to translate Zambia's manifest concern about malnutrition into effective strategies and programs to improve nutrition conditions, particularly of the most vulnerable groups. Implementation of a consolidated approach to the problem requires a combination of actions. If undertaken in the near future, they would begin to produce results over the next three to five years and pave the way for sustained, longer-range impact.

4.31 Nutrition improvement also requires a strengthened primary health care system. Nutrition rehabilitation facilities (Annex 5, paras. 5.53 and 5.57), adapted to regional differences, could reduce substantially excessive and costly hospital admissions for malnutrition. Measles eradication and malaria control, nutritionally more efficient in many areas than increasing food supply alone, also should have high priority. Moreover, vitamin A prophylaxis, oral rehydration and an attack on other micro-nutrient deficiencies such as iron and folate also require a more effective primary health delivery system.

4.32 The most far-reaching nutrition improvements would come from systematic incorporation of nutrition considerations into food pricing and production policies (Annex 5, para. 5.39), which need to place more emphasis on increasing total food supply. Recent measures to raise productivity of small farmers and to promote millet, sorghum and cassava production need to be sustained and intensified for this purpose. The National Agricultural Marketing Board's guaranteed producer prices for those commodities respond to nutritional need, although their adequacy and the marketing system's capacity to handle increased output are yet to be proven.

4.33 Monitoring of and response to the short-term consequences of decontrolling retail food prices also are high nutrition priorities. While longer-term supply response will temper currently sharp price increases, the interim effect is almost certain to be a further nutrition deterioration among low-income consumers. One way to moderate those negative nutritional outcomes would be to consider reprogramming a share of food aid to meet the relatively modest but urgent needs of pre-school children on an interim basis through targetting linked to a strengthened MOH surveillance system. Effective use of food aid to remediate or avert malnutrition would require concerted action by both health centers and non-government organizations.

4.34 The effectiveness of the National Food and Nutrition Commission should be reviewed. Specifically, the review should assess the impact of the Commission's activities on the country's nutrition status. Based on the findings of the review, the Government should consider the possibility of separating the Council's research and policy functions. One possibility is a smaller NFNC, with responsibilities for policy, review and coordination of nutrition programs reassigned to the National Commission for Development Planning. Research functions could be shifted to the University of Zambia or other suitable agency.

4.35 Since food habits (Annex 5, paras. 5.08, 5.23) also contribute to malnutrition, increasing the family food supply needs to be supplemented by other measures to improve pre-school nutrition. Increased emphasis needs to be placed on development of region-specific weaning food mixes suitable for household or community preparation. The Ministry of Agriculture's home economic extension service offers a promising vehicle both for this work and for intensified production of appropriate foodstuffs through home gardens.

Annex 1: POPULATION

Table 1.1: ASSUMPTIONS FOR POPULATION PROJECTIONS, 1980-2015

	1980-85	1985-90	1990-95	1995-2000	2000-05	2005-10	2010-15
<u>Mortality</u>							
(one assumption)							
Expectation of life at Birth <sup>1/2/</sup>	50.6	52.9	55.1	57.4	59.8	62.3	64.3
<u>Fertility</u>							
(three assumptions)							
<u>Total Fertility Rate</u>							
1. Constant Fertility	6.75	6.75	6.75	6.75	6.75	6.75	6.75
2. Belated decline <sup>2/</sup>	6.75	6.75	6.75	6.16	5.48	4.69	3.78
3. Rapid decline	6.71	5.32	3.93	3.50	3.12	2.77	2.47
<u>Migration</u>							
(one assumption)							
No net migration							

1/ Coale-Demeny North model used until 1990 and West model thereafter, in conformity with WDR usage: sex ratio at birth taken as 103.

2/ This is the standardized decline used in our WDR projection. For details of the methodology see Vu and Zachariah: "Short-term population projection, 1980-2000 and long-term projection, 2000 to stationary stage, by age and sex for all countries of the world." PHNPR, July 1983.

Table 1.2: PROJECTED RATE OF POPULATION GROWTH  
UNDER ALTERNATIVE FERTILITY ASSUMPTIONS, 1980-2015  
(percent)

	<u>1980-85</u>	<u>1990-95</u>	<u>2000-05</u>	<u>2010-15</u>
1. No change	3.4	3.6	3.8	4.0
2. Belated decline	3.4	3.6	3.4	3.0
3. Immediate decline	3.4	2.0	1.9	1.5

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Table 1.3: DEPENDENCY RATIO FROM POPULATION  
PROJECTIONS, 1980-2015

<u>Projected Fertility Trends</u>	<u>1980</u>	<u>2000</u>	<u>2015</u>
1. No change	103	105	108
2. Belated decline	103	103	86
3. Immediate decline	103	66	52

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Table 1.4: PRIMARY SCHOOL-AGE POPULATION FROM POPULATION PROJECTIONS, 1980-2015  
(in millions)

Projected Fertility Trend	1980	1990	2000	2015
1. No change	1.10	1.57	2.27	4.17
2. Belated decline	1.10	1.57	2.27	3.19
3. Immediate decline	1.10	1.57	1.58	1.73

Table 1.5: POTENTIAL MCH CLIENT POPULATION FROM POPULATION PROJECTIONS, 1980-2015  
(in millions)

Projected Fertility Trend	1980	1990	2000	2015
1. No change	2.40	3.35	4.81	8.66
2. Belated decline	2.40	3.35	4.61	6.69
3. Immediate decline	2.40	3.02	3.70	4.60

Table 1.6: LAND UTILIZATION  
(in percentage)

Cultivated land	16
Uncultivated land (of which good arable land)	41 (11)
Forest land	9
Other land (National Parks, Urban Areas, Swamps, Flooded or Mountain Land, etc.)	34
Total land area of Zambia	100

Table 1.7: ZAMBIA POPULATION SIZE, AREA AND  
DENSITY BY PROVINCE: 1980 CENSUS

Province	1980 Population	Area (KM <sup>2</sup> )	Number of Inhabitants per KM <sup>2</sup>
Central	513,835	94,390	5.4
Copperbelt	1,248,888	31,330	39.9
Eastern	656,381	69,100	9.5
Luapula	412,798	50,560	8.2
Lusaka	693,878	21,900	31.7
Northern	677,894	147,810	4.6
North-western	301,677	125,830	2.4
Southern	686,469	85,280	8.0
Western	487,988	126,400	3.9
<b>Total Zambia</b>	<b>5,679,808</b>	<b>752,600</b>	<b>7.5</b>

Source: Preliminary Report, 1980 Census of Population and Housing: Central Statistical Office, Lusaka, January 1980. Final Report, Census of Population and Housing; Vol. 1 - Total Zambia: Central Statistical Office, Lusaka, November 1973

Table 1.8: ZAMBIA URBAN POPULATION BY  
SIZE OF LOCALITY, 1980

No. of Inhabitants	No. of Urban Centers	Total Urban Population	
		Nos.	%
<u>Large Urban Areas</u>			
500,000 +	1	538,469	22.1
250,000-499,999	2	597,233	24.5
100,000-249,999	4	571,446	23.4
50,000- 99,999	3	193,128	7.9
<u>Small Urban Townships</u>			
25,000-49,999	6	190,461	7.8
10,000-24,999	7	107,079	4.4
5,000- 4,999	20	130,575	5.4
1,000- 4,999	38	108,735	4.5
Less than 1,000	4	3,293	.1
Total LUAs	10	1,900,276	77.9
Total SUTS	75	540,143	22.1
<b>TOTAL</b>	<b>85</b>	<b>2,440,419</b>	<b>100.0</b>

Annex 2: HEALTH STATISTICS

## ZAMBIA

Table 2.1: TEN LEADING CAUSES OF OUTPATIENT MORBIDITY (NEW CASES)  
CHILDREN (0-14 YEARS)  
1981

Diagnosis	<u>HOSPITALS</u>		Diagnosis	<u>HEALTH CENTERS</u>	
	Male Percent	Female Percent		Male Percent	Female Percent
Upper Resp. Illness	18.7	19.0	Upper Resp. Illness	19.7	20.0
Diarrhea	11.4	11.3	Diarrhea	11.9	11.6
Malaria	9.9	10.2	Fevers	10.8	12.1
Fevers	9.0	9.0	Injuries	9.0	7.5
Abd. Conditions	6.6	6.9	Malaria	8.2	8.5
Injuries	7.6	6.1	Abd. Conditions	6.9	7.2
Skin Conditions	4.6	4.4	Skin Conditions	5.7	5.5
Eye Conditions	4.9	5.1	Eye Conditions	5.6	5.7
Ear Conditions	2.6	2.4	Worms	3.2	2.9
Malnut/Anemia	2.0	2.1	Ear Conditions	2.3	2.3
Not Specified	22.7	23.5	Not Specified	16.7	16.7
Total	100.0	100.0	Total	100.0	100.0

Source: Ministry of Health

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Table 2.2: TEN LEADING CAUSES OF OUTPATIENT MORBIDITY (NEW CASES)  
ADULTS (14 AND ABOVE)  
1981

Diagnosis	<u>HOSPITALS</u>		Diagnosis	<u>HEALTH CENTERS</u>	
	Male Percent	Female Percent		Male Percent	Female Percent
Upper Resp. Illness	14.0	13.8	Upper Resp. Illness	18.6	17.4
Abd. Conditions	7.4	13.0	Injuries	10.1	7.8
Injuries	9.9	7.1	Fevers	9.8	9.7
Fevers	7.2	7.5	Diarrhea	8.3	8.0
Diarrhea	6.0	6.0	Abd. Conditions	8.2	12.1
Malaria	5.9	6.9	Malaria	6.6	7.0
Dental Conditions	5.4	5.9	Skin conditions	4.2	4.2
Eye Conditions	4.9	4.5	Eye Conditions	3.9	4.5
Venereal Disease	4.8	3.0	Venereal Disease	3.4	2.2
Skin Disease	4.2	4.2	Dental Conditions	2.1	2.5
Not Specified	30.3	28.1	Not Specified	24.8	24.6
Total	100.0	100.0	Total	100.0	100.0

