

# A STUDY OF SWAZI NUTRITION

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**A STUDY OF SWAZI NUTRITION**

**Report of the Swaziland Nutrition Survey 1961-62**

**for the Swaziland Administration**

by

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FOREWORD

Following the Sample Survey of Population and Land Use in Swaziland, carried out by the Institute for Social Research of the Natal University in association with the Swaziland Administration in 1959 and 1960, the Director of the Institute, Dr. J. F. Holleman, suggested that a sample nutrition survey would be a valuable "follow-up". The suggestion was supported by the Swaziland Administration and a plan of operations agreed upon, whereby the Institute for Social Research should provide a Nutritionist, and such statistical and other assistance as was possible, whilst Swaziland should be responsible for subsidiary field staff, transport and accommodation.

After considerable difficulty, the Institute was fortunate enough to obtain the services of Miss Sonya Jones, M.S., as Nutritionist, and the field work, which forms the basis of this report, was carried out between April, 1961 and March, 1962.

In the field of clinical medicine in Swaziland, malnutrition has assumed a progressively more important place over the past years and has become one of the leading causes of morbidity and mortality among young children, while there can be little doubt, that in view of the large number of cases of frank malnutrition seen, the condition is also a factor of great importance in such conditions as gastro-enteritis, broncho-pneumonia, tuberculosis and other infections. The incidence of pellagra also appears to be on the increase. Up to the present little has been known of the dietary background of these conditions, and it has been assumed that it was the usual Southern African pattern of too little protein and too much carbohydrate, but the lack of definite information of the dietary pattern of the Swazi or the availability of food supplies has been a very considerable handicap in attempting to combat these conditions. I am sure that this report will fill this very serious gap in our knowledge and provide the foundation on which measures to improve the position can be instituted.

B. D. WHITWORTH

DIRECTOR OF MEDICAL SERVICES

SWAZILAND

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INTRODUCTION

## INTRODUCTION

### A. EARLY STUDIES :

In the 1938 Annual Medical and Sanitary Report for Swaziland, appeared the report of an "investigation into the diet of the pupils at the Swazi National School" <sup>1)</sup>. The chief findings were that the day boys had no meal prior to school, carried no midday meal with them, and often went until 5 p.m. without food. As a result both their growth rates and academic potential were stunted during termtime. The author, Keen, among other recommendations, advocated that the school supply a midday meal for day boys. Financial stringencies were the main objections to this scheme.

The following year, Bantu Studies carried an article on the diet of the Swazi <sup>2)</sup>. Written by an anthropologist, it gives a vivid description of the foods used and their method of preparation; and a pioneer attempt is made to determine the adequacy of the diet, and to correlate distribution of food with social stratification.

In 1940, the Heads of the Medical, Agricultural, Veterinary and Education Departments in Swaziland formed a local committee <sup>3)</sup> to discuss nutrition problems. In several aspects the report is both informative and enlightened. The committee was convinced that "the problem of nutrition in Swaziland is largely one of educating the people up to better standards of living and production". At the same time it realised that for many Africans "total income was below the minimum required for satisfactory nutrition". The members recognised the value of teachers as a link between Government and the community, and discussed the possibility of school feeding. Perhaps somewhat ruefully, the report states that the practice of co-operation between Government departments, while very necessary, is difficult to achieve without some permanent and directive body.

As the result of a visit to Swaziland in 1944, Fox <sup>4)</sup> suggested the collection of data on infant mortality, on population increase, on family size and age distribution as a vital preliminary to nutritional work in the Territory. He recognized that in order that lasting results be achieved in nutrition, the Swazi must be aided to help himself.

- 
- 1) P. Keen, "An investigation into the diet of the pupils at the Swazi National School during 1938". Annual Medical and Sanitary Report, 1938. Swaziland. 27.
  - 2) H. Beemer, "Notes on the Diet of the Swazi in the Protectorate", Bantu Studies, (September, 1939).
  - 3) Report on Nutrition in Swaziland. 1940.
  - 4) F. W. Fox, Nutritional Conditions In Swaziland, 1944.

During 1945, two brief but separate surveys were made by visiting doctors. The surveys consisted of clinical examination of Swazi children. Selby <sup>1)</sup> found a low standard of nutrition throughout the Territory, and suggested: a midday meal for day pupils at school, free medical attention for school children, an annual inspection and weighing of all school children. The appointments of a school medical officer and of a dental officer were soon deemed urgent, also the development of Health Centres for pre-school children.

Squires <sup>2)</sup> found signs of malnutrition in 33.4% of the 670 children he examined. These figures, he regarded, "as warranting serious attention". Squires concurred with Selby on the need for a School Medical Officer and the development of a Health Centre scheme.

It is unfortunate that there are very few statistics to support the possibly dramatic thrust against malnutrition of which control of malaria in Swaziland in 1948 was the spearhead.

In 1959, officers of the Swaziland Administration and academics from the Institute for Social Research, University of Natal, designed the Sample Survey. <sup>3)</sup> Preceded by a Pilot Survey, this large adventure was based on a multidisciplinary approach using a random (area) sample method. The search for coherent patterns in Swaziland has been lucidly explained in the report on the project. The survey covered not only the census information recommended by Fox, but many other expressed needs of the individual departments of the Swaziland Administration.

One gap was left in the harvest of information gathered from the people in the sample areas : the Medical Department received no specific data on one of the Territorial problems, nutritional status. The Director of the Institute for Social Research, Dr. Holleman, suggested that this could be remedied by the execution of a Nutrition Survey, in which the key worker was to be supplied by the University of Natal, and the remainder of the required staff and equipment by the Swaziland Administration. The suggestion was readily received by the Director of Medical Services.

- 
- 1) Selby, Report. 1945.
  - 2) B. T. Squires, Report on Nutritional Status of Swazi Children. (December, 1945), 4 - 6.
  - 3) Experiment in Swaziland, ed. J. F. Holleman (2 vols: Institute for Social Research, University of Natal: June, 1962).

B. ASSIGNMENT AND TERMS OF REFERENCE FOR THE NUTRITION STUDY 1961/62 :

The objectives of the nutrition study were defined as follows :-

1. The assessment of the nutritional state of the community with its dietary patterns and food consumption levels.
2. As a research project of intrinsic value in an area where little or nothing is known.
3. The outcome of the survey would enable proposals to be formulated for the improvement of :-
  - (i) the nutritional state of the people ;
  - (ii) dietary habits by more intelligent use of existing foods or for the extension and improvement of agricultural products.

The project was originally designed to last eighteen months. In that period qualitative and quantitative data were to be obtained on :-

- (i) Dietary patterns and food consumption levels ;
- (ii) Morbidity and mortality with reference to malnutrition ;
- (iii) Growth of infants and children.

This rather formidable assignment greeted the non-medical nutritionist on her appointment. Acting on the advice of an officer of the World Health Organization, the decision was made to focus the study on the vulnerable groups in the population and on the reasons underlying existing food shortages. Other data relative to the defined objectives were to be collected in the field as far as personnel and time permitted.

One year after the start of the survey, it was clear that the remaining period of time was inadequate for the completion of the research work and the writing of the report. A grant from the Colonial Development and Welfare Funds was arranged by the Department of Technical Co-operation in London, to cover the financial requirements necessary for the completion of the study.

c) SUMMARY OF RECOMMENDATIONS :

The measures requiring urgent attention are marked with an asterisk. It is recommended that every effort is made :-

1. To continue research into the development of high protein strains of maize and of the palatable, bird-resistant sorghum.
2. To discourage the cultivation of starchy roots and tubers.
- \* 3. To encourage legume planting, and to review the methods, preparation and cooking of sprouting beans and non-sprouting beans.
- \* 4. To bring into prominence the indigenous wild vegetables, and encourage the cultivation of vegetables containing large amounts of carotene.
5. To inquire into simple methods of vegetable preservation.
6. To encourage the consumption of wild fruits and to advocate the planting of guava and paw-paw trees near homesteads.
7. To improve milk production, without increase in the numbers of cattle.
8. To encourage the consumption of eggs, particularly as an item of food for the young child.
- \* 9. To develop fish farming.
- \* 10. To investigate the facilities for the transport and marketing of foods, and to seek methods whereby surplus foods in one physiographic region are sold cheaply in another.
11. To concentrate energies on the cultivation of a high protein crop in the Lowveld.
12. To plan agricultural policy to include the needs of the wife of the migrant worker cultivating the homestead lands.
- \* 13. To provide a simple, nutritious food supplement at maternal and child health clinics for the pregnant and lactating woman and the pre-school child, and at schools for all schoolchildren.
- \* 14. To organize nutrition education for teachers, nurses and agricultural workers during training. To encourage it in schools, hospitals, clubs and community centres, in both rural and urban areas.

15. To send suitable Swazi candidates for training in Public Health, Nutrition, Community Development and Home Economics.
- \* 16. To iodize table and cooking salt.
17. To instigate family budget surveys in urban and peri-urban areas.
- \* 18. To develop and expand mother and child health services in the Territory.
19. To institute registration of births and deaths of the Swazi population.
20. To organize a school medical and dental service.
21. To expand existing services for the eradication of communicable disease and intestinal parasites.
22. To expand laboratory facilities.
- \* 23. To appoint a nutritionist to the Territory with the object of co-ordinating all nutrition endeavours within the Territory.

## d) METHODOLOGY

### 1. POLICY ADOPTED FOR THE NUTRITION STUDY :

The objectives and terms of reference for the nutrition study obviously involved much fieldwork, calculation and reporting to be covered in a short period of time. The time spent in the field had to be carefully proportioned so that the maximum amount of meaningful data could be gathered.

The decision was taken to concentrate on the vulnerable groups of the population (i.e. pregnant and lactating women and children up to the age of five years) and to attack the fieldwork from the viewpoint of the reasons for the existing dietary deficiencies and the most acceptable methods of remedying them.

The need to collect a large amount of data on the largest sample of manageable size precluded analysis of any data in the field, and so this was postponed until the end of the period. However, monthly reports, and in addition, accounts of the areas and visits made were sent to the Director of the Institute for Social Research, and advisors at the University of Natal.

The initial consultation and planning took place at the University of Natal in Durban, a brief visit to Swaziland being made half-way through, during which time the nutritionist received an exciting first view of Swaziland at the Incwala (first-fruits festival). At this time, contact was made and co-operation established with the officers of the Administration. Three months after the nutritionist had moved to Swaziland the first survey was made, and the team remained in the field for eleven months. The field material was then taken to Durban for analysis and reporting.

### 2. THE STATISTICAL FRAMEWORK :

The statistical boundaries of a survey are not always those desired, being enforced by a number of factors. In common with other surveys, the nutrition study had to consider the money available, length of time in the field, kind of personnel that could be seconded to the survey, and the need for supervision in the field.

The study was partially limited by its modest budget, and the team consisted of one non-medical nutritionist, two nurses, one interpreter-secretary and one driver-camp boy. It had been calculated that this team would remain in the field for one year.

There was some qualitative, but no quantitative information on the Swazi diet<sup>1)</sup>. Under these circumstances it was decided that a reconnoitring study in

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1) H. Beemer, "Notes on the diet of the Swazi in the Protectorate", Bantu Studies, (September, 1939) 199 - 236.

depth rather than a wide survey would be the most satisfactory at this stage. Armed with the information obtained in this study, subsequent and more rapid investigations could cover larger samples. This procedure is recommended by F. A. O. for nutrition studies in underdeveloped countries 1) :-

"In any area or group that is being studied for the first time, an intensive and detailed survey on all aspects of food consumption must be carried out so that the background will be completely known and an understanding of the factors influencing the dietary and nutritional situation obtained. Because of the methods that must be used and the period over which they must be applied, such surveys are usually made on small samples".

### 2.1. The Sample :

Swaziland is a rural country, with small nuclei of urbanization. A study of both rural and urban dietaries was necessary, but with an emphasis on the former. In 1960, some six months prior to the appointment of the nutritionist, a survey had been made in Swaziland using random sample methods on a national scale 2). The statistical frame had been so devised that "it should be possible to use the same matrix or matrices in successive surveys." It was therefore decided to use for the nutrition study some of the population samples covered by the 1960 survey, which could provide information essential to a nutrition study, on composition of the homestead, relationship, ages, incomes, nature of employment, etc. In addition, the population in the sample were already conditioned to the presence and questioning of enumerators, and might accept a visitation of female counterparts with equanimity.

Finally, for the purpose of the 1960 survey, aerial maps had been produced, so that each homestead in the selected sample area could be located on a map. Armed with these and a list of homestead heads, the problem of the nutrition sample could be approached with some confidence.

### 2.2. Sample Size : 1) Rural areas.

The Swaziland survey of 1960 had been based on area sampling of territorial units 3,000 x 3,000 metres. These squares were randomly chosen, but lay within the Swazi rural area. Moreover, the four major physiographic strata (Highveld, Middleveld, Lowveld and Lebombo) had been distinguished in the sampling pattern. The random survey sample of the rural Swazi areas finally consisted of fifty-two squares, to which were added eight specially selected squares of particular interest, a total of sixty in all.

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- 1) T. Norris, Dietary Surveys, (F. A. O. Nutritional Studies No. 4; Rome, December, 1949), 64.
  - 2) Experiment in Swaziland. op cit. Vol. 1; Chap. II. 1.

Some of these area units were accessible only on foot, a few contained no homesteads, and would be useless to the nutrition study. Moreover, the size of the nutrition team and the intensive method of the proposed study obviously precluded it from entering all sixty of the Sample Survey Squares. After consultation with the officers of the Department of Land Utilization, three rural squares were subjectively chosen for investigation. These 'primary' squares are situated in the High - Middle - and Lowveld of Swaziland and, as far as is possible to ascertain, are considered 'typical' of these regions. In addition, four other squares were subsequently chosen as control units for appraisal by questionnaire.

Within each square, every homestead was to be investigated and this was, in fact, achieved. In order to judge the effect of seasonal changes the primary squares were visited on two occasions.

## 2) Urban areas.

The Swaziland Sample Survey had rejected the "grid pattern" of the rural sample for the urban and peri-urban areas of Swazi settlement, and these areas were enumerated on the basis of a random sample of complete homestead lists.

The nutrition survey decided to adopt the same principle but to include some stratification based on family size, an important factor in dietary studies.

One urban and one peri-urban area was chosen. The mean number of homesteads in the rural area samples was thirty, and this number was selected as the total for the urban and peri-urban areas. Fourteen were allotted to the urban, and sixteen to the peri-urban (on the basis of the proportion of population living in this area).

Using the homestead lists drawn up in 1960, the houses were assigned into family size categories. (See Table 1.)

TABLE 1

FAMILY SIZE STRATIFICATION  
Urban and Peri-Urban areas

Persons per family		1-3	4-6	7-9	10-12	13+
<u>Urban area</u>	( Total No. of families	19	20	18	17	12
	( No. of families sampled	2	4	3	3	2
<u>Peri-urban area</u>	( Total No. of families	51	64	43	-	-
	( No. of families sampled	5	7	4	-	-

The actual homes to be investigated were derived by placing the families in each group into a lottery and withdrawing numbers until the total required were obtained. For each group, four reserve homes were drawn as substitutes, if necessary.

In the field it was discovered that some homesteads had altered in family size since the lists had been made. As this alteration involved increase in some families, and decrease in others, the final balance was little altered and so the survey continued with the homesteads originally drawn.

### 2.3. Coding of the sample :

The Swaziland Sample survey had an ingenious system of coding the squares, based on the kilometric enumeration of northings and eastings on the topographic map. During the fieldwork the nutrition team used the same nomenclature. However, in machine sorting and writing it proved simpler to re-name the areas. Table 2 shows the choice of areas, their original code number, and new designation. Throughout the report moreover, "a" denotes the first visit to the area and "b" the second.

As the urban and peri-urban samples are not 'squares' throughout the report, the samples are referred to as 'areas', even in discussion of the rural samples. The areas subjected to intensive study are termed primary areas and the remainder, control areas.

TABLE 2

#### THE SAMPLE FOR THE NUTRITION STUDY

Area	Abbreviation	Sample Survey Code Number	Type of area	Total No. of food consumption groups	Total No. of persons
Urban	U	-	Primary	18	121
Peri-urban	P	-	Primary	14	87
Highveld	H(a)	1344	Primary	23	195
Highveld	H(b)	1344	Primary	23	181
Middleveld	M(a)	2338	Primary	56	372
Middleveld	M(b)	2338	Primary	54	384
Lowveld	L(a)	2929	Primary	20	152
Lowveld	L(b)	2929	Primary	18	143
Middleveld	M.C. 1.	2211	Control	48	325
Lebombo	Leb. C.	4235	Control	52	306
Highveld	H. C.	1118	Control	48	284
Middleveld	M.C.2.	1954	Control	33	232

### 2.4. Numbers studied :

As will be explained in detail later, the unit for investigation was not the homestead, but the food consumption group. In the great majority of cases, these are one and the same, but in extended families there may be several food consumption groups in one homestead.

On the occasion of the first visit new homesteads established in the area since the census of July, 1960, were enumerated and surveyed. On the return visit, the homesteads which had entered the area since the first investigation, were disregarded as no seasonal comparison was possible. In addition, some of the original families had moved out of the area and were lost to the survey. This explains differences in the number of food consumption groups during the two visits.

TABLE 3  
TOTALS OF FOOD CONSUMPTION GROUPS  
AND INDIVIDUALS SURVEYED

Total No. food consumption groups	No. re-investigated	Total No of persons	No. re-investigated	Swaziland population June, 1960 <sup>1)</sup>
312	95	2074	708	220,798

The estimate of the population by the 1960 Sample Survey is subject to a variation coefficient of 9.47%. The nutrition survey covered approximately 0.94% of the population. The number surveyed is of less importance than the extent to which the study genuinely delineates the Swazi dietary. The greater the homogeneity of the diets, the smaller the error and the smaller the number of households required. When, however, one has no idea of the extent of the uniformity of the diet, it is somewhat difficult to predict the statistical requirements. In retrospect, there appears considerable homogeneity within physiographic regions, but fairly large differences between regions.

### 3. THE SURVEY TEAM :

#### 3.1. Personnel :

"The whole survey depends upon the ability of the field investigators to obtain and record accurately all the basic data"<sup>2)</sup>. To some extent this ability can be fostered by training and supervision in the field. But chiefly it is dependent on the integrity of the field-workers and their enthusiasm and interest.

The Swaziland Director of Medical Services seconded two African nurses to the nutrition study. One, a qualified nurse and midwife with a training in Public Health; the other a hospital nurse. The Swazi National Council appointed a woman to act as liaison officer and interpreter. She was a person of standing in the community and was also a trained nurse and midwife. All three were married, and two had children. They were fluent and literate in Swazi and English. (Some five months after the start of the survey, one nurse had to be replaced when she gave birth to a child; another nurse was appointed. )

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1) Experiment in Swaziland. op.cit. Chap. II. 16.  
2) Norris. op.cit. 13.

Two factors operated in the nurses' favour when working in the areas. One, the fact that they were married women and understood the problems of motherhood, of feeding a family and second, their profession, for nurses are universally respected, and their status is very high among men and women. The fact that a nurse was doing the questioning and weighing of food did not make it any more comprehensible to the subjects, but it became work of importance demanding co-operation.

The final member of the team was a driver, who combined with this duty a host of others around camp and occasionally using his masculine superiority in situations where co-operation was lacking.

The project involved constant moving, living in cramped quarters under uncomfortable conditions, absence from families and from the attractions of urban life. The morale and enthusiasm of the team was such that during the year of fieldwork a high standard of observation, weighing and recording was constantly maintained.

### 3.2. Training :

The public health nurse was especially trained at the Medical School of the University of Natal to recognize the signs and symptoms associated with the clinical manifestations of malnutrition.

All nurses were then trained by the nutritionist in the techniques of a Nutrition Survey. The programme was both theoretical and practical, and an endeavour was made to impart as much information as their previous training allowed. In this way the team came to identify itself with the project and its success and failure. The team members co-operated to work out the best method of introducing the survey into individual homes.

The fieldworkers weighed their own diets for the period of a weekend, this was calculated and discussed. They gained both confidence and accuracy by investigating the diets of hospital staff living nearby. Children at a nursery school and a mission school were used to perfect the techniques of clinical examination and anthropometric measurements. Variation and interest were provided by observation visits to a domestic science class and to a mother and baby clinic. The training programme was so designed that it would not only be of use for the specific project, but of value in future work. An attempt was made to view the survey in relation to the communities concerned. Throughout the survey period, discussions were held on the progress of the project, and the most acceptable methods of combating food shortages and poor dietary management in each area, were debated.

In order to relieve the inevitable tedium of the fieldworker, occasional visits were made to food processing factories, agricultural shows, to a school meal, and to clinics.

### 3.3. Clothing and Housing :

A fieldworker requires protective clothing, and a uniform not only welds the team together, but also becomes easily recognized by the community. The white nurses' uniform was unsuited to field conditions. Moreover, the wearers were not working in their capacity as nurses. The team chose a bright pink, loosely fitting overall. The colour was selected for its appeal, but it also served in another way : it was detectable at a considerable distance so that one field-worker could estimate the progress of another, if necessary.

When investigating the dietary of the urban and peri-urban area, the fieldworkers stayed at headquarters. In all the rural areas the team were accommodated in the locality. By this means the fieldworkers became temporary members of the community; the camp received visitors; the team members attended the local church and traditional ceremonies, and in emergencies the community requested the services of the team's Land Rover. Thus, a well rounded picture of the community and its activities was obtained.

Whenever possible the female fieldworkers were housed in the local 'Inkundla' huts. These are large huts, belonging to the community and used for holding meetings or housing important guests. The driver always had a tent. On one occasion the team was housed in a private homestead, on others in a caravan, and once tents were resorted to. The setting up and dismantling of the accommodation was usually accomplished in a day.

### 3.4. Transport and Equipment :

In Swaziland there are no villages, but an apparently haphazard scatter of homesteads. Distances between homesteads are often great, with such natural phenomena as dense bush, drifts and rocky outcrops intervening. The Land Rover would transport the fieldworker to the nearest approach but frequently the journey was completed on foot. Returning after weighing the evening meal, the fieldworker had to walk in the dark, (often beset by the fear of snakes).

The equipment had to be sturdy, light in weight and yet accurate in its recording. Each fieldworker carried a zippered, light-weight bag, containing a notebook, pencils, ruler, a two-litre plastic jug calibrated in cubic centimetres, a set of plastic measuring spoons, and kitchen scales so designed that the dial pointer could be restored to zero after placing a receptacle on the scale pan, thus obviating the need to deduct the weight of the receptacle. (The homestead containers varied from light aluminium plates to large clay pots). Included in the bag were tongue depressors and a flashlight for the clinical examination of children.

The team had a weighing scale and height measure for adults, calibrated with the metric system, a scale for infants, a pair of skinfold callipers and receptacles (water tight) to store the completed records.

### 3.5. Forms used :

The survey schedules were made of strong paper, and the instructions or questions were printed on them in an effort to make them weatherproof. The schedule for the dietary survey contained the instructions on the outside, but the inside was left largely blank. The team-workers were encouraged to regard this as a diary and to make notes of importance on it. (Experience with a carefully prepared form demonstrated that survey workers tend to adhere rigidly to its printed provisions, and no allowance is made for the different situations and vagaries of homestead life). Each fieldworker was provided with a clip board for use with the survey schedules.

### 3.6. The field schedule :

Benefiting from the experience of the Sample Survey in which, through inadequate prior publicity, there had been difficulties regarding enumeration in some localities, the Nutrition study team took care to prepare the areas before visiting them.

The nutritionist, in the company of an anthropologist, visited the Paramount Chief and explained the purpose of the survey to him. The Swazi National Council was also personally informed, and it appointed one of their members, Mr. J. Matsebula, to work with the team's liaison officer. Mr. J. Matsebula undertook to inform each area of the survey, shortly before the investigation was to be made.

The District Commissioner was also informed in advance of the team's visit in his district.

On arrival in an area, the team was met by a senior inhabitant or the Agricultural demonstrator, and conducted to the Chief. Introductions were made and the survey again explained but in more detail. The Chief would then select a suitable site for the team's accommodation, and a local official was appointed to introduce the team members to the homesteads on the required day. (The technique of explaining the purpose of the survey within the home is described in Chapter IV).

At the completion of the investigation, the Chief was re-visited, thanked for his co-operation and presented with a small gift. The three primary rural areas were subjected to a second investigation. At the end of the final visit, the people were called together for a discussion on some aspect of nutrition (generally infant feeding). These meetings were very popular, and the team felt that they had been able to help a community that had ungrudgingly aided them. Moreover, the discussion often proved to be a mine of information revealing new aspects on attitudes toward food.

The urban and peri-urban areas are not subject to the control of a Chief, and consequently the procedure differed somewhat. The Director of Medical Services and the nutritionist appeared before the Village Committee and explained the purpose of the Survey. The Village Committee would select an official to accompany the fieldworkers into the homes on the first occasion.

Much time appears to have been spent in these preliminary visits and arrangements. However, their value can be fully appreciated when the complete cooperation in the rural areas is examined, for not one homestead refused to admit the fieldworkers. In the urban area, difficulty was experienced in a few homes and other homes had to be substituted.

### 3.7. Daily schedule :

The fieldworkers commenced work before the first meal of the day and finished when the last meal had been portioned out. In the middle of the day a period of time was available to catch up on the writing of records and on household chores for, except in the urban area, the homesteads consumed only two meals a day.

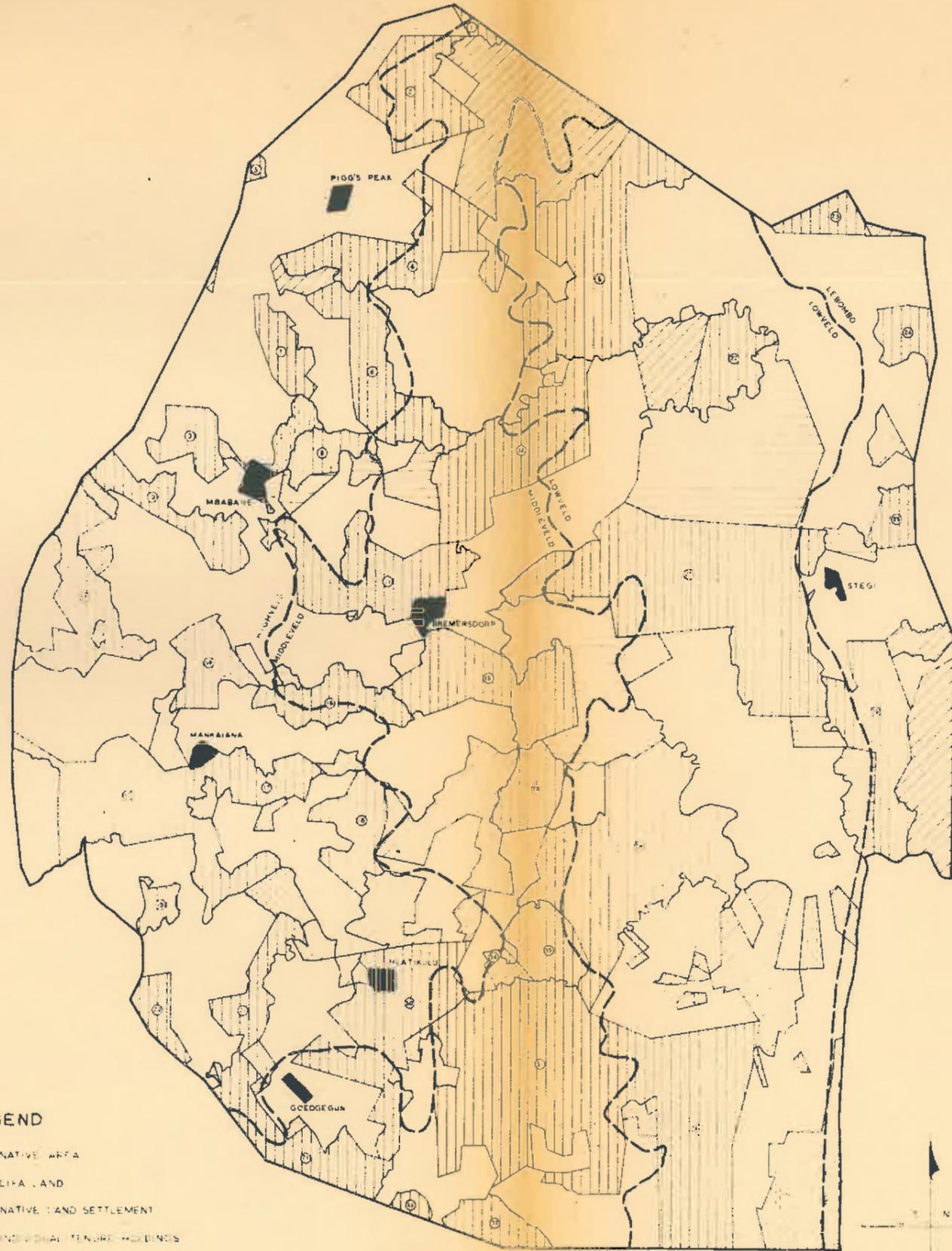
Once a week the team went into the nearest town to replenish provisions, pick up mail and meet friends. No days off were taken in the field, but at the end of an investigation in one area, the accumulated days off would be taken before the next area was entered.

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ANNEXURE

# SWAZILAND

## LAND OWNERSHIP (1960)



### LEGEND

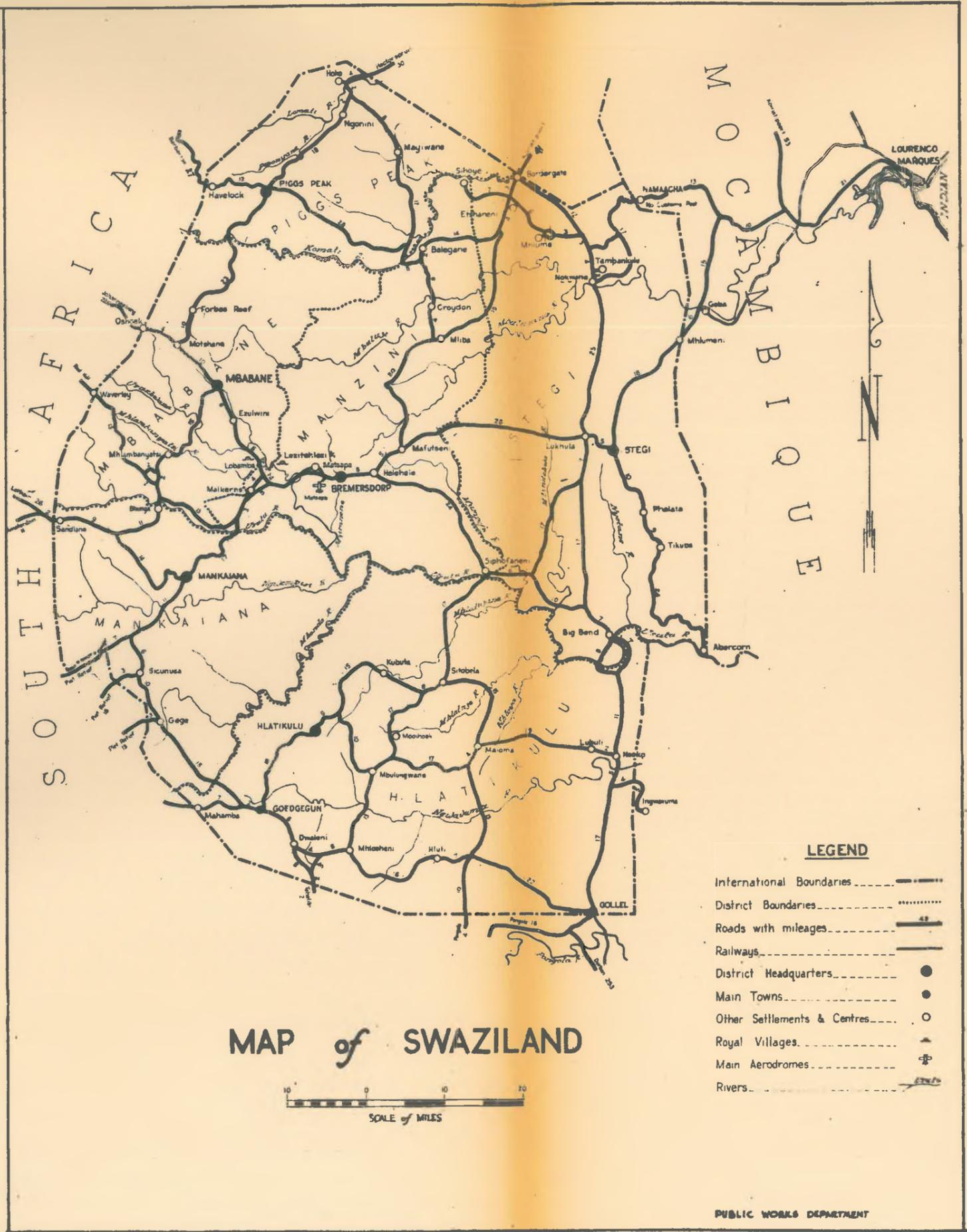
-  NATIVE AREA
-  LIPA LAND
-  NATIVE LAND SETTLEMENT
-  INDIVIDUAL TENURE HOLDINGS
-  CROWN LAND
-  TOWNSHIPS & ADJACENT CROWNLAND OR SMALL HOLDINGS.

10 5 0 5 10  
MILES



PART I

THE BACKGROUND



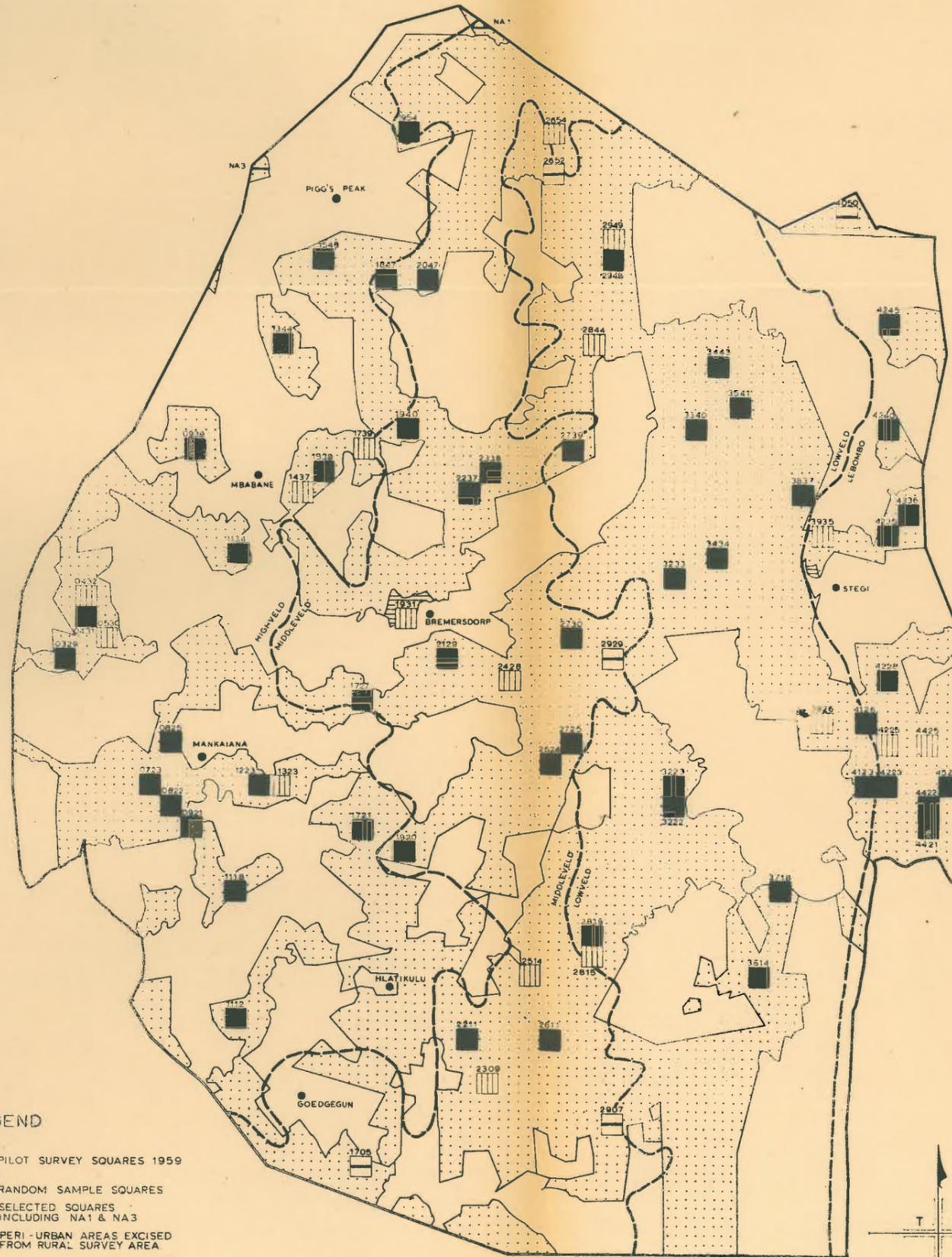
MAP of SWAZILAND

SCALE of MILES

- LEGEND**
- International Boundaries .....
  - District Boundaries .....
  - Roads with mileages .....
  - Railways .....
  - District Headquarters .....
  - Main Towns .....
  - Other Settlements & Centres .....
  - Royal Villages .....
  - Main Aerodromes .....
  - Rivers .....

# SWAZILAND

## DISTRIBUTION OF AREAS SURVEYED (1960)



**LEGEND**

-  PILOT SURVEY SQUARES 1959
-  RANDOM SAMPLE SQUARES
-  SELECTED SQUARES INCLUDING NA1 & NA3
-  PERI-URBAN AREAS EXCISED FROM RURAL SURVEY AREA
-  SWAZI-HELD LAND



CHAPTER I

THE GEOGRAPHICAL BACKGROUND <sup>1)</sup>

1. INTRODUCTION :

Swaziland, a green and lovely land, covers 6,704 square miles and is the smallest of the three Protectorates in Southern Africa. The country lies between the thirty-first and thirty-second meridians east and the twenty-sixth and twenty-seventh parallels of south latitude. Swaziland is an enclave surrounded by the Transvaal in the north, west and south and Natal and Portuguese East Africa in the east.

Within this small country lies a great diversity of scenery, altitude and vegetation which forcibly strikes the visitor travelling from west to east. Four physiographic regions can be distinguished: the Highveld, Middleveld, Lowveld and Lebombo. In the western part of the country the blue beauty of the Highveld peaks is very striking. The mountain tops are by nature treeless, but in the north, near Pigg's Peak and in the central Swaziland, near Mhlambanyati, large areas have been planted with exotic softwoods. During the winter flocks of sheep, which have trekked from the Transvaal, graze on the mountain slopes. In the Highveld is situated the administrative capital, Mbabane.

Large areas of the Middleveld are rolling, often broken by koppies and river valleys. Here one finds a wide variety of crops grown, and in the Malkerns valley rice, citrus, and also smaller amounts of bananas and vegetables are grown under irrigation. There are some cattle ranching farms in this region of Swaziland.

Beyond the centrally situated town of Manzini, (formerly Bremersdorp), the main road from Western to Eastern borders, enters the Lowveld (or Bushveld), the scenery changes to that of large flat areas covered in tropical bush. In places, clearings have been made for crop cultivation.

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1) The material used in this chapter has been drawn from several sources, chief among them are :

J. B. McI. Daniel, The Geography of the Rural Economy of Swaziland, Ph. D. thesis, University of Natal, Durban, 1962.

H. Kuper, The Swazi, (London, International African Institute: 1952).

H. Kuper, An African Aristocracy, (Oxford University Press: 1947).

Experiment in Swaziland, Editor J. F. Holleman, 2 vols. (Durban: Institute for Social Research, University of Natal), 1962.

After traversing the Lowveld, the road rises steeply up the escarpment of the Lebombo plateau to the town of Stegi. The Lebombo plateau falls away on the dip slope to merge into the Tongoland and coastal plain of Portuguese East Africa. Three rivers, the Mbuluzi, Great Usutu and Ngwavuma have gouged spectacular poorts through the escarpment.

The chief physiographic features of Swaziland can be visualised as four regions running north to south across the country, descending from the Highveld, through the Middleveld to the Lowveld and rising again steeply to the Lebombo plateau. However, the country does not fall into completely discrete categories, for in the Lowveld there arise hills, and in the Middleveld the deep river valleys have climatic conditions and a vegetation cover similar to that of the Lowveld.

In contrast to the dry conditions found in many parts of Southern Africa, Swaziland, in all regions except the Lowveld, is a well-watered country. The main rivers (from North to South) are the Lomati, Komati, Mbuluzi, Great Usutu, Ngwavuma and the tributaries of the Pongola.

Swaziland is a Protectorate administered by the British Government and the recent Constitutional proposals aim at eventual independence for the Territory. Ninety-seven per cent of the population of the country are Swazi, with about two per cent of Europeans who are engaged in administration, the development of industry and who supply the technological skill, and in farming. Unlike the two other Protectorates in Southern Africa, Basutoland and Bechuanaland, Europeans own a considerable acreage of land within the Territory. The majority of the Europeans live in the towns, but the remainder are scattered throughout Swaziland. The granting of land concessions to Europeans by a former Paramount Chief, Mbandzeni, resulted in almost the whole of Swaziland being disposed of in such a way. In order to quell the consequent disputes over land rights, (for sometimes the same piece of land had been granted to several concessionaries for different purposes), a commission demarcated Swaziland into Native Areas (for the exclusive use of the Swazi) and European areas in 1907. Both European and Swazi areas are scattered in a jig-saw pattern throughout the Territory. Approximately one-third of the country was originally allotted to the Swazi. The purchase of land by the Swazi Nation, and the Native Land Settlement scheme introduced in 1946 has resulted in this being increased to 51% at the present time. The situation exists, therefore, whereby a group who compose a very small percentage of the population own half the land.

Some of the towns of Swaziland have already been mentioned, none are large, but all are expanding. Mbabane was chosen as the Administrative centre because of its situation in the cooler Highveld. Manzini, centrally situated, is the location for certain food industries. Pigg's Peak, in the north, Stegi in the east, Mankiana in the west, and Hlatikulu in the south are the headquarters of the administrative districts.

Industrial development has been initiated by the European segment of the population, and most of this development is post-war. The British Government, through the Colonial Development Corporation, has sponsored several projects, such as the Swaziland Irrigation Scheme and Usutu Forests. Private companies and individuals have also participated in the economic development of the Territory. Swaziland is the Protectorate with the greatest potential for economic independence. At Havelock, the mining of asbestos produces the country's most valuable export. When the iron ore mine at Bomvu Ridge is in full production, with the export of this commodity to Japan, the income derived from the product in future may exceed that from asbestos.

The afforestation of the Highveld has given rise to the development of several industries. The largest is the Usutu Pulp Company in which both the Colonial Development Corporation and Courtaulds have an interest, and which manufactures unbleached sulphate pulp for British and European markets. In the north, the thinnings of the forests are utilized by two private companies, Peak Timbers and Swaziland Plantations. The former produces chipboard and the latter runs a boxmill. Peak Timbers also manufacture sawn planks.

The main centres of irrigation are at Malkerns, Big Bend and the Swaziland Irrigation Scheme. The Colonial Development Corporation was responsible for the inauguration of the Swaziland Irrigation Scheme. The industries which handle the crops grown under irrigation are two sugar mills (at Big Bend and Mhlume), a rice mill and citrus packing plant at Tshaneni (formerly Eranchi) and a fruit cannery at Malkerns.

Two other food industries deal with the agricultural produce, a creamery (supported mainly by Swazi farmers) and a milling company, both at Manzini.

The geographical factors which have a bearing on crop production and thus on nutrition, can be divided into three categories:- the physical environment, the nature of the population and the use that it makes of the environment, and the economic factors influencing this use.

## 2. PHYSICAL ENVIRONMENT :

The factors, in the physical environment, which have the greatest bearing of food production and thus on nutrition are rainfall, temperature, slope of the land, and the vegetation cover (for grazing purposes).

Primarily on the basis of geology and altitude, Swaziland can be divided into four physiographic regions viz., Highveld, Middleveld, Lowveld and the Lebombo. The factors influencing nutrition will be discussed in relation to each physiographic region.

Table I summarises succinctly the main characteristics of the physical environment in each of these physiographic areas. (In Chapter III the physical features of the primary areas are described in greater detail). The table pinpoints the contrasts between the physiographic regions and the resultant differing use of land.

### 2. 1. The Highveld:

The mountainous Highveld is dissected into rugged areas by numerous small perennial streams and rivers; thus there are only small sections of land where the slope, soil and climate combine to favour cultivation, (unlike the Middleveld which has large areas of arable land).

The climate is humid and near-temperate, the mean temperature is around 60°F, but frost sometimes occurs in the winter months, thus discouraging the cultivation of citrus. In general, rainfall is more significant than temperature for successful crop production and this area has a mean annual rainfall of between 45 and 73 inches. Far from being insufficient the precipitation is too great for the cultivation of certain crops. The rainfall in the Highveld is consistent, the occurrence of drought being rare. (The percentage of years in which less than 20 inches can be expected is less than five).

Slope in some cases determine the ability of the land to bear crops, for it is generally agreed that land with a slope of 12 per cent or more is too steep for cultivation. The Highveld has many areas that are so steep as to preclude cultivation, and the gentler more undulating areas are generally found in the river valleys.

The soils of the Highveld are acidic in nature; deficient in nitrogen and phosphate and possibly in some essential trace elements (e. g. molybdenum). On the whole, the soils are too leached and impoverished to be good for agricultural purposes. Murdoch <sup>1)</sup> has estimated that on the basis of slope and soil, less than thirty per cent of the Highveld can be classified as arable.

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1) Daniel, op. cit. 43.

TABLE 1 - THE PHYSICAL ENVIRONMENT - SUMMARY

Elements of the Physical Environment	HIGHVELD	MIDDLEVELD	LOWVELD	LEBOMBO
Area (morgen)	647,456 (31.94%)	534,237 (26.35%)	671,419 (33.12%)	174,220 (8.59%)
Average altitude (in feet)	3,500 - 4,500	2,000 - 2,500	1,000	2,000 - 2,500
Geology	Granite, gneiss, schists, quartzites. Minerals - asbestos, iron, gold	Varied gneisses and granites	From W-E: granite & gneiss; Ecca sandstones and shales; Basalt lavas. Coal in Ecca series	Principally rhyolite
Land forms	Mountainous, steep slopes, rugged. Limited regions of undulating land	Broken terrain and more expansive areas of undulating topography	Undulating plain. Some N-S trending ridges	Undulating land limited by poorts and incised valleys
Drainage Water utilization	Numerous perennial streams Hydro-electric power	Majority of streams perennial Hydro-electric power and irrigation at Malkerns (Usutu) and Ngonini (Lomati)	Tributaries of trunk rivers mainly ephemeral Irrigation: N. Lowveld (Komati), Big Bend (Usutu) and S. Lowveld (Ngwavuma)	Small streams on dip slope Local water supplies only
Climate Mean temperature °F. Mean annual rainfall	Humid near temperate 60 - 61 °F. 45 - 73 inches	Humid sub-tropical 64 - 68 °F. 30 - 40 inches	Sub-humid near-tropical 70 - 72 °F. 20 - 30 inches	Humid sub-tropical 67 - 69 °F. 30 - 35 inches
Vegetation: main veld type	False grassveld and inland tropical forest. Sourveld	Inland tropical forest and coastal tropical forest. Sourveld	Tropical bush and savannah. Sweetveld	Coastal tropical forest and tropical bush and savannah. Sourveld
Soils. General Best arable areas	Medium-deep loams. No good agricultural soils. Less than 30% arable W. Mbabane district and near Sicunusa	Friable red-loams and grey sandy loams. Large areas unfit for crops Lomati Valley; Malkerns-Ezulweni-Umtilane; Goedgagun-Dwaleni	Shallow clay loams, black clays. More than 80% arable Balegane; N. Lowveld, Big Bend, Nsoko	Medium-heavy red soils. Shallow in parts. Less than 33% arable Near Stegi and Noma-hasha
Main forms of land use on freehold land	Afforestation, winter grazing for sheep	Maize, tobacco, wattle in S., irrigated crops, small scale dairy farming, ranching	Ranching, irrigated crops and cotton	Ranching. Limited cultivation

Reproduced from "The Geography of the Rural Economy of Swaziland" with permission of the author.

The vegetation of the Highveld is chiefly sourveld, with false grassveld on the mountain slopes.

With these conditions of climate, soil and slope, it is apparent that the Highveld, in general, is unfit for crop cultivation and the main forms of land use on freehold land (as opposed to the communal tenure on the so-called "Native Areas") are afforestation with exotic timber for which the acidic soil is well suited and winter grazing for trek sheep brought by Transvaal farmers.

The random sample survey that investigated the 1959/60 harvest revealed that the Swazi living on the Native Areas (communal tenure) cultivated maize, sorghum, pumpkins, legumes and nuts, potatoes and vegetables. In that season, the maize produced was insufficient for the persons in the area.

## 2.2. The Middleveld:

The undulating Middleveld has the most favourable environment for human occupation, but nevertheless certain factors, mainly unsuitable slope and soil, make large areas unsuitable for crop production. The region is characterized by large areas of steep slopes and broken terrain and is well watered by numerous perennial streams and rivers. The annual rainfall is between 30 and 40 inches, and the drought hazard for less than 20 inches is 10 per cent or less. The mean temperature lies between 64°F. and 68°F. and frost occurs only occasionally in the river valleys. Variations in temperature restrict the development of certain tropical plant crops, such as sugar and cotton. However, in the lower Middleveld, cotton is grown. While the areas of steep slope are less than in the Highveld, nevertheless slope prevents successful crop cultivation in many places in the Middleveld.

The Middleveld soils are chiefly friable red loamy and clay loamy soils, and acidic in nature. The red soils are more suitable than the grey for agricultural purposes. The three major areas with good soil conditions are the Lomati basin in the north; the Malkerns-Ezulweni-Umtilane area and the Goedgegun-Dwaleni area in the south. The vegetation cover is principally sourveld.

On the individual tenure holdings (mainly European) the pattern of land use is more diversified than any other region, there are a few trek sheep farms, but the stock emphasis here is cattle ranching rather than small stock. The nature of the land use is, to a large extent, concerned with slope and soil. In the Goedgegun-Dwaleni area dryland farming of maize, tobacco and wattle has developed. Under irrigation, are grown citrus and bananas in the Lomati valley, and in the Malkerns valley and near Manzini, citrus and rice.

There is a similar, but much diminished diversity in the Native Areas, for the Sample Survey revealed the cultivation of sorghum, vegetables, nuts, fruit, wattle, cotton and tobacco, during 1959/60. For that season the maize crop was just sufficient to meet the populations' estimate of its needs. The maize harvest of 1959/60 is regarded as just below average.

### 2.3. The Lowveld:

In contrast to the two former physiographic areas, the Lowveld consists of an undulating plain with some ridges. The region is covered with tropical bush and savannah except in the areas cleared for cultivation.

The most important aspect of the Lowveld is the lack of water, for here the tributaries of the rivers are ephemeral and in exceptional years the Ngwavuma river dries up. The mean annual rainfall is 20 to 30 inches, but it is very variable both from year to year, (the drought hazard for 20 inches is 56% at Big Bend) and also within each year. It is the rainfall that sets the limit on successful production of some crops, for example, it is accepted that a maize crop to be successful requires a total annual precipitation of 30 inches, while other food crops require 25 inches. The mean annual temperature is 70 - 72°F. and frost is very rare in the Lowveld. The higher temperatures in this region enable sub-tropical crops, such as sugar and cotton, to be grown.

The problem of steep slopes scarcely exists in the Lowveld, and the soils are the most fertile in the Territory, being shallow clay loams and black clays. They are slightly acidic to neutral in reaction. (pH 6-7). Eighty per cent of the Lowveld is arable, but the soils tend to be shallow and irrigation is necessary for the successful production of most crops. The principal areas of good quality soil are located at Balegane, the northern Lowveld, Big Bend and Nsoko.

The presence of sweetveld makes this region very suitable for ranching purposes and the land is used for this purpose on most freehold farms. Where water is available, irrigation farming is found, the principal crop being sugar, although smaller quantities of citrus, rice, tobacco and cotton are grown. The climatic conditions limit dryland farming almost exclusively to cotton.

On the Native Areas, in spite of repeated failures, maize is sown each year, together with sorghum and other food crops and tobacco. Large herds of cattle are found in the Lowveld Native Areas.

#### 2.4. The Lebombo:

In altitude, temperature and rainfall the Lebombo is similar to the Middleveld. The undulating plateau-land is incised by three large rivers, the Mbuluzi, the Usutu and the Ngwavuma.

The steep slopes confine the land suitable for cultivation to the western margins of the plateau and the river valleys on the dip slope. The soils are moderately deep reddish of medium to heavy texture, but in parts the soils are shallow. Less than a third of the region is arable and the best areas are concentrated around Stegi and Nomahasha. The chief form of land use on freehold farms in the Lebombo is ranching on the sourveld vegetation. In the Native Areas, maize, sorghum, pumpkins and other vegetables are grown.

#### 2.5. Summary:

These brief descriptions of the physiographic regions, together with the information summarised in Table-1, are sufficient to indicate the diversity in climate, from near temperate in the Highveld to subtropical in the Lowveld, and in the form of the land from steep slopes to undulating plains.

It is the interaction of these factors that govern the success of crop production, although the rains of the Highveld are abundant, the steep slopes and poor soil fertility make this region unsuitable for food production, but suitable for grazing. Moreover, these same factors, together with the acidic nature of the soil, make the region favourable for the introduction of exotic softwoods, e.g. *pinus patula*.

The Middleveld with the more equable climate, and larger areas of undulating land is suited to the production of food crops, on the limited arable land. The development of irrigation further increases the food crop potential of this physiographic region. The Lebombo, with similar climatic conditions, but also steep slopes and areas of shallow soil is more limited in its ability to produce successful crops, and these factors together with the deep valleys restrict the irrigation potential.

The Lowveld, with its uncertain rainfall, and high rate of evaporation, renders food production even on the fertile soil a hazardous venture unless irrigation projects are developed.

#### 2.6. Water Resources:

Swaziland is a well watered country and her large rivers are international in character involving South Africa and Portuguese East Africa.

The full potential of the water resources in Swaziland has not been exploited, but the Lomati, Komati, Great Usutu and Ngwavuma and their tributaries are being used for the irrigation of over 28, 000 acres of cropland in the Territory. In addition, small hydro-electric schemes provide power for the towns of Mbabane and Manzini, and for industry in the Pigg's Peak areas.

The use that South Africa makes of the upper regions of the large rivers is of paramount importance to Swaziland, and in turn, Portuguese East Africa is deeply concerned in the use that Swaziland makes of the rivers as they pass through the Territory. The need for very careful planning of the policy with respect to water resources, is clearly indicated.

### 2.7. The Human Factor:

An attempt has been made to outline those physical factors that influence food production and thus nutrition in Swaziland. However, as far as nutrition is concerned, the use made of the environment by the inhabitants of a country is of equal or even greater importance.

## 3. THE HUMAN ELEMENT :

### 3.1. The Human and Economic Factors influencing Crop Production and Nutrition:

A great many factors can be considered to have some bearing on the food production and on the nutrition of a country. Six major factors have been selected for brief discussion in this chapter :-

- (i) The attitude of the Swazi to agriculture and animal husbandry ;
- (ii) Division of the land :
- (iii) Characteristics of the population ;
- (iv) Standard of education ;
- (v) Employment and wages ;
- (vi) Growth patterns in food production and population.

### 3.2. The Swazi Attitude to Agriculture and Animal Husbandry:

To the Swazi, cattle are of great importance as a source of wealth and status, for their labour and the milk produced by the cows. The cattle are held in deep respect and there is a strong emotional link between the homestead head and his herd. In spite of the small-scale development of cropping, the Swazi are essentially still pastoralists in outlook and in practice.

The partition of Swaziland in 1907, prevented the Swazi from following the practice of shifting cultivation and caused them to settle in one place (although movement of homesteads is still frequently practised). The pastoralists grew crops merely to supplement the milk and meat provided by their cattle and the wild herbs gathered on the veld. The increase in the population, and in the number of cattle, and the restriction of the Swazi to the Native Areas has resulted in the overstocking of these areas with cattle, and overgrazing and erosion has resulted. The Highveld and Lowveld are seriously overstocked, the Middleveld critically so, and the Lebombo less so. <sup>1)</sup> Methods of animal husbandry are poor, and use of winter feeding stuffs very limited in the Native Areas.

The attitude of the Swazi to crop production is to produce sufficient food to feed the family throughout the year. The methods of food storage do not encourage the production of excess food and the Swazi has little inclination to exert his energies to produce more.

For cash needs, the Swazi looks, not to his own fields, but to the 'openings' for unskilled and semi-skilled workers in industries and on the mines. The contracts are short-term and after a time the man returns to his home. Thus the economy is a dualistic one, with food obtained from the land, while money is relatively easily earned by labour sorties within and without the Territory.

In the Native Areas, the fields belonging to one homestead are often widely scattered, fencing is rare and there is little mechanization. As Daniel has pointed out: the introduction of the plough has been a mixed blessing for more land has been brought under cultivation but the larger area has resulted in less attention being paid to weeding and fertilizing. The need to develop sound farming methods, to preserve the soil and to prevent erosion is not widely appreciated.

As early as the beginning of the twentieth century, the Swazi were failing to produce sufficient food for their needs, and maize was imported from South Africa. With their attitude to agriculture and the existing low levels of production, the possibility of the Swazi raising money required for food, taxes, transport, clothing and utensils was remote. The Swazi then and now turned to wage employment to obtain the requisite cash. Formerly employment was sought in the mines and industries of South Africa, more recently the labour migration has also become internal with men working in the newly-formed industries in Swaziland.

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1) During 1959/60 it is estimated that on grazing and fallow land the Highveld had 29,572 excess livestock units, the Middleveld 95,579, the Lowveld 31,917 and the Lebombo 2,051. Experiment in Swaziland, op. cit. Vol. 2, Table 25, p. 361.

The importance of this labour migration and its effect on agriculture is that the men, who do not regard the land as a source of income, have continued to leave food production in the hands of the women, returning at infrequent intervals to plough. As a result, the land is ill-managed, and the stimulus for improvement lacking so long as wage employment is regarded as the source of cash earnings.

### 3.3. Division of the Land:

There are two aspects of the division of land which relate to crop production and to Swazi nutrition. Firstly, the amount of land available to the Swazi in the more fertile areas of the Territory, i.e. those regions with a high potential for crop production. Secondly, the way in which the land is held, whether under communal or individual tenure, often governs the extent to which improvements can be made in crop production.

In Swaziland, the land has been divided into three categories - communal tenure land held by the Swazi (comprising approximately 50 per cent of the country); individual tenure holdings (freehold and leasehold) and Crown Land.

The land held by the Swazi is of three types: firstly, the land originally set aside for the use of the Swazi by the Partition of Swaziland (Native Areas). Secondly, the land subsequently purchased by the Swazi Nation from Europeans (Lifa land). Thirdly, land made available by the Administration to the Swazi on a permanent leasehold basis (Native Land Settlement Scheme).

The Administration intend grouping all three types of land, Native Area, Lifa land, and Native Land Settlement under the single category of Swazi Nation Land.

Table 2 shows the division of the land in each of the physiographic regions. The proposed Swazi Nation Land will comprise 40 per cent of the Highveld, 64 per cent of the Middleveld, 54 per cent of the Lowveld and 43 per cent of the Lebombo.

Thus more than half of the fertile Middleveld is held by the Swazi, and approximately half of the dry Lowveld with its good grazing conditions is Swazi-owned. A smaller proportion of the relatively infertile Highveld is Swazi owned. The Swazi thus own a fairly large proportion of the regions most suitable for crop production, but it must be recalled that there are also in the Middleveld areas of broken terrain and steep slope.

At present the Native Areas and Lifa land are held under communal tenure and this system will be followed with the Swazi Nation Land. The main features of communal tenure are the fact that all the land belongs to the Nation, and is allotted on behalf of the people by the Paramount Chief. He, in fact, apports land to the chiefs, who in turn distribute fields to their subjects. Grazing grounds are communally held and are interspersed among the unfenced arable land.

TABLE 2

DIVISION OF LAND WITHIN EACH REGION

	Highveld	%	Middleveld	%	Lowveld	%	Lebombo	%
I.T.H.	374,129	57.78	189,979	35.56	276,226	41.14	92,018	52.82
LIFA	11,226	1.73	32,958	6.17	79,336	11.82	4,413	2.53
N.L.S.	23,480	3.63	50,530	9.46	44,782	6.67	28,604	16.42
N.A.	219,261	33.87	259,620	48.60	241,236	35.93	42,185	24.21
C.L.	19,360	2.99	1,150	0.22	29,839	4.44	7,000	4.02
Total	647,456	100.00	534,237	100.01	671,419	100.00	174,220	100.00

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The major aspect of communal tenure that concerns the improvement of land and increased crop production, and hence, nutrition, is the security of the individual's tenure. As has been pointed out in an earlier section, the concept of commercialization of the land is foreign to the Swazi, and methods and routine imposed by modern agriculture run counter to his attitude and inclination and resistance to new innovations is encountered.

Under customary law an individual's tenure is usually sufficiently protected; but cases of eviction by the Chiefs fall into two categories, firstly those persons who have aroused antagonism in the community, and those who have used their land in a way unfamiliar to traditional usage. This latter category includes the commercialization of the land by cash crop production.

It can be argued that this threat of eviction hangs over all who wish to improve their methods of agriculture. However, with the stimulus and guidance of the officials of the Department of Land Utilization, there is a general gradual improvement in all agricultural conditions. Only a very small proportion of keen progressive farmers would benefit by individual tenure.

