ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

SCHOOL OF INFORMATION STUDIES FOR AFRICA

A COMPUTER-AIDED SYSTEM TO SUPPORT MANPOWER REQUIREMENTS ANALYIS IN THE HEALTH SECTOR AT THE LOCAL GOVERNMENT LEVEL IN TANZANIA

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN INFORMATION SCIENCE

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A Computer-Aided System to Support Manpower Requirement Analysis in the Health Sector at the Local Government Level in Tanzania

by

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To my Lord Jesus, and my aunt Mariam Mungwabi, with love.

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ABSTRACT

In this study an investigation of the existing information facilities and information flow patterns for health manpower requirements analysis in Singida District Council has been carried out. A survey conducted for the purpose of understanding the existing information facilities in the chosen area has revealed the weakness of the existing information facilities, and observation has led to pinpoint the means of improving and strengthening the existing information support facilities for manpower requirement analysis at the Local government level.

The use of questionnaires, interviews, observations and literature survey on health manpower have revealed the information needs of health manpower planners and decision-makers at the local government in Singida District. Findings from the users groups are given. A computer-based information support system which is envisaged to be more efficient has been proposed based on those findings. Four prototype databases have been designed using Mico-CDS/ISIS which taken together are expected to provide all necessary information required by health manpower planners in Singida District. These include specialised database for health institutions, health staff, and health projects. An integrated database for bibliographic records has also been designed.

The prototype information support system has been proposed to work on a Local Area Network (LAN) located within Singida District Council's health departments. Measures to be taken for implementation of the prototype information support system and its further improvements are suggested.

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LIST OF ABBREVIATIONS

HA Health Assistants

LA Library assistants

M.A. Medical Assistants

M.W. Midwife

N.A. Nurse Auxillaries

R.M.A. Rural Medical Assistants

SAREC Swedish Agency for Research Corporation

SISA School of Information Studies for Africa

CHAPTER 1

INTRODUCTION

1.1. PROBLEM STATEMENT AND JUSTIFICATION

1.1.1. Statement of the Problem

In Tanzania, for more than 15 years health has been one of the priorities in all socio-economic development plans, including the first five year national development plan 1964-1969, the second five year national development plan 1969-1974, and the third five year national development plan 1976-1981, the results of which raise standard of the country's health status. In the first five year Development Plan for instance, Tanzania set three Ojectives: "first, to raise income per head from T.shs.152,000.00 in 1964 to T.shs.320,000.00 by 1980. Secondly, to have fully qualified Tanzanians filling government posts by 1980. Thirdly, to lengthen the life span of the Tanzanians" (Nyerere, 1965). In the Second five year Development Plan it is clearly stated that "The Second plan will increase emphasis on the development of preventive and rural Health Services" (Hence, 1969). Thus there is no doubt that the government is deeply concerned with development of the Health Sector.

The health of individuals, families and community depends upon a number of factors: existence of good sanitation systems, communication systems, transport, purchasing power, etc., including environment. Improvement in socio-economic situation of the citizens depends on the information that is made available to the Government in general and to the Health Sector in particular.

The maternal and child health services including family planning,contribute to socio-economic development in the country. Promoting and protecting children's health as well as health of child bearing age women, means building the country's future and guaranteeing future generation the strength of good health which is indispensable to socio-economic development (Quenum, 1982).

The objective of the expanded immunization programmes to reduce morbidity and mortality rates in Tanzania, the campaigns aimed at controlling major endemic parasitic diseases such as malaria, schistosomiasis and onchocerciasis launched in 1961 after independence, and projects ensuring adequate supplies of safe water and appropriate sanitation systems indicates how health sector has been contributing to the fulfilment of the Tanzanian people (Ministry of planning, 1990). The promotion and protection of the people's health is of paramount importance to sustain economic and social development hence contributing to better quality of life.

The government of Tanzania has realized the importance of the Health sector. It has increased Health budget from six percent in 1980's to almost eight percent in early 1990's. Health services have been decentralized in the country in order to reach the majority of its population, which lives in rural areas. Although there are private and voluntary agencies who are currently providing services, provision of health services is mainly the task of both Central and Local governments. Whereas the former is concerned with the urban areas the latter render health services in rural areas (John, 1964).

Although the government has given the appropriate attention to the health sector , the effectiveness and impact of the health services in Tanzania have been hampered by a shortage of skilled health manpower which can coordinate and supervise health programmes. Continuing search for human well-being, a goal which is greatly desired but rarely achieved, especially in a developing country like Tanzania, sets manpower, in this case skilled and knowledgeable personnel in health to address the problem of the Country in this sector.

So far, there is no complete and integrated information support system for manpower requirement analysis especially at the local government level. At Local level health manpower planning activities are carried out by heads of health delivery institutions such as, health centres, Village health Committees, Medical Officers, and District Council. Information is useful at all decision-making levels for such activities.

Health files found in health institutions are valuable sources of health manpower planning requirements, but are not entirely standardized and frequently fall short of accessibility to users (Mutombo, 1984). In most cases Health personnel files containing data is fragmentary, lacks uniformity and is characterised by over-stringent regulations protecting its confidential nature. This is at times a hindrance to in-depth manpower planning requirement analysis and in certain cases it delays action. Several factors limit the effectiveness of these rudimentary health information systems. Lack of coordination, insufficient information, not analyzed, analyzed too late to be useful for decision-making, are the major features of the present health information facilities at the local government level. Therefore, lack of an integrated and special purpose

information support systems in the health sector for manpower planning requirements analysis is a major problem area to efficiently managing health manpower planning at the local government level in Tanzania.

1.1.2. Justification of the Study

The United Republic of Tanzania's approach to meeting the health needs of the majority of its population must be considered in the light of constraints imposed by its lack of financial resources and manpower (WHO, 1975). The situation is worse at the Local government's primary health care. One of the the aims of primary health care in Tanzania is for as many services as possible to be provided by Medical assistants, Rural medical aides, Public health nurses, Midwives, etc., working in teams. Many of the functions of doctors are assigned to these category of health personnel in rural areas. In addition to diagnosing and treating common conditions with a simple measures, identifying pregnant women and ensuring that they deliver safely, identifying malnourished children, and providing health education in the community, health personnel mobilizes the communities for perventive action such as building of latrines , wells, and roads. However, Attempts to persuade health personnel to serve in the poorer areas of the Country have failed, largely because of lack of amenities such as electricity, water, and schools in rural areas. Consequently, health situation at the local government level is still far from ideal in terms of coverage and quality, despite the attractive and varied innovative features of Tanzania's health services.

Nutritional diseases, acute respiratory diseases, measles, diarrhoea, malaria, nutritional diseases including malnutrition, an complications following pregnancy and delivery are still big problems in rural areas, because of either shortage or maldistribution of the present health personnel.

The nonexistence of a complete and integrated information support system to assist in determining manpower planning requirements prompts health planners and decision-makers to rely on imprecise and sometimes non-analyzed information. Lack of coordinated information system for manpower planning requirements hampers the efficient and effective acquisition, analysis, supply and use of information. Imprecise information produced due to lack of guidelines concerning data to be collected, particularly in rural areas, or due to the large workload of those dispensing health care, who are asked for too many reports which appear not to be used, and lack of the analyzed information because it is over-abundant and does not always meet the real needs, are some of the factors which make the present Health manpower planning systems ineffective.

It is quite evident that there is a need for an information support system for manpower requirements which would respond to local needs, and would provide selective and relevant information to health manpower planners and decision-makers within the framework of the local government health system. This study therefore, is an attempt to create a computer-aided information support system for health manpower planning requirement analysis at the local government level in Tanzania. It aims to make use of information technology which has already been used in banks and

other financial departments for accounting purposes in the country, and thus will become an important tool in promoting the development of information systems at the level of Local government in Tanzania.

1.2. OBJECTIVES

1.2.1. General Objective

The general objective of this study is to develop a computer-aided information support system that would assist health planners and decision-makers in manpower planning activities, at the Local government level.

1.2.2. Specific Objectives

In order to achive the general objective as stated above, this study aims to achieve the following specific objectives:

- To identify the information needs of the health-planners and decision-makers for health manpower requirements at the local district level;
- To identify the way health-planners and decision-makers carry out their tasks at the District level;
- To identify the existing health information flow pattern at the Local district level;
- To identify the problems of the existing health information facilities at the

District level; and

- To design a prototype information support system.

1.3. METHODOLOGY

1.3.1. General Method

The general method which has been chosen for this research is the survey method. This is suitable for the collection of reliable precise and valid data for this particular study. A survey of Singida District was made whereby 21 health Units were visited and some of the health officers and district administrators were met with the researcher. It has been previously stated that local governments are much more concerned with the provision of the health services in the country's rural areas.

Singida District is representative of such areas for it is located in a region of central Tanzania where there are no big settlements. Like many rural areas found in the country, Singida District is characterized by poor social services, including health, a poor communications system, poor information systems and poor living conditions generally. Therefore, it is expected that for the study which involves rural Tanzania the chosen district is suitable. Though Singida District Council has few health institutions (41) and the number of health personnel (255) for the moment, the Council adds health institutions every year. Morever, there are other districts in Tanzania with

large number of both health personnel and institutions but they were in order to minimize cost. The solution proposed remains outstanding for all District Councils in Tanzania.

1.3.2. **Specific Procedures**

For the purpose of this work a combination of techniques was adopted in order to facilitate fast collection of data within the limited time available. Questionnaires, interview, observations and literature survey are the specific methods which have been used for the collection of data.

1.3.2.1. **Questionnaires**:

Three types of questionnaires were designed based on World Health Organisation. One for collecting health institutional data, the second was designed to collect socio-economic data and the third for collecting manpower data. All types of questionnaires are recommended by World Health Organisation for the purpose of collecting information for health planners, but have been modified to suit this study. Questionnaires for health institutional data were distributed among the heads of 41 health institutions in the district. The idea was to acquire data on institutional service load, utilization, facilities, services rendered by each institution and the existing manpower. Head of health institutions are the right people since they have those data at hand from their files. Health institutional data were collected for creating databases for profiles of health institutions.

Questionnaires for the socio-economic data were taken to the district planning and development unit and were completed by the respective staff. Socio-economic data are particularly useful for describing the size and composition of the population within health system planning area. The third questionnaire for health manpower data were taken to the district medical officer, questionnaires distributed were hundred and five to health personnel of seven health centers and dispensaries in order to cross-check the information obtained from the office of the district medical officer. Manpower data are useful for creating a database for profiles of doctors and identification of manpower shortages in the district. Samples of the above questionnaires are in the appendices.

1.3.2.2. **Interview**

Interview schedules were arranged for the district Health officers, personnel officer, District director and district councillors most of whom did not wish to go through questionnaires, due to some circumstances such as limited time. These are the people involved in planning and decision-making at the local level. The interview questions are given in Appendix 2.

The interview with the district-personnel officer and health officers was intended to identify:

- The extent that information is a vital resource for health manpower requirements planning;
- The present health manpower requirements at the District level; and
- Information needs of health planners and decision-makers

The interview with the district director and councillors was intended to elicit facts on the feasibility of establishing the computer-aided information support system in the district.

1.3.2.2.1. Discussions.

Informal communication was made between the researcher and the members of the general public in Singida District. Discussions were aimed at understanding their views related to the prevailing health care situation and its problems. Some of the problems discussed relates to health facilities, drugs, beds, ambulance cars, and health personnel. The majority of the members of the general public selected randomly indicated that shortage of health personnel, drugs, and beds are the main problems encountered by the District Council. Lack of ambulace cars and facilities was felt by small population.

1.3.2.3. **Observations**

Observations supplemented the findings obtained as a result of interviews, which helped to assess the type of information needed by health planners and decision-makers for manpower requirements. The investigator attended local government meetings in order to observe their decision making processes. District Council meetings. Health Committee meetings and Planning committee meetings were attended because these are the bodies which make decisions concerning health matters.