Source: Ministry of Health

Table 2.3: MEDICAL FACILITIES IN ZAMBIA: TIME-TRENDS 1964-1980

	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	% Increase 1964-1980
<b>HOSPITALS:</b>																		
Government	19	20	22	23	27	28	33	33	36	39	39	40	42	42	42	42	42	
Mission	19	20	20	20	23	26	26	27	28	29	29	28	28	29	29	29	28	
Mines/Other	10	10	11	12	12	13	13	12	11	11	11	11	11	11	11	11	11	
<b>TOTAL HOSPITALS</b>	<b>48</b>	<b>50</b>	<b>53</b>	<b>54</b>	<b>62</b>	<b>66</b>	<b>72</b>	<b>73</b>	<b>76</b>	<b>79</b>	<b>79</b>	<b>79</b>	<b>81</b>	<b>82</b>	<b>82</b>	<b>82</b>	<b>81</b>	<b>68.8</b>
<b>TOTAL BEDS AND COTS in Hospitals</b>	<b>7,710</b>	<b>8,330</b>	<b>8,750</b>	<b>9,210</b>	<b>9,910</b>	<b>10,550</b>	<b>11,520</b>	<b>11,910</b>	<b>12,870</b>	<b>13,870</b>	<b>13,870</b>	<b>14,400</b>	<b>14,670</b>	<b>14,700</b>	<b>15,630</b>	<b>15,630</b>	<b>14,877</b>	<b>93.0</b>
<b>HEALTH CENTRES &amp; CLINICS</b>																		
Rur. Health Ctrs: Governm.	187	194	207	223	251	276	299	339	360	376	378	387	388	396	405	420	469	
Mission	63	61	64	71	72	75	76	79	79	79	78	76	73	73	71	71	66	
Urban/Dept.) Government	39	38	52	64	68	75	80	89	106	106	111	111	138	138	139	142	120	
Industrial )																		
Clinics ) Mines/Others	17	18	20	22	28	38	46	49	50	51	58	57	58	58	58	58	66	
<b>TOTAL HEALTH CENTRES</b>	<b>306</b>	<b>311</b>	<b>343</b>	<b>380</b>	<b>419</b>	<b>464</b>	<b>501</b>	<b>556</b>	<b>595</b>	<b>612</b>	<b>625</b>	<b>631</b>	<b>657</b>	<b>665</b>	<b>673</b>	<b>691</b>	<b>721</b>	
<b>TOTAL BEDS AND COTS in Health Centres</b>	<b>3,140</b>	<b>3,440</b>	<b>3,810</b>	<b>3,860</b>	<b>3,970</b>	<b>4,080</b>	<b>4,220</b>	<b>4,390</b>	<b>4,830</b>	<b>4,830</b>	<b>4,990</b>	<b>5,030</b>	<b>5,070</b>	<b>5,100</b>	<b>5,110</b>	<b>5,150</b>	<b>5,630</b>	<b>79.30</b>
<b>TOTAL HOSPITALS AND HEALTH CENTRES</b>	<b>354</b>	<b>361</b>	<b>396</b>	<b>434</b>	<b>49</b>	<b>530</b>	<b>573</b>	<b>629</b>	<b>671</b>	<b>691</b>	<b>704</b>	<b>710</b>	<b>738</b>	<b>747</b>	<b>755</b>	<b>773</b>	<b>802</b>	<b>126.6</b>
<b>BEDS AND COTS IN HOSPITALS AND HEALTH CENTRES</b>	<b>10,850</b>	<b>11,770</b>	<b>12,560</b>	<b>13,070</b>	<b>13,940</b>	<b>14,630</b>	<b>15,740</b>	<b>16,300</b>	<b>17,400</b>	<b>18,700</b>	<b>18,900</b>	<b>19,370</b>	<b>19,740</b>	<b>19,800</b>	<b>20,740</b>	<b>20,780</b>	<b>20,507</b>	<b>(b)</b> <b>88.0</b>
<b>Number of Leprosaria (a)</b>	<b>30</b>	<b>30</b>	<b>32</b>	<b>30</b>	<b>24</b>	<b>22</b>	<b>21</b>	<b>20</b>	<b>19</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>17</b>	<b>16</b>	<b>16</b>	<b>16</b>	<b>15</b>	

(a) Leprosaria are being closed (or converted to other purposes) as the need for them decreases.

(b) In addition to 120 urban/departmental/industrial clinics, there were 27 mobile (govt) clinics in operation in the urban areas and 9 mobile (mission) clinics in operation in rural areas. The figures in the previous years include mobile clinics in operation both in urban and rural areas. A reduction in the number of beds and cots is notices in government hospitals this year.

Annex 3: HEALTH FINANCINGZAMBIATable 3.1: TRENDS IN NOMINAL MOH HEALTH EXPENDITURES <sup>a/</sup>  
(000,000 K)

Year	Annual MOH Expenditures		
	Recurrent	Capital	Total
1970	20.0	7.2	27.2
1971	24.0	8.4	32.4
1972	26.0	5.8	31.8
1973	28.0	3.1	31.1
1974	32.0	3.4	35.4
1975	36.9	4.5	41.4
1976	42.9	5.0	47.9
1977	51.8	4.5	56.3
1978	49.2	2.1	51.3
1979	54.8	0.9	55.7
1980	65.4	3.3	68.7
1981	72.6	3.7	76.3

<sup>a/</sup> Sources: Zambia, Financial Report 1970-1981; World Bank, Zambian Forward Budgeting Study, August, 1982; Rolf Jonson, Resources and Resource Distribution in the Zambian Health Care System, SIDA, 1982 (unpublished).

ZAMBIATable 3.2: TRENDS IN REAL MOH HEALTH EXPENDITURES a/  
(1981 Prices)

Year	Millions of Kwacha			Millions of US Dollars b/		
	Recurrent	Capital	Total	Recurrent	Capital	Total
1970	67.2	24.2	91.4	77.1	27.8	104.9
1971	73.6	25.7	99.3	84.4	29.5	113.9
1972	76.6	17.1	93.7	87.8	19.6	107.5
1973	77.9	8.6	86.5	89.3	9.9	99.2
1974	78.8	8.4	87.2	90.4	9.6	100.0
1975	83.9	10.2	94.1	96.2	11.7	107.9
1976	85.8	10.0	95.8	98.4	11.5	109.9
1977	84.5	7.3	91.8	96.9	8.4	105.3
1978	76.2	3.3	79.4	87.4	3.7	91.1
1979	67.1	1.1	68.2	77.0	1.3	78.2
1980	74.5	3.8	78.3	85.5	4.3	89.8
1981	72.6	3.7	76.3	83.3	4.2	87.5
1982 c/	82.5	10.3	92.8	94.7	11.8	106.4
1983 c/	75.3	8.0	83.3	86.4	9.1	95.5

a/ The price index for gross domestic expenditure has been used as the deflator.

b/ The exchange rate for 1981 was 1.147 \$US per kwacha.

c/ Budgeted.

ZAMBIATable 3.3: TRENDS IN REAL GOVERNMENT HEALTH EXPENDITURES PER CAPITA  
(1981 Prices)

Year	KWACHA			US Dollars		
	Recurrent	Capital	Total	Recurrent	Capital	Total
1970	16.1	5.8	21.9	18.5	6.7	25.2
1971	17.1	6.0	23.1	19.7	6.9	26.6
1972	17.3	3.9	21.2	19.9	4.4	24.3
1973	17.1	1.9	19.0	19.7	2.2	21.9
1974	16.9	1.8	18.7	19.3	2.1	21.4
1975	17.4	2.1	19.5	19.9	2.4	22.3
1976	17.2	2.0	19.2	19.7	2.3	22.0
1977	16.4	1.4	17.8	18.9	1.6	20.5
1978	14.3	0.6	14.9	16.4	0.7	17.1
1979	12.2	0.2	12.4	14.0	0.2	14.2
1980	13.1	0.7	13.8	15.1	0.8	15.9
1981	12.4	0.6	13.0	14.2	0.7	14.9
1982	13.6	1.7	15.3	15.6	1.9	17.6
1983	12.0	1.3	13.3	13.8	1.5	15.3

ZAMBIATable 3.4: PERCENTAGE RELATIONSHIPS AMONG GROSS DOMESTIC PRODUCT (GDP),  
TOTAL GOVERNMENT EXPENDITURES, AND MOH EXPENDITURES

Year	Total Gov't Expend. as % of GDP	MOH Expend. as % of Gov't	MOH Expend. as % of GDP	Recurrent, MOH as % of Recurrent Gov't
1970	49	4.4	2.1	5.2
1971	51	5.4	2.7	5.6
1972	39	6.1	2.4	7.2
1973	49	4.0	2.0	7.1
1974	34	5.6	1.8	7.3
1975	54	4.8	2.6	6.1
1976	41	6.2	2.6	7.0
1977	42	6.9	2.9	7.8
1978	37	6.3	2.3	7.6
1979	37	5.8	2.1	6.9
1980	44	5.3	2.3	6.0
1981	46	5.5	2.6	5.9
1982 <u>a/</u>	41	8.1	3.3	9.2
1983 <u>a/</u>	-	7.7	-	8.3

a/ Budgeted.