Students <sup>1)</sup> of conditions in Swaziland are of the opinion that a change from communal to individual tenure would create more problems than it would solve. However, some scheme should be available to assure protection for the small numbers of progressive farmers wishing to cultivate cash crops.

It would appear that the present system of land tenure on Swazi land is only discouraging a small proportion of progressive farmers from increasing food and cash crop production.

The individual tenure holdings (freehold and leasehold) are almost entirely owned by Europeans and the methods of agriculture on this land differs greatly from that on the Swazi-held lands.

#### 3.4. The Population:

Our interest in the population lies in its rate of increase, and thus the extra food needed to meet this growth, and in those characteristics of the population which will either aid in the increase of food production or help the economy of the country.

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1) See Daniel, op. cit. and J. F. Holleman: Some observations regarding the development of Swazi Economy. Memorandum to Swaziland Government, January, 1962.

The Swazi population is undergoing a period of increase which is estimated to continue and even accelerate during the next few years. Between the census of 1946 and that of 1956, the African population increased by some 2.7 per cent. One can foresee a reduction in the death rate (particularly among infants) as the medical facilities improve. It has been calculated that the population increase may be in the order of 5,000 per annum - a great number of extra mouths to feed in a country which already cannot meet its food requirements.

The rural population of Swaziland is typical of a developing country with high rates of fertility and mortality. Approximately 45 per cent of the population are under fifteen years of age and only 6 per cent are 60 years and over.

When the numbers of persons of working age (15-64 years) are considered, there are 107 dependent persons for every 100 persons in the rural areas. This high dependency ratio means that wage earners are responsible for the maintenance of others not in the working age category. Moreover, the women are engaged in the bearing and care of children and are unable to play a large role in a wage earning or food production capacity. Thus the high rate of fertility tends to restrict the employment of people in productive activities.

The sex ratio among the rural Swazi of 90.5 males for every 100 females, is regarded as unfavourable. The responsibility of wage earning is usually assumed to rest with the man; very few women in Swaziland are engaged in a wage-earning capacity. The low standard of education achieved by girls and the need for women to take part in activities around the home preclude the majority becoming skilled or semi-skilled workers. Job opportunities for unskilled women, apart from domestic work, hardly exist in Swaziland. For the better educated, the nursing and teaching professions are open.

### 3.5. The Population Distribution and Density:

The nature of the physical environment, to a large extent, governs the crops that can be produced. How are the people, that can cultivate these crops, distributed?

In 1956 only 1.4 per cent of the African population were living in towns. In comparison, the majority of the European population lived in the centres of urban settlement.

The following table reveals the percentage of Swazi settled in each physiographic region.

TABLE 3

Region	Percentage of Population	Total Area
Highveld	30 (± 3.5)	24.7
Middleveld	46 (± 7.4)	32.1
Lowveld	19 (± 4.6)	36.7
Lebombo	5 (± 1.7)	6.5

For many years the presence of malaria in the Lowveld and in valleys of the Lebombo discouraged Swazi from settling in these regions, while the Middleveld has always been regarded as the most fertile region of the country and a desirable place to live. These facts are borne out by the table which demonstrates the Lowveld as having the largest area of land, but the smallest percentage of the population while the Middleveld has the largest.

It would seem that the agricultural potential of the Lowveld may be more fully realised by the movement of more persons into the area.

More important than the actual distribution of the population is the pressure of people on land resources. The Sample Survey results show that the population density in the rural survey areas on communally held land is 55 persons per square mile, but there are 619 persons per square mile of cultivated land.

The regional distribution is shown in Table 4. The pressure of population on land resources is highest in the Highveld and Lebombo, and least in the Middleveld. In other words, the resources of the relatively infertile Highveld and Lebombo are already hard pressed by the existing population, so that any increase in food production must arise from better farming methods on the existing land.

### 3.6. Standard of Education:

Schooling is not compulsory for the Swazi children. Table 5, which was compiled from the Random Sample Survey data, indicates the low standard of education reached by the persons questioned. The majority have received no schooling, and only a small number of those in receipt of education, advanced beyond Standard II.

TABLE 4

LAND USE AND POPULATION DENSITY : RURAL SURVEY AREA

RATIO POPULATION/ARABLE LAND: RURAL SURVEY AREA

	Highveld	Middleveld	Lowveld	Lebombo	Survey Area
Persons per square mile	66	78	29	44	55
Persons per square mile of cultivated land	741	531	678	742	619
Persons per square mile of arable land	360	233	196	404	257
Acreage cultivated land per person	.86	1.21	.94	.86	1.03
Acreage arable land per person	1.78	2.74	3.26	1.58	2.49
Acreage cultivated land per homestead	6.69	9.40	7.15	5.97	7.95
Acreage arable land per homestead	13.78	21.39	24.70	10.96	19.16
% arable land under cultivation	48.5	43.9	28.9	54.4	41.5

Reproduced from Experiment in Swaziland, Vol. 2, Ch. VII

TABLE 5

## EDUCATION : STANDARD REACHED BY AFRICAN POPULATION\*

Area	Standard reached													
	Nil	Grade 1	Grade 2	1	2	3	4	5	6	7	8	9	10+	Total**
<u>Rural:</u>														
Males	3,300	155	146	211	157	129	103	74	69	19	20	18	4	4,406
Females	3,686	169	159	233	185	143	123	66	52	28	13	9	-	4,866
<u>Urban and Peri-Urban:</u>														
Males	390	52	39	50	58	41	40	36	69	40	18	23	9	865
Females	404	38	54	50	63	45	66	56	50	22	18	10	3	879

\* Source: 1960 Random Sample Survey

\*\* Total for random sample area

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The standard of education is higher in the urban centres than in the rural areas. The low standard of education is reflected in the high percentage of manual workers.

Domestic science instruction is started in Standard V and continues in Standard VI in all Government run- schools in Swaziland, and the Mission schools probably follow a similar policy. Similarly, hygiene lessons (which include instruction in food values) are commenced at a later stage in the children's education, so that the number of children that receive any information on food values, correct cooking and selection of foods, is very small.

### 3.7. Employment and Wage Earnings:

In a discussion of the Swazi attitude to agriculture, the dualistic nature of the economy was described, whereby the rural dwellers cultivate food crops in an attempt to feed the family, but obtain money by labour migrations within and without the Territory. Some of the industries within the Territories have compounds for men workers only, but some have, or are establishing, family housing schemes.

It has been calculated that the number of Swazi falling within the working age group (15-64 years) is 110,000 of which 52,000 are males. The number presently employed in the principal projects (Mining, Forestry and Agriculture) within Swaziland, is in the neighbourhood of 20,000 and it is estimated that some 25,000 will be required within the next few years.

The characteristics of the working population are: a small proportion of skilled workers and a high percentage of semi-skilled and unskilled labourers, earning low wages and having, in consequence, a low standard of living. The majority of the wage earners are under 40 years of age. The duration of employment is short as the turnover in labour is high.

The Sample Survey calculations revealed that 57 per cent of the wage earners drew R6 - R12., (£3 - £6) per month and a similar wage was earned by approximately 33.5 per cent of the men in the urban and peri-urban areas, but in the latter areas a further 35.5 per cent of the men earn between R20 - R60., (£10 - £30) per month.

In 1962, the controlled price of sifted granulated mealie meal was R4.82 (£2. 8. ld.) per 180 lb. bag. If one assumes that the average homestead has six members and they consume  $1\frac{1}{4}$  lbs. of maize meal per day, then one bag will last only 24 days. The wage earning of the majority of the Swazi would be insufficient for the purchase of more than two bags of maize meal a month, if all the earnings were devoted to maize meal.

Hughes <sup>1)</sup> has demonstrated that in the rural areas, in all the physiographic regions other than the Lebombo, half the homestead groups receive cash incomes of more than R50 (£25 per year). Moreover, the findings of the Sample Survey suggest that the majority of rural homestead groups are, at present, unable to provide even half their basic food requirements from wage earnings alone, and must obtain the necessary sustenance from their own fields.

The situation is one of a primarily unskilled population with a low rate of productivity earning low wages. In the rural areas, the families are dependent on cultivated crops for the majority of their food requirements. In the urban areas, the wage earnings are higher, but almost all foods have to be purchased.

### 3.8. Growth Patterns in Production:

Swaziland possesses mineral wealth, water resources and a variety of climatic conditions. In recent years there has been an inflow of capital into the country and the establishment of new industries.

The possible rapid increase in the rate of population growth has been discussed. The unfavourably low sex ratio, with its bearing on the employment of women, marriage and birth rate, has also been mentioned. The low standard of education and the low levels of productivity among the Swazi indicate the expansion of economic development may be retarded.

The great problem in Swazi agriculture is the overstocking of the land with its consequent effect on grazing and erosion. In each of the physiographic regions there is available arable land that could be brought under cultivation. However, the ploughing of this land will only intensify the already serious overgrazing that exists on the communally held land. It is essential that the first step on the Swazi Nation Land is to reduce the number of livestock units, not an easy achievement in view of the present Swazi attitude to the culling of cattle. Efficient farming of the present arable land would increase food production further. The Sample Survey revealed that during 1959/60, (a year in which the harvest was slightly under average) it required only the increased yield of less than half a bag an acre in the Highveld and Lowveld to make these regions self-sufficient in maize, and the amount would improve the stability of maize production in the Middleveld.

This quantity of increased output appears relatively small and easy to achieve, but the indications are that, in order for Swaziland to become self-sufficient in food, the Swazi attitude to crop cultivation and soil conservation will have to undergo a change.

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1) Experiment in Swaziland. op. cit. Vol. II. 377.

**4.0. SUMMARY :**

The physical environment of Swaziland defines the limits of crop cultivation, but the various human factors not least among them the attitude of the Swazi to agriculture, standard of education and the size of the profit obtainable from intensive farming, determine the food production levels of the Territory.

## CHAPTER II.

### FOOD ORGANIZATION

#### 1. INTRODUCTION :

In this chapter the background to the Swazi nutrition is outlined. A knowledge of the social and political organization of the people is essential to the understanding of food production and nutrition. Land distribution and land tenure as they affect food production have already been discussed, but here urbanization is briefly mentioned. The main body of the chapter is concerned with food production and distribution.

#### 1.2. Social and Political Organization<sup>1)</sup>:

The Swazi are chiefly Nguni in culture and language, their closest affinity being with the neighbouring Zulu. Their language SiSwati is one of the south-eastern Bantu group.

The simplest and most important unit of the Swazi is the homestead (umuti). The group of persons within the homestead function as a political, social and, to a large extent, as an economic unit.

Hughes has described the older style of homestead<sup>2)</sup> :-

"It was normally built so that the main entrance faced downhill with the cattle byre in this entrance, and an open internal courtyard above the byre. The dwelling and cooking huts were built around the circumference of the circle, thus forming two 'horns' (as the Swazi call them) embracing the courtyard and partially enclosing the cattle byre. The principal hut of the homestead (indlunkulu) or the Great Hut faced the byre across the courtyard, while on either side of the Great Hut were the other dwelling huts, housing the wives of the homestead head, their children, his married sons and their families, and possibly some dependents not belonging to the immediate family. At the entrance, near the cattle byre, were the quarters of the unmarried youths and girls, the former placed in this position so as to defend the byre from attack."

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1) For a full discussion on this subject, see books by Kuper listed in the bibliography.

2) Experiment in Swaziland, op. cit. Vol. 2. Chapter VIb. 2.

Within each homestead, the chief wives had their own houses (tindlu). Thus a wife, with possibly her co-wife, and children would reside in one house, she would cultivate her own fields, and store the grain in the pit belonging to that 'house'. Each tindlu was thus an independent economic unit.

Nowadays the tendency is for smaller homestead groups, the married sons no longer wish to reside at their parents homes and set up homesteads on their own. Also there has been a decline in polygyny, and increasing tendency for a man to have only one wife.

A typical homestead will contain five or six members. The husband's mother will be a highly respected member and will occupy the Great Hut. Then, there will be the head of the homestead (unumzana) and his wife (more rarely, wives) and children. Not infrequently, other relatives may be staying in the home on extended visits.

In the urban area, the homestead groups tend to be smaller than in the rural areas, and may consist only of a husband and wife and their children.

Swazi society is strongly patrilineal and the head of the homestead is held in much respect by his wives and children.

The homesteads are not grouped in villages, but are scattered in an apparently haphazard manner. People within hailing distance regard one another as a neighbourhood unit, and will aid one another in times of emergency (e. g. fire), and will be invited to join a feast.

Several homesteads come under the supervision of an indvuna, who is responsible to the chief for the maintenance of law and order in the area, for the settling of small disputes, and for organizing the communal work.

The chief is answerable to the Paramount Chief (Ngwenyama) for the conduct of the people in his region. It is the chief who apportions land to anyone wishing to settle in the area. He is also responsible for ensuring that the wishes of the Paramount Chief are carried out in his chiefdom. The qualities and characteristics of the chief, and to some extent his tindvuna, have a distinct bearing on the people of the area. In one of the areas surveyed the chief was a just, progressive man, and his people reflected these qualities and were keenly interested in the school and community activities.

The chiefdoms are grouped into districts (not to be confused with the districts of the Swaziland Administration) which are supervised by a prince or clan head or a specially appointed man. The Paramount Chief is the head of the Nation and, as such, carries out the wishes of the people.

The Territory is administered by the Commonwealth Relations office in London, and the Minister responsible is the Secretary of State for Commonwealth Relations.

Within Southern Africa, the High Commissioner for Basutoland, Bechuanaland and Swaziland is vested with the command of the Territory, and within Swaziland, the Resident Commissioner is responsible. The Territory is divided into six Administrative districts under the control of District Officers.

The Territorial government endeavours to work with the Swazi National Administration in all matters affecting the Swazi. To accomplish this, a system of liaison officers has been established.

The term National organization, has been used by Hughes <sup>1)</sup> to describe the "whole political complex emanating from the Central Authority and also to cover the direct agents of this authority".

The central authority, based on the national capitals, is headed by the Paramount Chief and the Queen Mother who, by a delicate balance of power, are jointly responsible for maintaining law and order throughout the nation. <sup>2)</sup> The monarchy is assisted by two councils, the inner council (Licoco), which deals with specialized problems, and the executive committee (libandla lencane). More rarely a meeting of the general council (libandla lomkulu) is called, and technically membership of this last council is open to every adult male Swazi. <sup>3)</sup> The libandla lencane is concerned predominantly with national legislative and administrative business.

The Central Authority is in communication with the ordinary man in a rural kraal by a series of links. Firstly, by the chief of the area who can approach the Central Authority concerning matters in his chiefdom. Secondly, there is the attachment of every chiefdom to one of a small number of royal homesteads. Thirdly, the regimental system, whereby men from the various chiefdoms enlist as 'regular' soldiers in the age-regiments attached to one of the royal capitals. The role of the regimental system has diminished greatly in recent years, and the regiments appear in force only for the Queen's Birthday Parade, and at the annual Incwala ceremony. Fourthly, there are direct agents of the

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- 1) A. J. B. Hughes, Swazi Land Tenure and Political Authority - in preparation.
  - 2) Kuper, op. cit. 35.
  - 3) Hughes, op. cit.

Central Authority, some act as 'envoys' and travel to areas where a particular problem has arisen. Others are attached to the headquarters of the Territorial Administration and act as liaison officers.

### 1.3. Urbanization:

The description of food production, distribution and consumption in Swaziland is focussed on the rural homestead group, rather than on the urban household. However, with the increasing amount of urbanization in Swaziland, its role must be briefly discussed.

Approximately four per cent of the African population live in the townships of Swaziland. <sup>1)</sup> In the main, the development of these settlements has taken place since the last war. The Sample Survey of 1960 <sup>2)</sup> revealed that, on the basis of length of urban residence and severing of ties with the rural areas, the urban and peri-urban areas exhibit a high degree of stability. Other facts revealed that the size of the homestead unit is smaller in these areas, that settlement appears to be on a family basis, and that far more women than in the rural areas are engaged in wage employment.

With the rapid strides in industrialization, in the Territory, further urbanization will inevitably follow in its wake. Urbanization, to varying degrees, involves the adoption of a Western way of life including that of new food habits and for this reason the present townships are of interest. Where families forsake traditional tastes for paid employment, inferior foods, or purchased foods replace the better usual diet. <sup>3)</sup>

## 2. THE FOOD SUPPLY :

### 2.1. Introduction:

The food production of a country is heavily dependent on the physical properties of the environment and on the customs of the people exploiting the land. <sup>4)</sup> The physical environment of Swaziland has been briefly surveyed in the previous chapter, in this one an attempt is made to describe some of the customs appertaining to food production.

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- 1) Swaziland Annual Report for 1961, 10.
  - 2) Experiment in Swaziland, op. cit., Vol. II, 489-503.
  - 3) Malnutrition and Food Habits, Eds. A. Burgess and R.F.A. Dean, (London, Tavistock Publications 1962)17.
  - 4) A.I. Richards, Land, Labour and Diet in Northern Rhodesia, (London: Oxford University Press, 1939), 228.

The Swazi, by tradition, are pastoralists, and a large herd of sleek cattle browsing among lush grass still rouses more exclamations of pleasure than any abundant field crop.

The Swazi attach enormous importance to their herds of cattle. The value of the animal as a potential foodstuff pales before their use in many other spheres, not least among them being the prestige conferred by owning large herds. The 1961 live-stock census showed 413,046 cattle owned by Africans.<sup>1)</sup>

Cattle are killed at times of ritual and festivity (e.g. marriage ceremonies), but only acute hunger will cause a commoner to slaughter or sell a beast for food. The cows are estimated to produce an average of one pint of milk per day throughout the year.<sup>2)</sup> The traditional food is soured milk (emasi), but under present conditions it is only plentiful in the Lowveld during the summer months.

The care of the cattle rests with the men, in fact custom prevents the women coming into contact with or crossing the path of cattle at periods of 'unclean-ness', for example during menstruation and after childbirth.

Although respect for and delight in cattle is great, the Swazi have little knowledge of animal husbandry and their cattle are of poor quality. In an endeavour to combat this situation, the Veterinary Officers of the Department of Land Utilization have been introducing good bulls for use by the Swazi. Efforts are also being made to encourage the cultivation of crops suitable for winter fodder.

The numbers of African-owned goats in the 1961 census amounted to 215,932. The value of goats lies in the fact that they are small animals, more readily slaughtered for food than the cow. The milk is not used for human consumption.

The role of donkeys, mules, pigs and fowls in the animal husbandry of the Swazi is small. Donkeys and mules are used for draught purposes, while pigs and fowls are eaten or, more commonly, sold.

Over the years the people have moved from shifting cultivators to people living semi-permanently at a 'semi-subsistence'<sup>3)</sup> level, in which the food supply is augmented by wages, earned by unskilled or semi-skilled labour in industry within or without of Swaziland.

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- 1) Annual Report for Swaziland 1961, op. cit., 39.
  - 2) Beemer, op. cit., 208.
  - 3) Experiment in Swaziland, op. cit., Vol. II, 373.

An almost irresponsible use is made of the environment (although recent measures by the Department of Land Utilization have been successful to some degree); cattle are allowed to overgraze until erosion results, gardens are made on river banks, and trees are cut down for fuel and building purposes, but not replanted. In the Lowveld the seasonal bounty of wild fruit is eagerly sought in times of famine.

## 2.2. The Unit of Production:

The unit of food production is not identical with the food consumption group; for example, school-children may play a negligible role in crop cultivation but will consume large quantities of food. Both units are constantly changing in size and composition throughout the agricultural year due to the movements of migrant workers, and the custom of visiting. Basically, however, the unit of production is the homestead group, and within the homestead group, the 'houses' are the simplest unit of production.

Traditionally the head of the homestead retains ground for his own crops, but is aided in their cultivation by his wives. The wives cultivate their own portions, but sometimes a junior wife will share with a senior. A daughter-in-law usually aids her mother-in-law and only gains a field of her own when she has borne a child.<sup>1)</sup> It was customary for an unmarried daughter, once she had taken a lover, to be allotted a plot of land<sup>2)</sup> in which to grow delicacies, (e.g. monkey nuts), but the majority of young women are either still at school or else away working, so that the practice has largely lapsed.

In Swaziland, women are the traditional cultivators of the soil and today they play a lesser, but still leading, role. In their hands also lies the task of meal planning, preparation and distribution. This study is primarily concerned with the distaff side of the family, for any subsequent improvements in diet will depend not only on the enthusiasm and co-operation of the women, but also on their position in society.

The young bride (makoti) formerly took up residence with her husband's family and was completely subservient to her 'in-laws' particularly her husband's mother, who trained the girl in the art of homemaking, and the child rearing practices of the husband's clan. The makoti's position was one of humble obedience and industry. In polygamous homes, the husband often places a junior wife to perform household tasks under a senior wife.

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- 1) B. A. Marwick, The Swazi, (Cambridge University Press: 1940) 164.
  - 2) H. Beemer, "Notes on the diet of Swazi in the Protectorate", Bantu Studies, Vol. 18, p. 199-236.

During the years of child bearing, the wife is dependent on the presence of her husband for her standing in the community. <sup>1)</sup> The husbands maintain that a 'child' (i.e. a woman) cannot be trusted with the wise spending of money and may give her only food and materials for clothing. If a woman wishes to make money (e.g. by the baking and selling of buns) she must gain her husband's permission, and he may seek to take her profits for himself. When a woman has borne several children, her position in society rises and she gains respect. The position of Swazi women is highest in the home of married sons, and she aids in the control of their wives and children. <sup>2)</sup> Thus the life of a married woman starts with lowly obedience and, as her sons reach adulthood, her status rises to one of authority.

Formerly, the menfolk departed to partake in tribal wars leaving their wives ensconced in the family circle, gaining companionship and protection. At the present time, there is a tendency for the married sons to break away from the parental home and to live apart. Frequently, a Christian woman will refuse to accept the law of subservience demanded of a bride by the non-Christian relatives-in-law. <sup>3)</sup>

The husband may join the bands of men finding wage employment on the Rand, and will be absent for several months. A husband is responsible for major decisions in the homestead, including the treatment to be sought when a member of the family is ill. The wife remains, unable to undertake major responsibilities and decisions (e.g. the sending of a sick child to hospital), frequently she must cultivate the fields, feed a family in the absence of irregular monetary gifts from her husband. A Swazi woman is "prepared to accept, perhaps even to desire, an occasional beating, but she is not prepared to live in celibate loneliness". <sup>4)</sup>

Women have more eagerly cleaved to Christianity. The Sample Survey <sup>5)</sup> demonstrates that nearly two-thirds of the women over eighteen years of age are Christians, as against less than half the males. Kuper maintains <sup>6)</sup> that Christianity gives to a woman "a fuller participation in the domestic life, a standing in Church affairs, a promise of an individual after-life and equality with other individuals irrespective of rank and sex." The Missions have denounced polygamy,

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- 1) H. Kuper, The Uniform of Colour. (Johannesburg: Witwatersrand University Press 1947), 152.
  - 2) H. Kuper, The Swazi, op. cit., 19-23.
  - 3) H. Kuper, Uniform of Colour, op. cit., 149.
  - 4) H. Kuper, The Swazi, op. cit., 152.
  - 5) Experiment in Swaziland, op. cit., Vol. II, 263 a (ii).
  - 6) H. Kuper, Uniform of Colour, op. cit., 120.

forced marriages and the practice whereby the brother of a dead man marries the widow. There is no doubt that, through the women's organisations attached to the majority of Churches, (e.g. the Mothers' Union of the Anglican Church), Swazi housewives escape the 'common round' and 'daily task' of domestic affairs, and find not only companionship and spiritual elevation, but through visiting speakers <sup>1)</sup> gain new knowledge and interests.

The effect of co-education on girls has helped to place them on an equal footing with boys, at least academically. The traditional Swazi elders also complain that the schools have reduced the morality of young girls who instead of having one recognized lover, conduct several secret courtships and "write love-notes to many boys".

School teachers have a high status in the rural community and some of this shines on women teachers. Nurses are listened to and are respected by both sexes in the community, the unmarried ones are not slow to adopt Western ways, but upon marriage become subservient to their husband's wish in domestic matters.

The Swazi men sometimes complain that their women are becoming like their European counterparts, physically weaker and more desirous of protection.

### 2.3. The Role of Men and Women in Agricultural Work:

The principles of age and sex on which the allocation of garden work was based, have broken down somewhat with the advent of mechanization, scientific farming methods and migrant work.

According to Marwick <sup>2)</sup> a man is required to plough for his wife; provide her with food when the grain stores are exhausted, and to keep her supplied with the implements and utensils she is unable to make for herself. The wife, on her part, is expected to sow, weed and reap her allotted fields. Beemer maintains that the man has always played an important part in agriculture. <sup>3)</sup> However, it must be recalled that formerly he would often be away engaged in warfare or regimental activities, and more recently, under contract to the Mines.

The carting and spreading of kraal manure on the fields is done by the men of the household. With the advent of the ox and tractor for ploughing, this task usually falls to men who have not only the strength, but also the mechanical 'know-how'. However, women do occasionally yoke oxen and drive the plough,

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- 1) One of the nurses attached to the Survey team, at the request of a local Mothers' Union, gave a talk on tuberculosis.
  - 2) Marwick, op. cit., 130.
  - 3) Beemer, op. cit., 213.

but such action still excites comment. Fenced gardens, which require hoeing, are worked by the women. Women still walk behind the plough sowing broadcast, but with the more economical method of sowing by a seed drill, the men assume this task; the weeding of the crops falls to the woman, but she is often assisted by the men and children of the household. Harvesting is performed by both men and women, but the women bear the crop home. Men and women thresh corn but only women winnow.

While the women assist the head of the household in the cultivation of his fields, to a large extent they are left to work their own. As a result, during the busy harvest periods, women have neither the time nor energy to prepare the main meal of the day, and a snack is eaten.

The men extension workers of the Department of Land Utilization, who endeavour to improve the farming methods of the Swazi, are concerned with the men of the homestead. However, the large role of the woman in food production is recognised, and recently home economics demonstrators have been appointed to work with the women. However, their activities lean towards handicrafts and cookery rather than agricultural methodology.

#### 2.4. The Agricultural Cycle<sup>1)</sup>

The seasons dominate the life of the rural Swazi to an extent difficult to appreciate by one reared in conditions of abundance and aided by modern methods of food storage and preservation. The food shortage at the end of the winter is accepted by the Swazi stoically, even as an inevitability. At the same time, the first mealie is consumed with a joy scarcely found among jaded Western palates.

January to March sees the end of the summer with an abundance of fresh mealies, pumpkins, legumes, green vegetables and nuts. The people are very active weeding and harvesting.

By April the wild veld plants are no longer young and succulent, but old and bitter, and the maize is now dry. During May, hunts are organized to kill game, and the community turns from harvesting to the repair and replacement of homes, tools and utensils.

As the months pass into September, the food stores diminish and many people cut their meals to one a day. If the rains are early, the first wild green vegetables are ready in October, when the agricultural work increases in intensity with ploughing, hoeing and weeding. Until December, when the first maize ripens, it is often a time of food dearth, and of increasing activity.

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1) See Annexure A.

Thus, not only are there periods of hunger and plenty, but also times of great activity when labour continues from dawn to dusk, and other lazy, leisure and play-filled days. It is an unhappy coincidence that the heaviest activities have to be performed at a period when necessity imposes food rationing. The calendar devised by Beemer<sup>1)</sup> well illustrates the correlation between the food cycle and the productive cycle.

It is beyond the scope of this study to analyse the agricultural methods presently practised, but attention is drawn to some aspects of the work cycle that reflect the achievements attained by the Department of Land Utilization.

(a) Fertilization:

Almost universally kraal manure is used on the fields, a measure introduced by the Administration several years ago. Fertilizers are becoming more widely used by Swazi farmers, and purchases have increased from 298 short tons in 1951 to 1,364 short tons in 1961.<sup>2)</sup>

(b) Ploughing:

Throughout the Territory, the practice of contour ploughing is followed thus helping to protect arable lands from erosion. The Administration have made failure to plough along contours a punishable offence.

(c) Sowing:

Formerly the maize was sown by hand in a broadcast manner, and legumes and pumpkins were cultivated among the maize. The introduction of crop planting in rows has facilitated inter-row cultivation, so making the onerous task of weeding easier.

(d) Weeding:

Such is the labour of this task that it is customary to weed the fields only once during the cultivation season. The majority of people weed by hand or hoe, but some farmers have cultivators.

(e) Harvesting:

Mechanization has not yet spread to this activity and the food crops are still harvested by hand.

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1) Beemer, op. cit., 223.

2) Annual Report for Swaziland 1961. (London: Her Majesty's Stationery Office 1962), 36.

Communal labour is a method whereby tedious onerous tasks can be accomplished in the company of others. For those agricultural activities that remain unmechanized, the work parties tackle the job.

## 2.5. Communal Work:

A commoner who desires others to work in his fields must offer some incentive and reward. If one engages a man to plough with his tractor, then the payment is in money. For ploughing with oxen, cash, or sometimes kind, is the basis of the agreement.

But weeding and harvesting labour parties are usually given beer or food (preferably meat) as a reward (lilima). A woman whose husband is away and who has no close relatives in the area, must not only wait for the owner of the plough to finish his fields and his relatives' before ploughing hers, but must obtain large quantities of maize to brew beer.

The essential part of the reward is that it is food to be consumed immediately the labours are over, in other words, sustenance to satisfy hunger and thirst induced by the task.

The lilima is not allocated according to the time and labour poured into the task, i.e. there is no rate for the job. One can arrive shortly before the completion of the job and still imbibe as frequently from the subsequent beer-pot as the man that had laboured since sunrise.

Chiefs have the authority to summon their followers to work in their fields as a communal working party. It is usual to give the workers some reward, porridge or beer, or both, for such services rendered. However, with the establishment of a cash economy, the practice of tribal labour appears to be dying.

Emasimu enkosi or gardens of the King, are scattered throughout the country. In theory, the produce from this land is to feed the people of the country in times of necessity; but in actual fact, the produce is consumed in the Nation's capitals. For example, great quantities of maize are used to brew beer for visitors to the Queen Mother's kraal at Lobamba, and at the time of the Incwala. (During 1961, there was a severe shortage of grain, and the Government took steps to alleviate it, but by tradition the Ngwenyama and his Mother would have fulfilled this economic obligation.)

The Royal fields are cultivated by the age regiments, who render communal labour as a tribal service. These age regiments are in residence at the Royal villages, but the ranks of this labour force have thinned greatly in modern times, and the annual weeding of the gardens has become a ceremony whereby gardens are merely cursorily passed through prior to eating and drinking.

## 2.6. Food Storage:

The Swazi cultivator hopes to harvest sufficient food to last until the new crops are ready for reaping. Although, at the time of the harvest, an excess of food is often eaten and beer brewed frequently, some efforts are made to store food in order to tide the family over the lean winter months when the veld yields only a few bitter-green plants.

### (a) Vegetables:

Wild or cultivated green vegetables are cut in small pieces and are spread on a flat surface to dry. This process takes several days, and so, each evening and on windy days the vegetables must be brought indoors.

An alternative method is to blanch the vegetables in boiling water prior to drying. But this method is not popular for it is believed to be unclean, and to alter the original taste and colour.

Pumpkins and vegetable melons are peeled, the seeds removed and cut in segments, and then dried.

### (b) Fruit:

Certain wild fruits (e. g. mantula) are allowed to dry in their picked state.

The drying of fruit and vegetables for use during the lean winter months is not a common practice.

### (c) Grains, Legumes and Pulses:

The produce from each woman's field is dried and stored separately. The maize cobs are tied into bundles and dried on a specially erected platform (inyango), out of reach of the chickens.

Monkey nuts and beans are spread on sacks on the ground and a child detailed to scare off marauding donkeys, pigs and chickens. When dry, the legumes are stored in baskets or sacks or in the grain pit.

After drying, the better maize cobs are retained for seed, and stuck, together with the seed heads of sorghum, inside the thatch in the kitchen hut. The smoke from the fire prevents attack by pests. For the remainder, the maize grains are removed from the cob and a quantity are stored in grass baskets and sacks for use in the near future. The remainder are poured into a grain tank or grain pit (ingungu).

An ingungu is dug, generally inside (rarely, just outside) the cattle kraal. It is bottle shaped, narrow at the neck and widening to some ten feet at the base. To prevent damp reaching the grain, the pit is allowed to dry after digging, then smeared with dung and a grass fire is lit inside. Finally a grass mat is placed around the inside walls. Once the foodstuff is inside a large stone is placed over the entrance and sealed with cow dung. In spite of these precautions the damp gains access and the maize develops a frowsty flavour; porridge made from this mouldy grain is called isancoti and is liked by the older generation, but not the young. Weevils are said not to attack the ingungu grain, due to an oxygen lack. After opening the ingungu it must be left for several hours to allow the gases to escape and air to enter. The value of the ingungu lies in the fact that in times of war the grain stores remained hidden in the kraal. Married women are not allowed to enter the cattle kraal and so an extravagant housewife is prevented from obtaining extra grain.

The officials of the Department of Land Utilization have discouraged the use of the ingungu on the grounds that some grain is always rendered inedible. Many Swazi have purchased the metal grain tanks recommended, but at the same time retain a grain pit. The key to the grain tank remains in the possession of the homestead head.

## 2.7. Other Sources of Food:

### (a) Gathered:

The gathering of wild vegetables and fruit is entirely confined to the women and children. The men spurn porridge containing wild vegetable maintaining that it is "a woman's food".

The wild vegetables are found on the hill-sides and in the fields after harvest. Complaints are sometimes made that the wild vegetables have disappeared. A likely explanation is that burning of the vegetation, over-cultivation and more important, overgrazing have resulted in a change in the plant cover, so that only the sourveld remains. With the advent of European vegetables, food tastes have changed and it is only the elderly women who seek the aromatic, astringent herbs of their youth.

The dwellers in the bushveld include a wide variety of wild vegetables and fruit in their diet. During the summer season the children eat large quantities of fruit straight from the tree, rarely do they gather them and bring them home.

(b) Hunted:

Locusts and grasshoppers are chased and captured by fleet-footed children and eaten roasted. Flying ants are trapped as they emerge from the anthill, and caterpillars are picked off the green foliage by women and children.

Herd boys carry catapults with which they slay birds and small animals. Dogs are half-starved "in order to make them better hunters".

The Ngwenyama opens his hunting grounds, containing many kinds of buck, for a short period each year, to all adult males. During the 'close' season many snares found all over the Territory indicate that wild and domestic animals are poached.

Fish is not a traditional food, and fishing is little practised, but enthusiasm for the sport appears to be growing, particularly in those Swazi living near large rivers.

(c) Purchase:

The local store plays a large role in the life of the rural community, for every household wishes to purchase such "luxuries" as salt.

In the rural stores, the chief foodstuffs stocked are :- maize, maize meal, sorghum, rice, white bread, flour, baking powder, white and brown sugar (the latter for beer-brewing), full-cream dried milk, condensed milk, corned beef, tinned pilchards and sardines, beans, nuts, tea, cheap sweets, margarine, cooking fats and oils, soft drinks, rough salt and curry powder. In the towns, the urban Swazi is exposed to a bewildering array of European foods and persuasive advertising.

In the rural areas the foods, other than salt, in the store are essentially 'extras' to be purchased, if there is available money. No rural home places total reliance on the shop for foodstuffs, and the basic foods (e.g. maize and legumes) are obtained from the homestead's fields. In times of scarcity, maize meal and sorghum are, however, purchased; and regular beer brewers may purchase all their ingredients from the shop, with the profits from the sale of the beverage.

In towns almost all foods are purchased from the local shops and fruit and vegetable markets. In the peri-urban areas some wild vegetables may be gathered from nearby hillsides.

The shopping is on a cash basis and credit is rarely given. It is not uncommon for a trader to purchase local grain shortly after the harvest and to sell it again at a greatly enhanced price at the end of winter. 1)

In both urban and rural areas the bus stops have attracted Swazi women who sell fruit, vegetables, porridge, amaheu, cooked meat, home-made buns and brightly coloured beverages to the travellers. Often the buses contain migrant workers returning home with their savings.

It is possible to forecast that the proposed railway line will attract similar hopeful market-women.

(d) Rations:

Some industrial concerns and certain Government departments give rations to their employees. Frequently these are uncooked and find their way back to the homes of workers, where they contribute to the family dietary. Even when a man's home lies at a long distance from his place of work, he will often take some of his rations when he visits the family.

(e) Gifts:

A visiting relative brings food to the home, and on departure will be given food for the journey. In times of dearth, a housewife will return to her maiden home to beg for food. The custom of sharing one's food stores with a less fortunate neighbour appears to be dying in the presence of a cash economy.

2.8. Magic and Religion in Farming:

(a) Rainmaking:

The prerogative of making rain lies with the King and his mother, indeed the control lies in medicines associated with kingship. However, the chief of the Magagula clan is allowed to work "local rain". 2)

The ritual involved in rainmaking is worked on the initiative of the Royal rulers or when the subjects request. During the visit of the Nutrition Survey team to the Middleveld area, two beasts (tinkomo tomdivumezulu) were sent to the royal capital, at Lobamba, with a request for rain. The process of rainmaking involves several stages depending on whether the rain falls or not, sometimes diviners are consulted to determine the reason for the failure of rain to fall.

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1) c. f. H. Kuper, The Uniform of Colour, op. cit., 137.  
2) Kuper, The Swazi, op. cit., 44.

Almost all subjects (including Christian ones) accept the efficacy of the rainmaking technique. 1) Gentle persistent rain is attributed to the Queen Mother and violent downpours to her son. 2) The former has also the ability to prevent rain.

When hail has fallen, no labour in the field is undertaken that day. Similarly, no man ploughs after the first summer rain, but waits until the second shower has fallen.

(b) Soil and Seed Fertility:

Marwick 3) describes several rituals for the purpose of improving the productivity of the soil and fertilizing the crops. In some cases ritual murder has taken place in order to obtain parts of the body for ceremonial purposes, but such murders are foreign to Swazi tradition. With the advent of mechanical agricultural tools and fertilizers there has been a decline in the practice of ritual to promote soil fertility. 4)

(c) Incwala:

It is not proposed to describe here the Incwala festival nor to discuss the various interpretations placed upon it. 5) All authors agree that the ceremony has strong associations with the earth, rain and products of the soil, but some will not concede that it is essentially a First Fruits Ceremony.

The timing of the Incwala is based on moon phases and the sun's progress across the skies, but takes place at the end of December or early January, the time when the new crops reach fruition.

Throughout the Incwala ceremony the plants used in the various medicines are all green and quickgrowing. 6) On the fourth and great day of the Incwala the King ceremoniously 'bites' (kuluma) the new season's crops, he is followed by the royal family and important officials.

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- 1) Kuper, The Swazi, op. cit., 44.
  - 2) Marwick, op. cit., 219.
  - 3) Marwick, op. cit., 195 - 205.
  - 4) Marwick, op. cit., 205.
  - 5) See Kuper, An African Aristocracy, op. cit., 197 - 225.
  - 6) Kuper, The Swazi, op. cit., 47.

The Incwala controls the consumption of a few but essential foods, maize, pumpkins, gourds and sweet reed. Up to the time of Incwala householders are restrained from eating the new crops of these foodstuffs. It was customary at the end of Incwala for the people to return to their homes, and for the head of each household to ritually partake of the new crops of the homestead.

Kuper has discussed the breaking of other Incwala taboos by participants and states that among the Swazi "morality is not so much a question of character and individual conscience as overt behaviour and group conscience".<sup>1)</sup> After a hard winter, with shortage of grain, the new maize crop is eagerly awaited. Agricultural research has led to the development of earlier ripening maize, and experts have recommended earlier planting of maize in order to ensure better harvests. These factors lead to the ripening of maize well before Incwala, and it can be seen offered for sale on market stalls. The de-tribalized person eats publically the maize with impunity, but the more conservative 'steal' the grain. They endeavour to harvest the cobs while unobserved and consume it in the secrecy of their homes, thus satisfying a public demand while staving off hunger.

## 2.9. Factors Affecting Food Production:

For many years Swaziland has not grown sufficient maize for its needs, and in years of poor harvest this deficiency is accentuated. Daniel<sup>2)</sup> has demonstrated that an increased production of less than half a bag of maize would render the Swazi population independent of imported grain. What are the factors that affect the food supply of a homestead? There are large differences between urban and rural homesteads and only the latter will be discussed as the present information on urban budgeting is not sufficient.

### (a) Rural Homesteads:

#### (i) Environment:

Nature sets the outer limits to food production, and probably the most important environmental factors are : slope of land, rainfall, temperature and soil fertility. These have been discussed in an earlier chapter, and at this juncture attention is drawn to the active research programmes engaged in a study of soils and soil fertility, and the development of irrigation.

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1) Kuper, An African Aristocracy, op. cit., 220.

2) Experiment in Swaziland, op. cit., Vol. II, 370.

(ii) Available Land:

The cry is often heard that there is insufficient land for Swazi cultivation. It has recently been shown that the area under cultivation in the Highveld and Middleveld could be doubled, and that in the Lowveld trebled by making use of the existing fallow land. <sup>1)</sup> In addition, there is further arable land that has never been cultivated. The vexed question of the pressure of cattle on available grazing must once again be raised, for although there is surplus arable land the overstocking is not only serious, but also still increasing. The only answer lies in culling herds. <sup>2)</sup>

(iii) Family Size and Composition:

The number of persons in the homestead has decreased in recent years, due to the decrease in polygamous marriages and the break up of the extended family. The Swaziland Sample Survey found indications that the smaller homesteads are less efficient units of production than the larger ones. <sup>3)</sup> So that the trend is for the food supply to become less adequate as the number of smaller homesteads increase. The age composition of the family and the ratio of adults to children also probably affect the quantity of food produced. Less and less can children be regarded as assistants in the agricultural tasks, for many of them attend school, and are either boarding or engaged in homework. Thus the cultivation of sorghum has been greatly reduced because the children cannot act as bird-scarers. Cattle herding is another job designated for children, and only by the use of cattle camps, can cattle be kept and all the children attend school, this problem is particularly acute in the Lowveld. Perhaps one of the greatest factors within the homestead is whether the head of the household is engaged in migrant labour. If so, in his absence, no major decisions regarding a change in agricultural policy can be made, and capital cannot be invested in tools, fertilizers or seeds. With the departure of the man, the stimulus and strength for agricultural tasks departs.

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1) Experiment in Swaziland, op. cit., Vol. II, 317.

2) A commission to investigate overstocking in Swaziland is preparing its report.

3) Experiment in Swaziland, op. cit., Vol. II, 344.

It is important to include the family's health and state of nutrition when considering the quantity of food they can produce. The Swazi people have been called 'apathetic', it will be demonstrated later that the general dietary is deficient in calories. On the Mines, where the rations are nutritionally adequate, the Swazi has the reputation of being a good worker. 1) A family in a state of subnutrition is unlikely to find the energy necessary to produce extra food supplies. As Richards has pointed out, one cannot assume that the shorter the food supply the more willing a man is to cultivate food. 2) The Swazi attitude to food production has already been discussed.

(iv) Equipment, Capital and Credit:

Increased food production is dependent on the equipment available to cultivate the soil, and for adequate storage of the crops, however, many of the Swazi still use primitive tools and methods of cultivation. The Department of Land Utilization, by means of a revolving loan, is making it possible for farmers to purchase equipment on credit. Without such measures the difficulties are great for few Swazi households have any monetary capital (their 'capital' lies in cattle which are only rarely sold), and when there is no "security of tenure" in the recognized sense of the word, banks are slow to advance loans. The wives are often credited with having 'prodded' their husbands into purchasing fertilizer, maintaining that if they have to sow, weed and harvest, then they must have a worthwhile crop. 3)

(v) Agencies for Changes in Food Production:

One of the earliest influences on food production were the missionaries to whom are attributed the introduction of maize as a major item of diet in the Territory. The mission stations have gardens attached to them and endeavour to propagate the principles of gardening. 4) The purpose of these gardens is to supplement the diet of the Mission station and to inculcate into the Swazi better agricultural methods. With the development of towns, it is no longer possible to obtain easily the wild vegetables.

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- 1) Chapter VI. 2.1.
  - 2) Richards, op. cit., 399.
  - 3) Letta Dhlamini, personal communication.
  - 4) At the Nazarene Mission in Manzini, the Swazi nurses in training spend several hours a week gardening under the supervision of a Sister Tutor.

Schools, whether Government, Mission or tribal, often have school gardens which have varying degrees of success as an educational project. The chief drawbacks are lack of enthusiasm on the part of the teacher and the failure to maintain the gardens during school vacations. Recently the question of school gardens has been considered by officers of the Department of Land Utilization and advice given with regard to the allocation of individual plots to senior students only, and the establishment of competition between gardeners. It is doubtful whether in the near future school gardens will be economic, or even money raising ventures, and the advisability of selling all the produce is also open to question. In theory, the produce from the garden should be sold at cost price to the school for school meals, but never will the gardens be able to provide a regular supply of vegetables to the schools. The whole question needs careful evaluation.

The Department of Land Utilization, through its extension staff, has endeavoured to arouse enthusiasm; to institute better methods of agriculture and animal husbandry, and to find markets for produce. A research organization provides the basis for future policy. An assessment of the stimulation given to food production by the Department of Land Utilization would require further study.

### 3. FOOD DISTRIBUTION :

#### 3.1. Introduction:

In Swaziland a potential foodstuff can serve a purpose other than the satisfaction of hunger. It may be :

- (i) rendered as tribute to a chief (e.g. the top vertebrae of a slaughtered ox) ;
- (ii) used in barter purposes (a clay pot is exchanged for the quantity of grain or legumes that it can hold) ;
- (iii) the fulfilment of a legal contract (the lobola cattle used in the ratification of a marriage) ;
- (iv) used for sacrificial purposes (the pregnant ewe slaughtered during the rainmaking ceremony);
- (v) partaken ritually (the foods eaten on the fourth day of the Incwala.)

However, in this section the concern is with the distribution of foods used to satiate hunger, and the effect of this distribution on the nutritional status of the community.

### 3.2. Territorial Distribution:

It has been stated earlier that the role of the Ngwenyama and his Mother as "herdsmen of people" is performed in the apportioning of land, but no longer do the rulers feed the people during hunger periods. However, the grain from the Royal fields is used in the provision of beer for the dignitaries and special guests that visit the Royal kraals throughout the year and who flock in large numbers on special occasions (e.g. Incwala).

The milling companies distribute grain to rural stores throughout the Territory. In Swaziland, the Maize Advisory Board advises the Government on measures concerned with the marketing of this staple food. 1) During the maize shortage of 1961, the Government made it possible for storekeepers to obtain extended credit for maize purchases.

The Territory has few markets, in the major centres of urbanization small fruit, vegetable and handicraft markets operate, but in the rural areas there are hardly any. There exists no machinery whereby a surplus produced in one region can be distributed throughout the Territory. The road conditions cannot be held responsible for this absence, particularly in view of the fact that major roads are in the process of being tarred. A great deal of the seasonal deficiencies of certain nutrients (e.g. Vitamin A) could be alleviated if the marketing system was improved.

### 3.3. Local Distribution:

The Chief can be regarded as the local herdsman of the people. While no demands of food as tribute are made, it is customary to send a gift of a food delicacy when available; and when summoned the people are required to render their labour in the fields. When drought ravages, the people request the Chief to send representatives to the Queen Mother, and it is he who arranges the levy of cattle that accompany the representatives.

In the rural areas, when an animal is slaughtered the owner informs the neighbours, who foregather so that the meat is distributed beyond the immediate family into the neighbourhood. 2)

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1) See Maize and Maize Products, a supplement to the Times of Swaziland. 1962.

2) Beemer, op. cit., 219.

Formerly, a family, verging on starvation, could look to their neighbours for succour, but with the rise of a cash economy, the giving of food to the needy has decreased. Kinship ties which impose laws of hospitality and sharing of food still exist, so that a woman who has no food will beg some from her maiden home, but even these are weakening.

Differences in the food consumption in the rural areas are not based on class, but on age and sex. (Although the teachers who cultivate no fields and are salaried will purchase those foods indicative of Western influence, for example, rice, bread and butter). When a community is living near subsistence level it is dependent largely on the foods that can be grown in the area and upon the season of the year. Only when cash is used to supplement the diet are variations introduced and then the purchaser is largely dependent on the stock held by the local storekeeper.

### 3.4. Distribution Within the Family:

Each wife has her own field, or a share of a field, and the produce of the field is hers. Men often accuse women of rushing to the store after the harvest to sell some of their grain. Their accusations are not unfounded, but sometimes this is the only resort by which the women can obtain money they desperately need for a particular purpose. Later, in the winter, it may be necessary to repurchase maize for the family, but the financial onus will fall on the head of the homestead.

To feed her husband and family the wife will use her own grain and legumes. When the stocks within the hut are exhausted she will, formally, inform her husband's mother that she will draw on the store in the ingungu. The wife then requests the husband to open the ingungu. When the ingungu is empty, then recourse is made to the Ndlunkulu ingungu containing the crops gathered from the family's fields (i.e. those belonging to the homestead head).

With the advent of the graitank for storage of crops, few households can afford more than one tank so that all the supplies from whatever source are placed in here, and the tank secured by a lock, the homestead head retaining the key.

Thus, although in theory a woman has the right to her own grain, the head of the homestead retains the final distribution of the food, for the married woman is not allowed to enter the cattle kraal, (for fear that her presence would bring harm to the beasts) where the ingungu is situated, and she has no means of access to the grain tank. If the wife feels that she is being unjustly treated she can request the husband's mother to mediate on her behalf.

The budgeting of the food lies in the hands of the housewife, she decides on the quantity to be cooked, and is responsible for the provision of food for a visitor. In general, housewives tend to use the same measure of grain each day, regardless of the total number expected at a particular meal. If an excess is produced, by the absence of members, then some remains to be eaten cold next day; if there are extra guests then the wife will forego some or all of her portion. Formerly a good housewife was expected to provide beer for her husband, but now beer is made by specialists within the community and the husband purchases from these women.

Once the food is cooked, the portions are allocated on the basis of rank within the family, age and sex.

The head of the homestead receives the first portion that is dished. It is made to look attractive and is carefully carried (covered) to him by a child.

The mother of the husband, if she is not cooking for herself and son, is served next. The children follow, their portions being divided on the basis of sex and age: a large bowl for the older boys and one for the younger ones, the girls are given another bowl. If the mother is anxious to ensure that the toddler receives sufficient food, she may dish for him separately or share her food with him. Lastly, the wife serves herself and, rarely, the remaining food is given to the dog. These patterns are not rigid, and sometimes one finds a girl sharing a bowl with the boys.

The head of the house receives a bowl of food from each of his wives, even when food is very short. A wise husband will prevent inter-wife jealousy by taking a portion from each bowl presented to him and leaving the remainder for the children.

Children in polygamous families are fed by their mothers, but it is not unusual for them, after eating, to repair to the food group of another woman and have some more food.

This description of the distribution of a meal reveals several facts: firstly, the communal idea of eating is instigated from weaning onwards, no one eats alone, and most share bowls, which is more economical than dishing separate portions. Secondly, the wife has an obligation to feed her husband, even if it is obvious that he has been supplied with adequate food already. Thirdly, the wife serves herself last and in times of shortage, will ration herself severely. Sometimes a husband and wife decide to forego a certain amount of food so that the children will not feel hunger pangs. The fact that the wife is served last has an important bearing on the improvement of the dietary of the pregnant and lactating woman, for it is obvious that unless

the diet of the whole family is improved she will not benefit. <sup>1)</sup> By the Swazi, a fat wife is equated with a solicitous husband who ensures that his wife has plenty of food.

### 3.5. Ritual Restriction of Food:

In general, the restrictions placed on food, work in favour of the aged and the men, and against the women and children. Similarly, in the apportioning of food, the former two benefit, for example, the flesh of a chicken is given to adults, while a child is given the feet to suck.

Nutrition education methods that emphasise the child as the most important member of a family <sup>2)</sup> are not suitable for such a situation, one can merely explain that the nutritional needs of a child differ from those of an adult.

### 3.6. Hospitality:

A visitor is always offered some succour: beer for the men and food for the women, although in Christian homes tea is the beverage usually suggested. Even in times of food shortage a guest is served. A male visitor has his own bowl, but a woman visitor may share with the housewife. A woman visitor will help the housewife prepare the meal. Anyone departing after a visit, is given food for the journey.

Visits are often made by children to their grandparents, and by wives to their maiden home. Grown sons rest at home after a period at the mines. These visitors become absorbed into the family consumption unit.

### 3.7. Feasts and Fasts <sup>3)</sup>:

Swazi religious beliefs do not require periods of fasting and feasting. However, appeals to the ancestors are usually accompanied by offerings of meat and beer. Those Swazi who are members of the Separatist Churches, usually abstain from pork, blood and fermented foods.

When an ox is slaughtered the men of the neighbourhood foregather, but women visitors are forbidden. The man eats his fill at the subsequent feast, but is allowed to take a portion home "for the dogs". The "dogs" referred to are in fact his children.

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1) See Malnutrition and Food Habits, *op. cit.*, 18.

2) Malnutrition and Food Habits, *op. cit.*, 60.

3) For full accounts of ceremonies and the sacrificial foods involved see Kuper and Marwick.

At ceremonies, for example marriage, lobola ceremonies and funerals, large amounts of food are prepared. At all times the consumption of excessive quantities of meat and beer is equated with great pleasure and contentment. At the lobola ceremony, one of the cattle (lugege) is slaughtered by a representative of the girl's parents and equally apportioned between the two families to indicate their mutual acceptance of the marriage.

On the death of a Chief's brother, during the visit of the Survey team, the people of the district gave food, or went to the mourning home to aid in the preparation of the food. The food was given to those who had come from some distance to mourn.

### 3.8. Urban Families:

When families move into an industrialized area, and are unfamiliar with a money economy, they sometimes have great difficulty in obtaining enough food after paying for the other necessities of urban life. <sup>1)</sup>

In the rural areas there are small differences in the standard of living from home to home, but in the urban areas much greater differences exist, so that in the urban areas, there is a greater disparity in the distribution of food from one home to another than there is in the rural areas. Differences are maintained as the habit of aiding the needy neighbour declines even faster in the presence of urbanization.

### 3.9. Summary:

The semi-subsistence level of the Swazi people and the sociological factors described above affect the actual amount of food eaten by each individual within the community.

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1) Malnutrition and Food Habits, op. cit., 17.

## CHAPTER II (a)

### FOOD PREPARATION AND CONSUMPTION

#### 1. INTRODUCTION :

It is proposed to describe the background to the preparation of meals; the people concerned, the water and fuel resources, the kitchen and its utensils, Swazi foods and the early Swazi dietary. The labour of meal preparation is long and often monotonous, occupying a large part of the housewife's day, when cooked is it rapidly consumed.

The value that the Swazi place on food, and certain dietetic theories are of value in planning desirable changes in the diet, and so these have been included.

#### 2. THE DOMESTIC UNIT IN FOOD PRODUCTION :

Small children with dolls fastened to their backs play at housekeeping and construct small hearths and grind imaginary corn to prepare for their 'families'. By five years of age, the young girl accompanies her elders in fetching water, her young neck held taut as she balances a small container on her head. Throughout her growing years, she will play an increasing role in aiding her mother and will become proficient at hand grinding. When her mother is away visiting or forbidden to cook (i.e. after a miscarriage, after childbirth, and for a month after the death of her husband) the daughter will take over the household duties.

As a bride, she will be closely supervised by her mother-in-law, and for the early period of the marriage may act as assistance to her husband's mother. The young wife will glow with pleasure when praised for her diligence and deftness. The mother-in-law will instruct her in the food avoidances of the husband's clan.

In a polygamous home, a junior wife (inhlanti) is often seconded to a senior one. The two wives may share the task of preparing the meal, or they may decide to cook alternate meals. The preparation of food is a long and monotonous labour that is eased by the help and conversation of another. A woman guest participates in the preparation of food.

##### 2.1. Water and Fuel Resources:

To some extent, the availability of, and proximity to, the water and fuel supplies govern the number of times a day that food is prepared, the variety of the dishes cooked, and the general cleanliness of the home and its inmates.

In choosing the site for a new home, its nearness to a clean water supply is one of the factors considered. Nevertheless, during the winter in the Bushveld, local sources of water frequently dry up and water must be fetched from a great distance. Very little effort is made to ensure the cleanliness of the water and it is often drawn from a place where cows drink and clothes are washed. Many of the Middleveld and Lowveld streams contain bilharzia. Water for drinking purposes is not boiled, but scooped straight from the water-pot.

The water is fetched by the women and girls, formerly in clay pots, but now the four-gallon paraffin drum or bucket are generally used. When large quantities of water have to be fetched a long distance, then men or boys yoke the oxen and convey it in a large drum by sledge.

In the townships water is laid on, and the housewives fetch it from communal standpipes.

Wood is preferred fuel, but recourse is sometimes made to empty maize cobs and maize stalks. Beemer describes the use of dung as a fuel when all other supplies fail <sup>1)</sup>, but I have never seen it used. Some traditional chiefs discourage the planting of trees and in these areas the land is being denuded and women often have to walk ten miles to gather wood. It is little wonder that the fire is lit shortly before the hot water is required.

In the urban areas fuel is often purchased from people who collect it in the Lowveld and convey it by lorry to the towns. Sometimes paraffin stoves are used in the towns for quickly-cooked dishes. The Government Housing provides stoves powered by bottled gas for senior Swazi officials and their families. The long slow methods of cooking used by the housewives consume large quantities of the fuel.

The labour of collecting wood falls on the woman, but rarely is she permitted to handle a chopper, but must break the branches off. <sup>2)</sup> The girls that might assist in this task are frequently attending school.

## 2.2. The Swazi Kitchen (lidladla):

Each woman has her own kitchen, but in fine weather the cooking is done out-of-doors, and the kitchen functions as a store. In the Highveld and Middleveld of Swaziland the kitchen is made of grass, but in the Lowveld it is frequently made of upright wood poles and the interstices between are left unfilled to promote coolness. The grass huts have no means of ventilation, apart from the low door, and so the smoke percolates through the thatch.

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1) Beemer, *op. cit.*, 215.

2) c. f. P. J. Quin, Food and Feeding Habits of the Pedi, (Johannesburg: Witwatersrand University Press, 1959), 133.

The floor of the kitchen is smeared with cow-dung which is renewed at intervals. Inside the kitchen, the maize cobs and sorghum heads, to be used for seed, are hung near the thatch. Here, they are safe from hens and the smoke prevents infestation by weevils and other pests.

Sacks of maize, legumes and nuts may also be stored within the kitchen, but are frequently found in a special store hut. The water is placed in a large clay pot, and the thirsty use a calabash ladle or a tin can to scoop some out. Salt, a precious commodity, is kept in a glass bottle which may have a screw top or cork, but an empty mealie cob often substitutes for the latter. Matches are carried by the housewife in one of her capacious pockets.

The hearth is a circular depression in the centre of the hut floor, sometimes a piece of iron lines the hearth. An iron tripod is used to hold the pots in place, but clay cooking pots are frequently supported by three stones. Outdoor hearths are exactly the same and are protected from the wind by the reed screen enclosing the yard of the hut.

In some of the urban homes and in a very few of the rural ones iron stoves, fired with wood, are used.

In the summer months the kitchen contains swarms of flies. The residual warmth in the hut after the fire has died allows many of them to survive the winter. The practice of washing bowls and dishes not immediately after a meal, but shortly prior to the next, provides the flies with plenty of food. The Swazi regard flies as a nuisance, but not harmful.

### 2.3. Utensils:

Grain foods are generally stored in woven grass baskets or in sacks, while water is kept in a large clay pot. In every kitchen are found grass mats on which to sit while preparing the food or waiting for it to cook. Mats are offered to visitors and it is a breach of etiquette to refuse one. Sometimes a European guest is offered a wooden stool or chair, a sign of honour, which has the distinct disadvantages of placing the sitter on a level with the smoke from the fire.

The first job in food preparation is to grind the maize, while some homes have hand mills, the majority of the rural women still grind on a stone. The lower stone is roughly rectangular in shape, the top surface is rendered rough and concave in shape by hammering, but over a period of time the surface becomes smooth and is re-hammered. The upper stone is shaped like a large fat sausage. Small closely-woven grass mats receive the maize meal as it is expelled by the grinding action from the nether grinding stone. In some homes the

mealie meal is sifted through wire mesh sieves in a wooden frame. The gauge of the mesh is of such a size that only the husk remains in the sieve.

Clay pots are the traditional cooking vessel of the Swazi and ceramics is an art practiced by women specialists in the community. The utensils are manufactured close to suitable clay deposits, and the potter barter her wares for the volume of grain or legumes that the pot will hold. Clay pots rarely have well-fitting lids and green leaves closely wrapped over are often used. In addition to cooking, the clay pots are used for beer brewing. The ease with which the clay fractures has caused the majority of housewives to adopt the use of iron utensils, but beer is almost universally preferred in a clay pot. 1)

For cooking, the heavy three-legged iron pots are widely used. They range from huge ones holding many gallons (used in beer making) to small ones holding a pint, used for relish. All pots have lids and these are used for all cooking processes, except in the preparation of a mixture that bubbles excessively.

In the towns enamelled, iron and aluminium saucepans are purchased for use on iron and paraffin stoves, while most urban homes have a kettle.

Inside the thatch of the hut, wooden spoons are stored until required to stir the food. A wooden stick called a lujojo closely resembles a large scale version of the European "swizzle-stick", and is used for a similar purpose: to mix the maize meal into the boiling water in the pot.

Cooked meat is served in Swazi meat dishes, made usually of two-coloured wood and round in shape standing on short legs. Frequently, two such bowls are joined in parallel. The bowls are carved by boys and men and have found favour with tourists. It is rare to find porridge in wooden bowls, they have been usurped by 'modern' containers, enamelled iron, or aluminium dishes, and, more rarely, china plates. Teapots and trays are used by those Christians influenced by Europeans.

