WORLD HEALTH ORGANIZATION

SEMINAR ON THE ROLE OF HEALTH SERVICES AND TRAINING INSTITUTES IN CONTROL OF VECTORS AND RESERVOIRS OF DISEASES

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A BRIEF REVIEW OF THE EPIDEMIOLOGY AND RELATIVE IMPORTANCE OF VECTOR BORNE DISEASES IN TANZANIA

BY

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"SEMINA ON THE ROLE OF HEALTH SERVICES AND TRAINING INSTITUES IN CONTROL OF VECTORS AND RESERVOIRS OF DISEASES"

"EPIDEMIOLOGY AND RELATIVE IMPORTANCE OF VECTOR BORNE DISEASES AND ORGANIZATIONS OF VECTOR CONTROL UNITS IN TANZANIA"

BY. DR. A. U. DAHOMA, M.D., MPH

Sumarry:

Tanzania lies sauth of the equator and enjoys a tropical climate which also offer a very good breeding area for different vectors and other parasites.

Malaria is found in all its four forms and the predominates malaria parasites are Plasmedium falciparum 90 (%), percent followed by P. malaria 8 (%) percent. The disease can be classified respectively as a holoendemic and hyperendemic in big portion of the contry and also malaria free area exit especially in high altitudes. It ranks number one with 13 percent of outpatient reported cases and with 5.3 percent mortality among admitted cases.

For the last five years, plague cases are being reported in the country Yersenia pestis and plague antibodies are found in all confirmed cases. The incidence of the disease this year is also on the increase incomparison with last year.

Bancroftian filariasis are found along the coast and shores of Lake Victora, Tanganyika while onchocerciasis are fond mountain terrain areas where there are fast flowing rivers. Simulim damnosium and S. naevei are the principal vectores of onchocerciasis while, filariasias are transmitted both by Anopheles gambie, A funestus and culex fatigans. Both these disease claim a moderate morbidity in the affected areas.

Geographical distribution of human Rhodensianis trypanosomiasis has been shifted over the years. Glossina morsitans, G. Suynertoni, G. pallidipes and G. fuscipes are important vectors. The latasb recorded incidence of the disease is 560 pt.

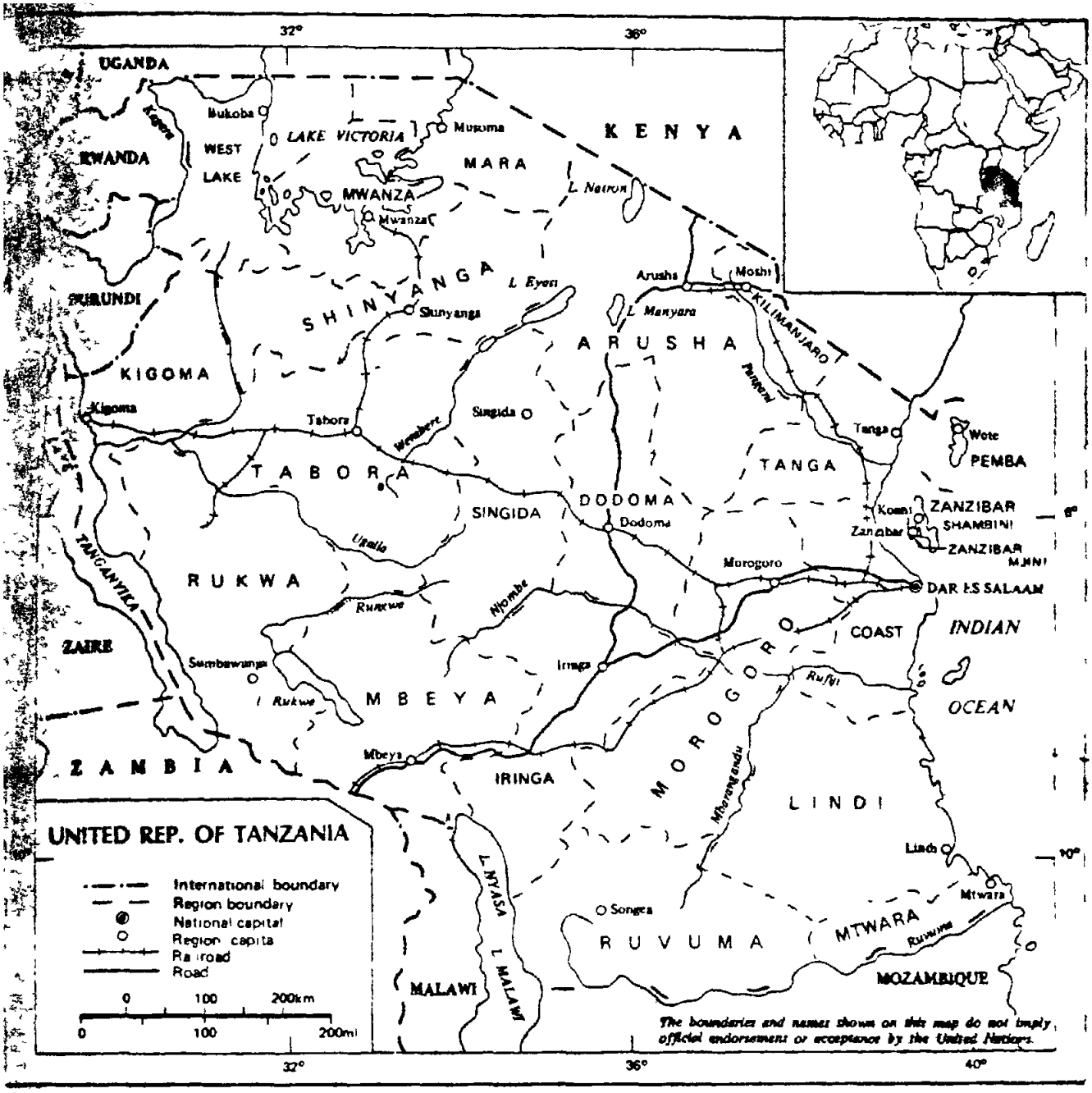
Bilharsiasis both of haemotabium and monsoni types are found in the country. Mansoni is more predominant along Lake Victoria shore while haemotobium is prodominant along tne coastal areas.

