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## MALNUTRITION IN TANGANYIKA

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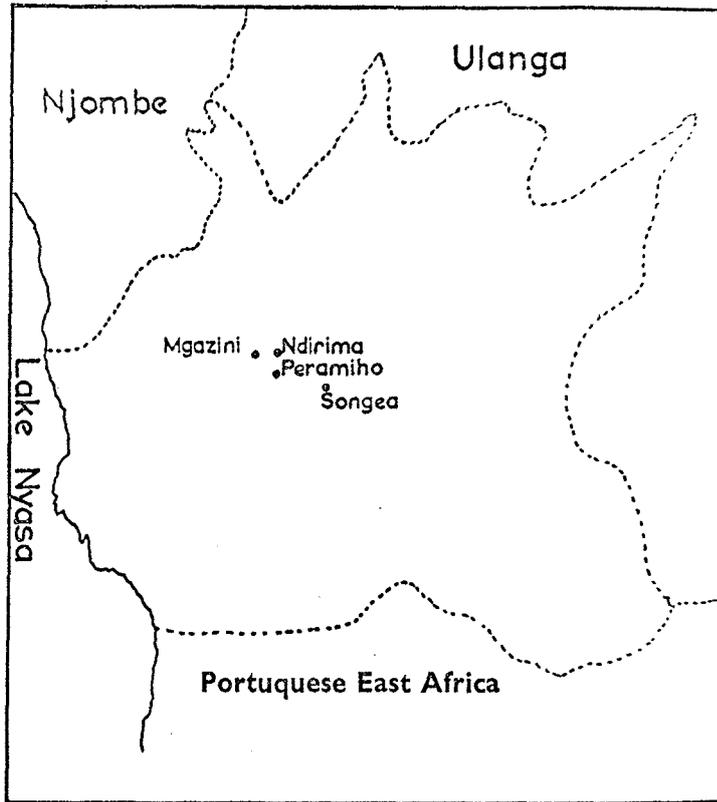
Malnutrition is now being recognized as one of the major causes of illness and death throughout the whole world.

The causes of malnutrition in its widest sense are various; insufficient food to eat, eating a diet which is inadequate in certain substances, eating poisonous substances—such as poisonous fungi or berries or grain contaminated with ergot—or even too much food. Insufficient food implies famine due to drought, flood, fire or locusts; this will not be considered further as there is adequate machinery for dealing with famines when they occur in Tanganyika. Neither is it proposed to consider the problem of eating too much food; although it is a national problem facing the United States of America at the present time, it is not likely to affect Tanganyika for many years to come. The ingestion of poisonous substances is of very minor importance, so that the main problem to be faced is malnutrition due to a diet which is lacking in certain substances. A normal diet should provide energy, which comes from the cereals, starchy foods, oils and fats: it should provide materials for building the body, (protein,) which is derived from milk, meat, eggs, fish and, most important in this country, cereals; lastly, the diet should provide protective substances, such as vitamins and minerals, which maintain health and prevent diseases.

Considering Tanganyika as a whole, it is possible to state with some degree of accuracy the amount of foodstuffs available per head of population. These figures indicate that there are sufficient energy foods for subsistence only and that the community as a whole is suffering from protein shortage and also from seasonal shortages of fresh fruit, vegetables and green leaves. This is the position today, but the population is increasing, making the problem ever more urgent. Birth rates remain about the same but death rates are decreasing, and people are living longer. In Tanganyika the African population increased by 1,200,000 in the nine years between 1948 and 1957 and it is estimated that the population will double within the next thirty or forty years, so that it is evident that the production of energy-supplying foodstuffs must be doubled in the same period, while, if an adequate protein consumption is to be attained, production should be tripled.

Tanganyika has no homogeneous social or economic structure but its communities may be classified into the following groups:— Urban communities with peri-urban settlers; labour communities; institutional communities, such as schools, police, prisons, hospitals; and rural communities.