A special utensil is the beer strainer used to remove the husks from the fermented product. Beer strainers, carefully and often attractively woven, are hung near the thatch of the hut in readiness for the next brewing.

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1) The Queen Mother offers guests beer served in a white enamelled iron can.

The fruit of the gourd is shaped into dishes, scoops and ladles. A gourd is used as the vessel in which milk is ripened to form curds (emasi) and whey (umlaza). The calabash (igula) for emasi has a hole at the bottom plugged with the skins of a special root. The igula is suspended in a grass harness near the roof of the hut, well out of the way of animals and young children, but in the warmth of the fire, when the emasi is ripe, the whey is withdrawn through the hole in the base of the calabash.

### 3. THE EARLY SWAZI DIETARY :

After exhaustive inquiries, Allister Miller concluded that maize was introduced into Swaziland about the time of the Dlamini clan, the conquerors of the Territory who crossed over from Tongoland towards the end of the eighteenth century.

Prince Mavedu Dlamini <sup>2)</sup> vividly described the dietary of his youth at the end of the last century. In Swaziland, the abundant cattle grazed in lush grass and produced large quantities of milk. Both children and adults consumed the soured milk, emasi for the first meal of the day and in the evening emasi was mixed with boiled, then crushed, maize grains (umcaba). Sometimes sorghum was used instead of maize. In addition, full use was made of the veld vegetables and herbs for food and for medicinal purposes. A number were eaten raw, and others cooked for a short time. Young men did not consume beer until they were over twenty years of age, but drank milk instead. Meat was obtained by hunting in the winter, and from the occasional feasts at times of wedding or other celebration. Mntfwanenkosi Mavedu attributed the more general use of maize meal porridge (its name impalishi is derived from the English) to the Missionaries who provided this dish for their families and workers. He decried the disappearance of the lush grass and mentioned the small quantities of milk produced by the present cows.

His description is very similar to one given by Bryant <sup>3)</sup> of the Zulu diet up to the outbreak of rinderpest in 1897. It seems very likely that this same disease that destroyed some 54,000 <sup>4)</sup> head of cattle in Swaziland during that year, caused the radical change in the diet from one in which the main ingredient was milk to the staple maize. Krige, writing in 1935, describes emasi as the traditional mainstay of the Zulu diet, <sup>5)</sup> but after the rinderpest scourge, the milk production in that country never recovered sufficiently to reinstate the traditional milk dishes.

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- 1) Quin, op. cit., 34.
  - 2) Personal communication.
  - 3) A. T. Bryant, A Description of Native Foodstuffs and their Preparation (Verulam: 1907), 8.
  - 4) D. E. Faulkner, The Cattle of the Swazi, Mpisi Series, No. 1., January, 1947.
  - 5) E. J. Krige, Social System of the Zulus, (Johannesburg: University of the Witwatersrand, 1936), 55.

1)  
4. SWAZI FOODS :

With the decline in the mixing of crushed grain with the curds of milk, the Sotho eating pattern was adopted, whereby porridge is shaped by the hand and dipped into a bowl of relish, usually a vegetable, or vegetable and ground nut mixture. More rarely, the vegetables are mixed with the maize meal during the cooking process, but the appearance of the cooked dish does not appeal to many people.

(a) Cereals:

Cereals are responsible for the satiety value of the Swazi diet, and an essential ingredient of every meal, except when an ox has been slaughtered and the people eat their fill of meat. When a family is without maize or sorghum, it is described as 'starving', regardless of the nature and extent of other food stored in the house.

(i) Maize:

The importance of maize and sorghum is symbolised by the ceremony in which a new born baby is fed a fine gruel of one or other of these cereals (depending on the clan custom) before the mother receives any food or the baby, the breast milk.

In Swaziland, only white maize is eaten, and efforts by officers of the Department of Land Utilization to improve the maize strains by seed selection are resulting in the replacement of the traditional types.

Home grown maize is either ground in a hand mill which removes only the husks, or stone ground by the housewife. Some families cook the whole grain meal in this state, while others sift it through wire mesh sieves of various gauges, but little more than the outer husk is removed.

The stores sell mill-ground maize-meal, either sifted or unsifted; however, the former is subjected to an extraction rate of only ten per cent. In other words, very little of the original grain is removed during the milling process. At the present time, highly refined maize meal is not sold in Swaziland. From a nutritional viewpoint, this is an excellent practice, but under the growing demand for whiter maize meal, emanating from a society pursuing sophistication one wonders how long this favourable position will be maintained.

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- 1) In Annexure B are listed the chief Swazi foods, their botanical names, and more common methods of preparation. The literature source for the chemical composition of each food is stated.

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Some idea of the great number and variety of dishes in which maize is used can be gained from Annexure B. Emashica are the husks of maize and corn which are strained off from beer at the end of the brewing process. The strainings are believed to be the food of evil spirits. In times of acute privation, a family may resort to eating porridge made from emashica. To do so is to bring deep disgrace upon the head of the family.

(ii) Sorghum:

In the dry Lowveld, sorghum is a more successful crop than maize owing to its ability to withstand drought. It is a well-liked cereal, but with a greater number of children attending local schools, the task of warding off the birds from the crop has become a problem, and less sorghum is grown. There is resistance to introduction of bird-proof varieties,<sup>1)</sup> probably due to an alteration in flavour.

One of the chief uses of sorghum is in the production of African beer, but it is also used to make porridge, soured porridge, and mixed with beans and vegetables in other dishes.

(iii) More Recently Introduced Cereals:

Foreign staples appear to cause early hunger,<sup>2)</sup> and consumers often complain of the "light" feeling of wheat products. Swazi visitors to England, though well-fed, describe their desire for the satiety provided by their usual staple.

In town and rural stores much white bread is sold, for it is enjoyed not only as a prestige food, but also because it requires no preparation and chunks can be broken off for snacks. Scones, buns, cakes and biscuits are also enjoyed, but are not intended to replace maize.

Those persons that can afford the cost, substitute rice (lilayisi) for maize at some meals.

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1) R. I'Ons, Notes on Crops Grown by the Swazi. (Land Utilization Department, Mbabane, Swaziland, 1962), 2.

2) Richards, op. cit., 46.

(b) Starchy Roots and Tubers:

Several varieties of wild roots and tubers are found growing in Swaziland, and are eaten at the end of the summer months and during the winter. They are usually boiled in their skins. Yellow sweet potatoes find no favour, but white ones are eaten. It is nutritionally unfortunate that the yellow ones, with the superior carotene content, are not liked. European potatoes are increasing in popularity and are to be seen offered for sale on many of the market stalls.

Cassava, (its consumption is attributed to the influence of Portuguese East Africa), can be found growing in garden plots, however, its appeal appears to be limited.

(c) Sugar and Sugar Products:

Sugar is sprinkled on to porridge, and generous helpings are ladled into cups of tea. Its use is limited by the cost, and is found to the greatest extent in urban homes. Brown sugar is widely used by beer brewers to hasten the fermentation process. The older gourmets contend that this addition spoils the flavour, but the younger drinkers are indifferent to such niceties. It is also used as an ingredient for more alcoholic home-brewed beers.

Jam, sweets and chocolate are all popular with adults and children, but are luxury foods purchased as "treats". Most rural stores carry a range of cheap sweets.

(d) Legumes:

A variety of legumes (e.g. mungo beans, jugo bean, and cowpea) are grown and stored. They are made into a bean porridge or stew, and sesame and pea nuts are often ground and put in a vegetable relish to add piquancy. Legumes play an important role in the protein content of the dietary. They grow best in the Middleveld, but are found also in the Highveld, Lowveld and Lebombo.

(e) Vegetables:

(i) Wild Green Vegetables (imbhido):

Formerly, green vegetables, growing wild on the veld, formed an essential part of the diet and were particularly valued when other supplements to maize (for example legumes) were exhausted. Wild vegetables are used not only as a foodstuff, but also for the medicinal properties.

generally used as the basis of vegetable or meat stews, and as such are fried in fat. Cabbage is much coarser than the traditional vegetables and requires prolonged cooking to reduce it to the soft spinach-like pulp necessary for relish. Frequently, it is cooked for an hour by which time it is a brown pulp devoid of any ascorbic acid. The rural Christian and urban families most favour European vegetables.

(f) Fruits:

Fruits are essentially a snack, although in times of dearth in the Lowveld, they become items of importance, and hungry individuals may consume several pounds of wild fruit a day. Sometimes fruits, e.g. Vangueria infausta and Strychnos gerradi are stored and kept for times of food shortage. 1)

It is not customary to plant fruit trees around the homestead, for the belief exists that a kraal should stand alone for all to see, nevertheless families have planted pawpaws, mangoes, peach, citrus and banana in their yards. The best fruit is very often sold, while the family have the bruised produce.

Most fruit, particularly wild figs and peaches, is eaten in a half-ripe state, which may be explained by the eagerness of the children to eat and the necessity to consume the fruit before pests ravage the crop.

Citrus fruit, pineapples, guavas, mangoes, pawpaws and bananas are all enjoyed, but often their price is so high that the producers offer them for sale (to Europeans), and Swazi consumers have insufficient money with which to purchase.

(g) Meat and Meat Products:

Horses, donkeys and mules are not eaten by the Swazi, but sheep, goats, pigs and chickens are. Pork is not popular and is said to cause vomiting, 2) probably due to the deep layers of rich fat on most domestic pigs in Swaziland. Buck is considered a delicacy.

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1) Beemer, op. cit., 221.

2) Marwick, op. cit., 219.

Certain ones have been pointed out to me as cures for indigestion or stomach-ache, and other minor ailments. The herbalists (izinyana) use a variety of wild plants, often the roots, in the cure of maladies. The most common wild vegetables are umdzayi (Asclepia affinis), uchuchuza (Bidens pilosa) imbuya (Aramanthus paniculatus), inshubaba (Mormordica faetida), umdzebedze (Annesorrhiza flavellifolia), umsobo (Solanum ingrum), igusha (Corchurus tridens) and isilele (Portulaca olevaca).

In picking the vegetables care is taken to gather only the tender, fresh plants. A few vegetables are eaten raw, but the majority are washed and cooked for a short while in a small amount of boiling salted water. The vegetables are seasoned with peanuts, salt, chillies and even curry powder.

Vegetables are regarded as the food for women and children, some men will partake, but the remainder spurn them. The old women enjoy the pungent bitter herbs, but the younger people find their taste displeasing.

Not only are the wild vegetables probably disappearing, due to the overgrazing and through the practice of grass burning, but also there has been a change in outlook, the indigenous plants are scorned and the foreign vegetables lauded. This desire to abandon the traditional diet is seen in other foods and is not easily reversed, in fact it may be futile to attempt to do so. Those elements of the population who have already abandoned the wild vegetables may have to be re-introduced to them through a carefully planned approach, while those people who still use them should be encouraged to continue.

(ii) Cucurbits:

Pumpkins, vegetable melons, and gourds are planted among the maize, and then they ripen fast, they provide early variety after the lean winter months. Thrifty housewives dry pumpkins to provide a winter vegetable. The green leaves of pumpkin make a very pleasant relish, and these are sometimes dehydrated.

(iii) European Vegetables:

Onions, tomatoes and cabbages are the most popular of the European vegetables among the Swazi. <sup>1)</sup> The two former are

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1) R. l'Ons, op. cit., 2.

Red and green caterpillars (*Gynanisa maia*) flying ants (*Odonto termes* sp.) grasshoppers and locusts are seasonal delicacies that are usually roasted and enjoyed by the whole family.

Animals that have died are eaten without revulsion or fear. Under Government regulations the kidney, spleen and one lower rib of an ox must be given to the Cattle Guard for subsequent laboratory examination.

Cattle are killed for special religious, economic and political reasons and very rarely for succour. A married woman is not allowed to eat the meat of an animal slain for the ancestral spirits until she has borne a child. 1)

#### The Division of the Carcase:

The ox is usually slaughtered in the early afternoon when the men of the neighbourhood foregather at the home of the host, but women are forbidden to visit. The male visitor is expected to consume his portion before departing, but he is permitted to carry a small portion home "for the dogs" (i.e. his children).

The animal is slaughtered with a spear and then skinned, the first bite of the flesh is taken by the head of the house or the guest of honour, or both. The male visitors can then consume the "stolen portions" (amantshontsho) which they have removed during the skinning. The carcase is hung in a hut and the ragged portions or trimmings given to the women. The latter also receive the "insides", except the spleen, liver, heart and sweetbreads (amalulu). Women prior to menopause are forbidden to eat the part of the entrails known as umsasane. 2)

Early the following day the men roast and eat the forequarters (umkono), while the women are apportioned the ribs. The contents of the facial sinuses (bopondveni) are removed, and these, together with the sweetbreads and a certain liver lobe (imphundvu) are roasted for the grey haired men, and the senior old women. According to Krige, 3) the Zulu believe that the imphundvu causes young people to be forgetful. It is to be noted that the elderly, who are held in much respect in Bantu society, receive the soft, easily chewed portions.

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- 1) Marwick, op. cit., 119
  - 2) Marwick, op. cit., 233.
  - 3) Krige, op. cit., 57.

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The top vertebrae (sankala) of the beast are taken as a present to the local chief by a youth or young girl. The remainder of the meat is boiled in large pots. The herdboys take from the pot their perogatives, the upper lip (ingcova), the appendix (umntshaza) and a certain portion of the stomach (tsandlwane).

While the meat is cooking, the bubendze is being prepared. The ingredients are small pieces of fat from the peritoneum, the lung tissue, blood and salt. These are boiled together and the resultant thick mixture is eaten in small amounts early in the day. Its satiety value is so high that it must be eaten while the stomach is comparatively empty.

The boiled meat is distributed, the women having the hind leg (umlente) and some of the ribs, the men the remainder; but the brisket (umganga) is left in the pot, or put on one side. The fat part of the gravy is skimmed off into a clay pot.

The men eat near the cattle kraal, but the women partake in the privacy of the huts. As the evening comes the visitors depart, while the immediate family (Lusvendo) gather outside the reed screen of the big hut (Indunkulu) to eat the brisket (umganga) and to discuss family affairs.

On the third day, the hooves (amasondvo) are cooked. If a guest is departing the haunch may be boiled in salted water, and then salt rubbed in (umkhunsu). Eaten cold, this will provision a journey lasting several days. It is on the third day that sidlwadlwá is eaten: to the reserved fat portion of the gravy is added finely ground sorghum preferably, or maize meal. The dish is given to important guests and adults, it is considered too rich for children.

The division of the slaughtered ox exhibits well the apportioning of food on the basis of age and sex. With urbanization tradition falls away, and purchasers are unaware of the significance of the different parts of the animal. Butchers' shops in town are always crowded with customers. Soft meats, for example mince and sausages, are not popular for, to the Swazi, part of the enjoyment is the chewing of the underdone meat.

Canned corned beef is a popular but expensive purchase.

(h) Eggs:

The only eggs eaten are from chickens, for turkeys, ducks and geese are not bred by the Swazi. Eggs are the prerogative of the men, for this food is said to cause women to lust after men, and so young girls, from puberty upwards, are forbidden them. Eggs are not fed to infants and children.

It appears that another reason for not eating eggs is that they are a potential fowl that can later be eaten or sold. Many of the chickens are disease-ridden and so die early. Eggs are offered for sale in the Swazi markets and thus are also regarded as a source of income.

The outcome of a group discussion among Swazi men and women <sup>1)</sup> was a grudging admission that women be allowed to eat eggs. Mr. Varty <sup>2)</sup> has described how rural women readily accept cakes and biscuits in which eggs have been incorporated during the demonstration of cooking methods. An egg in which the white and yolk have been mingled (e.g. scrambled egg) is more acceptable than one in which these portions remain intact.

(i) Fish:

Creatures living in fresh water have not been regarded by the Swazi as a source of food. Some people maintain that fish are related to snakes. However, canned pilchards and sardines, and fried fish and chips are popular food items. In an effort to increase the animal protein of the diet dams have been stocked by officials of the Department of Land Utilization, with Telapia Mozambique and Barble. The fish farming is still in its early days, but housewives will require instruction in the preparation and cooking of fish.

(j) Milk and Milk Products:

Goats and donkeys are not milked, but cows are. The food products of cattle are treated with ceremony and respect on all occasions. A woman is believed to have the power to bring harm to the herd (for example, to cause them to abort or die,) and contact between the wife of the house and the cattle is limited, and at times (e.g. during menstruation) she must avoid all contact with them.

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1) Mposi, January, 1962.

2) G. B. Varty, personal communication.

Cows are milked once a day, usually at mid-morning. If there is a dairy in the vicinity all or a portion of the milk is sent for skimming. The skimmed milk is either consumed by the family or given to the dogs. It is generally believed that skimmed milk is either useless to the body or harmful.

Herdboys, out in the veld, milk directly into their mouths, but the preferred way of consuming milk is in the soured form. The milk is poured into the special calabash and hung in a warm place. When soured the plug at the base of the calabash is removed, then a herdboy blows through the mouth of the container and the whey streams out, leaving the curds behind. The whey is usually given to the children, if the home has a great deal of emasi then the whey is fed to the dogs. The true emasi is made by the addition of finely ground sorghum or maize meal to the curds (emasi avutshiwe).

Milk and emasi are not general foods to be eaten by anyone at anytime or anywhere. One is permitted to eat emasi at the home of someone with one's own clan name (sibongo), and at the home of a person with the same sibongo as one's mother. 1) In Swazi society it is not permissible for one to marry into certain clans and the restrictions on emasi consumption are related to this ruling. In other words, a person is allowed to consume emasi at the home of the family into which he or she is not permitted to marry.

A girl can eat emasi at her own home for the length of her life, and so when married she can, on a visit to her childhood home, consume emasi. Upon marriage, the wife is not allowed to take the milk from her husband's herd. A solicitous father may provide a milch cow for his daughter to take to her new home, and the milk from the cow is for the exclusive use of the daughter. This gesture is comparatively rare, and most wives must await the birth of the first child, 2) when the husband gives his permission for the wife to drink the milk of his herd, symbolized by the gift of a cow, (the lipakelo). Marwick 3) quotes Engelbrecht, who maintains that the idea underlying the lipakelo beast is to provide for other children besides the heir. Many husbands neglect to give their wives the lipakelo beast and so they pass their lives without receiving milk at their married home.

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1) Marwick, op. cit., 57.

2) Marwick, op. cit., 58.

3) Marwick, op. cit., 58.

Girls and women abstain from emasi during periods of menstruation, <sup>1)</sup> but are allowed to handle it during food preparation. A woman after a miscarriage or childbirth does not eat emasi for a month, and upon the death of her husband she forsakes milk.

Emasi is said to cause worms when a child, unused to receiving it, eats it away from home. An excess of emasi induces drowsiness and a feeling of deep contentment.

The head of the household and the children enjoy eating emasi at the entrance to the cattle kraal, but women must ingest it in the privacy of their own huts.

Emasi is offered for sale in some of the town markets, but it is only the de-tribalised women who will purchase and eat it in public. In the rural areas, the laws governing the milk consumption and distribution hold strong.

#### Other Milk Products:

Cheese is procurable from stores which stock European foods, but neither the smell nor the taste appeal to Swazi palates. Butter is enjoyed and is spread on bread. Condensed milk is disparagingly called "donkey's milk", but nevertheless finds a market in urban areas and in the rural areas during winter months, and with those families that have no milch cows.

#### (k) Fats and Oils:

Vegetable fats and oils are being increasingly used for frying of meat and vegetables.

#### (l) Miscellaneous:

##### (i) Seasoning:

One family in the present study was found to be using a certain soil to obtain salt for seasoning food. The soil was collected and water added, the supernatant fluid was withdrawn and evaporated. The remainder of families purchase cooking salt, which they crush to finer particles on the grinding stone. Pepper is expensive and rarely used, but curry powder is much liked and a frequent condiment in well-to-do homes. Red chillies are used to add piquancy to many vegetable relishes and meat stews.

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1) c.f. Krige, op. cit., Appendix III. (1)

(ii) Beverages:

The Swazi drink, used for snacks and for provision in the fields and long journeys, is emahewu. It is made of porridge fermented with a little flour. Tea, coffee and cocoa have been introduced to the Swazi through the contact of the Mission Stations or by service in the mines. The first, tea, is the most popular and is the drink of the Separatist Church members whose religion forbids the consumption of fermented fluids. Coffee and cocoa are expensive and less popular than tea. Bottled gaseous drinks are very popular with children and are sold at many rural stores.

Alcoholic beverages are available to the Swazi but, in the main, their price prevents excessive consumption. For the majority of the Swazi the drink, par excellence, is Swazi beer.

(m) Swazi Beer (Utshwala):

When the sorghum ripened in the late autumn all wives would brew large quantities of beer for a period of relaxation and pleasure. Throughout the year, while stocks held out, a woman was expected to brew for her husband. The smoke from her fire would draw others to share the beer, but always she cached some for her husband to have the following day. There is a tendency to-day for beer brewing to be left in the hands of experts, within the community, who brew regularly. The men that gather to drink must now pay for the frothy pots of beer that circulate around the group. The price varies from urban to rural areas and from one woman to another and five cents purchases anything from 18-30 fluid ounces. Prices are higher in the towns.

By tradition, the best beer is made from sorghum, but now a mixture of maize meal and sorghum is used. In order to speed the fermentation process and to increase the alcoholic content of the brew, it has become a widespread practice to add brown sugar to the beer.

Annexures C and D contain two recipes for Swazi beer, the first, taken from Beemer's notes on the diet of the Swazi<sup>1)</sup>, is the older method rarely practised now, and the second the method used by a woman in town who brewed 44 gallons several times a week.

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1) Beemer, op. cit., 230.

The first recipe takes four days to complete and involves heavy labour in grinding (sometimes twice) and lifting heavy pots of water and beer. The second method requires no grinding for the ingredients are purchased from the store and the process is completed in three days.

Utshwala is a thirst-quenching drink which can be taken in large quantities before intoxication sets in. Beemer states that nine pints of beer is the average amount that one man regards as sufficient food for the day. 1) Sufficient quantities of beer cause a craving for meat, but desire for other foods dies. Formerly, the large quantities of sorghum in utshwala made it a food of moderate nutritional importance, and a not insignificant quantity of ascorbic acid was found in the beer. With a decrease in the quantity of sorghum used, and the addition of brown sugar, the intoxicating qualities of the beer have increased while the nutritional importance has decreased. 2)

During February and March the morula fruit (Sclerocarya caffra Sond) ripens in the Lowveld of Swaziland and is used to make beer. The fruit is gathered, bruised and allowed to ferment, and the thin potent fluid that is produced is much enjoyed. The beer is high in ascorbic acid. Other more potent brews are also made, chiefly from fruit or from sugar or both are popular for their quick intoxicating effect rather than the flavour or other properties.

Infants who toddle into the circle of beer drinkers are offered sips to drink. Unmarried girls should drink only in the privacy of their huts. Young wives and youths are not expected to drink to excess, but no such strictures are placed on the men and elderly women.

Beer is not considered a drink but a food, the supreme Swazi food. From the celebration of a birth to the burial of a person, beer is an essential part of, or an accompaniment to, most rituals; for example, appeals to the dead are made through beer, for the ceremony of bringing back a dead spirit, beer is brewed, 3) and beer marks the end of the mourning period.

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- 1) Beemer, op. cit., 218.
  - 2) Pellagra, a comparatively rare disease, is now increasing in Swaziland. It is generally seen in the chronic beer drinker.
  - 3) Marwick, op. cit., 225.

The Swazi are a society in transition, the warrior days, and the comradeship of regimental service are behind. The rural family are highly dependent on the vagaries of the weather for the crops that will feed the family during the coming year. At the same time, new demands for money arise and can be met only by the husband working at one of the industrial centres. His departure leaves a gap in the family circle and the 'prop of the hut' is gone.

Beer has changed its role from that of a pleasurable relaxation after heavy labour or military service to that of a soporific, a drowner of sorrows and a closer of ears, (a woman in the Lowveld remarked: "When I drink I no longer hear my children crying for food"). Women, lonely through the absence of their husbands, are attracted to the crowd at the beer brewer's home and visiting for beer becomes habitual. Those that drink heavily rise late when the sun is hot, their nutritional status is debilitated, their appetite dulled and they have little energy for heavy labour in the field. Beer which was once a source of strength is now a source of weakness.

The teachings of some Mission Church leaders include the avoidance of alcohol. As a result a certain number of Swazi Christians avoid intoxicating drinks, while the Separatist Church members abstain from all fermented drinks.

## 5. MEAL TIMES :

In the urban areas the European pattern of three meals a day has been widely adopted, with breakfast, lunch and dinner. The introduction of the midday meal is probably due to the fact that the first meal of the day has become fixed at an hour which allows the children sufficient time to eat and arrive at school on time. The availability of easily prepared European foods (e.g. bread) has enabled families to enjoy a lunch, while traditionally the big meal is eaten when the day's labours are over.

In the rural areas, and many peri-urban areas, two meals a day are eaten; the first meal varies in time from before sunrise to after 11 a.m., and the evening meal is eaten after sunset, usually around 6.30 p.m. Snacks are eaten throughout the day, and beer drinking commences with the sunrise and continues all day. The time of meals is governed to some extent by the seasonal activities, for example, in the Lowveld during the spring and summer the women go out to hoe before the sun is hot and return to prepare the first meal around 9 a.m. In some rural homes, as in the urban ones, the time of the first meal is governed by the school bell, however, other families do not cook prior to the schoolchildren's departure.



A YOUNG GIRL GRINDS MAIZE ON A STONE



A GRANDMOTHER FEEDS THE BABY WITH "EMASI"

## 6. MEAL PREPARATION :

The preparation of the meal is the responsibility of the housewife, but she is often aided by her daughters. In polygamous homes, as has been explained, a senior wife is assisted by a junior one, or they prepare alternate meals.

Meal preparation is a lengthy business and is rarely hurried, for there is not the same emphasis on meal punctuality that harasses housewives of other cultures. First, the wood must be collected for the fire and it is usual for the women to make sorties two or three times a week to replenish supplies. The water for cooking is frequently fetched by the young girls, but if there are none the housewife does so. Wild vegetables are cooked soon after picking, a task often accomplished by the elderly women accompanied by a young child.

The pots and dishes are washed at the time of meal preparation and not immediately after the meal. Cold water is used with sand, ashes or fine stones as an abrasive. The housewife takes care to wash her hands before handling food.

The grinding process is the longest part of the meal preparation. Beemer states that three women, timed separately, took nearly one hour to grind  $3\frac{1}{2}$  lbs. of mealies. <sup>1)</sup> Girls learn early this hard rhythmic task and the ability to grind finely and evenly is praiseworthy in a wife. A handful of grain is placed in the lower grinding stone and then by a rocking motion is crushed, and at the end of the movement the finely ground meal is expelled onto the closely woven grinding mat. For some foods the grain is soaked before grinding, making the task easier. Only sufficient maize is ground for the meal and so many women grind twice a day.

Some homes are fortunate enough to own handmills and it falls to the children to turn the wheel. During busy times the housewife, who uses a stone for grinding, will send a child with a pail of maize and  $2\frac{1}{2}$  cents to get the cereal ground at a neighbour's hand mill.

The food is prepared inside or outside the kitchen hut, lidladla, depending on climate, season and inclination. Vegetable melons and pumpkins are thinly peeled and the seeds gouged out or retained according to preference. A few housewives grind the fatty seeds and add them to the vegetable relish. Excess of stalk and dead leaves are removed from the green vegetables and they are washed. Beans are sorted to remove the bad ones prior to cooking.

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1) Beemer, op. cit., 215.

The large pot for cooking the maize meal is put on to boil early in the cooking process. When the water is boiling a generous amount of salt is added, the ground maize sprinkled on the top and worked in by means of a wooden spoon or "swizzle stick" (lujojo). The lid is replaced and the fire carefully controlled to allow sufficient heat to slowly cook the porridge, but avoiding hot flames which will cause the porridge to burn. If pumpkin porridge is made, the vegetable is cut into chunks and cooked in a small amount of water and the maize meal added when the pumpkin is cooked.

The cooking of the vegetable relish commences after the maize meal, and is so timed that both are ready at the same time. A small amount of water is put into the iron pot and brought to the boil, salt and the vegetable are added and the lid replaced. The young tender leaves cook in a short time, and the cooking water is not drained off, but the cooked mixture is beaten with a spoon until smooth, finally, to add flavour, finely ground nuts may be added.

Almost all foods are boiled: green vegetables, maize meal, meat, eggs, beans, but for a minimum time. It is only the coarser green European vegetables that are boiled for lengthy periods.

Certain cuts of meat and green mealies are roasted in front of the fire. The meat may be placed on the stones, or 'barbecued' on sticks. Insects may be impaled on sticks or roasted dry in a pan. Men, like their European counterparts at a barbecue, are only interested in the roasting process, and will supervise the cooking of the meat after an ox has been slaughtered. Occasionally a man will roast a mealie to be eaten as a snack.

Frying is a cooking technique more recently adopted and seen in the town, where fried meat, tomatoes and onions form the basis of a stew.

Baking, a modern form of cooking, is done in the iron stoves, or in ovens dug out of an antheap, or a rudimentary oven made by placing a tin over a baking tray, while excellent bread can be baked in an iron cooking pot. The chief baked product is buns for sale to other people. There is a Swazi "bread" made of maize and baked between two maize leaves usually in an iron pot.

#### 6.1. Serving the Food:

The housewife lines up the dishes and bowls in front of her and, sitting or kneeling, serves the porridge. The first spoonful is placed on the inverted lid of the saucepan, for it is believed that if a man consumes this first helping he will be the first to fall in war. The first dish filled is that of the head of the homestead and care is taken to pat the top surface down neatly, the remainder of the dishes are filled with less care.

In Swazi custom the division of the food rests upon age, sex and kinship. The head has a bowl of food for himself, but the remainder usually share. There is an economic advantage in sharing a bowl for there is less wastage on the surface of the bowl.

The relish is served in smaller separate bowls and the mode of eating is to shape the porridge in one hand into a sausage which is dipped in the relish and then carried to the mouth. Men returning from some of the Rand mines complain that the food, at the labour compound, is "all mixed up", that is, served in one dish.

The porridge that adheres to the wooden spoon is for the girls of the home, for it is believed that if a herd boy eats it he will develop crippling pains when running away from the angry owner of a field into which the boy's cows have strayed. For the herd boy there are the crisp scrapings around the rim of the pot.

Food remaining in the pot is not wasted, but covered and kept for snacks or the next meal. Occasionally surplus porridge is given to the voracious dog or fowls.

#### 6.2. Eating the Meal:

The morning meal is informal and partaken in the more convenient places, but a child carries bowls to the head of the homestead near the cattle kraal where he sits with his buttocks on the ground and knees erect and, as he eats, he watches the prized cattle. The head of the home may be joined by the older boys, the remainder will eat in the yard near the boys' hut at the entrance to the homestead. The mother and her young children will eat in the enclosure of her hut. The women sit on mats with their feet drawn to one side, only aged women with stiff joints are permitted to stretch their legs out in front of them.

The evening meal is eaten at the great hut, indlunkulu, in this hut lives the most senior woman of the homestead, usually the mother of the head of the homestead. The family, having been engaged in different tasks all day, forgather in the yard (sibuya) of the indlunkulu to partake of the big meal of the day. At this time the senior woman can gaze with pleasure at the family assembled and if necessary, family discussions can be held. However, a daughter-in-law will not eat in the presence of her husband's father, or a husband in the presence of his wife's mother owing to the custom of avoidance.<sup>1)</sup>

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1) Marwick, op. cit., 53-54.

The food is allowed to cool until it can be easily handled, only in very Westernized homes are spoons used. The participants take turns at the bowl, while it is considered ill-mannered to snatch at the food, the boys empty the bowl very quickly. From a very early age, children are taught to share any food, and the young babies are offered titbits from other bowls.

#### 7. SNACKS :

Most snacks are seasonal in nature, for example, at the time of the jugo bean (Voanndzeia spp.) harvest the women will boil some beans to carry with them into the fields. Sweet and sugar cane are much liked and pieces of chewed cane can be seen strewn along the roads. Fruit is always eaten as a snack rather than as part of a meal. Roasted nuts are much enjoyed, as are green mealies.

Porridge fermented with flour to make amaheu is used to satiate hunger and quench thirst. African beer is too important a food to be designated a snack, although consumed at all hours of the day.

Sweets, chocolate, ice cream, buns, biscuits and soft drinks are partaken of by the children living in the towns.

#### 8. FOOD TASTES :

Contrary to the expressed opinions of some European employers, the Swazi have a finely developed aesthetic appreciation of food, moreover, this fact should be borne in mind by those responsible for feeding Swazi on a large scale. The wide range of recipes that are made from the few available foods is another proof of the Swazi interest in food, and the names given to the different consistencies of porridge is another example.

The appearance of the food is important, the smooth white appearance of sour porridge is pleasing. Some people dislike porridge cooked with wild vegetables because of its speckled green colour.

The odour of a food can either stimulate or kill appetite, hence some Swazi inform me that cheese has no appeal, for it smells like the crust of curds in the emasi calabash, while others dislike the smell of fish. It is often the unfamiliar foods that displease with their smell.

The food is eaten when cool and no concern is felt if the food is cold before being eaten. The chief criteria for the pleasure is the ease with which it is swallowed. When porridge is served without the smooth vegetable relish, participants complain that the porridge does not slide down easily. Fermented foods are well-accepted,

e.g. sour porridge, emasi, and beer, and 'high' meat is eaten when decay has fully set in. To the European palate many of the porridges are insufficiently salted, but no salt is added once the food is cooked. The relishes are more tasty and often have salt, nuts and chillies added for piquancy. The wild vegetables range from mild in taste to aromatic, stringent and even bitter. In recent years there has been a movement away from the bland diet to the food containing curry powder and chillies. It has already been described how fruit is eaten long before it is softened by ripening. Fruit flavours range from tasteless to bitter.

The monotony often attributed to the Swazi diet is relieved by the seasonal vegetables. Many housewives consciously strive to introduce variety into the diet, but are limited by price to products that they can grow or gather on the veld. Swazi schoolchildren, in essays written on the subject of food <sup>1)</sup>, frequently complain of the monotony of diet. When the boredom is relieved, the pleasure-giving properties of the food are enhanced. Richards has vividly described the village celebration and feasting when she shot a buck. <sup>2)</sup> The Swazi also delight in an orgy of meat and speak of the pleasure that it brings. However, the delight in, and desire for, meat does not amount to a craving. In the urban areas many homes are able to purchase meat several times a week.

#### 8.1. The Rating of Food:

When asked to place foods in order of importance the Swazi will place beer (utshwala) first. It is the supreme traditional food and a man requires none other, being able to live for several days on this manna alone. (Unfortunately with the decrease in nutritive value of the beer, the length of time that one can subsist on beer without symptoms of deficiency disease is now limited).

Beer awakens a craving for meat, specifically roast meat, for boiled beef consumed after beer is said to cause vomiting, but appetite for other foods is lost. Meat and beer are complementary, for meat-eating causes a thirst for beer alone. It is thus not surprising that these two foods are the basis of all feasts. Informants agree that meat is second to beer, but still a 'wonderful' food, its rarity and the excess consumed at times of a slaughter add to its importance.

Emasi is rated third in the list, by emasi is meant the form in which finely ground sorghum (preferably) or maize meal are added to the curds, the use of very stiff porridge (phuthu) or bread instead of the former two cereals lessens the importance of the food.

1) See Chapter V, Section 9.

2) Richards, op. cit., 58-59.

Only after these three foods comes porridge, this may well be because porridge, although the staple dish, is a comparatively recently introduced food. Beyond these three foods the order of priority becomes confused.

In the house of a man with money, wishing to impress others with his adoption of the Western way of life, one would find the daily consumption of meat and rice. White bread and highly refined mealie meal also have a kudos value. Very often a male visitor would be offered gin or brandy to drink. The traditional vegetables are abandoned by those seeking to follow the Western way of life.

As Beemer <sup>1)</sup> has remarked, the Swazi are not conservative as far as food is concerned. Sugar has been eagerly accepted as a food item and is sprinkled on porridge, and liberal helpings are spooned into cups of tea. The consumption of tea has been stimulated not only by the advertising, but the influence of the missionaries who offer this beverage on social occasions and who often extol its superiority over alcoholic drinks.

#### 9. SWAZI DIETETIC THEORIES :

The Swazi are aware of the relationship between food and body fat. Rotundity is a sign of prosperity, and thinness one of want. The Swazi male's appreciation of beauty is of a plump, glossy girl. (Only among the most sophisticated women is the Western ideal of a slim female figure sought).

The bearing that food has on health is also realized and many blame the poor physical appearance of children on wrong feeding. Beemer <sup>2)</sup> has described the ailments that the Swazi attribute to different foods: excess of sweet reed brings forth complaints of bile (inyongo). Fresh milk and raw meat are believed to cause worms. Large quantities of emasi induce drowsiness and sweating (the latter may be due to the heat produced by the specific dynamic action of protein). Locusts, sour porridge and beans cause indigestion in some people.

Energy is known to stem from food, for without food one is weak and listless. In the homes the grandmother will palpate the stomach of the toddler, and if it is as tight as a drum all is well, if not then he is deemed hungry. Food is valued for its satiety value, an important consideration for a people that only eat two meals a day; and sour porridge is often accused of passing through the stomach very soon after ingestion. A slight sensation of distension is pleasurable, but the 'blown out' feeling due to 'gas' in the stomach is not. Vegetables are believed "to make the stomach right" in much the same way that a European mother regards syrup of figs.

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1) Beemer, op. cit., 226.

2) Beemer, op. cit., 226.

Babies receive an enema a few hours after birth and this is repeated daily up to the age of approximately two years. At any period from childhood to adulthood when the person is feverish, an enema is given to 'cool' the body. It is not surprising to find a great emphasis on the necessity for regular defecation, and certain foods (for example, beans) are deemed constipating.

The herbalists (izinyanga) use the roots and leaves of specific plants as emetics, purgatives and laxatives in an effort to cure a range of diseases.

#### 10. RITUAL RESTRICTIONS ON FOOD :

The taboos on milk and eggs have already been described, and a later Chapter <sup>1)</sup> the pregnancy avoidances are listed, but in this list no commonly eaten food is mentioned. The clan taboo that involves a domestic animal, is the sheep forbidden to the Dhlamini clan, for this animal is used in certain death rites. However, it is possible for a Dhlamini to be so doctored that he is free to eat meat of this animal, a necessary procedure when one goes to any industrial concern that gives cooked rations, for one has few clues as to the nature of meats served.

The Separatist Church leaders preach that pork is an unclean animal and to be avoided by their followers. They, together with other Churches (for example the Nazarene) frown upon the consumption of alcoholic drinks. The Zionists avoid the meat of an animal that has met its death other than by slaughter, and also abhor blood of animals. <sup>2)</sup>

#### 11. SUMMARY :

##### 11.1. Factors Governing Food Consumption:

The husband's mother is the authority in the homestead for she represents her deceased husband, and so, to a large extent, she dictates the food patterns of the household. However, the wives, having fields of their own, are independent to some degree until their stores of food are exhausted. The mother-in-law also acts as a mediator between husband and wife, for if the daughter-in-law considers she is being unjustly treated, she can appeal to her to intercede with her son.

The number of dishes prepared, the method employed and the frequency of cooking depend, to a large extent, on the availability of water and fuel.

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1) Chapter V, Section 2.

2) B. G. M. Sundkler, Bantu Prophets in South Africa, 2nd Edition, Oxford University Press, 1961), 217.

In the urban and peri-urban areas the consumers are dependent on the shops and local markets for these foods, and the choice is large but limited by the price of the items. In the rural areas, however, the foods eaten at any one time are largely dependent on the season. Seasonal work also governs the time available for preparing food.

The grinding of maize is the most time-consuming task in the routine of meal preparation and the more general use of handmills would ameliorate this situation. However, the more conservative element among the men regard the ability to stone grind as a virtue, and the task an essential part of a wife's duties.

Clan, age, sex and kinship prescribe the ritual restriction of food. The most important restrictions, from the viewpoint of nutritional status, are those affecting the consumption of milk and eggs. In the presence of urbanization and Westernization it is not easy to forecast the strength of these restrictions, but the one on eggs is much weaker than on milk, which is strongly held in the rural areas.

Within the family there is inequality in the distribution of food, the father having the first and largest portion, although the children are given his surplus food. Choice morsels are brought to the man, for example, a boy carries a slain bird to his father, the latter retains all but the head and crop which are returned to the boy. The differing nutritional needs of young children are not recognized, while the role of the father as provider for his children is emphasized with the gifts of delicacies.

The Swazi are not slow to accept new foods that a European contact has introduced, but the need for a staple of high satiety value will be required for a continuing period of time. At the present time, the more recently introduced foods serve as snacks and delicacies, but not as the basic foundation of the diet.

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ANNEXURE A.

<u>MONTH</u>	<u>PRODUCTIVE CYCLE</u>	<u>FOOD CYCLE</u>
(English and approx. Swazi: equiv.)		
January. <u>Bimbitwane</u> ; everyone is satisfied. <u>Kibimbitela</u> .	Last month possible for planting maize in areas where there is no frost. Last gardens known as "sangcapa". People busy getting huts ready for guarding the corn from the birds.	Slight rains, plenty of food-new mealies, pumpkins, gourds, sugar cane. Fruits on trees ripen - "incosi" etc., kaffir corn ripening. Marula beer.
AUTUMN <u>Likwindla</u>		
February. <u>Indlovana</u> Little Elephant.	Bringing in new mealies from early gardens. Women and children very busy guarding kaffir corn, weeding the last gardens. Men break up old and virgin fields and allow them to lie unworked during winter.	Slight rain. Still eating new mealies and fresh foods and vegetables, cow peas and monkey nuts ripen. Women begin to bring in kaffir corn. Marula beer.
March <u>Indlovu Enkulu</u> Big Elephant	Still bringing in mealies, "tindlubu" and other legumes. Early burning of grazing fields.	New mealies and legumes. Marula beer.
WINTER <u>Ubusika</u>		
April - <u>Mabasa</u> Everyone begins to make a fire ( <u>kubasa</u> ). Beginning of cold season.	Dry maize and fresh corn reaped, grain platforms built for storing old mealies. Women " <u>songa</u> " tie the bundles of mealies together in the fields. Work sporadically from early in the morning until late in the afternoon.	Mealies getting dry, corn and the making of beer, greens at an end, using of dried vegetables. Milk getting scarce.
May <u>Inkwekweti</u> . to pick everything you have ( <u>kwekweta</u> ).	Harvest dry mealies for storage, picking corn, bringing in last pumpkins. Some peasants turning the ground for the next sowing. Hunting. Cattle graze on harvested fields.	Unusual for it to rain. Greens already old and bitter. Using dry mealies. Cows milked only once a day.

MONTHPRODUCTIVE CYCLEFOOD CYCLE

May to June  
Inhlangula:  
kuhlangula  
emacembe  
to brush off  
the leaves.

Beans and maize from  
the last maize gardens  
are reaped. Women  
busy cutting grass for  
the huts, mats and  
baskets. Men cut sap-  
lings. Burning of late  
garden sites. Women  
and men still busy with  
building material.  
Moving of villages.  
Hunts arranged.

Strong North winds  
and leaves blown  
about. No rain.  
Start on stored foods.  
Beer drinks from  
first kaffir corn and  
eat boiled whole corn.  
Very little milk.  
Dried greens.  
'Emahala' (Aloe sp.)  
begins to flower;  
eat its root.

July - Kolwane.  
A hawk, kolwane,  
which nests  
during this  
month.

End of harvest, plough-  
ing but no planting.  
Waiting for Spring  
rains. Hunting season  
Cutting of grass, etc.,  
for building. Cleaning  
and threshing of corn.  
Mealies ripe for  
storing. Beans and  
peas brought in.

Little rain. Old food  
as above. Beer  
drinks on newly ripe  
emabele. Cereals  
beans and peas and  
pumpkins. Hunting  
season.

SPRING Emahloboludlana

August - Inci

If rain falls early gar-  
dens are planted with  
mealies, pumpkins,  
potatoes and sugar cane.  
Corn ripe in the fields  
for storage. Moving of  
Royal villages.  
Planting started in  
high lands. Busy  
burning grass.

Little rain. Food still  
sufficient in store huts.  
Cattle show slight im-  
provement in quantity  
of milk given. Palm  
wine.

September  
Inyoni: A bird.  
Inyoni named  
Pezukwomkono  
mates.

Very busy ploughing,  
planting and weeding  
and trying to finish  
off huts before heavy  
rains set in. Planting  
beans and peas as well  
as maize, etc.

Early rains. Mealies  
getting less. Few  
greens and mushrooms.  
Using kaffir corn.

October - Impala:  
The antelope  
Impala gives  
birth during  
this month.  
Also speak of  
"ukupala emasimi"  
(to scrape the  
gardens).

The great month for  
planting Kaffir corn.  
Everyone very busy  
ploughing, sowing,  
weeding, building.

Intermittent storms.  
Stores low, hunger.  
Use of green vege-  
tables and buying of  
grain. In bushveld  
mealies are nearly  
ripe. In the Highveld  
still small. Month  
for locusts.

MONTHPRODUCTIVE CYCLEFOOD CYCLESUMMER Ihlobo

November - Lweti Great agricultural a star, also a kind activities. Weeding of insect of the gardens. Some still same name, Lweti planting beans. which appears Building speeded up. during this month. "Little Incwala" (an Inkosi lencane, agricultural ritual) Little King. may be held in this month. Very late for planting mealies, but happens if rain is delayed.

Heavy rain in normal years. Nearing peak of hunger. Mealies ripening and some already ripe. Green caterpillars and grass hoppers, mushrooms, and wild plants and insects. The market price rising. Buying of grain to brew beer for "little Incwala". If mealies ripe, people eat them secretly "they steal", for permission has not yet been given. Taboo on pumpkin and mealie.

December. Inkosi Lenkulu the big King: the big Incwala usually played in this moon. Liduba breeds in the bushveld, sometimes gives its name to the moon, which is also known as "mavulangamiti" "kuvungula" to pick the teeth, "mita", swallow.

Weeding of gardens. Busy preparations for the big "Incwala".

Peak of hunger before the big Incwala hence the name "maval angamiti" to swallow the pickings of one's teeth. Great listlessness. People go around begging food. Corn Emabele bought from traders. After big "Incwala" start on the new crops if they are ripe.

CHIEF SWAZI FOOD AND THEIR METHODS OF PREPARATION

ENGLISH NAME	SCIENTIFIC NAME	LITERATURE SOURCE FOR COMPOSITION	SWAZI OR ZULU NAME	METHOD OF PREPARATION OR USE	SWAZI NAME OF DISH
A) <u>CEREALS:</u> 1. MAIZE	<u>ZEAMAYS</u>	S.A. CEREALS <sup>1)</sup>	UMBILA	1. GREEN MAIZE, BOILED ON COB 2. MAIZE GRAINS BOILED IN WATER 3. MAIZE GRAINS ROASTED 4. CRUSHED BOILED MAIZE WITH <u>EMASI</u> 5. CRUSHED OR GROUND MAIZE COOKED IN MILK 6. VERY FINELY GROUND MAIZE MADE INTO A GRUEL 7. THIN PORRIDGE OR SOFT, SWEET PORRIDGE 8. THICK PORRIDGE 9. VERY THICK PORRIDGE 10. DRY, CRUMBLY PORRIDGE 11. SOURED PORRIDGE 12. GROUND MAIZE AND SORGHUM PORRIDGE 13. MAIZE MEAL AND BEER PORRIDGE 14. PORRIDGE MADE WITH HUSKS FROM BEER STRAININGS 15. MAIZE MEAL PORRIDGE FERMENTED WITH FLOUR AND WATER 16. UNLEAVENED "BREAD" MADE FROM MAIZE 17. MAIZE MEAL AND PUMPKIN PORRIDGE 18. GROUND MAIZE AND PUMPKIN MADE INTO A THIN PORRIDGE 19. STIFF MAIZE MEAL PORRIDGE MIXED WITH BEANS 20. CRUSHED MAIZE AND GREEN HERBS	IFUTO TINKOBE MBASHA UMVUBO ISITHUBI INEMBE INDENGANE UMQAQWANGA SISHWALA UPHUTU INCWANCA IYAMBAZI INCOLOSI INSEKESI AMAHEWU UMBHACANGA ISIJEZA ISIDUDU INSONTAWANA ISIDLWADLWA
2. SORGHUM	<u>SORGHUM SPP.</u>	S.A. CEREALS	AMABELE	1. MAIZE MEAL, SORGHUM AND SUGAR FERMENTED TO BEER 2. WITH MAIZE MEAL AS BEER 3. SOURED PORRIDGE 4. SORGHUM AND GROUND MAIZE PORRIDGE 5. PORRIDGE WITH GREEN HERBS ADDED 6. SORGHUM AND BEAN PORRIDGE	UTSHWALA INCWANCWA IYAMBAZI
B) <u>STARCHY ROOTS:</u> 1. TARO	<u>COLACASIA ANTIQUORUM</u>	F.A.O. <sup>2)</sup>	AMADUMBE UMHLATA AMATABANE	BOILED IN SKINS BOILED IN SKINS	AMADUMBE
2. SWEET POTATO	<u>IPOMOEA BATATA</u>	S.A.F.T. <sup>3)</sup>	UBATATA	BOILED IN SKINS	UBATATA
C) <u>SUGARS:</u> 1. SUGAR CANE	<u>SACCHARUM OFFICINARUM</u>	F.A.O.	UMOBA	CHEWED AS A SNACK	UMOBA
2. SWEET CANE	<u>SORGHUM VULGARE</u>	F.A.O.	IMFE	CHEWED AS A SNACK	
3. HONEY		F.A.O.			

CONTINUED NEXT PAGE

CHIEF SWAZI FOOD AND THEIR METHODS OF PREPARATION (CONTINUED)

ENGLISH NAME	SCIENTIFIC NAME	LITERATURE SOURCE FOR COMPOSITION	SWAZI OR ZULU NAME	METHOD OF PREPARATION OR USE	SWAZI NAME OF DISH
<b>D) LEGUMES &amp; SEEDS:</b>					
1. PEANUTS	<u>ARACHIS HYPOGAEA</u>	S.A.F.T.	AMANTOGOMANE	1. ROASTED, AS A SNACK 2. GROUND AND MIXED WITH VEGETABLE RELISH 3. EATEN FRESH, AS A SNACK 4. GROUND AND BOILED TO FORM RELISH	
2. JUGO BEANS	<u>VOANDZEIA SPP.</u>	S.A.F.T.	TINDLUBU	1. COOKED WITH MAIZE MEAL IN PORRIDGE 2. GROUND AND BOILED IN WATER TO FORM STEW 3. COOKED WITH SORGHUM, IN PORRIDGE	INSONTWANA
3. COWPEAS	<u>VIGNA SPP.</u>	S.A.F.T.	TINDLUBU	) SEE JUGO BEANS (ABOVE)	
4. MUNG BEANS	<u>PHASEOLUS MUNGO</u>	M.R.C. <sup>4)</sup>	MGOMENI		
5. SESAME	<u>SESAMUN INDICUM</u>	M.R.C.	UDONCA	SEEDS GROUND AND ADDED TO VEGETABLE RELISH	
6. WILD BANANA	<u>STRELITZIA AUGUSTA</u>		INKAMANGU	SEEDS EATEN	
<b>E) VEGETABLES:</b>					
<b>1) WILD PLANTS:</b>					
?	<u>ASCLEPIA AFFINIS</u>		UMDZAYI	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
PIGWEEED	<u>ARAMANTHUS PANICULATUS</u>	S.A.F.T.	IMBUYA	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
?	<u>ANNESORRHIZA FLAVELLI FOLIA</u>		UMDZEBEDZE	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
BLACK JACK	<u>BIDENS PILOSA</u>	S.A.M.J. <sup>5)</sup>	UCHUCHUZA	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
?	<u>CYRANTHUS BICOLOUR</u>		UPIPILIZA	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
?	<u>MOMORDICA FAETIDA</u>	QUIN <sup>6)</sup> FOX <sup>7)</sup>	INSHUBABA	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
?	<u>PORTULACA QUADRIFOLIA</u>	FOX	AMAYENJANA	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
PURSLANE	<u>PORTULACA OLERACA</u>	S.A.F.T. M.R.C.	ISILELE	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
BLACK NIGHTSHADE	<u>SOLANUM NIGRUM</u>	S.A.F.T.	UMSOBO	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
SOW THISTLE	<u>SONCHUS OLERACUS</u>	S.A. MED. J.	INGABE	USED AS RELISH, OR, MORE RARELY, MIXED WITH MAIZE MEAL	
	<u>CORCHORUS TRIDENS</u>		IGUSHA	LEAVES AND TENDER STEM BOILED IN WATER TO WHICH ASHES HAVE BEEN ADDED	
	<u>ALOE SAPONARIA</u>		AMAHALA	FLOWERS AND PART OF THE STEM BOILED AND USED AS RELISH	
CHILLIES	<u>CAPSICUM ANNUM</u>	M.R.C.		USED TO SEASON A VARIETY OF DISHES	
	<u>TRUMFETTA ANNUA</u>		IGUSHA	SEE <u>CORCHORUS TRIDENS</u> ABOVE	
<b>2) CUCURBITS</b>					
PUMPKIN	<u>CUCURBITA SPP.</u>	S.A.F.T.	ITHANGA IBECE	1. BOILED AND EATEN ALONE 2. BOILED AND MIXED WITH MAIZE MEAL 3. SEEDS ARE GROUND AND ADDED TO VEGETABLE RELISH 4. THE FRESH LEAVES USED AS RELISH	INKCEBE
CALABASH FRUIT	<u>LANGENARIA SPP.</u>		ISELWA	BOILED WHEN YOUNG AND GREEN	IMBIDO
CHAYOTE FRUIT	<u>SECHIUM EDULE</u>	F.A.O.	"SUSU"	BOILED	

CHIEF SWAZI FOOD AND THEIR METHODS OF PREPARATION (CONTINUED)

ENGLISH NAME	SCIENTIFIC NAME	LITERATURE SOURCE FOR COMPOSITION	SWAZI OR ZULU NAME	METHOD OF PREPARATION OR USE	SWAZI NAME
<b>F) WILD FRUITS:</b>					
WILD PLUM	<u>CEPHALANTHUS NATALENSIS</u>	QUIN	UMFOMFO	FRUIT EATEN RAW	
	<u>CHRYSOPHYLLUM MAGALIES-MONTANUM</u>		UMNUMBELA	FRUIT EATEN RAW	
WILD FIG	<u>DIOSPYROS</u>	FOX <sup>3)</sup>	UMCAFUDANE	FRUIT EATEN RAW (SAID BY SOME AUTHORITIES TO BE POISONOUS)	
	<u>JYCIODIES GUERKEI</u>		UMKHIWA	FRUIT EATEN RAW	
	<u>FICUS SPP.</u>		INTOKOLOVU	FRUIT EATEN RAW	
MARULA	<u>LANNEA EDULIS AND DISCOLOUR</u>	QUIN	TINEYI	FRUIT EATEN RAW	
	<u>PHYLLOCELTON ZEYHERI</u>		INTOKOLOVU	FRUIT EATEN RAW	
	<u>RHUS SPP.</u>		UMGANU	1. FRUIT EATEN RAW 2. FRUIT MADE INTO AN ALCOHOLIC DRINK 3. NUTS EATEN ALONE, OR ADDED TO RELISH	
MONKEY APPLE	<u>STRYCHNOS GERRADI</u>	QUIN	UMHLALA	FRUIT EATEN RAW	
WILD MEDLAR	<u>SYZYGIVM CORDATUM</u>	QUIN	UMNGCOSI	FRUIT EATEN RAW	
	<u>VANGUERIA INFAUSTA</u>		AMANTULWA	1. FRUIT EATEN RAW 2. FRUIT ADDED TO PORRIDGE 3. FRUIT MADE INTO AN ALCOHOLIC DRINK	
SOUR PLUM	<u>XIEMENIA CAFFRA</u>	QUIN	AMATHUNDU-LUKA	FRUIT EATEN RAW	
<b>G) MEAT:</b>					
BEEF, PORK, GOAT, MUTTON CHICKEN		VARIOUS SOURCES	INYAMA (I.E. MEAT)	1. FLESH ROASTED 2. FLESH BOILED 3. BLOOD AND SMALL PIECES OF FAT COOKED TOGETHER 4. VERY FAT GRAVY MIXED WITH GROUND SORGHUM OR MAIZE	BUBENDZE SIDLWADLWA
GAME, CHIEFLY BUCK		VARIOUS SOURCES		AS ABOVE	
BIRDS		F.A.O.		ROASTED	
LOCUSTS, CRICKETS		M.R.C. F.A.O.	SIKONYANE	ROASTED	
CATERPILLARS	RED AND GREEN	M.R.C.	EMANYAMANE	ROASTED	
FLYING ANTS		M.R.C.	TINHLWA	ROASTED	
<b>H) MILK:</b>					
FRESH MILK		S.A.F.T.	LUBISI	FRESH MILK	
SOUR MILK		FOX <sup>7)</sup>	EMASI	SOUR MILK = CURDS ONLY	EMASI
WHEY		S.A.F.T.	UMLAZA	CURDS MIXED WITH FINELY GROUND SORGHUM OR MAIZE MEAL	EMASI- AVUNSHIWE
<b>I) EGGS:</b>					
CHICKEN		S.A.F.T. F.A.O.	AMAQANDZA	EATEN BOILED, CHIEFLY BY MEN	

- 1) D.C. CRAWFORD AND B.W. MARLOTH, THE CHEMICAL COMPOSITION OF SOME SOUTH AFRICAN CEREALS AND THEIR MILLING PRODUCTS, CHEMISTRY SERIES NO. 171 (PRETORIA: GOVERNMENT PRINTER, 1942)
- 2) FOOD COMPOSITION TABLES, MINERALS AND VITAMINS, F.A.O. (ITALY, MARCH, 1954)
- 3) F.W. FOX AND L. GOLBERG, SOUTH AFRICAN FOOD TABLES (JOHANNESBURG: SOUTH AFRICAN INSTITUTE FOR MEDICAL RESEARCH, 1944)
- 4) B.S. PLATT, TABLES OF REPRESENTATIVE VALUES OF FOODS COMMONLY USED IN TROPICAL COUNTRIES (LONDON: HER MAJESTY'S STATIONERY OFFICE, 1945)
- 5) L.F. LEVY, D. WEINTRAUB, F.W. FOX, "FOOD VALUE OF SOME COMMON EDIBLE LEAVES", SOUTH AFRICAN MEDICAL JOURNAL, 1936, VOL. X, PP. 699-707
- 6) P.J. QUIN, PERSONAL COMMUNICATION
- 7) F.W. FOX, PERSONAL COMMUNICATION

UTSHWALA: I will describe here beer (utshwala) made from equal quantities of maize and kaffir corn.

The first step is the preparation of the malt. The corn is put into water to soften it for subsequent sprouting, 'ukewna emabele'. The time which it is left in the water, depends on the season - in the Summer it is left for one day, in Winter usually two. As Bryant has shown, the length of time "required for sprouting, as also for fermenting, varies considerably according to the locality, the season, the day heat at the particular time and the quality of the seed" <sup>1)</sup>. When it is taken out of the water, it is left to germinate in a warm hut, until it has shoots about  $\frac{3}{4}$ " long. Among the Zulu the malt is then dried and after a couple of days it is ready for grinding, though it can keep for a considerable while. The Swazi on the other hand grind the sprouted grain while it is still moist.

The next step is the brewing. Take the same amount of maize and place it in water until it is soft, then grind it. Very often it is ground twice to give it the necessary fineness. It is then known as "inhlama" or dough. Put the dough into a large pot and pour on sufficient boiling water to cover it, then add cold water to reduce the mixture to medium warmth. One can add only cold water and then warm the whole mixture: 'ukufutumetela'. On the following morning half fill the cooking cauldrons with cold water to which one adds the water taken from yesterday's mixture and allow this to boil. Take the dough and mix it in such quantities with the boiling water as to make it the consistency of thin porridge when it is "umhido". The excess of water is removed with a ladle from time to time and used to fill up other pots. The boiling should take 30 - 40 minutes. The germinated seed is then ground, if this has not already been done, and a little is mixed with the "umhido" and set apart to ferment. It can be made into the first beer or "lidlula". On the following day, the remainder of the malt is poured into the "umhido" to make it ferment and if necessary some of the "lidlula" can be added to accelerate fermentation. In about an hour's time the "umhido" should be covered with a layer of large bubbles when it is known as "lihalatelo". It is then put through a grass strainer, the dregs (insekendze) or husks of corn (emashiqa) remain behind and the beer is known as "lipupusi". When the beer is strained, it is left until the following morning, during which pause fermentation has continued. It is then at its best for drinking, and is known as "utshwala". It will remain sweet for quite a few days, depending largely on the vessel in which it is kept. The day after it is properly matured as "utshwala" it is called "mutshu" and on the next "mutshu wesibili" and on the next "umtshoto" and on the next "umcocodo". After that it is either re-cooked or fresh malt is put into it to make it ferment, when it is called "impetukane". Old men are particularly fond of beer when it is a few days old, and the final beer is the strongest.

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\* From "H. Beemer, Notes on the Diet of the Swazi" Bantu Studies (September, 1939).

1) I. A. T. Bryant - A Description of Native Food Stuffs and their preparation. A Swazi Cookery Book is being collected.

ANNEXURE D.

METHOD OF MAKING BEER (ITSHWALA).

MSUMDUZA, 1962.

Mealie meal is mixed with cold water to a paste, and then boiling water is added. The meal should not be cooked by the hot water. This mixture is left to ferment.

Second day: The mixture is now sour. The mixture is thoroughly cooked. It is allowed to cool. Water, malt and brown sugar are added. The fermentation process is accelerated by the addition of some prepared beer.

Third day: The beer is strained, and then ready for consumption.