It is estimated that about 20 percent of Tanzania are infected with schistomes.

In all administration levels, vectors coutrol have been established. Three ministries are involved in the vector control programmes.

Ministry of Health deals with the control of human related diseases, while the Livestock Ministry is involved with zoonotic disease and the Ministry of Agriculture deals with rhodent control programmes. Insecticides combined with chemotherepy prophylaxis are being used in the control programmes.

The problem of insecticides resistances especially on malaria control is rising in the country. The mosquitoes including malaria parasites are becoming resistance respectively both to the mentioned insecticides and to the malaria chemotherapy. This problem forces us to change our malaria control strategy. In future, we have to exphasis more on enviromental control i.e. by improving enviromental sanitation, and drainage system other than to rely on expensive and less effective insecticides.



MAP NO.3006 UNITED NATIONS
OCTOBER 1978

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GEOGRAPHY AND PEOPLE

Tanzania lies just South of the Equator between Lakes Victoria, Tanganyika and Malawi and the Indian Ocean. It covers an area of 945,050sg km. (inlcuding 59,050 of inland water), all of which - except for anarrow belt along 900 kilimeter coast lies an altitude of over 300 meters. In the north Mount Kilimanjaro, with a permanet ice cap, rises over, 5,000 meters with a belt of high land that runs South West from Usambara mountains behind Tanga to the high lands around the tip of Lake Malawi. The bulk of the country forms a plateu of about 1000 meters high. Tanzania shares border with Kenya and Uganda in the north, Rwanda, Burundi and the Republic of Zaire in the west and Zambia, Malawi and Mozambique in the South.

Woodland, bushland and wooded grassland are the predominant types of vegetation. The main climatic features is the long dry spells from May to October, followed by a period of low rainfall which is concetrated into relatively few days of heavy showers. The main rainy season on the coast is from March to May but there is a second sesonson from October to December, total rainfall increasing fowards north. Around Lake Victoria, however rainfall is well distributed through the year with a peak during March to May. Tempratures very cousiderably depending on altitudes from 0^{c} in highlands during winter to as high as 35^{c} along the coast with very high humidity.

Demographic Characterestic

Tanzania has 18,000,000 (17,527,000 people) of these 46% are under 14 years and 6% are over 60 years. The number in the repreductive age group (19 - 44 years) are over 20% of population.

Demographic Rates

Rates	1967	1976	1978 Tsh
Crude Birth/1000	47	47	46
Crude Death/1000	22	17	13
Rate of Growth o/c	2.5	2.8	3.3
Infant Mortality Rate/1000	161	152	135
Life Expectancy at birth (year)	35	47	52
Total Fortility	6.2	6.2	6.2

The indigenous in habitants of Tanzania are mainly Bantu. Small Arab, Asian, and European Communities are also found in Urban and Semi Urban Communities. Considerable inter marrage has taken place over the years amongst different communities. Kiswahili is understood everywhere and is the official language of the Governments. A majority of population is either Moslem or Christian.