ZAMBIATable 3.5: GOVERNMENT CAPITAL EXPENDITURES IN HEALTH  
(000,000 K)

Year	Nominal			Real Total (1981 Prices)
	MOH	Provincial	Total	
1970	7.2	.6	7.8	26.2
1971	8.4	.6	9.0	27.6
1972	5.8	.5	6.3	18.6
1973	3.1	.7	3.8	10.6
1974	3.4	.8	4.2	10.3
1975	4.5	1.1	5.6	12.7
1976	5.0	.8	5.8	11.6
1977	4.5	1.0	5.5	9.0
1978	2.1	1.2	3.3	5.1
1979	.9	.8	1.7	2.1
1980	3.3	1.3	4.6	5.2
1981	3.7	1.3	5.0	5.0
1982 <u>a/</u>	11.8	.8	12.6	11.0
1983 <u>a/</u>	11.0	.8	11.8	8.6

a/ Budgeted.

ZAMBIATable 3.6: TRENDS IN NOMINAL MOH BUDGET ESTIMATES FOR HEALTH <sup>a/</sup>  
(000,000 K)

Year	<u>Annual MOH Budget</u>			<u>Differences between Budgeted and Actual Expenditures <sup>b/</sup></u> (Budget less Actual)		
	Recurrent	Capital	Total	Recurrent	Capital	Total
	MOH					
1970	19.0	7.0	26.0	-1.0	-0.2	-1.2
1971	20.4	11.7	32.1	-3.6	3.3	-0.3
1972	20.2	7.4	27.6	-5.8	1.6	-4.2
1973	27.5	5.9	33.4	-0.5	2.8	2.3
1974	29.4	5.6	35.0	-2.6	2.2	-0.4
1975	33.2	8.5	41.7	-3.7	4.0	-0.3
1976	37.8	6.5	44.3	-5.1	1.5	-3.6
1977	47.3	5.0	52.3	-4.5	0.5	-4.0
1978	50.5	3.4	53.9	1.3	1.3	2.6
1979	55.4	2.3	57.7	0.6	1.4	2.0
1980	64.4	4.4	68.8	-1.0	1.1	0.1
1981	76.2	7.5	83.7	3.6	3.8	7.4
1982	95.0	11.8	106.8	-	-	-
1983	103.9	11.0	114.9	-	-	-

<sup>a/</sup> Source: Estimates of Revenue and Expenditure, 1970-1983.

<sup>b/</sup> Actual Expenditures are given in Tables 3.1 and 3.5.

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Table 3.7: FOREIGN ASSISTANCE IN HEALTH AND POPULATION a/, 1981  
(\$ 000)

	<u>UN</u> <u>Agencies</u> <u>b/</u>	<u>SIDA</u>	<u>UK</u>	<u>Other</u> <u>Bilateral</u> <u>c/</u>	<u>Missions</u>	<u>Other</u> <u>International</u> <u>Agency</u> <u>d/</u>	<u>Total</u>
1. Population	1,079					5	1,084
2. Health	1,168	2,892	1,904	1,968	4,500	146	12,578
<b>Total</b>	<b>2,247</b>	<b>2,892</b>	<b>1,904</b>	<b>1,968</b>	<b>4,500</b>	<b>151</b>	<b>13,662</b>

a/ UNDP, Report on Development Cooperation to Zambia, 1981 Mission contributions are based on data obtained from the Churches Medical Association of Zambia.

b/ UNFPA, FAO, WHO, UNICEF.

c/ Austria, Belgium, DANIDA, Finland, FRG, GDR, GVS, Ireland, Italy, ONV, Norway.

d/ International Federation for Family Life Promotion, Mennonite Central Committee (USA), IAEA, EEC, CFTC, Apicare (USA), Fribaptistsamfundet (Sweden), Emmans (Switzerland), LEPR, United Methodist Church, Beit Trust, Cebemo.

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Table 3.8: ESTIMATED MOH RECURRENT COSTS PER UNIT VALUE OF CAPITAL BY TYPE OF SERVICE UNIT, 1981 (1981 Prices)

Service Unit	Estimated Replacement Cost of Capital (000 K)	Recurrent Expenditures (000 K)			Recurrent Expenditures Per Unit Value of Capital (K)		
		Wages	Non Wages	Total	Wages	Non Wages	Total
UTH	29,800	7,123	5,002	12,125	.24	.17	.41
Ndola Hospital	17,932	3,343	2,068	5,410	.18	.12	.30
Kitwe Hospital	12,024	2,439	1,569	4,008	.20	.13	.33
A. Davison Hosp.	2,363	648	441	1,089	.27	.19	.46
Chain. Hills Hosp.	8,445	747	687	1,434	.09	.08	.17
Liteta Leprosarium	1,851	234	141	375	.13	.07	.20
Pneumoconiosis Bur.	417	206	117	323	.49	.28	.77
Pub. Health Lab.	791	125	28	153	.16	.04	.20
Provinces <u>b/</u>	196,113	19,916	11,492	31,408	.10	.06	.16
All Zambia <u>c/</u>	281,417	36,291	29,739	66,030	.13	.10	.23

a/ Replacement costs include service buildings, housing, vehicles and equipment. Provisional unit costs of construction and equipment per square foot by type of facility (hospitals, health centers, housing, etc.), and cost of vehicles were obtained from the MOH. Unit costs have been recalculated in 1981 prices and multiplied times an inventory of facilities to obtain total values of capital.

b/ Includes district and province headquarters, general hospital, district hospitals and special units.

c/ In addition to the service units listed, the total for Zambia includes expenditures for headquarters and special units.

ZAMBIATable 3.9: CENTRAL HOSPITAL, PROVINCE AND MISSION RECURRENT EXPENDITURES  
AS A PER CENT OF TOTAL MOH EXPENDITURES, 1973-1983 a/

<u>Budget Category</u>	<u>Year</u>						
	<u>1973</u>	<u>1975</u>	<u>1977</u>	<u>1980</u>	<u>1981</u>	<u>1982 <u>b/</u></u>	<u>1982 <u>b/</u></u>
Central Hospitals <u>c/</u>	33	33	28	32	30	28	29
Province <u>d/</u>	40	39	39	41	42	38	41
Missions	9	8	8	9	9	6	7
Other <u>e/</u>	<u>18</u>	<u>20</u>	<u>25</u>	<u>18</u>	<u>19</u>	<u>28</u>	<u>23</u>
Total	100	100	100	100	100	100	100

a/ MOF, Financial Reports.b/ UTH, Ndola and Kitwe Hospitals.c/ Budgeted at beginning of fiscal year, Estimates of Revenue and Expenditures.d/ General hospitals, district hospitals, health centers, and provincial and district administration are included under the heading "Provinces."e/ Includes Central Headquarters, special units, training centers and public health laboratories.

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Table 3.10: DISTRIBUTION OF 1981 RECURRENT HEALTH  
EXPENDITURES BY PROVINCE a/  
(000 K)

Province	MOH Expenditures <u>a/</u>	Mission Expenditures <u>b/</u>	Mine Expenditure	Total Expenditure	Government	Total
					Expenditure Per Capita (K)	Expendi- ture Per Capita (K)
Central	5,930	159	1,186	7,275	11	14
Copperbelt	16,261	747	31,967	48,975	13	38
Eastern	4,601	1,855		6,455	7	10
Luapula	4,251	913		5,164	10	12
Northern	5,775	874		6,650	8	9
Northwest	3,640	1,887		5,526	12	18
Southern	7,910	1,821		9,731	11	14
Western	4,804	1,055		5,858	10	12
Lusaka	12,858	364		13,222	18	18
Zambia Average					11	19
Total	66,029	9,675	33,153	108,857		

a/ MOF, Financial Reports, 1981

b/ Unpublished records, Zambia Churches Medical Association

c/ Unpublished records, ZCCM

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**Table 3.11: ESTIMATED RECURRENT COSTS PER UNIT VALUE OF CAPITAL IN MOH FACILITIES BY PROVINCE <sup>a/</sup> (1981 Prices)**

## I. 1981 Ratios

Province	Estimated Replacement Cost of Capital <sup>b/</sup> (000 K)	Recurrent Expenditures (000 K)			Recurrent Expenditure Per Unit of Capital (K)		
		Wages	Non Wage	Total	Wages	Non Wages	Total
Central	20,497	3,063	1,881	4,944	.15	.09	.24
Copperbelt	15,510	1,616	875	2,491	.10	.06	.16
Eastern	22,605	2,204	1,284	3,488	.10	.06	.16
Luapula	20,235	1,860	1,411	3,271	.09	.07	.16
Northern	32,504	2,752	1,477	4,229	.09	.05	.13
North West	20,273	1,767	861	2,628	.09	.04	.13
Southern	35,318	4,036	2,239	6,275	.12	.06	.17
Western	22,112	2,281	1,404	3,685	.10	.06	.17
Lusaka	7,060	337	60	397	.05	.01	.06
All Provinces	196,113	19,916	11,492	31,408	.10	.06	.16
II. 1975 Ratios <sup>c/</sup>	-	-	-	-	-	-	-
All Provinces (1975 Prices)	78,653	13,601	5,690	13,601	.10	.07	.17

<sup>a/</sup> Headquarters, Central and Special Hospitals are omitted. General hospitals, district hospitals, health centers and provincial and district administration are included.

<sup>b/</sup> Replacement costs include service buildings, housing, vehicles and equipment. Provisional unit costs of construction and equipment per square foot by type of facility (hospitals, health centers, housing, etc.), and cost of vehicles were obtained from the MOH. Unit costs have been recalculated in 1981 prices and multiplied times an inventory of facilities in each province to obtain total values of capital.

<sup>c/</sup> Based on a 1975 inventory of facilities in each province.