The yeast from the beer is saved and may be used for baking purposes. The sifted remainder is fed to the pigs which, when fattened, are sold.

Cost of Production.

To produce 6 gallons of beer :-

Mealie meal	20 cents
Malt	50 cents
Brown sugar	10 cents
	<hr/>
	80 cents.

Cost per gallon: 13.3 cents for raw ingredients.

There is also the cost of the fuel if purchased and not gathered for the fire.

PART II

THE NUTRITION STUDY

## CHAPTER III

### CHARACTERISTICS OF SAMPLE AREAS.

#### 1. PRIMARY AREAS :

##### 1.1. The physical environment :

The physical environment of Swaziland has been described in Chapter I. The data applicable to the primary areas are shown in Table I.

##### 1.2. Drinking Water :

The diet was suspected of being low in Calcium and analyses were therefore obtained of this element from the supply of drinking water in the area.

The source of supply varied from the carefully supervised town reservoir, to the turbid small spring used, in addition to drinking, for bathing, washing of clothes and watering of animals.

Where there were two main sources of supply, both were sampled.

##### The calcium content :

Little information could be found on the calcium requirement of water supplies. It is suggested that in an adequate well balanced diet the calcium ingested from the water supply forms only a small fraction of the dietary calcium. <sup>1)</sup>

The South African Bureau of Standards <sup>2)</sup> demands that water certified as Class A must have a calcium content of 20 parts per million. No such criterion is made for Class B water.

The water supply of Durban <sup>3)</sup> contains 22 parts per million of calcium (Umlazi River) and 15 parts per million from the Umgeni.

On this slender evidence it appears that, in all the primary areas, except the Lowveld, the water supply contains low to very low quantities of calcium and that the quantities ingested from this source are small.

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- 1) E. W. Taylor. The Examination of Water and Water Supplies. (Seventh Edition; London, J. A. Churchill Ltd. 1958.) 31.
  - 2) South African Bureau of Standards. Specification for Water for Domestic Supplies. (June, 1951) 9.
  - 3) Chief Chemist, City Engineer's Department, Durban. Personal communication.

TABLE 1  
THE PHYSICAL ENVIRONMENT - PRIMARY AREAS

Area	Urban	Peri-urban	Highveld		Middleveld		Lowveld	
<u>Drinking Water</u>								
Source	Town water supply	Town water supply			Stream	Spring	River	Spring
Calcium content in parts per million	2.4 (mean figure)	2.4 (mean figure)	2.4 (mean figure)		10.21	11.10	21.60	23.80
<u>Soil*</u>								
Top soil figures			(1)	(2)	(1)	(2)	(1)	(2)
p.H. value			5.00	5.20	5.40	6.00	5.70	6.20
Total Nitrogen %			0.14	0.14	0.10	0.07	0.09	0.06
Available CaO %			0.03	0.02	0.06	0.08	0.08	0.07
" K <sub>2</sub> O %			0.01	0.01	0.01	0.01	0.01	0.01
" P <sub>2</sub> O <sub>5</sub> p.p.m.			0.50	0.80	1.00	2.30	1.50	1.00
<u>Temperature**</u>								
Yearly means (degrees Fahrenheit)	62.1	62.1	62.1		68.5		72.0	
Seasonal range	13.2	13.2	13.2		17.0		16.5	
Temperature station	Mbabane	Mbabane	Mbabane		Mpsisi		Sipofaneni	
<u>Rainfall**</u>								
Estimated long term	-	-	40.8		-		-	
Observed annual mean	54.6	54.6	43.2		30.5		27.4	
Drought hazard	-	-	-		11		25	
Rainfall station	Mbabane	Mbabane	Forbesreef		Mliba		Sipofaneni	

\* G. Murdoch - personal communication

\*\* Data from E. and G. Murdoch, Swaziland Meteorological Data (To 1957)

(1) = Deep reddish loamy soils

(2) = Shallow greyish sandy soils

### 1.3. Soil :

The figures for the soil analysis were obtained from the Swaziland Soil Scientist. <sup>1)</sup> Using Morgan's method of assessing the available plant nutrients the following results were obtained :

Nitrogen: The content of Nitrogen is low (less than 0.10 in the deep, reddish loamy soils of the Lowveld Area, and low in the shallow greyish sandy soils of the Middleveld and Lowveld Sample areas.

Available Calcium: This element is low (less than 0.05) in the both types of soils in Middleveld Area Sample, but satisfactory in the other areas.

Available Potash: The potash levels are marginal in all areas. A level less than 0.01 is considered low.

Available Phosphate: The soils in all areas are deficient in phosphate.

### 1.4. Temperature:

Apart from the Lowveld, the temperatures are all around the territorial average of 68°C. Frost occurs during the winter months in the Highveld.

### 1.5. Rainfall:

"Estimated long-term annual mean" is used, in connection with rainfall stations with less than twenty years of records, and is an "attempt to arrive at a rainfall that is probably more characteristic of the short-term station than its observed mean . . . ." <sup>2)</sup>

The drought hazard: this figure represents "the percentage of years when it can be expected that the stations rainfall will be less than 20 inches". <sup>3)</sup>

For successful crop production a rainfall of 25 inches is required. <sup>4)</sup> Only the Lowveld approaches this figure and here the drought hazard is high, twenty-five years out of every hundred there will be less than 20 inches of rain.

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- 1) G. Murdoch. Personal communication.
  - 2) E. and G. Murdoch. op. cit. 3.
  - 3) E. and G. Murdoch. op. cit. 2.
  - 4) Swaziland Sample Survey.

#### 1.6. Composition of the population:

Data on age groups, relationships, educational standard and religious affiliation were obtained from the 1960 Sample Survey. Several months had elapsed since the census and the advent of the nutrition study. It was necessary to check the census information, deleting some names and adding new ones.

The same procedure was followed in the establishment of relationships and religion, as in the Sample Survey.<sup>1)</sup> Age presents one of the most difficult problems, in a society without written records. Like the 1960 Survey, the nutrition study used the 'event chronology', a "list of accurately dated historic events of sufficient national or local importance to be remembered in the community".

In the Sample Survey the enumerator had been required to note whether the respondent was pregnant, though the question was not asked directly. In the nutrition study, the matter was simpler for it was nurses who questioned. One can assume that some of the early pregnancies were not recorded, as the women may have been unaware or uncertain. Very often the information was volunteered, the housewife complaining of vague pains.

Table 2 shows the composition of the population. The large numbers of dependent children are typical of developing countries with a high birth rate. In the rural areas, the prepondence of women over men is due, in the main, to the effect of migrant labour. In Highveld and Middleveld areas, on the second visit, some of the men had returned to plough. In the Lowveld Area the first visit was prior to the ploughing season and the second, well after it. The urban settlement is on a family basis and the ratio between adult men and women is thus much smaller.

The highest density of population is in the Middleveld Area, which is typical of the agriculturally fertile Middleveld.

All rural sample areas have a population composed largely of dependent children being cared for by a predominantly female population. In the absence of their husbands, the women must not only act as mothers and housewives, but also as the tillers of the soil.

#### 1.7. The Livestock population:

On the occasion of a visit to the area the livestock was counted in each homestead. Chickens presented the greatest problem as the householders never knew the number. The chickens were thrown some grain and the fieldworker, assisted by a helpful child, counted the darting hens.

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1) Swaziland Sample Survey. op. cit. Chap. IV. 4-29.

TABLE 2  
AGE GROUP AND SEX DISTRIBUTION OF PRIMARY AREAS

Age Group in Years	U		P		H a)		H b)		M a)		M b)		L a)		L b)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Under 2 both sexes	7	5.8	5	5.7	3	1.5	5	2.8	16	4.3	20	5.2	6	3.9	6	4.2
2-5 both sexes	43	35.5	29	33.3	55	28.2	58	32.1	77	20.7	59	15.3	30	19.7	23	16.1
6-10 both sexes	16	13.2	11	12.6	30	15.4	30	16.6	68	18.3	74	19.3	28	18.4	24	16.8
11 - 14 girls	5	4.9	3	3.4	8	4.1	6	3.3	20	5.4	21	5.5	8	5.3	12	8.4
11 - 14 boys	1	4.1	2	2.3	13	6.6	12	6.6	16	4.3	18	4.7	5	3.3	5	3.5
15 - 18 girls	1	0.9	3	3.4	5	2.6	5	2.8	13	3.5	16	4.2	6	3.9	7	4.9
15 - 18 boys	1	0.9	2	2.3	8	4.1	8	4.4	14	3.8	17	4.4	4	2.6	4	2.8
Over 18 women	21	17.4	19	21.8	47	24.2	33	18.2	88	23.6	82	21.4	35	23.1	36	25.2
Over 18 men	15	12.4	7	8.3	17	8.7	17	9.4	42	11.3	54	14.1	20	13.2	15	10.5
Lactating and pregnant females	6	4.9	6	6.9	9	4.6	7	3.8	18	4.8	23	5.9	10	6.6	11	7.6
Total	121	100.0	87	100.0	195	100.0	181	100.0	372	100.0	384	100.0	152	100.0	143	100.0

Table 3 shows the final count on two visits, and also the calculated numbers of each animal per 100 persons. Livestock in the urban and peri-urban areas was negligible.

Donkeys (used as pack animals), pigs and sheep play only a small role in the animal husbandry of the Swazi.

The drop in the numbers of small animals, sheep, goats and chickens, from the first to second visit, can be ascribed to the winter shortage of food and the necessity to sell or to slaughter animals for money or food. The greater number of the animals were probably sold to purchase maize. The increase in cattle can be explained by the advent of calves, but may also be due to increase in herd size through other sources (e.g. bridewealth).

In the Highveld and Middleveld areas, each person on an average owned one cow, half a goat and one chicken, while in the Lowveld area, there were three and a half cows, one goat and a chicken per human.

The Sample Survey <sup>1)</sup> has demonstrated that the whole country is overstocked by 86% on the basis of permanent grazing land, and by 60% if fallow land is included.

The figures given in Table 3 give the total numbers of animals in the area, but also a misleading impression of their distribution. The Sample Survey <sup>2)</sup> comments on the large number of homesteads owning no cattle, in all regions this figure amounts to over one quarter. "In the Middleveld, Lowveld and Lebombo, in particular, a large proportion of the damage brought about by overstocking is caused by the larger herds which are owned by a relatively small proportion of the total homesteads".

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1) Experiment in Swaziland. op. cit. Chap. VII. p. 54

2) Experiment in Swaziland. op. cit. Chap. VII. p. 5.

TABLE 3

## LIVESTOCK POPULATION (PRIMARY AREAS)

Area	Highveld				Middleveld				Lowveld			
	a		b		a		b		a		b	
	Total	%*	Total	%	Total	%	Total	%	Total	%	Total	%
Cattle	120	62	205	113	506	136	547	142	480	316	511	357
Donkeys	4	-	1	-	9	2	9	2	-	-	-	-
Sheep	25	35	13	19	21	6	-	-	15	10	6	4
Goats	105	89	54	49	191	51	164	43	182	120	149	104
Pigs	5	2	3	1	39	10	22	6	-	-	-	-
Chicken	209	220	107	122	738	198	597	155	209	138	89	62
Ducks	4	-	2	-	18	5	14	4	-	-	-	-

\* = Number of animals per 100 persons

TABLE 4.

FOOD STORESNumber of homes storing food.

Area	Highveld		Middleveld		Bushveld	
	a	b	a	b	a	b
<u>Food</u>						
<u>Cereals</u>						
Maize	16	7	43	33	14	5
Sorghum	2	2	1		9	2
Flour	2	1				
<u>Starches</u>						
Potatoes	1					
Sweet Potatoes			3	1		
<u>Legumes and Nuts</u>						
Ground nuts			30	17	2	1
Beans (all varieties)	3	2	44	12	9	2
Sesame			5		2	1
<u>Vegetables</u>						
Pumpkin	10		2		1	
Melons (veg.)	9		15	2	3	1
Wild vegetables (dried)	1		1			
<u>Miscellaneous</u>	6	6				
Peri-urban Area. Maize:					2 homes	
Potatoes:					1 home	

Each household was asked about the content of food stores. Sometimes the householder would show the fieldworker the stores, generally she refrained. No attempt was made to measure the quantity, as it was feared that this might arouse antagonism. Moreover, the fieldworkers were married women and, as such, were not allowed into the cattle kraal where the grain was stored.

The incidence of the food items stored is shown in Table 4. The Urban and Peri-urban areas had only stores sufficient for the day, except for three homes in the peri-urban area, two of which had maize and the other potatoes.

The harvest of 1960/1961 was very poor and quantities stored are therefore unlikely to have been large. In the highveld only 16 out of 33 homesteads were storing maize during May. Pumpkin and vegetable melon was the only other food item regularly stored; these had been used by September of the same year.

The Middleveld stored maize, legumes and nuts in a majority of homes, but the legumes supplies were exhausted in many homes five months later.

The Lowveld stored some cereals and beans, but few homes had any stored during the second visit.

These data are of value in that they emphasise the dependence of the rural area upon seasonal foods.

#### 1.9. Description of the Primary Areas:

In this section an attempt is made to describe the ecology of which the nutrition is a part.

The Urban and Peri-Urban areas were randomly sampled and visited only once. The information here gathered is limited. The remainder of the primary areas were twice visited; households became intimately known and the areas can be described in detail.

#### 1.10. Urban Area:

The Sample Survey investigated some 186 urban and some 144 peri-urban homesteads. Eighteen of the sampled homesteads were in the urban area of the nutrition study. The report <sup>1)</sup> draws attention to the balanced population, indicative of settlement on a family basis; the smaller homestead size when compared with the rural areas; the long median period of residence in the urban area (most of the urban areas are a post-war phenomenon); and the number of women, as well as men, in wage earning employment. The Report concludes that the urban, and more particularly the peri-urban, areas are places of considerable stability, which have become progressively detached from the rural home areas.

The Urban Area, selected for the nutrition study, is situated on a hill above the capital town of Mbabane. The terrain is steep and stony. The settlement has grown considerably since the war. There is one general store, one butcher's shop, and two tea-rooms, a village centre composed of a meeting room (used by the nursery school on weekday mornings) and the Village Hall. Other amenities include a football field and tennis courts. Close to the village are several mission stations with schools attached.

In Mbabane itself there are several general stores, butcheries, tea-rooms, clothes shops. Hotel bars are open to all races, and liquor is sold at the bottle stores. There is a general hospital and a mother-and-baby clinic, and private medical practitioners are available in the capital.

#### 1.11 Housing:

In the urban sample area the original plots of land were sold for thirty-eight rand and the owners built their own houses. The houses are constructed

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1) Swaziland Sample Survey, op. cit. Chap. X. Vol. II. 1-16.

from a variety of materials: some walls are made of wattle and daub, some of cement and roofs are of corrugated iron or thatch. Some houses are a combination of many building materials. In many cases the existing houses have been subdivided or extended, or further houses have been built on the site for letting purposes. Often each room of a house is occupied by a number of tenants. There is a general impression of overcrowding.

Between the houses are narrow precipitous paths. The yards around the houses are neglected. A few of the householders have dug rubbish pits, but otherwise refuse accumulates in heaps. Some homes have small, well-tended gardens, others have no space for these. An occasional pig is styed in the 'backyard', usually fed on the siftings from African beer; its meat is sold to the butcheries. Avacado, guava, banana and mulberry trees grow in the town but tend to shut out the light.

#### 1.12 Sanitation:

Cold water is obtained from a communal tap that serves many homes. In the urban area there are no private lavatories. The public conveniences consist of a separate but small stall connected by a single open drain, with an automatic flushing unit at one end. The excrement from the lavatories is sent by air injection into the main sewers.

After dark, many people will not walk the distance to the lavatory, and the yards around the houses become fouled.

#### 1.13 Lighting:

The town is lit by a few central street lamps. In the houses candles or lamps are used.

#### 1.14 Cooking:

Cooking is done on an open fire outside the home, and inside by means of a wood-fired iron stove or by primus stove. Wood can be purchased in the locality and nearby plantations provide limited amounts of fuel. The householders cook in a variety of sauce-pans, most homes have an iron pot, but the majority use aluminium pans. The food is dished into enamelled or aluminium bowls and occasionally, china plates. Three meals a day are eaten. The homes have no larders: the frequently used dry goods, for example, tea and sugar, are kept on a shelf. Many foods are purchased in small quantities daily.

Cleanliness varies from home to home, as does furnishing. Some homes have gramophones, radios and sewing machines. Newspaper cuttings and large family photographs decorate the walls.

### 1.15 Activities:

The woman's day is filled with a variety of activities, fuel gathering, beer brewing, laundering, snuff making, mat weaving and cooking. Frequently the mother is working and will leave the home in charge of the grandmother. The unmarried mother living in one room leaves her child at the nursery school while she works in town.

### 1.16 Sickness:

The incidence of kwashiorkor is high in this area. Cases frequently present themselves at the mother and baby clinic.

### 1.17 Discussion:

In a survey involving prolonged visits to families it is hard to find that "stability" that the Sample Survey reports. It is due to a different interpretation of the term. Stability defined in terms of length of residence, settlement on a family basis and house-owning does exist. Within the homes there is evidence of insecurity. Meals are not the family gatherings of the rural area; food is eaten at all hours while members of the family are drifting in and out. Rural children requiring a secondary school education are sent to 'lodge' with an urban family; parental control is shed and not infrequently the schoolgirls fall pregnant. Mothers depart to join their husbands at his place of work away from the town, leaving the household in the care of a young child. Bachelors form temporary liaisons with girls in the area who cook for them.

The impression that remains is one of overcrowding, dirt and domestic instability. 1)

### 1.18 The Peri-Urban Area:

The peri-urban area lies on the outskirts of the urban Swazi settlement, but further from Mbabane itself and thus farther from the larger shops, places of work and entertainment. The area tumbles down a steep, rock infested hill-side; there is one precipitous main road, and meandering foot paths connect the houses.

There is one general store, little patronized as the proprietor charges prices higher than those in the neighbourhood or in Mbabane. For all other facilities - schools, Village Hall and sports grounds - the peri-urban residents must look to the urban area.

### 1.19 Housing:

In order to construct the homes on level ground, the householders have been forced to cut deep into the hillside over a small area. As a result many houses have a band of damp rising two feet up the wall.

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1) Replanning of the township is now in progress.

Some houses are the traditional beehive huts, others are of sticks and mud, and the remainder use a variety of building materials,

On such a steep site soil erosion is the chief problem. Some homes overcome this by planting the tenacious napier grass.

#### 1.20 Gardens:

In spite of the poor nature of the land, many households have gardens. Maize, cabbage, sweet potatoes and tomatoes were seen growing during the survey period. Young fruit trees, avacado, banana, peach or guava are planted in the area.

Some households keep hens in fenced fowl runs, and a few homes fatten pigs.

#### 1.21 Sanitation:

Communal water taps are provided at points along the road. There are no public lavatories, but many homes have constructed their own earth lavatories. In contrast to the urban area, rubbish pits are dug and used. However, little effort is made to burn the rubbish inside the pits, and some advice may be required.

#### 1.22 Meal patterns:

Fuel is gathered from the hillsides or purchased for 10 cents a bundle. Some housewives use iron or primus stoves, but the majority cook over an open fire. In the rural tradition, the families eat two meals a day. This difference from the urban area can be ascribed to lower household incomes, the ability of the working people to get home for a mid-day meal, distance from the shops and, possibly, less Western influence on dietary habits.

The homes are mostly occupied by the family only, there being few tenants. The aspect of overcrowding, so striking in the urban area, is absent in the peri-urban area.

#### 1.23 Stability:

After a period of time spent in the peri-urban area, an impression is gained of householders proud of their homes and of a general cleanliness, and a stable family life greater than that of the urban area. The Sample Survey report <sup>1)</sup> comments that the degree of stability (referred to earlier in this section) appears to be greater in the peri-urban areas than the urban. Dr. Holleman concludes: "This may well be due to the very nature of peri-urban settlement, in that to a rural derived, but urban oriented people, it appears to offer the best of two worlds."

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1) Experiment in Swaziland. loc. cit. Vol. II. Chap. X. 15.

#### 1.24 Summary:

The peri-urban sample area has a lower wage income than the urban area; a rural orientation expressed in the planting of gardens and in diet, and it leaves one with an impression of stability.

#### 1.25 The Highveld Area:

This rural area is situated in the north-west highveld of Swaziland (see Map.) Most of the country side stands at 5,000 feet. The Highveld sample area is twenty-two miles north of Mbabane, and lies on the road to Piggs Peak.

The terrain is hilly with steep slopes and rocky outcrops, and is best suited for grazing. The land is well watered by numerous springs and small streams.

Grass, well-suited for thatching and mat making, grows in the vicinity. Wattle has been planted several years ago by the people of the area. The bark is sold while the remainder of the trees make an excellent fuel.

#### 1.26 Communications:

The road to Piggs Peak was opened in 1926 and a bus service started operating in 1940. There are several bus owners who, between them, operate a daily service between Manzini, Mbabane and Piggs Peak. The nearest hospital is at Mbabane, and the bus fare is seventy cents. The nearest large shops and butchery are also at Mbabane.

#### 1.27 Facilities:

Within the area is situated one general store (opened in 1948). It sells clothing, materials, paraffin, soap, lamps and other necessities, as well as a small selection of foodstuffs (maize, meal, sugar, salt, sweets and dried milk). Belonging to the store is a grain tank, which remained empty throughout both visits of the survey team, through lack of surplus maize.

In 1924 an Anglican Church, together with a school, was established in the area. The church is stone-built and stands on a hill. The school (which teaches up to Standard VI) adjoins the church, and has a well-irrigated school garden.

Three Inkundla (community) huts were built after the last war. Two of the huts are occupied by the Agricultural Demonstrator and his family, the third is used for meetings, housing temporary visitors, and storing grass mats prior to sale. A small agricultural store carries fertilizer and seeds for sale.

An unusual innovation is the extensive cattle camps. The camp is wired with money raised by the community.

### 1.28 Housing:

The dwellings are sited some distance from each other, there being some thirty-three homes in the area. The chief construction materials are sticks and mud with a European style thatch, the latter usually finished with the traditional finial. The beehive huts are not seen. Other, but rare, building materials are corrugated iron, concrete blocks or sods.

### 1.29 Land:

Mostly, the homestead's lands are localized near the huts, some have fenced gardens, but not many. The cattle and goat kraals are erected near the homestead, and are moved annually in order to enrich other parts of the land. Fencing of fields is seen, but not in the majority of cases.

### 1.30 Livestock:

The Highveld, in general, is overgrazed and this sample area is no exception. In order to alleviate the situation, the Veterinary Department has recommended the division of the cattle camp into strips. The raising of the money for the necessary fencing is under discussion in the community. Cattle, donkeys, goats all seek grazing in the area. Each home has its fowl population.

### 1.31 The people:

The community was controlled by Chief Mnisi Dhlamini, (who died after the second visit of the team), an uncle of Sobhuza II. The Chief had lived in the area for many years and had the reputation of being a just, progressive man. His influence was very strong. Chief Mnisi was a member of the Anglican Communion and it is he who allowed the establishment of the Anglican Church in the area (after gaining the consent of the Paramount Chief.) Since its establishment, the church and its accompanying school have become an influence in the community and the people of the area realize the need for and the advantages derived from education. Many of the features of the Highveld Area, the sober habits, the early rising and activity, the good attendance at meetings, and the enthusiasm, can be attributed to the sagacity of the late Chief. 1)

There has been an Agricultural Demonstrator in the area since 1932. The present one is a Swazi trained in the Cape. This is an advantage, for his advice will be listened more readily. A Demonstrator, other than a Swazi, apparently has to prove his worth before the community accepts him. The Demonstrator's duties include giving advice to the community, the selling of seeds and fertilizer, and supervision of the school garden.

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1) James Matsebula, B.A., has helped in the analysis of the community.

The school is staffed by mainly "foreign" teachers (i.e. Xhosa and Zulu). The teachers, who are resident in the area for all but ten weeks in the summer, are an influence in the community. Schooling is not compulsory, but Chief Mnisi brought strong persuasion to bear on parents, and one finds nearly every child attending school. The cattle are put in the cattle camp by the children on their way to school, and are brought home at night.

Many men from the homesteads are migrant workers. In general, they send money home at regular intervals.

A striking feature of the area is the strength of the Anglican community. A communion service celebrated once a month attracts a large congregation. The Mothers' Union meets for one hour every Wednesday morning.

#### 1.32 The women:

The women of the community, in general, are hard-working and anxious to promote their children's education. The women busily make the grass mats for sale at the local market; they herd the goats while the children are at school; they carry out the seasonal activities in the fields during their husbands' absence. Rather unusually, the women attend and occasionally speak at inkundla meetings. It appears that women are accorded a fairly high status in this community. When questioned on what they would like to learn, the majority of women wished to be taught to knit or sew.

#### 1.33 Community needs:

The community expressed its needs for a clinic, so that minor ailments could be treated. At present the journey to the hospital at Mbabane is undertaken only when the complaint is serious. Also there is a general desire to add additional grades to the school, so that older children who pass Standard VI do not have to seek a place in a school in another district, (not an easy task). The people are aware that improved school facilities will involve expense, and are debating the relative importance of dividing the cattle camp into strips or building the additional classrooms.

#### 1.34 Meal patterns:

Almost universally the food is cooked in iron pots on an open fire, using the plentiful wood as fuel. Water is obtained from springs and streams. The first meal of the day is eaten very early in the day prior to the children's departure for school. A favourite dish in this area, found much more rarely elsewhere, is sour porridge. Eaten with sugar, it forms the first meal of the day.

This is the only area in which some households dish out a specific portion of food for the dog. Generally, dogs, thin and diseased, are

They were expected to hunt for their food, and are occasionally thrown left-over porridge.

### 1.35 The first visit:

The Highveld Area was visited for a period of three weeks on two occasions. The first time, during May 1961, the weather was dry, the days sunny with a cold wind, the nights cold with frequent frost. These climatic conditions were reflected in the dry skins of legs and arms and the fissured lips of the people.

There was very little grazing and in some places it had been burnt in preparation for the rains. Long mountain grass had been put into the cattle kraals to increase the manure yield.

The sorghum had been harvested and was drying on the inyango (platform for drying grain) or else stored in huts. Heads of sweet cane retained for seed were stuck in the thatch inside the huts. In the fields the maize crop was being harvested, mainly by the women. Melons and pumpkins lay fat on the ground, the leaves of the pumpkins providing food as "relish". The year was considered a 'starvation' one, due to the rain falling at the wrong time.

The women were very busy herding goats during the childrens' school hours, harvesting maize, drying vegetables for the winter, brewing and selling beer, and rope and mat-making.

### 1.36. Second visit:

The second visit was made in the Spring during September, 1961. There had been good rains in August and the land appeared green. But the grass was sparse; the cattle were kept out of the camp until the end of September when the newly platted fields made it necessary for them to be enclosed.

The weather was inclement with cold, cloud-encompassed days, thunder, hail and much rain. A few days of bright sun interspersed the wet.

The men had returned for the ploughing season. The kraal manure was spread on the fields, and the cattle kraals moved to an area of poor soil in order to enrich it. Ploughing with thin oxen had already started, and the women were hoeing in the gardens; some planting had been accomplished.

Stores of maize were low or exhausted, and the donkeys were being used to bring back maize purchased from a store some six miles away. (The local shop charged higher prices for the maize, hence the buying farther afield).

Food was restricted in many homes, but only two homesteads were near starvation and living only on green vegetables. It is interesting that these two homes lay within the confines of the statistical square, but outside the jurisdiction of

Chief Mnisi. Although it was a time of hardship, all families continued to send their children to school and to purchase necessary school materials.

### 1.37 Summary:

The Highveld Sample Area is typical of its physiographic region in climate, in overgrazing and in the large number of migrant workers. The land provides the grass for the matmaking which is a source of petty cash for the women in many homes. The bracing climate conditions are an encouragement to sustained work.

Under a sagacious Chief, who had accepted the available scientific and educational improvements offered, the community have become united in their desire to further these ends. In general, the people are keen supporters of the local church and its school, and follow a way of life demonstrating sobriety, early rising and activity.

### 1.38 The Middleveld Sample Area:

The Middleveld Sample Area is situated some twenty-five miles north-west of Manzini. It lies on a road junction, the Mliba-Manzini road having been opened in 1947 and the local bus service commenced soon after; a second road (opened about 1950) serves a Roman Catholic mission station and some farms, eventually leading by a precipitous route to Mbabane.

The area lies at some 3,000 feet, the terrain is undulating with bushveld at the bases of the hills. Abundant streams run in deep channels between the hills. The trees are small and very sparse, (the deceased Chief actively discouraged the planting of trees). This is a very fertile part of Swaziland, and one which frequently wins prizes for produce at the Agricultural Show at Manzini.

### 1.39 Crops:

Peach, mango, avocado, banana and paw-paw trees grow in the area and in addition there are wild fruits. Maize, sorghum, tomatoes, pineapples, sweetcane, beans, groundnuts and sesame can all be grown successfully. The area has a large number of homesteads, which leads to an intensive ploughing of the land and leaves little grazing for the over-abundant livestock.

### 1.40 Facilities:

A general store was opened at the cross roads in 1955. The present owner is a Eurafrikan. The store is well stocked and has a petrol pump. It serves a fairly large area, the next store being at some distance. Prices of goods are substantially higher than in Manzini. Attached to the store is a 'beer hall' operated by the storekeeper's wife.

Women come with vegetables or home-prepared food to sell at the bus stop near the store, to the embarking and disembarking passengers. The store

is the social meeting place and its role in community life is large.

In the area is a Government diptank where the cattle are dipped every Friday during the summer and alternate Fridays in the winter months. There is also a Government dairy for skimming milk. The dairy is maintained by the Government but staffed by a paid local assistant. Milk is brought to the dairy, the quantity is weighed, the milk skimmed, and the cream is transported to the creamery in Manzini three times a week. The skimmed milk is returned to the producer, who is paid for the quantity of milk supplied.

#### 1.41 Schools:

The deceased Chief strongly resisted progress. When representations were made to build schools in the area, he despatched the envoys "over the hills". Thus the Nazarene School with classes to Standard VI is some six miles away, and the Roman Catholic Mission School and clinic, some four and a half miles. About 1934 the late Chief consented to the establishment of a local school in the Lutheran Church. It remains a tribal school with classes up to Standard IV and a low standard of teaching. As soon as a child can walk the distance, ambitious parents send their children to the mission schools.

Just outside the area is an Anglican Church; a service, sparsely attended, is conducted by a layman on Sundays, and communion is celebrated by a visiting minister occasionally.

This area also has an Inkundla hut (somewhat dilapidated), and communal grain tanks which remain empty; there is a hut for the Agricultural Demonstrator on this site.

#### 1.42 Housing:

The Middleveld Sample Area is densely populated with about fifty-five kraals and some three hundred and eighty people. The housing varies from the traditional beehive to the brick home of the storekeeper. Some homes have dryland gardens, others have sought to lead irrigation channels from the streams, but these are in the minority. Many homes have the Government provided grain tanks, others retain the woven baskets and the ingungu (a pit in the cattle kraal) as storage. There are a few handmills, but mostly the women stone grind.

#### 1.43 The people:

The Chief, a strong willed traditionalist, died some four years ago and his reluctant heir has not been brought before the Paramount Chief to be recognized as his successor. The late Chief's brother and their sons are similarly strong willed and keen rivals. The area never advanced, and is at a standstill with regard to major policy decisions. The indvuna deals with the daily responsibilities, a gentle, busy man whose orders are respected,

but not a person likely to initiate changes.

There are two Agricultural Demonstrators in the area, one a Xhosa, and the other a Swazi. Under a Government scheme mechanical planters can be purchased on credit and the requests in this area have exceeded supply. There is a steady demand for fertilizer.

The fertility of the area has attracted Swazis, who had been working for Europeans in the Transvaal, to move into the area. The local people realize that the neighbourhood is becoming overcrowded, and blame local crimes on the Transvaal immigrants. However, the ex-Transvaalers bring wagons with them, and these are used in preference to the local sledge (the latter aggravates the erosion of soil). Many of them have learnt to work a long, hard day. (These people say of the locals that they plough for half the morning and then go off to drink beer). Moreover, the immigrants appreciate the value of mechanization and fertilizer, and make good use of Agricultural Department's services.

Many of the women from the Transvaal have worked for European women, and their homes have the stamp of cleanliness, neatness and an organized domestic routine.

Labour migration is a strong factor in the area; but many men, working away from home, are not sending money to their wives. In this area, unlike the Highveld Sample Area, a general irresponsibility on the part of the man towards his family is frequently seen. This may in part be attributed to a breakdown in the traditional family system. Many homes have recently moved into the area and are composed of nuclear families. The wife loses the support and authority of the grandmother, who would have controlled or admonished her irresponsible son. Even the husband's brothers are not present to show the husband his responsibility.

The influence of the Inyanga ('herbalists') in this area is strong and sick children are brought before him rather than the clinic. Other mothers take their sick child to the clinic once; if it has not recovered, after this initial visit they resort to the Inyanga.

#### 1.44 Hygiene:

Standards of hygiene are generally low: flies, even in the winter, abound in the huts and dishes are left unwashed until the next meal is prepared. Many people do not wash frequently and yards remain unswept.

#### 1.45 The team's visit:

The first visit was made to this area in June and July, 1961. The weather was sunny with occasional rain during July and strong wind blew. The grass was diminishing in quantity and quality. In July, after the crops had been harvested, the cattle wandered at will.

By June, the maize and millet had been harvested and the ground nuts were drying on the corrugated roofs, or other suitable places. The jugo beans were being harvested and the mung bean, sesame and sweet potato were still growing. At the end of July all had been harvested; kraal manure was dumped on the fields and very early ploughing started.

#### 1.46 Activities:

The women were brewing, baking scones and buns and making mats, all for a monetary return. Drunkenness, chiefly among the men, was frequent. It was not uncommon to find a man drunk by the time the fieldworkers arrived at the home at 7 a.m. Those people, both men and women, who lived nearest the store, (and its 'beer hall') were the most avid beer-drinkers.

#### 1.47 Meal patterns:

The people rose late in the morning and consequently ate late. School children leaving for the distant school had to depart without breakfast, their first meal being after school, around 4 p.m., when they would eat the food saved from breakfast for them. In the evening the meal was also late and the young children had to be woken up in order to partake.

The diet during these months was varied, the staple being augmented with a variety of beans and sesame. Nuts were used for a relish to accompany the porridge. Sugar cane was nibbled between meals. Fruits eaten included oranges, lemons, paw-paws and sweet bananas.

The Highveld Sample Area was 22 miles from the nearest clinic, and apart from ringworm, coughs and colds, little sickness was seen. The Middleveld Sample Area has two clinics in the vicinity, and a visiting (private) Swazi medical practitioner was available to treat patients at the local store every week. Yet in this area there was much more sickness, the fieldworkers found two children with such advanced kwashiorkor that they had to be hospitalized. Several children died of either measles or whooping cough, others were left severely debilitated by these diseases.

#### 1.48 The return visit:

The return visit was made at the middle of October and lasted until the end of November. This season of the year is one of great activity in the fields and gardens.

Prior to the arrival of the fieldworker very little rain had fallen, and the people of the area had sent two beasts to the Ndlovokazi (Queen Mother) with a request for rain. The land was dry

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1) H. Kuper, An African Aristocracy. (Oxford University Press, 1947), 52.

but the grass had not been burnt. In some places the kraal manure lay in piles on the fields, awaiting dispersion.

Rain soon fell, and there were several successive wet days every week. Sometimes there were thunderstorms on successive nights.

The migrant workers returned for the ploughing season. A tractor was available for hire and in constant use. Elsewhere thin oxen pulled the plough.

By the end of November maize was sprouting in the fields, with pumpkins and beans in between. The labour of weeding began, usually regarded as a women's job; but men assisted in the weeding and were rewarded with beer and food.

The ploughing of the fields reduced the available grazing. The numerous cattle nibbled at the sparse grass cover and the small calves did not improve the picture.

The people became more active, the men rising early to inspan the oxen and to plough. The women were brewing beer and preparing food for the men ploughing, sorting seed maize, they walked beside the oxen sowing maize, and in rare cases, themselves, ploughing. Handicrafts were laid aside until the heavy seasonal tasks were over.

The return of the migrant worker brought further advantages. The women were more diligent and better organized. He gave money to the family, just as the maize ran short.

The children were still at school and commencing examinations. In December they were freed to help with the weeding. In homes spurring education the children were continually helping with the seasonal work.

The households were cooking earlier in the morning and later at nights. Some families had stores of beans, monkey nuts, sesame and maize (see Table 4), two homes were in a state of semi-starvation, without maize, income or cattle.

The wild vegetables had flourished with the rain and were plentiful. Flying ants and locusts figured as snacks. Peaches were eaten; paw-paws, bananas, cabbage and tomatoes were offered for sale.

Milk was plentiful and much was taken to the dairy to be skimmed.

Pellagra was found in a woman whose staple diet was beer. One case of infantile pellagra was seen in a home which sold eggs, milk, fruit, sugar cane and vegetables. It was probably due to the fact that the mother, having a sick husband, had to supervise all the agricultural tasks herself.

Sickness still persisted. Some of the children who suffered from infectious diseases during the first visit, now had other symptoms of tuberculosis or malnutrition. In all, the survey team found nine patients that had to be taken to hospital or clinic. There was considerable apparent apathy in the face of sickness. If one visit to the clinic did not cure, no return one was made. This apathy can be attributed to the belief that sickness is due to bewitchment or to the multitude of tasks that the housewife must perform (however, an "Open Day" at a school, adjoining a clinic, attracted nearly everybody from the area); or to lack of money to pay for treatment. The husband will not entrust money to his wife. ("You cannot give money to a child".) When a child falls ill, the men are often unwilling to sell a cow in order to pay for treatment, and unless the wife had made her own money by means of bun making, mat making or beer brewing, there is no money available for treatment.

#### 1.49 Summary:

The Middleveld characteristics of soil fertility, over-grazing, high density of population and some migrant labour are here.

Unlike the Highveld Sample Area, the Middleveld area had a Chief who clung resolutely to traditionalism. Since his death (some four years ago) and the failure of his successor to accede, the area has not progressed as a whole.

The influence of church and education is small, that of the Izinyanga and of beer, strong. The 'beer hall' provides leisure time (or day long) activities for the returned migrant, the unenthusiastic farmer and the woman who discards some of her responsibilities to the family.

The population consists of subsistence farmers and part-time farmers (migrants) anxious only to obtain a year's food supply from the land; and of the embryo master farmer (frequently a Swazi immigrant from the Transvaal), an assiduous worker, eager to benefit from Agricultural improvements.

#### 1.50 The Lowveld Sample Area:

This area lies south-west of Manzini and some twenty miles from that town. A short distance from this area is the main road to Gollel along which a bus runs from Manzini to Hlatikulu one day, and back the following day (except Sundays). The area is bisected by the Mzimpofu River, and traversed by a road to the ranch of a European farmer.

The area is surrounded by small hills covered with stunted trees, and capped by rocks and aloes. The land is covered by 'bush,' - in parts, very dense. Clearings have been made around the homesteads for cattle kraal and fields. The chief problem is water, and in winter when the small sources dry up the Swazis may come two miles for water. The area is best suited for cattle ranching.

### 1.51 Facilities:

Outside the surveyed area are sited the cattle dip, the small store, the dairy and the tribal school. The store stocks only maize meal, sprouting sorghum (for beer), matches, salt and paraffin. The tribal school, which has one teacher, consists of a single stone built room with hard benches. The attendance is about forty pupils with classes up to Standard III. At Sipofaneni (some 10 miles away) there is a large Government school with classes up to Standard VI. It is noticeable that many of the children in the area have no clothes, or only tribal garb, and on these grounds alone cannot attend school. Other reasons are lack of money for school materials and the necessity for the children to act as cattleherds.

There are a Roman Catholic Church, a Methodist and a Nazarene Mission some miles from the area. They may have some converts, but the Zionists have a stronghold in the area, a church of this faith having been built at a nearby kraal. A large portion of the population remain traditionalists.

The area is 'lifa' land (i. e. land purchased by the Swazi nation for occupation since Partition was affected in 1913. <sup>1)</sup>

### 1.52 People:

The elderly Chief succeeded to the chieftainship in the 1920's and became a Zionist convert in the early 'thirties. A man of moderate intelligence, he is said to work without counselling or consulting others, and is blamed locally for the lack of progress in the area.

The Indvuna is literate in English and Swazi, and would like to raise the standards of the local school.

### 1.53 A Schism:

There is a strong cleavage between the Zionists and Traditionalists. The former abstain from alcohol (according to the Agricultural Demonstrator), and along with other Christians, are the best farmers. The Christians are easier to wean from the unprofitable maize crops onto the more fruitful jugo beans, nuts and cotton.

Zionists, in general, are hard working and eager to learn. As the area produced a good maize crop about once in five years, it is considered to be wiser to cultivate a cotton crop and to purchase more maize from the profit. All cotton farmers grow some maize, but do not make it their main crop. Cotton requires an industrious farmer to plant the seed correctly, to keep it free from weeds and

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1) Swaziland Sample Survey, op. cit 9. Vol. I. Chap. II., 9.

to harvest it in good condition. The whole family must assist at harvest time. As cotton farmers the Zionists are prospering.

The traditionalists, indolent and chronic beer drinkers, have not been converted to cotton, but at the same time see little point in planting a large quantity of maize that will not come to fruition. As a result men go out and scrape the surface of the land and when the sun is hot, beer-drinking commences.

#### 1.54 Handicrafts:

The women practise few handicrafts. There is neither suitable grass nor sisal for mat making. There is excellent clay for pots, but no market for them. Manzini is some 22 miles away and any profit made on the sale of pots there dwindles with busfares. Many of the women have expressed a desire to learn to knit, sew, to preserve fruit and make jam, for monetary ends.

#### 1.55 The team's visit:

The first visit was made in the area during August, the weather was fine and warm; no rain fell and the grass was sparse and dry. The hunting season was drawing to a close. The cattle appeared sleek and content.

The majority of the men were away, many of them allegedly not sending money home; some remained at home without any apparent source of income.

The milk was sent to the rural dairies for skimming, but the skimmed milk was rarely used for human consumption. The families, on the whole, had very small stock of food. Some had none at all and were begging it from relatives. The shortage was in great measure due to the lack of rain during the year, leading to a poor harvest. Work was available in nearby industries, but the men appeared to be making little effort to secure it.

The bushveld is renowned for its beer drinking habits, and this area was no exception. The women explained their continued beer drinking - "So that we do not hear the children crying for food".

#### 1.56 Diet:

The poverty of the people was reflected in their diet. No sugar was used and some were unable to afford salt. The people were consuming wild vegetables, fruit and nuts. Some families were on the verge of starvation. There was an apparent apathy in the face of this prospect. This apathy may well have resulted from a lack of calories, but the acute food shortage was of relatively recent origin and the children, although thin, played with energy.

### 1.57 Re-visit:

In January, the survey team revisited the Lowveld Sample Area. There were days of torrid heat, some were windy and cooler, and a few thunderstorms preceded heavy rain.

The migrant husband had returned to plough and were still doing so. The early maize was ripe, sorghum in flower, pumpkins and vegetable melon swelling visibly in the sun and the rain.

The grazing was thin and losing colour, but the cattle appeared sleek and were producing good quantities of milk. Milk was playing a large part in the economy and diet of the people, a regular income was coming in to many homes from the cream sold at the dairy. The income allowed families to purchase maize or maize meal, for their own stores had long been exhausted. The seasonal milk supply had saved many families from starvation.

The adults, and particularly the children, were eating a large variety of wild fruits in an apparently unripe condition. Fat juicy caterpillars, flying ants and locusts contributed to the protein of the diet. The annual beverage, marula beer, was being brewed.

Families, that in August appeared to be in a desperate situation regarding food, emerged very well. Much can be attributed to the milk and the veld produce. Many families were purchasing maize on credit from a store.

The return of the men had enforced sobriety in some of the housewives and they were up early to weed before the sun became too hot, resting during the day, and hoeing again as the sun sank.

### 1.58 Sickness:

Among the children conjunctivitis was prevalent. This condition may have been caused, or aggravated, by the plumed grass seed and maize tassels. An outbreak of whooping cough affected many families. In spite of the continued beer drinking by a sector of the population, pellagra was not seen.

### 1.59 Summary:

Typical of the Lowveld, this primary area is rich in grazing and in cattle, short of water and sparsely settled. Wage incomes, labour migration and education are low in incidence. In the face of constant maize crop failures, some of the farmers have turned to the hard labour of cash crop production. Others have not attempted this, and in the heat of the Lowveld are content to enjoy the not inconsiderable pleasures of cattle, women and beer.

### 1.60 Application:

These five areas were chosen for their urban, peri-urban and physiographic contrasts; once

within them other differences became apparent: of seasonal change, of leadership, of orientation of outlook, of income level and of education. All these factors contribute to the nutritional status of the area, and for this reason each has been described in detail. Moreover, each area requires that the problem of nutrition education be tackled in a way geared for that locality.

2. THE CONTROL AREAS:

The control areas, two in the Highveld, one in the Lebombo and one in the Middleveld, were visited for a maximum of seven days each. In many cases the housewives were questioned at a meeting place and not in their homes. As a result it has not been possible to obtain as detailed a description of these areas as that of the primary areas, nor has the dietary information been treated in the same way. Tables 5 and 6 summarize the relevant data on the control areas.

TABLE 5 - THE PHYSICAL ENVIRONMENT - CONTROL AREAS

Area	Highveld 1	Lebombo	Middleveld	Highveld 2
<u>Soil</u> *	Fair amount of rocky land. Elsewhere not very fertile loam and sandy loam soils. Soils deficient in phosphorous, calcium magnesium but moderately high in potassium. pH. commonly 5. Small to medium amounts of organic matter in the top-soil.	Northern part - shallow sandy loams, infertile and lacking most food elements. South - red loam, containing reasonable quantities of nitrogen, phosphorous, potassium and much iron. pH. commonly 6.	Much sandy vleii soil with occasional peaty loams. Iron often reduced. Also some shallow reddish loam, very unproductive. Deficient in magnesium. Some very rocky slopes. pH. very acid.	Patches of deep red loam. Low in phosphorous, calcium, magnesium and zinc, but with abundant iron. Main soil, shallower, greyer, sandier, containing less iron. Humus usually low. pH. 5-6.
<u>Temperature</u> ** Yearly means degrees F. Seasonal Range Temperature Station	69° 13.0 Kubuta	66.7° 12.0 Stegi	70.3° 19.7 Peebles	63.8° 13.0 Pigg's Peak
<u>Rainfall</u> Estimated long term mean Observed annual mean Drought hazard Rainfall Station	34.5 30.8 - Mooihoek	30.1 27.1 - Omhlumeni	46.5 50.1 - Johannesloop	46.5 47.8 - Pigg's Peak
<u>Notes</u>	Tobacco as a cash crop. Dense population, overploughing and overgrazing.	Samp eaten, influence of Portuguese East Africa.	Very fertile. Large maize and bean crops. Dense population.	

\* G. Murdoch - personal communication

\*\* E. & G. Murdoch, Swaziland Meteorological Data. op.cit.

TABLE 6  
THE POPULATION - CONTROL AREAS

Area	High veld 1	Lebombo	Middle- veld	High- veld 2
<u>Human:</u>				
Total number of persons	325	306	284	232
Total number of children	188	152	165	129
Percentage of children	57.8	49.7	58.0	55.6
<u>Animal:</u>				
Total number of hens	319	288	280	198
Number of hens per 100 people	98	94	99	85
Total number of pigs	27	6	32	17
Pigs per 100 people	8	2	11	7
Total number of goats	125	209	292	62
Goats per 100 people	38	68	103	27
Total number of sheep	33	-	-	-
Sheep per 100 people	10	-	-	-
Total number of cattle	110	10	109	10
Cattle per 100 people	34	3	38	4
Affirmative answers*	27	29	22	27
<u>Incomes:</u>				
Nil	35	24	28	18
Per month: Under R5	7	19	10	5
Between R5-9	3	2	3	2
R10 and over	-	4	4	8
Unknown	3	3	3	-

\* Some people answered the question on cattle in the affirmative but did not state number

## CHAPTER IV

### DIETARY STUDY

#### 1. METHODOLOGY :

##### 1.1. The Sample:

In the Introduction the selection of the sample has been described : i. e. three rural sample survey areas situated in the highveld, middleveld and lowveld. Serving as a control, were a further four areas, subjectively chosen. The urban and peri-urban samples were obtained by random sampling on the basis of family size.

Every homestead within the Rural Sample Areas was investigated. In this respect the survey team was able to achieve complete success, and credit must be given to the enthusiasm of the fieldworkers, the goodwill of the subject under investigation, the aid of the Swaziland Administration, the close support of the Paramount Chief, and his chiefs and their representatives.

In the urban areas some difficulty was experienced, but very few outright refusals to co-operate. In cases of refusal another home, of the same family size, also selected by random selection, was substituted.

##### 1.2. The Unit:

Initially, the fieldworkers approached the homestead's housewife and obtained her co-operation. Within the homestead, the unit of study was the food consumption group, defined as the persons served from one cooking pot, i. e. the catering unit. In many cases the food consumption unit consisted of a nuclear family. In polygamous homes, for example in a home with two wives, they frequently cooked separately; the husband being served by both, was a member of two food consumption groups. The composition of the group may change from day to day, meal to meal, but at each meal the consumers partaking were recorded. By working at the level of the food consumption unit, information was gained on the factors governing the distribution and consumption of food within families.

##### 1.3. The Method Employed:

Little qualitative and virtually no quantitative information was available in the Swazi diet. The decision was taken to make an intensive and detailed survey on many aspects of food consumption in order that those factors influencing the nutritional situation<sup>1)</sup>

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1) Dietary surveys. F.A.O. Nutritional Studies No. 4. Rome : (December, 1949), 64.

might be determined. This technique is recommended by the Food and Agriculture Organization for use in developing countries.

The weighing method was chosen whereby for each food consumption unit the food was weighed before preparation, after preparation but prior to cooking, and finally the served portions were weighed. The advantages of this method are that it provides a precise picture of the diet and the quantities prepared and consumed. Moreover, it does not require the subjects under investigation to be literate.

The disadvantages are that the method is time-consuming and laborious, enabling only a small sample to be covered. It is possible that the presence of the fieldworker interferes with the normal eating pattern. Evidence indicates that in the rural areas this was not so. The small degree of sophistication, a shortage of ready money, and the distance from homestead to shop prevented additional purchases for the purpose of impressing the fieldworkers. The easy familiarity with which the housewife worked with her food quantities, served as a guide to the lack of self-consciousness occasioned by the fieldworker.

In the urban areas, housewives tended to purchase extra food from the shop prior to the arrival of the survey worker. However, running short of money and tiring of this practice before the final survey day, they resorted to their normal meal pattern.

The control areas were investigated by questionnaire. This latter was drawn up after some fieldwork had been done and the dietary situation better known. With this tool it was hoped to discover any differences between the primary areas and these control groups. The questionnaire proved a much coarser instrument but it demonstrated that few dietary differences existed between the primary and control areas.

#### 1.4. Duration of the Survey Period:

Preliminary investigations revealed no food cycle extending over a period of days, the diet appearing very monotonous. The seasonal effect in the rural areas was believed, and proved, to be considerable. Each homestead in the rural areas was surveyed for three days and this investigation was repeated five months later, a total of six days being spent in each homestead.

In the urban areas, where food was purchased from the stores, the seasonal changes were small, and a repeat visit was not made.

#### 1.5. Collection of the Data:

The number of homesteads that could be investigated concurrently by our fieldworker, depended on the distance between homesteads; the difficulty of the terrain, the number of food consumption groups in the homesteads, and the degree of organization of the housewives. This number rarely exceeded three and sometimes was one!

The fieldworker made a preliminary visit in the company of some locally well-known person, a man of status, for example the agricultural demonstrator or the induna. Introductions were made, the intended investigation explained, and co-operation was requested. A mutually convenient time was arranged for the commencement of the survey. The fieldworker then checked on the composition of the household relationships, age, the family income, religious affiliation, school standard achieved, and nature of employment.

On the first day of the survey period the fieldworker spent some time in initiating the housewife into the methods required. The source of the food, whether purchased, gathered, hunted or grown, was ascertained. The staple, maize was weighed, and then ground by the housewife, the fieldworker noting the method, measuring the water in the iron pot and weighing the amount of maizemeal added. The ingredients for the relish were weighed before and after preparation, the recipe was written down, the type of pot was noted, as was also the use of a lid during cooking.

After cooking, the weights of the food served into the bowls were recorded. Visitors were observed and their age and sex noted. Family absentees were inquired after and the meal they were eating away from home elicited. Left-over food was measured, and the portions served to animals recorded.

Frequently a member of a family revealed his attitude towards a certain food and unobtrusively this piece of information was added to the notebook.

Snacks and beer drinking are one of the greatest problems of a dietary survey. Although the subjects were co-operative, it is not easy to measure the amount of figs eaten by a small boy who scales up a tree, picking and eating until stomach-ache demands a temporary halt. The constant passing of the beer pot around a continually changing circle makes an estimate of a particular individual's intake a very difficult matter.

Further information was gathered on the activities of the family, on physiological conditions such as sickness, pregnancy and lactation, and on homestead hygiene. Local budgets, local food prices, beliefs and taboos concerned with food, were investigated.

#### 1.6. Vulnerable Groups:

The nutrition of vulnerable groups (i.e. pregnant and lactating women and children under five years), is of paramount interest. It was not possible to establish the individual intake of the members of these groups owing to the universal custom of sharing bowls. To have insisted on the serving of food in separate bowls would have been a departure from the usual practice, and the housewife would have had difficulty gauging the requirements of an individual rather than of the group.

In order to gain further knowledge of the dietary habits of the vulnerable groups a questionnaire was used. (See Annexure). It covered the diet of pregnant and lactating women; the time of onset and duration of breastfeeding; the introduction of supplementary foods, and time and method of weaning. Questions are also asked on subjects allied to nutrition. This questionnaire was administered to each mother in the homestead. In a polygamous household the wives were questioned together. They appeared to follow the directives of husband's mother in the upbringing of children.

During the period of the survey, the children were also clinically examined for signs of malnutrition. This examination will be fully described later. Questions were asked on livestock numbers, contents of foodstores, fuel and water sources, as discussed earlier.

## 2. ANALYSIS OF THE DATA :

### 2.1. Identification of Plants:

Wild plants occurring in the Swazi dietary were kindly identified by Professor R. Compton, at the Swaziland Herbarium.

### 2.2. The Schedules:

The diet record sheets of the three days survey in each homestead were prepared for analysis, and the following adjustments were made.

### 2.3. Visitors:

The food portions of visitors present only for an occasional meal were deducted. Those visitors present for the whole of the survey period were considered temporary members of the food consumption group and their food portions were included.

### 2.4. Absentees:

When members of the food consumption group were absent for a meal, the nature of the meal eaten away from home was determined. If this was not possible, the amounts recorded at the equivalent meal at home were increased to allow for an extra portion.

### 2.5. Left-over Food:

Left-over food that was given away, allowed to spoil or fed to animals, was deducted from the record. Left-over food eaten at a meal later in the survey period was not deducted.

Any member of the food consumption group who forwent a meal or ate little because of unhappiness or illness was still considered to be a member of the group for that meal. A note was made of the reason for this abstention.

## 2.6. Snacks:

Known quantities of snacks were included in the record. When the consumption of a snack or beer was recorded without any indication of quantity, an estimate was made and added to the schedule.

## 2.7. Food categories:

The quantities of each food expressed in metric units, were summed for the three day period. The diet was costed using the local prices prevailing at the time of the survey.

The quantities of food were then grouped according to the categories of the Food and Agriculture Organization categories :-

- (a) Cereal and cereal products
- (b) Starchy roots and tubers
- (c) Sugars and syrups
- (d) Legumes, nuts and seeds
- (e) Vegetables
- (f) Fruit
- (g) Meat and poultry
- (h) Fish
- (i) Eggs
- (j) Milk and milk products
- (k) Oils and fats
- (l) Miscellaneous.

## 2.8. Analysis and sorting of Data:

The chemical composition of the diet was calculated from data in published tables <sup>1)</sup> and by personal communication. Due allowance was made, as far as possible, for the source of the food, the degree of maturity of cereals, fruit and vegetables, the processing of the food and the method of cooking. Those figures most appropriate to Swaziland conditions were utilized. The dietary components selected for analysis were : calories, carbohydrate, fat, total protein, animal protein, calcium, iron, thiamine, riboflavin, niacin, Vitamin A, and ascorbic acid. The constant sunshine and the small amount of clothing worn, indicated that there would be no shortage of Vitamin D, so no analysis was made for this vitamin.

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- 1) F. W. Fox, L. Golberg, South African Food Tables, (Department of Biochemistry, The South African Institute for Medical Research, Johannesburg, 1944). B. S. Platt, Tables of Representative Values of Foods Commonly Used in Tropical Countries. (Special Report Series 253; Medical Research Council, London. Her Majesty's Stationery Office, 1945).  
D. C. Crawford, P. J. Hamersa, B. W. Marloth, The Chemical Composition of some South African Cereals and their Milling Products. (Chemistry Series No. 171; Department of Agriculture and Forestry; Pretoria, Government Printer, 1942).  
Food Composition Tables - Minerals and Vitamins, F.A.O. Nutritional Studies No.11. F.A.O. of the United Nations; Rome, 1954).

For each food consumption group, the nutrients consumed were expressed on a per head per day basis. The primary rural areas yielded these data for two seasons.

The mean nutrient intake per person per day for each area was compared with internationally recognised recommended allowances. For calories and protein the F. A. O. procedure for estimating these requirements was adopted.

For each food consumption group the nutrient levels and the majority of the supplementary information (income, religious information etc.) were coded on to punch cards. An attempt was made to estimate national requirements of certain nutrients by adjustment of a Table of Practical Allowances<sup>1)</sup> employing a method to be described later. A scale was devised to demonstrate the extent to which the food consumption group satisfied these practical allowances, and this scale entered on the punch card.

A Powers-Samas machine was used to sort the information into discrete categories.

### 3. FREQUENCY OF CONSUMPTION :

In each survey area the foods consumed were classed into the twelve F. A. O. categories and the frequency with which each food was eaten, was graphed. (See Figures 1-8).

Any foodstuff that was mentioned less than five times was classified under 'other'; the foods in this category were then totalled.

The first impression received is the general shortage of animal protein and the almost total absence of eggs and fish in the diet.

#### 3.1. Urban and peri-urban comparisons: (Fig. 1 and 2).

The urban area had the widest variety of foodstuffs. Only few legumes were used but the purchase of beef was high. White bread, flour, potatoes, sugar and tea are pointers to the sophistication of the diet.

In the peri-urban area the purchasing power is much lower, and the distance from the shops greater. These facts are reflected in the diminished variety of the diet, the absence of the luxury purchases, e.g. flour and potatoes. Both bread and beef consumption levels were lower than in the urban area.

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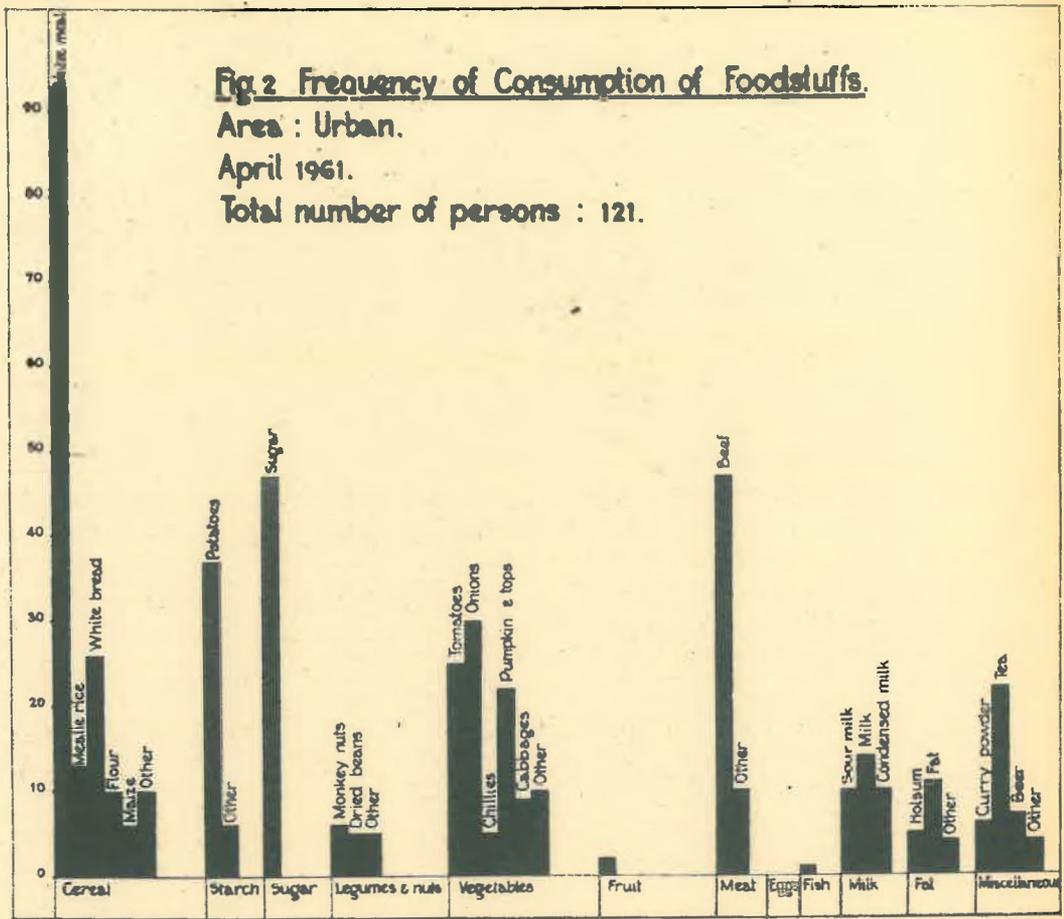
1) M. Autret, Reflexions sur les enquetes alimentaires et leur interpretation Nutrition et alimentation tropicales. (Rome: F. A. O. / W. H. O., Vol. 3 pp. 1837 - 1842. Nutrition Meeting Report No. 20).