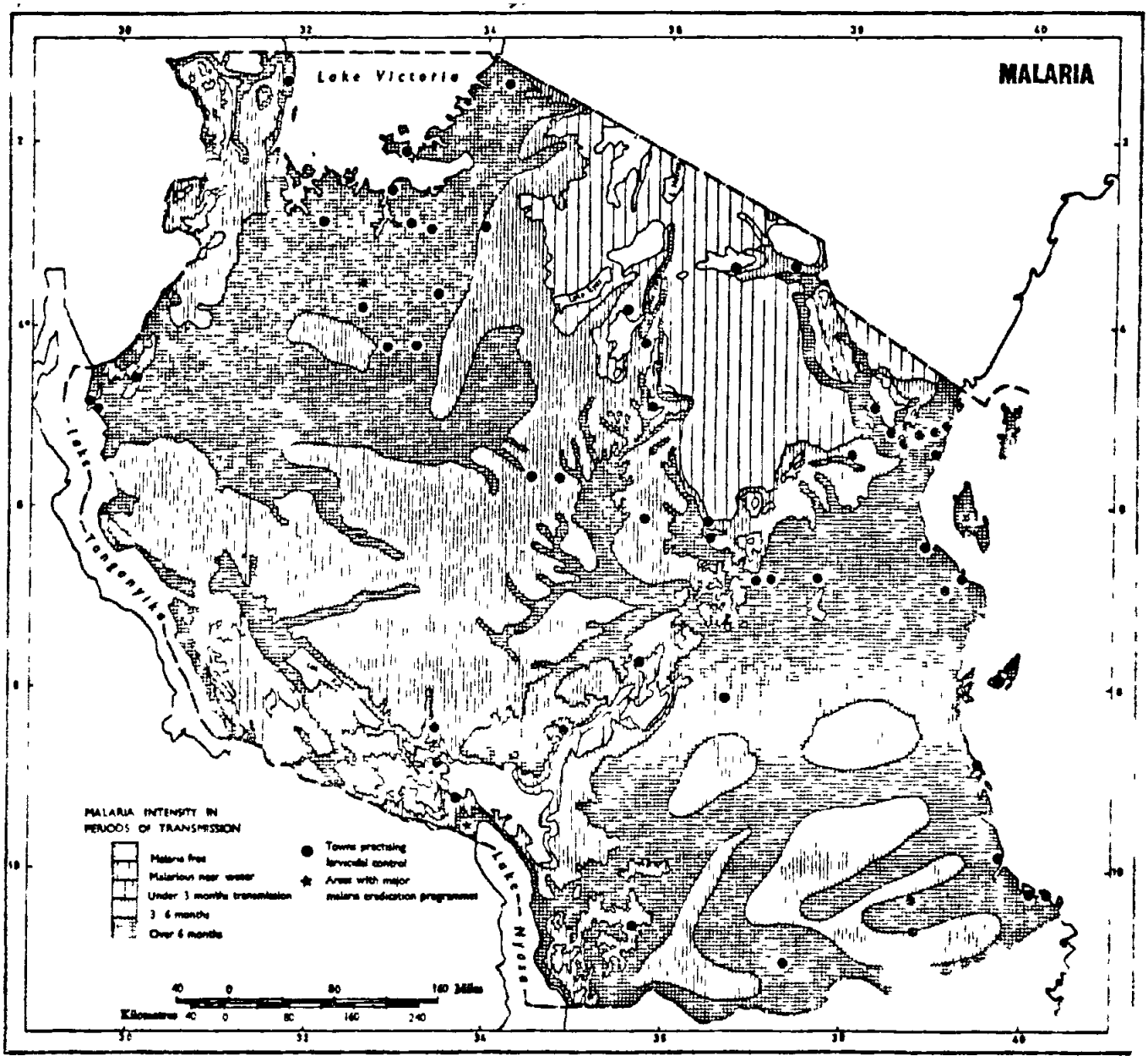
ADMINISTRATIVE STRUCTURE

Tanzania is a constitutional one-party state. The administrative Structure has developed in response to the development of the political system. Since independence the country has adopted a man centred 'or mass oriented' development strategy in which people's participation in the development process is expected to play the basic role.

All the regions (20) and districts, municipaties and cities are directly under the administrative control of Prime Ministers Office. Each region is headed by a Regional Commissioner who is appointed by the President. All development activities within the region are headed by a Regional Development Director (RDD). RDD is the Chief Executive and is supported by a Regional Planning Officer, Regional Manpower and Administrative officer and Regional functional managers who represent the various development sectors which are Ujamaa and Co-operatives, Agriculture, Industries, Education Commerce, Health, Water, Lands, Natural resources and Livestock Development of various sectors within the regions. The Ministries are also responsible for sectoral manpower development training and retraining and staff development.

At the district level there is a corresponding structure which is headed by Area Commissioner. There are a total of 104 districts in the country. The next administrative level is the Division which is headed by Divisional Secretary. There are 360 Divisions which are again divided into wards. Each is headed by a ward secretary.

It is also appropriate here to mention about health administration. Each region has a Regional Medical Officer who is also a functional manager assisted by a Regional Health Officer, Regional Nursing Officer and Health Secretary. Regional Medical Officer is responsible for all



MAP
Figure 1 Malaria Transmission in Tanzania

Source Berry L Tanzania in Maps

Curatives and Preventive work in the Region. Although administratively, he is under R.D.D., he seeks technically advice from the Ministry of Health. District Medical Officer is also incharge of his district for both curative and preventive work.