ZAMBIATable 3.12: PROJECTED RECURRENT MOH ALLOCATION, EXPENDITURES AND NET AVAILABILITY OF FUNDS WITH CAPITAL STOCK CONSTANT AT 1983 LEVEL

(1981 Prices, K 000,000)

Year	Projected Allocation of Government Revenues			Projected Expenditures			Net Availab. of Funds
	MOH Base Allocation <u>a/</u>	Transfers to Missions	MOH Net Allocation	Recurrent Costs Net of Maint. <u>b/</u>	Maint. and Replacement <u>c/</u>	Total Recurrent	
1983	76.5	6.3	70.2	72.0	8.6	80.6	-10.4
1984	76.6	6.4	70.2	72.0	8.6	80.6	-10.4
1985	77.6	6.5	71.1	72.0	8.6	80.6	- 9.5
1986	80.1	6.6	75.5	72.0	8.6	80.6	- 5.1
1987	82.6	6.7	76.0	72.0	8.6	80.6	- 4.6
1988	85.3	6.8	78.5	72.0	8.6	80.6	- 2.1
						Total	-42.1

a/ It is assumed that the MOH base allocation changes from its 1981 level in proportion to changes in GDP, and that GDP grows as follows:

1982	3032
1983	3072
1984	3074
1985	3117
1986	3217
1987	3319
1988	3426

b/ The replacement value of capital stock in 1982 was K281 million; with projected capital expenditures of K8 million in 1983, the 1983 value of capital is K289 million. The projected value of capital expenditures for 1983 equals the ratio of actual to budgeted capital expenditures for 1983. Recurrent costs are estimated using a recurrent cost/capital ratio of .25.

c/ The average ratio of recurrent costs for maintenance to value of capital is .03.

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Table 3.13: NET AVAILABILITY OF RECURRENT FUNDS  
WITH GROWING CAPITAL STOCK a/  
(1981 Prices, K 000,000)

<u>Year</u>	<u>New Capital</u>	<u>Cumulative Value of Capital</u>	<u>Recurrent Expenditure with Maint.</u>	<u>Net MOH Budget Allocation</u> <u>b/</u>	<u>Net Availability of Funds</u>
1983	7.4	288.8	80.6	70.2	-10.4
1984	6.0	294.8	82.5	70.2	-12.4
1985	6.0	300.8	84.2	71.1	-13.1
1986	6.0	306.8	85.9	75.5	-12.4
1987	6.0	312.8	87.6	76.0	-11.6
1988	6.0	318.6	89.3	78.5	-10.7
<b>Total</b>					<b>-70.6</b>

a/ The new capital expenditure for 1983 is estimated under the assumption that the ratio of actual to budgeted expenditures is that for 1976 to 1981. The 1984 through 1988 capital expenditures are derived from the MOH proposal for primary health care in MOH, Health by the People, 1981.

b/ MOH total revenue less transfers to missions.

ZAMBIATable 3.14: SENSITIVITY OF NET AVAILABILITY OF FUNDS TO ALTERNATIVE ASSUMPTIONS - GROWING CAPITAL STOCK IN ALL CASES a/

(1981 Prices, K 000,000)

<u>Year</u>	<u>R/K = .26</u> <u>b/</u>			<u>R/K = .28</u> <u>c/</u>		
	<u>Zero</u> <u>GDP</u> <u>Growth</u>	<u>Slow</u> <u>GDP</u> <u>Growth</u> <u>d/</u>	<u>Moderate</u> <u>GDP</u> <u>Growth</u> <u>e/</u>	<u>Zero</u> <u>GDP</u> <u>Growth</u>	<u>Slow</u> <u>GDP</u> <u>Growth</u> <u>d/</u>	<u>Moderate</u> <u>GDP</u> <u>Growth</u> <u>e/</u>
1983	-4.9	-4.9	-4.9	-10.7	-10.4	-10.4
1984	-6.5	-6.5	-4.2	-12.4	-12.4	-10.1
1985	-8.2	-7.1	-3.5	-14.2	-13.1	- 9.6
1986	-9.9	-6.3	-2.8	-16.0	-12.7	- 8.9
1987	-11.5	-5.4	-1.9	-17.8	-11.6	- 8.2
1988	-13.2	-4.4	-1.0	-19.0	-10.7	- 7.4
Total	-54.2	-34.6	-18.3	-90.6	-70.6	-54.6

a/ The cost of new capital is not included.b/ Recurrent cost/capital ratio equal to 1981 ratio with maintenance.c/ Recurrent cost/capital ratio equal to 1975 ratio with maintenance.d/ GDP grows at rate given in footnote to Table 3.12.e/ GDP grows at 3% per year.

ZAMBIATable 3.15: PROJECTED POTENTIAL FUNDS FROM COST RECOVERY a/  
(1981 Prices, K 000,000)

<u>Year</u>	<u>Projected GDP</u>	<u>Population (000,000)</u>	<u>Projected GDP Per Capita</u>	<u>Projected Private Expenditures</u> <u>b/</u>	<u>Cost Recovery</u> <u>c/</u>
1980	3,046	5.680	536	-	-
1981	2,990	5.867	510	44.9	-
1982	3,032	6.060	500	45.5	-
1983	3,072	6.260	491	46.1	-
1984	3,074	6.466	475	46.2	-
1985	3,117	6.679	467	46.8	-
1986	3,217	6.900	466	48.3	12.0
1987	3,319	7.127	466	49.8	12.5
1988	3,426	7.662	447	51.4	12.9

a/ It is assumed that implementation of cost recovery starts in 1986.

b/ Private expenditures per capita ( $h_t$ ) in year  $t$  are extrapolated from baseline private expenditures ( $hg_1$ ) in 1981 using an income elasticity ( $e_h$ ) of 1 and the rate of growth per capita GDP ( $g_t$ ) in column 3. Total private expenditures ( $H_t$ ) are obtained using population ( $N_t$ ) in column 2. The formula used is

$$H_t = [(1 + ehgt) \cdot hg_1] N_t$$

c/ Derived from an arbitrary goal of diverting 25% of private expenditures (baseline plus incremental) to cost recovery. 25% is based on experience in other countries.

Annex 4: BUDGETING

4.01 Examination of the trends and levels of MOH expenditures reveals that declining government revenues have forced a reduction in recurrent expenditures for health services. The stringent fiscal conditions that the government has faced since 1976 have increased the need for financial planning reforms that will promote an allocation of resources that reflects the relative priorities and effectiveness of alternative programs.

4.02 The major deficiencies in financial planning concern: (i) coordinated central planning; (ii) functional budgeting; and (iii) coordination of recurrent cost and capital expenditures. These problems are common to other sectors in Zambia and are in the process of being explored in the larger context by The World Bank Eastern Africa Regional Office. The discussion in this annex is concerned with functional budgeting and develops only specific aspects related to MOH. Additional detail can be found in The World Bank document, Planning and Budgeting in Zambia (white cover), February 1983.

4.03 Under the present system of budgeting in Zambia, it is not possible to distinguish expenditures for curative or preventative care, primary care and higher level care, or for training, services and administration. Improved planning would require an alternative budgeting system giving a knowledge of the allocation of expenditures among the functions, programs and institutions that comprise the Plan. A functional budgeting system would facilitate the planning process in three major respects. First, the allocation of expenditures among functions forces a clarification of budget choices and makes it possible to relate annual budget choices to long-term intentions set out in development plans. Monitoring of progress towards objectives is facilitated by the possibility of relating program choices in budget plans to actual expenditures. Second, functional classification of expenditures allows expenditures to be linked with measures of functional output to provide estimates of cost effectiveness among programs. Such estimates are important inputs in the formulation of long-term investment strategies and also are useful in distributing the burden of short-term constraints among alternative recurrent expenditures. Third, functional expenditure information allows budget allocations to be related more accurately to the workload underlying the request of individual budget units.

4.04 Functional budgeting<sup>1/</sup> has proven difficult to adopt fully in many countries and it is important that the difficulties be recognized and changes be limited to the modest budgeting reforms necessary to provide basic planning information. The difficulties partly lie in the forced

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<sup>1/</sup> Functional budgeting is also discussed in the literature as performance budgeting and program budgeting. An important reference is K. J. Davey, *Programme Budgeting for East Africa*, East African Staff College, Nairobi, 1972.

allocation of everyday line expenditures among alternative programs or functions. Other difficulties, also at the level of everyday implementation, center on the need to retrain bookkeepers and middle level management in the use of alternative budget classifications. Some of these problems can be circumvented by adopting individual features of functional budgeting in stages, starting with the easiest classifications to implement and moving towards more difficult functional distinctions. A valuable feature of functional budgeting is that it need not be inconsistent with the present use of line expenditure categories. It is possible to retain essential features of the present system while incrementally adding the additional features required by functional budgeting.

4.05 It is important that changes be made with the understanding and support of staff at all levels. As functional categories are developed, the objectives of the analysis need to be clear. What use will be made of the information? How does the information collected contribute to the planning process? When answers to these questions are apparent, the cooperation of staff should be easier to secure. The development of functional budgeting should parallel and not exceed the development of planning capacity to use the information. Growth in planning capacity will generate a demand for budgeting information that will encourage the cooperation of financial officers.

4.06 It is not possible to set forth definitive functional categories here. Development of appropriate and useful program categories would require a careful analysis of MOH objectives and capacity carried out in close collaboration with senior and mid-level management. Of the potential categories noted in Table 4.1, the classification by institution would be relatively easy to implement as it would only require vouchers and salaries to be recorded by institution. Institutional classifications would allow a better monitoring of expenditures by level of care and would also, when combined with sub-classification by program, contribute towards a comparative cost effectiveness analysis. To a limited extent, institutional classifications are already made for central and special hospitals. Similarly, classification by geographic location would be straightforward to implement and would help in the analysis of the equity of expenditures for health services. Classifications by function, such as those suggested in part C of Table 4.1, are more difficult to carry out because of the necessity to construct criteria to allocate the cost of units performing multiple functions. These are, however, the classifications that would ultimately prove to be the most useful for plan management.