From the nutritional viewpoint, methods of influencing the diets of the first three of these groups can be, and have been, used, but it is most necessary to consider the fourth group, i.e. the rural communities who are the food and cash crop producers of Tanganyika. They form the vast majority, but their diet patterns are influenced by so many factors, such as climate, social life, tribal taboos and methods of agriculture, that, apart from supplying food during famine, little has been done to improve their nutritional status. So much in the future depends on increased production by the rural peasant farmer, but if he is to be more efficient he must be healthy; his health depends on his diet; his diet depends on his energy output; and his energy output in turn depends on his diet. The basic problem is to break this vicious circle. It is proposed to give an account of an enquiry into the nutritional status of a rural community in Songea District, describing the problems which were revealed and the methods used to solve them, in an attempt to deal with this situation in one small area.



Map 2. Songea District

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<sup>1</sup>Gulliver, P.  
<sup>2</sup>Nutrition an

Songea District has an area of 16,000 square miles, roughly the size of the Netherlands, and it is situated in Southern Tanganyika. In the district book in the Songea District office there is a very adequate description of the country which says "It comprises three types of country, the lower Ungoni plateau, the higher Matengo highlands and the riftlands which lie between the latter and Lake Nyasa. The greater part of this country is most fortunate in possessing as soil a red loam of remarkable fertility. Thorn bush is not seen, but the country is well wooded, and watered with clear free-running perennial streams. The annual rainfall is 40 inches, most of which falls between December and April." First impressions are bound to be that it is difficult to understand why malnutrition should occur in a country so favoured by climate, soil and topography.

A portion of the central part of Ungoni plateau is populated by the Wangoni. They are the descendants of a war-like group of the Zulu tribe which, as a result of tribal dissension, fled from the South African Zulus led by Chaka. The Wangoni settled in this territory in about 1862 after waging war in Southern, Central and Eastern Africa. They were powerful, well led and feared until the Maji-Maji rebellion in 1906. After the rising, the German Government's punitive measures included the execution of the leaders of the Wangoni and as Gulliver has written:—

"At a blow the Ngoni were humiliatingly deprived of their military power and pride and were thrust into a modern world, in which local warfare was banned and in which they were totally unfitted by custom and training to live. Bereft of their military activities and prestige they could find little to put in their place as a cultural ideal or as the basis of a political system."<sup>1</sup>

One other anthropological fact is significant. Those tribes which had capitulated in former wars were taken as slaves and later were allowed to marry into the tribe. By this system it would appear that the tribes of greater mettle were killed and those of weaker spirit were absorbed into the Wangoni, the net result being a tribe having the lowest common denominator of similar characteristics and culture, with little except a name in common with their ancestors.

In 1956 malnutrition was noticed amongst the people of Maposeni. This is a small village situated close to the large Benedictine Mission at Peramiho and is in the centre of the area inhabited by the Wangoni. Further examination showed that malnutrition was rife in the neighbourhood and the state of affairs was brought to the notice of the Chief, Nkosi Zulu, who denied the presence of malnutrition, pointing out that children were certainly ill, that many died every year, but that this was a normal state of affairs; since there was ample food in the form of cassava, how could it be due to malnutrition? The problem was discussed by the Songea District Team and with the approval of the Chief it was decided to conduct a combined enquiry into conditions around Maposeni.

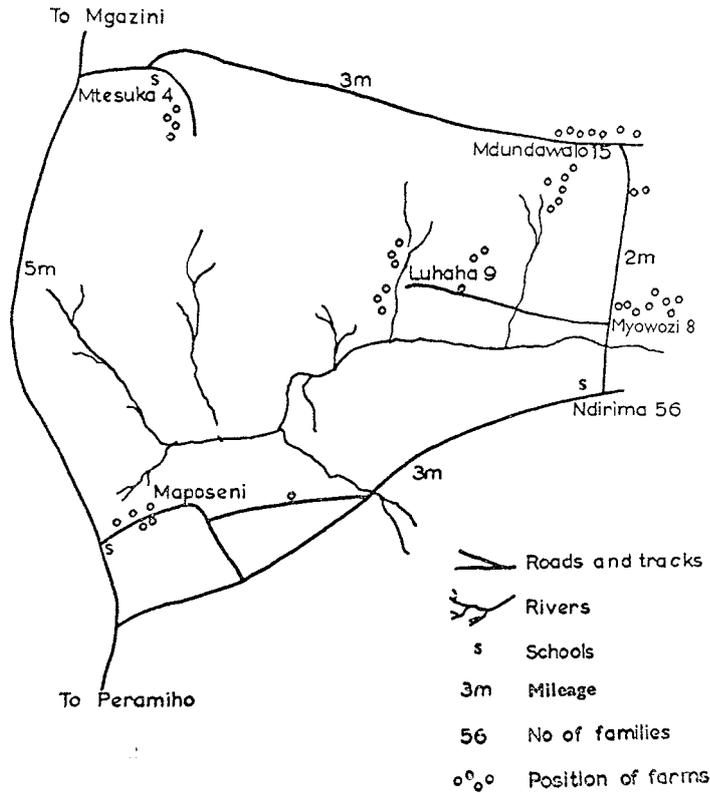
Previous enquiry involving the nutritional status of a community had been made by Culwick<sup>2</sup> in Bukoba in 1938 and in 1939 and it was shown then that "to study the subject of nutrition *in vacuo*, without relating it to topography, geology, climate, social and political organizations, history and the social values it has produced, economic activities other than food production, public health, population trends, land laws, the maintenance of fertility, even religious beliefs, magical observances, fads, fancies and prejudices, is of little, if any value."