1.3.2.4. **Literature Survey**

The following information systems were searched as part of the literature survey:

- Library and information sources in Tanzania were used to collect basic data about Tanzania: Country's profile, political history, socio-economic situation and local government health services.
- Library and information sources in Addis Ababa University Libraries including Medical Library, provided various documents about data acquisition and analysis for health planners, health planning information and guides to data for health systems planners were consulted.

These documents highlight the kind of information needed by health planners.

- ECA Library-Addis Ababa: This library was consulted in order to collect information about information systems for the management of National Health Programmes and whereby guidelines and strategies for the development of health information systems are made available.

1.4. FACILITIES AND TOOLS FOR SYSTEM DEVELOPMENT

It may be noted here that, for the purpose of developing the prototype information

support system, the following facities and tools have been used:

1. The network facility available at the school of information Studies for Africa (SISA);
2. The Micro CDS/ISIS software for the creation of the databases;
3. The ABNCD (Abebe et al 1992) integrated database approach; and
4. SISA interface.

1.5. SCOPE AND LIMITATIONS

1.5.1. Scope:

The study focuses specifically on the information support for the health manpower requirements at the local government level. The research conducted at Singida district in Tanzania has however, implications for other districts in the country.

1.5.2. Limitations:

The limitations of this study are three fold. First, it was found that health presonnel files are one of the most valuable sources of health personnel information for the management of health services in the district. However, they are characterized by over-stringent regulations protecting its confidential nature. This was a hindrance to the collection of data on manpower and health institutions in the District.

Secondly, data related to educational qualifications and experience of personnel, which were supposed to be acquired from both the district health unit and health

employees, could not be cross-checked because some employees didn't want to return questionnaires. The fact that the government of Tanzania is intending to reduce the number of its emloyees in the governmental organisations, including local governments, worries health employees. This explains their unwillingness to disclose their qualifications; They fear that they might be fired from their jobs. Information on Educational qualifications is useful for creating database on profiles of the health personnel in the district.

Finally, because of the transportation problem, the researcher had difficulty to travel to field where health units are located. This has forced researcher to rely secondary sources of data which are more general especially for the collection of data after the period of fieldwork.

CHAPTER TWO

BACKGROUND INFORMATION ABOUT THE COUNTRY

2.1. COUNTRY PROFILE

United Republic of Tanzania consists of mainland Tanzania and the Island of Zanzibar. It lies immediately South of the equator and covers an area of some 950,000 square kilometers. In East of Tanzania there is the Indian Ocean, whereas in the North it is bordered by Uganda and Kenya, and in the south, by Mozambique, Zambia and Malawi. In the West of the country is neighboured by Zaire, Burundi and Rwanda.

Commonly, the country is subdivided into six agro-ecological zones: (i) the coastal zone, (ii) the arid lands, (iii) the semi-arid lands, (iv) the plateaux, (v) the southern and western highlands, and vi) the northern highlands. However, in terms of agricultural potential, these may be grouped into three broad categories: (i) the highlands and plateaux which are high potential areas with an adequate rainfall and fertile soils, (ii) the coastal zone and semi-arid lands which is an intermediate potential area where capital investment and human effort can create fairly favourable conditions, and (iii) the arid lands which are the low potential areas with unfavourable conditions for agriculture (Mwinyi, 1989).

Administratively, the country is subdivided into regions and districts. In 1994, there were 25 regions consisting of 94 districts. Due to constraints such as unfavourable agro-ecological conditions, lack of investments, limited availability of fertilisers, and tse-tse flies, only some 5% of the total surface is more or less permanently cultivated. The most fertile land is densely populated, intensively used and subject to degradation. Most of the land is used for grazing (50%) or is classified as forest and woodland (43%) (Netherlands Development Cooperation, 1994). Fuelwood is the most important source of energy in Tanzania. This leads to serious de-forestation causing environmental degradation around settlements. Variation in altitude and population pattern distribution set high demands on the communication system which is poorly

developed. There are about 3600 km of railways; and only 3700 km of its road network are bitumised. Generally many roads are in poor conditions. The country has four Harbours: Dar es Salaam, Mtwara, Tanga and Zanzibar of which the former, a natural deep-water harbour, is the largest in the country.

2.2. POPULATION

The country's population is predominantly rural, and in mid-1993 it was estimated to be 26 million. The annual growth rate is 2.8% (some sources even mention 3.4% between 1960 and 1990) (Netherlands Development cooperation, 1994). Population density amounts to 26 persons per square kilometer with uneven distribution. The more densely populated parts are those where agro-ecological conditions are favourable. The urban population is only 2.6 million (10% of the total population of the Country) of which 50% are living in the capital city, Dar es salaam. The majority of Tanzanians are Bantu but there is small community of Asians of Indian origin who dominate the trade sector. Though there are many ethnic groups, no one is dominant by number, and government policy and common language of Swahili are important factors which have been preventing ethnic strife, which is the scourge of so many African countries like Burundi and Rwanda.

2.3. POLITICAL HISTORY

The United Republic of Tanzania was formed in 1964 when an act of a union was signed between Tanganyika and the Island of Zanzibar which obtained their independence in 1961 and 1964 respectively. Before colonialism, Tanganyika was a collection of tribal entities. It fell under German rule in 1885 but it was mandated to the British by the League of Nations in 1920 after world war I. In 1946, Tanganyika became a UN-trust territory to be prepared by British for independence. The Tanganyika African National Union (TANU), formed in 1954, was the main political party and acquired the support from both cooperative movements and trade unions. This enabled TANU to mobilise millions of people and to foil British attempts to create

tribal chiefs through conservative leaders. Tanganyika achieved its independence in 1961 with strong support from all the masses of people. TANU's leader, J.K.Nyerere became the country's first President. High degree of political consciousness, and Swahili as the National language, as well as broad support of the political party (TANU), were some of the important factors that contributed, during post-independence period, to the political stability and unity with a defacto one-party state.

TANU's adoption of the Arusha Declaration in 1967 ushered the grip of party and the state on the economy of the country. It was followed by recurrent decentralization exercises which led to the formation of the local governments. Further attempts to strengthen the administration at regional and district levels were supported by the Village and Ujamaa Act of 1975, which made villages the basic units of administration and launched village governments with executive powers. The village councils took over the responsibilities of cooperative societies in procuring and storing crops. Crop authorities, which brought agricultural marketing entirely under government control, were eventually established (Mwinyi, 1989). Having put all the main sectors of the economy, the constitution was amended in 1975. Party's supremacy was formally established and principles of Socialism and self-reliance were included officially. The principles of socialism and self-reliance, were confirmed in 1977 following the merger of TANU and Zanzibar's Afro Shiraz party into the revolutionary party commonly known as CHAMA CHA MAPINDUZI.

However, Tanzania had to return to a market-oriented economy following the 1970's and early 1980s socio-economic crisis. This was followed by a voluntary stepping down of President Nyerere in 1985, to be succeeded by Hassan Ali Mwinyi. Ruling party was stripped of its rule of monopoly constitutionally in 1992, paving a way to multi-party politics. In 1993, several political parties including NCCR-Mageuzi, CHADEMA, and PONA were officially approved and registered by the registrar of the political parties.

2.4. ECONOMIC SITUATION

In the period between 1961-1967, the country experienced a high economic growth rate averaging 6% per annum. After the Arusha Declaration this declined markedly. During the period between 1967-1973, GDP growth declined to an average of slightly more than 4.0% per annum. The rate of growth slowed down to about 2.3% per year during the period between 1973-1978. Between 1979 and 1985, GDP growth average reached around 1.5%, a significant economic decline in per capital terms (World Bank, 1989).

It is believed that the Economic Recovery Programme (ERP) enhanced an increase in economic growth. Again, official statistics indicates a growth rate of around 4.0% for the period between 1986-1992 (Doriye & Wuyts, 1992). The sectoral composition of GDP indicates that agricultural sector dominates the country's economy (Table 2.1.), contributing more than 60% to GDP in 1991 and about two-thirds of the exports. Of the total production, arable agriculture land represents 80%. Small scale farmers occupy about 90% of the cultivable area and farming is mainly traditional giving low yields. The main food crops include maize, cassava, millets and potatoes. Main cash crops are coffee, cotton, pyrethrum, tobacco, sisal, tea, and cashew-nuts, estimated at over 75% of agricultural export earning. Production of food crops has shown steady improvement since the mid-1980s. Growth of agricultural output is attributed to several factors, such as (a) the economic liberalization, (b) increased producer prices, and (c) favourable weather conditions. The livestock sector is largely in the hands of small-scale producers though there are also state ranches which supply milk to the urban areas. Animal husbandry contributes to about 15% of agricultural production but recent figures, showing performance of livestock, has been disappointing (World Bank, 1989).

The industrial sector is composed mainly of food processing and imports substitution industries, oriented primarily towards manufacturing for domestic consumption. The principal industries that exist include textiles, breweries and tobacco. Following the Arusha Declaration and state investments in 1960s and 1970's, the public sector was

largely represented throughout industry but parastal enterprises are currently sold to the private companies due to their failure to run in profits. Industries suffered from severe shortage of foreign exchange and many factories were closed down or suspended operations during the 1980s. The country has abundant natural resources which may offer ample opportunities for exports, the development of local industry and energy resources in the long run (World Bank, 1994).

The sources of foreign exchange earnings include minerals such as gold, diamonds, salt, Kaolin, gypsum, gemstone etc. There is good potential for developing agro electricity and natural gas. Coal and iron ore deposits have been found recently. The mining sector has shown signs of significant recovery in 1990s, especially gold, with an increase from 50kg per annum in 1986-1989 to 3000kg in 1991 (NDC, 1994).

Weak economic performance in various sectors since the mid-1970s mirrored stagnation of exports and GDP, and affected the country's balance of payments and debt situation. At the end of 1991, total external debt stood at US$6,500 million (NDC, 1994). Production of Diamonds and coloured gemstones has increased since 1986. The tourist sector is also waxing with growth receipts totalling US $63 million in 1991 (EIU, 1993/94).

Table 2.1: Sectoral Origin of Gross Domestic Product For selected five years (in percentages).

SECTOR	1970	1976	1982	1988	1992
Agriculture, forestry and fishing	48.4	41.8	50.3	59.7	61.4
Mining and quarying	1.3	1.0	0.5	0.3	1.6
Manufacturing	10.1	13.0	7.3	6.1	4.6
Electricity and water	1.0	1.0	0.5	1.1	1.6
Construction	4.9	4.1	3.2	2.2	4.3
Trade, hotels etc.	12.7	13.1	12.0	12.0	12.3
Transport and Communications	7.4	6.8	6.5	5.5	5.1
Financial Services	3.0	9.0	9.3	5.8	4.7
Public Administration	11.2	10.2	10.4	7.3	5.5
GDP (Tsh million)	8215	21652	52546	14086	698024

Source: Economic planning report, 1993.

2.5. SOCIAL SITUATION

Tanzania is one of the world's poorest countries in terms of both GNP per capita and purchasing power. It was estimated that 40-60% of the rural population lived below the poverty line in 1988 (NDC, 1994). This implies that their incomes were below World Bank index of 300 dollars per GNP's per capita (World Bank,1994).

However, in terms of the UNDP's Human Development Index, Tanzania ranks higher than 33 other countries-because of its expansion of community services after independence. Tanzania has made significant achievements in health and education sectors.

2.5.1. **Education**

According to official figures, 93% of men and 88% of women were literate in 1986, and more than 90% of children aged between 7-13 attended school. However, their percentage has fallen since 1989, partly because of the decline in the quality and access to primary education. The percentage of children attending school was just below 50% and the adult literacy rate was estimated at 65% in 1990 (Materu, 1995).

In the period between 1970 to 1983, a proportion of total government expenditure on education was roughly at 12.5%. In the period between 1985-1992 it dropped to 6% (Materu, 1995). The government budget for 1992/93, showed some improvements in the allocation of resources to education which was around 8% (NDC, 1994).