4.07 Program categories can be further divided into a sequence of sub-categories as needed to provide information about expenditures to achieve given plan objectives. As an example, Table 4.2 suggests possible categories for the analysis of expenditures by hospitals and health centers. Expenditures for hospitals would be subdivided into training, services and administration. Services would be further subdivided into inpatient and outpatient categories.

4.08 Classification of expenditures by function makes it possible to develop measures of cost effectiveness of alternative programs. Such measures are commonly constructed as the ratio of expenditures to performance. The usefulness of such measures is dependent on the quality of the performance data that parallels the expenditure data. The most readily obtained performance data will usually relate to process units, such as numbers of bed days, outpatient admissions, deliveries, or inoculations. Unfortunately, performance data directly related to output objectives such as, deaths averted, morbidity reduction, malnutrition avoided, or increase in labor productivity are more difficult to obtain. Measures of performance by process can provide useful allocatable tools for short-term budget analysis but ultimately measures of performance by output objective are necessary for long-term planning. Table 4.3 gives some possible performance measures for the MOH programs in Zambia.

4.09 Recommendations related to functional budgeting:

- (i) technical assistance should be obtained to set up a system of functional budgeting. Such a system can only be devised through on the spot interaction with Zambian officials. Care should be taken that the system is not more elaborate than is necessary to answer the major resource allocational questions required for efficient planning. The budget headings must conform to specific MOH needs and also be implemental by the accounting units;
- (ii) measures of program performance should be devised and used in determining the optimum allocation of MOH resources; the performance measures should be related to planning objectives and budgeting categories;
- (iii) clarification of the actual flows of in kind contributions to missions would help both the government and the mission agencies to achieve a mutual coordination of resource expenditures consistent with the development plan. At the present time only rudimentary information, based on a sample of mission facilities, is known about mission expenditures. Substantial imports of materials in kind and direct contributions occur without any knowledge of the actual amounts or programs supported.

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Table 4.1: SELECTED BUDGET CATEGORIES TO FACILITATE MOH PLANNING

A. By Institution

1. Central Hospital
2. General Hospital
3. District Hospital
4. Urban Health Center
5. Rural Health Center
6. Special Hospitals
7. Flying Doctor
8. Ambulance Service
9. Tropical Disease Research

B. By Geographic Location

1. Province/District/Municipality
2. Rural/Urban

C. By Function or Program

1. Primary Care/Secondary Care/Tertiary Care
2. Inpatient/Outpatient Services
3. Training/Services/Administration
4. Preventative/Curative Care
5. Maternal and Child Health
6. Health Education
7. Environment
8. Disease Specific Programs: TB/Malaria/Leprosy/  
Schisto/Venereal Disease/EPI
9. National Food and Nutrition Program

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Table 4.2: POSSIBLE FUNCTIONAL CLASSIFICATIONS OF EXPENDITURES FOR  
HOSPITALS AND HEALTH CENTERS

I. Hospital Expenditure Categories

- A. Administration
- B. Training
  - 1. Physician Training
  - 2. Nurse Training
  - 3. Paramedical Training
- C. Services
  - 1. Inpatient
    - a. Maternal, Delivery
    - b. Other
  - 2. Outpatient
    - a. Maternal and Child Health
    - b. Other
  - 3. Disease specific, semi-vertical programs
    - a. Malaria
    - b. T.B.
    - c. Leprosy
    - d. Venereal Disease
    - e. EPI
    - f. Schisto

II. Health Centers

- A. Administration
- B. Training
- C. Services
  - 1. Outpatient
    - a. Maternal and Child Health
      - (i) Ante-natal
      - (ii) Family Planning
      - (iii) Postnatal-well baby activities
      - (iv) Health education
      - (v) Nutrition
      - (vi) EPI
      - (vii) Oral rehydration therapy
    - b. Other
  - 2. Outreach (same sub-classifications as under 1. above)
  - 3. Inpatient Care
    - a. delivery
    - b. other MCH
    - c. Other

ZAMBIATable 4.3: POTENTIAL MEASURES OF PERFORMANCE

<u>Program</u>	<u>Process Measures (Cost per ...)</u>	<u>Output Measures (Cost per ...)</u>
Training		MD Trained Nurse Trained VHW Trained
Inpatient Care	Bed Day Delivery Surgical Procedure	Death Averted Disability Averted Healthy Day Gained
Outpatient Care or Outreach Care		
a. General	Outpatient visit	Death averted Disability averted Healthy Day Gained
b. MCH	MCH visit Pregnancy monitored Child monitored Immunized child Oral rehydration Contraceptive acceptor	as above plus ... Month increase in birth interval Malnourished child avoided
Disease Specific Programs		
a. Malaria/Schisto/ Leprosy/T.B./ Venereal Disease	House sprayed or hec- tare of water treated, confinement day, case treated	Unit reduction in morbidity (slide positive rate, egg count, etc.) Death averted Disability averted Health days gained.
b. Nutrition	Additional breast fed child, weaned child covered, nutritional supplement given	as above plus ... Malnourished child avoided Low weight birth avoided.

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Table 4.4: POTENTIAL RANKING OF HEALTH SERVICE PRIORITIES <sup>1/</sup>

Program or Category of Expenditure	Government			Missions	
	Central Ministry	Province		Urban	Rural
		Urban	Rural		
1. Personal Services (care of patient)					
1.1 Through Hospital					
1.1.1 Inpatient					
- General (bed and nursing)					
- Deliveries					
- Surgery					
1.1.2 Outpatient					
- General					
- MCH					
- Family Planning (FP)					
1.2 Through Health Centers					
1.2.1 Inpatient					
- General					
- Delivery					
1.2.2 Outpatient					
- General					
- MCH					
- Family Planning					
1.3 Outreach					
1.3.1 Mobile Units					
- General					
- MCH					
- Family Planning					

<sup>1/</sup> The priorities in the table are based on presumed marginal cost effectiveness of recurrent operating expenditures. The private sector is not included in the table.

Notation: 1 = highest cost effectiveness  
 2 = high cost effectiveness  
 3 = moderate cost effectiveness  
 ? no basis for evaluation, need more information  
 - = service not offered by this provider category.

ZAMBIATable 4.4: POTENTIAL RANKING OF HEALTH SERVICE PRIORITIES <sup>1/</sup>

(Continued)

Program or Category of Expenditure	Government				
	Central Ministry	Province		Missions	
		Urban	Rural	Urban	Rural
1.3.2 <u>Flying Doctor</u>					
1.3.4 <u>Visiting Health Worker</u>					
- <u>MCH</u>					
- <u>PHC</u>					
- <u>FP</u>					
1.4 <u>Special Hospitals</u>					
1.4.1 <u>Pediatric Hospitals</u>					
1.4.2 <u>Psychiatric Hospital</u>					
2. <u>Supporting Programs</u>					
2.1 <u>Training</u>					
2.1.1 <u>Medical Doctors</u>					
2.1.2 <u>Nurses</u>					
2.1.3 <u>Health Promoters</u>					
2.2 <u>Public Health Labs</u>					
2.3 <u>Tropical Disease Research</u>					
2.4 <u>Surveillance</u>					
2.5 <u>Pharmaceutical</u>					
2.5.1 <u>Supplies</u>					
2.5.2 <u>Transportation and Storage</u>					
3. <u>Disease Specific Programs</u>					
3.1 <u>EPI</u>					
3.2 <u>Malaria</u>					
3.3 <u>Schisto</u>					
3.4 <u>Venereal Disease</u>					
3.5 <u>Leprosy</u>					
3.6 <u>Oral Rehydration</u>					
3.7 <u>Nutrition</u>					

Annex 5: NUTRITION

A. Current Nutrition Status

5.01 Protein-calorie malnutrition remains a serious public health problem in Zambia. A comprehensive 1970-71 National Consumption and Nutrition Survey established that more than 20 per cent of children under five had second or third degree malnutrition, with prevalence greatest among those between seven and twenty-four months. Smaller recent surveys and review of less direct indicators show that nutrition status has not improved and, especially in urban areas, has declined in many places. Though most protein-calorie malnutrition reflects chronic deficiencies that stunt growth, seasonal and drought-induced episodes of acute malnutrition occur frequently in more deprived areas. Zambia's malnutrition resembles that of Cameroon, Lesotho, and Zimbabwe in numbers and severity.

5.02 Protein-calorie malnutrition is concentrated among children under five, especially between six and twenty-four months. It occurs more widely and acutely in provinces off-the-rail-line and among the poor in urban squatter settlements. Rural malnutrition, concentrated among subsistence small holders, exceeds urban malnutrition in prevalence and severity. More than half the country's pre-school children are at risk of malnutrition. Seasonal changes aggravate malnutrition problems, with increased incidence and severity during the rainy "hungry season", January through March, before harvest. Little documentation of adult malnutrition exists, but consumption data and the prevalence of malnutrition suggest that all age groups are affected.

5.03 Though infant morbidity and mortality data are not available by underlying cause, clinical impressions corroborate the extent of malnutrition. At least 20% to 40% of child deaths after the first week of life are at least partially caused by malnutrition. Cases of measles, malaria, and diarrheal disease combined with inadequate food intake illustrate the classic nutrition-infection interaction resulting in high mortality.

5.04 Vitamin A deficiency, with resultant blindness, continues to be a serious problem in Luapula and Northern provinces. Cases of vitamin A deficiency exist throughout the country. The severity and extent of the problem is not known. Anemia, heavily influenced by malaria, is a serious overall public health problem. According to the 1970-71 survey, hemoglobin values were deficient in more than 70 percent of all Zambian children under five, more than 45 percent of adults, and 22 percent of pregnant and lactating women. Pockets of iodine deficiency and endemic goiter have been reported in many parts of the country. The 1970-71 survey indicated an overall prevalence of endemic goiter of 8.1 percent.