**Fig. 2 Frequency of Consumption of Foodstuffs.**

Area : Urban.

April 1961.

Total number of persons : 121.

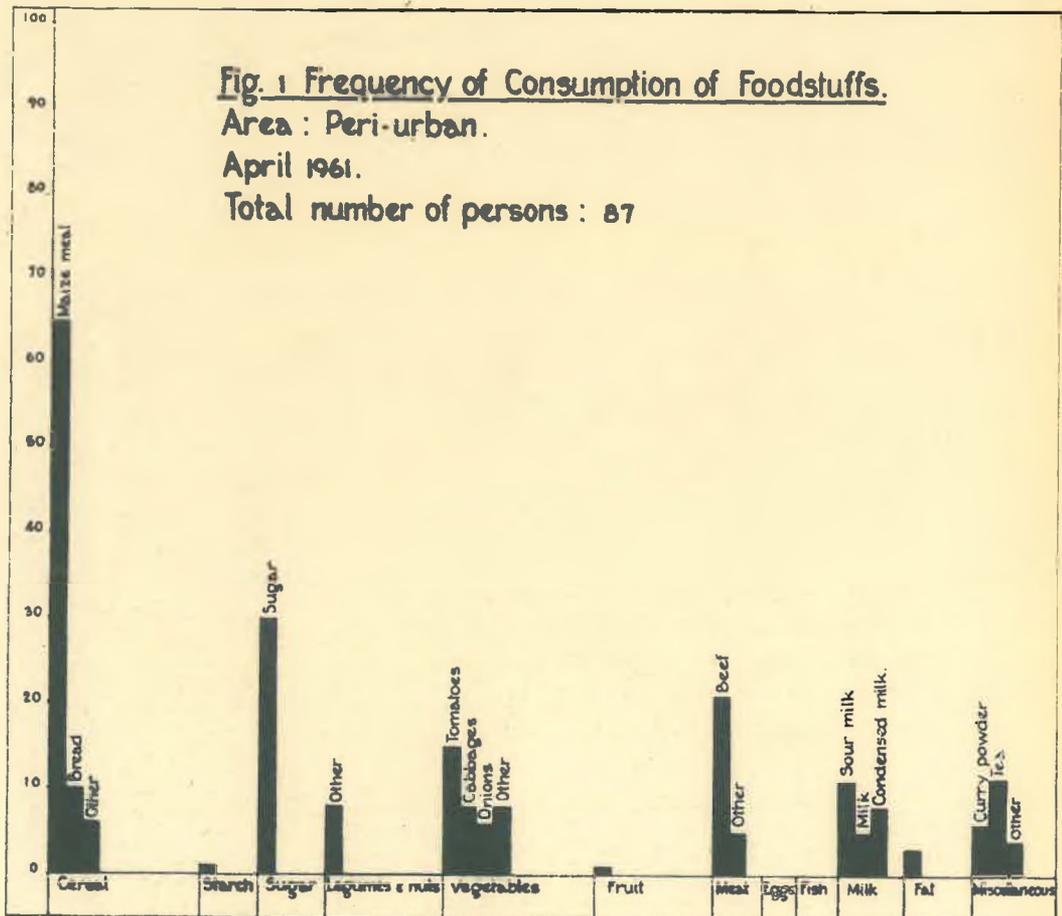


**Fig. 1 Frequency of Consumption of Foodstuffs.**

Area : Peri-urban.

April 1961.

Total number of persons : 87

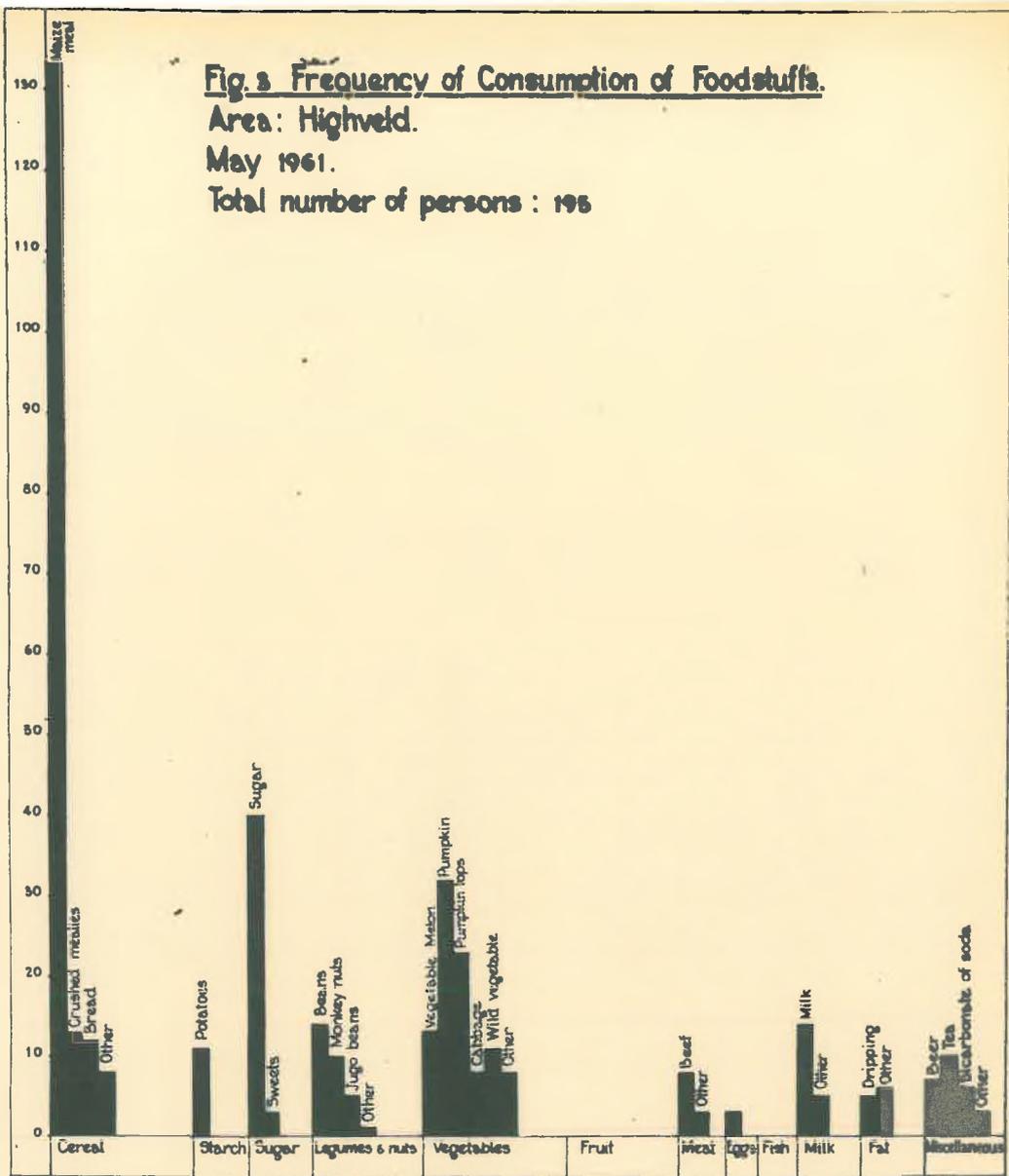


**Fig. 3 Frequency of Consumption of Foodstuffs.**

Area: Highveld.

May 1961.

Total number of persons : 196

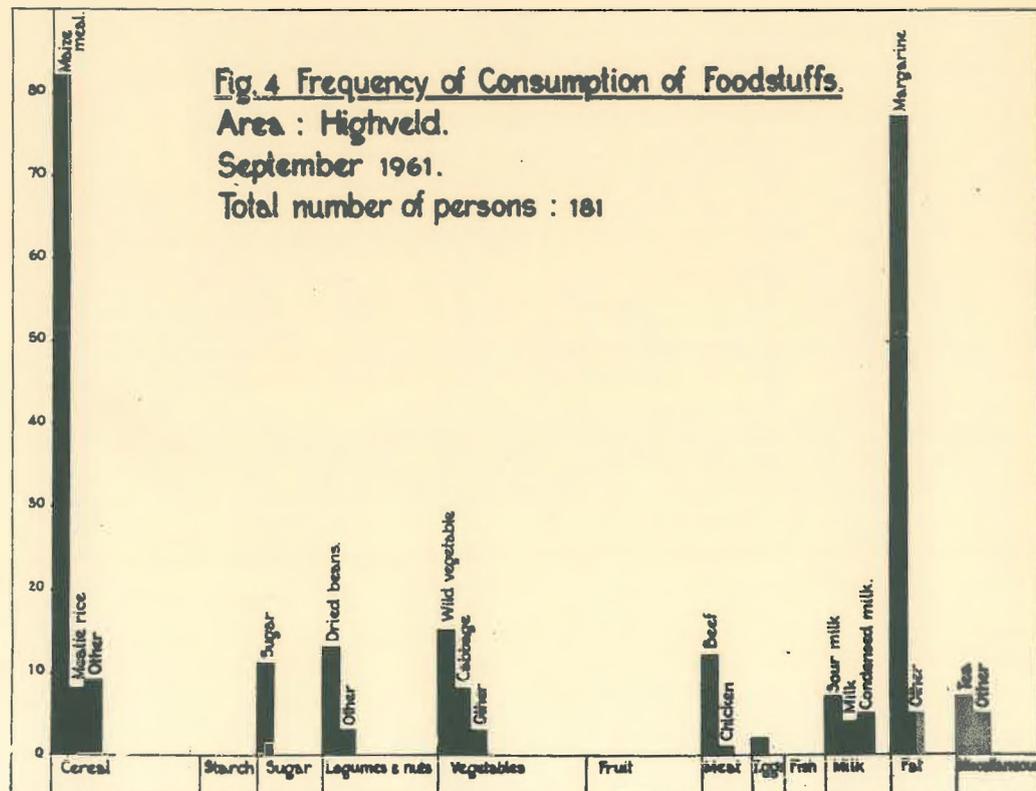


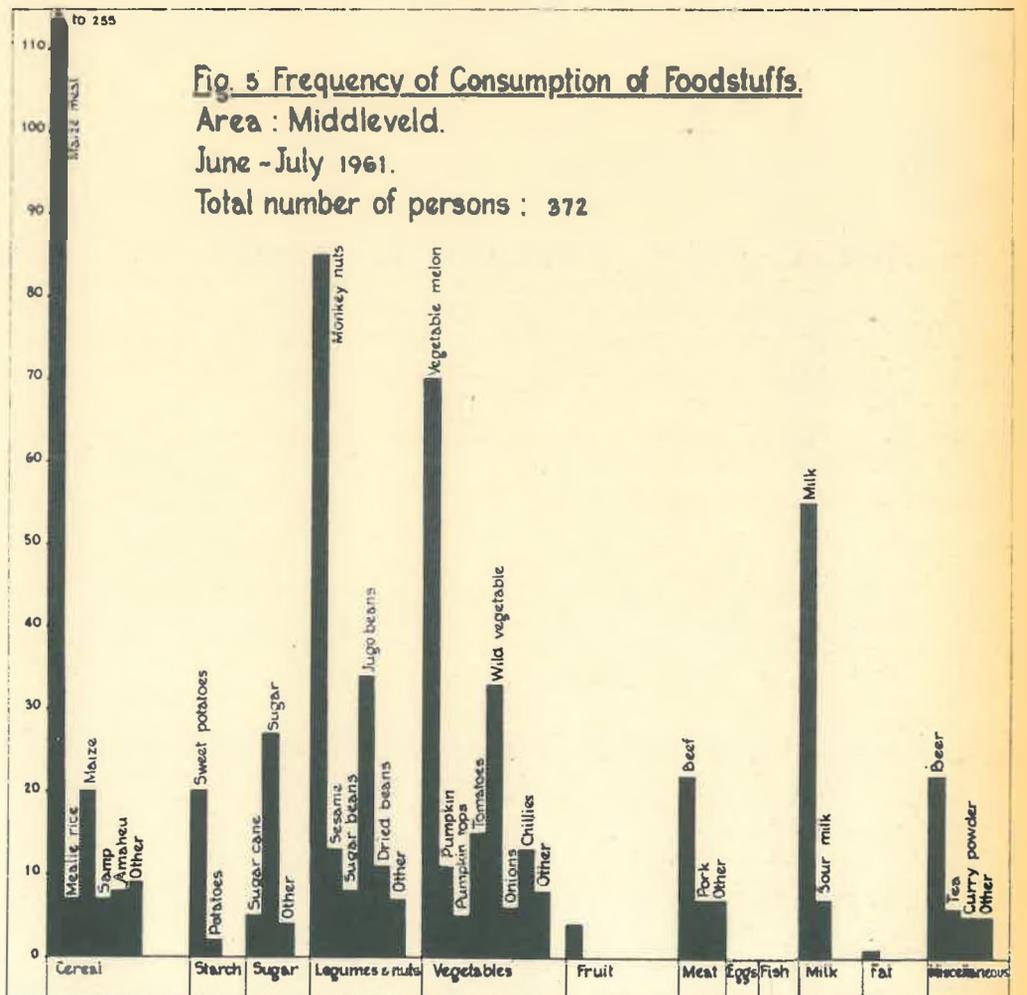
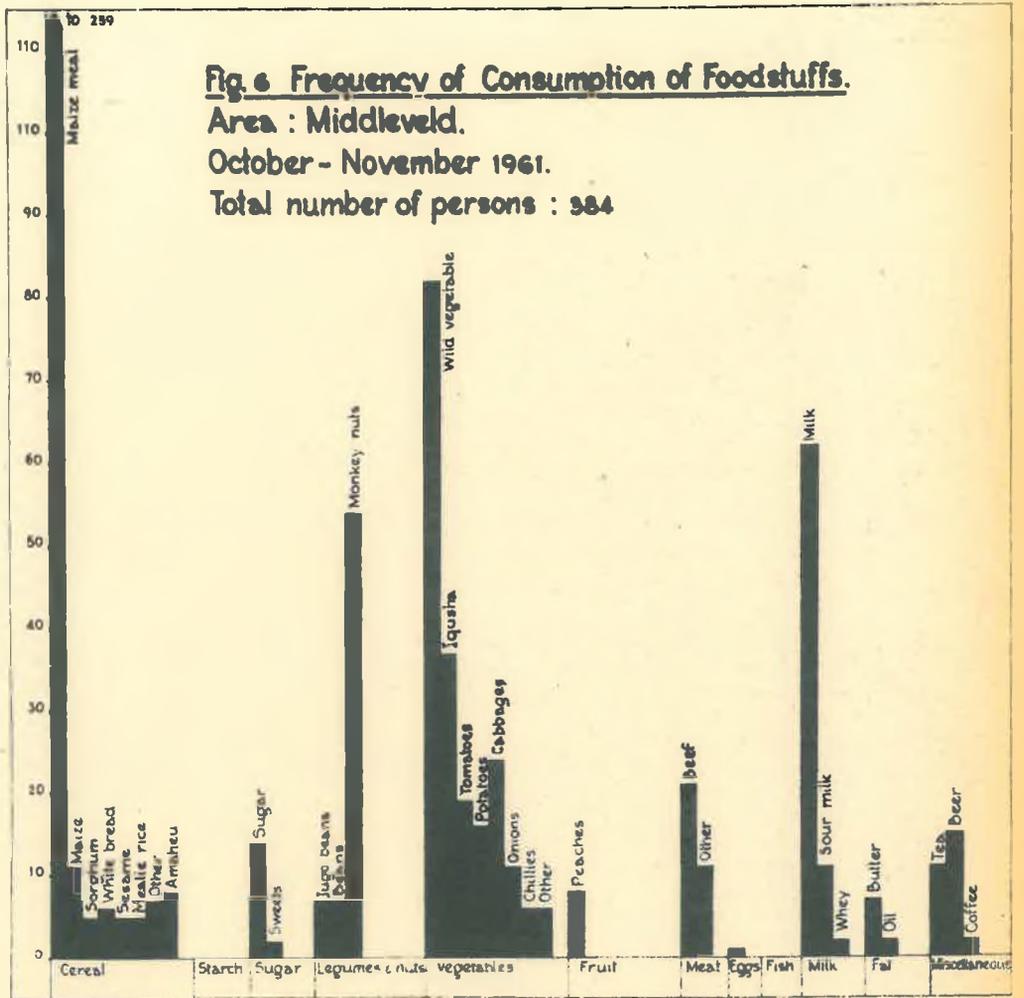
**Fig. 4 Frequency of Consumption of Foodstuffs.**

Area : Highveld.

September 1961.

Total number of persons : 181



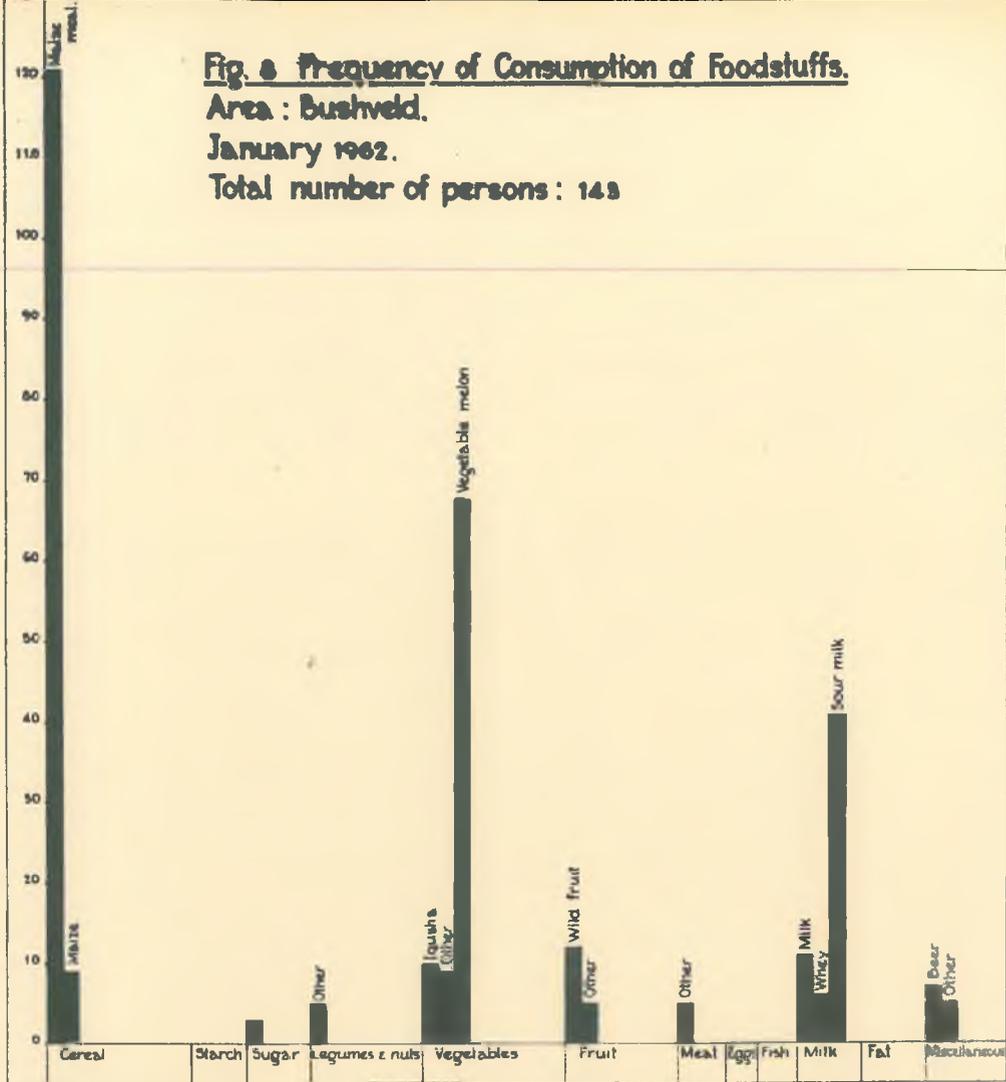


**Fig. 6 Frequency of Consumption of Foodstuffs.**

Area : Bushveld.

January 1962.

Total number of persons : 143

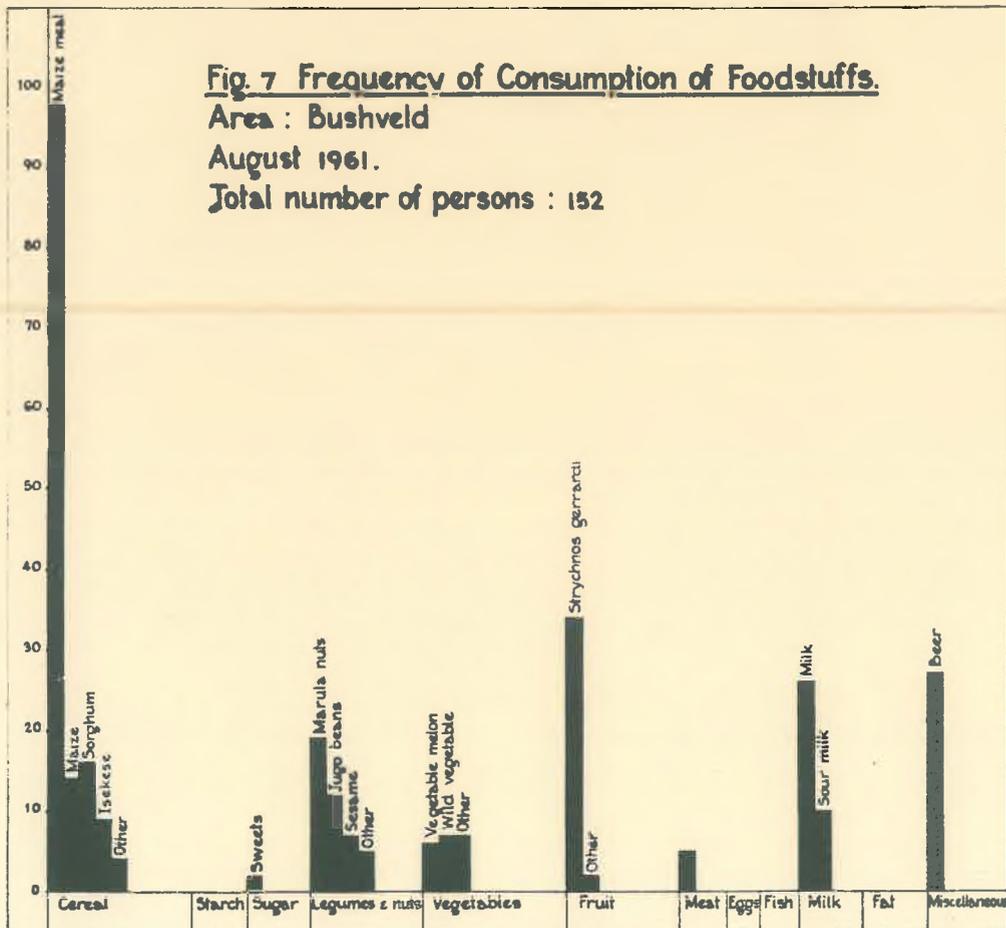


**Fig. 7 Frequency of Consumption of Foodstuffs.**

Area : Bushveld

August 1961.

Total number of persons : 152



### 3.2. Highveld Sample: (Fig. 3 and 4).

The highveld area is rather rugged and the weather inclement. The sample contained several well salaried, well educated families, whose sophisticated tastes are reflected in the use of fat and tea.

During May the main morning meal consisted of sour porridge, sweetened with sugar. Sugar is also used in beer-brewing and, as this was harvest time, much sugar was purchased. This area is not very suitable for legume production. There is no rural butchery, the nearest being some fifteen miles away.

In September the harvest was over. Stores were being carefully husbanded, and the legume consumption fell away. Sugar consumption dropped, possibly due to the lack of maize for beer brewing and the need to purchase maize rather than luxury items. The increased use of margarine is inexplicable. The pumpkins were almost finished, cabbages were large and firm, and the veld supplied the hardy wild plants.

The eggs consumed in this area were confined to two teachers and the agricultural demonstrator's family.

### 3.3. Middleveld Sample: (Figs. 5 and 6).

This area is agriculturally fertile and this is seen in the wide variety of the foodstuffs consumed. The variety and frequent use of legumes auger well for the protein content of the diet. In June and July, milk was available and was taken to the dairy to be skimmed, the cream being sold. Sweet potatoes (white) and potatoes supplemented the staple maize, and plenty of vegetables were used. By November, the stores of legumes were reduced, but consumption was still high. The veld was being combed for the wild vegetables growing on the harvested, but unploughed, fields. Milk consumption remained fairly high. The dietary shows little evidence of sophistication, sugar was used in beer brewing rather than on porridge, for the soured meal is not popular in this area.

### 3.4. Lowveld Sample: (Figs. 7 and 8).

In the drought-ridden Lowveld maize grows with difficulty, sorghum is attacked by birds, but the bush is rich in wild vegetables and fruit. The cattle graze on good grass and yield milk; the cream is sold to purchase maize.

August saw the end of a poor harvest and beer was consumed while families rested before the ploughing season, and while maize remained as an ingredient for beer. Apart from milk, the animal protein levels were low, and fat intake was negligible. Wild fruits were extensively used for perpetual day-long snacks.

In January the rains had brought the new grass, and milk production and consumption levels rose. The variety in the diet had been further reduced and maize, cucurbitaceae and milk were the major dietary items.

These figures demonstrate rural-urban, regional and seasonal differences. Apart from the urban area the diet contains few elements of a Western diet and is influenced chiefly by season.

#### 4. QUANTITIES OF FOOD CONSUMED :

The previous section dealt with the frequency with which foodstuffs were consumed, this one considers the quantity of these foods.

In each case, the weight, in grammes, of the foods (placed in the F. A. O. categories) was totalled and divided by the total number of consumers and the number of survey days, thus deriving the quantity in grammes per head per day. The results are shown in Table 1. The most significant observation regarding Table 1 is that there exists a considerable range of weights for each category, varying not only from region to region, but also from season to season. In the rural areas, this range represents, to a large extent, the seasonal availability of the food source. This fact should be recalled when the average values of calories and other nutrients are compared with recommended allowances.

Other points revealed by the Table are :-

1. Differences between sample areas are greater than those from one season to the other, in the same area.
2. The overall low consumption of fats.
3. The high levels of cereal and meat consumption in the urban and peri-urban areas, which may be associated with a desire to impress the fieldworkers. The milk consumption in the urban area was due chiefly to the addition of condensed milk to tea.
4. During June and July the legumes were harvested in the Middleveld area, hence the high consumption levels. A bowl of cooked beans accompanied the harvesters into the jugo bean fields.
5. Fruits, wild and cultivated, are little used except in the Lowveld area, where there was an abundance of wild fruit, and a shortage of all other food.
6. Milk supplies are scarce in the overgrazed Highveld area, but plentiful during the summer months in the Lowveld.
7. In August, the season was still open for hunting buck and other game, yet the meat consumption was around nine grammes per person per day.
8. The mean figure for cereals is of interest. Most of the industrial concerns base their diets for labourers on two pounds of maize meal per head per day. Admittedly the present sample did not consist of active men only, and the year was one of bad harvest.

TABLE 1

QUANTITIES OF FOOD CONSUMED IN GRAMMES PER HEAD PER DAY

Category	A r e a								Mean/Head/Day	
	U	P	H a)	H b)	M a)	M b)	L a)	L b)		%
Cereals	607	140	262	310	407	332	196	313	339	48.50
Starch	55	27	30	2	59	13	-	6	26	3.72
Sugars	20	7	5	2	6	1	-	1	4	0.57
Legumes & Nuts	23	8	32	18	75	15	3	34	32	4.58
Vegetables	99	27	30	67	34	61	459	129	164	23.46
Fruits	2	1	-	-	1	2	28	19	5	0.73
Meats	219	21	12	29	23	22	9	4	24	3.43
Eggs	-	-	-	-	-	-	-	-	-	-
Fish	-	-	-	-	-	-	-	-	-	-
Milk	105	27	20	14	65	63	170	73	65	9.29
Fats & Oils	3	-	1	1	-	-	-	-	-	-
Miscellaneous	56	13	35	16	60	44	48	17	40	5.72

There is some considerable difference in the calories provided by 2 pounds (960 grammes) and the 12 ounces (330 grammes) estimated in this study. However, it will be demonstrated that the diets under investigation are deficient in calories.

## 5. NUTRIENT COMPOSITION OF THE DIET :

### 5.1. Losses due to transport, storage, preparation and cooking:

In the rural areas the nutrient losses prior to cooking are small. The majority of foods are grown in the fields and gardens or gathered from the veld. The loss of nutrients during transport is thus negligible. When maize supplies are exhausted the housewife prefers to purchase maize, for she is well aware that the storing qualities of the maize meal are much lower.

Maize is stored traditionally in ingungu (pits) in the cattle kraal. In spite of sealing the entrance with a stone and cattle dung, the damp enters and causes the grain to deteriorate, thus affecting the chemical composition and imparting a distinct flavour, disliked by the present generation.

The Department of Land Utilization actively encourages the use of metal grain tanks which give protection against damp and insects.

Legumes are easily stored in grass baskets and deteriorate little while kept. Pumpkins and melons are usually stored inside huts.

As a rule food is most economically prepared. The thin-skinned cucurbitaceae are scraped and those with tough skins are thinly pared. The very coarse leaves of wild vegetables are removed prior to cooking.

Only during cooking is the loss of nutrients significant. The analyses of Swazi foods are based on the uncooked food. In the preparation of igusha, a wild vegetable, sodium bicarbonate is added to the cooking water. Whenever this dish was mentioned, the ascorbic acid content of the food was presumed to be nil. Otherwise no allowance was made for cooking losses. Wild green vegetables are cooked in small quantities of water for a short period and, generally, the cooking water is not strained off. However, when the coarse European vegetables (e.g. cabbages) are cooked, they are usually boiled until reduced to a brown, tasteless pulp. In considering the nutrient levels it is advisable to bear in mind the losses occasioned by the cooking processes. The South African National Nutrition Council <sup>1)</sup> give the following figures for cooking loss :-

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1) "Recommended Minimum Daily Dietary Standard". National Nutrition Council, South African Medical Journal, Vol. 30. 4. (February, 1956). 110.

Carotene	5 - 21%
Thiamine	9 - 37%
Riboflavin	12 - 37%
Niacin	9 - 41%
Ascorbic acid	27 - 47%

The low figure is for waterless cooking, and the high one when the foodstuff is covered with water. Laboratory facilities in Swaziland were not available for analysis of raw and cooked food. In the absence of more positive data, no figure has been given for the loss of nutrients during cooking. It is necessary to recall that the actual intake levels of carotene, thiamine, riboflavin, niacin and ascorbic acid are lower than those shown in Table 2.

## 5.2. The means and range of Nutrients:

For each survey area (and for two seasons in the rural areas) the means and range of calories and nutrients were calculated. The results are shown in Table 2. The range within each nutrient category is wide. This is not surprising when one considers the many differences that occur from one food consumption group to the next. The means for all the areas surveyed is thus based on a wide range of figures due to familial, seasonal and climatic differences. This fact should be borne in mind when this mean is used as a basis of comparison with recommended allowances.

A study of Table 2 reveals that the urban diet has the highest mean intake of nutrients, the peri-urban the worst. The rural areas lie between these extremes. There is, moreover, to some extent, a decline in nutrient levels with decrease in altitude.

The seasonal effect is demonstrated in levels of certain nutrients, for example the difference in Vitamin A levels in the Highveld area on two visits (5315 I. U. and 1270 I. U. ), is explained by the consumption of cucurbitaceae in May but not in September.

## 6. SOURCES OF NUTRIENTS IN THE DIET :

For each food category the totals of nutrients for each area at each visit were summed. The percentage contribution of each food category to the nutrient was then calculated, (see Table 3), and Figures 12<sup>a</sup>) - 15<sup>a</sup>) ).

Calories: Not unexpectedly the cereals contribute three quarters of the calories, every other category donating less than ten per cent. The cereal category is chiefly maize with a small quantity of sorghum.

Protein: The majority of protein was derived from cereals (meat being the main source of poorly represented animal protein).

Fat: Maize meal and sorghum supplied half the dietary fat; nuts and legumes being much more a secondary source.

Carbohydrate: Nearly all the carbohydrate of the diet is derived from a cereal source.

Calcium: Vegetables are the chief source of calcium; cereals and milk supplying almost equal quantities.

Area	Calories Units			Total Protein g			Animal Protein g		
	$\bar{x}$	-	+	$\bar{x}$	-	+	$\bar{x}$	-	+
U	2011	986	3962	73	36	128	30	2	80
P	1253	720	1569	42	28	62	11	2	41
H a)	2128	1068	3064	64	11	146	6	-	22
H b)	1898	864	3506	61	26	115	8	2	44
M a)	1791	872	4203	60	12	161	9	1	53
M b)	1796	296	5529	53	4	144	12	-	105
L a)	1251	558	1828	41	18	74	11	1	42
L b)	1245	449	2180	39	14	59	11	1	31
Mean	1672	727	3230	54	19	111	12	15	52

TABLE 2(b)

Area	Fat g			Calcium g			Iron mgs			Vitamin A I.U.		
	$\bar{x}$	-	+	$\bar{x}$	-	+	$\bar{x}$	-	+	$\bar{x}$	-	+
U	46	16	98	0.4	0.2	1.0	18	10	29	2197	306	6163
P	20	9	44	0.2	0.1	0.3	12	9	18	1081	32	4841
H a)	25	11	39	0.5	0.1	1.7	24	10	93	5315	1169	17758
H b)	22	4	73	0.4	0.1	2.8	21	10	92	1270	25	6061
M a)	32	9	121	0.5	0.1	1.2	22	9	81	3259	216	16457
M b)	37	3	114	0.4	0.1	1.4	23	3	56	3662	107	11346
L a)	16	6	91	0.4	0.1	2.0	17	6	38	1021	15	8212
L b)	19	3	40	0.4	0.0	1.1	12	3	28	2697	362	11052
Mean	27	8	78	0.4	0.1	1.4	19	8	54	2563	279	10110

TABLE 2(c)

Area	Thiamin mgs			Riboflavin mgs			Niacin mgs			Ascorbic acid mgs		
	$\bar{x}$	-	+	$\bar{x}$	-	+	$\bar{x}$	-	+	$\bar{x}$	-	+
U	0.9	0.3	1.7	1.0	0.2	8.0	12	3	27	72	15	215
P	0.6	0.3	2.1	0.5	0.1	1.4	8	2	51	38	2	108
H a)	1.6	0.2	7.5	1.0	0.1	5.2	11	3	81	115	14	856
H b)	2.7	0.4	11.4	1.1	0.1	7.2	8	-	51	55	6	201
M a)	1.6	0.4	5.9	1.2	0.2	9.5	9	1	34	49	2	149
M b)	1.1	0.2	2.5	1.2	0.1	7.4	8	1	76	63	2	308
L a)	1.5	0.1	5.8	0.7	0.2	1.1	6	-	16	24	1	107
L b)	1.7	0.2	6.2	2.0	0.4	5.9	6	-	10	54	2	305
Mean	1.5	0.3	5.4	1.1	0.2	5.7	9	2	43	59	6	281

TABLE 3  
SOURCES OF NUTRIENTS IN THE DIET

Food groups	Percentage of Nutrients from each source										
	Calories Units	Animal Protein g	Total Protein g	Fat g	Carbo- hydrate g	Calcium g	Vitamin A I.U.	Thiamin mgs	Riboflavin mgs	Niacin mgs	Ascor- bic Acid mgs
Cereals	75.0	-	69.8	51.1	80.5	20.8	2.5	57.2	18.6	37.2	2.7
Starches	1.8	-	-	0.2	4.1	17.8	9.7	2.9	20.3	2.8	9.3
Sugar	1.2	-	-	-	1.5	0.1	-	-	-	-	-
Nuts & legumes	9.4	-	6.5	19.9	4.1	11.5	0.1	16.4	12.1	4.9	6.2
Vegetables	6.2	-	6.2	1.6	5.6	37.0	81.2	11.0	23.3	22.5	76.3
Fruit	0.2	-	-	0.1	0.2	0.2	1.3	0.1	0.3	0.4	0.8
Meat	3.4	70.5	10.6	14.4	-	1.5	0.6	3.6	2.9	26.1	-
Eggs	-	0.2	-	0.1	-	-	0.1	-	-	-	-
Fish	-	-	-	0.1	-	-	-	-	-	-	-
Milk, etc.	1.9	28.2	5.0	9.5	1.0	24.5	2.8	2.0	12.8	1.1	1.5
Fats and oils	0.3	-	-	1.9	-	-	0.1	-	-	-	-
Miscellaneous	0.6	1.1	1.9	1.1	3.0	2.7	1.0	6.4	9.7	5.0	3.2

Vitamin A: Vegetables are responsible for 81 per cent of the Vitamin A.

Thiamine: Thiamine is derived mainly from cereals, the only other sources of importance are nuts and legumes.

Riboflavin: Cereals, starches and legumes provide almost the same quantities of riboflavin.

Niacin: Cereals are the chief source of niacin with meat and vegetables playing a not inconsiderable role.

Ascorbic acid: Vegetables supply the majority of the Ascorbic acid. Fruit is eaten in such small quantities that it is a negligible source of ascorbic acid.

7. THE CONTRIBUTION OF PROTEIN, FAT AND CARBOHYDRATE TO TOTAL CALORIES :

TABLE 4

Percentages of dietary calories derived from protein, fat and carbohydrate

Area	Calories	Protein g	% calor.	Fat g	% calor.	Carbo- hydrate g	% calor	Total %
U	2011	73	15	46	21	338	67	103
P	1253	42	13	20	14	229	73	100
Ha	2128	64	12	25	11	381	71	94
Hb	1898	61	13	22	10	385	81	104
Ma	1791	60	13	32	16	357	80	109
Mb	1796	53	12	37	18	321	69	99
La	1251	41	13	16	12	230	74	99
Lb	1245	39	13	19	14	227	73	100
Mean	1672	54	13	27	15	328	78	106

The total weight in grammes of protein, fat and carbohydrate for each area at each survey period was multiplied by the factors 4, 9 and 4 respectively, and the three respective products were divided by the total calorie figure. Thus the percentage of calories derived from protein, fat and carbohydrate is obtained. It will be noted that the total percentages do not add up to exactly one hundred. The reason for this is that the calorie conversion figures 4, 9 and 4 are only an approximation and do not apply to all foods, thus for foods derived from animals the conversion figures are usually greater than 4, 9, 4. In this instance the factors have been applied to a mixed diet rather than to single foods.

It has been customary for authorities to recommend that dietary fat compose some 20 - 30 per cent of total calories <sup>1)</sup>. Within this range the body needs for the essential fatty acids are usually met.

At levels over thirty per cent of fat the question of the relationship between excess fat intake and ischaemic heart disease arises, and the present trend is to approach high levels of saturated fat intake with caution.

1) National Nutrition Council, Recommended Minimum Dietary standards, op. cit. III.

Fig. 10° Composition of the Swazi diet in terms of food categories expressed as a percentage.

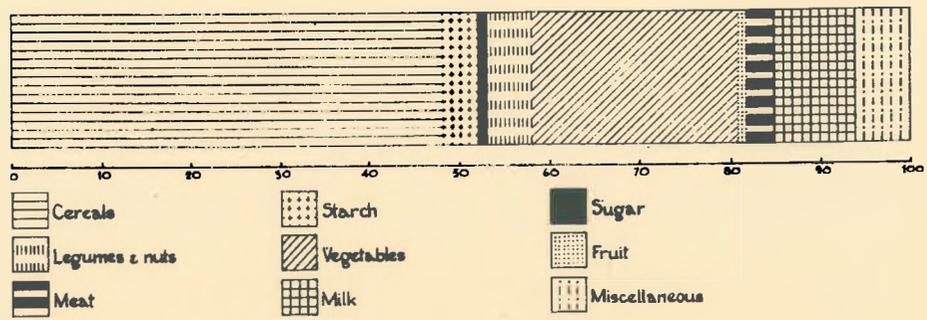


Fig. 11° Calories per head as a percentage of total intake.

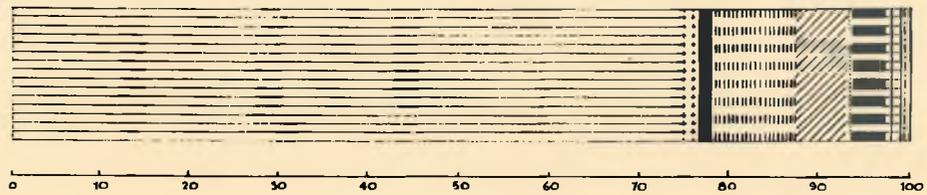


Fig. 12° Total Protein per head as a percentage of total intake.

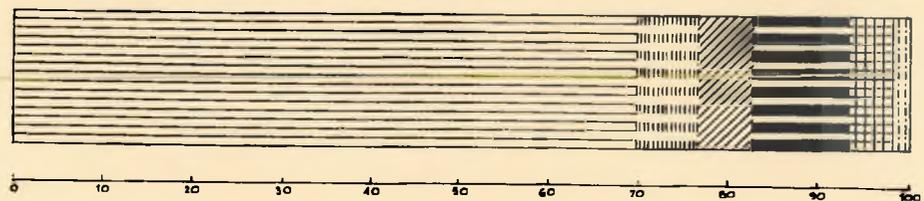
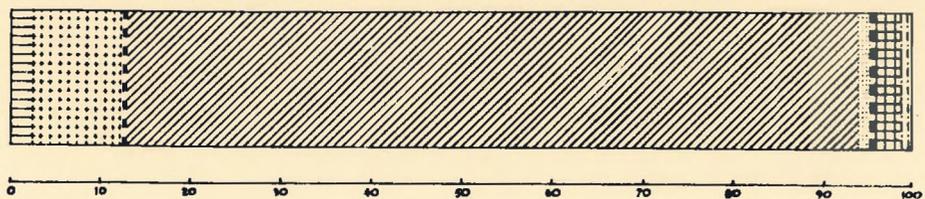


Fig. 13° Vitamin A per head as a percentage of total intake.



In Swaziland, the fear of an excess of saturated fat, at the present time, can be dismissed, for none of the diets has a fat intake over 25 per cent of total calories.

It is usually maintained that at levels of fat under 20 per cent of calories, there is not only a possibility of insufficient essential fatty acids, but also of the diet becoming bulky. A large percentage of calories must emanate from carbohydrate in order to achieve the necessary calorie intake and feeling of satiety. This latter type of diet is typical of the tropical and sub-tropical dietary.

The Swazi culture embraces this large carbohydrate intake quite happily. The distension of the stomach from early childhood is associated with a feeling of satiety and general well-being. It appears that fat cannot happily substitute, and pork meat is generally described as 'too fat'. This fact may, however, be due to the unscientific method of Swazi pig raising, so that a thick fat layer develops; and to the custom of ingesting large quantities of meat at one time, thus arousing a sensation of nausea when the meat is fat.

The urban dwellers are using increasing amounts of vegetable oil in stews and vegetable relish.

The requirements for protein are no longer based on the percentage calories supplied by that dietary component. In this study, the percentage of calories from protein is consistent throughout all areas at all seasons.

It would appear that vegetable oils and butter will, in the future, be used to increase the palatability of the diet but that large amounts of some form of carbohydrate (for example, rice) will be demanded to achieve the weight and distension associated with a sensation of well-being.

## 8. RECOMMENDED ALLOWANCES

The temptation directly to compare the calorie and nutrient intakes of the Swazi with those recommended by recognized authorities is very great. But, as has frequently been emphasised, recommended allowances are designed for a specific population which may differ from the Swazi in energy expenditure, body size, environmental temperature, the presence and absence of internal parasites, clothing etc. Most tables of recommended allowances have been designed for an already well-nourished population and are inapplicable to countries where there is a constant food shortage.

The extent to which a population falls short of the recommended allowances can serve as a pointer to the most serious dietary deficiencies, but only clinical examination and biochemical tests can substantiate such findings. Many tribes appear to be living without signs of deficiency at levels of calcium considered by most authorities to be very inadequate.

In this study, in order to achieve a practical approach, the requirements for calories and protein are based on the method designed by the Food and Agriculture Organization of the United Nations. For the other nutrients an adaption of Autret's <sup>1)</sup> table of practical allowances has been used.

### 8.1. Calorie Requirements and Calorie intakes:

The calculations for the calorie requirements of Swaziland are based on the method recommended by F. A. O. <sup>2)</sup>. The requirements for calories are influenced by activity, body size, age and environmental temperature.

Activity: The assumption is made at the start that the average activity of the Swazi population corresponds to that of the Reference Adult formulated by F. A. O. The F. A. O. Reference Man spends eight hours in a non-sedentary occupation, and has only occasional periods of hard physical labour. When not at work he is sedentary for about four hours "and may walk for up to one and a half hours. He spends about one and a half hours on active recreation and household work". The Reference Woman is considered to be engaged in general household duties.

The activity of the rural Swazi is seasonal, but the average Swazi housewife is engaged in far heavier tasks than her European counterpart. The energy requirement of the Swazi woman will be higher than that of the Reference Woman.

Weight: The F. A. O. Reference Man weighs 65 kilograms and his wife 55 kilograms. Difficulty was experienced in obtaining the weights of adult Swazi at different ages. Rather than basing the requirements calculations on weights obtained from small numbers of people, it was decided to omit the correction for body weights. Indications are that the adult Swazi differs little from the weight of the Reference Man and Woman of the same age.

Age: The division of the population into age and sex groups was obtained from the Swaziland Sample Survey <sup>3)</sup>. The age groups of the children and adolescents do not correspond with that of the F. A. O. groupings. The adjustment for the Swaziland age groups was made according to the recommended method. <sup>4)</sup>

Climate: The reference temperature used by F. A. O. is 10°C. The territorial average for Swaziland is close to 20°C. In drawing up the actual requirement scale for calories an adjustment was made for temperature difference.

- 
- 1) Autret, op. cit. 1837 - 1842.
  - 2) Calorie Requirements, F. A. O. Nutritional Studies No. 15, Rome, 1958.
  - 3) Swaziland Sample Survey 1960 Preliminary Report, Table I.
  - 4) Calorie Requirements, op. cit. 40.

TABLE 5

## AVERAGE PER CAPUT CALORIE REQUIREMENTS FOR THE SWAZI

Age Group	%		Calories per caput per day					
	Population		Reference Requirement Scale		Actual Requirement Scale		Actual Requirement Scale x Population	
	Male	Female	Male	Female	Male	Female	Male	Female
0-4	17.5		1260		1197		20948	
5-9	15.0		1943		1846		27690	
10-14	13.6	12.2	2678	2488	2544	2364	34598	28841
15-19	9.1	8.7	3305	2344	3140	2227	28574	19375
20-29	15.1	15.5	3200	2300	3040	2185	45904	33868
30-39	10.3	10.1	3104	2231	2949	2119	30375	21402
40-49	8.0	8.4	3008	2162	2858	2054	22864	17254
50-59	5.6	5.8	2768	1900	2630	1890	14728	10962
60-69	3.2	4.0	2528	1817	2402	1726	7686	6904
70+	1.9	3.5	2208	1587	2098	1508	3986	5278
Average Swazi per caput requirements per day = 2276								

Thus the reference requirement scale was adjusted for age and temperature, but not for body size or physical activity. The results are shown in Table 5. The average per caput figure for the population is obtained by multiplying the requirements of each age and sex group by the number of persons in that group, (Column 5, Table 5). The resultant figures are totalled and divided by the population. The average per caput calorie requirement for Swaziland so calculated is 2276. 1)

### 8.2. Calorie intake:

The results of the weighed food study for the survey areas are shown in Table 6.

TABLE 6

AVERAGE PER CAPUT CALORIE INTAKE PER DAY

Area	Calorie Intake	Mean	Percentage of Calorie Requirements
U	2011	-	88
P	1253	-	55
Ha	2220 )	2018	89
Hb	1898 )		
Ma	1791 )	1793	79
Mb	1796 )		
La	1251 )	1248	55
Lb	1245 )		
Mean calorie intake = 1672			74

The proportion of the year represented by these two survey periods is not known, nor the extent to which calorie levels fall below or rise above these means during the year. The first survey period was during the harvest, the second during the growth of the maize when stores were depleted.

Not one of the surveyed areas at any period has an average per caput calorie intake sufficient to meet the calculated requirements. The mean calorie intake is only seventy four per cent when compared with the calculated requirements. Is it possible that the communities in the presence of the survey staff were eating less food? The two homes in which this was suspected have been omitted from the calculations. For the remainder of homes, the team members are satisfied that the family ate according to their normal pattern.

Could some foods not have been accounted for? All foods eaten at home were weighed. However, when a member of the food consumption group went beer-drinking at another home, the amount of beer could not be measured and had to be estimated. Similarly, snacks, although accounted for, may have been eaten in larger quantities than estimated.

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1) Calorie requirements for the Reference Man are : 3,200 calories daily.

The harvest of 1961 was poor and the people were complaining of hunger. But only in the Lowveld area on the second visit (mean calorie intake 1245) was semi-starvation actually seen. The inhabitants of this area were noticeably apathetic. In each area there was a drop in calorie intake during the second period of the survey. This was a time of great physical activity, of ploughing and sowing, but a food shortage was being felt, and maize had to be purchased.

### 8.3. Protein requirements:

The average requirement of protein per caput per day in terms of reference protein was calculated according to the method recommended by F. A. O. 1)

Table 7 summarises this calculation:

1. The average minimum requirements for the reference protein per kilogram body weight were read off the graph devised by F. A. O. This requirement is expressed in terms of age and sex.
2. The Swaziland population age and sex groups were obtained from the Swaziland Sample Survey 2). From anthropometric measurements of Swazi school children, the mean body weight of the age and sex groups was calculated.
3. The reference requirement was multiplied by the average body weight of the group, thus providing the average requirement. (See Column 5 of Table 7).
4. The mean requirement of each age and sex group was multiplied by the percentage of the population in each group. (Column 6).
5. The resultant figures were summed and then divided by the total population, yielding the average protein requirement per caput per day.
6. In order to cover the individual variation in protein requirement the F. A. O. committee recommends increasing the average requirement by 50%.

Finally a coefficient was derived which took into account the quality of the proteins in the diet under survey. This coefficient is derived from the amino acid content of the dietary proteins. Table A (of the Annexure) contains the data used in calculating this coefficient. In Table B the amino acid content of the proteins in the five survey areas is compared with the provisional F. A. O. pattern. In the calculations on the amino acid content of the diet the protein supplied by fruit and vegetables was ignored, because some wild fruit and vegetables have not been analysed for amino acid content. It is known that wild vegetables contribute tryptophan to the diet, so that the protein score of the diets surveyed may well be higher than calculated. The limiting amino acid determines the protein score of the mixture of foods. In each area the limiting amino acid was tryptophan not surprising in a country whose staple cereal is the tryptophan-deficient maize.

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1) F. A. O. Protein Requirements. Rome 1957.  
2) Swaziland Sample Survey. 1960 Preliminary Report, Table 1.

TABLE 7  
SWAZI AVERAGE REQUIREMENT FOR PROTEIN PER HEAD PER DAY

Age Group	Body weight in kgs		Population distribution*		Requirement/kg body weight		Average requirement		Requirement x % population	
	M	F	M	F	M	F	M	F	M	F
0 - 4	11		17.5		1.14		12.54		219.5	
5 - 9	26		14.9		0.65		16.90		253.5	
10 - 14	34	36	13.6	12.2	0.75	0.85	26.3	30.6	357.6	373.3
15 - 19	60	54	9.1	8.7	0.60	0.45	36.0	24.3	327.6	211.4
20 - 24	65	55	8.1	8.4	0.37	0.35	24.1	19.3	195.2	162.1
25+	65	55	36.0	39.0	0.35	0.35	22.8	19.3	820.8	752.7
Average requirement of protein per caput per day									32.78 grams	

\* Swaziland Sample Survey 1960, Preliminary Report, Table I

Having calculated the protein score, the formula for the coefficient is :

$$\text{Coefficient} = \frac{100}{\text{Protein score}}$$

7. As shown in Table 7 the protein requirement per head per day for Swaziland is 59.

#### 8.4. Protein intake:

In Table 8 the protein consumption levels are compared with the calculated requirements :

TABLE 8

COMPARISONS OF THE PROTEIN INTAKE FOR THE SURVEY AREAS WITH PROTEIN REQUIREMENT

Area	Average protein intake in grammes/caput/day	Protein requirements grammes/caput/day	Percentage adequacy of protein
U	73	53	138
P	42	58	72
Ha	64 )	63	100
Hb	61 )		
Ma	60 )	57	100
Mb	53 )		
La	41 )	63	63
Lb	39 )		
Mean	55	59	93

Protein requirements are met in the Urban, Highveld and Middleveld areas, but not in the peri-urban and Lowveld samples.

In considering these protein levels, it is important to recall that in none of the areas was the requirement for calories met. The protein requirements are based on the assumption that sufficient calories are present to cover energy demands. In young children, with a deficiency of only 100 calories, as much as 25 grammes of protein will have to be burned for energy <sup>1)</sup>. If some of the protein is diverted into fulfilling energy demands, the requirements for protein must be set higher. However, the use for this purpose of protein, the most scarce and expensive of dietary components, is wasteful.

An earlier section of the report has described the distribution of food within the family, and this aspect will be considered again when the nutrition of particular population groups is examined. The protein content of the diet is not proportionally distributed throughout the family on the basis of requirements. The allotment of animal protein is particularly biased in favour of the adult man. Thus, in areas in which the protein requirements are fully met, there are also children suffering from kwashiorkor which, although a multiple deficiency

1) B. S. Burke, R. B. Reed, A. S. van der Berg, H. C. Stuart, "The relationship between animal protein, total protein and total caloric intakes in the diet of children from one to eighteen years." Amer J. Clin. Nutrition. IX(1962), 729.

TABLE 9

AVERAGE DAILY REQUIREMENTS PER HEAD FOR CALCIUM, IRON AND CERTAIN VITAMINS

Age Group	Population Distribution		Average Requirement							Requirement x Population						
	Male	Female	Ca g	Fe mgs	Vit A mgs	B1 mgs	Rib mgs	Niacin mgs	Ascorbic Acid mgs	Ca g	Fe mgs	Vit A mgs	B1 mgs	Rib mgs	Niacin mgs	Ascorbic Acid mgs
0-4	17.8	17.2	1.0	7	0.6	0.6	1.0	6	24	17.5	122.5	10.5	10.5	17.5	105	420
5-9	15.3	14.5	1.0	9	0.9	0.9	1.4	9	58	15.0	135.0	13.5	13.5	21.0	135	870
10-14	13.6		1.3	13	1.1	1.3	1.9	12	54	17.7	176.8	15.0	17.7	25.8	163	734
10-14		12.2	1.3	13	1.1	1.1	1.8	11	50	15.9	158.6	13.4	13.4	22.0	134	610
15-19	9.1		1.2	13	1.2	1.6	2.1	16	64	10.9	118.3	10.9	14.6	19.1	146	582
15-19		8.7	1.1	13	1.2	1.1	1.8	11	50	9.6	113.1	10.4	9.6	15.7	96	435
20+	44.2		0.7	10	1.2	1.4	1.4	14	50	30.9	442.0	53.0	61.9	61.9	619	2210
20+		47.4	0.7	10	1.2	1.2	1.2	12	45	33.2	474.0	56.9	56.9	56.9	569	2133
			Total							150.7	1740.3	183.6	198.1	239.9	1967	7994
			Mean requirement per head of population							0.9	10.4	1.1	1.2	1.4	12	48

disease, is basically caused by lack of protein.

#### 8.5. Fat:

The mean daily fat intake was 27 grammes per person which is considered low. Animal fat played a small role in the content of the diet. The low fat levels may be partially responsible for the clinical signs of Vitamin A deficiency detected.

#### 8.6. Requirements for Calcium, Protein, Iron, Vitamin A, Thiamine, Riboflavin, Niacin and Ascorbic Acid:

For the remainder of nutrients other than calories, protein and fat, the Table of Practical Allowances designed by Autret for tropical countries has been used. <sup>1)</sup>

The allowance for the man of moderate physical activity and the woman of intense physical activity have been multiplied by the percentage population figures for Swaziland. (See Table 9).

The child population figures for Swaziland are expressed in the age groups 0-4, 5-9, 10-14, 15-19 years. Autret's table uses different age groups. The age specific nutrient allowances for his table were interpolated to bring them into agreement with the Swaziland population age groups. The method used for weighting the average for each age group, is the one described in Calorie Requirements. <sup>2)</sup> The calculated allowances for the age groups were then multiplied by the percentage of the population in these groups. These figures were summed and then divided by the population total. Thus a series of average daily allowances per caput of the population was obtained. It should be noted that no allowance was made for the pregnant and lactating woman. Some of the demands of pregnancy may be met by cutting down on activity, whereas the above allowances are based on an intensely active woman. Swazi women differ greatly in their energy expenditure during the latter months of pregnancy, some continue to work, others go to hospital and rest for a month or so.

The average requirements were then compared with the intakes of the five areas surveyed, and the percentage adequacy calculated. (Table 10.)

#### 8.7. Calcium:

Adequacy 42%  
Mean intake 0.4 g. Requirement 0.9 g.  
Range 0.0 - 2.0 g.

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- 1) W. H. O. / F. A. O. "Seminar on Problems on Food and Nutrition in Africa South of the Sahara", F. A. O. Nutrition Meetings Report Series. No. 25, Rome 1961. Appendix 4.
  - 2) Calorie Requirements. Loc cit 38.

TABLE 10  
PERCENTAGE ADEQUACY OF THE DIETS UNDER SURVEY

Area	Diet cost in cents/caput/day	Calories Units	Protein g	Calcium g	Iron mgs	Vit. A I.U.	Thiamin mgs	Riboflavin mgs	Niacin mgs	Ascorbic Acid mgs
U	13.2	88	124	43	170	58	77	74	102	144
P	6.9	55	71	18	113	29	51	36	71	76
H a)	9.8	93	108	50	229	141	130	74	94	230
H b)	6.2	83	103	42	206	34	226	76	68	110
M a)	7.6	79	102	53	207	87	129	87	77	98
M b)	4.6	79	90	43	226	97	89	86	67	126
L a)	3.8	55	69	41	161	27	123	47	45	46
L b)	3.5	55	66	50	118	72	138	143	46	107
Mean	6.9	73	93	42	179	68	120	78	71	117
Average Requirements		2280	59	0.9	10.4	3760	1.2	1.4	12	50

### Calcium content of Swaziland soils.

For Swaziland soils the calcium analyses are : 1)

Highveld	0.02%	Calcium
Middleveld	0.05%	"
West Lowveld	0.07%	"
East Lowveld	0.09%	"

For adequate nutrition, according to Morgan, most plants' lime requirement is 0.04 - 0.07% Calcium. The calcium content of the water in the areas under survey have been tabulated in Chapter II, and it appears that all areas have a low calcium content. The veterinary department in Swaziland reports calcium deficiency syndromes in animals, particularly lactating cows.

The South African Bantu diet contains phosphorus mainly in the form of phytates. The Calcium/Phosphorus ratio of 1:10 is considered highly unfavourable. 2)

In Swaziland the preparation of one vegetable relish, igusha, involves the use of pot ashes, thus increasing the calcium content of the diet (for which no allowance was made in the calculation). This use of pot ashes is fast being replaced by sodium bicarbonate.

There is a large amount of literature on calcium metabolism, but it appears (a) that breast milk from Bantu mothers has much the same calcium content as that of British and American mothers. 3) (b) so many other factors, such as height and weight, influence calcium requirements, that a definition of the role played by calcium is not possible, and (c) many populations seem to be adapted to a low calcium intake.

Such evidence has caused many observers to conclude that there are levels of calcium far below the recommended allowance on which it is possible to live without onset of deficiency symptoms. The critical level below which calcium must not fall has not been determined.

- 
- 1) G. Murdoch, Soil Scientist, Department of Land Utilization, Swaziland: personal communication.
  - 2) A. R. P. Walker, W. L. Draper: "The Composition of Breast Milk of S. A. Bantu Mothers". Trans. of the Royal Soc. Trop. Med. & Hygiene. 48 (Sept. 1954).
  - 3) A. R. P. Walker, "Does a low intake of calcium retard growth or conduce stuntedness?". Am. Journ. Clin. Nut. II, (July-August, 1954).

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## 8.8. Iron:

Adequacy 179%  
Mean intake 18.6 mg. Requirement: 10.4 mgs.  
Range 3 - 93 mgs.

Intake. The Swazi diet is high in iron obtained from maize and from vegetables.

Walker et al <sup>1)</sup> maintain that iron is also obtained from the iron cooking utensils, particularly in the preparation of acid fermented foods. Odendaal <sup>2)</sup> on the other hand, contends that iron pots only yield iron when the pot is new. With use the pots develop a protective film which prevents further dissolution. In Swaziland, the urban and peri-urban areas used aluminium pans generally, iron pots rarely, for cooking. The Lowveld area used clay pots universally. Those three had the lowest mean dietary intake of iron from foodstuffs.

Factors interfering with iron absorption: The Bantu diet is high in phytates and phosphates, both of which interfere with iron absorption. The levels of calcium are low, so that this element should not discourage iron absorption.

Excessive loss: Loss of iron can arise from hookworm infestations and from sweating. The latter is a small loss, and in the Swazi hookworm is rarely found.

Increased need: Towards the end of the first year of life, during adolescence, pregnancy and lactation, there is an increased need for iron. Lanzkowsky <sup>3)</sup> working among urbanized Africans, found 93.9% of the pregnant women to be anaemic.