2.5.2. **Health Services and Health Indicators**

By the end of the 1970s, it was estimated that three quarters of the population was living within 5km of the nearest health institutions. There has been a major improvement in average life expectancy from 41 years in 1960 to 54 years in 1990. Likewise, mortality rate among children up to the age of five had dropped from 248 per 1000 in 1960 to 170 in 1990 (NDC, 1994). The functioning of the health system has been seriously affected by the severe economic crisis of 1980's. Health sector budget fell from over 7% in the mid-1970's to less than 6% in the second half of 1980's. In the 1992/93 budget the share has been increased to 8% (Mosha, 1994).

The Ministry of Health is responsible for providing, directly or indirectly, a balanced curative and preventive health services for the whole country. However, the Central government has never provided all the services. The private agencies and local governments have developed a network of health institutions such as Dispensaries, Health centres, Clinics, and Hospitals.

2.5.2.1. Central Government Health Services

The Government Health Services are organized on the three-tiered administrative structure found in the government departments: the ministry, the region, and the district. At the top, the health division of the Ministry of Health is headed by the Chief Medical Officer. Certain special services are supervised directly by medical headquarters: medical training, the pathology and pharmaceutical services, psychiatric and certain special units. The bulk of the personal and environmental services, provided by the central government directly, are delegated to twenty one regional medical officers (Titmuss et al, 1964). Regional medical officers, are responsible to the chief medical officer for the day to day organization of health services within their respective regions. The average region is divided into three to five districts, each of which is supervised by a district medical officer accountable to the regional medical officer. The administrative headquarters of a district are usually located at a hospital supervised by the district medical officer, but there are special headquarters for the districts which do not have hospitals. District medical officer is also expected to supervise all the health institutions in his area which are under the Local government. Some of these districts are considerably large in size. It is not suprising that the

district medical officer, who often is in clinical charge of the hospital in the area, fails to perform his supervisory tasks effectively. Moreover, during the rainy seasons, communication becomes difficult; and a lot of time is to be spent in travelling to this Districts, parts of which are inacessible by road for a couple of months.

The government maintains 149 hospitals in the Country, of which two are in Dar es salaam. The 21 hospitals situated at the regional administrative headquaters are known as Regional Hospitals, although most of them are similar to the District Hospitals except that the former are larger, have more facilities, and staffed by more doctors (5-10 Doctors including one or two specialists). Most of the hospitals set a number of beds for maternity cases and for cases of infectious diseases. About one-third of the regional and district hospitals make special provision for tuberculosis patients. The government also maintains two mental hospitals located at Dodoma in the central region, with a combined total of 992 beds. One of them is Mirembe Hospital, with 746 beds, which accommodates both acute and long-stay cases. The other one is Isanga hospital, with 246 beds which accommodates patients who are referred for psychiatric treatment through the courts on criminal charges. These hospitals are directly under the control of medical department of the Ministry. The central government is responsible for three other special hospitals: Kibongoto Hospital for tuberculosis patients on the slopes of Kilimanjaro, and two Leprosy hospitals, one in Eastern and the other in Southern Highlands regions. Unlike mental hospitals which are administered directly by the Ministry, these hospitals are administered through the regional hospital system.

There are other five referral sophisticated consultant hospitals, which serve the whole country. These are Muhimbili, KCMC, Bugando, Mbeya, and Ocean Road. The doctors employed by central government have recently been allowed to run their private practice following the economic hardships faced by all government employees.

The government has been pressurised by the IMF and World Bank through the so called Economic Recovery Programme to terminate offering free medical services. However, the government is still subsidizing some of these services, especially in regional and referral hospitals.

Environmental health services had been fully separated from the medical health services since the early twenties. There were in fact two separate branches of health services: the medical branch and sanitation branch. Doctors in government service were seconded for duty as either medical officers or sanitation officers. Gradually these two branches have been brought together under the Ministry.

At the regional level, responsibility for the environmental services falls upon the regional medical officer who has one or two inspectors on his staff, whose task is to supervise the environmental health of the whole region. Meanwhile, the supervision of environmental health at the district level is the responsibility of the assistant health inspector who is generally based in an office in a township or large settlement. His work consists chiefly of health information and education. Vaccination campaigns are also carried out by the health inspectorate. The only vaccine which is widely used is that for small pox. In addition, the government provides special units which are administered centrally, to deal with particular aspects of public health work. These

include epidemiology unit and units concerned with sleeping sickness, health education, nutrition and port Health. The most important in terms of size is the epidemiology unit based in Morogoro. The work of epidemiology unit consists primarily in the organization and supervision of mosquito control.

2.5.2.2. The Private and Voluntary Agencies Health Services

There are many private practitioners who provide standard services comparable to those rendered by the government, but most of the private health institutions are located in urban areas. The tendency accentuates the gap between life in urban and rural areas. Private practitioners are required to obtain a licence from the government for a substantial fee. This fee may go as high as up to T.shs. 55,000 per month. Private accommodation for in-patients exists in all regions of the country, but little is known about these health institutions as no register is maintained.

At least twenty-one separate voluntary medical services agencies operate in Tanzania. The number and variety of these agencies present many difficult problems of developing an integrated service. Health institutions are supervised by their own parent organizations. There is little co-ordination among the voluntary agencies themselves, or between the voluntary agencies and the public sector. A Missionary Medical Advisory Committee exists to foster medical co-ordination centrally, between the representatives of the agencies and

representatives of the government but the decisions of this body are in no way binding on individual agencies. At present the voluntary agencies are assisted by the government under three forms: staff grants, training grants, and additional grants. Staff grants account for almost 2/3 of total grants provided to a Voluntary Agencies. These grants are provided on the following conditions:

i) that the medical unit, must in the view of the Ministry fulfil an acknowledged need in the area;

ii) maintains an adequate standard of building and equipment; and

ii) It employs an adequate number of qualified staff.

Training grants are rendered in the form of a lumpsum for the qualifying students. This varies from T.shs.50,000 for a health nurse to T.shs.95,000 for a medical assistant. More nurses and midwives are trained in these voluntary institutions than in government schools. Additional grants are given according to the number of beds approved for this purpose by the chief Medical Officer. Therefore, government grants-in-aid represent an important part of the total income of the voluntary health institutions. Another considerable source of fund comes from patients' fees. No information is available on the amount of grants which voluntary agencies receive from abroad in form of money or goods.

2.5.2.3. **Local Government Health Services**

Local government health units provide health services in both urban and rural areas. In towns, they provide the usual urban sanitation, inspectorate and other public health services. However, only few towns employ full-time medical officers. Some other

towns use the part-time services of the government officers. In the rural areas local in-patient health centres provide curative services. Dispensaries and clinics public health services are paid for by the central government. The Local government rural health services also provide first-aid and diagnostic services through a network of their health institutions. The services are thus primarily first-aid and clinical. Currently, there is a total of 2690 Dispensaries and 252 Health Centres in Tanzania. Maternity and child welfare clinics are usually attached to dispensaries and health centres. The rural health services provided by the local governments have been expanding rapidly in response to the demand for more medical attention and maternity and child welfare services. Although there is no common policy, charges imposed at the local governments' health institutions are generally affordable to all citizens. There are thus very few financial restrictions, in the form of charges imposed by local and central government. This is due to the growing demand for medical care in the rural areas. This demand is caused by low standards of health and nutrition, and reinforced as a result of mass-education, as expressed by the activities of local self-help schemes. In some areas these sef-help schemes help in the raising environmental standards but in others, in the construction of new health institutions without seeking information about staff to run them. The distinctions between central and local government health services are geographical rather than functional (Titmuss, 1964). Central government provides a direct service to the population down to the level of the district hospital. People in the rural areas, however, for their health services depend upon health institutions maintained by the local governments.

2.6. SINGIDA DISTRICT COUNCIL: GENERAL BACKGROUND

2.6.1. Geographical Location

Singida rural district, which has an area of about 12164 square kilometers, is among four districts which constitute Singida Region in central Tanzania. The district is located between latitudes 3^0 - 7^0 in the south and longitudes 34^0 - 35^0 in the east. It is bordered by Manyoni district in the south and Tabora district in the west.

In the north, Singida is neighboured by Hanang district whereas in north-west and east it is bordered by Iramba and Kondoa districts respectively.

2.6.2. Population

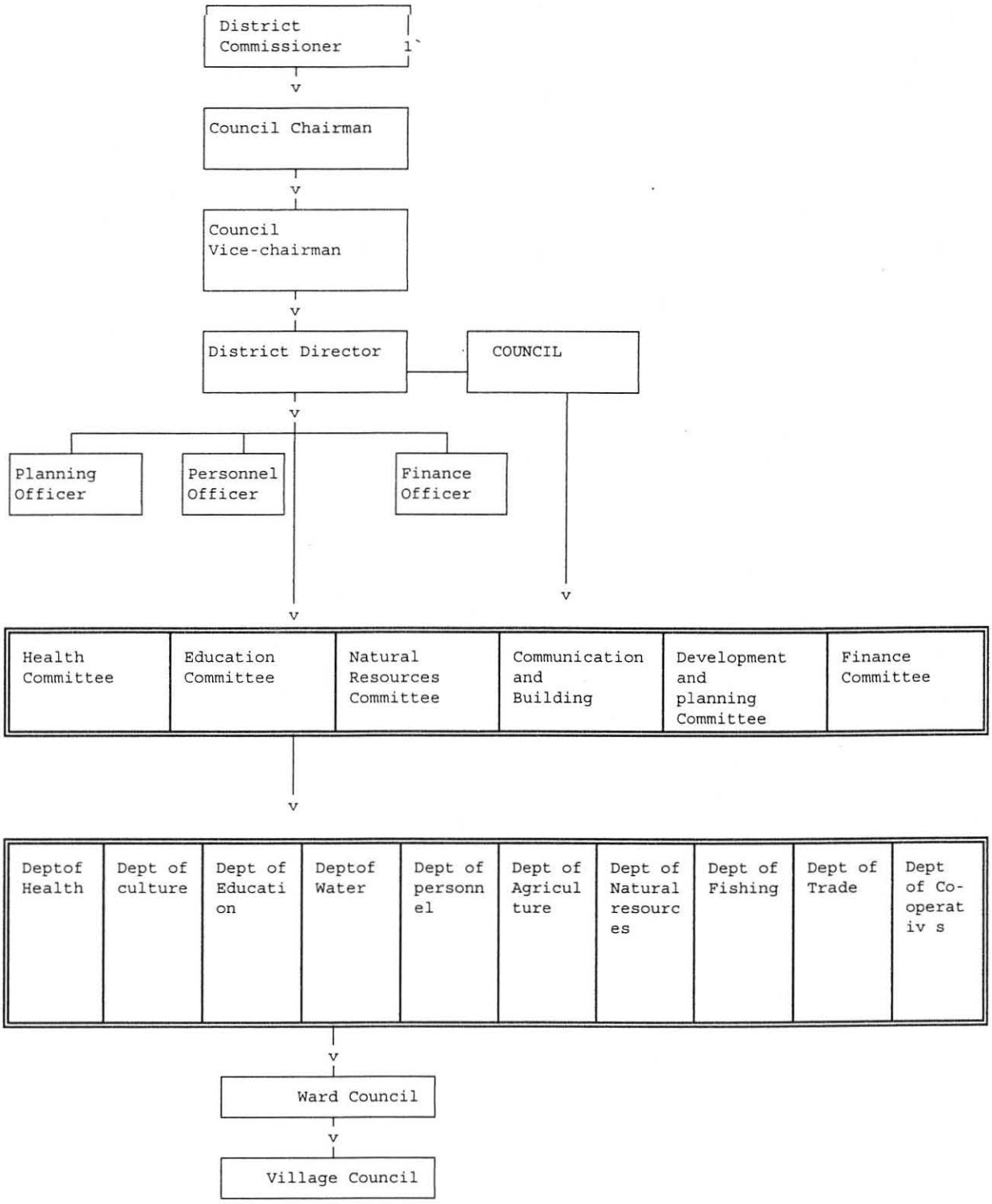
In 1988, the District had a total population of 365,092. The number of female and male being 118,546 and 146,446 respectively. At the moment the number of the inhabitants is estimated to have reached 552,553, the growth rate being about 2.5% per annum. Turu, Nyiramba, Barbaig, Gogo and Nyamwezi are the ethnic group who live in the area but Turu people constitutes about 90% of the population (Singida District Council report, 1995).