5.05 Zambian malnutrition follows closely the deprivation patterns furthered by national economic policies favoring urban areas, Copperbelt province, and others along the "Line of Rail" developed to get copper out and services to those mining it. Eastern, Western, Luapula, and Northern

provinces, all located off the rail line, consistently show higher percentages of children at risk, regardless of how defined, than for those along it. No data were collected in Luapula province during the national survey, because earlier studies had confirmed the poor nutrition situation there. The areas surveyed ranked, on the basis of percentage of children under four below 60% of standard weight for age (a measure of severe malnutrition).

	<u>Percent</u>
Eastern	8.7
Northern	8.1
Western	7.4
Northwestern	5.7
Ndola Rural	4.4
Central (incl. Lusaka Province)	3.0
Southern	0.0

Source: Zambia Nutrition Status Survey Technical Report No. 2, FAO, Rome, 1974, page 4.

5.06 These figures are quite high. They indicate widespread deprivation confirmed by data indicating that in these same regions, the percentage of similarly-aged children below 70% of weight for age and thereby on the brink of malnutrition ranged from 29% to 16%.

5.07 The survey findings on weight-for-height, a measure of acute rather than chronic malnutrition, show less deficiency. No province, for example, had more than five percent of children below 70% of standard. Other evidence supports the conclusion that Zambian children, and many adults, suffer from chronic protein-calorie malnutrition (PCM) with serious consequences for health, educability, and efficiency. The data suggest some preference to male children, but not serious enough to have policy consequences.

5.08 The survey and all later studies confirm onset and greatest severity of PCM during the weaning period, beginning usually between four and six months of age. Zambian birth weights are generally within acceptable limits (Davis, 1977). Some evidence suggests that malnutrition occurs earlier in Lusaka and Ndola, possibly because of premature cessation of breast-feeding, a common urban pattern (Rao 1981, Lynch 1970).

5.09 FAO food balance calculations for 1977, the most recent year available, show Zambian per capita availability of 1947 calories (excluding alcohol) against a requirement of 2,038 calories, about the same as the 1966 calories available in 1971. Chronic food deficits among Zambia's 200,000 subsistence farm families remain as serious as before the Government's Intensive Rural Development Project (IRDP), according to a 1980 Report issued by FAO, SIDA and the National Food and Nutrition Commission.

5.10 The Dutch sponsored Food Strategy Study (Ministry of Agriculture, Republic of Zambia 1981) includes a Nutrition Annex that summarizes primary data collected for the study and various recent clinic records, hospital admissions, and surveys. Though some conclusions seem daring from the evidence offered, other support can be found. For example "the weight of newborns delivered in health institutions is quite acceptable" and "at five years of age the Zambian child has a weight and height of a reference child of approximately three years" resemble conclusions of independent research studies. The Annex concludes that infant malnutrition in Zambia remains chronic rather than acute and uses hospital admission records to show that seasonal patterns have not changed since the 1970-71 Survey.

5.11 A 1981 survey of 50 households in a typical ward in the Western Province found 42% of children between one and five with arm circumference below normal and 32% of households exhibiting "serious signs" of malnutrition (Kalumba and Freund, 1982). A 1979 Northern Province survey in two villages found 33.5 and 38.3% of children under five with second or third degree malnutrition, worse than found in 1971, despite adequate access to, and reasonable use of, health services (Keller 1982). A 1980 study of infant feeding practices in Northern, Eastern, and Central Provinces confirmed onset of infant malnutrition at the sixth month and severity during the second year of life, with 21.8% of boys and 26.3% of girls under 60% of standard weight for age. These figures showed no improvement from the 1970-71 survey. Visitors to Zambian hospitals and clinics find cases of kwashiorkor and marasmus commonly enough to dramatize existence of severe and poorly attended problems.

5.12 This methodologically weak, but direct, evidence on nutrition status since 1971 receives support from economic data. In 1980, for example, 100 Kwacha per month (or 50 cash and 50 of subsistence) was estimated as minimum required for poverty-level support of a six person family. Eighty percent of rural, and 26% of urban, families fell below this very modest amount (ILO 1981). Price and wage movements since then leave little doubt that the current poverty group is greater. These and the following causal aspects of malnutrition also serve as indirect indicators of nutrition status, corroborating more direct findings.

5.13 The thoughtful Dutch study (para. 3.10) after reviewing consumption and expenditure data, estimated the average energy deficit among the malnourished in 1980 at 350 cal. daily. This can be expressed in cereal equivalent as a yearly "gap" of 14,600 tons. Comparing this with more than 700,000 tons of maize alone, available during the 1982-83 crop year, and the FAO estimate that more than 80,000 tons of grain go into beer production annually, the potential for improving nutrition by redistributing food within the population and among family members becomes apparent.

5.14 Though hospital deaths ascribed to malnutrition are a poor indicator of absolute malnutrition prevalence, trends would reflect significant changes. The following table, from a 1979 Government publication indicates that conditions in 1978 were worse than in 1973:

HOSPITAL ADMISSIONS IN CHILDREN

Year	Admission due to Malnutrition in Hospitals	Total Admission in Children	% of Malnutrition in Children	Deaths Due to Malnutrition	Total Deaths in Children in Hospitals	% of Deaths Due to Malnutrition	Case Fatality Rate Per 1,000 Admissions
1973	6,975	139,092	5.0%	1,151	9,747	11.8%	165.0
1974	7,100	143,083	4.9%	1,128	10,619	10.6%	158.8
1975	7,566	142,810	5.2%	1,053	9,764	10.7%	139.1
1976	9,014	158,747	5.7%	1,422	10,861	13.1%	157.8
1977	10,049	166,833	6.0%	1,586	11,526	13.7%	157.8
1978	12,253	169,625	7.2%	2,275	12,710	17.9%	185.7

Source: Some Preventable Diseases of Major Concern in Zambia (Government of Zambia 1979).

5.15 The same volume records "total malnutrition cases" in hospitals and health centers of: 1976-73,604; 1977-84,147; and 1978-87,978. These numbers reflect both seriousness of Zambian malnutrition and lack of improvement. Adding the number of patients for whom malnutrition contributes to another diagnosed condition, and recognizing that only the most severe malnutrition reaches health institutions, it becomes clear that malnutrition remains a critical problem in Zambia. A 1982 seminar on demography used 76% as the prevalence of child malnutrition in "peripheral rural areas", including 5% with third degree and 34% with moderate malnutrition (ECA-Government of Zambia, 1982).

#### B. Causes of Malnutrition

##### Agricultural and Economic Factors

5.16 The paucity of recent data on nutrition status reflects wide acknowledgement that Zambian agricultural and economic conditions have worsened since 1971. Extensive continued study of malnutrition often appears less urgent when indirect indicators make deterioration seem obvious and reduced government resources make increased action unlikely. The 1981 ILO volume describing Zambia: Basic Needs in an Economy Under Pressure and the Report of a 1980 seminar at the University of Edinburgh on "The Evolving Structure of Zambian Society," that opens with reflections on the country's "almost annual food crises," dramatize Zambia's poor course since the 1970-71 Survey.

5.17 That Survey was accepted by the Government with a proviso that it be followed by action to improve nutrition. Disillusionment with the lack of subsequent international response remains and influences Zambian

approaches to malnutrition problems. Existence of the problems continues to be acknowledged widely within and outside Government. The absence of greater efforts to improve nutrition reflects both the force of competing claims on government funds and intractability of many of the major causes of national nutrition problems.

5.18 The decline in copper revenues, urban bias of food production and price policies, and historical patterns of transport in Zambia form a pattern of development that contributes to the country's serious malnutrition problems, most severe among rural subsistence households away from the "line-of-rail" and in squatter settlements around major cities. The dual economy established to extract and export copper, and to feed those doing it, while neglecting other areas, concentrated production and development along the rail line. Luapula, Northern, Western and Eastern provinces, less well endowed and further from the copper and the tracks, remained isolated and unserved. They continue to be populated primarily by widely dispersed subsistence farm families. Intermittent droughts, and the border problems associated with Zimbabwe's struggle for independence, also contributed to economic stagnation and poor nutrition.

5.19 Difficulties in transporting and marketing agricultural produce to and from remote areas is one cause of malnutrition. In addition, male migration to the Copperbelt and Lusaka provinces left the rural provinces with 25-30 percent of households headed by females. Severe agricultural labor shortages at peak demand periods are typical, while urban unemployment exceeds thirty percent. The history of Zambian policies on production and pricing of maize, perpetuates the foregoing pattern: marketing board producer prices are too low to encourage optimum maize production and require costly consumer subsidies. A uniform maize price throughout the country and during the entire crop year has resulted in further distortions of production and storage patterns. The consequences of these policies have been examined comprehensively in the 1981 Food Strategy Study of the Ministry of Agriculture and Water Development. The lack of adequate transportation and marketing systems, fragmented landholdings, labor constraints, and the absence of basic services have turned the off-line provinces into perennial food deficit areas, highly vulnerable to drought, and dependent on emergency foreign relief for survival.

5.20 Absence of male labor and resulting increased burdens on females, first order outcomes of the foregoing process, aggravate malnutrition. Adequate family food supply, if achievable at all, often imposes excessive burdens on mothers. This has led to increased cultivation of cassava instead of maize, for example, primarily to spread labor requirements more manageably and to reduce famine risk. The macroeconomic context, within which nutrition status unfolds, includes a tenuous food availability situation that increases sharply the difficulties of improving nutrition. The level and distribution of income adds to these difficulties.

5.21 In 1974-75, a national urban household budget survey found 26 percent of households with less than K50 (US\$57.4) income per month. By spending 58 percent of that income with concern only for nutrition, they

could have afforded a model balanced diet. By 1980, the same diet would have required 80 percent of equivalent low income. In February 1983, the Government removed price controls from everything but maize meal, candles, and flour. Supply response may moderate ultimate price increases, but initial newspaper reports make it clear that poor urban consumers will suffer severely. Current price trends and wage controls clearly aggravate the already difficult nutritional situation of poor urban consumers.