It was decided to carry out a survey on several different lines simultaneously; the Medical Department conducting a medical survey, the Agricultural Department a survey of food production and methods of cultivation, the Veterinary Department a livestock census, and the Administration an enquiry into the social and family background of the people living around Maposeni. The area which was chosen for the survey is shown on the sketch map on page 262. It is approximately four miles square

<sup>1</sup>Gulliver, P. H.: Labour Migration in a Rural Economy. East African Studies No. 6, 1955, p. iii.

<sup>2</sup>Nutrition and its Content in Bukoba, Tanganyika. A. T. & G. M. Culwick.

and there are 98 families, consisting of 378 men, women and children living there. The area was chosen, first because it was a known source of children suffering from protein malnutrition, secondly because soil sampling had shown that the soil was impoverished, and thirdly because agricultural methods were typical of the whole district. Also Chiefs and influential headmen lived within the area and Ndirima was in fact the headquarters of the tribe, while the area included two schools, whose pupils could be examined from time to time and who could at a later date be educated regarding nutritional matters. Each family was visited and each member of the household was questioned in turn; the answers given to specific questions could thus be counter checked. The families were co-operative and there is no reason to suspect the veracity of their replies.



Map 3. Survey Area

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The medical survey revealed, as was suspected, an extremely high incidence of malnutrition; up to 76 per cent of the schoolboys had signs of protein deficiency, up to 50 per cent had signs associated with Vitamin A deficiency, and up to 30 per cent had signs associated with a deficiency of one of the B Vitamins. One other startling fact was noticed and that was that 25 per cent of the girls were suffering from goitre. The World Health Organization has stated that goitre is considered to require public health measures when it is present in more than 3 per cent of adolescent girls in the population group. As was to be expected anaemia was severe; not a single child had the normal level of haemoglobin of 100 per cent, and the majority of both boys and girls had only half of this amount.

Study of the results of the non-medical parts of the survey showed how this state of malnutrition could have arisen. The agriculture investigation showed that the main foods being grown were maize, millet, sorghum and cassava: with the exception of cassava, all are excellent foods. The area should, from its topography and climate, provide adequate amounts of protein, but when the amount of land cultivated was examined, it was found that it amounted to only three-quarters of an acre per head. This falls far short of the three acres per head which is by tradition accepted as the minimum area for a farmer on the African plateau to cultivate. Soil samples had shown that the area was greatly lacking in minerals and nitrogen so that any crops grown on such soil would have a poor yield. To explain this the Agricultural Officer advanced the theory that, as the ground is very hard and arid at the start of the planting season, it is not cultivated satisfactorily and during the early part of the rainy season there is insufficient vegetation or organic matter in the soil to inhibit the leaching effect of the rains so that nitrogen is irretrievably lost. Finally the germination rate of seed used is known to be low. It becomes apparent that the vegetable protein in the area is in short supply because of the small acreage cultivated soil impoverishment, and poor seed.