2.6.3. Administrative Structure

Singida district has seven divisions, twenty five wards and 136 villages with 723 cell units. The administrative structure at the district level is as shown in figure 2.0.

The Council is composed of the Wards' Representatives, elected by the people, commonly known as the Councillors, and the executive officers heading various departments in the district. The council is chaired by the council chairman elected from among the representatives themselves.

FIGURE 2.0. ADMINISTRATIVE STRUCTURE IN SINGIDA DISTRICT



Besides the council members, the district technical staff who supervise government departments such as regional agricultural officer, medical officer, rural development officer, and the district commissioner are also included in the council. A large part of Singida District Council's tasks are carried out through its standing committees. The central government gives support to the district council both in terms of manpower and financial support to enable them implement its local development projects.

District council has six standing committees in all, the names of which denote the activities which they are undertaking.

i) The finance committee

ii) The district education committee

iii) National resources committee

iv) Health committee

v) Communications and building committee, and

vi) District development and planning committee

2.6.3.1. Finance Committee

The finance committee consists of chairmen of all other committees and the treasury workers in the district. The authority to warrant expenditure from the Council's budgets is invested with this committee. Once the Council takes a resolution regarding certain project, this Committee is entrusted with its implementation.

2.6.3.2. **Education and Cultural Committee**

Members of Committee include several elected councillors and representatives of the Ministry of National Education at the district level. Its function is mainly the maintenance of the primary schools and secondary schools which are under the council. The primary school fees is paid to the district council which allots some money to the district education committee according to its needs. The fees is used for building schools and school materials. Central government provides compensatory funds to meet staff salaries since money generated by the council is insufficient.

2.6.3.3. **Natural Resources Commitee**

This Committee takes care of all the lands under the jurisdiction of the council, public game parks, water supply forests, fishery and mines. The committee has powers to make by-laws governing land distribution. It also supplies pipeline in the District.

2.6.3.4. Communications and Building Committee

This Committee maintains the main district roads and feeder roads, and has the responsibility of building both bridges and public buildings, as well as maintenance of the council vehicles.

2.6.3.5. **Development and Planning Committee**

This Committee is composed of the District Commissioner, all departmental technical officers in the district, the Council Chairman and Vice Chairman as well as its executive officers. The functions of the Committee are mainly to construct master plan for development of the district and review, coordinate and arrange priorities of the proposals submitted from the village committees. The proposals are considered in the light of the available funds from the council.

2.6.3.6. Health Committee

This Committee is responsible for the maintenance of all health institutions in the district. These are the hospitals, dispensaries and health centres. Other duties include inspection of meat and general health conditions in hotels and bars.

2.6.4. **Socio-economic Activities.**

2.6.4.1. Agriculture and Livestock

Agricultural production is the main economic base in the district. The food crops cultivated includes millet, maize, cassava and potatoes. There are also cash crops grown such as wheat, groundnuts, cotton, tobacco, etc. The majority of the population who engage themselves in farming are small-scale farmers (peasants). Table 2.2 illustrate the yields of food and cash crops in the area.

TABLE 2.2. Food Crops Yields in Singida District 1991-94

Type of Crops	1991/92		1992/93		1993/94	
	Target in Tonnes	yields in Tonnes	Target in Tonnes	Yields in Tonnes	Target in Tonnes	Yields in Tonnes
Maize	17845	23377	17854	17296	18800	15914
Sorghum	28075	24203	30640	21388	26097	17959.9
Millet	30364	26350	27540	20553	2067	1478.24
Cassava	12092	10160	12276	9813	11225	8146
Potatoes	12092	11010	11445	10114	1225	836
Total	112560	95100	99755	79164	59414	44334.14

Source: Singida District Council report,1995.

Singida district has good pasture areas covering a land of 3840square kilometers. It is estimated to have 471,163 cattle, 237,927 goats, 148,648 sheep, 9626 donkeys, and 141 pigs. The Distirct has seven livestock centres and 54 cattle dips.

Cattle supplies both meat and milk, and some are taken to be sold in auctions. Table 2.3. shows the selling of livestock in Singida District during 1991-94.

Table 2.3. Livestock Selling During 1991/92 to 1993/94

	SELLING IN T. SHS.			
Year	Cattle	Goats	Sheep	Total Value
1991/92	4359	1489	1489	104,622,411
1992/93	4660	1464	1833	167,304,500
1993/94	3999	2818	845	130,554,676

Source: Livestock department report, 1995.

CHAPTER 3

HEALTH FACILITIES IN SINGIDA DISTRICT COUNCIL

3.1. INTRODUCTION

The goals of the Council is to improve health status of its people through the improvement and expansion of both preventive and curative services in the district. In order to be successful the following strategies have been adopted.

i) Rehabilitation of buildings and equipments of its 41 health institutions.

ii) Improving availability of drugs and other medical supplies as well as qualified health personnel.

iii) Establishment of new health institutions in the year 1995 as follows:

- 1 Health Centre; and
- 4 Dispensaries

3.2. HEALTH INSTITUTIONS

The district has only one hospital located at Makiungu, established by Catholic Association. There are five health centres namely Ikungi, Ihanja, Mtinko, Mgori and Ilongero, and 36 Dispensaries. Units such as pharmacies, laboratories, clinic units and nursing care units are available in Makiungu hospital and health centres. However, dispensaries do not have these facilities. Table 3.1. shows Health Institutions and their distribution in Singida District

Table 3.1. Distribution of Health Institutions in Singida Distirct.

DIVISIONS	WARD	NO. OF VILLAGES	HOSPITALS		HEALTH CENTERS		DISPENSARIES	
			CONTROLLED BY SINGIDA COUNCIL (S.C)	CONTROLLED BY NGO'S	CONTROLLED BY S.C	CONTROLLED BY NGO'S	CONTROLLED BY S.C	CONTOLLED BY NGO'S
Ikungi	Ikungi	7	-	-	1	-	1	-
	Isuna	5	-	-	-	-	2	1
	Mangonyi	5	-	-	-	-	2	-
	Dungunyi	5	-	-	-	-	2	-
Ihanja	Ihanja	5	-	-	1	-	1	-
	Muhintir	3	-	-	-	-	2	-
	Minyughe	3	-	-	-	-	1	-
	Puma	6	-	-	-	-	2	-

Ilonger o	Ilonger o Magho joa Merya Kijota Ikhano da	6 5 5 7 6	- - - - -	- - - - -	1 - - - -	- - - - -	1 - 3 2 1	- - 1 - 1
Sepuk a	Sepuk a Mwera Mugun girlrisy a	5 4 3 4	- - - -	- - - -	- - 1 -	- - - -	1 1 - 2	1 - - -
Munga a	Munga a Ntuntu Siuyu Misugh aa Mtinko Makur o Ughan di	6 5 3 5 8 8 8	- - - - - - -	1 - - - - - -	- - - - - - -	- - - - - - -	2 - 4 - 2 3 -	- - - - 1 - -

Mgori	Mgori Ngimu	6 6	- -	- -	1 -	- -	- 2	- -
Total		131	-	1	5	1	36	5

TABLE 3.1.

Key: S.C.- Singida District Council

Source: District Council's Health Committee Report,1995.

3.3. **HEALTH MANPOWER SITUATION**

The number of all health employees pertaining to Health Institutions owned by Singida district council is as follows:

Health Assistants	20
Laboratory Assistants	2
Medical Assistants	9
Nurse Auxiliaries	72
Rural Medical Aids	72
Village Midwives	35

Required qualification for each category of staff are mentioned below:

- Medical assistants (MA): These must have completed ordinary level Secondary education and undergone three years course in any college of TMA (Training for Medical Assistant).
- Rural Medical Aide (RMA): These are the heads of rural Dispensaries.

They ought to have completed primary education and undergone three year RMA course. They are therefore holders of RMA Certificates.

- Nurse Auxiliaries (NA): These ought to have completed primary education and undergone two years training in nursing grade A or B courses.
- Nurse-Midwives : Completes primary education and undergoes a two years MCHA's Course. They holds certificate in maternity and child health care aid.
- Health auxiliaries: They have completed primary education and underwent three years training in health auxiliary course. They holds certificates.
- Laboratory Assistants: These have completed secondary education and undertaken three years laboratory technician course. They are given certificates after successful completion of their studies.

According to the Government of Tanzania all public hospitals are owned by the Central government. Required standard number of health staff in rural health institutions owned by the Local governments, are as is indicated below:

Health Center:	Medical Assistant	1
	Rural Medical aides	2
	Nurse Midwives	2
	Nurse Auxillaries	2
	Health Assistant	1
	Laboratory Assistant	1
Dispensary:	Rural Medical aid	1
	Nurse Auxilliary	1

Midwife 1

Assistant Health Auxillary 1

Table 3.3. The Distribution of Health Staff in Singida District Councils' Health Centres in 1994.

Name of Health Centre	No of MA	V	No of RMA	V	No of NA	V	No of MW	V	No. of HA	V	No. of LA	V
IHANJA	1	-	4	-	2	-	4	-	1	-	1	-
IKUNGI	-	1	1	1	3	-	2	1	-	1	-	1
ILONGERO	3	-	13	-	10	-	4	-	2	-		-
MGORI	2	-	5	-	10	-	2	-	1	-	-	1
MTINKO	3	-	13	-	13	-	5	-	1	-	1	-
TOTAL	9	1	36	1	38	-	17	1	5	1	2	2

Source: Singida District Council's report, 1994.

Key: MA - Medical Assistants
RMA- Rural Medical Aides
MW - Midwives
HA - Health Assistants
LA - Laboratory Assistants
V - Vacancies

TABLE 3.4. SHORTAGES OF HEALTH PERSONNEL IN SINGINDA DISTRICT COUNCIL'S EIGHT DISPENSARIES

Name of Dispensary	Shortages						Total
	MA	RMA	NA	MW	HA	LA	
DUNG'UNYI	-	-	-	-	-	-	-
IKHANODA A	-	-	1	-	1	-	2
IKHANODA B	-	-	1	-	-	-	2
KIJOTA	-	-	-	1	-	-	1
KIKIO	-	-	-	1	1	-	2
KINYETO	-	-	1	-	-	-	1
MAKURO	-	-	1	1	-	-	2
SAMBARU	-	1	-	1	1	-	3

Source: Singida District Council report, 1984.
Key: MA - Medical Assistants
RMA- Rural Medical Assistants
NA - Nurse Auxillaries
MW - Midwives
HA - Health Assisatants
LA - Laboratory Assistants

Table 3.3. and 3.4 show that there is an imbalance in the distribution of health personnel in both health centres and dispensaries in Singida District Council. For example, whereas Ikungi Health Center has six employees, Mgori Health Center has twenty health employees, having a significant difference of the number of Rural Medical Aides and Nurse Axillaries. The same applies to Dispensaries (table 3.4). It can be noted that Sambaru dispensary needs a total number of three health employees while other dispensaries such as Dung'unyi do not need any employee. A total of six

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	MA	RMA	NA	MW	HA	LA	
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IKHANODA A	-	-	1	-	1	-	2
IKHANODA B	-	-	1	-	-	-	2
KIJOTA	-	-	-	1	-	-	1
KIKIO	-	-	-	1	1	-	2
KINYETO	-	-	1	-	-	-	1
MAKURO	-	-	1	1	-	-	2
SAMBARU	-	1	-	1	1	-	3

Source: Singida District Council report, 1984.
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APPENDIX 10

Ministry.....
Organization.....
Project Title.....
Project Description.....
Objectives.....
Benefits.....
Constraints in Implementation.....
Finance.....
Status of the Project.....
Starting Date.....
Completion date.....