Metz et al <sup>4)</sup>, also working among urban Africans, found in pregnancy a fall in haemoglobin, packed cell volume, and serum iron (similar to that in pregnant white women. In infants, protein malnutrition was accompanied by iron deficiency. An analysis of the feeds given to these children contained low levels of iron.

Only a small proportion of the Swazi are urbanized and living on a Westernized diet. The remainder are rural and unlikely to be ingesting low levels of iron. The infant, owing to the prevailing weaning foods, is more likely to be anaemic.

- 
- 1) A. R. P. Walker, U. B. Arridson. "Iron overload in the S. A. Bantu". Trans. of the Royal Soc. of Trop. Med. & Hygiene, 47 (1956) 536.
  - 2) W. A. Odendaal, Nutrition Adviser, Hind Bros.: Personal communication.
  - 3) P. Lanzkowsky, "Haematological values in pregnant women at term and after delivery in the three main racial groups in Cape Town". Journal Obstet. Gynaec. Brit. Emp. 67 (1960), 932.
  - 4) J. Metz., C. Isaacson and K. Stevens, "Iron deficiency with special reference to the S. A. Bantu". Proc. of the Nutrition Soc. of Southern Africa. 2 (1961), 5.

All hospitals and rural clinics administer iron mixtures of a routine measure to women attending ante-natal clinics. Post mortems are infrequently performed in Swaziland, and the incidence of siderosis (associated with iron overload) is, therefore, not known.

In 1960 the Annual Medical Report listed 47 cases of hyperchromic anaemia and two cases of hypochromic in Swaziland, the diagnosis having been made on clinical examination, and in a few cases, by haemoglobin estimation. In an analysis of some 47 cases of anaemia found in school children in southern Swaziland, 25 were ascribed to iron deficiency <sup>1)</sup> based on detection of hypochromia in blood-slides. There are no data on the diets of these children.

Until tests are done on the serum iron content of the Swazi, the picture remains incomplete. It appears possible that the general population has an optimal iron intake, but that the vulnerable groups are deficient.

#### 8.9. Vitamin A. :

Adequacy: 68%  
Mean intake: 2563 I. U. Requirement 3760 I. U.  
Range : 15 - 17758 I. U.

The Swazi diet is low in the chief sources of Vitamin A, butter cheese, eggs, yellow fruit. In season, pumpkins are a good source of carotene, the precursor of Vitamin A.

Vitamin A deficiency may be related to the skin lesions (e.g. phyrnoderma) frequently seen in clinical examination.

#### 8.10. Niacin:

Adequacy : 71%  
Mean intake: 8.5 mgs. Requirement: 12 mgs.  
Range: 0.0 to 81 mgs.

In maize, the majority of niacin is situated in the aleurone layer and is lost in the highly milled product <sup>2)</sup>. Initially maize contains a low proportion of niacin. Niacin deficiency is responsible for the disease Pellagra.

Niacin is present in the diet in three forms: The free state, as a coenzyme, and as a precursor. The latter form requires treatment in order to render it available. The addition of lime to maize, as in the making of "tortillas", releases this bound niacin, but has a deleterious effect on the other vitamins. Sufficient boiling also makes available this niacin. In this connection it is of interest that in some food consumption groups in the Swazi study, the housewife boiled the maize prior to grinding it on a stone.

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1) W.E. Laufer. Personal communication.

2) Maize and Maize diets. F.A.O. Nutritional studies No. 9. F.A.O. Rome, (1954).

The amino acid, tryptophan, can be converted somewhat inefficiently into niacin in the body. This process requires the presence of the vitamins pyridoxine, riboflavin and thiamine. However, maize is also low in tryptophan.

In addition, it has been demonstrated that maize contains an antagonist to niacin. Experimental diets comprised of maize require additional niacin (or tryptophan) in order to prevent pellagra; control diets containing no maize and less niacin evoke no pellagra symptoms.

In the light of this information and because cases of pellagra are seen annually in Swaziland, the figure of a mean intake of 8.5 mgs. must be regarded with some apprehension. Positive measures to raise the niacin and tryptophan content of the diet are discussed later.

#### 8.11. Thiamine:

Adequacy: 120%  
Mean intake: 15 mgs. Requirement: 1.2 mgs.  
Range: 0.1 - 11.4 mgs.

When possible loss of thiamine during cooking is considered, it seems likely that the Swazi diet is adequate in Thiamine. The urban and peri-urban areas with little fruit and vegetable consumption had the lowest levels of thiamine.

#### 8.12. Riboflavin:

Adequacy: 78%  
Mean intake: 1.09 mgs. Requirement: 1.4 mgs.  
Range: 0.1 - 9.5 mgs.

The chief reason for the low levels of riboflavin is that the diet does not contain sufficient quantities of good sources of riboflavin, i.e. meat, eggs and milk.

#### 8.13. Ascorbic Acid:

Adequacy: 117%  
Mean intake: 59 mgs. Requirement: 48 mgs.  
Range: 1-856 mgs.

The range of Ascorbic acid intake is great. Apparently Bantu babies can live on a diet containing negligible quantities of ascorbic acid without developing scurvy<sup>1)</sup>.

The Annual Medical Reports for Swaziland list a few cases of adult scurvy each year.

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1) A. R. P. Walker. "Anomalies in the Prediction of Nutritional Disease". Nutrition Reviews, 19, (September, 1961), 257.

#### 8.14. Summary:

There are large differences between food consumption groups, between two seasons, between urban and rural areas and between physiographic regions. The overall picture of Swazi nutrition is of a typical maize consuming community :-

1. Somewhat deficient in calories.
2. Levels of protein are almost adequate.
3. A lack of calcium.
4. Inadequate quantities of riboflavin and niacin<sup>1)</sup>.

Less typical are the totally inadequate levels of Vitamin A, and the adequacy of ascorbic acid. In the Swazi diet thiamine and iron levels are satisfactory.

#### 9. THE ABILITY OF THE FOOD CONSUMPTION GROUPS TO MEET RECOMMENDED ALLOWANCES:

To reiterate, the ability of a food consumption group to meet the recommended allowance is not the only criterion for nutritional status. Recommended allowances are composed of averages, and in comparing the nutrient intake of a small unit, such as a food consumption group, with requirements, one must be fully aware of the hazards involved.

Nevertheless, in order to establish whether the means obtained from the data were biased by the inclusion of one or two homes consuming very low or very high levels of nutrients, a comparison was made between the means for individual food consumption groups and recommended allowances derived from Autret's table. Any nutrient falling at, or above, the recommended figure was classified as 'above' ; all others as 'below'.

Finally, in order to summarise the information, each food consumption group was placed into one of two categories - those whose vitamin levels satisfied the recommended allowances for one or two vitamins and those whose vitamin levels were adequate for three or four vitamins. (See Table 11.) The final summary column was based on a sixteen point scale. The nutrients considered were Calories, Protein, Calcium and Vitamins (0.2 satisfying recommended allowances) and Vitamins (3-4 vitamins satisfying recommended allowances.)

Starting from a point where Calorie, Protein, Calcium levels between 3-4 Vitamins satisfied requirements, and concluding at the point where the calorie, protein, calcium and vitamin levels were unsatisfactory and a sixteen point scale was devised. The food consumption groups were then placed on the scale, which then divided at the midpoint. The final column of Table 11 shows the percentage of food consumption groups falling into the first (0-8) and most satisfactory part of the scale, and those falling into areas of inadequacy (9-16).

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1) Maize and Maize diets. op.cit. 29.

TABLE 11

ANALYSIS OF THE FOOD CONSUMPTION GROUPS' ABILITY TO MEET REQUIREMENT

Area	Calories		Protein		Calcium		Vitamin A		Thiamin		Niacin		Ascorbic Acid		Vitamins		Summary	
	A*	B*	A	B	A	B	A	B	A	B	A	B	A	B	3-4	0-2	0-8	8-16
U	22	78	67	33	17	83	17	83	17	83	44	56	67	33	22	78	22	78
P	-	100	7	93	-	100	7	93	7	93	7	93	29	71	-	100	-	100
H a)	17	83	48	52	9	91	52	48	52	48	22	78	74	26	} 24	76	} 24	76
H b)	30	70	43	57	4	96	9	91	52	48	17	83	30	70				
M a)	14	86	45	55	5	95	23	77	70	30	21	79	38	62	} 23	77	} 18	82
M b)	20	80	42	58	7	93	39	61	46	54	17	83	50	50				
L a)	-	100	15	85	-	100	10	90	60	40	10	90	5	95	} 8	92	} 3	97
L b)	-	100	-	100	11	89	17	83	47	53	-	100	28	72				
Mean	13	87	33	67	7	93	22	78	44	56	17	83	40	60	15	85	13	87

A = on or above baseline  
 B = below baseline

A study of Table 11 emphasizes again that, in this study, differences between areas are greater than between one season and another.

The mean figure for the final column of Table 11 indicates that the great majority of the food consumption groups (87 per cent) failed to meet the recommended allowances in the majority of the nutrients under study.

Urban: It is in the categories of Calories, Calcium, Vitamin A and Thiamine, that the greatest number of food consumption groups are inadequate.

Peri-urban: A dismally large number of food consumption groups are unable to meet recommended allowances in nearly all nutrients.

Highveld: The big seasonal difference in Vitamin A adequacy levels is due to the prevalence of pumpkins and vegetable melon on the first visit.

Middleveld: The largest seasonal changes are in Vitamin A and thiamine intakes.

Lowveld: The greatest difference, in this poor dietary, appears to be in ascorbic acid levels. This is somewhat surprising in an area rich in wild fruits and vegetables. But the first visit was made at the end of the winter, when the fruit was finished and the animals were searching among sparse patches of sun-scorched grass for the same wild vegetables.

Table 11 demonstrates the same differences between survey areas that earlier sections have revealed, but it also serves to indicate the percentage of food consumption groups failing to reach recommended levels of adequacy.

## 10. THE POSITION OF FOOD CONSUMPTION GROUPS ON THE NUTRIENT INDEX:

The previous section has described how for each nutrient a baseline was devised by interpolation of Autret's table. Food consumption groups were there divided into those falling above and below this baseline. This is, however, a crude device. It is possible that the groups falling below the line, are only just below, and those above, are only fractionally so.

For each nutrient a scale was drawn up (varying with each nutrient) and the number of food consumption groups falling at each point on the scale was depicted by histogram (See Figs. 9 - 15).

### 10.1. Calories: (Fig. 9.)

The baseline for calories is 2280, the number of food consumption groups above this line 16% is fairly evenly spread with a slight cluster at the uppermost limit of the scale. A great number (80) or 36% of food consumption groups fall at the lowest limit, i.e. 1480 calories or less.

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1) The figures for nutrients are expressed throughout this section as per head per day.

## 10.2. Protein: (Fig. 10.)

A more evenly balanced group: the largest number 13 % of food consumption groups lies just above the baseline (60 g.) and at the further point, i.e. those with more than 90 grammes of protein.

## 10.3. Calcium:

The small number of food consumption groups above the baseline (0.9 g.) are evenly distributed; below there is a great cluster 32 % of food consumption groups at the level of 0.5 - 0.8 grammes of Calcium.

## 10.4. Vitamin A:

The majority 51 % of food consumption groups are at the extreme ends of the baseline (3760.)

## 10.5. Thiamine:

The largest number of consumption groups 14 % lie at the position of more than 2.0 milligrammes of thiamine.

## 10.6. Niacin:

The full extent of the deficiency of niacin can be appreciated, when it is seen that the majority of the food consumption units have 6 milligrammes or less of niacin.

## 10.7. Ascorbic acid:

Many food consumption groups have 30 milligrammes or less of ascorbic acid. Forty-four of these groups have an intake of more than 75 milligrammes of ascorbic acid daily. Thus ascorbic acid levels lie as the two extremes of the index.

## 11. FOOD COSTS AND INCOMES :

### 11.1. Diet cost:

The members of the survey team weighed and recorded the unprepared food in each household. A price was assigned to each food. Those items of food preparation which were not priced are :cooking salt, (the amount used is very difficult to estimate); tea and coffee used for between-meal dishes - this occurrence was extremely rare in the rural areas, but may have taken place in the urban and peri-urban areas.

A price was placed on each food item regardless of the means by which it was obtained. The price chosen was that appertaining to the locality during the season that the surveys were made. Rural stores are allowed to charge for the transport involved in bringing the goods from the nearest town, but this was often arbitrarily imposed and might be placed on one type of goods and not on another, e.g. on salt, but not on an article of clothing. One store, some 25 miles

Fig. 9 Calorie Index

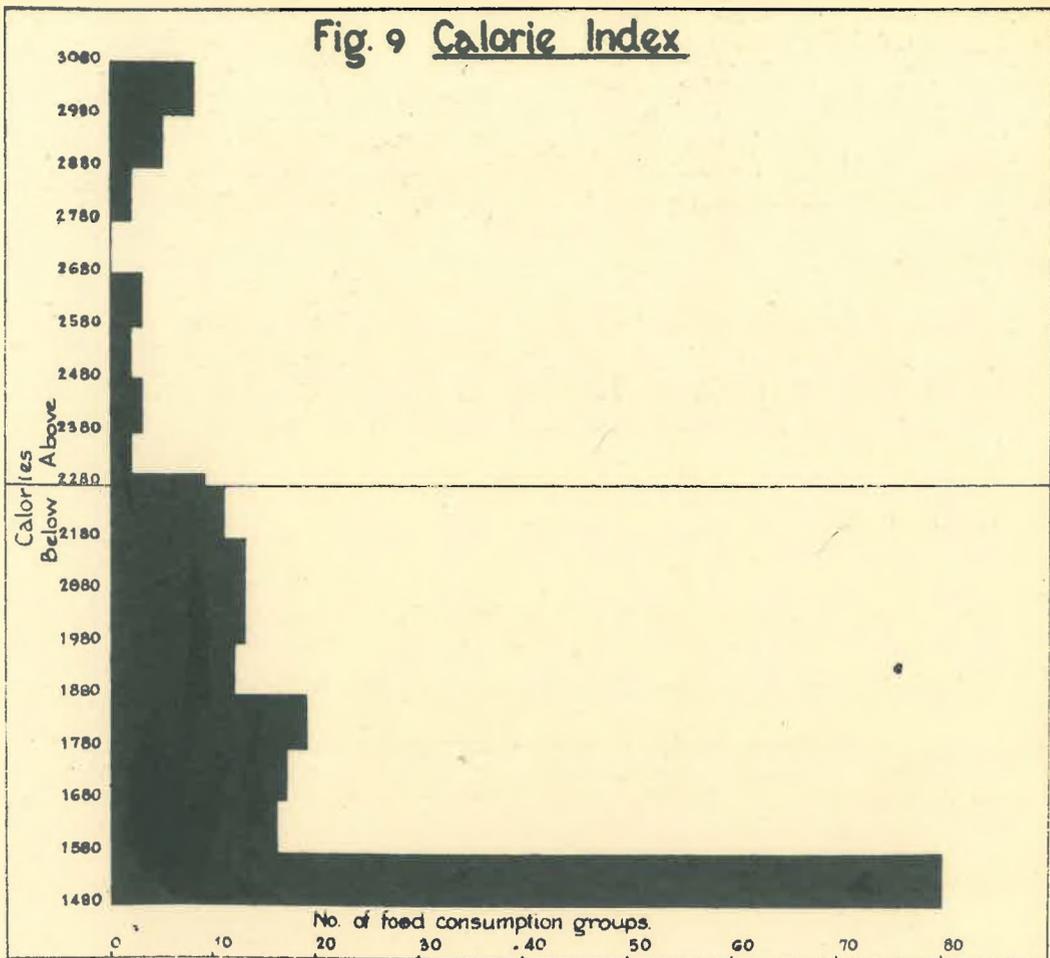


Fig. 10 Protein Index

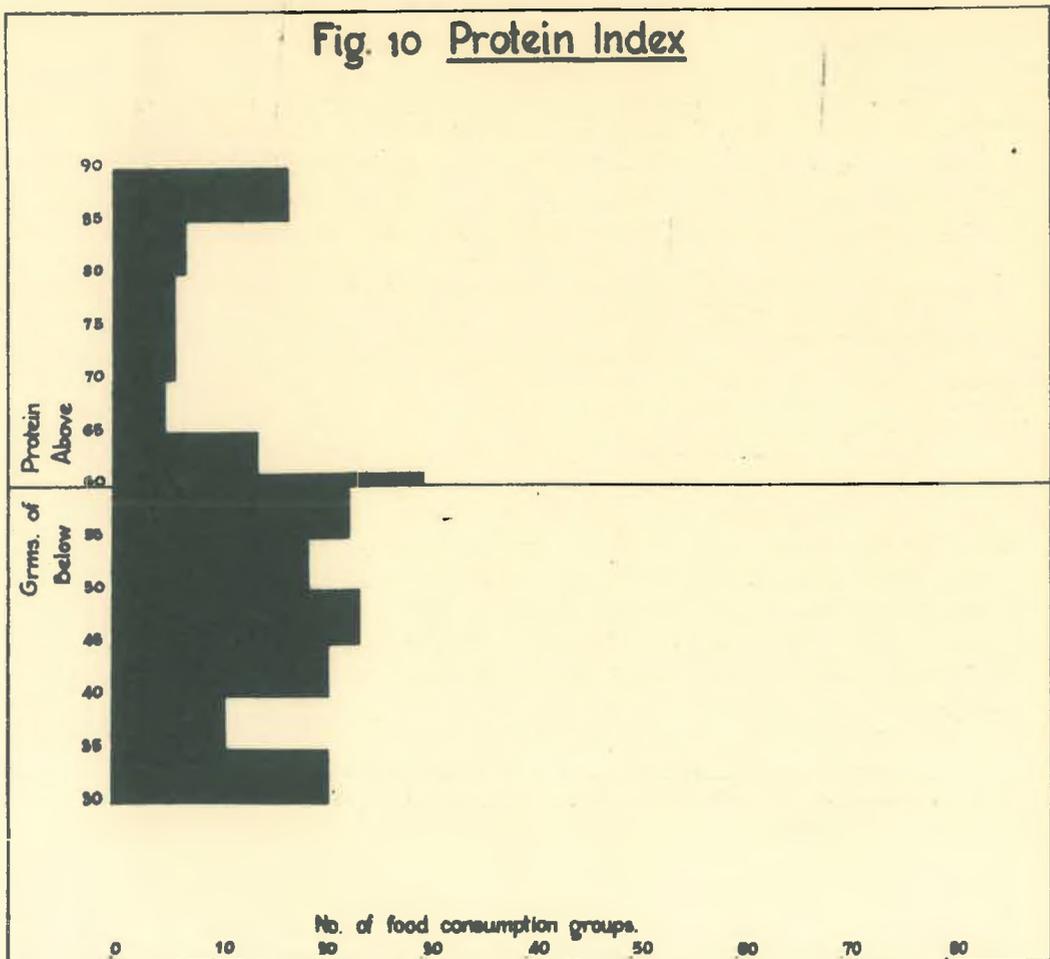


Fig. 12 Vitamin A Index.

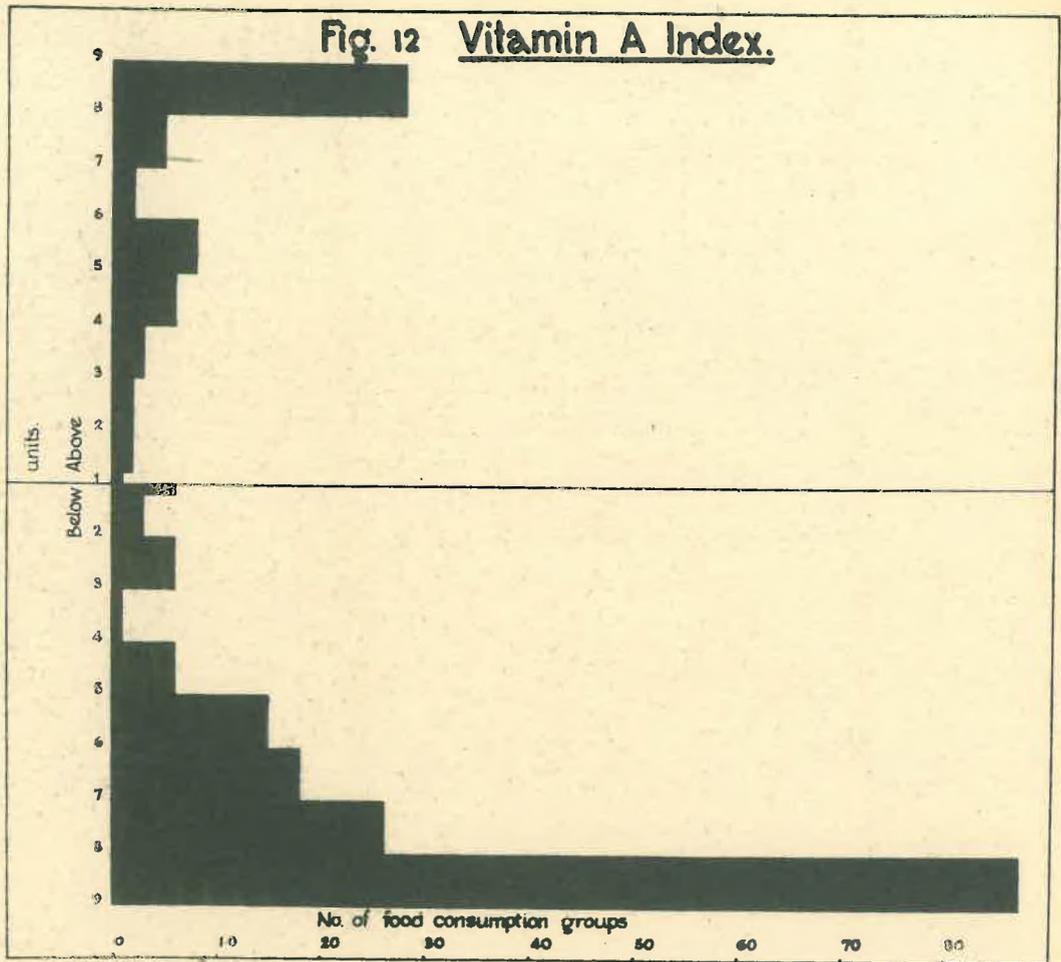


Fig. 11 Calcium Index

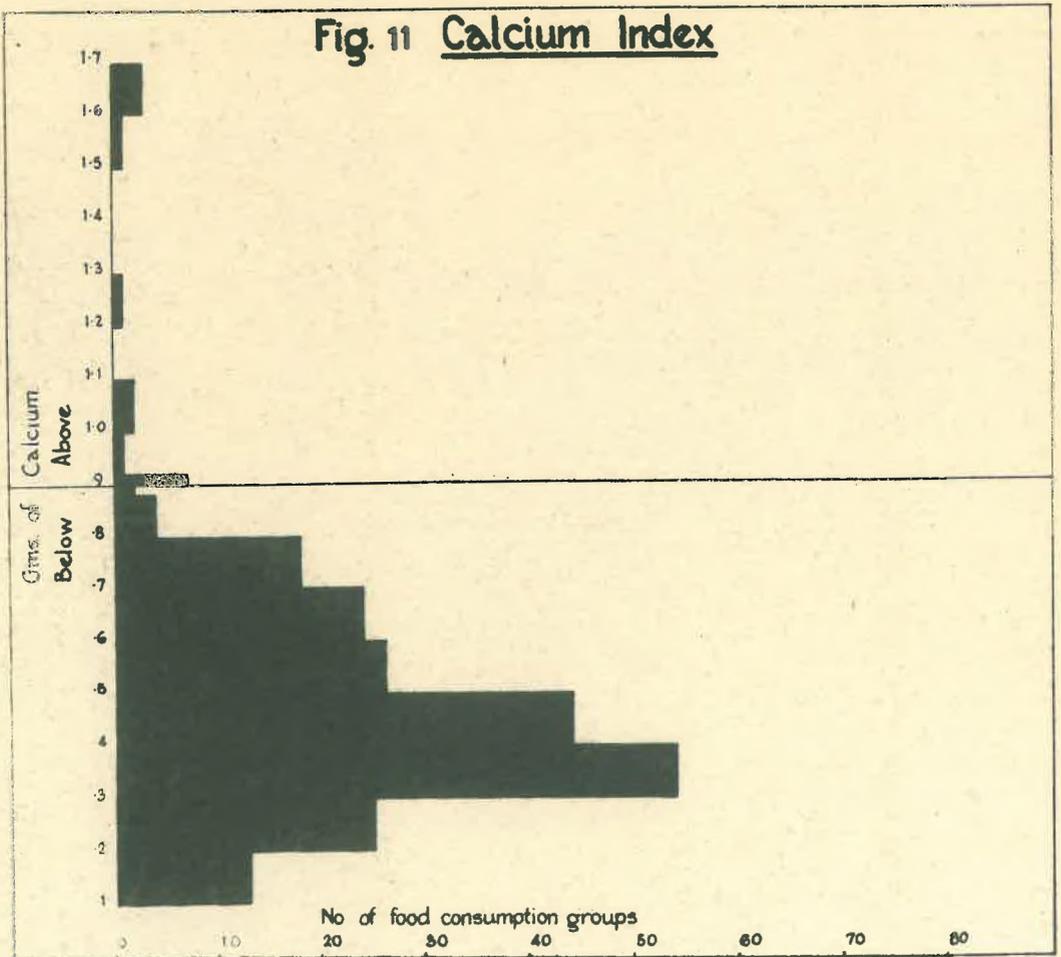


Fig. 14 Niacin Index.

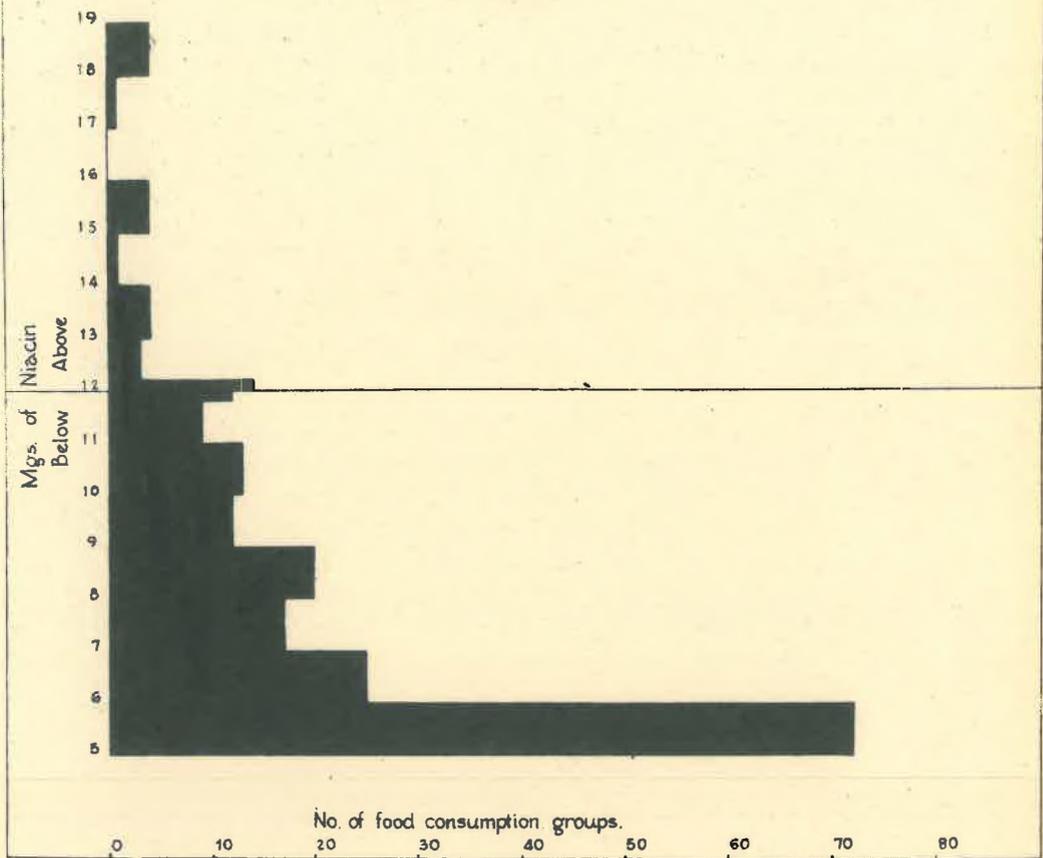


Fig. 13. Thiamin Index.

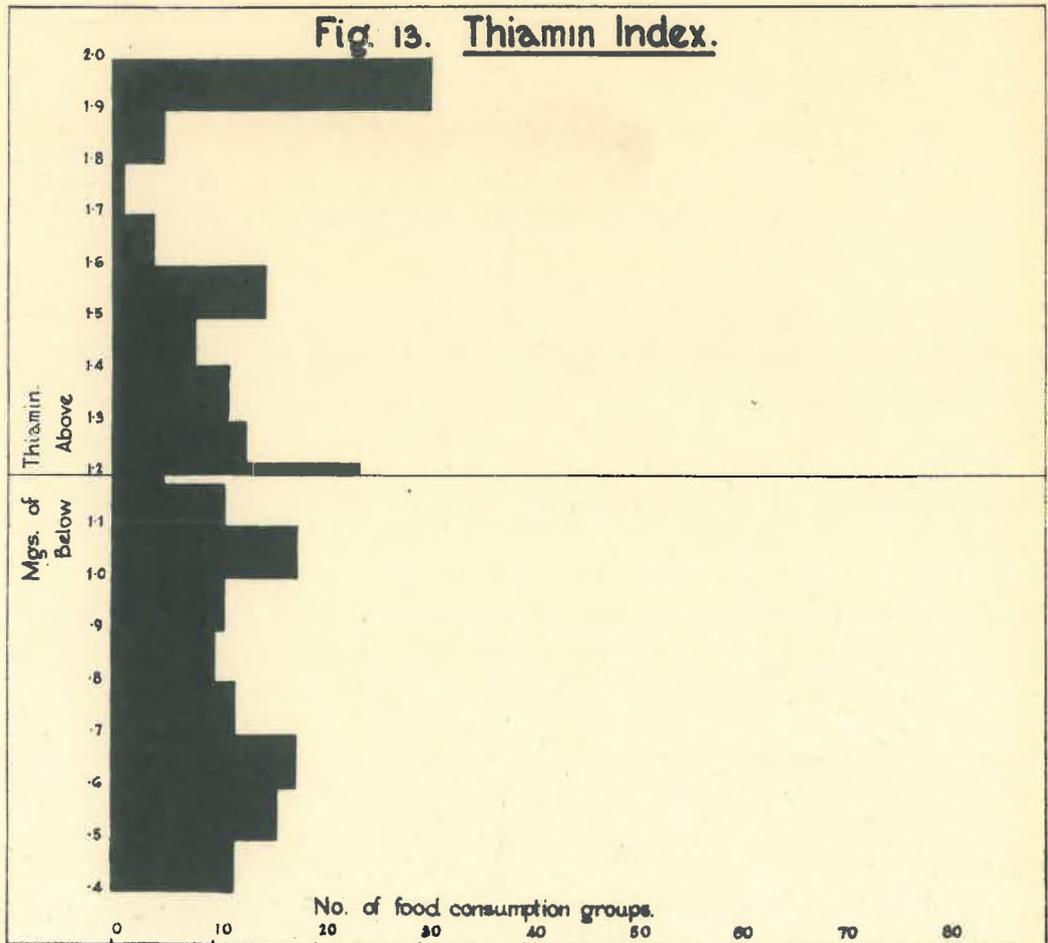
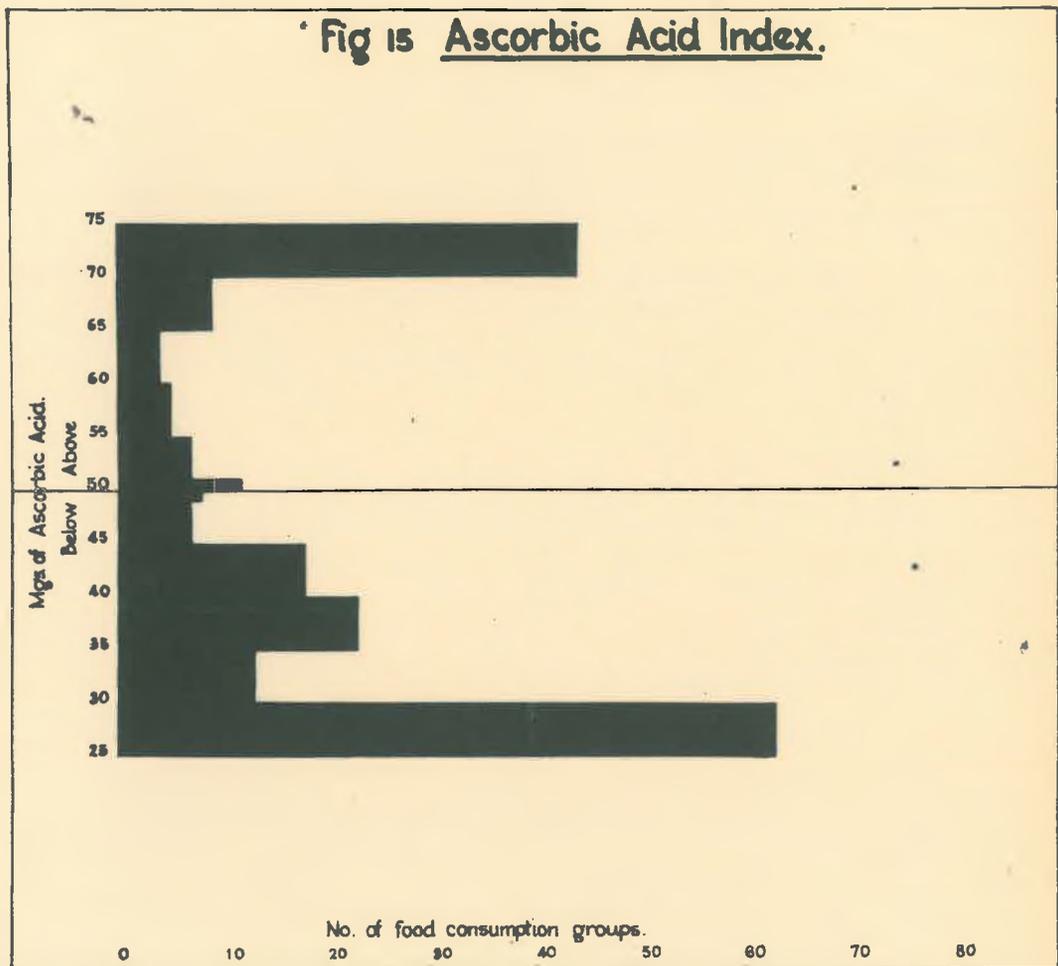


Fig 15 Ascorbic Acid Index.



from town sold salt at a price one hundred per cent higher than in town. On the other hand, local fruit, vegetables and milk are cheaper in the rural areas than in the town markets.

Certain foodstuffs cannot be priced, for they are never sold, such as wild fruits gathered and eaten by the bushveld dwellers. Others are not sold locally but command a good price in town, e.g. flying ants, which retail at 5 cents a dishful in Manzini during the season.

Pumpkins and melons can be purchased locally but are so numerous in the fields and gardens that they are rarely bought.

Milk and amasi is consumed in the home and not sold to neighbours, but may be retailed to strangers or in the nearest town; or the cream may be sold to the rural dairy.

### 11.2. Incomes:

Incomes were obtained from the 1960-1961 Swaziland Sample Survey and by questioning the homestead occupiers. Often the woman would quote a sum earned by her husband in Johannesburg, but further questioning would reveal that he had not been home for a year nor sent any money. Thus the cash income of this homestead during the survey period was nil.

When income derives from handicrafts, (e.g. matmaking), it is dependent on the number of articles made and sold. The monthly income fluctuates. Sometimes a beer-brewing woman was unable to estimate her income as the few shillings so earned were immediately spent on raw ingredients for beer, and small food and household items.

Where doubt arose over incomes they were not included in the calculations. Several households had no source of income. The urban and peri-urban areas provided the most concrete data on incomes.

The mean monthly incomes for the five areas are shown in the following table :-

TABLE 12 MEAN MONTHLY CASH INCOMES

Area	Mean cash income in Rand	Range
Urban	33.04	0 - 102.50
Peri-urban	10.04	0 - 14
Highveld (a)	18.54	0 - 66
Highveld (b)	17.12	0 - 66
Middleveld (a)	12.09 (5.35 *)	0 - 322 0-46*
Middleveld (b)	11.46 (3.59 *)	0 - 350 0-30*
Lowveld (a)	2.17	0 - 6
Lowveld (b)	2.10	0 - 8
Mean	12.20 (10.38 *)	

\* Value obtained after deducting one storekeeper's income.

In the Middleveld area, a store owner had an income some forty times greater than the average for the area. The second mean for the area is the result of deducting this income and re-calculating the mean.

The mean incomes for the rural areas are in agreement with those of the Swaziland Sample Survey<sup>1)</sup> in that the Highveld has the higher cash income, and the Lowveld the lowest of the three, (the Sample Survey includes the Lebombo region, included in the control areas of this study only).

### 11.3. Diet cost:

No calculation of the actual food purchases was made. However, for each food consumption group, the cost of the diet over the three day survey period was calculated and divided by the number of persons forming the group and by the number of days. Thus the cost of the diet per caput per day was obtained.

TABLE 13  
COST OF DIET PER HEAD / DAY

Area	Diet Cost (mean) per caput per day	Range
Urban	13.2 <u>cents</u>	5.7 - 30.5
Peri-urban	6.9	4.3 - 14.4
Highveld (a)	9.4	2.6 - 24.6
Highveld (b)	7.2	0.8 - 14.9
Middleveld (a)	7.6	3.4 - 20.2
Middleveld (b)	4.6	2.0 - 8.3
Lowveld (a)	3.8	2.0 - 5.5
Lowveld (b)	3.5	1.3 - 7.6
Mean	7.0	2.8 - 15.8

Urban: This area is almost completely dependent on the purchase of foods. Very few homes have gardens, and fruit and vegetables are expensive in the market.

Urban dwellers consume three meals a day, and have sophisticated tastes with a preference for rice, mealie rice, white bread, and butter. The area contains some well salaried persons, e.g. two nurses, one agricultural demonstrator and one teacher. These factors may account for the high food expenditure (13.2 cents).

Peri-urban: These householders live further from the shops and more time is required to reach centres of employment. Two meals a day are eaten, and the diet is much less sophisticated than in the Urban area. The diet is also far less adequate nutritionally. The diet cost is almost half that of the Urban area.

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1) Experiment in Swaziland, op. cit. Vol. 2. VIII. 9.

**Highveld:** The fairly-high mean expenditure recorded during both visits in this area is not easily explained. Within the small total number of homesteads (24) there are, however, five salaried teachers, having more sophisticated tastes than the remainder of the community.

**Middleveld:** The diet cost on the first visit was 9.4 cents; on the second, 7.2 cents. In June and July, large quantities of newly harvested jugo beans, monkeynuts and sesame were being consumed, all expensive items; on the second occasion these were exhausted and the diet was less varied.

**Lowveld:** On both occasions the community was undergoing a food shortage, the harvest had been poor and stocks were low. The people were eating wild vegetables and fruit from the bush, hence the low diet cost.

#### 11.4. Percentage of income devoted to food:

Engel's law states that the proportion of expenditure devoted to food increases as the income of the family decreases. In the rural areas the majority of the family food is obtained from the fields, gardens and veld, and any comparison between income and the cost of the diet as calculated above, becomes meaningless. 1)

However, in the Urban and Peri-urban areas where almost all foods are purchased the percentage of income devoted to food can be calculated.

TABLE 14

#### PERCENTAGE OF INCOME DEVOTED TO FOOD

Area	Mean Income (Rand)	Mean Diet cost (cents) during 3 day survey	% of income spent on diet
Urban	33.04	13.2	40.4
Peri-urban	10.04	6.9	62.3

Surveys on peri-urban and urban Bantu in the Republic of South Africa 2) have obtained the following results :

- 1) For an ingenious method of determining the rural economy, the reader is referred to Swaziland Sample Survey, op.cit. Vol. II. 371 - 398.
- 2) National Nutrition Research Institute, Food Enrichment in South Africa, (Pretoria, South African Council for Scientific and Industrial Research, 1959), 26.

TABLE 16

## THE PURCHASING POWER OF FIVE CENTS

FOOD	QUANTITY (IN GRAMMES) OBTAINED FOR FIVE CENTS					CALORIES AND NUTRIENTS OBTAINED FROM MEAN QUANTITY OF THE FOOD									
	AREA				MEAN QUANTITY	CALORIES UNITS	PROTEIN G	FAT G	CALCIUM MGS	IRON MGS	VIT. A I.U.	THIAMIN MGS	RIBOFLAVIN MGS	NIACIN MGS	ASCORBIC ACID MGS
	U+P	H	M	L											
<b>CEREALS:</b>	693	1384	494	1195	818										
MAIZE MEAL	714	714	833	714	744	2678	70.6	31.2	148.8	28.2	-	1.86	0.22	4.5	-
SORGHUM BREAD (WHITE)	-	-	352	481	416	1464	43.3	14.1	133.1	27.5	-	1.25	0.50	14.6	-
FLOUR (WHEAT)	490	439	439	-	456	1140	33.7	3.2	109.4	5.5	-	0.41	0.18	3.6	-
	481	481	352	-	438	1546	49.5	4.4	118.3	10.1	-	0.53	1.31	87.6	-
<b>STARCH:</b>	744	1200	1241	-	1062										
SWEET POTATOES	1087	-	1923	-	1505	1400	24.1	1.5	361.2	15.1	753	1.20	0.75	9.0	301
<b>SUGARS:</b>	417	422	6398 <sup>A)</sup>	1162	2100										
	417	362	352	481	403	1612	-	-	8.1	-	-	-	-	-	-
<b>LEGUMES:</b>	203	555	458	1177	598										
SESAME MONKEY NUTS	-	-	481	-	481	2742	96.2	240.5	7215.0	72.2	-	2.02	-	-	-
JUGO BEANS	162	-	450	602	405	2442	111.8	196.4	247.1	8.1	-	2.03	2.03	60.8	-
	-	770	287	575	544	1975	81.6	40.3	342.7	-	-	1.63	-	-	-
<b>VEGETABLES:</b>	515	413	2745	B) -	1224										
TOMATOES	455	-	1190	-	822	181	8.2	1.6	82.2	3.3	8220	0.41	0.25	1.2	164
CABBAGE	481	543	7143	-	2722	735	46.2	2.7	1061.6	13.6	19610	1.63	1.09	8.2	2178
<b>FRUIT:</b>	742	-	856	B) -	799										
ORANGES	463	-	463	-	463	171	3.7	-	189.8	1.4	787	0.37	0.14	0.9	232
BANANAS	420	-	450	-	435	352	6.5	1.3	43.5	3.1	1740	0.17	0.22	2.6	44
<b>MEAT:</b>	307	228	418	-	318										
LIVER (ox)	187	-	-	-	187	260	30.9	15.1	13.0	26.0	18700	0.65	0.56	33.7	56
BEEF	228	228	667	-	374	752	70.3	52.3	44.9	15.0	187	0.56	0.15	18.7	-
<b>EGGS:</b>	-	279	481	-	380	600	45.2	46.7	212.8	9.5	3800	0.38	1.14	0.4	-
<b>FISH:</b>	-	171	83	-	127	93	20.3	1.3	25.4	0.9	-	0.06	0.17	3.8	-
<b>MILK PRODUCTS:</b>															
MILK CONDENSED	500	1000	1000	1000	875	569	28.9	32.4	1050.0	0.9	1050	0.26	1.40	0.9	9
MILK	186	186	96	-	156	568	12.5	18.7	536.6	0.3	234	0.16	-	-	2
<b>FATS:</b>	123	92	101	-	105										
MARGARINE	100	96	96	-	97	698	0.6	78.6	14.6	-	-	-	-	-	-
<b>MISCELLANEOUS:</b>															
BEER (AFRICAN)	602	1240	1351	1612	1203	180	3.6	-	144.1	1.2	-	1.68	1.32	6.0	1
TEA	266	45	60	-	123	71	17.3	-	524.0	-	-	-	1.10	7.4	-

A) INCLUDES SUGAR CANE

B) WILD FRUITS AND VEGETABLES - NOT POSSIBLE TO ALLOT A PRICE

TABLE 15

PERCENTAGE OF INCOME SPENT ON FOODS AS  
FOUND IN CERTAIN SURVEYS  
Peri-urban and Urban Bantu

Locality	Johannesburg	Umbogintwini, Natal	Dunlop employees Natal	Edendale, Natal
Year of Survey	1940	1942	1947	1948
No. of households Surveyed	987	73	28	157
Mean Range	49 *	58	54 17-159	69 29-96
* Values based on expenditure and not total income.				

The Swazi urban householder appears to spend a smaller proportion of his income on food than his counterpart in the Republic (but all the South African figures relate to the 1940's). The peri-urban householder compares with the upper regions of the South African figures. The extent to which the peri-urban householder supplements his diet with garden produce is very variable. Maize is not usually grown but vegetables could play quite a large role in supplementing the diet.

Increase in income affects the expenditure on foods, particularly those foods having a high elasticity of demand (e.g. meat)<sup>1)</sup>. However, in African society this phenomenon is less marked owing to the habit of sharing. So that with an increase in family income the per caput expenditure on food rises very slowly.

In Swaziland, the custom of sharing in times of adversity is declining. In the future a rise in income may have a marked effect on food expenditure.

11.5. Correlations:

In the last section of this chapter certain relationships are examined and subjected to the chi-square test. At this stage it is sufficient to say that, at the 0.05 level of confidence :

1. Diet cost<sup>2)</sup> is not influenced by the presence or absence of the homestead head.
2. Diet cost is unrelated to the school standard of the mother.
3. Polygamy does not effect diet cost.
4. Diet cost is unrelated to family size.

At the same level of confidence :

- 
- 1) F. A. O. W. H. O. Seminar on Problems of Food and Nutrition South of the Sahara. (F. A. O. Rome, 1961), 4.
  - 2) That is, per person per day.

1. There was a relationship between diet cost and whether the household avowed "Mission" or Traditional affiliation, the diet cost of the former being higher. The same was seen in a comparison of "Mission" Christians and Separatists with diet cost. The "Mission" Christians had a higher diet cost. But there was no significant difference between Separatists and Traditionalists when diet cost was compared.

2. In the control groups there was a relationship between the declared income of the family and the quantity of maize meal consumed. The amount of fats purchased was influenced by the income of the household.

The most surprising result is that, in this study no relationship was found between diet cost and family size.

12. FOOD SELECTION: COST OF FOODS IN RELATION TO CALORIE AND NUTRITIONAL VALUE :

In an endeavour to explain dietary patterns, and as a possible guide for nutrition improvements, the calories and other nutrients provided by 5 cents worth of different foods were calculated by the following method :

1. Price lists for foods in each area were drawn up; when a food item had a different price on the subsequent visit the mean of the two prices was deduced.

2. From these price lists was calculated the quantity in grammes of each food that could be purchased for five cents (sixpence).

3. The foods were then classified according to the F. A. O. categories and the mean quantity available for each category was calculated.

4. Frequently consumed foods were then extracted and the quantity available for five cents was analysed into calories, protein and other nutrients by means of the food composition tables used in the dietary study.

The results are shown in Table 16. The first observation is that fairly large price differences exist between areas. This is due to the fact that foods bought by the storekeeper from the nearest town (e. g. bread), cost more in the country due to a transport charge in the rural areas. Similarly, vegetables and fruit produced in the rural areas cost more in the urban areas where the demand is high.

Some foods are found only in one area, e. g. sesame in the Middleveld. Eggs were eaten only in the Highveld and Middleveld.

TABLE 16

## THE PURCHASING POWER OF FIVE CENTS

FOOD	QUANTITY (IN GRAMMES) OBTAINED FOR FIVE CENTS					CALORIES AND NUTRIENTS OBTAINED FROM MEAN QUANTITY OF THE FOOD										
	AREA				MEAN QUANTITY	CALORIES UNITS	PROTEIN G	FAT G	CALCIUM MGS	IRON MGS	VIT. A I.U.	THIAMIN MGS	RIBOFLAVIN MGS	NIACIN MGS	ASCORBIC ACID MGS	
	U+P	H	M	L												
<b>CEREALS:</b>	693	1384	494	1195	818											
MAIZE MEAL	714	714	833	714	744	2678	70.6	31.2	148.8	28.2	-	1.86	0.22	4.5	-	
SORGHUM BREAD (WHITE) FLOUR (WHEAT)	490	439	439	481	416	1464	43.3	14.1	133.1	27.5	-	1.25	0.50	14.6	-	
	481	481	352	-	456	1140	33.7	3.2	109.4	5.5	-	0.41	0.18	3.6	-	
	481	481	352	-	438	1546	49.5	4.4	118.3	10.1	-	0.53	1.31	87.6	-	
<b>STARCH:</b>	744	1200	1241	-	1062											
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<b>SUGARS:</b>	417	422	6398 <sup>A)</sup>	1162	2100											
	417	362	352	481	403	1612	-	-	8.1	-	-	-	-	-	-	
<b>LEGUMES:</b>	203	555	458	1177	598											
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JUGO BEANS	162	-	450	602	405	2442	111.8	196.4	247.1	8.1	-	2.03	2.03	60.8	-	
	-	770	287	575	544	1975	81.6	40.3	342.7	-	-	1.63	-	-	-	
<b>VEGETABLES:</b>	515	413	2745	B) -	1224											
TOMATOES	455	-	1190	-	822	181	8.2	1.6	82.2	3.3	8220	0.41	0.25	1.2	164	
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BANANAS	420	-	450	-	435	352	6.5	1.3	43.5	3.1	1740	0.17	0.22	2.6	44	
<b>MEAT:</b>	307	228	418	-	318											
LIVER (OX)	187	-	-	-	187	260	30.9	15.1	13.0	26.0	18700	0.65	0.56	33.7	56	
BEEF	228	228	667	-	374	752	70.3	52.3	44.9	15.0	187	0.56	0.15	18.7	-	
<b>EGGS:</b>	-	279	481	-	380	600	45.2	46.7	212.8	9.5	3800	0.38	1.14	0.4	-	
<b>FISH:</b>	-	171	83	-	127	93	20.3	1.3	25.4	0.9	-	0.06	0.17	3.8	-	
<b>MILK PRODUCTS:</b>																
MILK	500	1000	1000	1000	875	569	28.9	32.4	1050.0	0.9	1050	0.26	1.40	0.9	9	
CONDENSED MILK	186	186	96	-	156	568	12.5	18.7	536.6	0.3	234	0.16	-	-	2	
<b>FATS:</b>	123	92	101	-	105											
MARGARINE	100	96	96	-	97	698	0.6	78.6	14.6	-	-	-	-	-	-	
<b>MISCELLANEOUS:</b>																
BEER (AFRICAN)	602	1240	1351	1612	1201	180	3.6	-	144.1	1.2	-	1.68	1.32	6.0	1	
TEA	266	45	60	-	123	71	17.3	-	524.0	-	-	-	1.10	7.4	-	

A) INCLUDES SUGAR CANE

B) WILD FRUITS AND VEGETABLES - NOT POSSIBLE TO ALLOT A PRICE

## 12. 1. Discussion:

A housewife, uninstructed in feeding a family, will purchase first those foods that satisfy the hunger, and only if there is sufficient money remaining will the more expensive food items be purchased. A study of Table 16 reveals that the foods obtainable in the greatest quantity for 5 cents are the starches, cereals and vegetables, hence their widespread use.

It has been demonstrated that the Swazi diet is deficient in calories, protein, fat, calcium, Vitamin A and certain B complex vitamins. What foods can replenish these nutrient categories and at the same time provide the satiety so necessary in a Bantu diet?

Sorghum is a more nutritious cereal than maize, but it is also more expensive, so that for five cents the quantity obtained will appease hunger less adequately than maize, and the various nutrients are less than that gained from 5 cents of maize (niacin is the exception to this generalisation).

Legumes have a high satiety value and contain good amounts of calories, protein and fat, and their calcium content is not inconsiderable. In this category, sesame is an outstanding addition to the diet.

Cabbage, in season, is a good source of Carotene. Liver is an excellent source of Vitamin A, but the quantity sold for five cents is not great. Butcheries are found only in towns and major rural centres; the majority of rural dwellers get liver only when a beast dies, and then custom dictates the distribution of liver to certain people only.

In Western dietaries, milk and eggs are considered good sources of protein and fat. Table 16 demonstrates that these food items are expensive and are of low satiety value when compared with cereals and starches. Milk is not cheaper than beef (the universally eaten meat) as an animal protein source. Moreover in the urban areas, milk is purchased from European milk suppliers, but costs twice as much as in the rural area. However, in the rural areas the Swazi does not normally purchase milk from his neighbour. This custom appears to stem from the fear that the milk may be impure or poisoned. If one has plenty of milk one drinks it, sending some to the dairy for skimming while leaving the skim milk for the dogs. If one has no milk, one goes without.

Table 16 indicates the difficulties involved in improving the diet of a population with low purchasing power and food taboos, and with differences in food production from season to season, and from area to area.

## 13. CONTROL AREAS :

The reason for the use of a questionnaire in the control areas has been discussed. The questionnaire, together with the one on infant nutrition (see Annexure), was administered to the housewife of each food consumption group within the area. If a man lived alone

and did his own housekeeping, he was also questioned. Initially, the fieldworkers visited every household, but this proved time-consuming and laborious. Instead, the housewives were requested to meet the fieldworkers at a central point, bringing with them the usual measure of maize or maize meal for the day. By this means the fieldworkers were able to weigh directly the quantity of maize used daily; any housewife who came with an empty bowl was told to measure out from a bag of maize meal the usual quantity for a meal. Any tardy housewife that did not attend the meeting was visited by the fieldworkers later in the day. Again, in all areas, there was total co-operation. In all, 181 food consumption groups were covered.

As has been explained, the data from the questionnaire were transferred on to punch cards and machine sorted. The nature of the area and the composition of the population have been dealt with in Chapter III.

### 13.1. Cookery:

All the housewives interviewed cooked in iron pots over a wood fire. However, in some four houses an iron stove and aluminium pans were used, in addition.

### 13.2. Maize consumption:

TABLE 17

QUANTITY OF MAIZE CONSUMED PER HEAD,  
EXPRESSED AS A PERCENTAGE.

Area	M. C. 1.	Leb. C.	H. C.	M. C. 2.	Total
<u>Maize meal</u>					
Less than 1 lb	38	40	23	21	122
Between 1-1½lb	10	38	13	45	106
" 1½-2 lb		10	8	24	42
Over 2 lbs.	2	4	-	-	6
<u>Maize</u>					
Less than 1 lb	13		4		17
Between 1-1½lb	6		6		12
" 1½-2 lb	6		4		10
Over 2 lbs.	-		2		2
No estimate	25	8	40	10	75

The table indicates the quantities of maize and maize meal consumed per head per day. One pound of maize does not yield one pound of maize meal when ground, so that the two categories have been distinguished.

The category with the greatest frequency is that in which less than 1 lb. of maize is consumed per head per day. This agrees with the findings in the primary areas, in which the mean quantity of maize meal was 12 ozs.

### 13.3. Maize processing:

"Homeground" maize meal is, for the purpose of this study, defined as meal produced by grinding on a stone or in a simple handmill. "Millground" is meal produced at a commercial mill, or purchased from the store.

Sifting may be done at home using a wire mesh sieve or at the commercial mill (the extraction rate is approximately ten per cent)<sup>1)</sup>.

The results are expressed as a percentage in the following table :-

TABLE 18

METHODS OF GRINDING AND MILLING OF MAIZE  
EXPRESSED AS A PERCENTAGE.

Method	M.C.1.	Leb.C.	H.C.	M.C.2.	Total
Homeground unsifted	63	21	38	6	128
Homeground sifted	17	10	38	24	89
Millground unsifted	4	2	-	21	27
Millground sifted	10	46	6	27	89
No description	6	21	18	22	67

The greatest quantity of homeground maize is found in the first Middleveld Control Area. The least in the second Middleveld Control Area. Sifted millground was most frequently used in the Lebombo Control Area.

At the present rate of extraction only a small quantity of nutrients is lost in the milling process. There is likely to be an increased demand for finer, whiter maize meal, and if the milling companies respond - then there will be considerable nutritive differences between homeground maize and the commercial product.

### 13.4. Maize sufficiency:

The Swaziland Random Sample Survey<sup>2)</sup> investigated the maize sufficiency in 1960. The following harvest was a poor one, and to gain some idea of the extent of the food shortage, the fieldworkers asked the housewife if they were purchasing maize. The time of the year was February/March and homestead stores, in years of plenty, would not be exhausted. Where maize has been purchased this does not necessarily mean that all the homestead's stores are exhausted, but it does indicate that the homegrown quantity is considered insufficient to last until the next harvest. (The question was not asked in the first Middleveld Control Area, the extent of the shortage not having been appreciated).

- 
- 1) N. Kirsh, Swaziland Milling Company: personal communication.
  - 2) Experiment in Swaziland. op cit. Chap. VIII, 22.

TABLE 19  
CONTROL SQUARES - FOOD CONSUMPTION PATTERNS  
(AS A PERCENTAGE)

Food	Daily to 2-3 times a week	3-4 times a month	1-2 times a month	Sometimes	Never or Seldom
Samp	-	-	-	26	74
Rice	-	-	-	9	91
Mealie rice	-	-	-	30	70
Bread	6	-	12	60	22
Beans	-	-	-	34	66
Tinned fish	-	-	-	29	71
Eggs	-	-	-	70	30
Nuts	1	-	-	52	47
Oil	-	1	1	2	96
Vegetable fat	1	2	8	27	62
Margarine	1	-	1	9	89
Tea	1	11	-	46	42
Coffee	-	4	-	16	80
Cocoa	-	-	-	2	98
Salt	3	43	-	44	10
Sugar (white)	3	30	-	39	28
Sugar (brown)	6	9	-	15	70

Seventy-four per cent of the food consumption groups were already purchasing maize, sixteen per cent were not and ten per cent did not reply.

### 13.5. Food consumption patterns:

One of the difficulties of the questionnaire is to obtain information from the households on matters relating to quantity and frequency, ("I buy a shillings-worth of meat now and again", is a typical response).

Table 19 contains the food consumption patterns for the four control areas. It reveals the small role played by cereals other than maize, rice being consumed by only nine per cent of the food consumption groups and then only occasionally.

Although seventy per cent of the homes declared they ate eggs, the majority added that it was the men of the house that did so.

Nuts are the chief suppliers of fat in the diet, with the commercial vegetable fats rating second.

Salt is purchased by all but a small minority, and tea is the favourite non-alcoholic drink. Brown sugar is used in beer brewing.

The low consumption of tinned fish is probably due to the fact that it must be purchased, and tinned qualities are relatively expensive.

#### Other foods:

Milk: In response to the questions on the quantity of milk (Questionnaire Section B, Question 7 and Section C, Question 7), the usual response was "hardly any" or "enough for the children". This information was not specific enough and has not been used. However, ten per cent of families were purchasing condensed milk for their use, four per cent were using condensed milk for the baby alone. Powdered milk was purchased by five per cent for family use, while only one per cent for the baby alone. It must be noted that U. N. I. C. E. F. milk was available at all rural clinics for young babies. This, together with the ample breast milk, may perhaps explain the small sale of powdered milk.

Meat: The rural areas have very few butcheries and meat is generally obtained from town. In Table 20 a breakdown is given of the purchase of meat.

TABLE 20

#### CONSUMPTION OF MEAT EXPRESSED AS A PERCENTAGE

Sometimes	1/-	2/-	3/-	4/-	5/-	6/-	7/-	8/-	Never
61	1	5	4	3	3	3	1	1	18

Meat is purchased by the shillingsworth (10 cents) but the quantity involved depends largely upon the whim of the butcher's assistant. From the pattern in Table 20, it appears that in the control areas meat is consumed with the same frequency as in the primary areas.

#### 13.6. Desirable purchases:

The housewives were asked what foods they would like to purchase, given more money. It was assumed that the first item mentioned was the most desired. Forty-one per cent put maize first; sugar, rice, tea and legumes each were put first by only two per cent of the respondents. Forty-eight per cent gave some other food priority and three per cent "did not know" what they wished to purchase. The high place given to maize is another indication of the general shortage. With big stores of maize, the housewives would probably choose a luxury food first.

#### 13.7. Summary:

The typical housewife of the control groups cooks over an open fire with iron pots, and grinds her maize by hand. She will occasionally have meat to cook; there is little enough milk for the children, and eggs are eaten by the men. From the store she will purchase salt, bread and sugar, and more rarely, tea and cooking fats.

#### 14. SIGNIFICANT CORRELATIONS: PRIMARY AND CONTROL AREAS:

It is desirable to know those factors affecting the community's nutrition. The fieldwork had given leads on certain phenomena that might well influence the dietary of the food consumption group. The data being available on punch cards it was possible to test these hypotheses. The small number of households surveyed has rendered the chances of patterns emerging very slender. When statistical testing has not borne out impressions received in the field, then doubt is cast on sample size.

The same procedure was used for each chi-squared test :-

- (a) The null hypothesis was stated and was rejected or retained according to the result of the test. All alternate hypotheses to the null one are two-tailed. That is, if the null hypothesis is rejected, two other alternatives exist, but no indication is given of the more possible one.
- (b) The level of significance chosen was 0.05. All sigma values of 0.05 or less (i.e. 0.04, 0.03, 0.02 etc.) lie in the region for rejection of the null hypothesis. (In Annexure C are presented the chi-squared tests of significant correlations).

14.1. Presence or Absence of the Homestead Head:

Absence of the homestead head was defined as having been away from the home for a period of two months or more prior to the survey period. Mostly it concerned the migrant labourer.

Some fifty eight food consumption groups at one season or another were without the homestead head.