5.22 Agricultural subsidies reached 80 percent of total spending on agriculture in 1975 and 1976, and totaled K 195 million (US\$224 million) in 1979. Declining copper prices increased pressures on the national budget, and called for a reassessment of subsidy policies. The National Agriculture Marketing Board has currently fixed the retail maize price at a level intended to cut losses by half and has, simultaneously and for the first time, established producer prices for sorghum, millet, and cassava. It is too early to say what the consequences of these major changes will be for food production, farm income, and consumer food purchases, but reduced reliance on maize should have favorable nutrition consequences. Inadequate producer incentives, intermittent drought, and the rapid expansion of demand forced resort to food imports since 1978. It is clear that domestic food production cannot keep up with demand unless productivity of smaller farmers receives more attention. The Government, with encouragement from the Bank and others, now acknowledges this, though policies and resource allocations are changing slowly. More consideration of small farmers should have positive nutritional impact through effects on income distribution and food availability. National agricultural and economic policies contribute substantially to malnutrition, and budgetary, foreign exchange, and other constraints limit sharply the options available for modifying them.

#### Nutrition-Specific Factors

5.23 Within the general pattern of deprivation that leaves some 3,000,000 Zambians of all ages malnourished or at high risk of malnutrition, there exist specific factors that affect nutrition status more directly and frequently turn the predisposition created by poverty into frank clinical malnutrition, especially among weaning age children. Weaning practices and infectious disease present a joint causal influence, relatively independent of economic and agricultural causes, that explains much of the infant malnutrition in Zambia.

5.24 Measles, malaria, bronchial and diarrheal infections, linked with low calorie intake, produce an interaction of malnutrition and infection that accounts for most infant hospital admissions and deaths. An analysis of 6,543 admissions to the Arthur Davidson Childrens Hospital in Ndola showed measles incidence increasing during the seasonal peak of malnutrition, with 30% of cases occurring among children under a year. The pattern of infant deaths and weaning age malnutrition is a classic example of the interaction with malnutrition on infection in Zambia.

5.25 Recent studies confirm that frequency and content of feeding, rather than timing of introduction, make supplementation of breast-feeding

inadequate. Maize, millet, sorghum, or cassava serve as the base for a porridge (diluted "nshima", the adult staple) that, though introduced early enough (3-6 months), fails to provide enough calories.

5.26 Though little data on knowledge of nutrition exists, the wide circulation of Commission posters over the past fifteen years makes information readily available. A 1981 survey in Sesheke district of western province, a typical deprived rural area, found 69% of women able to identify malnutrition. Twenty-one percent attributed it to lack of food and most of the others blamed sexual indulgence too soon after delivery, an explanation possibly related to the common description of kwashiorkor as resulting from premature displacement of the infant at the breast (Kalumba and Freund, 1982).

5.27 Distinctive consumption patterns have been identified for urban and rural groups and, within rural areas, for subsistence farm families and others buying half or more of their food. Further differences occur between those earning wages for farm work and others employed in towns. Maize meal dominated all diets, providing 60 percent of all calories, with the rural poor consuming even more. In the "cassava belt", coinciding with the deprived subsistence sectors in Northern, Luapula, and North-western provinces, maize is the secondary staple. Maize meal continues to be the major energy source among the urban poor, despite influx of wheat. The new availability of cassava and millet at reasonable prices in urban markets should replace the more expensive maize consumption among the poor.

5.28 Typical diets include a proper balance of nutrients, so that, if families can grow or buy enough food, much malnutrition will disappear. Except for weaning practices, the typical increased sugar and soft drink consumption associated with urbanization, and the nutritionally unfavorable preferences for beer and for breakfast meal, with a calorie cost 50% higher than less refined roller meal, Zambian food habits leave little room for improvement. The demonstrated correlation between urban dental caries, double rural, and "confectionery" consumption reflects the influence of increased sugar intake (Baboo, 1981). Recent elimination of the sugar subsidy (7 kwacha per capita in 1974) should have favorable influence and the inflationary pressures of price decontrol may slow the 20 percent annual growth of breakfast meal sales.

5.29 Government pricing policies for alternative varieties of maize meal, Zambia's "cultural superfood", contribute to infant and other malnutrition by favoring the less nutritious variety. This "nutrition-specific" cause differs from the more general negative influence on food availability that stems from maize production policies. Commercial processing of maize produces "roller meal" and "breakfast meal". The lower extraction rate of roller meal yields a more nutritious product, with 88% of calories and nutrients retained from the raw material, than breakfast meal, with only 60% retention. Smoother texture and lighter color, preferred by consumers, aided by convenient packaging and heavier promotion by millers preferring to sell the higher-margin product, make breakfast meal the higher status item. Sales continue to increase at the expense of the more nutritious roller meal. Breakfast meal sales grew by 20.7% a year

from 1965 to 1979, while roller meal sales rose 3% annually. An FAO expert identified the problem and recommended policies for optimum use of maize meal in 1973, but it remains (Qureshi, 1973).

5.30 In January, 1983, a 2.5 kg. package of breakfast meal sold in Lusaka for k.90. Roller meal is not packed in this convenient size. Twenty-five kilos of breakfast meal cost K. 8.37 while the same quantity of roller meal cost K6.70. A higher differential between the two prices would favor consumption of roller meal, save much-needed maize, and improve nutritional efficiency of consumer purchases. Importance of maize meal in the Zambian diet makes this anomaly a significant contributor to malnutrition. Like the Government's former subsidy and pricing policies that catered to urban preferences for sugar and wheat, the maize meal policy sacrifices nutrition concerns to competing interests.

### C. Nutrition Expenditures and Activities

#### Expenditures

5.31 The 1983 direct budget for nutrition-related activities in Zambia includes only K300,000 for National Food and Nutrition Commission expenses and K10,000 for "running expenses" of the Ministry of Health's two-person nutrition unit. SIDA and UNICEF financing for a national nutrition surveillance project adds another K186,000 clearly linked to nutrition. Salaries of the nutrition unit members and four provincial nutritionists, though not listed separately, also form part of the "nutrition budget," as do the costs of training nutritionists at the Natural Resources Development College.

5.32 The amounts provide little indication of the importance of nutrition-related expenditures and activities in Zambia. Fifteen Ministry of Health nutritionists in the provinces, two hundred home economists in the Department of Agriculture, more than one thousand village level workers from the Ministry of Community Development, and practically all workers in the primary health care program (which includes Preventive Services, Maternal and Child Health, and Family Health Care) devote substantial time to nutrition. The small "nutrition budget" reflects Zambia's unusually effective integration of nutrition with activities of other ministries. Nutrition education, cooking demonstrations, and home food production assistance by non-nutritionists, though not budgeted separately and rarely evaluated, abound in both governmental and private facilities.

5.33 The transportation, logistic, and coverage limitations that constrain effectiveness of health and other rural services also reduce efficacy of nutrition activities. Lack of outreach limits attention to the widely dispersed subsistence farm families who need it most. As coverage and efficiency of other services improves, the scope and effectiveness of nutrition-related activities will also benefit.

5.34 Weaknesses of the health delivery system also prevent national or donated supplementary food from being a significant part of the national nutrition program. Under-five clinics distribute dried skimmed milk "when it is available," which is intermittently and in quantities insufficient for nutrition impact. The wisdom of passing out unaffordable skimmed milk

to rural mothers need hardly be addressed, since distribution is so sporadic that it can be little more than a modest income subsidy. Zambian field workers show a healthy concern for encouraging use of locally produced foods for supplementing infant diets, but no identifiable budget item for their purchase appears.

5.35 Zambia receives substantial food aid, through grants and concessionary loans, from donor countries. It is not programmed in relation to nutrition considerations and should be considered primarily as budget support. Since the aid fluctuates with market adequacy of domestic food production, it dampens likely nutrition impact of output increases. As Zambia approaches "self-sufficiency", commodity assistance will decline, reducing aggregate nutrient availability.

UNDP REPORTED 1980 FOOD AID AS:

Australia - \$626,000 (flour)  
Canada - \$2,941,176 (wheat)  
Germany - 379,523 (wheat)  
Sweden - 4,386,796 (emergency food and other items)  
United States - 12,500,000 concessionary loan for 83,000 m.t. of  
maize 6,000,000 grant for 20,000 m.t. of maize  
EEC - 5,599,547 grant of 10,000 m.t. of grain 2,000 m.t. of  
dairy products

Total \$32,641,419

Activities

5.36 Most nutrition activities in Zambia involve the National Food and Nutrition Commission (NFNC), created in 1968 as one of the developing world's first nutrition coordination agencies. A parastatal organization attached to the Ministry of Health, it brings nutrition concerns to the attention of the agricultural and financial institutions that decide key macroeconomic issues affecting nutrition. The Commission's modest influence on more powerful ministries such as agriculture limits their consideration of the useful nutrition-oriented studies of (e.g.) agricultural and price policies prepared by NFNC staff. Despite this shortcoming, NFNC continues to deliver impressive nutrition work from a modest \$300,000 annual budget for twelve professionals and additional supporting staff.

5.37 The Commission's coordination activities include (a) preparing proposals for, and linking donors in, joint nutrition activities; (b) standardizing professional training and nutrition education messages and materials, (c) assembling and maintaining nutrition information, and (d) assisting allocation of food aid. Starting with the 1971 Survey, although references to nutrition appear in the agriculture and health chapters (cf para. 3.01), in which NFNC served as implementing agency, to current collaboration with SIDA and the Health Ministry in nutrition surveillance, the Commission has performed a useful role.