B. EPIDEMIOLOGY OF VECTOR BORNE DISEASES

Here is the epidemiological description of the main vector born diseases found in Tanzania. Viz, Malaria, Plague filariasis, human typonosomiasis Onchocerciasis and schistomiasis.

1. Malaria

The most widespread tropical disease in Tanzania is malaria. 13 percent outpatients and 9 percent of hospital admissions were patient of malaria and hospital deaths are 5.8 percert.

Malaria distribution in Tanzania is shown in map A and can be conviniently be divided into three transmission periods which will be described below.

All four species of malaria parasite occur, Plasmodium falciparum consisting of more than 90 percent of the infections encountered in all alltitude, P. malariae is usually 8% of infections particularly in childhood when it is always mixed with falciparum, P. Vivax is about 1-2 percent of infectious and P. avale is V. rare infections.

The principal vectors are Anopheles Gambie, the most dangerous and ~~widespread vector of malaria in Tanzania, which is capable~~ of breeding in collections of fresh or brackish water of almost any size and A. funestus favouring rather more shaded and permanent breeding sites. Conviniently malaria transmission can be divided into 3 periods:

(a) Transmission For More than Six Months

This condition is one of the stable malaria. The principal vector is Anopheles gambie in coastal Tanzania where temperatures range is 75-90%, the humidity high and the life expectancy of mosquito is long.

A high degree of immunity is acquired by unprotected inhabitants of these areas, who liable to be infected repeatedly during the year. Much illness occurs among children and mortality rate is about 10 percent. Adults are

generally free from clinical malaria. The spleen and parasite rates are between 70-100 percent and is decreasing to 30-50 percent to adults. Malaria is in this group holoendemic.

(b) Transmission for three to Six Months

Malaria tends to be seasonal, resulting in epidemics which are mild in areas eight degrees south of equator. A substantial degree of immunity may be confered upon the inhabitants. This group is hyperendemic and the spleen and parasite rate is between 50 - 70 percent.

(c) Transmission for less than Three Months

This condition usually cause seasonal malaria. It is transmitted by A. gambie and it occure in epidemics form except in particular dry years.

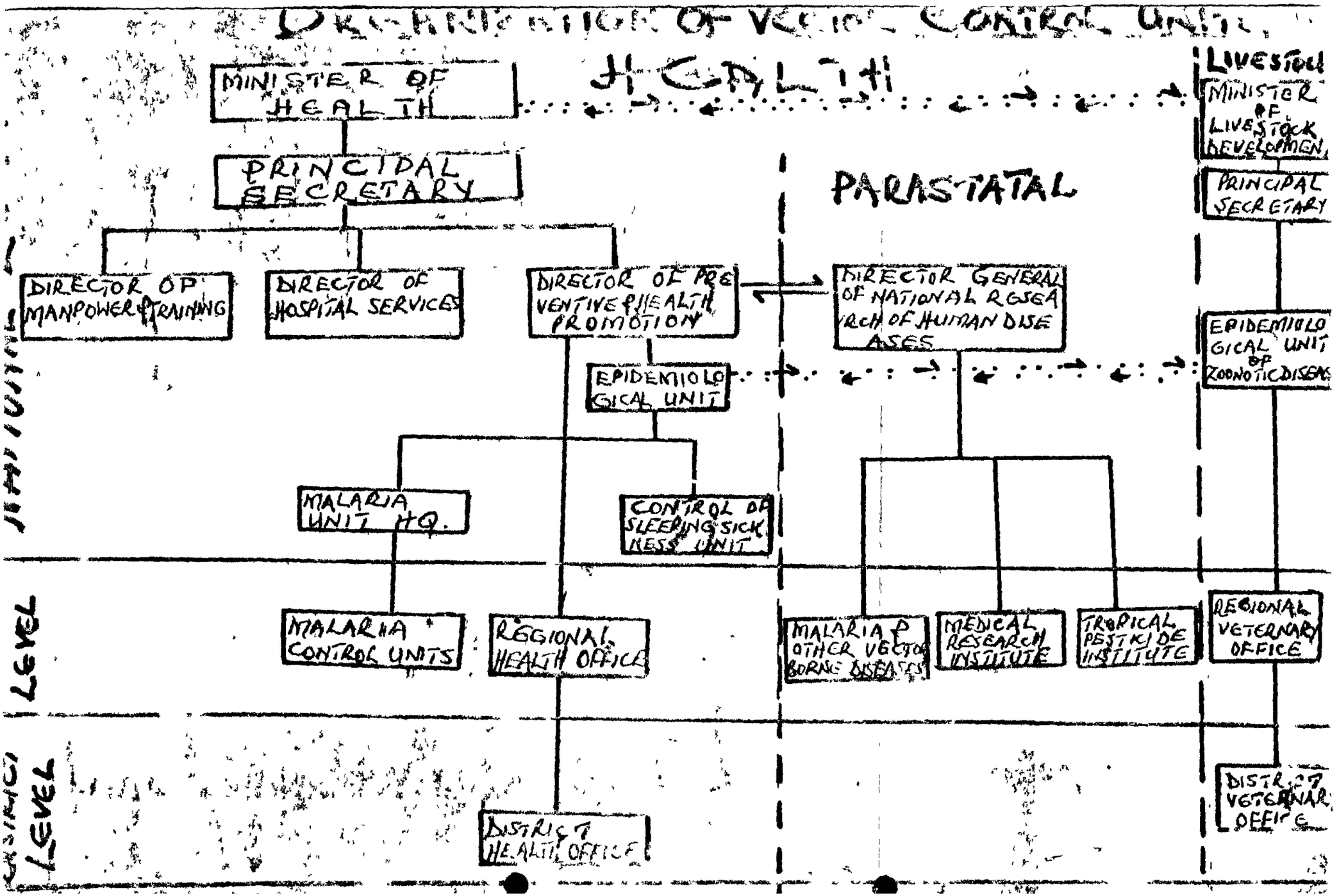
Seasonal malaria generally becomes manifes one month after the onset of the rains and reaches a peale in two months soon after the end of the rains. The central period of this season is Northern Tanzania is May - July, to the East and April - June to the West of Rift Valley and in Central and Southern Tanzania is from March to May and is during this seasons that A. gambiae predominates.