Income: Income levels were divided into homes receiving no income and those in receipt of income during the survey period.

The chi-squared test, at the level of confidence chosen, revealed no relationship between the absence of the head of the homestead and the income of the group.

Diet cost: Diets were divided into those that cost between one and five cents per person per day, and those costing six cents and over. The presence or absence of the homestead head did not appear to have an appreciable effect on the cost of the diet.

Protein index: The protein index has been described earlier. 1) Essentially it consists of a baseline, food consumption groups with protein levels at or above the baseline are classified as above, the remainder below. The chi-squared test revealed no relation between the presence or absence of the head of the homestead and the position of the group on the index.

Calorie index: A similar tool to the protein index, the null hypothesis was retained in this instance also.

When the head of the homestead is away from home he is usually employed in migrant labour, and the homestead might be expected to have a regular cash income, above that of the subsistence farmer. This money might well be directed into improving the diet of his family by purchase of meat, etc., which would be reflected in the diet cost, and protein and calorie indices.

However, in the field it was observed that several absent heads of families were sending no money home and the wife was forced into living a subsistence level, and farming inefficiently. It is possibly these families that are insufficient in number to produce a negative correlation between absence of the homestead head and the factors tested, but are numerous enough to confuse the issue.

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1) Chapter IV, section 9.

## 14.2. Education of the Mother:

It is possible that the school standard of the housewife might influence the nutrition of the food consumption group. In Swaziland, school girls in Standards V and VI are taught domestic science, including the basic concepts of nutrition. The number of subjects in the present sample who attained this level was very small. The housewives were divided into those without schooling (143 in number) and those with schooling (83).

Diet cost: The same criteria were used in the classification of diet as in the previous test. No relationship existed between education of the housewife and diet cost at the 0.05 level of significance.

Protein index: The definition of protein index has been described. The education of the housewife does not influence the protein levels of the family.

The education of the housewife bears a relationship to the adequacy of the dietary calories.

Summary of nutrient values: The sixteen point scale used to summarize the ability of the dietary nutrients to meet recommended allowances has been described earlier.<sup>1)</sup> The scale was divided into two, the top half being the more satisfactory region, the lower the less adequate.

The education of the mother bears a slight relationship to the total adequacy of the diet.

The education of the housewife is unrelated to the diet cost and the protein adequacy of the diet, but bears a slight relationship to the calorie level and to the overall adequacy of the diet.

If one lives at, or just above, subsistence level, in times of food shortage the overriding need is to satisfy hunger with the limited range of available foods. However high one's educational standard it will not fill empty stomachs. Nevertheless the possession of some education may influence the buying practices in times when there is cash available for purchasing.

A factor that may influence the relationships examined, is that women with some education might possibly marry men who had received schooling. The women could practice handicrafts learnt at school, and the men may be more successful farmers. These points may explain the correlations obtained. In the field the impression was received, that apart from nurses and teachers, the educational standard of the housewife bore little relation to the factors under test.

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1) Chapter IV, section 9.

#### 14.3. Polygamy:

Observations had led one to suppose that the members of polygamous families were less well nourished than those in a non-polygamous household. When the polygamous homes (24) were compared with the non-polygamous (202) no significant relationship was found between these marital states and diet cost, protein and calorie index, and the summary of nutrients.

Polygamy and monogamy are not related to the factors tested, at the level of significance chosen.

The number of polygamous families are small. The impression made on the fieldworkers is that if the head of the homestead tilled sufficient land, and if he organized his wives well, dealing impartially with them and encouraging co-operation, then the family dietary was good. If, however, the head was distinterested in organization, the wives became unruly, disorganized; and many poorly fed children filled the homestead.

#### 14.4. Family Size:

The usual findings are that family size bears a distinct relation to the nutritive value of the diet. In this study, food consumption groups were divided into those consisting of one to five members (127) and those with over five members (109). The modal homestead population of the Swazi is five to eight persons<sup>1)</sup>. No relationship was discovered between family size, and diet cost, calorie and protein indices, and summary of nutrients, at the level of significance chosen.

In non-dietary studies a correlation is found between family size, and diet cost, and the adequacy of the diet. It may be that in this test the sample was too small or the categories too crude to reveal these correlations.

#### 14.5. Religious Affiliation:

The classifications of religious affiliation are those defined by the Swaziland Sample Survey<sup>2)</sup>. 'Traditional' covers all those who claim to have retained all the traditional Swazi religious beliefs and practices, and to belong to no Christian or other international faith.

The Christian church is divided into two categories: Mission and Separatist. 'Mission' are the large international denominations, primarily under European control". The Separatists are "churches under African control, which frequently differ markedly in doctrine, ritual and administrative organization from the Mission churches".

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- 1) Experiment in Swaziland, op. cit. Vol. II. Chap. VIB., 14.
  - 2) Experiment in Swaziland, op. cit. Vol. II. Chap. VD., 2.

The Separatist churches are frequently referred to as 'Zionists'. Among their teachings is the avoidance of alcohol and pork. Thus there are marked differences in the dietary between a Traditionalist and Zionist, the former imbibing large quantities of African beer, the latter tea. The Christians of some denominations (e.g. Nazarene Mission) are discouraged from consuming alcohol, other denominations take no stand on the issue, so that one finds Mission affiliates to be both tea and beer drinkers.

In defining the religious affiliation of a food consumption group, the religion of the head of the household was accepted as the determining factor.

Income: Income was again divided into those with income and those without. There was no difference in these income categories between the Missions and the Separatist members.

There is a significant relationship between the Traditional and Mission affiliation and income.

Finally, the income level of the food consumption group is affected by Separatist or Traditional affiliation.

Diet cost: When diet cost (1-5 cents; 6 cents and over) was tested against Separatist and Traditional affiliation no relationship was found.

However, diet cost is related to the Mission or Traditionalist affiliation of the food consumption group.

There is a relationship between Mission and Separatist affiliation and diet cost.

Calorie index: No relationship was discovered between calorie index and (a) Mission and Separatist affiliation, (b) Separatist and Traditional affiliation, but (c) Mission and Traditional affiliation has some bearing on the meeting of calorie requirements.

Protein index: Religious affiliation bore no relationship to the satisfaction of protein requirements.

#### 14.6. Child/Adult Ratio:

For each food consumption group the number of children under eighteen years was divided by the number of adults. The ratios so derived were divided into two categories, those under 1.0 (i.e. those with more adults than children) and those of 1.0 upwards. The two categories were tested for significant correlations with various dietary factors. No significant correlations were found between the ratios and income, diet cost, calorie and protein indices, Vitamin A index and general dietary adequacy.

Dietary requirements for Swaziland have been calculated on the basis of the mean per head per day of the population age and sex groups; all the intakes are based on the mean per head per day, and adequacy is derived from the gap between requirements and intake. Thus the fact that no correlation could be found between dietary factors and the presence of more, or less, children than adults points to the fact that the deficiencies are not confined to either children or adults but to both, a truth borne out in the fieldwork.

#### 14.7. Male/Female Ratio:

Exactly the same procedure was followed with the male/female ratio as with the child/adult one. The number of males in the food consumption group was divided by the females and the two categories under 1.0 and 1.0 upwards were obtained. No significant correlations were found between income, diet cost, protein and Vitamin A indices and the overall dietary adequacy. The chi-squared test for male/female ratio and the calorie index was significant. It appears that when the females out-number the males the calorie adequacy of the diet is decreased. This may arise from the fact that the women usually forego food in order to allow their children or menfolk to benefit.

Control Areas: Relationships were also tested in the control areas.

#### 14.8. Family Size Tested with Quantity of Maize Meal Per Head:

Two categories of food consumption groups were drawn up: those consuming under  $1\frac{1}{2}$  lbs. of maize meal per head, and those groups consuming more than this quantity. The food consumption groups, as before, were divided into those with less than six members and those with more.

In the control squares there is a relationship between the size of the family and the quantity of maize meal consumed per head per day.

#### 14.9. Income Tested with Quantity of Maize Meal per Head:

Income was again categorized into those food consumption groups in receipt of income and those not. The maize meal per head was divided as for the above test.

Income is related to the quantity of maize meal consumed per head per day.

#### 14.10. Luxury Purchases Tested with Income Group:

No relationship was found between the number of luxury foods (i.e. tea, cocoa, coffee, sugar) purchased and those with an income and those without.

14.11. Purchasing or Not Purchasing Maize Tested with Income:

The purchase or non-purchase of maize is unrelated to the possession or lack of an income.

14.12. The Number of Fat-Rich Foods Purchased Tested with Income:

Margarine, vegetable fat, vegetable oil and nuts are classified as fat-rich foods. The food consumption groups were divided into those groups eating one or two of these fat-rich foods and those eating none.

The number of fat-rich foods purchased is related to the possession or non-possession of income.

14.13. The Number of Fat-Rich Foods Purchased Tested with Family Size:

No relationship was demonstrated between family size and the number of fat-rich foods consumed.

14.14. Family Size Tested with the Number of Protein-Rich Foods Eaten:

The protein foods considered were milk, meat, eggs and fish. The food consumption groups were divided into those eating one or two such foods and those eating three and four.

Family size affects the number of protein rich foods consumed.

14.15. Child/Adult Ratio:

When this ratio was tested against :

- (i) income,
- (ii) purchase of 'luxury',
- (iii) fat foods,
- (iv) protein food in the diet,
- (v) whether the family was purchasing maize, and
- (vi) the quantity of maize meal per head, no significant correlations were found.

One would surmise that groups with more children than adults would consume less maize meal per head than the groups with the reverse relationship. However, the fact that no correlation was obtained could be explained by the fact that, although the young children consume less than an adult, the adolescent children eat much larger quantities.

Control Area: The control area, when subjected to the chi-squared test, produces a greater number of anticipated results than the primary areas. The reason may be that the various factors (family size, income, etc.) are compared with quantities of food rather than with the amounts of nutrients contained. In the control areas, size of family and income are related to quantity of maize meal per head.

It is surprising that maize purchases bore no relationship to the possession or lack of income. One would surmise that if there is no income coming into a home they would be unable to purchase maize. However, this calculation may be complicated by undisclosed income and purchasing on credit. Fat-rich foods are expensive and it is to be expected that the numbers purchased would be related to the income of the household.

#### 15. SUMMARY :

This section has ranged over a wide field, sometimes pointing out, sometimes questioning, sometimes going into detail. In an endeavour to make the data comparable with other surveys, some lengthy descriptions of the treatment of the data had to be included.

It has been demonstrated that the dietaries of the sample areas vary from season to season; but there are greater differences between rural and urban dietaries, and in the rural areas between one physiographic region and another.

The diet is most deficient in calories, calcium, Vitamin A, riboflavin and niacin, the peri-urban sample area and the Lowveld sample area having the most inadequate dietaries. In both these areas low purchasing power provides a partial explanation; in addition the Lowveld was subjected to the annual hazard of drought.

Food costs vary from urban to rural areas, and from one rural area to another. But when the foods available for five cents are considered, it becomes evident that the diet is limited by the overriding need to satisfy appetite at lowest cost.

It has not been possible to explore all those factors that might possibly be related to the Swazi diet, but some attempt has been made along these lines. One of the most important factors appears to be the religious affiliation of the food consumption group.

Conversion to a religion is not only a spiritual but also a physical undertaking. The women discard the traditional garb and adopt European clothes. The close association of the Mission Station, with its flock, lead the Swazi converts to adopt a way of life, similar to the missionaries. Hospitality is no longer expressed in the Swazi home by an offer of beer, but of tea. The mothers bear their children in hospital and are instructed in infant feeding methods. This mission-inspired way of life is reflected in the dietary patterns of the people so converted.

ANNEXURES

SOURCES OF PROTEIN IN THE SWAZI DIET

Area	Calo- ries	Total Protein	Animal Protein	Animal Protein as a percent- age of total protein	Percentage of dietary intake					Notes
					Maize	Potatoes	Legumes	Meat	Milk	
U	1169	58.7	10.7	18.2	64	2	6	25	3	Potatoes: European variety
P	2021	75.6	30.1	39.8	48	2	8	36	6	Meat: 95% beef
H a)	2220	63.9	6.1	9.5	70	1	18	9	2	
H b)	1898	61.0	7.5	12.2	72	-	11	15	2	
M a)	1966	62.6	5.5	8.8	65	2	21	9	3	
M b)	1937	57.3	7.0	12.2	75	-	10	10	5	
L a)	1327	42.8	3.9	9.1	76	Sorghum 4	10	4	6	
L b)	1063	34.1	7.8	22.8	71	-	2	2	25	
Mean for Highveld	-	-	-	-	71	-	15	12	2	Legumes: 50% beans 50% groundnuts
Mean for Middleveld	-	-	-	-	70	-	16	10	4	Legumes: 33.3% beans 33.3% groundnuts 33.3% sesames
Mean for Lowveld	-	-	-	-	74	Sorghum 2	6	3	15	Legumes: 50% beans 50% groundnuts

TABLE B

## COMPARISON OF THE AMINO ACID CONTENT OF THE SURVEY AREAS WITH THE PROVISIONAL PATTERN

Amino Acid	Provisional Pattern	Urban	Peri-Urban	Highveld	Middleveld	Lowveld
Isoleucine	270	306	314	302	303	270
Leucine	306	707	663	731	732	306
Lysine	270	291	344	253	246	270
Phenylalanine	180	282	624	289	297	180
Tyrosine	180	324	301	628	342	180
Sulphur-containing:-						
Total	270	207	207	192	202	270
Methionine	144	126	127	113	119	144
Threonine	180	255	261	250	247	180
Tryptophane	90	51	56	47	52	90
Valine	270	336	342	343	232	270
Protein grammes/day		59	76	62	57	38
Protein score		57	62	52	58	53
Conversion Coefficient (100/Protein Score)		1.75	1.61	1.92	1.72	1.89
Safe Practical Allowance:-						
Requirement x 1.5 x Conversion Coefficient		57	53	63	57	63

SWAZILAND NUTRITION SURVEY

INFANT FEEDING PRACTICES.

Date ..... Mother's Name .....

Square No. .... Surname .....

Homestead .....

Section A: Mother.

1. Are there any foods that you do not eat during pregnancy? If so, why not?
2. Are there any foods that you make a point of eating during pregnancy? If so, why?
3. What foods does a nursing mother eat between meals?
4. What foods produce more milk during nursing?

Section B: Infant.

5. How soon after birth does a mother breast feed her baby? If delay, reason.
6. How often is the baby fed?
7. If a mother does not have enough milk for the baby, what does she give it to eat? If the answer is milk, find out what sort (e. g. canned, powdered or cow's milk) and the quantity.
8. What does a mother do about the child's food if she goes out to work and has to leave her baby behind?
9. Does a mother give her baby any special food? How much? At what age? How is it prepared? How is it fed?
10. What supplementary foods are given? When do they begin? Before or after breast milk?
11. At what age is a baby weaned from the breast? How is it done?
12. What foods are given after weaning? Obtain dietary pattern up to age when all adult diet eaten.
13. Is the baby ever given water to drink?
14. Is the baby ever given beer?
15. Is the baby ever given skimmed milk?
16. Do you give the baby anything to prevent worms? What? How often? How much?
17. Do you give the baby anything to get rid of worms? What? How often? How much?

18. Do you ever give the baby an enema? Why? At what age?  
How often? What is it?
19. Do you give the baby a purgative? Why? What type?  
How much? How often?
20. If a baby has diarrhoea, what do you give it to eat and  
drink?
21. At what age does a baby feed itself without assistance?
22. Has anyone told you what foods to feed a baby?

ANY OTHER INFORMATION.

INSTRUCTIONS FOR USING QUESTIONNAIRE

1. If possible interview the housewife in her own home where she can show the interviewer the measures used.
2. Explain to the housewife that the information is confidential, and is to be used to produce a description of the food eaten in Swaziland. If she has doubts about the confidential nature of the Survey, one can point out that by the time one has interviewed several people one cannot recall specific points about any of them.
3. Ensure that answers are not put into the housewife's mouth. On the other hand she may endeavour to give an answer that pleases the interviewer rather than the correct one.
4. In a group of women being questioned together, there is a tendency for all the women to say they eat a certain food once one has stated that her family eats it. Thus it is better to interview the women singly if possible.
5. Under "any other information" can be put any comment that the housewife may have to make about her family's food and nutrition.

Square No.

Homestead No.

Name of Informant.

Age.

Education.



4. How much mealie meal do you use a day?  
Can you show us the container you use to measure the mealie meal?
5. Do you use homeground or mill-ground mealie meal?  
Is it sifted or unsifted?
6. How much samp do you use a week?  
How much mealie rice do you use a week?  
How much rice do you use a week?  
How much bread do you buy?
7. How much amasi or milk do you use a week?
8. Do you buy powdered or condensed milk?  
Is it for the baby or the whole family?
9. How much meat do you buy a week? (Express in shillingsworth if weight is not known)  
What sort of meat is it? beef? or goat?  
or chicken?
10. Does your household eat eggs? If so, how many a week?  
Are they a) from your own hens? or b) bought?  
or c) a gift?
11. What quantity of beans does your household eat each week?
12. Do you eat tinned fish? How often?
13. What vegetables does your family eat? List them :-
14. Does the household eat igusha? or wild spinachs?
15. What quantity of nuts are eaten by the household?
16. Do you purchase cooking oil, Holsum  
Margerine? How often?
17. How often do you buy (times per week) tea coffee  
cocoa salt white sugar brown sugar?
18. What did the household eat yesterday? Describe the meals  
for the day, indicating quantity as far as possible.
19. If you had more money what foods would you like to buy  
in larger quantities more often?
20. Can you give us any other information on your household's  
eating habits?

CHI-SQUARED TESTS OF SIGNIFICANT CORRELATIONSA. PRIMARY AREAS :1. Education of the Mother and Calorie Index:

	Schooling	No Schooling	
Above	18	16	34
Below	63	127	190

81

143

$$\text{Chi-squared} = 4.07 \quad (\text{df:1})$$

$$p = 0.05$$

Null hypothesis rejected at the 0.05 level of significance.

2. Education of the Mother and Summary of Nutrient Values:

	Schooling	No Schooling	
First half	19	17	36
Second half	63	126	189

82

143

$$\text{Chi-squared} = 4.13 \quad (\text{df:1})$$

$$p = 0.05$$

The null hypothesis is rejected at the 0.05 level of significance.

3. Mission and Traditional Affiliation and Income:

	Traditional	Mission	
No Income	29	25	54
Income	27	77	104

56

102

$$\text{Chi-squared} = 10.91 \quad (\text{df:1})$$

$$p = 0.001$$

There is a highly significant relationship between Traditional and Mission affiliation and income.

4. Separatist and Traditional Affiliation and Income:

	Separatist	Traditional	
No Income	4	29	33
Income	16	27	43

20

56

Chi-squared = 4.83 (df:1)

p = 0.05

The null hypothesis is rejected at the 0.05 level of confidence.

5. Mission and Traditionalist Affiliation and Diet Cost:

	Mission	Traditional	
Diet Cost 0-5 cents	60	24	84
Diet Cost 6 cents and over	54	5	59

114

29

Chi-squared = 7.46 (df:1)

p = 0.01

There is a relationship between Mission and Traditionalist affiliation and diet cost.

6. Religious Affiliation and Calorie Index:

	Mission	Traditionalists	
Above	25	5	30
Below	89	65	154

114

70

Chi-squared = 5.91 (df:1)

p = 0.02

The null hypothesis is rejected at the 0.02 level of confidence.

7. Calorie Index with Male-Female Ratio:

	Above	Below	
Under 1.0	7	73	80
1.0 and over	21	68	89

28

141

Chi-squared = 5.69 (df:1)

p = 0.02

The null hypothesis is rejected at the 0.02 level of significance.

B. CONTROL AREAS :

8. Family Size and Quantity of Maize Meal per Head:

	Family Size 1-5	6 and Over	
Maize meal Under $1\frac{1}{2}$ lbs	40	65	105
Over $1\frac{1}{2}$ lbs	17	9	26

57

74

Chi-squared = 5.25 (df:1)

p = 0.05

The null hypothesis is rejected

9. Income with Quantity of Maize Meal per Head:

	No Income	Income	
Under $1\frac{1}{2}$ lbs	33	37	70
Over $1\frac{1}{2}$ lbs	16	5	21

49

42

Chi-squared = 4.38

p = 0.05

Income is not related to the quantity of maize meal consumed per head per day

10. The Number of Fat-Rich Foods Purchased Tested with Income:

	No Income	Income	
Purchasing Fats	73	52	125
Not purchasing	34	7	41

107

59

Chi-squared = 7.07 (df:1)

p = 0.01

The null hypothesis is rejected at the 0.01 level of significance

11. Number of Protein-Rich Foods Consumed Tested with Family Size:

	Family Size 1-5	6 and Over	
2 Protein foods	57	68	125
3 and 4 Protein foods	9	38	47

66

106

Chi-squared = 9.02 (df:1)

p = 0.01

Family size affects the number of protein rich foods consumed

expressed cravings for certain foods, and nausea on eating others. The variation was great, but those women who avoided certain protein foods (e.g. meat) on account of nausea, further restricted a potentially inadequate diet.

## 2.2. Confinement:

It is unusual for a woman to prepare any clothes for the expected baby - to do so would be to invite bad luck, but many women will secretly wash and put away used garments. As term approaches the woman collects firewood from the mountains, in preparation for the confinement.

The child is usually born at the husband's village. At the onset of labour the woman is slow to reveal the fact, and it is left to the grandmother to summon the elder women to the confinement. The baby is born in a store hut, or in the husband's mother's hut if the spouse of the latter is deceased. 1)

The baby is washed soon after delivery and, according to Marwick, 2) the umbilical cord is cut about 6 ins. from the navel, and tied with a sinew as close to the body as possible to encourage the shedding of the stump. Frequently the cord is encouraged to drop off by inflicting small nicks with a knife, broken bottle or sharp reed. Ashes are rubbed into the wound. With such treatment the cord drops off within a few days. 3)

Soon after the birth the grandmother selects maize or sorghum (depending on clan custom) which have no black spots. The cereal is very finely ground, sifted and made into a thin porridge, inembe. Only after the baby has been fed this porridge with a cupped hand is the mother allowed any food.

The delivered woman is given medicine to heal the tissues, and hop pumpkin water to drink which serves to warm up her body and to aid in the discharge of the afterbirth.

Marwick 4) described the midwives burying the afterbirth at night. Frequently, however, the mother is expected to bury the placenta during the early hours of the morning, in the cool, moist soil at the river below the place where the water is drawn. While the placenta is rotting there, the uterus is believed also to cool and heal faster. If the mother is not strong enough to walk to the river, she buries the placenta in the hut.

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1) Marwick, ibid. 141.

2) Marwick, ibid. 142.

3) Infant deaths from tetanus are not uncommon.

4) Marwick, ibid. 142.

### 3. THE BABY :

#### 3.1. The Baby's First Food:

The Zulu baby is fed for the first few days of its life on cows' milk or emasi.<sup>1)</sup> The period of delay before a Swazi baby is breast fed depends on the clan teachings and on the influence of the medical services. The answers to the questionnaire revealed that the period varies from a few hours after birth to one week. The majority of mothers wait until the umbilical cord drops off, some three to four days after birth. It is at this time that the colostrum of the breast is finished and the milk 'comes in'. The mothers believe that colostrum is harmful and express it by hand. In the interim between birth and the initiation of breast feeding the baby is fed on inembe. This food has been held responsible, by many medical authorities,<sup>2)</sup> for much of the gastro-enteritis seen in the newly born. Inembe is given with breast milk for the next few months. If at any time the mother's milk fails, or if for other reasons she must wean the baby, she will use inembe alone. Mothers appear to appreciate the lactogenic properties of fluids, and a list of the foods that are believed to encourage the production of breast milk are given in Annexure B. Physical methods of stimulating a failing milk supply include rubbing soot on the nipple (a Zionist custom), or making small incisions on the breast and rubbing salt into these.

#### 3.2. Enemata:

Shortly after birth, a herb is obtained from the family herbalist (inyanga). This herb is treated to obtain an enema solution and is administered, formerly by means of a reed, and at the present time by an enema bulb. Its purpose is to clear the meconium from the stomach. Marwick<sup>3)</sup> maintains that enemata are given twice daily for six months and after that less regularly up to the age of two years. After this age an enema is given only if the child is ill. Questioning some 270 mothers elicited the fact that they all used enemata. There is a great variety in the types of enemata used, ranging from herbs to washing soap and water, they are administered with varying degrees of frequency and the reasons given for using enemata are manifold (See Annexure C). There is general agreement that a child cannot be raised in good health without such treatment.

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1) E. J. Krige, The Social System of the Zulus, (Longman, Green and Co., 1936), 66.

2) See Annual Medical and Sanitary Report, Swaziland, 1957. 10.

3) Marwick, op. cit. 145.

### 3.3. Early Life:

After the birth, the hut is swept daily but the dirt is not thrown out until the umbilical cord drops off. The mother and baby are confined to the hut and for the first few days receive no visitors except those who assisted at the birth. The length of the period of confinement is dependent upon the mother's status, but a month is considered a suitable period. The purpose of the seclusion, the Swazi say, is to protect the mother and child from harm at this vulnerable time. This is an excellent method of preventing intercurrent infections from reaching the baby and to ensure that the mother gives all her attention to the new baby while yet having time to recuperate. During this period the woman is considered 'unclean' and is not allowed to cook for men. She uses her own utensils and a calabash rather than a spoon. <sup>1)</sup>

By tradition, a few days after the birth a goat is slaughtered. The mother consumes some of the meat, but the purpose of the slaughter is to provide a skin in which to carry the baby. (It is no longer customary for mothers to carry babies in a goat's skin, and a blanket is used instead, but the custom of slaughtering continues).

### 3.4. Ceremonies:

The first few weeks of life are marked by two ceremonies. The first, ukubuyisela, involves the use of an enema and 'smoking' of the child. <sup>2)</sup> After this the child is frequently 'smoked' in the fumes of certain burnt medicines, tinyanatane. The 'medicines' are usually the hide or hairs of chosen animals. The purpose of the smoking is to hasten the closing of the fontanelle and to protect the child from evil forces. The most dreaded influence of evil forces is manifested in "inyoni" (the disease is usually referred to as impezulu, the former term being considered too direct), the presenting syndrome of which is a depressed fontanelle, a distended abdomen with or without prominent blue veins, vomiting and the passage of green stools. (A European doctor would probably diagnose the condition as gastro-enteritis with dehydration). The disease is treated by the herbalists.

The second ceremony occurs during the fourth month of the baby's life when it is shown to the moon, and after this the child is recognized as a human being rather than an object.

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1) Marwick, op.cit. 143.

2) For full descriptions, see Marwick, op.cit. 144 and Beemer, op.cit. 76.

### 3.5. The Child's Diet:

For the first few weeks the baby is fed on breast milk and inembe only. The baby is offered the breast whenever the mother believes the child to be hungry. A crying baby is deemed a hungry one, but if it refuses to feed some other cause is sought. Mixed feeding is introduced at around three months of age.

TABLE 1

AGE OF INTRODUCTION OF MIXED FEEDING  
EXPRESSED AS A PERCENTAGE

No. of Answers	B A B Y ' S A G E I N M O N T H S								
	Under 3	3-6	7-10	11-14	15-17	18-22	23-26	27-30	Over 30
70	4.29	65.71	20.00	2.85	1.43	1.43	-	2.86	1.43

The great majority (70%) of the mothers in our sample introduced mixed feeding by six months, and almost all by ten months. The age of the mother appears to have little influence upon the time that mixed feedings were introduced (Table 2). This indicates that it has long been customary to introduce supplementary foods at an early stage.

If the mother's milk fails while the baby is still young, the diet is supplemented with inembe or diluted fresh cow's milk, or powdered milk usually made in very dilute solution ("enough powdered milk to colour" is a typical answer) and administered in dirty plastic bottles.

In a society which is not very time conscious, and which rears its children without the authoritative word of books on child management, the specific food and the time of its introduction are not easy to establish.

The first foods are usually emasi and thin porridge (sometimes soured). By four months of age a child has its own calabash for emasi, if milk is available. At five months the baby will share a bowl with its mother and the children of the household will take great delight in playing with it and offering it tit-bits from their own bowls.

At six months of age it may be eating potatoes, cowpeas or jugo beans, pumpkin or squash. The nature of the introduced food is very dependent upon the season of the year. Apart from pumpkin and squash, vegetables and fruit are withheld until the child is nearly one year old.

is believed to be taking the dead child's milk; or if another pregnancy commences the child is weaned at the fifth month. Other possible reasons for early weaning are European influence (unlikely), working mothers, (a much more likely cause) and failure of the milk supply. It seems strange that African mothers who produce ample quantities of milk in the rural environment should fail when they live in the towns. The Red Cross officials confirm that inadequate breast milk levels are found in many mothers attending the clinic. The failure may be explained by the stress of town life, and the readily available baby foods that may keep a mother from persevering with breast feeding. Trowell <sup>1)</sup> states that "African mothers regard lactation placidly as natural, inevitable and desirable. This attitude is rapidly passing among the more sophisticated groups."

About half the mothers of under fifty years old wean their children after twenty-two months. Of mothers now aged over fifty years, more than three-quarters of the babies were weaned after the age of twenty-two months. In questioning these elder women they would frequently reply: "We wean the child when he is old enough to herd cattle" or "when he is old enough to ask for the breast". Several children of three and four years of age were observed to be running to the breast for comfort.

Table 4 suggests that the age of weaning is being reduced to under the two years of age, probably owing to successive pregnancies.

The weaning period is very brief. A bitter substance is rubbed on the nipples, usually aloe juice, although chillies are sometimes substituted; the Zionist mothers use ashes. To appease the child a chicken is slaughtered and the infant given the gravy. Formerly the child was sent to the grandmother's home to forget the breast. The weaned child receives a diet high in carbohydrate, low in animal protein and in fat. If he catches an inter-current infection his appetite may diminish and the intake become inadequate. A bout of gastro-enteritis treated with purgatives and enemata lay the foundations for protein malnutrition.

### 3.7. Sickness:

The mothers were questioned on the treatment they gave the children to prevent and cure intestinal worms. Further questions were asked on reasons for giving purgatives and the type used. The same herb brews are frequently used as both an enema and a purgative. (See Annexures D and E.) These should be further investigated to determine their preventive and curative properties.

The traditional way of curing infantile diarrhoea is by the feeding of a cow dung and dagga mixture. The cow dung is still used, along with a host of other herbs and foods. The different 'cures' have been listed in Annexure D.

1) A. C. Trowell, Non-Infective Disease in Africa (London, Edward Arnold, 1960), 328.

TABLE 4

AGE OF MOTHER AND WEANING AGE OF BABY EXPRESSED AS A PERCENTAGE

Mother's age in Years	No. in Group	Baby's age in months									Total %
		Under 3	3-6	7-10	11-14	15-17	18-22	23-26	27-30	Over 30	
Under 20	3	-	-	-	33.33	-	33.33	-	-	33.33	100
20-29	24	-	-	8.33	12.51	16.67	8.33	45.83	-	8.33	100
30-39	19	-	-	5.26	15.79	5.26	31.58	42.11	-	-	100
40-49	19	-	-	5.26	15.79	-	15.79	47.39	-	15.78	100
50-59	7	-	-	-	-	-	14.29	<u>85.71</u>	-	-	100
60-69	13	-	7.69	7.69	-	-	7.69	30.78	-	46.15	100
Over 70	5	-	-	-	-	-	-	20.00	-	<u>80.00</u>	100

#### 4. THE CHANGING PATTERN OF CHILD CARE :

The traditional pattern of child-birth and management has been preserved in the rural areas with some small changes (e. g. the use of the blanket in which to carry the baby, and the dressing of the child in European baby clothes).

However, other influences are impinging on the traditional methods and a period of transition ensues.

##### 4. 1. Clinics and Hospitals:

Both Government and Mission clinics are scattered throughout the Territory and pregnant women are encouraged to attend these for examination and advice. The clinics vary in the quality and quantity of ante-natal teaching that they give. It is not always possible for clinics to set aside a particular day for visiting expectant mothers. As a result a busy woman may have to make arrangements for someone to do her work at home, and walk some distance to the clinic to await her turn in a long line of other patients, hardly an encouragement to regular attendance.

The clinics act as a screening organization: cases in which difficulty is expected can be referred to the visiting doctor and mothers may be advised to deliver the child in hospital.

The clinics also dispense, free of charge, the skimmed and full-cream powdered milk supplied by U. N. I. C. E. F. to all children under five years.

At the hospitals the same ante-natal facilities are offered, usually with a doctor in attendance. It is medical policy to encourage mothers to abandon their tasks during the last month of pregnancy and to await the baby at the hospital, where food and accommodation are provided. In this way, it is hoped to prevent premature delivery. At Government hospitals all maternity services are available at the cost of ten cents.

In hospital, the umbilical cord is cut, after delivery, breast feeding initiated within twenty four hours, and no enemata are given to the baby. However, many mothers confining in hospital are found surreptitiously administering an enema to the child.

##### 4. 2. Red Cross Clinics:

In some of the towns, Red Cross mother-and-baby clinics help the mother in the post-natal period. The Red Cross officials are doing an excellent job in encouraging breast feeding, distributing powdered milk and helping needy cases. Attendance figures at these clinics are mounting.

#### 4.3. Zionist Religion:

Adoption of this religion has led mothers to make use of prayer, water and ashes in preference to the traditional medicines. For enemata, water or soap and water are frequently used.

#### 4.4. Urban Mothers:

There is an unconfirmed impression that the incidence of kwashiorkor is greater in the urban than in the rural areas. The urban mother is usually deprived of the advice of her husband's mother, and also loses the chance of leaving the baby for short periods with her. Many of the urban mothers are working, but as babies are not welcomed by European employers, they are often left with a very young nursemaid, and are given a poorly mixed, dilute feed in a dirty bottle. Or the baby is sent to the grandmother's kraal in the country. Here cattle may be absent or not giving milk, and the grandmother may not know (or may disapprove) of the U.N.I.C.E.F. milk and the child receives an inadequate diet. When the child sickens the mother is summoned and she may take the child to hospital, or consult an herbalist.

A mother that retains her child in town is surrounded by a variety of foods, all highly advertised, but receives no guidance on buying practices. If a certain canned food costs a lot of money it is presumed to be good, yet the price prevents the mother from giving it to the child in adequate quantities. 1)

#### 5. SUMMARY :

A married woman is forbidden certain foods, and when she becomes pregnant new food avoidances are introduced. No special foods are added to the woman's dietary at this time. If the season is one of hunger, then she deprives herself to feed the other children. The result is that the woman often has an inadequate protein and calorie intake to cope with the demands of pregnancy and lactation.

If the woman delivers in the rural areas (as the great majority do) she will have a period of rest and recuperation after the birth, the length of time depending on her status and domestic responsibilities.

The woman who delivers in hospital will probably rest before the baby is delivered, and for a short time after delivery.

Lactation proceeds for a period of up to two years, unless another pregnancy ensues.

The baby's first food is starch and the breast milk is supplemented at an early age with carbohydrate and small amounts of protein foods. At two years the infant is on an adult diet.

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1) Recently, a medical officer was brought to a young baby fed only on a carbonated beverage. The green colour appealed to the mother and the aeration produced wind in the baby.

## 6. DISCUSSION :

The fundamental error in the puericulture practised by the Swazi women is the failure to recognize that the child's nutritional needs are not the same as an adult.

It would seem that the best approach is to stress those beneficial aspects of the child management that are already being practised, and perhaps to overlook (temporarily) other features. For instance, husbands can be encouraged to give their wives a milch cow. The Swazi readily understands that a baby's nutrition starts at the moment of conception, for they believe that the child, inside the womb, takes milk from the breast, and thus mothers can be encouraged to eat adequately. The value of ante-natal examinations can be stressed, and further advice may be given during the 'waiting periods' at hospitals; mothers would seize the opportunity to learn more about family feeding and the making of baby clothes. The value of lactation can be mentioned and the traditional early introduction of mixed feeding praised. Eggs are not forbidden to babies; it is merely that they are foods in short supply, not usually thought vital to nutrition, and are given to the head of the home. With some advice mothers would make an effort to ensure that the baby received eggs. The traditionally cultivated bean can be promoted as a good supplementary food for the six months old child.

So far the success of the medical authorities' campaign against the enemata has been almost nil. Little can be lost by stressing the beneficial positive side of child management already practised, and by overlooking the administration of enemata. The example set by the hospitals in not administering them may prevail, but not quickly.

The urban mother presents the greater problem, for she is probably working prior to and after delivery. One can only press for education in infant feeding and wise buying practices in an already crowded school curriculum, and for the establishment of health visitors, creches and mother-and-baby clinics.

## 7. HERDBOYS :

Herding is considered a boy's job, although occasionally, if there are no sons of the right age, a girl may be seconded to the job. At five years of age the young boy will be given the calves and goats to look after; as he becomes more experienced he will assist in herding the cows and oxen.

During the growing season of the crops the herdboy has to be alert to prevent the cattle trespassing into the fields. If the cattle do wander into the crops, the owner has the right to beat the herdboy (if he can catch him); when all the fields are harvested the cattle wander almost at will and the herdboys can indulge in games.

The herdboys are up early, and on days when cattle are dipped, very early. For it is an advantage to be early at the tank and so avoid waiting. Customs vary. In the hot summer days in the bushveld the cattle are out early to graze while it is still cool. The herdboys bring them back around 11 a.m. for milking, and to eat the morning meal. In other areas, where the heat is less great or when the cows are 'dry', the herdboys will have breakfast before they depart.

Rarely do the herd boys carry food with them. They forage on the veld for fruits, berries and edible insects. When thirsty, they milk from the cow straight into their mouths.

Each herdboy carries a catapult which he uses to kill birds. Traditionally the herdboy must carry any slain birds home to his father, who returns the head and crop of the bird to the slayer and roasts the remainder for himself. Sometimes, however, the temptation to eat the whole animal is too great and smoke curling up in the middle of the veld, betray herdboys enjoying an illicit roast.

When an ox is slaughtered the upper lip, appendix and a certain part of the stomach are the prerogative of the herdboys. To the herdboy falls the pleasure of licking the wooden serving spoon for porridge, but the pot scrapings are for the girls.

Clinical examination of herdboys showed them to be thin, with a prominent rib cage, and bearing the marks of their outdoor activities. Under the dirt were dry, scaly skin on limbs; they had fissured lips and ringworm.

As the advantages of education are more widely realised the number of children available to herd the cattle is lessened. This creates a problem which could be solved by fenced grazing camps.

## 8. SCHOOLCHILDREN :

Children of ambitious parents attend the local school as soon as they are six years of age, or when they are able to walk the distance to school.

In a well-organized home within reasonable distance of the school, the child will receive breakfast before departure. But in other homes the child has either to forgo the meal or, if lucky, consumes the 'left-overs' from the previous night.

It is beneath a schoolboy's dignity to carry food to school, and so only the girls do. It was noticed, however, that only the minority of girls do so. Enterprising girl scholars sell 'fat-cakes' during the lunch hour to more affluent classmates. Only the Swazi National School supplies a midday meal to day scholars.

The schoolboy, and frequently his sister, must walk to school, partake in lessons and sports and then return home before being able to gorge a meal. This meal is usually the food saved from breakfast for them; later the big meal of the day is eaten. In 1938, Keen <sup>1)</sup> pointed out the strain of attending school under these conditions and the apparent effects on their normal physical and mental development.

The remedy is school meals, but one must consider the relative isolation of many schools, lack of facilities and personnel, and above all, the shortage of money. <sup>2)</sup>

## 9. SCHOOLCHILDREN'S ATTITUDES TO FOOD <sup>3)</sup>:

In the course of the fieldwork, the impression had been received that schoolchildren differed in tastes from their parents and from their peers not attending school. In order to test this hypothesis, and to obtain an idea of the future food demands, all the Swazi schoolchildren in Grades V and VI were asked to write an essay on "Foods - those I like and those I dislike." Eight hundred and fifteen essays were received.

On reading the essays, it was manifest that the section on enjoyed foods was unworthy of analysis, being based on the hygiene lessons at school (e.g. "I like cod-liver oil because it contains Vitamin D"). When the disliked foods were considered the children allowed their prejudices and physical experiences to take command.

### 9.1. Frequency Table of Food Dislikes:

Each essay was studied, and the frequency of each disliked food was obtained. The disliked foods were then tabulated in descending order of percentage frequency (see Table 5). The ten most disliked foods were then subjected to further analysis.

The reasons for disliking the foods were analysed into seven specific categories: aesthetic, education, physiological, beliefs, other reasons, unintelligible response, and no response.

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- 1) Keen, op. cit. 32.
  - 2) This subject is further discussed in the final chapter.
  - 3) This section is based almost entirely on the work and account written by Miss C. Bennett, B.A.

TABLE 5.

FREQUENCY WITH WHICH FOODS WERE DISLIKED

Food	Frequency	%
Porridge	178	21.8
Pumpkin	140	17.1
Sour Porridge	121	14.8
Beans	90	11.0
Beer	83	10.0
Nuts	66	8.0
Pork	57	6.9
Fish	52	6.3
White Bread	48	5.8
Meat (Beef)	47	5.7
Emasi - sour milk	47	5.7
Milk	42	5.0
Rice	37	4.5
Sijabane	31	3.8
Mealies	31	3.8
Igusha - wild vegetable	31	3.8
Peas	31	3.8
Carrots	28	3.4
Sweets	25	3.0
Melon - vegetable	24	2.9
Samp	24	2.9
Tomatoes	22	2.6
Le mon	22	2.6
Cabbage	20	2.4
Potatoes	18	2.2
Cheese	16	1.9
Egg	16	1.9
Fat	15	1.8
Jam	15	1.8
Coffee	14	1.7
Mango	14	1.7
Mutton	12	1.4
Sugar	12	1.4
Bananas	12	1.4
Wild Fruit	12	1.4
Tea	12	1.4
Jam	12	1.4
Potatoes - sweet	12	1.4
Beetroot	10	1.2
Madumbe	10	1.2
'Bought' Fruit	10	1.2
Wheat	9	1.0
Cassava	7	0.8
Pineapple	5	0.6

## 9.2. Definition of Categories:

**Aesthetic:** or kynaesthetic knowledge of food. This category included the widest range of reactions, all connected with the immediate experiences of the senses of taste, touch, smell and appearance of a food. Some examples also came under the mental or emotional effect of food, such as boredom and monotony, or some association with the food of a former unpleasant experience. An example of the latter was a child who vomited in revulsion against black-jack porridge, not because of what constituted the porridge, not because she did not like it for itself, but because she had once been forced to eat it as a punishment. Pain was not included under this heading.

### Education:

This category included theoretical knowledge of foods, gained by the children from their teachers, their books, or by contact with others whose advice remained in their minds, but had not been converted into experience. There were found to be a mixture of valid reasons, erroneous information, and wrongly assimilated facts about nutrient deficiencies, beneficial foods and precautions against disease. Sometimes a minor fact learnt from a book had been too carefully stressed, resulting in an attitude that was detrimental to their diet, e. g. white bread was said to have less vitamins than brown bread, and therefore brown bread was to be eaten in preference. Many children interpreted this as white bread having so few vitamins as to be useless, and had in theory excluded it altogether from their diet. Their education named possible sources of dietary deficiency that they took as a cause of mal-nutrition.

### Physiological:

To define this category it was decided to include foods that caused unpleasantness or pain after swallowing. This was the knowledge of experience, as opposed to educational knowledge, and included such reactions as vomiting, stomach-ache, constipation and skin eruptions mainly.

### Beliefs:

Under this heading were placed the foods avoided because of the teaching of the Church, or taboos of the tribe or family.

### Any Other Reason:

There were few reasons given that could be included here - the main one was cost of a certain food, generally an unusual, or "European" food.

### Unintelligible Responses:

This meant that a reason had been given by the pupil, but that the scrutineers were unable to give it a satisfactory interpretation, usually owing to children's curious mode of expression.

### No Response:

In this category the children had not given any reason.

### 9.3. Correlation:

The two essay scrutineers perused thirty of the essays independently and allotted categories to the reasons for disliking the foods. The essays were then exchanged and the extent to which the two readers agreed on the allocated category calculated. Some 95% agreement was obtained.

### 9.4. The Analysis:

In Table 6 are reproduced the analyses for the ten most disliked foods.

#### Porridge:

It was surprising to find more educational than physiological reasons for disliking porridge. This can perhaps be explained by the fact that the children have been taught that it is not beneficial to eat porridge alone without the addition of those other foods that aid the nutritional balance of a diet. They have learnt that proteins are necessary for health, and that porridge is of less value, being chiefly carbohydrate. This attitude is sometimes linked with a slight contempt for the Bantu way of life, although some children militantly declare that as their diet produced such strong forefathers the Europeans' advice about food is quite unnecessary. One or two thought porridge a status symbol, and that only inferior people ate it, (did not Europeans think that "it is like putty used in windows?") Theoretically, they have rejected porridge, but in practice continue eating it as their staple food. They gave the expected physiological reasons for their disliking porridge, viz: constipation, vomiting, indigestion, stomach-ache, etc. Porridge is highly valued for its satiety value, although it is sometimes realised that the irregularity of Swazi feeding causes them to over-eat when food is available. (As one boy puts it: "A stomach becomes like a balcony.")

Education promotes changing standards and this led to an increasing awareness of the monotony of their diet, which accounted for some of the reactions under the aesthetic heading. A slight refinement in the children caused them to react to the taste, touch, texture and sight of porridge and other foods.

TABLE 6

ANALYSIS OF THE REASONS FOR DISLIKING CERTAIN FOODS

(AS A PERCENTAGE)

	Aesthetic	Education	Physiological	Religious	A.O.R.	We Don't Know	No Reason
Porridge	24.7	46.7	28.0	-	3.0	-	9.5
Pumpkin	18.0	34.3	35.0	-	2.1	2.1	8.0
Sour Porridge	25.5	43.8	48.0	-	3.3	2.4	7.4
Beans	3.3	11.0	50.0	1.0	1.0	-	7.0
Beer	6.0	20.5	65.0	2.4	8.4	-	3.6
Nuts	9.0	9.0	57.5	-	-	-	33.3
Pork	31.5	17.5	29.0	1.7	1.7	5.3	1.7
Fish	53.9	2.0	38.4	-	7.7	2.0	16.1
White Bread	4.0	58.3	16.6	-	4.0	4.0	8.3
Meat	2.1	14.9	23.4	-	17.0	2.1	2.1
Emasi - sour milk	38.3	55.3	40.4	-	2.1	-	4.3

### Sour Porridge:

With this food there was an even balance between educational and physiological reasons, with some inaccurate information in both categories. The aesthetic reasons were the sour taste and smell. The children had been taught about germs and bacteria, and in many cases could give a graphic account of what they meant. Their logical train of thought was: it is sour to taste, nasty to smell, it also contains bacteria: therefore it is not good to eat. They concluded that nothing sour had any food value, and therefore sour porridge was useless in the body. Because of this reasoning even those who liked the taste and smell, theoretically rejected sour porridge. Some were concerned specifically about its lack of protein.

Physiologically there was the notion that germs waged war in one's stomach, causing pain and disease. If the pain occurred in the chest this was called heartburn, and in one instance pain in this area meant TB. Heartburn was mentioned frequently. Sometimes the sour smell would be the cause of vomiting. The sense of sight was not offended.

### Pumpkin:

There was a balance between educational and physiological reasons for their dislike. Few aesthetic reasons given, as the taste and the smell were not considered unpleasant, and only one or two children did not like the appearance.

The alleged uselessness of pumpkin was stressed, as it contained neither starch nor protein, but mainly water. However, its merit seemed to be the lubricating function it had when mixed with porridge. As it consisted mostly of water, it was believed to have no beneficial effect on the body, and only a low satiety value. It could still cause indigestion, stomach-ache, constipation and vomiting. Some gave no reason for not liking pumpkin.

### Beans:

Predominantly the reason given for disliking beans was physiological. The only educational reason was that beans contain starch. They are considered a "heavy" food, and therefore believed to be one of the main causes of constipation. They also cause stomach-ache and indigestion. No aesthetic objections were mentioned.

### Beer:

This drink brought forth the strongest and most heartfelt reactions of dislike, which were given mostly on account of the physiological upset caused by too much beer-drinking. There had obviously been teaching against over-indulgence, and the theoretical knowledge had been made all too manifest to the children by their experience.

There was a surprising lack of religious reasons for abstinence. There was often a plea to correct their parents who had been degraded by drink. In one essay a boy revealed sorrow at the sight and thought of his nation being incapacitated by beer, ("My people lie like a dead in the road, but are still living.") There was a reaction against the Swazi losing control of themselves when intoxicated "and walk like they were driving the goats." A change in character was noticed when the father and mother became cruel through drink, and aberrations of the mind were deplored as a kind of madness. There were complaints of strange physical reactions like palpitations, breathlessness and fever, as well as the usual vomiting.

#### Nuts:

Very few aesthetic objections were given, but there were some misapplied educational reasons, such as nuts being lacking in vitamins, and the cause of toothache. The main reasons for dislike were physiological, such as the fact that nuts cause constipation, indigestion and stomach-ache. Nuts were never mentioned as being valuable because they provide oil and protein.

#### Pork:

The dislike of pork stemmed from aesthetic and physiological reasons. Education had taught them that pork could be 'measly' and contain worms, especially tapeworm. The Swazi intake of fat is very low, and their main objection to pig is that the meat is too fat. Traditionally, pork is not consumed. There is a revulsion in some cases which causes vomiting even if the person has not tasted the meat, but only sees it. There is also an objection to a pig being a "dirty" animal, and so its meat is considered unhealthy and a cause of illness. It is also disliked because it is so often badly cooked. Girls mentioned that they were forbidden to eat pork, but gave no reason for this. Some of the separatist churches discourage the consumption of pork on the grounds that it is an unclean animal.

Fish: (Tinned fish - usually well accepted, was not included in this category.)

The children were concerned about the smell of fish, and maintained that this alone could cause vomiting. There was suspicion in one or two cases because, as fish are water-dwelling they are not animal, but similar to snake. It could cause stomach-ache, and one essay declared that it stunted growth. Fish is not a traditional food, and one has the impression that not much fresh fish is prepared and eaten. Fried fish and chip shops are, however, well patronized.

### White Bread:

Children's dislike of white bread is almost entirely due to their education. The reasons given were that white bread contains no vitamins, only starch, and is therefore "useless". It contains no roughage and has low satiety value. A few children did mention that it was too expensive for them. It is regarded as a status symbol, and a European food. Some children complained of constipation, probably arising out of the low roughage content. Nevertheless, white bread sells in large quantities in both urban and rural areas.

Meat: (This category includes all meat except pork, but the children referred mainly to beef).

One of the main objections is that meat is too expensive. One of the school text books states that to eat too much meat is unhealthy, the children also remark on its lack of starch content. It can cause stomach-ache, vomiting and indigestion. There were some doubts expressed about the Swazi ability to cook it properly, probably due to the traditional way of serving meat 'underdone'. They are very conscious that it can become "measly" or "go bad".

### 9.5. Sex Differences:

No sex difference was found between the boys and girls in either the frequency of their dislike nor the reasons for the distaste for the food.

### 9.6. Discussion:

The purpose of this study was an effort to determine the future food tastes of the community and the acceptability of present foods.

In one sense, the experiment was a failure. The children were writing in a school situation and, in general, reproduced the information imparted by their hygiene lessons. (See Annexure G for a discussion on the textbooks and their influence on the essays). To overcome this it would have been necessary to conduct informal discussion in groups in a situation other than that of the school.

However, the essays did reveal features that are of value to a nutrition study. Although very few of the children wrote on their food dislikes, without the influence of their school education, the Aesthetic and Physiological response contain statements that quite obviously stem from personal experience. From these specific categories, two points emerge :-

- (a) There is a response of all the senses to a food dish. It has often been said by the ill-informed that the Bantu does not care about the appearance of the food. These

essays firmly contradict this statement. This fact is of great importance when mass feeding schemes are planned. For instance, porridge and relish are not favoured when mixed in the same bowl; they must be kept in separate dishes. When a new food is introduced, its appearance as well as its taste is of prime importance. The revulsion against fresh fish on the grounds of its source, appearance and taste, was general. However, the rural stores sell quantities of tinned fish. When the fish in the Swaziland dams mature, some guidance and encouragement may be necessary initially to make fresh fish dishes popular.

- (b) The tremendous pre-occupation of the Swazi with the gastro-intestinal tract. This is hardly surprising in people reared from birth on purgatives, enemas, and emetics. Whenever a Swazi is sick, recourse is made to enemata to reduce the fever; and emetics are prescribed by herbalists to remove tuberculosis. (A child with kwashiorkor was receiving enemata daily, and when the waning appetite allowed some food to be taken, an emetic was administered.) One of the chief complaints against a food was that it caused constipation: the lower the roughage content of the diet, the more often will be this complaint, a point for medical authorities to bear in mind.

Whilst abdominal distention and sleepiness after a meal induces a feeling of physical well-being, the same distention accompanied by flatulence provokes a distinctly unpleasant sensation. Beans and nuts were frequently blamed for this effect and for constipation. If it is desirable to encourage the consumption of legumes and nuts in Swaziland in homes and institutions, then ways must be found of rendering them less "indigestible". (It has been suggested that 'blanching' the beans prior to cooking and the withholding of salt until the beans are cooked, prevent the culpable skins from becoming leathery).

The fact that porridge, white bread and meat were placed among the most disliked foods does not indicate that their use as a food will decrease rapidly within the next few years. Meat was objected to chiefly on the grounds that it is sometimes 'measly', a theoretical consideration as far as the children are concerned. As meat inspection is more rigorously controlled, the incidence of 'measles' in meat will decrease and meat will continue to hold its place among the 'great' Swazi foods.

As yet, few of the rural people have money to purchase bread daily, but it finds favour as an easily prepared meal or snack. It is considered 'light', i. e. lacking in satiety value, and for some time maize will be used together with bread.

Sour porridge, pumpkin and wild vegetables are, undoubtedly, finding less favour and unless the last are fostered as nourishing foods, may disappear from the dietary.

Some authorities consider that "over emphasis on the superiority of the traditional diet in an effort to improve nutritional standards is generally useless".<sup>1)</sup> On the other hand, incorporation of a knowledge of the traditional diet into plans for improving the present state is probably desirable. The danger lies in over-emphasis.

It is apparent that some "culture shame" is attached to such basic traditional dishes as porridge and sour porridge. To the newly-literates this constitutes a potential danger for this very attitude may also cause their rejection of other traditional foods as relishes (wild spinaches, etc.), which provide at least some variety and balance in the diet. If these, too, become "non-U", culture shame together with lack of money and inadequate knowledge of nutritive values of bought foods, will aggravate the problem. These very circumstances may explain the inadequacy of the diet found in the peri-urban area.

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1) Malnutrition and Food Habits. Eds. A. Burgess and R. F. A. Dean. (London: Tavistock Publications, 1962), 54.

ANNEXURES

PREGNANCY AVOIDANCES AMONG SWAZI WOMEN

Avoidance	To Whom Applicable	Reason (if known)
<b>a) <u>Animals</u></b>		
Black sheep	Dhlamini Simelane	Used in death rites
Pig	Separatist Church members	An 'unclean' animal
Suckling kid (of a goat)	Ngwenya	
Reedbuck ( <u>Inhlangu</u> )	Maziya	
Hare ( <u>Umgwaja</u> )	Mqovu Maziya Vilane	
Rabbit	Maziya	
<b>b) <u>Birds</u></b>		
Crossbill ( <u>Sangoli</u> ) ( <u>Umguphane</u> )	Ndlangamandla Simelane	Ritual association with the animal * ditto *
Mousebird ( <u>Indlanti</u> )	Gwebu	
Wagtail ( <u>Umvemve</u> ) ( <u>Intsengo</u> )	Vilakati Simelane Maziya	
Butcher bird (Ilunga)	Mbamali	
<b>c) <u>Offal</u></b>		
Liver, kidney, spleen		
Cooked blood and fat ( <u>Ububendze</u> )	Myeni	
<b>d) <u>Plants</u></b>		
Solanum nigrum ( <u>Umsobo</u> )		
Leonolis leonurus ( <u>Tshwala benyoni</u> )	Mazibuko	
Gymosporus senegal ( <u>Sihlangu</u> )	-	Wood must not be used on the fire
Flowering shrub ( <u>Umphepheto</u> )	-	

\* H. Kuper. The Swazi, op.cit. 20, maintains that the Swazi have no developed totemic rites.

FOODS BELIEVED TO STIMULATE BREAST  
MILK PRODUCTION

Porridge

Boiled maize

Amahau, soured mealie meal drink

Incolosi, made from fermented beer strainings

Beer

Soured milk

Gravy, soup

Tea, coffee, fruit drinks

Jugo beans

ENEMATA

a) Types of Enema :

Soap and water

Salt water.

Umfusamvu (Pittosporum vividiflorum)

Umsuzwane (Lippia asperifolia)

Uluhlakahla (Agapanthus umbellatus)

Umsongo (Pelagonium aconitiphllum)  
or Acalypha  
Augustata Sond

b) Reasons for Using Enemata :

1. To prevent impezulu (inyoni).

2. For the general health of the child.

3. To heal the umbilicus.

4. To increase appetite.

5. To prevent Sipanda.

INTESTINAL WORMS

a) Prevention:

1. Patent mixture.
2. Unijela boiled with milk. (Quinine tree:  
Rauwolfia natalensis)
3. Worms are dried, ground and mixed with warm water, and administered by mouth.
4. A potion made using the male fern.
5. Ground pumpkin pips.
6. Uluhlungahlungu. (Veronia corimbosa shrub)

b) Cure:

1. Take the child to hospital.
2. Patent medicine.
3. Inkomankoma herb. (Tree fern: Nephrodium athamanticum)
4. Inkhomankome . (Wood fern: Dryopteris athamantica)
5. Umkhando. (Medicinal charm)
6. Umnyamathi. (Species of Essenwood tree:  
Ekekeria Copensis or Meyeri)

PURGATIVES

Castor oil.	
Milk of magnesia.	
Gripe water.	
Uluhlakahla.	* ( <u>Agapanthus umbellatus</u> )
Umphephe the	* (Species of small flowering shrub)
Uludlutshana	* ( <u>Aster hispidus</u> - a composite with lilac daisy flowers)
* Sanwati (isinwazi)	( <u>Rhoicissus cunefolia</u> - a climber with edible berries)

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\* Doke and Vilakazi op cit.

REMEDIES FOR DIARRHOEA

1. Hospitalization.
2. Sweet porridge, sour porridge, sorgum porridge, inembe.
3. Amaneu.
4. Beer.
5. Tea.
6. Water and ashes.
7. Cows milk, emasi.
8. Breast milk.
9. Whey.
10. Cow dung and milk.
11. Crushed wattle or marula bark infused.
12. Isikhuni (Ashes)
13. Mikhiwa (Wild fig)
14. Sihlangu \*(Gymnosporias senegal)
15. Umthuma \*(Bitter apple tree: Solanum sodamaeum)
16. Izifico \*(Protorhus longifolia or Heevia paniculosa)
17. Inkhokhoko \*(Ficus sonderi, Ficus ingeris or Wild almond Pygeum africanum)
18. Idololendoda \*(Indigofera hedyantha)
19. Umsongo \*(Pellargonium aconitiphllum)

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\* C. M. Doke and B. W. Vilakazi. Zulu-English Dictionary. (Johannesburg: Witwatersrand University Press, 1948)

THE INFLUENCE OF THE SCHOOL TEXTBOOKS  
ON THE ESSAYS

As is to be expected there are very marked traces of book-learning and school lessons in the scholars' attitude to food. This results in an overall awareness of the function of foods in the body, and an enlightened attitude as to keeping the body healthy. They acknowledge that the main factors contributing to health, which are those that are mentioned in their two books, Personal Hygiene and Healthy Living : that constipation makes one ill; food must be fresh and protected from germs; it is best to eat regularly, three times a day. (On the strength of the last mentioned factor some take sandwiches to school.) The benefit of fresh air (which is important, considering the low, windowless huts in which the people live) is stressed by the simple statement in Personal Hygiene - "Fresh air is a kind of food". Although the books urge them not to over-cook their food, nor to eat too much tinned food, few children complained of this in their essays.

Meat is mentioned in Healthy Living as being harmful to the body if taken in excess, which may have resulted in its taking its place in the top ten dislikes. (It is understandable that pork is disliked - mainly for its excessive fattiness.)

The children have taken to heart that white bread contains no vitamins, which means that bread is largely excluded from the diet, in theory but not in practice. One child volunteered that "people" thought that brown bread was dirty and only the poor ate it, and she regretted that such people were so ignorant !

Smoking does not seem to be a habit with them, for tobacco is rarely mentioned. The reasons given for not drinking beer or alcohol were those found in the school books, but a few heartfelt pleas to teach their parents not to drink excessively, were voiced. Occasionally drunken behaviour was explicitly described in an essay.

The text book emphasises that the cost of food is not a measure of value. Cost does not worry the Swazi unduly, because only the imported foods, like coffee, are expensive. These "town foods" are objected to because they are not customary, i.e. tinned and costly, and sometimes also because there is a feeling of their being the food of the Whites, and therefore an encroachment on the habits of generations of Swazi. But this is by no means a widespread attitude. One spendthrift child, because of the new eating habits acquired by her education, boasts of spending money on chicken and rice rather than on the usual maize and vegetables the family is used to. Conversely, one person thinks that the Bantu are stronger than the Europeans because they eat hard, strong food.

The two school books try to give information a religious slant, and use simple maxims. In school it seems, the child learns he is important, whereas he might have felt a cipher in the home. One consideration put forward for being conscious of the body and its need for care is that "through it the real YOU is made ready for the good things God has prepared for you when life is over." This seemed too abstract, for it was not reproduced in the essays. The maxim "prevention is better than cure", on the other hand, was frequently remembered in the essays.