It is now proposed to examine the first of these factors further. The ground is no more difficult to cultivate than in most areas in Tanganyika. Mechanical cultivation is unknown and it is customary for the men to do the heavy work of clearing the bush, after which cultivation is done by the women. A study of the population structure reveals one of the reasons for the small acreage under cultivation, for if this structure is compared with that of Great Britain it is seen that there is an obvious shortage of men aged between twenty and fifty years. Migration is known to account for the permanent absence of five per cent of the male population and for the temporary absence of nineteen per cent. The latter is probably not significant as most absences occur during the dry season, the men returning before the onset of the rains to cultivate the family plot, so that migration cannot altogether account for the shortage of men. There are twenty-eight widows and one divorcee in this community, and twenty per cent of the women of marriageable age are without husbands so that it appears probable that sufficient clearing of new ground cannot be done by the relatively few males and therefore the natural shifting cultivation which does to some extent prevent the land from being continually impoverished is not being carried out.

Furthermore there appears to be a lack of organization of communal effort. The diverse tribal structure already mentioned may account for the lack of cohesion of the community. Only eight per cent of the community are direct descendants of the Mswazi (Wangoni) tribe which settled here in 1862 and this is the headquarters of the tribe.

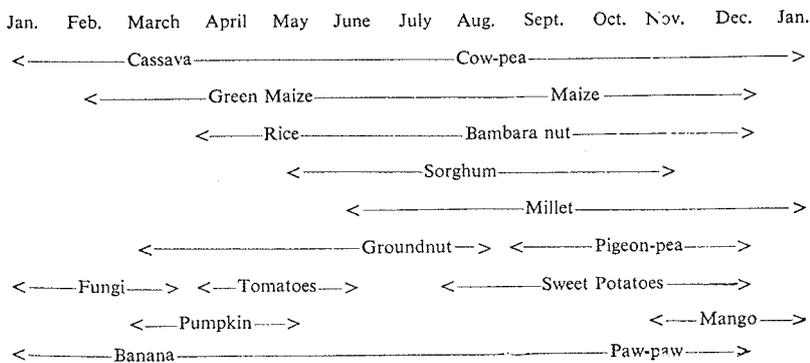
TABLE 1.—TRIBAL STRUCTURE

Tribes	Male	Female
Mswazi ... ..	11	19
Mkoaranga ... ..	26	36
Msukuma ... ..	19	28
Mpangwa ... ..	24	47
Mmatengo ... ..	19	12
Msingo ... ..	15	17
Mnyasa ... ..	9	19
Mrundi ... ..	7	7
Myao ... ..	8	8
Mngamanga ... ..	2	5
Mbena ... ..	4	4
Mkamga ... ..	1	2
Mmanda ... ..	-	8
Mdendeule ... ..	-	3
Mbwele ... ..	1	-
Mwetu ... ..	1	1
Msokile ... ..	-	1
Mhehe ... ..	-	1
Mnyika ... ..	1	-
	148	218
Not known ... ..	4	8
	152	226

TOTAL: 378

A crop cultivation calendar, based on information obtained in the survey, shows what foodstuffs are available throughout the year for the whole community, it is very apparent that there are "hungry months" when the sole source of food is cassava and cowpea.

## CROP CALENDAR SHOWING "HUNGRY MONTHS"



The latter is only used as a resting crop to assist recovery of the soil so that it is probable that cassava forms the main food during the hungry months. Moreover such food as is available is liable to be depleted by the attacks of insects, birds and beasts, as maize crops and other foodstuffs are left on the roofs of open shelters until required. It is also very probable that the estimates of the duration of food supplies are optimistic and that the hungry months last somewhat longer than appears on the diagram; there are probably four months in the year when empty stomachs, or stomachs filled only with cassava, are the order of the day.

During these hungry months the only means of improving the standard of the diet is by buying food. There are no organized markets in the vicinity and from the available cultivation figures it is unlikely that surplus food is obtainable anywhere in the group. Food can be bought from the nearby Mission but before considering that as a possible source it is necessary to examine the income of householders in this area. Only one fifth of the householders have any income of any sort. Of the twenty-one earning money only eight have a regular income, part of which could be used to buy food.