APPENDIX 11

Field Definition Table (FDT) Data Base: HOSEA

Tag	Name	Len/Typ/Rep/Delimiters/Patters
- 1	Participating centre Code	100 X
- 2	Participating centre record no	6 N
- 3	Record status	1 P A
- 5	Date record entered	0 P 9999-99-99
- 6	Date record changed	10 P 9999-99-99
- 7	Bibliographic level	5 A
- 8	Bibliographic level - parent	1 A
- 9	Country of origin of record	2 A
- 10	Record number of parent	6 N
- 11	Record number (s) of part (s)	6 N
- 12	Record number (s)	6 N
- 20	Language of analysis	18 A
- 21	Language (s) of text	2 A
- 22	Language (s) of summaries	2 A
- 25	Record heading	50 X
- 100	Title	500 X

APPENDIX 12

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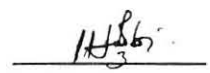
DECLARATION

The thesis is my orginal work and has not been presented for a degree in any other university.

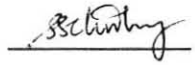


(Signed)

Hosea Mungwabi

May 24, 1995

The thesis has been submitted for examination with our approval as university advisors.



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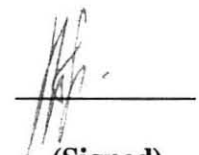
Dr. G. G. Chowdhury

May 24, 1995



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Dr. Taye Tadesse

May 24, 1995

health employees are needed to fill gaps at two Health Centres. These Centres are Ikungi and Mgori. In Mgori Health Centre for instance, laboratory assistant post is vacant. In Ikungi Health Centre Medical Assistant, Rural Medical Aide, Health Assistant and laboratory assistant are the vacant posts.

3.4. INFORMATION FACILITIES AND SERVICES

Singida Rural District like other rural communities in Tanzania have no information support systems as we know it today. Health information facilities are disconnected. The provision of Health manpower information in Singida rural district is a responsibility fragmented among several governmental Departments namely District Health Department, District Personnel Department, Health institutions and Wards Offices. The users normally approaches these places and ask for the information they needs. Those who are in charge of those facilities in turn consult their health personnel files or the reports kept in their departments or Offices. When the files containing the needed information are found they are either photocopied or copied in long hand. Information retrieval is not efficient since files are normally not arranged in order, and there is no guarantee that information queries could be provided with the right data.

The common tendency in these information facilities, however, is to refer their users to the other facilities for further data. For instance, District Health Department have data about the distribution of all health personnel. However, data related to educational qualifications of the same health staff is obtainable from the District personnel

department. The users of these information facilities are the heads of health institutions, Ward leaders, District Health Officers and administrators, and other administrators from the Regional level.

CHAPTER 4

FINDINGS OF THE SURVEY

4.1. INTRODUCTION

This chapter presents an overview of the process of health manpower requirements analysis in Singida District Council followed by the findings of the survey which aimed to identify the information requirements of the Health manpower planners and decision-makers at Singida District Council. This survey also attempted to find out the existing information flow patterns and the shortcomings of the existing situation.

4.2. HEALTH MANPOWER REQUIREMENTS ANALYSIS

In determining Health manpower requirements for Singida District Council a combination of approach is used. This include: the health demand approach, the targets approach, and the empirical normative ratios approach. Health demand approach is the means of determining manpower requirements through reference to the standardized number of Health staff in each category of the Health institution. For example, if the Council is intending to build two Health Centres and two Dispensaries, formula for determining the staff required for such Health institutions has been established by the Central government as it is indicated in chapter three, section 3.3.

Service target approach is the determination of manpower requirements through

examining shortages of personnel in Health institutions. A review of the number of Health staff for all Health facilities is usually made in order to identify the needs.

Empirical normative ratios approach is the determination of the manpower requirements through reviewing the laid down National target ratio. District Council determines its Health manpower requirements in line with the national ratios. So far, the present Health Centres ratio in Singida District is 1:64,516 but the National ratio is 1:50,000. These ratios can be used to determine the number of Health Centers to be constructed in the District, and also the manpower to run such Health Centers.

4.2.1. **The Process**

Health Manpower requirement analysis process starts at the Village and District level as well as in Health institutions. In the Villages, Health Committees make analysis of their manpower requirements in line with the Village's Health plans. For example, construction of a new Dispensary, Health Center, etc. Health Committee forwards manpower requirements to the Village Development Committee which would

discuss the matter in detail and pass it to the Ward's Representative who may then

i) Refer to the District Health Medical Officer for action or advice; or

ii) Refer to other District Health Officers for reporting the matter to the District Health Committee.

The District Health Committee Coordinates all health requirements report about manpower, finance and equipments, and forward them to the District Development

Committee for decision, and eventually to the District Council for ratification. District Council's plans and decisions are taken to the Regional Commissioner for Approval.

4.2.2. **Personnel**

It may be recalled that during Health manpower requirements process Village committees and Health staff initiate demands for Health manpower but it is the Ward Representatives commonly known as Councillors, and District Health Officers who make decisions. All categories of people involved in Health manpower requirement analysis, planning and decision-making need a lot of data which are generated at the Village levels and at some other level upwards. Therefore, to take a right decision they should have ready access to the data.

4.3. **INFORMATION NEEDS OF THE USERS**

In order to ascertain the information requirements of different categories of people in the process of Health manpower requrements analyis, a survey was conducted. This survey used interviews and questionnaires. Responses recieved from different categories of planners and decision-makers (who would eventually be the users of the proposed information support system). Their information requirements and the existing sources of information are now presented in the following sub-sections.

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4.3.1. **Information needs of the Ward Representatives**.

Health manpower information is generated at the village level by the existing Health staff, Village Health Committees and Village Development Committees depending upon a situation or Health programmes. Ward Representative coordinates reports from all Villages of his area and arranges them according to their priorities. He may decide to send it forward, or meet the respective Villages for discussion. Therefore, Ward Representatives are perceived leaders who play an important role in both the decision-making process of the community concerning manpower requirements, and may also be opinion makers.

For the purpose of identifying the information needs of these category of Ward leaders ten Wards Representatives out of a total of twenty five Ward representatives in Singida District Council were interviewed by the researcher. The interview schedule appears in an appendix 1.

The respondents (10 Ward representatives) were asked what kind of information they need from a village which is intending to construct a new Health institution such as a Dispensary. Again, Ward Representatives were asked the kind of Health manpower information they need from a Village which have a Health institution but lacks Health personnel. Table 4.1. presents the views of the respondents.

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For the purpose of identifying the information needs of these category of Ward leaders ten Wards Representatives out of a total of twenty five Ward representatives in Singida District Council were interviewed by the researcher. The interview schedule appears in an appendix 1.

The respondents (10 Ward representatives) were asked what kind of information they need from a village which is intending to construct a new Health institution such as a Dispensary. Again, Ward Representatives were asked the kind of Health manpower information they need from a Village which have a Health institution but lacks Health personnel. Table 4.1. presents the views of the respondents.

Table 4.1. **Information Needs of the Ward Representatives for Health Manpower Requirements**

SI.NO.	QUESTION	POSITIVE RESPONSES		NO RESPONSES	
		TOTAL	PERCENTAGE	TOTAL	PERCENTAGE
1.	Type of Health institution which exists or to be constructed	10	100%	-	-
2.	Information about the number of health staff required	10	100%	-	-
3.	Information about starting date for construction of Health institution	10	100%	-	-
4.	Information sources of finance	10	100%	-	-
5.	Information about the present number of Health personnel	10	100%	-	-
6.	Date of Completion	7	70%	3	30%
7.	Information about number of Health institutions in the Villages	5	50%	5	50%
8.	Information about services offered or to be offered.	4	40%	6	60%
9.	Information about the educational qualifications of the required health staff	3	30%	7	70%
10.	Information about educational qualification of the existing personnel	3	30%	7	70%

Hundred percent (100%), of the Ward representatives, responded positively towards information about the following: type of institutions which exists or to be constructed, information about sources of finance, information about the present number of Health

personnel, information about the number of Health staff required, and information about starting date for the construction of Health institutions.

Seventy percent (70%), of the Ward representatives expressed that information about completion date for the construction of health facilities is equally vital for manpower requirement analysis in their areas.

A further information need is for the number of Health facilities in the Villages pertaining to their Wards. This need was realised by fifty percent (50%) of the Ward representives. Information about educational qualifications of the existing health personnel and of the staff required, as well as information about health services offered or to be offered was not seen as important by the Ward representatives. This is supported by the lower percentages indicated (40% and 30% respectively).

Ward Representatives were also interviewed about sources of information regarded as important in reaching decisions about Health manpower requirements. They were asked to opine about 10 possible sources. The views of the respondents are as presented in table 4.2.

Table 4.2. **Information Sources of the Ward Representatives**

for Health Manpower Requirements

SI. NO.	QUESTION	POSITIVE RESPONSES		NO RESPONSES	
		TOTAL	PERCENTAGE	TOTAL	PERCENTAGE
1.	Personal meeting with health staff	10	100%	-	-
2.	Village chairman and vice-chairman	10	100%	-	-
3.	Personal Meetings with constituents	8	80%	2	20%
4.	Personal experience and contacts	6	60%	4	60%
5.	Personal Meeting with District Health Officers	5	50%	5	50%
6.	Departmental reports	5	50%	5	50%
7.	District Health committee	5	50%	5	50%
8.	Government publications	2	20%	8	80%
9.	Radio	2	20%	8	80%
10.	National press	-	-	-	-

It seems that Village Chairman and vice-chairman, and personal meeting with Health staff are the information sources regarded most highly by Ward Representatives, for 100% of them responded positively. Personal meetings with

constituents is also a very important source of information because 80% of the Ward representatives responded positively.

Meetings with the District Health Officers, District Health Committee, and Departmental reports scored betweeen 50%-60% responses. Thus,these sources are regarded fairly highly important. Thought to be of limited value were radio and government publications, which were responded by only 20% of the respondents.

4.3.2. **Information Needs of the District Officers**

At the District level 15 questionnaires were distributed to the Medical Officer, 11 members of District Health Committee, Personnel officer, District Director, and Chairman of Singida District Council. These categories of users were chosen bacause they are actively involved in the process of health manpower analysis in Singida District. For example,

- District Medical Officer receives reports from the Wards and is vested power to transfer employees. He is also a Chairman of the District Health Committee.
- Health Committee members decide on reports to be sent to the District Council for either further discussion or ratification.
- Personnel Officer is responsible for the recruitment, transfer, and staff development in the District.
- District Director is an overall superviser of Local government employees

The Views of these 15 respondents about Health Manpower information needs are presented in table 4.3. Questionnaire is indicated in an Appendix 2.

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Table 4.3. **Information Needs of the District Officers for Health Manpower Requirements**

SI. NO.	QUESTION	POSITIVE RESPONSES		NO RESPONSES	
		TOTAL	PERCENT AGE	TOTAL	PERCENT AGE
1.	Information about the number and types of Health personnel	15	100%	-	-
2.	Information about geographical distribution of Health institutions and personnel	13	87%	2	13%
3.	Information about the number and types of health institutions in the District	12	80%	3	20%
4.	Information about the services offered	10	67%	5	33%
5.	Information about the characteristics of the present health personnel	8	53%	7	47%
6.	Information about training institutions	7	47%	8	53%
7.	Information about effectiveness of the present health employees	5	33%	9	67%
8.	Information about population in the District	3	20%	12	80%
9.	Information about Health equipments in health facilities	3	20%	12	80%
10	Information about Health institutional utilization	2	13%	13	87%

It would seem that between 80%-100% of the District Officers regarded information

about the number and types of health personnel, and the distribution of both health institutions and personnel as the most useful. Between 53%-67% of the respondents sought information about the services offered by different health facilities and the characteristics of the present health personnel.

Other information needs, though regarded as of limited value, include information about effectiveness of the existing health employees, population, health equipments and institutional utilization data. These were responded by less than 50% of the respondends.

4.3.3. **Sources of information**

District Officers were then requested to indicate how do they get to know, the health manpower requirements of various health institutions located in their area. The respondents answers are shown in table 4.4 Questionnaire is shown in an appendix 2.