5.38 The Third Five Year Plan omits improved nutrition from the discussion of national objectives and development strategies, nevertheless official Zambian awareness of nutritional concerns remains measurably higher than in many other countries demonstrated by inclusion of nutrition in school curricula, development of a post-secondary training course at the Natural Resources Development College that graduates 10-15 nutritionists annually, and widespread nutrition education activities.

5.39 Zambian food production and pricing policies continue to reflect primarily the influence of foreign exchange, urban preference, and other concerns than nutritional improvement. Until the Food and Nutrition Commission builds a more effective advocacy role, Zambian food policy will lack even review of opportunities for improving nutrition within these other policy constraints. Higher priority for nutrition goals depends on both more effective advocacy and some lessening of current economic pressures. The Women's Division of UNIP, the national political party would, according to some observers, be an appropriate group to lead efforts to give nutrition goals higher priority.

5.40 The Commission also helped establish twelve "nutrition groups," associations of volunteers dedicated to doing useful things for nutrition. Their activities have included shops to sell nutritious foods at lower prices, nutrition recuperation centers, and many different nutrition education efforts. Although current economic conditions have reduced the groups' fund-raising and other activities, and the Commission's support of them, there remains a promising network that, with help, could play a useful role in nutrition advocacy and action. Their existence indicates effectiveness of the Commission in sensitizing Zambians to nutrition problems.

5.41 The Commission works closely with other divisions of the Ministry of Health, primarily on nutrition surveillance and nutrition education. With SIDA and UNICEF help, the Ministry has begun development of a national surveillance system that will include use of weight charts in MCH clinics and arm circumference measurement by volunteer primary health care workers in surrounding areas. Although Zambian use of weight charts began with David Morley's work in the late 1960's, the Ministry has never achieved the organization and coverage required for a useful surveillance system. The transportation and other logistic problems that hamper Ministry operations also affect surveillance and the system is unlikely to provide useful data to the central ministry for several years. Designers of the system seek to decentralize processing, analysis and response, which should accelerate feedback and increase use. It is not yet clear what special reactions review of the data may generate, but the surveillance system's multiple purposes (education, clinical monitoring, evaluation) still justify the effort.

5.42 The weight charts form part of the Ministry's nutrition education program, which also includes special attention to mothers with children showing unsatisfactory growth. Zambian posters and other materials, developed by the Commission, compare favorably with those of most developing countries and circulate widely. Some observers criticize

Ministry staff for overemphasizing protein consumption, but the technical quality of the materials is adequate. Poor supervision of health workers limits effectiveness and there is some evidence that attendance at clinics diminishes after completion of immunizations, though regular weighing should continue longer. Both of these problems need attention, but a good basis for effective nutrition services in primary health care exists.

5.43 In addition to weak administration of vitamin A prophylaxis and oral rehydration therapy, the major gap in nutrition services arises from absence of any intermediate step between hospital care for malnutrition and routine treatment at health centers or under-fives clinics. Rehabilitation centers, an accepted intermediate treatment level (Latham, 1979, p.123) receive little attention from the Ministry. Innovative approaches to rehabilitation have existed in Zambia since the late 1960's, including a private "village" designed to train mothers under typical rural conditions (Koppert, 1972). The Ministry's few rehabilitation facilities, all attached to hospitals, vary widely and are not easily distinguishable from conventional clinic services.

5.44 This omission leads to a more serious problem because the clinics offer nothing but "home visits and nutrition education" when a child grows unsatisfactorily. Should it relapse further, only expensive and often ineffective hospital confinement remains. Malnutrition admissions at the Davidson Children's Hospital in Ndola, despite impressive clinic services, were: 1977-78 - 853; 1978-79 - 1,042; and 1979-80 - 1,080, indicating continued severity of nutrition problems and inadequacy of current services to prevent them. Zambian experience with supplementary feeding at clinics suggests that separate recuperation facilities may be a cost-effective alternative or adjunct to expensive care and rehabilitation at hospitals.

5.45 Zambia also has experimented with formulated nutritious foods. The World Food Program assisted the Ministry of Health by providing a vitamin and protein supplement (VPS) for distribution to children identified as growing poorly. The 5-year \$610,000 grant ended in December, 1980, and WFP has rejected applications for renewal. Government failed to assume financial responsibility for continued distribution as promised and performance during the grant period proved disappointing, with maximum intermittent coverage only 30% of eligible children. Transport and other difficulties led to irregular distribution and little evidence of impact. Treated as medicine, VPS also failed to respond to the calorie deficiencies most common among infants, but poor distribution made it impossible to test efficacy.

5.46 Zambia's next effort, a processed mixture of soy, milk, and corn flour, called NUTRIFEX and developed by the National Council for Scientific Research, demonstrated better infant growth than a hospital diet when tested (Raghu, 1980), but encountered other problems. Scarcity of required soy prevented processing in quantity. With German assistance, the Council then tried substituting wheat germ for soy only to discover, after developing and testing a new product, that this, too, was not sufficiently available. NUTRIFEX, dormant at present, clearly could not be produced at a cost affordable by malnourished families and no subsidy sources were ever

identified. It could, at best, serve only urban sites since neither the Health Ministry or parastatal distribution systems reach the rural poor effectively.

5.47 On the basis of these results, the National Food and Nutrition Commission discourages regular supplementary feeding with donated food. The emphasis is on emergency relief rather than remediation or prevention of malnutrition, which would require closer targetting and more selective distribution of relatively modest amounts of food aid. However, such reprogramming toward nutrition goals could make food aid more cost effective as a development resource.

5.48 The Ministry of Agriculture, Ministry of Community Development, and other agencies carry on a limited number of programs with nutritional implications. Volunteer nutrition groups have been established in a number of cities. Encouragement of home gardens, a promising activity, receives some attention but deserves more. In urban squatter settlements, gardening is promoted and most families are eager to plant crops if land is available.

5.49 Though not primarily a nutrition program, the Ministry of Agriculture's Adaptive Research Planning Team Project is intended to "institutionalize farming systems research in Zambia." Addressed primarily to the needs of small farmers, this project will eventually have a farm systems agriculturalist and a farm systems economist in all nine Zambian provinces, with one or more rural sociologists supporting them. The Project's director now seeks a nutritionist to integrate nutrition goals into farm system plans. This research direction responds well to the requirements for improving consideration of nutrition in agriculture and could have useful consequences throughout the Ministry.

5.50 The Ministry of Agriculture's new concern for the production and marketing of millet, sorghum, and cassava also has important implications for nutrition. Farmers have responded well to price incentives in the past and, if the new prices are attractive enough and NAMBOARD marketing improves, food available for urban malnourished and income of rural families could increase significantly.

5.51 Zambia's nutrition-related program efforts address many important aspects of nutrition. They are, unfortunately, so poorly funded and so limited in scale and performance that their efficacy remains untested. Although the causes of malnutrition are rooted in Zambia's economic circumstances, reasonably good implementation of an explicit and coherent nutrition strategy could at least cushion the severe nutrition consequences likely to be experienced by the most vulnerable.

5.52 Recent policy changes reducing reliance on maize by encouraging production of millet, sorghum, and cassava may have favorable nutrition effects, particularly on rural populations, if prices offered producers are high enough. The lack of access to and from the market in off-line-of-rail provinces must also be addressed if expected production increases are to reach consumers.

5.53 The Ministry of Health's reliance on hospital care for the acutely malnourished rather than on preventive measures is both costly and ineffective. Most undernourished children are not afforded appropriate nutritional interventions, with the result that there are more acute cases than necessary, cases which require costly hospital care, and often result in death. Sufficient attention has also not been given to developing such alternatives to hospital care as oral rehydration, and nutrition rehabilitation.

5.54 If the Ministry of Health institutionalizes rehabilitation services as part of primary health care through both government and the private sector, and uses some ingenuity in varying them to meet the diverse conditions and needs, savings from reduced hospital admissions would more than offset the costs. The ministry's long-standing commitments to expensive hospitals impede adoption of more useful preventive services, but the current PHC emphasis offers new opportunities. Although integration of nutrition into primary health care already includes impressive education and surveillance work, the need for more systematic attention to nutrition rehabilitation remains. The Dutch-sponsored Food Strategy Study, Nutrition Annex, includes a similar recommendation.

5.55 The feasibility of some other important nutrition activities depends on evolution of the health care system. The trivial costs of vitamin A tablets (6 cents for the 3-year treatment), for example, emphasize the great potential of an effective health services delivery system. If the Ministry served Luapula Province well, and the tablets arrived regularly, vitamin A prophylaxis could show dramatic impact on the serious eye problems seen there. Oral rehydration therapy for diarrheal disease, another low cost response, offers similar promise but depends equally on effective training, supervision, and logistic support not yet available in the health system. Strengthening the health services system requires long-term attention, but short-term initiation of individual services is feasible and and be encouraged.

5.56 Measles eradication and malaria control, essential to improved health and nutrition and frequently more efficient than increased food supply, suffer from the same deficiencies. De-worming and iron supplements, also cost effective, depend on improved health services. Strengthening the health system is a "nutrition intervention" of high priority in order to increase the comparative efficiency of options available. Nutrition surveillance, useful for clinical, educational, and planning purposes, should be institutionalized fully before taxing the system further, since it will assist eventual selection of preferred interventions.

5.57 The VPS and NUTRIFEX experiences raise questions about the role of processed weaning foods and similar programs in Zambia. The identification of low-cost, home-processable mixtures, based on the porridges now given to weaning infants, offer more promise than commercial weaning foods. The wide availability of fish and groundnuts, for example, should permit both rural and urban mothers to prepare more adequate weaning mixtures at home or at local millers. Introducing the idea of special

foods for babies, and encouraging the frequency of feeding required to offset bulk problems, already part of widespread nutrition education, needs continued attention.