As regards protein derived from animal sources, the livestock census showed a paucity of stock of any kind. There are a few goats; nineteen per cent of the families actually own them, but they may be discarded as a normal source of food as they represent the wealth of the family and are used in bride-price transactions. The remainder of the stock is a negligible source of food as animals are slaughtered only on rare festive occasions or when death from disease is imminent. Chickens are kept by half of the families, but they are all native strains, small in body and poor egglayers, which is not surprising in view of the small amount of food available in the district.

Game animals are rare and are seldom eaten, as the Wangoni, unlike so many other East African tribes, are not huntsmen. Occasional bird-traps are set but there is no regular supply of meat from such sources.

As regards Vitamin A, the main source appears to be the green leaves of cassava, but there is some reluctance to utilize these leaves in the dry season as the farmers are well aware that stripping all the leaves will reduce the size of the root which is their main food reserve during the hungry months.

All in all, the nutritional status of the tribe has become so poor that there is insufficient food now for an output of energy sufficient to maintain family life. Some one must die in order that the rest of the community may live. The ones most susceptible are those known as the stress groups, the weaning child of 18 months to 3 years of age, the pregnant and lactating mother and the breadwinner, who is over-taxing his undernourished body to the utmost, but who has insufficient energy for a normal day's work. It is not surprising that he succumbs to one of the many infections to which the rural African is exposed and this is undoubtedly a major factor in producing the population structure already described. It is well known too that undernourishment and malnutrition are accompanied by mental changes of varying severity. Apathy, despair and open resentment are the common mental signs. It is not surprising that these areas are known as "trouble spots".

The problem of the nutrition worker, as already stated, is to break the vicious circle of malnutrition, apathy, despair, disease and premature death by increasing the availability of protein, Vitamin A and Vitamin B. Methods by which these objects can be attained are described in the following paragraphs.

Vegetable protein production can be increased by planting a better cereal seed, increasing the acreage or by increasing the natural fertility of the soil. The increased consumption of cereals would also increase the availability of the B Vitamins.

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Animal protein consumption can be increased by education of the farmers in animal husbandry and poultry production, especially the keeping of Muscovy ducks, which are hardier and provide a better yield than chickens, and, best of all, by initiating fish-farming in the area. Each family or family group can prepare a small pond in which lake fish of the carp family are allowed to breed: up to twelve hundredweights of fish per acre of pond per year have been obtained under favourable conditions and in Songea District there are now records of over two thousand ponds. A family can easily look after half an acre of fish ponds and there is every expectation of such ponds producing at least two hundredweights of fish a year. Once the fish population is established, fishing of the pond is carried out every day by the family, the surplus fish being cured for future consumption or sale. The economy of effort and of space compared with meat production from cattle is remarkable for it has been estimated that in the survey area two acres of land must be available for the grazing of each head of cattle. Considering that a family must have six to eight beasts at least for natural increase to allow of one being slaughtered per annum, the advantages of fish farming are obvious.

Vitamin A deficiency can be corrected by increased production and consumption of fruit and vegetables. The picture is complicated by shortage of oil and fat in the diet which is necessary for the absorption of Vitamin A. Groundnuts are grown but oil extraction is not being carried out. The people are now being shown methods of oil extraction with locally made machinery. The machines are to be used on a communal basis with a small charge being made for their use.

The work described is being carried out principally by the Agricultural and Veterinary Departments. An Agricultural Instructor has been posted to the area and he is building up a model farm, many features of which are already being copied by the people. Education programmes, including cultivation techniques and seed selection, have been initiated. Ante-natal and child welfare clinics are being held, so that mothers can be taught correct methods of infant feeding and child care. Endeavour is being made, by the encouragement of communal projects, to bring natural leaders to the fore and to weld the tribe into a more closely integrated community. The Chief has been given a formal course of instruction in local government. Education of the children is considered one of the most important ways of improving the nutritional knowledge and status of the community. Their normal syllabus covering general science and biology has been adjusted to stress the importance of good nutrition. They are being given practical training in better agricultural methods in their school garden, and it is hoped that they will carry to their homes what they have learnt about the constitution of a good diet and how to obtain it and cook it.

This briefly is what is meant by a nutritional scheme. Maposeni is typical of hundreds of communities which have the same problem, a problem which can be solved in similar, but not necessarily identical ways. Much hard work lies ahead, and progress is slow, but it must be accepted that the work is worth while, that it is effective and that it will make Tanganyika a better place to live in.