Table 4.4. **Information Sources of the District Officers. for Health Manpower Requirememts.**

SI.NO.	QUESTION	POSITIVE RESPONSES		NO RESPONSES	
		TOTAL	PERCENTAGE	TOTAL	PERCENTAGE
1.	Ward representatives	15	100%	-	-
2.	Health files	15	100%	-	-
3.	Village health staff	12	80%	3	20%
4.	Heads of Health institutions	12	80%	3	20%
5.	Government directives	11	73%	4	27%
6.	Government publications	10	67%	5	33%
7.	Radio	3	20%	12	80%
8.	National press	1	6%	14	94%

Between 80%-100% of the respondends identified four most important sources of information. These are: Ward representatives, health files, heads of health institutions, and health staff. Between 67%-73% of the respondents responded positively for government directives and publications. Radio and national press are the least used sources of information about health manpower for they were responded by 20% and 6% of the District Officers respectively.

Therefore, the proposed Computer-based infomation support system must include information which were responded positively by most of both Ward representatives and the District Officers. Such information can be outlined as follows:

- information about the number and types of health personnel in the district;
- infomation about the number, and geograghical distribution of both health

institutions and personnel;

- information about the number and type of health staff required;
- information about starting date for the construction of health facilities;
- information about the sources of finance; and so on.

4.4. INFORMATION FLOW PATTERNS

This study has identified the following flow pattern of information related to health manpower information requirements:

1. Information related to the health Manpower requirements is mainly generated at the Village Level by Village Health Committees, Village Development Committees, and health institutions. At this level, information about lack of Health personnel in their respective areas is identified in order to meet their Health needs.
2. This information is then passed on to the Wards, representatives in the form of a report, who then send it to the Medical Officer at the District level.
3. At the district level, The Medical Officer can take decision on his own or refer it further to the Health Committee which reviews reports and comes up with recommendations and passes it to the District Development and Planning Committee, which in turn makes decisions on the basis of available manpower and funds in the District Council. The results of this decision lead to transfer of personnel to fill the existing gap or to recruitment of new health personnel

by the District Council.

4. The District Council ratifies decisions made by Health Committee or takes decision on its own. It may decide to submit the report to the Regional Commissioner for approval.

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Figure 4.1. HEALTH MANPOWER INFORMATION FLOW IN SINGIDA

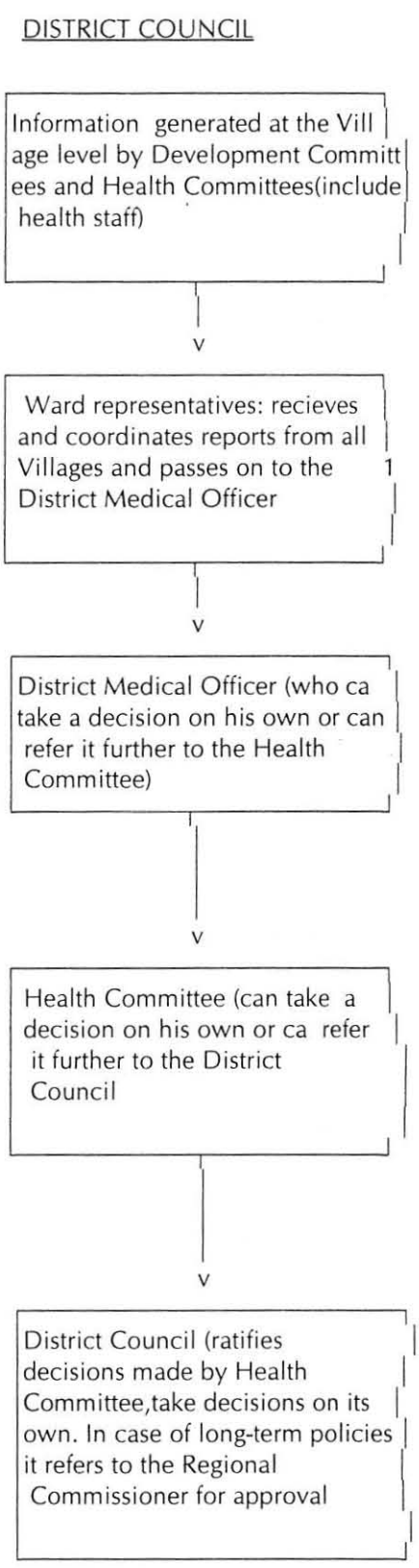
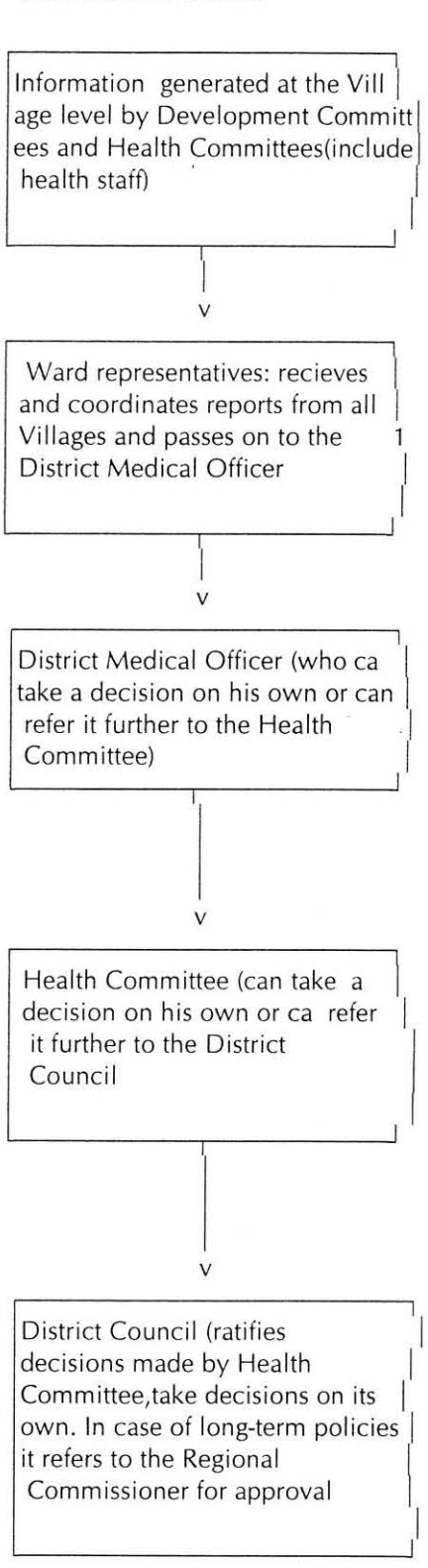


Figure 4.1. HEALTH MANPOWER INFORMATION FLOW IN SINGIDA



4.5. SHORTCOMINGS OF THE PRESENT INFORMATION FACILITIES

In the course of the survey in Singida District, several shortcomings have been identified. These are briefly discussed below. First, it may be recalled that the information facilities in Singida District are manual. There is no doubt that it is not efficient in retrieval and management of information in general. Information retrieval can't be fast since Health files are not arranged in such a way that they can be picked easily upon demand. Security of those files is also not guaranteed.

Secondly, as we have already seen in chapter three (section 3.4.), information about Health manpower is scattered in many sources. This is due to the fact that there is no established information support system in the District. Consequently, data are not obtainable on time and information is un-coordinated.

4.6. NEED FOR DEVELOPING A COMPUTER-BASED INFORMATION SUPPORT SYSTEM

Manpower is the most essential resource at all levels in the Country. Without trained manpower, other resources can't be properly used and this is particularly true of the Health Sector (Hall, 1980). Information is a vital part of any system and it is of paramount importance to the decision-making bodies, at the Singida District Council level.

There is therefore, a need to create a Computer-based information support system to assist Health manpower planners and decision-makers to determine their

requirements, thereby avoiding wastage of resources, for example, hastily constructed health institutions lying idle owing to lack of trained health personnel. Health manpower information should be as detailed and relevant in decision-making and monitoring health programs and projects as information about finance, buildings and equipment (ILO, 1982).

In Singida District Council, a mechanism should be developed in such a way that all information related to manpower should be collected. Information should be stored in such a way that decision-makers, planners and other users can retrieve information outputs in a desirable form, for example, in tabular form. Again, Health manpower analysis process do not only depend on factual data but also the various kinds of information namely bibliographic information including reports, some information related to persons, especially health personnel in particular, etc., are required.

Therefore, a computer-based information support system capable of acquiring, processing, storing and retrieving all kinds of information required by the health manpower planners and decision-makers can largely facilitate the activities of the latter, and therefore can contribute to the national development process.

CHAPTER 5

THE PROPOSED INFORMATION SUPPORT SYSTEM

5.1. General Overview

Information support system is a purpose oriented system, that can help in problem identification or finding solutions to problems, or it may even be a goal seeking system. Such a system should be capable of presenting analyzed and syntesized data in readily usable form to different user groups at different levels (Materu, 1994).

The different sub-systems of an information system should be designed to relate to and be compatible with each other (Neelameghan, 1993). This is in agreement with Davis and Olson (1985) when they say ".... Information Systems do not operate independent of the organization; they exist because they support organizational processes and the achievement of organizational goals. These information systems are therefore termed support systems." According to Davis and Olson, an organization with a well designed information system will generally have a competitive advantage over organisations with poorer systems (Davis and Olson, 1985).

It may be recalled that there is a need for developing an information support system as discussed in chapter 4 subsection 4.6. Although the sample chosen in Singida District is small , the people whom questionnaires were distributed and those who were interviewed are the key people who deal with the process of health manpower requirements, hence are knowledgeable, and experienced in terms of writing health

personnel requirements reports , and interact with various health groups in the District. Results obtained through discussions with those people, interviews, and questionnaires, are so important in the proposed solution of the system that the researcher has recommended .

A computer based system should be designed so that health manpower planners, decision-makers and other user group would perform more efficiently by virtue of having timely access to relevent, up-to-date and reliable information. Such a system should enhance the information handling capacity of Health Institutions and departments deemed to be centers of excellence in health manpower information in the district level. This chapter presents the design features of the proposed computer based system and demonstrates how it can perform the desired functions.

5.2. Objectives

5.2.1. General Objectives

The general objectives of the computer-based information support system for health manpower requirements analysis are:

i) to improve the process of health manpower requirement analysis at the local government level by providing necessary information to Health planners and decision-makers;

ii) to ensure that information made available is precise, exhaustive and accessible with minimum delay, presented in a manner more convenient to the respective users and the service is provided at the minimum cost;

-Interactive information retrieval for instant

decision-making;

-Restropective search for long-term planning and

decision-making; and

-Provision of printed health reports, directories, projects, etc.

5.3.1.System Structure

The system structure should correspond to the organizational structure of the Singida District council as shown in Figure 2.0. A separate Information Centre for health information should be established within the Department of Health. The terminals should be located in Personnel Department, The District Director's Office, District Planning Officer' office, Council chairman's Office, and to the District Commissioner's Office at their information facilities. Some of these facilities provides information about health manpower for the moment.

The information Centre which currently does not exist would have a collection of books, various health reports, and Central computer terminal with specialised databases of health manpower, health institutions, and health projects etc. This information center would specialise in the collection of information about health sciences generally. In that information centre, system manager, whom together with other information workers who would be employed, would carry out the input, process and output functions as well as system management. The centralized system structure has been recommended for the following reasons:

- it would reduce duplication of efforts among different departments of Singida District Council;
- it would support tight managerial control since both material and human resources of such a system would be concentrated in a specific central area; and would simplify the protection of privacy and may limit access to secured information.

5.4. SYSTEM REQUIREMENTS

The requirements of the proposed information support system include hardware, software, and network facilities.

5.4.1.Hardware

Hardware recommended for the proposed system are the Micro-computers. This owes to its relative simplificity and decreasing prices. The micro-computers will be connected to other computer in the District Council offices in a local area network (LAN). LAN is defined by Bridges as a system of interconnected computers and associated devices which allows interchange of information within a certain geographical area (Bridges, 1986). Other factors to be considered on hardware are the processor and memory capacities, file servers and number of the workstations.