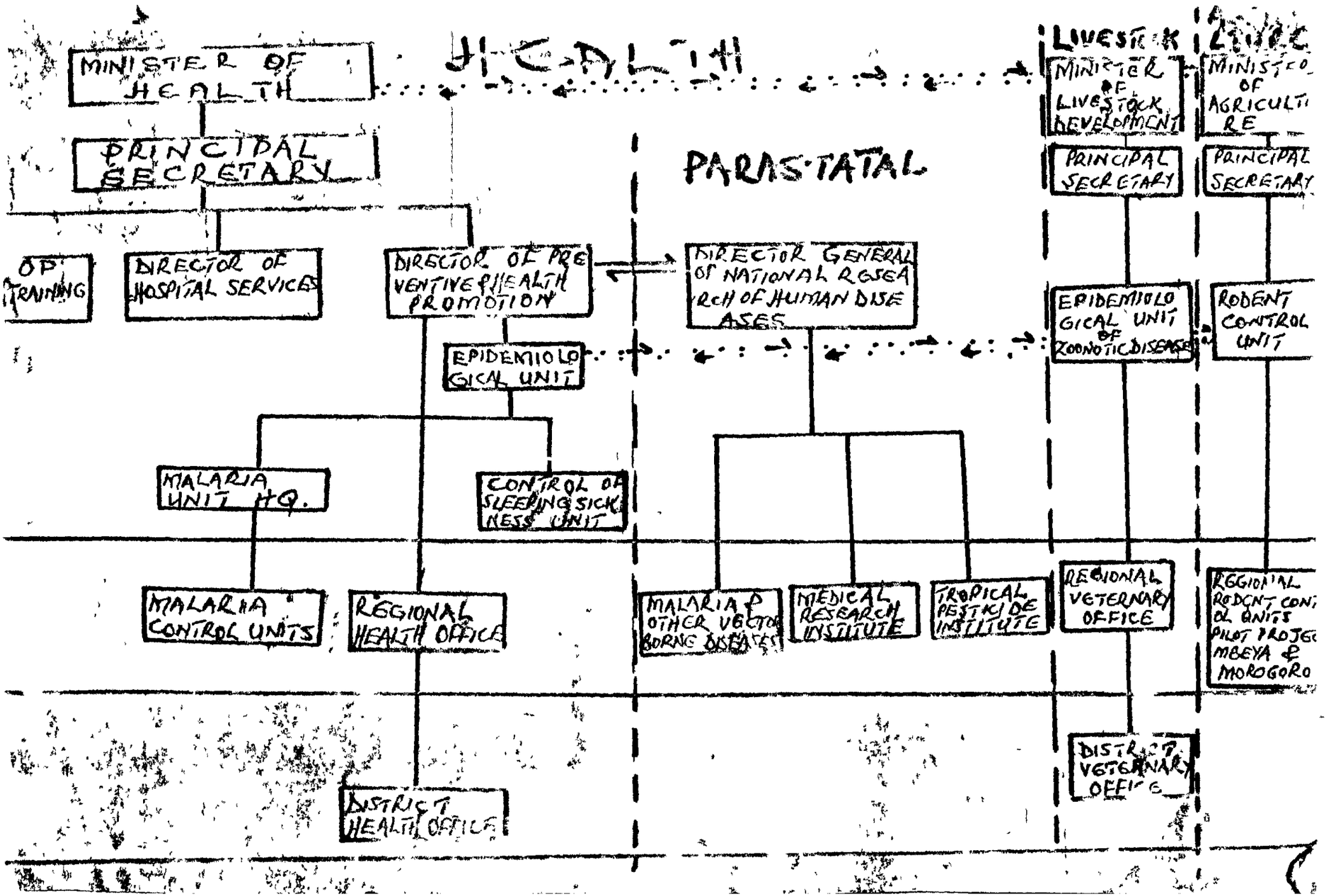
Little immunity is acquired by inhabitants unless they visits zones of greater transmissions.