The LAN system is recommended for the following reasons:

- it would facilitates interchange of information among district departments involved in health manpower.

- It would facilitate planners and decision-makers to interact with the databases searching for information from their personal computers or terminals connected to their network.
- It would facilitate linkage to external networks located in other Districts and Regions in the Country.

The following are the basic network facilities which should be considered:

- Telecommunication lines,
- modem,
- remote search services,
- Data input through the network,
- network nodes, and
- air conditioners.

5.4.2. **Software**

Two softwares has been proposed for the purposes of this system. This are Word perfect and microisis.

5.4.2.1. **Word Perfect**:

Word perfect is a word processing package that makes it possible to carry out the following functions quickly and easily:

- Make both minor and major changes without having to re-type whole pages of

text;

- Change the layout (formating);
- Copy, move, or delete text; and
- Facilitate grqphics and tables.

5.4.2.2.**MicroIsis:**

Microisis is a text-retrieval software package developed by Unesco and distributed free of cost to non-profit organizations especially in developing countries.

Since the release of the first version of the software in December 1985, some twenty thousand copies of it are reported to be in use in different countries of the world, in Europe and developing countries in particular (International Classification, 1993).

MicroIsis version 3.0+ supports multi-user local area network (LAN) applications. Surveys by the Pan-African Development Information system (PADIS 1989, 1991) indicate a significant increase in use of the software in Africa, and the situation is similar in other developing regions of the world. Although Microisis was initially intended and used for designing and developing bibliographic databases, it is now being used increasingly in developing factual databases and Object Oriented Data Bases such as patients' records databases (Neelameghan 1992). Programs are now available for converting databases developed using dBase to ISO 2709 format and then download into MicroIsis database and vice versa. Programs are also available for converting any structured ASCII text record(s) to ISO 2709 format and then download the records into a MicroIsis database. These factors and other useful features of the software are mentioned below:

- Microisis is a generalized package for the management of machine-readable textual databases, i.e. to build, manipulate, maintain, and retrieve records from such databases. In particular Microisis enables;
- defining of databases containing user selected fields and data elements;
- entering new records into a given database;
- modifying, correcting and deleting records in a database;
- automatic creation of fast access files, such as inverted files (index files) for any or all of the words or combination of them in any or all of the fields in each database applying eight different indexing techniques;
- retrieval of records from a database using simple or complex (including Boolean, adjacency and other operators) search expressions;
- displaying the number of hits for each component of the search expression;
- re-execution of earlier search expressions in the same or other databases during a search session;
- displaying/printing out of records from a database as per user defined formats;
- printing out an entire database, or
    . some or all the retrieved records, and/or
    . indexes of a database;
- exchanging or merging of records of two or more databases that are in compatible formats (e.g.ISO 2709 format), and;
- enhancing the software's capabilities through programs written in CDS-ISIS Pascal language, for example, development, maintenance and use of

controlled vocabularies, multiple databases search, retrieval and display, online public access catalogue, etc.

5.5. DATABASES

In order to satisfy the information requirements of the users, two different kinds of databases have been created. The first one is the specialized database, which may be used regularly by the user community. This category of the database comprises three databases. The first one, named `HEA', contains records of health institutions.

The second named `MPO', contains records of health staff, and the third one, `PO' contains databases about health projects. The other category of the database was intended to be an integrated one containing bibliographic records, health research projects and information systems.

However, the present research could not identify any health research projects conducted by the District Council or information systems in the area of the researcher's subject. Therefore, the integrated database contains only one kind of a record, namely bibliographic records.

5.5.1. Specialized Databases

Specialized databases provide information about an object to meet the needs of the specialized user groups for a particular purpose (Neelameghan 1993). At a given time, an end-user is usually interested in selected attributes of the object, with a view to manipulating, modifying or using information for decision-making or problem-solving.

Design of the three specialized databases is based on the findings of an analysis of health manpower planners and decision-makers' information needs in Singida District after close interaction between the researcher and the expected end-users. Therefore decisions on objects, fields and data elements rest with the user's information need so as to facilitate the possibility of retrieving information pertinent to their needs. This helped in identification of concepts to be indexed and arrangement of the data in the output from the databases.

5.5.1.1. **Health Institutions Databases**

The database named HEA, has been created to incorporate data about all health institutions in Singida District. A Field Definition Table (FDT), has been designed for HEA Database which incorporates the following fields:

Name of Institution

Type of Institution

Date of Establishment

Address

Institution Head

Licenced Bed Capacity

Annual Admission

Personnel

Annual Expense

Facilities

Services Available

Control

The FDT appears in appendix 4. The prototype HEA database contains a sample of 15 records created using the worksheet designed for the purpose as shown in appendix 5. A Simple display format, has been designed to produce output records as shown in figure 5.1a. This database can be searched through various fields.

For example, it can be searched by name of institution, by type of institution, etc.

Figure 5.1 Sample output from the HEA Database

```
***HEALTH INSTITUTIONS**
NAME OF INSTITUTION    : Misughaa Dispensary

TYPE OF INSTITUTION    : Dispensary

DATE OF ESTABLISHMENT  : 1979

ADDRESS                : P.o.Box 233, Misughaa,Singida,TANZANIA

INSTITUTION HEAD       : Mateo Mbugha

LICENCED BED CAPACITY  :

BED CAPACITY           :

ANNUAL ADMISSION       : Out-patients 2340

PERSONNEL              : RMA1;NA1;MW2

CONTROL                : SINGIDA DISTRICT COUNCIL

SERVICES AVAILABLE     : Phamarcy

FACILITIES             : Curative services; leprosy

ANNUAL EXPENSE         : T.shs.250,000

*** END OF DISPLAY ***
```

5.5.1.2. **Health Staff Database**

The MPO database has been created to incorporate data about all Health Personnel pertaining to Singida District Council. The database includes the following fields:

Name

File Number

Date of Birth

Sex

Date of Joining

Jobs held before joining

Specialization

Educational Qualification

First appointment Post

Current Post

Starting Salary

Current Salary

Current Workplace

The field definition Table for `MPO' database appears in appendix 6. The prototype database contains 10 records, created using the worksheets designed for the purpose, as shown in appendix 7. Users can access the database through several keys provided in SISA interface.

5.5.1.3. **Health Projects Database.**

The Health projects database is named `PO'. This database incorporates data about Health Projects which are implemented by Singida District Council. Its field definition table has the following fields:

Ministry

Organization

Project Title

Project Description

Objectives

Benefits

Constraints in Implementation

Finance

Status of the Project

Starting Date

Completion Date

Appendix 8 and 9, show field definition table and field select table respectively. The prototype database for Health projects has 10 records entered using special worksheet designed to suit the purpose, and indicated in appendix 10. The display format displays the outputs of the records as examplified by figure 5.2.

Figure 5.2. Sample output for PO display format

```
                    *** HEALTH PROJECTS***
MINISTRY                          : Health

ORGANIZATION                      : Regions

PROJECT TITLE                     : Primary health care

PROJECT DESCRIPTION               : The project is to be implement
                                    in all Regions
OBJECTIVES                        : To improve existing rural
                                    infastructure through
                                    coordination of all health
                                    institutions, vehicles, drugs,
                                    equipment
BENEFITS                          : All Regions are expected to
                                    benefit  from
                                    this project

CONSTRAINTS IN IMPLEMENTATION     : Funds; coordination; vehicles

FINANCE                           : Foreign; Local

STATUS OF THE PROJECT             : Implementation  completed

STARTING DATE                     : 4-4-1986

COMPLETION DATE                   : 1991
```

5.5.1.4. **Bibliographic Database**

The ABNCD structure for creation of integrated database has been chosen to use a prototype bibliographic database named HOSEA. This prototype data base contains records of books pertaining to health sciences for which the FDT and the worksheet for monograph. However, the field select table and display format have been designed to facilitate retrieval of bibliographic records from the database. Appendix 11 and 12, show the Field Definition Table and Display format for HOSEA Database respectively. A record output from (`BIB') display format is presented in Figure 5.3.

Figure 5.2. Sample output for PO display format

```
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MINISTRY                          : Health

ORGANIZATION                      : Regions

PROJECT TITLE                     : Primary health care

PROJECT DESCRIPTION               : The project is to be implement
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                                    benefit  from
                                    this project

CONSTRAINTS IN IMPLEMENTATION     : Funds; coordination; vehicles

FINANCE                           : Foreign; Local

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Figure 5.3 Sample output from HOSEA Database

```
                ***BIBLIOGRAPHIC RECORDS***
Author                  : Mgala, Mujinga
Title                   : Demographic and health survey
Publisher               : Government press
Place of publication    : Dar-es-salaam
Date of pubilication    : 1993
ISBN                    : 0 947568 06 9
Call Number             : QA 75.5 .153 1985
Number of copies        : 5
Descriptors             : HEALTH; SURVEY
Abstract                : This book presents a brief overview
                          ofhealth medical services in TANZANIA