2. HUMAN PLAGUE

Incidence of reported human plague cases seem to fluctuate for the last five years as show below.

No. of Cases and Deaths of Human Plague
From 1978 - July 1982, Tanzania


ORGANIZATION OF VECTOR CONTROL UNITS
HEALTH
LIVESTOCK
MINISTER OF HEALTH
MINISTER OF LIVESTOCK DEVELOPMENT
PRINCIPAL SECRETARY
PRINCIPAL SECRETARY
PARASTATAL
DIRECTOR OF MANPOWER & TRAINING
DIRECTOR OF HOSPITAL SERVICES
DIRECTOR OF PREVENTIVE & HEALTH PROMOTION
DIRECTOR GENERAL OF NATIONAL RESEARCH OF HUMAN DISEASES
EPIDEMIOLOGICAL UNIT
EPIDEMIOLOGICAL UNIT OF ZOONOTIC DISEASES
MALARIA UNIT HQ.
CONTROL OF SLEEPING SICKNESS UNIT
NATIONAL LEVEL
MALARIA CONTROL UNITS
REGIONAL HEALTH OFFICE
MALARIA & OTHER VECTOR BORNE DISEASES
MEDICAL RESEARCH INSTITUTE
TROPICAL PESTICIDE INSTITUTE
REGIONAL VETERINARY OFFICE
DISTRICT LEVEL
DISTRICT HEALTH OFFICE
DISTRICT VETERINARY OFFICE


HEALTH
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DISTRICT VETERNARY OFFICE
MINISTRY OF AGRICULTURE
PRINCIPAL SECRETARY
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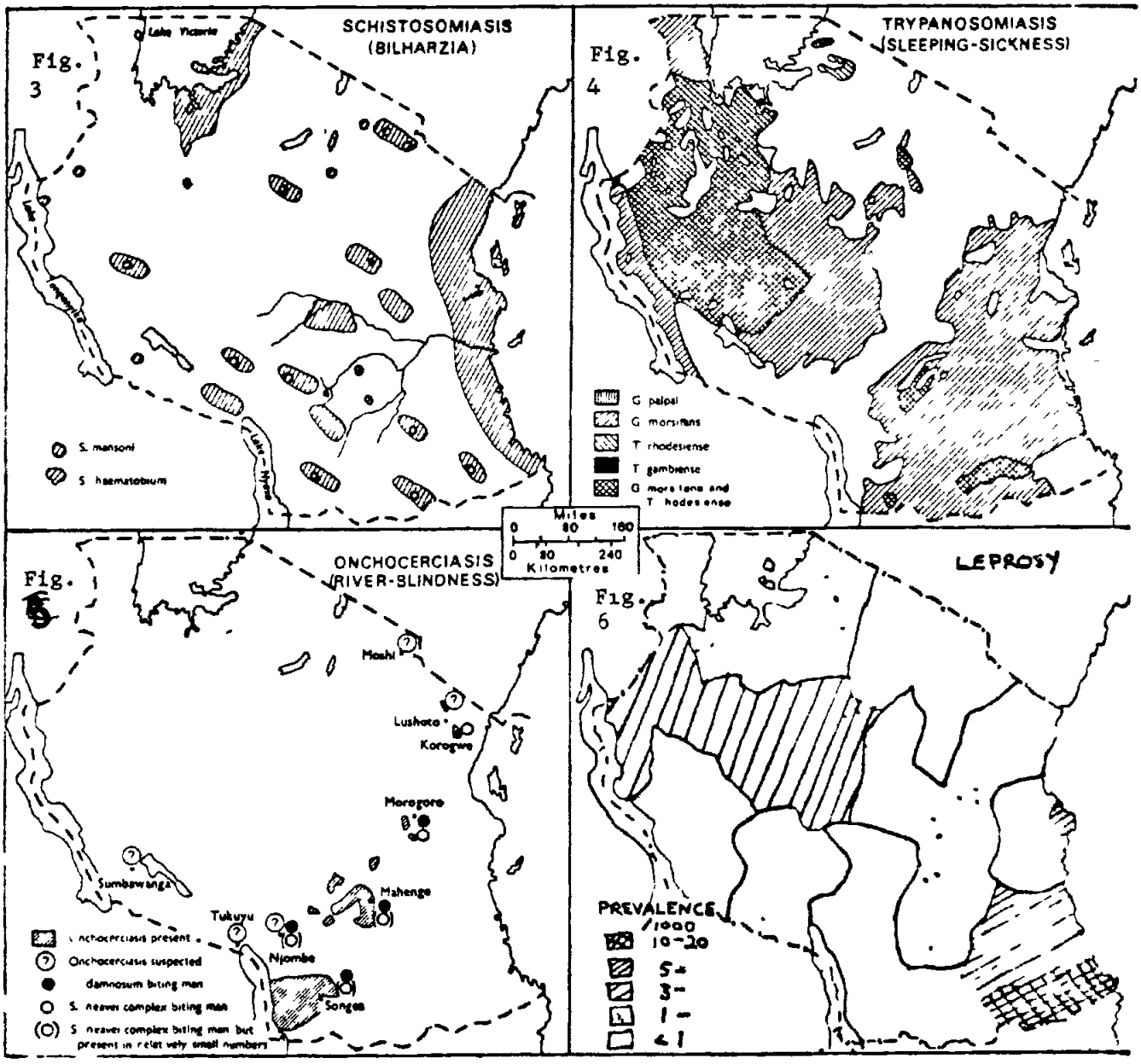