                          it also highlights on the existing
                          projects as well as the interests of
                          donors in financing health institutio
```

The existing database structure is flexible enough to include other kinds of health related information, like patient information, disease information, and other items of information related to maternity, child health care, etc., because health manpower can not be separated from the treatments they provides to the people and the various diseases which they tackle. Therefore the database structure can be utilized to build a complete health care system in the long run in the Country in this particular sector.

5.6. **USER INTERFACE**

The prospective users of the proposed information support system in Singida District Council are not computer literate, are not familiar with the utilization of computer-based information systems, and cannot be expected to learn software to make use of it. The user-interface for the proposed system should be designed such that it is easy to use for all functions including retrieval purposes. An interface could not be designed owing to limited time, and therefore a user-interface, developed at SISA, also name proposed for this system.

SISA (system interfact search Assistance) is designed to assist end-users in operating search and retrieval in Micro CDS/ISIS databases (Neelameghan, 1993). It provides the following major functions:

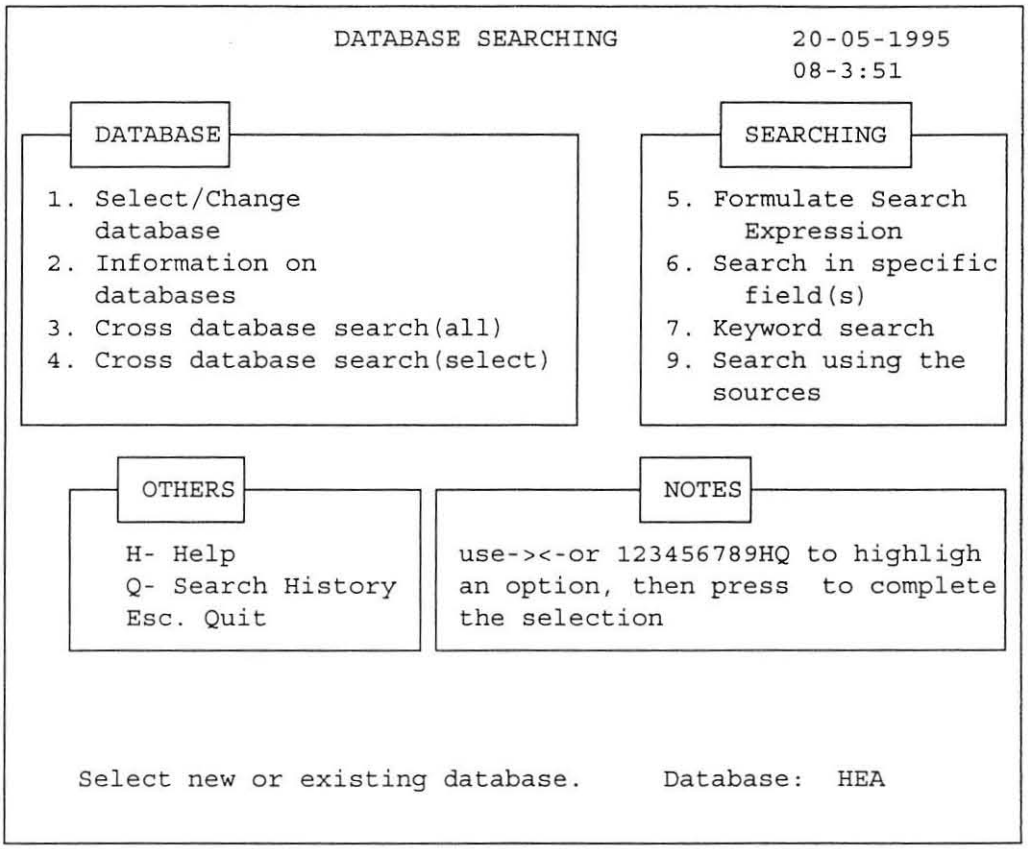
- selection of databases for searching;
- formulation of search expressions using CDS/ISIS search language and use of different search capabilities of CDS/ISIS;
- retrieval and display of records using different display formats;
- saving of retrieved records selectively; and
- storing of search queries and the results for review of search performances on each database.

The interactive methods of seraching using SISA interface in case of the proposed system are demonstrated in the following subsection.

5.7. DEMONSTRATION

In designing computer-based information systems it is indispensable to emphasize not only the need to save user time and effort in obtaining information but also the improvement of the search results (Ingwerser and Pejtersen, 1986). The SISA interface is system-depended, in the sense that it tends to rely on data entry and search expressions of the MicroIsis software.It is considered useful to the expected users who are not computer literate owing to its ability to help end-users perform several functions as indicated in Section 5.6. When the program is run through option `A' of the CDS/ISIS main menu, SISA main Menu appears as shown in Figure 5.4.

Figure 5.4. **SISA main menu**



Let's suppose that a user wants to get information about the number of health personel in Misughaa Dispensary, He/She would select option 1 as in the SISA main menu. The names of the available databases will be screened. The user would move the cursor to the HEA database and then press enter to select it.

The system will ask the user to formulate search expression for his/her query. In this case the user has to formulate a query as follows:

Misughaa$

The system would display the record corresponding to the Misughaa Dispensary, from which the user can get the number of health personnel working in the given health institution as shown in figure 5.1a.

5.8. **IMPLEMENTATION**

The goal of this thesis is to propose an informaiton support system that can be developed and implemented for Singida District Council to provide better information services to the different categories of users. This goal can only be achieved if the prospective users and their management perceive and are convinced that the proposed system would meet their needs as mentioned above. If the respective organization decides to implement it the major factors to be considered are:

- Formation of the system development project team as a first step to carry out effective implementation of the proposed system. The team should include

Let's suppose that a user wants to get information about the number of health personel in Misughaa Dispensary, He/She would select option 1 as in the SISA main menu. The names of the available databases will be screened. The user would move the cursor to the HEA database and then press enter to select it.

The system will ask the user to formulate search expression for his/her query. In this case the user has to formulate a query as follows:

Misughaa$

The system would display the record corresponding to the Misughaa Dispensary, from which the user can get the number of health personnel working in the given health institution as shown in figure 5.1a.

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- Formation of the system development project team as a first step to carry out effective implementation of the proposed system. The team should include

information professionals; the present researcher may be a member of the team.

- Revision of the system proposal by the project team (include modification if any).
- Conduct of a detailed cost-benefit analysis
- Selection and acquisiton of the necessary system requirements based on the quality, capacity, cost, period of warranty, and maintanance support after sales.
- Implementation and testing of the system (whether would be phase by phase or parallel implementation).
- Based on the feedback from potential users of the system, modifications can be made.
- Training of some staff to operate the system effectively and efficiently.

CHAPTER 6

CONCLUSION AND RECOMMENDATIONS

6.1. CONCLUSION

Health Services in Tanzania is largely a responsibility of the Central and Local governments. Central government control the Referral, regional, and district hospitals which are located in towns. Local governments control other health institutions such as Health Centres, Dispensaries, and Clinics which provide health services in rural areas. The development of health services at both the Central and Local government levels has been hampered by many factors, including shortage of skilled health manpower. This problem is aggravated further due to lack of integrated information support system for health manpower analysis especially at the District Council levels.

Survey conducted in Singida District showed that there are 41 health institutions which are under the District Council. This include 36 Dispensaries and 5 Health Centres. Health manpower categories found in these health institutions inlude: 20 Health Assistants; 9 Medical Assistants; 72 Nurse auxilliaries; 52 Rural Medical Aides; 35 Village Mid-wives; and 2 Laboratory Assistants.

Moreover, it was comprehended that preventive, curative, and maternity and child care are the services offered by these health institutions. The common facilities available are pharmacies, laboratories, and nursing care units.

The health institutions and health manpower available in Singida District serves a total population of 365,092. The survey revealed that there is imbalance of health

personnel among Health Centres which belong to Singida District Council whereas severe shortage of health staff is experienced among the dispensaries.

It was also understood that information related to the health manpower requirements in Singida District is mainly generated at the Village levels by Village Development Committees and Village Health Commitees. The information then passes through the hands of the Ward representatives, District Medical officer, Health Commitee, and finaly to the District Council. All these people and bodies are vested with power to take decisions on their own.

In order that health manpower planners and decision-makers execute their tasks efficiently and effectively they need adequate and timely information. So far they rely on information fragmented among several government departments scattered in the District owing to the lack of proper information infrastructure in Singida District. Hence, in their manpower planning and decision-making processes they do not get adequate information.

Therefore, it was felt that if the proposed information support system is designed the above mentioned people would be highly benefited. A survey was conducted among these categories of health manpower planners and decision-makers to understand their information requirements. The findings revealed that information needed by the Councillors mostly relate to (a) the type of health institutions that exist in their areas, (b) the number of health staff required, and (c) the number of the present health personnel in their areas. The Councillor's main existing sources of information relating to the health manpower requirements are (a) personal meetings with the health staff,

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(b) Village Chairmen and Vice-chairmen, (c) personal meetings with the District health Officers, and (d) personal experience and contacts.

At the District level, health manpower planners and decision-makers expressed a need for the following information: (a) number, types, characteristics, and distribution of health personnel; (b) number, types and distribution of health health institutions; and (c) Services offered, and facilities available.

Currently, the following are the major sources of health manpower information used by these people: (a) health files, (b) Ward representatives, (c) Village health staff, (d) heads of health institutions, (e) government directives, and (f) government publications.

The observations made led to the conclusion that there is a need for a computer-based information support sytem for health manpower requirements analysis to meet the multiple audiences engaged in the process. The system should be able to process data and provide information tailored to the needs of different user groups, and be considered as an integral part of the Singida District Council's health system.

The findings prompted the researcher to come up with four prototype databases: database for health institutions, health staff, health projects, and bibiographic database which should work in a local area network. The prototype database for health institutions provides the following information: name of institution; date of establishment; address; name of the institution head; licenced bed capacity; annual admission, personnel; annual expense; facilities; health services available; and control.

The prototype database for health staff provides the following kinds of information: name of an employee; file number; date of birth; sex; date of joining; jobs held before

joining; specialization; education qualification; first appointment post; starting salary; current salary; and current workplace. The prototype database for health projects contain the following information: Ministry; Organization; project title; project description; objectives; benefits; constrains in implementation; finance; status of the project; starting date; and completion date. The prototype database for bibliographic records contains the following information: author; title; publisher; place of publication; date of publication; ISBN; call number; number of copies; description; and an abstract.

SISA interface has been recommended to help users interact with the system. The system can produce several information products such as directories of health institutions, health personnel, health projects, etc. Experience gained in course of this research has led the researcher to believe that the prototype system can be implemented, provided necessary infrastructure is made available at the Singida District Council, which will facilitate health manpower planning and decision-making process by providing adequate, timely, and tailored information to the respective people. It is also believed that the prototype system can be equally applicable to other District Councils in the country to enable the health system within the local governments in Tanzania to function more efficiently and effectively.

6.2. **RECOMMENDATIONS**

In course of this study the researcher has felt that there are several measures which need to be taken for proper utilization of the results of this research and its future

development. Some of the major points to be considered in the near future are as follows:

- mounting of the users sensitization programmes about the application of computer-technology to ease their planning and decision-making tasks;
- formation of the technical committee as proposed in the implementation part;
- establishment of an information center in Singida District;
- organizing and supporting training of the information workers;
- database construction, installation,testing, and maintanance of the system;
- development of a sound mechanism for the flow on information from the Villages, wards, to the District level;
- The proposed model should be used to build information systems for other Districts in Tanzania in order to build a nation-wide health infromation system. This owes to the fact that Local governments has similar administrative structures, health institutions and similar types of health manpower
- information infrastructre in the country should be developed to facilitate networking of the system;

The researcher also feels that similar study may be undertaken for health institutions which are under the control of the Central government as well as under various private agencies. Development of such systems would largely facilitate the management of health institutions at all levels, and thereby would ensure a better health service in the Country.

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Appendix 1.

Interview Schedule to identify information sources

and needs of the Ward Representatives

1) Do you usually get health manpower information in your ward?

- Though personal meeting with health staff?
- Through department reports?
- Through meeting with constituents?
- Through reports from village and vice-chairman?
- Through experience and contacts?
- Through receiving reports from health committee reports?
- What about radio and National press?

3) Health manpower information

4) What is your information needs for health manpower requirements in your ward?

Do you need information about type of health institutions which exists?

Do you need information about health staff needed?

Do you need information about starting data for construction of health institutions?

Do you need information about date of completion?

Do you need information about number of health institutions?

Do you need information about the number of health staff required from each village?

APPENDIX 2

Dear Sir/Madam

RE: Computer-aided information support system for manpower requirement analysis for health sector at the local government level in Tanzania.

I am a graduate student at Addis Ababa University. I am conducting a study on "Information support system for manpower requirements analysis for health sector at the local government level." My study, among other things, involve identification of health planners and decision makers information needs, information sources, health staff and health institutional data.

The information you provide in the questionnaires will facilitate the planning as well as the development of the prototype databases of health institutions, health staff and health projects for Sinigda District Council.

Please return the completed questionnaire by 30th September, 1994 to:

Hosea Mungwabi
University of Dar Es Salam Library
P.O.Box 35092
DAR ES SALAM, TANZANIA.

Questionnaire to Identify Health Manpower Information Sources and Needs of the District Officers

1. Name ----------
2. Position ----------
3. Affiliation ----------
4. Responsibilities ----------
5. In executing your duties, what types of health manpower information do you need? Please fill in an appropriate space.

i) Information about the number and types of health personnel

v) Through government directives ----------

vi) Through government publications ----------

vii) Through media ----------

viii) Through national press ----------

APPENDIX 7

Name.....
File number.....
Date of birth.....
Sex.....
Status of employment.....
Date of joining.....
Jobs held before joining.....
Specialization.....
Educational qualification.....
First appointment post.....
Current post.....
Starting salary.....
Current salary.....
Current workplace.....

APPENDIX 7

Name.....
File number.....
Date of birth.....
Sex.....
Status of employment.....
Date of joining.....
Jobs held before joining.....
Specialization.....
Educational qualification.....
First appointment post.....
Current post.....
Starting salary.....
Current salary.....
Current workplace.....

APPENDIX 8

Field Definition Table (FDT) Data Base: PO

Tag	Name	Len	typ	Rep	Delimiters/Pattern
- 10	Ministry	100	X	R	
- 11	Organization	100	X		
- 12	Project Title	100	X	R	
- 13	Project Description	300	X		
- 14	Objectives	500	X	R	
- 15	Benefits	100	X		
- 16	Constraints in Implementation	100	X	R	
- 17	Finance	100	X	R	
- 18	Status of the Project	100	X		
- 19	Starting Date	15	X		
- 20	Completion date	15	X		

APPENDIX 9

Data Base Name: PO FST for Inverted File FST name: PO

```
==========================================
 ID  IT  Data extraction format
==========================================
===
- 10  1  (v10/)
- 11  0   v11
- 12  1   (v12)
- 18  1   V18
```