Figure 3 (Upper Lt.). Schistosomiasis Distribution in Tanzania.

Figure 4 (Upper Rt.). Trypanosomiasis Distribution in Tanzania.

Figure 5 (Lower Lt.). Onchocerciasis Distribution in Tanzania.

Figure 6 (Lower Rt.). Leprosy Prevalence in Tanzania.

Sources: Figs. 3, 4, and 5. Berry, L. Tanzania in Maps.
Fig. 6. Meyerson, E. Un Atlas de la Lepre.

YEARS:	1978		1979		1980		1981		1982		TOTAL	
	C	D	C	D	C	D	C	D	C	D	C	D
	1	1	1	-	22	8	2	-	8	2	34	11
	1	1	1	-	22	8	2	-	8	2	34	11

The affected regions are Arusha (1978), Mwanza (1979) and Tanga (1981 - 82). These are areas of high altitude, and covered in most part of the year with bush and grassland and there is a large presense of rhodent populations. Among the endemic foci, Tanga is the new foci and the disease has occured repeatedly for the last 3 years. Even though there is no reported deaths, the incidence of the disease is rising. All bacterialogical examination in all positive cases confirmed the presence of Yersenia Pestis.

Endemic foci of human plague, in this context, can be defined as areas which have experienced outbreak of human plague at one time or another. Here the name of the foci have been named according to the region or district the disease occured. Therefore the known endemic foci are Iringa, the Lake Victoria foci, the Singida/Kondoa foci, and Meru/Kilimanjaro/Pare foci and new Tanga foci.

Some of the foci are still active and human plague cases have been reported from then the past decade e.g. W. Kilimanjaro 1972, Mbulu 1977, 1978 and Mwanza 1979. Some foci such as Iringa are generally regarded as ~~quiescent but possibility~~ of the rececurence of the disease in the region can not be ruled out completely, as some of the areas plague has reoccured after a long period of quiscence. In Mwanza, for example plague occured in October 1979, twenty nine years after the last recorded outbreak. Which occured in 1951.

3. Filariasis

Bancroftian filariasis is an important infection over a large part of Tanzania. The infection of filariasis is very prevalent of about 20 - 70 percent infection rates in three areas a large and extensive coastal belt of about 20 - 56 miles of inland Tanzania, a large and diffusely demarcarted area extending sauthwards from L. Victoria shores, and a small localized area the northern end of L. Nyasa and Rungwe District. The inland foci and very probably in most of the Coast plain, the disease is rural incharacter and transmitted by anopheles gambie and A. funestus and culex fatigans. There is a high incidence of this disease in these areas, which manifest self by clinical signs of elephentiasis, hydrocele, thickness of spermatic cord etc. Besides being a major cause of morbidity, Bancroftian filariasis is a big drain on scanty medical resources, most surgical cases in both coastal especial hydrocele.

Recent years have witnesse increased in this infection much of it is due to unplanned urbanisation.

4. HUMAN TRYPANOSOMIASIS

Presently only Rhodensian trypanosomiasis is endemic in Tanzania. Rhodensian trypanosomiasis was first recorded in 1922 in Maswa District south of L. Victoria. It then spreads throughout mainland Tanzania, the majority of cases are coming from Arusha, Kigoma Rukwa and Kagera region.

However, the first two epoches of this century epidemics of Gambian trypanosomiasis occure on shores of L. Victoria, others occur on the shores of L. Tangenyika.

The geographical distribution of trypanosomiasis has shifted over the years. Arusha region which until 1943 was not endemic now accounts for over one third of all cases, similarly Ngara district was net afflicted until 1953. However, Shinyanga region which previously experienced devastating epidemic is now practically non-endemic and so are Bukoba, Singida, Kamana, Ulanga, Kondoa, Tarime, Serengeti, Geita and Kigoma districts.

Recent epidemics in Tanzania have accompnied excessively dry seasons when animals reservoirs, tsetse and man have congregated at the scare water resources. Others have accompnied the exploitation of Vargin land when creating new human settlements. Many sporadic infection have been associated with social visits, hunting, honey and beeswax collecting, fishing, charcoal burning, road and rail constructing aid so on.

Over 60% of Tanzania is tsetsed infested, the most impertant vectors of the human disease being Glossina morsitans and G. swynnertoni, G. pallidipes and G. fuscipes keeps on reappearing in Kigoma. The annual reported incidence of Rhodension trypancsomias varies from highest record of 3,262 cases in 1926 to 560 in 1982.

5. Onchocerciasis

Onchocerciasis is endemic in some areas lying between East, North east and South west port of Tanzania. The disease is prevalent where the vecters. Simulium (Edwardsellum) damnosium, and s. neavei that are involved in the transimission of the disease are confined. These are the areas of wellwooded, fast flowing rivers and streams on hilly or mountain terrain of Kilimanjaro, Lushoto Tanga) Mahenge (Morogoro), Kigoma, Mbeya and Ruvuma.

It is estimated that about 5,000,000 Tanzania were infected will O valvulus. Two percent of persons infected suffer from visual impairment and blindness is almost likely to occur in the elederly. Prevalence rate in Tanga are throught to be as high as 40%, Morogoro, 35% and Ruvuma 20.
The set up of vector control units on the national, regional and district levels as shown in the organization chaft.

Bilharsiasis (SCHISTOSOMIASIS)

This is endemic disease in the country. Schistosoma haematobium is found more on along the coast while S. mansoni is found on the southern and estern shores of Lake Victoria and near Lake Rukwa. See fig 8. Snails Bulinus and Biomphalaria are the vectors responsible for the transmission of the diseases. In 1976 it was estimated that about 20% of Tanzania were infested with Schistosomias. There is no National Programme for the control of the diseases. The methods of control of using moluscuciding and Chemotherapy are advocate by the Medical Research institutions. Mini antibilharzias projects were carried out in 1980 in Mbeya and Rukwa regions. This project combine/health education to the puolic on the importance of having and using latrines and avoidance of indiscriminate micturation or defeacation,

Molusciding of the infested water, treatment of patients and providing where possible with alternate source of water as near to their residance as possible in an attempt of reduce their attractions to the infested water. The initial results are encouraging as the prevalence of the diseases has been reduced by 50%. If this becomes successful it is the aim of extend if to other areas.

National Level

Three Ministries are involved in the set up vector control units. These are Ministry of Health, which is concerned with malaria, sleeping Sickness and insect control; while the livestock Ministry which is involved with Zoonotic diseases, and the Ministry of Agriculture which is involved with rhodent control. Applied research of treatment and control of diseases are being conducted by three institutes i.e. malaria and other vector borne diseases, medical Research and tropical Pesticides research institues. The results of findings of these rearch are then forwarded to the Ministry of Health for practical applications.

The main functions at the national levels are to organize, to equip, to supervise, advice, and provision of manpower to the regions and districts.

REGIONAL/DISTRICT LEVEL

This is the level of implementation of different health programs. Regional Health Officer is the right-hand man of Regional Medical Officer, and he is incharge of a large proportion of preventive services in the region. Control of vectors, and insects with all their control units fall under his jurisdiction. He is assisted by regional and district teams of health officers and health auxillaries. He ~~is being supervised by a Regional~~ Medical Officer who is overall incharge of health in the regions. Likewise is the district health officer in the district.

The regional vertenary officer in charge of zoonotic diseases in the region. In the Vertenary department, there is a unit of tsetse fly control, headed by a regional tsetse fly officers and they are responsible for control of tsetse fly in the region .

Likewise, the rhodent Control unit, in the ministry of agriculture, is responsible for rhodents control in the region.

In all levels, there is a close cooperation between Interministerial, regional and sistrict levels. Concerning the control of vectors and rhodents.

Both health and vertenary control units are using residual insecticides of different brands and strength to fight against vectors. In malaria, and bancroftian filariasis, organochloride (DDT, BHC, Dieldrin), organophosphorus (Sumithion, Diazon) and Carbamites combines with larviciding are being used to fight Anopheles gambiase, A. funestus and Culicine mosquitoes while in tsetse fly control Dieldrex/5T being used for spraying.

Weekly chloroquine prophilaxis are given to pregnant women and under children in the clinics.

Agricultural extension officers from rhodent control units are using rhodenticides and traps to reduce rhodent population, but in case of outbreak of plague traps are being used to traps rhodents alive defleaing them and then kill them. Gemaxin or D.D.T. powder 0.5% is being used to dust dwellings of cases or suspected cases of plague.

The problem of insecticides resistances especially on malaria control is rising in the country. The mosquitoes including malaria parasites are becoming resistance respectively both to the mentioned insecticides and to the malaria chemotherepy. This problem forces us to change our malaria control strategy. In future, we have to emphasis more on enviromental control i.e. by improving environmental sanitation, and drainage system other than to rely on expensive, less effective insecticides.