## CHAPTER VI

### SOMATOMETRIC MEASUREMENTS AND NUTRITIONAL STATUS

#### 1. SOMATOMETRIC MEASUREMENTS :

##### 1.1. Equipment:

For weighing of children and adults a scale calibrated on the metric system was used. It had an accompanying height measure.

Young babies were weighed in a hammock suspended from a spring hook, also graduated in kilogrammes. Infants were weighed on a special scale, one which allowed for the counter-balancing of a blanket or other wrapping.

Skinfold thickness was measured by a pair of "John Bull" skin callipers, in which each graduation was 0.2 of a millimetre.

##### 1.2. Sample:

As far as possible, all the young babies in each home were weighed. Nevertheless, the sample was very small and it was deemed inadvisable for statistical treatment.

Adult weights proved more difficult to obtain. In an effort to procure accurate height and weight measurements, a rather cumbersome scale was purchased. It required the Land Rover to transport it from home to home. This was done, except in cases where the homestead was accessible only on foot. The people were not anxious to meet at a particular spot solely for the purpose of weighing. The weights and heights of adults when placed into age categories, proved too few for any definite conclusions to be drawn.

The schools presented the best situation for somatometric measurements :- they could provide a room for the purpose; a list of pupils and their age was obtainable from the register; and the subjects were captive, being under the discipline of the teacher. In each area, except the urban and peri-urban areas, the children at the local school were weighed, their height measured and a skinfold thickness reading made. On the return visit some five months later the procedure was repeated on the same children.

##### 1.3. Technique of Somatometric Measurements:

The younger children undressed completely; the older girls and boys retained their light uniform pants. The pupils lined up in registered order. The child stood in the centre of the scale with feet together and arms hanging relaxed by the sides.

Height was measured with the pupil in the same stance, and the chin forming a right angle with the floor. A horizontal bar was brought down the scale measure until it contacted the child's head (not hair). The reading was taken to the nearest centimetre.

The skinfold measure was made over the triceps. The child stood with the arms relaxed and a measurement was made of the distance between shoulder and elbow. At the midpoint, a fold of skin and subcutaneous tissue was lifted clear of the underlying triceps muscle, by means of the thumb and first finger of the left hand of the investigator. The callipers were then applied at a constant site on the lifted skinfold, and the reading taken to the nearest 0.1 millimetre. All skinfold readings were made by the nutritionist. Reliability was tested by selecting at random a child for a repeat measurement. Some difficulty was experienced with the adolescent girls, who, frequently, had a deep layer of subcutaneous fat.

#### 1.4. Bias:

The schoolchildren are a biased population. These are children whose parents can afford to send them to school and who can walk the, often long, distances to the school. One can thus expect these children to come from homes with some income and in which the children are comparatively adequately nourished.

However, it has already been described how in the Lowveld area the children left for school in the early morning prior to the first meal of the day, and on their return would eat the meal saved for them. It is extremely rare for a child, particularly a boy, to carry food to school. In an essay competition set for all Standard VI and VII pupils, some of them spontaneously mentioned the need for a meal to be served at school.

Keen,<sup>1)</sup> in 1938, investigated the heights and weights of boarders and day boys at the Swazi National School. He found that the boarding boys lost weight during the holidays. The day boys gained practically no weight during school time, but gained rapidly during six weeks holiday. The day girls gained well all the year. The headmaster confirmed that many day boys departed from home prior to the first meal of the day. The girls, however, brought a mid-day meal with them. (It is of interest that the failures in Junior Certificate were among the day boys, and the headmaster considered it 'impossible' for a day boy to get through this examination).

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1) P. Keen, An Investigation into the Diet of the Pupils at the Swazi National School during 1938. Annual Medical Report (1938 Swaziland), Appendix p. 27.



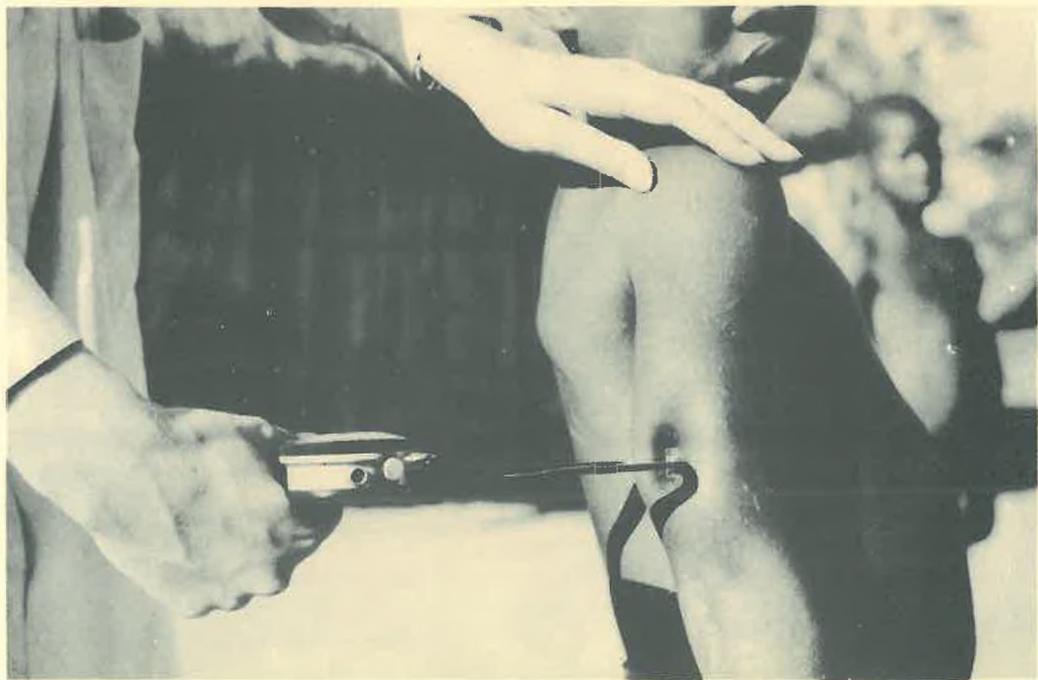
WEIGHING AN INFANT



WEIGHING CHILDREN



EXAMINING CHILDREN FOR SIGNS OF MALNUTRITION



MEASUREMENT OF SKINFOLD THICKNESS

TABLE 2

HEIGHTS AND WEIGHTS (LAUFER DATA)

Age	M a l e (994)		F e m a l e (1018)	
	Average Height	Average Weight	Average Height	Average Weight
6	114.50	20.15 kgs	113.30	20.00 kgs
7	118.36	22.78 "	117.30	21.78 "
8	119.90	23.64 "	123.40	23.96 "
9	127.25	26.00 "	128.80	27.45 "
10	133.30	29.08 "	132.80	29.70 "
11	137.10	31.00 "	139.40	33.70 "
12	142.20	34.38 "	144.00	37.30 "
13	145.50	40.14 "	149.80	42.80 "
14	152.90	46.70 "	152.40	47.56 "
15	162.30	52.00 "	155.70	51.70 "
16	165.30	58.40 "	155.95	56.80 "
17	167.40	61.70 "	147.50	59.45 "
18	169.60	63.50 "	-	-

### 1.7. Standard Curves:

It is common practice to compare heights and weights with standard curves. A better course would be to compare one group of Swazi with another Swazi group, known to be well-nourished. Such a group was not available in Swaziland, however, so recourse is made to the well proven Boston scale, Figures 3 and 4. These figures indicate that the arithmetic mean of the Swazi schoolchildren lie at or a little above the twenty-fifth percentile of the Boston standards.

Professor Ford has suggested that the term "malnutrition" be applied to all children whose weight was more than two-thirds below the median on the Boston weight standards. One doubts, however, whether Bantu children's physique can be compared directly with American children's. There is some evidence that children of another race can, with improved nutrition, achieve the American children's levels. If one is to adopt Ford's criteria then almost all the Swazi children measured by us and by Dr. Laufer, are "mal-nourished". Clinical examinations were not done on all these children, but were conducted with regard to other Swazi children (see later), and the incidence of other signs of malnutrition is nowhere near 100 per cent.

### 1.8. Weight Changes:

Longitudinal measurements over a period relating to one group of children are considered a better indication of physique than a comparison of one set of measurements with cross sectional norms.

The mean changes in weight from the first measurement to the second are shown in Table 3 and are graphed in Figures 5 and 6. The total number of cases is less than that in Table 1, for some of the children had either left school or were absent during the second weighing. The numbers of boys and girls gaining weight are almost exactly the same, and are much greater than those losing weight or with constant weight. Occasionally the loss of weight in a few pupils was so great that the overall alteration works out at a loss for the age group, (e. g. eight and eleven year old boys). The eight year olds may have been at a period of slow growth prior to the pre-pubertal spurt. The boys' weight change curve shows the greatest fluctuations. The drop in weight at the age of eleven years may be due to a growth in height, with no gain in subcutaneous fat, prior to the prepubertal spurt. The twelve to fifteen year old boys demonstrate the pre-pubertal spurt by weight gain. At sixteen the impetus appears to be over. The girls, like the boys, show a loss of weight at eight and again at eleven years, with a big rise at twelve and thirteen years, dropping before the boys at fourteen years. The loss at sixteen years is inexplicable, but may possibly be explained by school

Fig. 1 Height & weight of Swazi schoolboys.

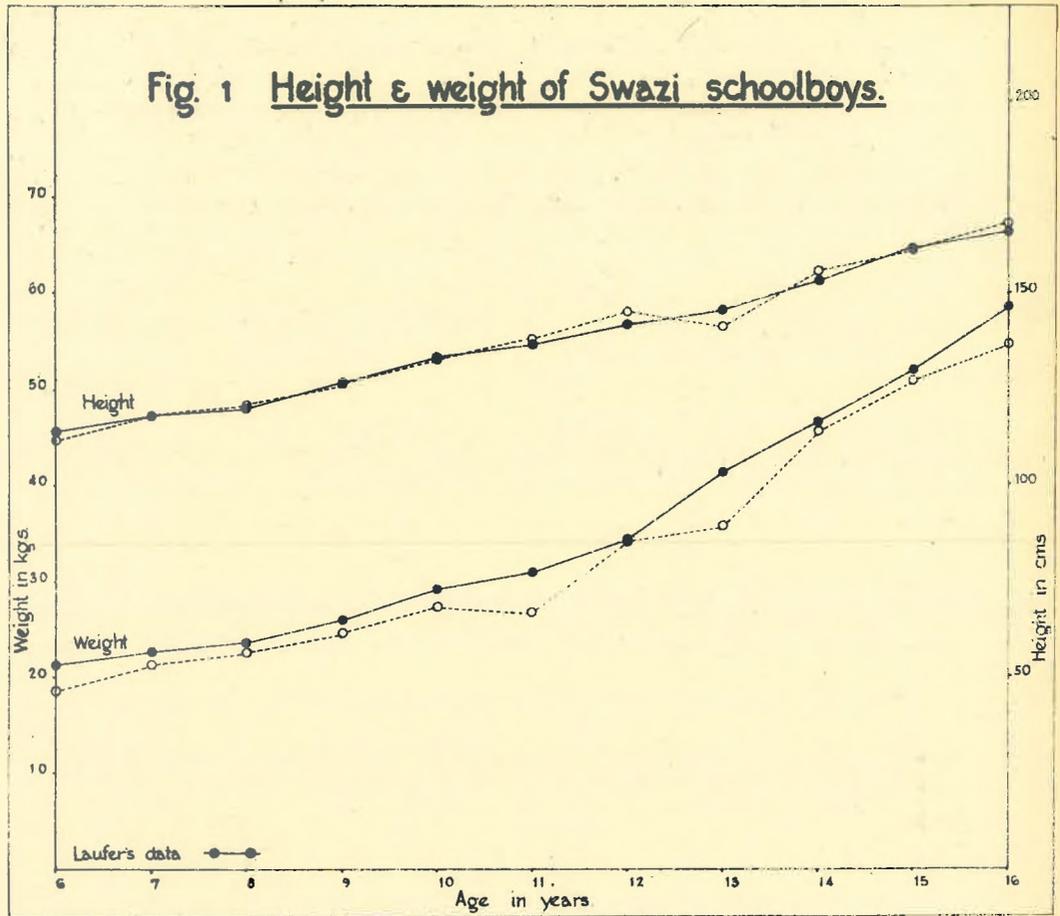
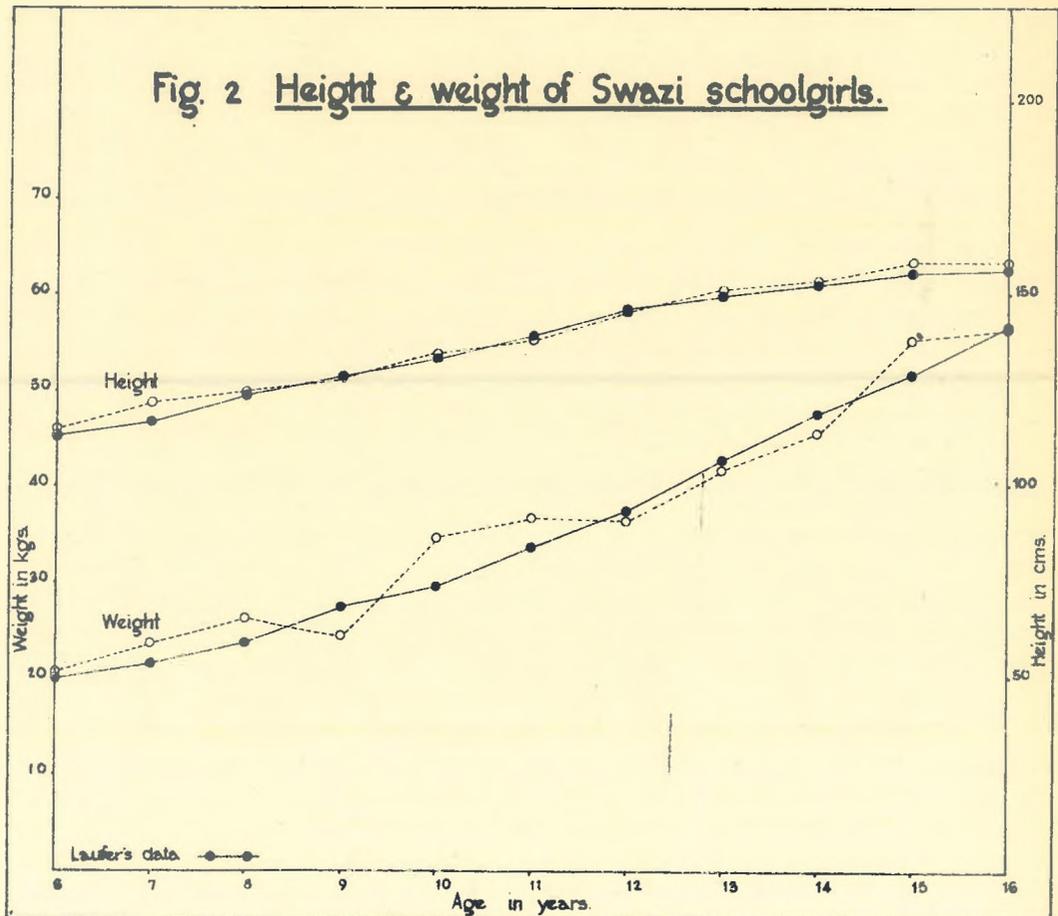


Fig. 2 Height & weight of Swazi schoolgirls.

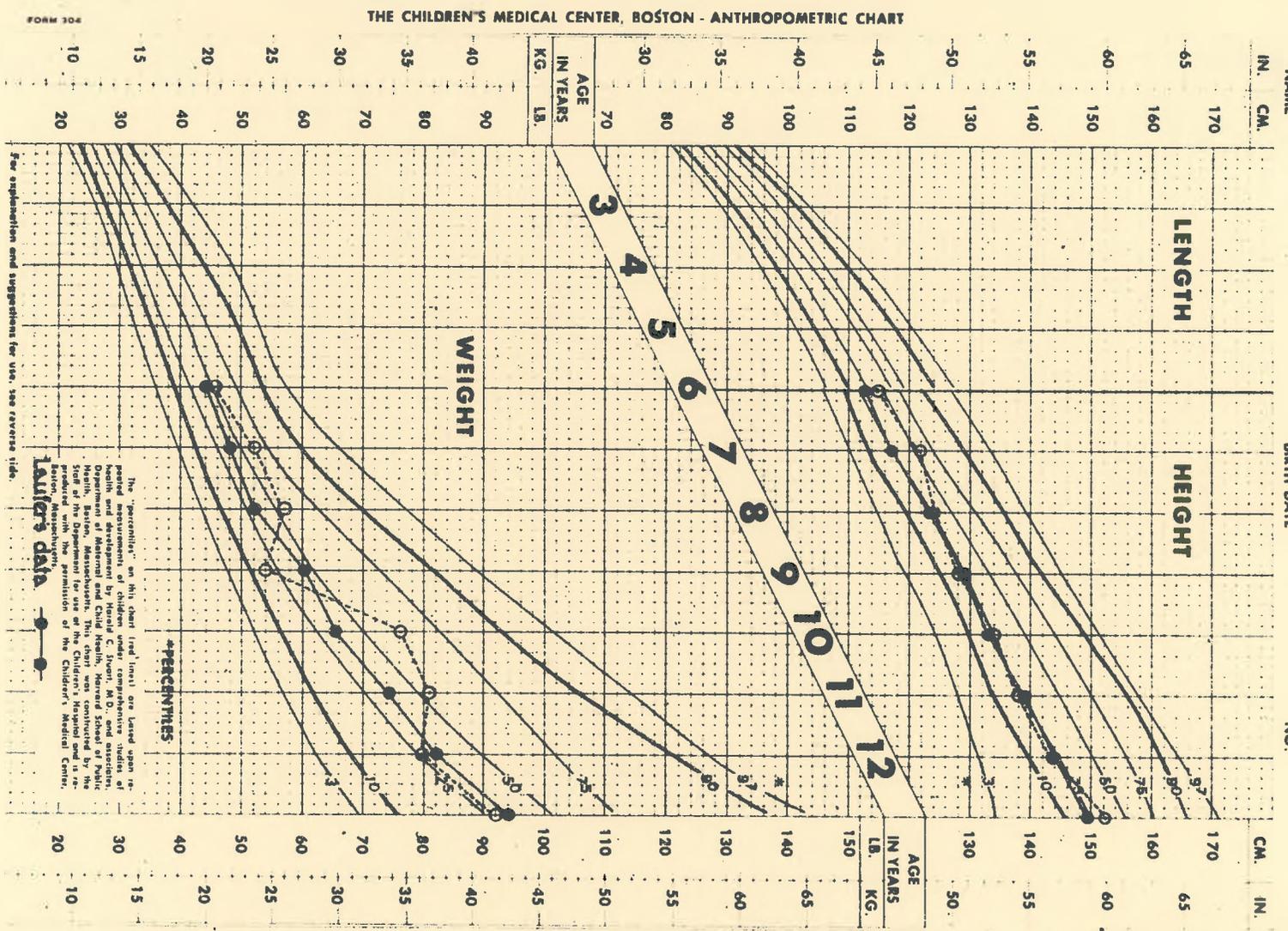




**Fig. 4.**  
NAME

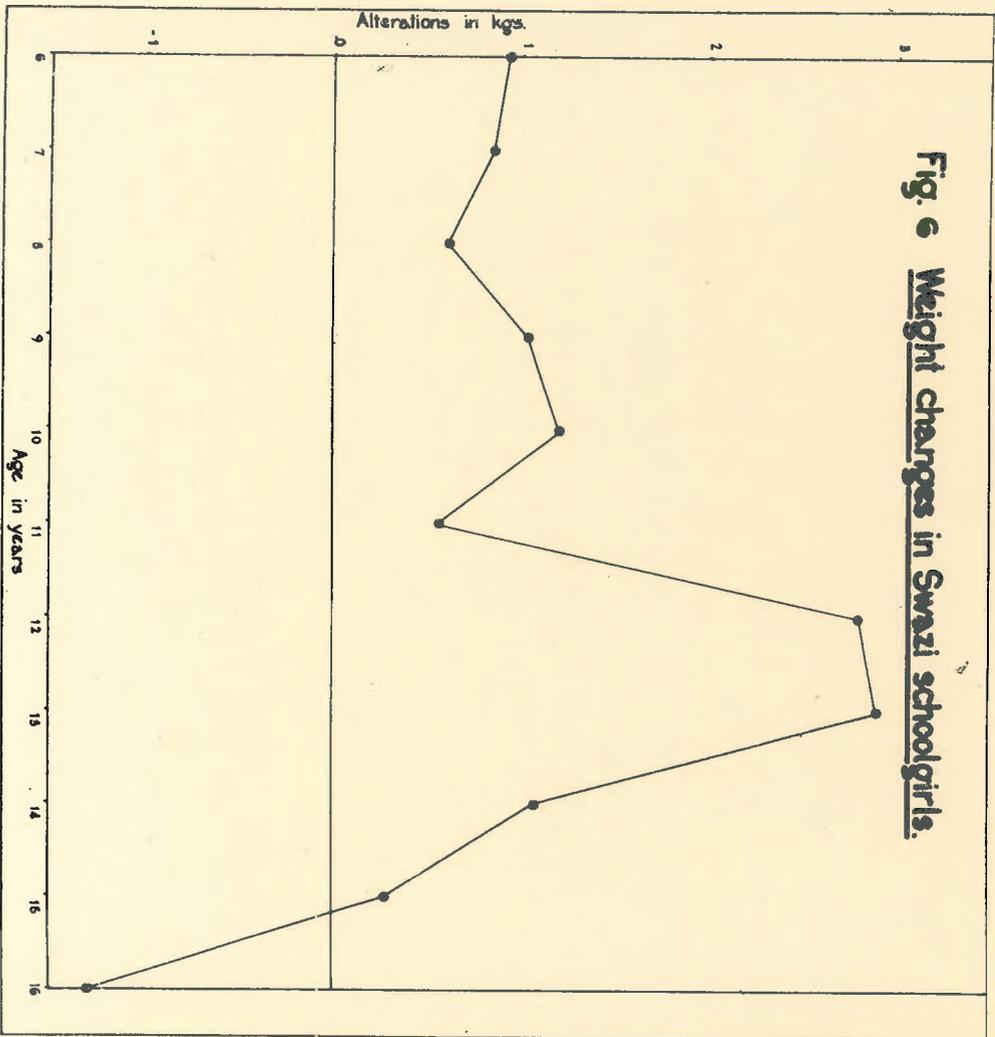
**GIRLS**  
BIRTH DATE

NO.



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**Fig. 6** Weight changes in Swazi schoolgirls.



**Fig. 5 Weight changes in Swazi schoolboys.**

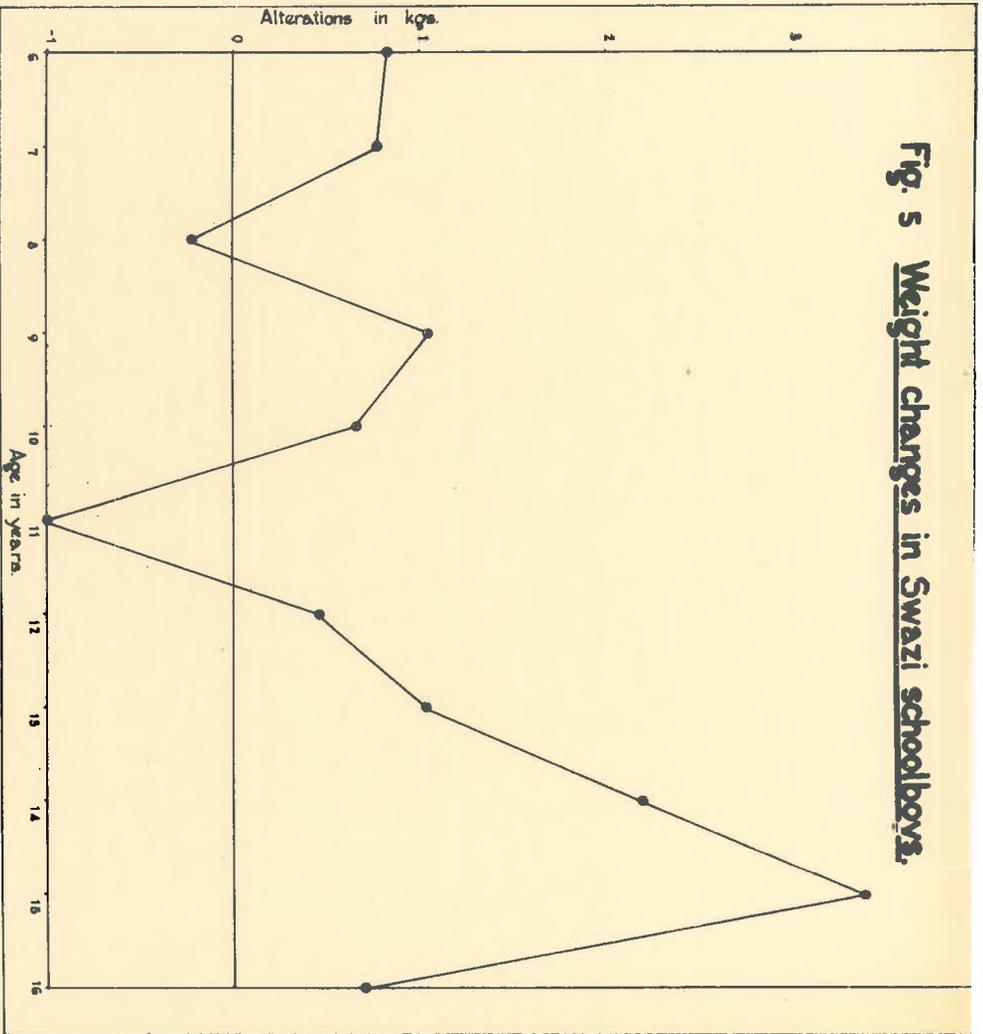


TABLE 3  
WEIGHT CHANGES IN SWAZI SCHOOLCHILDREN

Age	M a l e s					F e m a l e s				
	No. of Cases	No. Gaining	No. Losing	No. with no Change	Overall Alteration (kgs)	No. of Cases	No. Gaining	No. Losing	No. with no Change	Overall Alteration (kgs)
6	5	4	-	1	0.84	10	8	2	-	0.94
7	9	7	-	2	0.77	12	11	-	1	0.85
8	12	7	3	2	-0.21	11	7	1	3	0.62
9	15	12	2	1	1.05	16	12	3	1	1.04
10	15	10	3	2	0.63	31	22	5	4	1.20
11	22	13	6	3	-1.00	19	12	7	-	0.57
12	36	27	6	3	0.46	32	28	1	3	2.80
13	24	17	3	4	1.04	27	23	2	2	2.90
14	25	22	2	1	2.20	20	16	2	2	1.08
15	26	23	-	3	3.40	13	6	4	3	0.27
16	15	9	4	2	0.70	13	5	5	3	-1.30
Total	204	151	29	24		204	150	32	22	

examinations, by heavier domestic duties or the emotional vagaries of courtship.

Kark <sup>1)</sup> has demonstrated an increase in weight increment after the age of eleven years in girls. At the same time there was a steady increase in the standard deviation of the mean weight at each weight from 8 to 12 years, and this increase remained relatively high. Pubescent girls were taller and heavier than less mature non-pubescent girls of the same age-group.

#### 1.9. Skinfold Thickness:

Measurement of the skinfold thickness of an individual is a direct indication of the quantity of subcutaneous fat. Several sites of measurement are suitable and can be used in conjunction to build up a total picture. The triceps site is generally agreed to be readily accessible, easily determined and to give a just estimate of subcutaneous fat. A single fat measurement gives more information on the general amount and distribution of body fat on an individual, than one physical measurement can indicate a person's size and shape. <sup>2)</sup>

The skinfold thickness of Swazi children and the comparative norms for British children are shown in Table 4. The subcutaneous fat of the Swazi boys is consistently below that of their European age mates until the age of fifteen years. The Swazi girls have a greater skinfold thickness at fourteen years than have their English counterparts; and in the next year the reading is even considerably larger. These findings are graphed in Figures 7 and 8.

#### 1.10. Changes in Skinfold Thickness:

The changes in skinfold thickness between the first and second measurement of the same children were calculated and the mean change for the age group calculated. These findings are presented in Table 5 and graphed in Figure 9. The boys show less change in skinfold thickness than the girls. An increase in skinfold thickness is seen in the ten and eleven year old boys whereas it is the twelve to fifteen year old that show the greater weight gains.

- 
- 1) E. Kark, "Sexual Maturation and Variation in the Height and Weight Growth of Bantu Girls in Durban". Journal of Trop. Ped. Vol. 3, No. 1 (1957), pp. 32 - 40.
  - 2) W. H. Hammond, "Measurement and Interpretation of Subcutaneous Fat, with Norms for Children and Young Adult Males", British Journal of Sociol. and Preventive Med. 9 (1955) 201 - 211.

TABLE 4  
SKINFOLD THICKNESS OF SWAZI SCHOOLCHILDREN COMPARED WITH BRITISH NORMS

Age	Males					Females				
	No. of Cases	Range	Mean Millimetres	Norms* Mean    Standard		No. of Cases	Range	Mean Millimetres	Norms Mean    Standard	
6	5	4.6- 6.9	6.0	8.23	0.16	10	5.4- 9.7	7.9	9.57	0.39
7	9	4.2- 8.7	6.1	7.88	0.28	12	5.2-10.3	7.5	9.39	0.31
8	12	4.3- 7.5	5.6	7.56	0.23	11	5.0-11.5	7.1	10.10	0.55
9	15	3.6- 8.9	6.1	8.21	0.23	16	5.2-16.2	7.8	10.25	0.36
10	15	3.4-11.1	6.1	8.20	0.08	31	4.6-12.6	8.1	10.36	0.34
11	22	3.5-10.9	5.8	8.94	0.23	19	5.9-15.9	8.5	10.64	0.33
12	36	3.9- 8.1	5.8	8.45	0.23	32	5.2-16.3	8.9	10.06	0.38
13	24	3.9-12.5	6.4	8.11	0.16	27	5.5-23.0	10.1	10.40	0.39
14	25	4.1- 8.7	5.1	7.91	0.09	20	6.5-27.9	12.5	11.27	0.52
15	26	3.6-10.0	6.8	6.30	0.18	13	12.3-25.5	17.0	11.35	0.70
16	15	4.1- 7.7	6.5	6.22	0.22	13	9.1-38.1	17.5	-	-
Total	243					249				

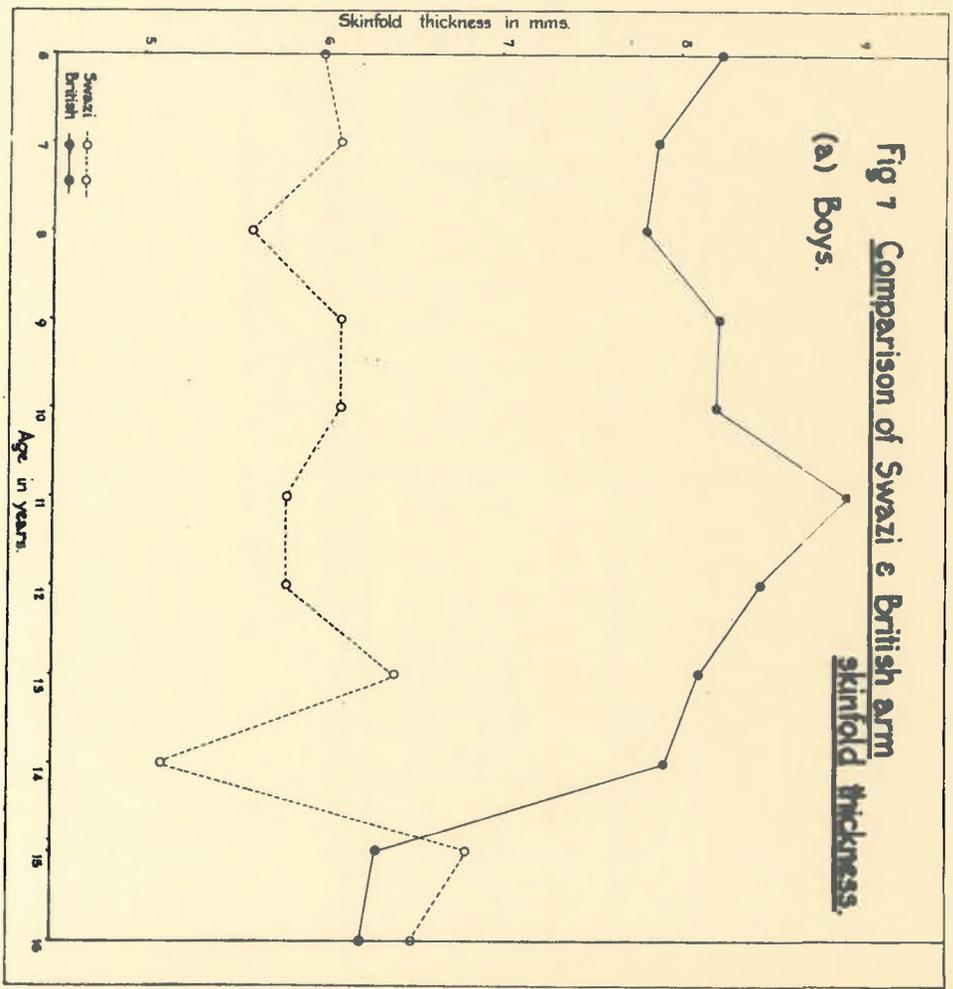
1) W.H. Hammond, "Measurement and Interpretation of Subcutaneous Fat", British Journal of Sociol and Prev. Med., 9 (1955), 201-211.

TABLE 5

CHANGES IN SKINFOLD THICKNESS AMONG SWAZI SCHOOLCHILDREN

Age	Males		Females	
	Number of Cases	Alteration (in Millimetres)	Number of Cases	Alteration (in Millimetres)
6	5	-0.3	10	0.7
7	9	-0.1	12	0.0
8	12	0.3	11	0.1
9	15	0.1	16	0.6
10	15	0.7	31	0.5
11	22	0.7	19	1.7
12	36	0.2	32	0.9
13	24	0.2	27	0.2
14	25	-0.2	20	0.5
15	26	0.4	13	-0.8
16	15	-0.1	13	-1.6
Total	204		204	

Fig 7 Comparison of Swazi & British arm  
skinfold thickness.  
(a) Boys.



**Fig. 8 Comparison of Swazi & British arm skinfold thickness. (b) Girls.**

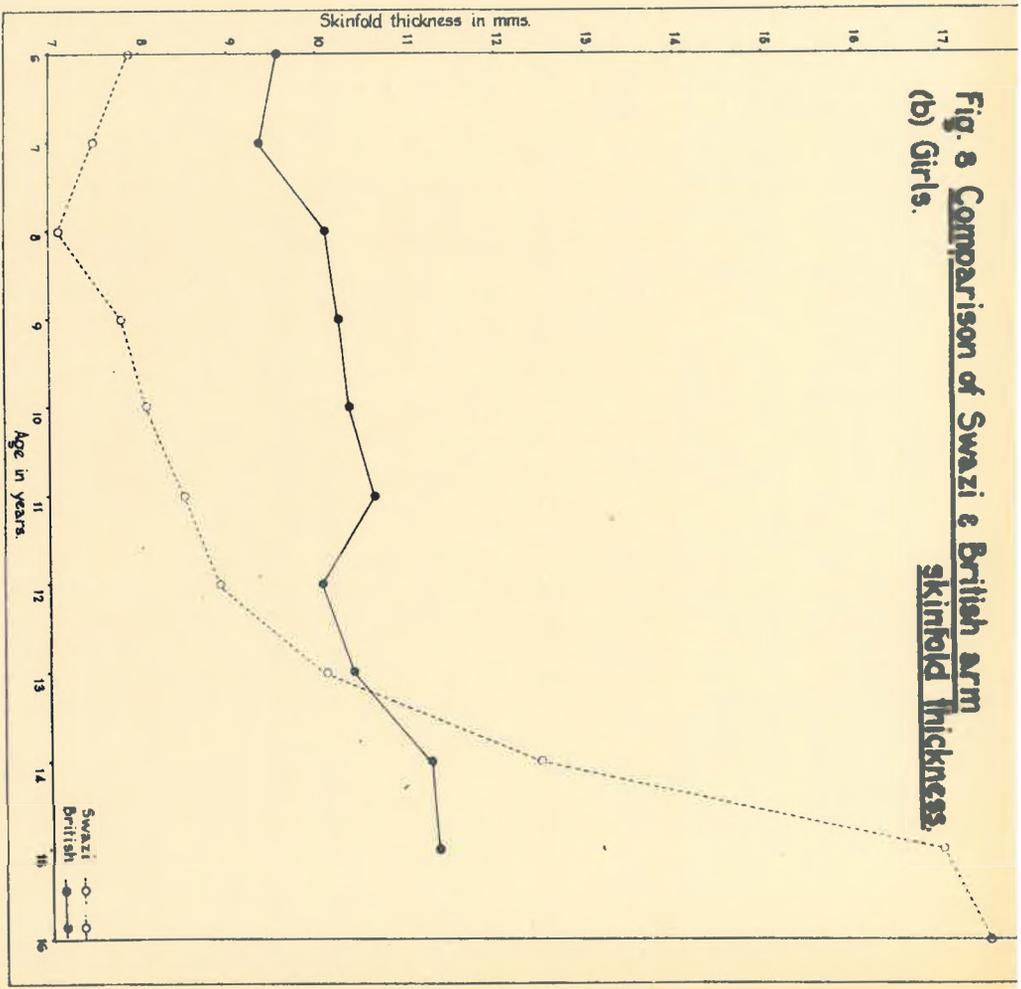
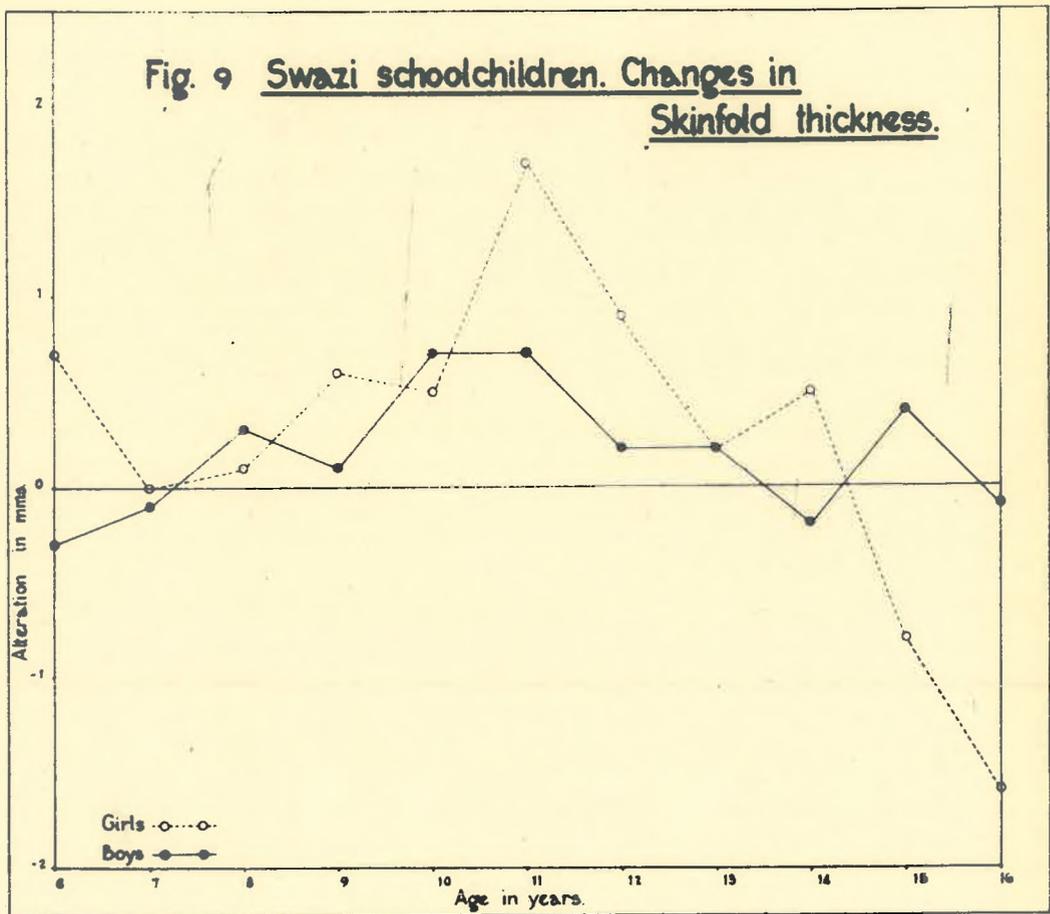


Fig. 9 Swazi schoolchildren. Changes in Skinfold thickness.



The seven, eight, thirteen, fifteen and sixteen year old girls show the greatest loss of subcutaneous fat, whilst the six, nine, eleven and fourteen year olds have the larger gains. As with the boys, an increase in subcutaneous fat appears to precede a weight increase, for the subcutaneous fat increase is at ten and eleven years, and the greatest weight gains at twelve and thirteen years.

The range of skinfold readings in the fifteen and sixteen year old girls is so large that not a great deal of importance can be attached to the big loss in these ages. They may well be due to the difficulties in obtaining an accurate measurement.

## 2. NUTRITIONAL STATUS :

The adequacy of a diet cannot be judged only by its capacity to meet recommended allowances. The population must be examined for signs of specific dietary deficiencies and for malnutrition. The discovery of definite signs of deficiency can be correlated with dietary inadequacies, although the results are often disappointing. The assessment of nutrition deals with the past dietary history, for some signs of deficiency are manifest only slowly, while a weighed dietary survey is concerned with the present intake. 1)

### 2.1. General Observations:

The Swazi men and women give an impression of generally good physique and appearance. The men have a proud 'warrior' carriage, and the women the upright posture resulting from the bearing of loads on the head.

The urban man and woman, whose manual tasks are fewer and dietary better, appear plump and sleek.

However, old women in the rural areas are usually thin, even emaciated, with pendulous sagging breasts. This thinness is not so evident in the elderly men.

The young babies are rounded, glossy, content individuals for the first months of their lives. Their appearance after the age of nine months varies greatly from infant to infant.

The seven to ten year old child is frequently thin and lacks lustre in appearance and in behaviour. Young girls of this age frequently have

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1) K. Plough and E. B. Bridgeforth, "Relations of Clinical and Dietary Findings in Nutrition Surveys", Public Health Reports 75 (August, 1960) 699.

the drooping head, sagging shoulders and curved spine of the 'fatigue' posture. With the onset of puberty the girls grow plump, the skin develops a lustre and they appear to 'bloom'.

Many have remarked on the apathy of the Swazi. The Nutrition Report <sup>1)</sup> states that "it is a noticeable fact that the Swazi as a whole are far less energetic than most tribes in South Africa". Fox <sup>2)</sup>, commenting on this remark, considers that, if this could be proved true, it might be due to dietary causes (racial and climatic causes being unlikely). He obtained an "authoritative" opinion from the Witwatersrand Native Labour Association that the Swazi is "well-liked on the mines and regarded as a good worker". Fox suggests the possibility that, under local conditions, the Swazi compensates for an inadequate diet by cutting down on energy expenditure, and that the superior feeding on the mines stimulates greater work output.

In the present study, the least mental and physical energy expenditure was found in the Lowveld area during the hunger period. The people sat around for a great portion of the day, sometimes drinking beer, sometimes without beer, in apathetic attitudes. This evidence appears to support Fox's hypothesis.

## 2.2. Clinical Examination:

In the physical examination for signs of malnutrition several difficulties arise :-

- (a) Almost all the early signs of malnutrition lack definition. The examiner may be misled by artifacts or by lesions which are the result of non-nutritional factors: <sup>3)</sup>
- (b) Difficulty is experienced in deciding what is normal. <sup>4)</sup> Very protruberant abdomens are a feature of young Swazi children, and this state appears to be almost general. Should it be regarded as normal? On the advice of Dr. E. Kahn, (Baragwanath Hospital, Johannesburg), it was considered as abnormal for the purposes of this study.
- (c) Individual examiners adopt different criteria in the diagnosis of a lesion, which leads to confusion and error. <sup>5)</sup>
- (d) The standard of the examiner may alter during the survey period.

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- 1) Report on Nutrition in Swaziland. 1940.
  - 2) F. W. Fox, Nutritional Conditions in Swaziland. 1944.
  - 3) H. M. Sinclair, "Assessment of Nutriture", Medical Surveys and Clinical Trials, ed. L. J. Wilts, (Oxford University Press, 1959), 187.
  - 4) Ibid. 183.
  - 5) I. C. Plough and E. B. Bridgeforth, op. cit. 703.

In the present study, none of the fieldworkers had any prior experience in the conduct of clinical examination and could, therefore, not be influenced by earlier experience. All instruction was received from one doctor at the Medical School (University of Natal). The diagnosis of malnutrition was never based on one individual symptom, but rather on the finding of a constellation of symptoms which indicated nutritional impairment. In the early stages, the team worked in close corroboration on individual children until agreement was reached. This agreement was subsequently checked periodically. Dr. H. Stott<sup>1)</sup>, on a visit to Swaziland, expressed himself in agreement with the diagnoses made when members of the team examined children in his presence. It is therefore likely that a high degree of uniformity was reached with regard to the criteria adopted during the present study.

In order that the findings may be gauged in the light of the criteria adopted, some of these have been described in the Annexure to this chapter.

### 2.3. Sample;

In each sample area, children from birth to nineteen years were clinically examined for signs of malnutrition and for an assessment of their nutritional condition. In the rural areas the children were re-examined on the return visit. In the urban areas, where the majority of children attend school, difficulty was experienced in finding a mutually convenient time for examination. Saturday mornings were tried, but the children were occupied with chores or sports. For this reason the urban and peri-urban samples are chiefly composed of nursery school children.

The total number of children examined was 293 and on re-examination 242.

### 2.4. Examination and Recording;

The children were examined when completely undressed and the results recorded on prepared forms. (Table A of the Annexure). No attempt was made to indicate the extent or seriousness of a lesion (the subjective nature of this estimate could only increase the likelihood of existing error, and merely the presence or absence of signs of malnutrition was recorded.

### 2.5. Findings;

The child population was divided by sex and into the following age groups :-  
Under 1 year, 1-4, 5-6, 7-9, 10-12, 13-16, 17-19 years. The percentage of all clinical findings on each group are shown in Table B of the Annexure.

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1) Dr. H.H. Stott, Valley Trust, Botha's Hill, Natal.

TABLE 6  
DISTRIBUTION OF CASES EXAMINED CLINICALLY  
(RURAL AREAS)

Age in Years	Sex	No. of Cases		Percentage Examined		Percentage Affected	
		a	b	a	b	a	b
Under 1	M	8	6	2.73	2.48	3.02	0.81
	F	4	5	1.37	2.07	1.13	0.73
1-4	M	33	34	11.26	14.05	15.88	14.07
	F	51	40	17.41	16.53	4.91	13.82
5-6	M	19	17	6.48	7.02	7.89	7.88
	F	37	18	12.63	7.44	8.32	7.80
7-9	M	25	25	8.53	10.33	9.51	14.80
	F	17	25	5.80	10.33	8.78	10.62
10-12	M	21	20	7.17	8.26	9.39	9.85
	F	25	15	8.53	6.20	10.99	7.34
13-16	M	17	9	5.80	3.72	8.67	3.73
	F	23	18	7.84	7.43	7.67	4.74
17-19	M	7	5	2.40	2.07	6.52	1.82
	F	6	5	2.05	2.07	7.32	1.99
Total		293	242	100.00	100.00	100.00	100.00

The rural areas have been classed together, but seasonal distinctions have been retained, (Table 6.)

The greater incidence of clinical findings of malnutrition is in the toddler group, 1-4 years, during both seasons. The difference between the boys and girls in the 1-4 year old group is not statistically significant. The young babies and the adolescent are least affected, the seven to twelve year age groups moderately so.

It has already been demonstrated that overall weight losses occurred among both boys and girls in the 8-11 age groups. This may be associated with the increased energy expenditure of attending school and also with the lag preceding the pre-pubertal spurt. In the urban areas, the higher incidence scabies, a disease of overcrowding, is remarkable. In general, the urban children, with discharging noses, red throats, hair changes and carious teeth, compared poorly with their rural age groups. The urban sample may be biased in favour of the children of working mothers.

#### 2.6. Other Clinical Surveys:

In June and July, 1945, Dr. Selby <sup>1)</sup> conducted in Swaziland a survey of "well over a thousand children", both school and non-school attenders were represented. The criteria for the examination are not given, but an inspection was made of face, hair, teeth, limbs and skin. Among Dr. Selby's conclusions are :-

- " 1. The best fed subjects were those on the breast.
2. The poorest nourished were between 2 and 6 years of age.
3. Their teeth are in a poor state.
4. In the Southern area the children showed evidence of gross healed rickets.
5. Boarders are invariably in a better condition than day children."

In November of the same year Dr. B. T. Squires <sup>2)</sup> examined children in the Highveld and Middleveld of Swaziland. He inspected "eyes, skin, mouth, teeth and pharynx, together with a haemoglobin examination where considered necessary." Again, in this study the criteria used in the diagnosis are not stated.

Out of a total of 670 children (those with obvious chronic disease were excluded), 33.4% showed signs of malnutrition and of this percentage 5.3 per cent were adjudged to be severely malnourished.

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1) Report made by Dr. Selby.

2) B. T. Squires, Report on the Nutritional Status of Swazi Children. I.

Squires <sup>1)</sup> found no significant difference between Highveld and Middleveld children, between boarders and non-boarders, between school and non-school children, or between girls and boys. Both reports comment on the prevalence of scabies.

In an examination of Selby's report, Squires comments that he saw few breast fed children, but confirms that these were the best nourished. His subjects were all over the age of 6 years. He also agrees that the teeth of the Swazi children are in a poor state.

The findings of the present study concur with the statements about breast fed children, and that the greatest number of signs of malnutrition were manifested in the 1-4 year old age group.

#### 2.7. Environmental Factors:

Children that walk to school and take part in the domestic and agricultural tasks will bear visible evidence of the influence of their environment. The dry, flaky skins (sometimes with increased reticulation of the limbs) reflect the interaction between poor diet, harsh winds and the walk through dry grass. Older boys and girls protect and burnish themselves with vaseline rubbed onto exposed areas.

The incidence of thickened pigmented conjunctiva in all age groups, except the first, is of interest. Some authorities ascribe this condition to the constant irritation of smoke in ill-ventilated huts.

The first visits were made to the rural areas at the end of the summer and the second towards the end of winter. The increase in 'red' and dry lips between the two examinations can be explained by the cool winter winds, probably producing more "wear and tear" on malnourished mucous membranes which would explain the absence of these symptoms from many children.

#### 2.8. Specific Lesions:

Knock knee is seen frequently among the children, particularly girls; about 50 per cent of the 1-4 year olds revealed this condition. Rarely is it accompanied by any other rachitic signs and cannot be considered diagnostic criteria for this disease. The majority of children appear to outgrow the condition as they enter adolescence.

Protruberant Abdomen is very common in childhood and some abdomens are greatly distended, (see photograph). This condition is almost certainly due to the stretch associated with ingestion of large quantities of carbohydrate. As the child grows older and taller, the stomach flattens.

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1) B. T. Squires, Loc. cit. 2.

Enlarged tonsils. During the winter months many cases of enlarged tonsils were seen, usually in conjunction with discharging noses. Thirty-five per cent of the 7-9 and 13-16 year old girls manifested this condition during the first examination. Very few of the subject complained of pain associated with the enlargement.

Enlarged thyroid. Goitre in Swaziland is discussed in Chapter VII. At this stage, it will suffice to state that enlarged thyroids were found only among girls, and in the ten to sixteen years age groups. It is associated with the stress of puberty and adolescence. Twenty-five per cent of the girls had enlarged thyroids.

Buccal frieze. This condition is usually attributed to malnutrition. There is a deterioration of the cells lining the cheek. The tissues become oedematous and the biting surfaces of the teeth on this surface cause a permanent lesion. <sup>1)</sup> A buccal frieze is not seen before eruption of the teeth, and is frequently associated with indentation of the tongue, which results from the same mechanism. The highest incidence recorded was in the 17-19 year old group where 80 per cent has buccal friezes.

Scabies. Several medical practitioners have remarked on the decrease in cases of scabies within recent years. Dr. David Hynd <sup>2)</sup> attributed this to the decline in use of the goatskin in which infants were strapped to their mother's backs. There is a movement away from animal skins to blankets for sleeping in. In this study it was found in the rural areas only in one per cent of the girls. Two per cent of the urban children in nursery school had scabies.

## 2.9. Dietary Deficiency and Clinical Findings:

The diets were found to be low or deficient in calories, fat, calcium, Vitamin A, riboflavin and niacin. Small lesions of skin and body-covering lesions are no longer attributed to the lack of a specific nutrient but, generally, to a multiple-deficiency.

It has been demonstrated that the clinical findings relating to ascorbic acid correlate well with dietary intakes. <sup>3)</sup> But investigators found that clinical findings, believed to reflect an insufficiency of thiamine, riboflavin and niacin, showed scarcely any correlation with dietary intake. Further, no correlation was apparent between clinical results and Vitamin A and calorie intakes.

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- 1) Dr. Z. Jacobson. Medical School, University of Natal, personal communication.
  - 2) Dr. David Hynd, formerly Superintendent, Nazarene Mission, Manzini, personal communication.
  - 3) I. C. Plough and E. B. Bridgeforth, Loc. cit. 706.

In this study no rash endeavour is made to link dietary deficiencies with clinical findings, although the temptation is there. However, two cases of kwashiorkor were found in the primary rural areas, a further three children were in a pre-kwashiorkor state; one case of infantile pellagra and several cases of goitre were discovered. No other diseases directly attributable to dietary deficiencies were seen.

### 3. SUMMARY :

No appreciable difference in height and weight was found between the various rural samples, and the results have consequently been pooled. The arithmetic mean for weights and heights of Swazi schoolchildren are at the 25 percentile on the Boston scale.

Skinfold thickness for both boys and girls up to the age of fifteen, lies below the norms established for British children. After fifteen years of age the subcutaneous fat of the Swazi girls is much greater than that of their English counterparts.

The greatest incidence of clinical signs of malnutrition was found in the 1-4 age category, and in both sexes from seven to twelve years.

The lesions found can be attributed to the interaction of genetic, climatic and dietary factors, but the extent of the role played by each of these cannot be determined in this study, as in all similar studies.



SOME CRITERIA FOR THE CLINICAL EXAMINATION  
OF CHILDREN

Some of the diagnostic criteria are well-known and require no explanation. In others, confusion has arisen over terminology. The criteria used for certain tissues and organs in the present study are described below :-

1. Posture:

- (a) Protruberant abdomen: a 'pot-belly' appearance with a sensation of distension when subjected to slight pressure.
- (b) Fatigue posture: a drooping head, sagging shoulders, distended abdomen and lordosis are characteristics of the fatigue posture.

2. Skin:

(i) Pigmentation:

- (a) Hypopigmented areas: are pale patches, distinct from the surrounding skin, although the margins are not as well defined as in ringworm, and frequently seen on the face.
- (b) Hyperpigmented areas: are dry, and of a deeper colour than the remainder of the skin. On the face and forearms they are often symmetrical.

(ii) Elasticity:

- (a) Increased reticulation: usually sited on the legs, near the ankle: these are areas of dry skin with crinkling which is more evident when the skin is pushed by the finger. In an advanced stage, the area may be broken up by a jig-saw of lines forming a mosaic pattern, this is best demonstrated over the anterior surface of the tibia where the skin is usually taut due to the lack of subcutaneous tissue. Occasionally actual fissuring of the skin is seen over heels and soles.

(iii) The Follicles:

- (a) Cutis anserina: this condition is characterized by the appearance of "gooseflesh" on the arms, thighs and buttocks, due to enlargement of the follicles. (The area is rubbed to ascertain that it is not temporary gooseflesh caused by chilling).
- (b) Follicular hyperkeratosis: This describes enlargement of the follicles which appear as rough spiny papules and contain dry keratotic plugs, which can be removed by the application of fingernail: it is also designated phrynoderma. The dryness of the skin and

the site of the body in which it is found, distinguish follicular hyperkeratosis from acne, which usually occurs on face and upper back and which is characterized by a greasy plug of fat in the follicle.

- (c) Dyssebacia: this condition is seen in the region of the sebaceous glands, particularly the naso-labial fold, and the mid-portion of the face. The early signs are oiliness with fatty sebum. In a more advanced stage filiform lesions are present.

(iv) Texture:

- (a) Atrophic: the skin becomes dry, but occasionally abnormally shiny, inelastic and excessively thin in the presence of atrophy.

3. Hair:

- (a) Hypochromotrichia: the African child's hair loses the dense black appearance, and lightens in colour becoming a biscuit-grey shade, and in an advanced stage, reddish lights appear in the hair. In kwashiorkor the colour may reach an auburn or "old gold" shade and the hair margin recedes, the hair becoming scanty, and extremely easy to pull out.

4. Mucous membranes:

(i) Tongue:

- (a) Hypertrophied papillae: are red prominent papillae. In children the tip of the tongue is most frequently involved.
- (b) Atrophic papillae: with this lesion, the anterior third of the tongue is frequently the first to be involved. The papillae become flattened and then fused, and fissures may arise. Occasionally this is found in association with a geographic tongue.

(ii) Buccal mucosa:

- (a) Buccal frieze: At the point of closure of the molar teeth, the buccal mucosa develops a hypopigmented but quite distinct line. This buccal frieze is formed by the pressure exerted by the teeth on an oedematous mucosa and, therefore, does not occur in infants.

5. Eye:

(i) Eyelids:

- (a) Blepharitis: in this condition there is hyperaemia, and thickening of the eye-lid margins, frequently associated with loss of eye-lashes.



AGE IN YEARS		UNDER 1		1 - 4		5 - 6		7 - 9		10 - 12		13 - 16		17 - 19	
SEX		M	F	M	F	M	F	M	F	M	F	M	F	M	F
NUMBERS IN EACH GROUP	A	8	4	33	51	19	37	25	17	21	25	17	23	7	6
	B	6	5	34	40	17	18	25	25	20	15	9	18	5	5

CLINICAL SIGNS:

CONJUNCTIVA:

DRY	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	40.0
THICKENED	A	-	-	12.1	-	4.2	21.6	24.0	23.0	38.1	24.0	36.9	4.4	14.3	16.7
	B	-	-	8.7	15.5	5.9	16.7	28.0	16.0	30.0	26.7	55.3	42.9	20.0	32.0
CIRCUMCORNEAL PIGMENTATION	A	25.0	-	15.2	33.3	36.8	51.4	44.0	35.3	38.1	-	35.3	34.8	28.6	50.0
	B	16.8	20.0	38.2	27.5	47.1	55.6	52.0	48.0	40.0	33.3	33.3	-	60.0	80.0
INCR. CORNEAL VASCULARIZATION	A	-	-	-	-	-	-	8.0	-	28.6	56.0	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OTHER INCR. VASCULARIZATION	A	-	-	-	7.8	5.3	5.4	-	-	-	8.0	11.8	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-

THYROID:

ENLARGED	A	-	-	-	-	-	-	-	-	-	4.0	-	4.4	-	-
	B	-	-	-	-	-	-	-	-	-	20.0	-	-	-	-

PAROTIDS:

ENLARGED	A	-	3.0	-	-	-	-	-	5.9	-	-	5.9	8.7	-	-
	B	-	2.9	-	-	-	-	4.0	4.0	-	-	-	-	-	-

TEETH:

CARIES	A	-	15.2	-	-	-	18.9	32.0	35.3	23.8	36.0	29.4	26.1	28.6	50.0
	B	-	8.8	-	-	-	27.8	44.0	24.0	40.0	26.7	33.3	50.0	60.0	60.0
MOTTLED	A	-	-	-	-	-	-	4.0	-	-	4.0	-	-	-	16.7
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRREGULARITY	A	-	-	-	-	-	5.4	-	29.4	4.8	-	11.8	4.4	-	-
	B	-	5.9	-	-	-	-	4.0	4.0	15.0	6.7	22.2	5.6	-	-

TABLE B  
PER CENT FINDINGS ON SKINS ALL AGES (RURAL AREAS)

CLINICAL SIGNS		SCALP AND FACE		TRUNK ANTERIOR		TRUNK POSTERIOR		ARMS		ELBOWS KNEES		BUTTOCKS THIGHS		LEGS	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F
DULL	A	25.4	17.8	37.7	28.8	-	27.6	-	20.9	-	17.8	-	17.2	-	15.3
	B	3.5	9.5	19.8	13.5	-	13.5	-	7.9	-	4.8	-	11.1	-	7.9
HYPOPIGMENTATION (GENERAL)	A	8.5	6.8	0.8	-	-	-	-	-	-	-	-	-	-	-
	B	6.0	4.8	-	-	-	-	-	-	-	-	-	-	-	-
HYPOPIGMENTATION (PATCHES)	A	22.3	38.7	-	-	-	-	-	-	-	-	-	-	-	-
	B	35.3	22.2	-	-	-	-	-	-	-	-	-	-	-	-
HYPERPIGMENTATION (GENERAL)	A	1.5	1.2	-	-	-	-	-	-	-	-	-	-	-	-
	B	1.7	-	-	-	-	-	-	-	-	-	-	-	-	-
HYPERPIGMENTATION (PATCHES)	A	3.1	0.6	-	-	-	-	-	-	-	-	-	-	-	-
	B	-	2.4	-	-	-	-	-	-	-	-	-	-	-	-
GREASY	A	-	1.8	-	-	0.8	-	-	-	-	-	1.5	0.8	0.8	-
	B	1.7	1.6	-	-	-	-	-	-	0.9	-	-	-	2.6	2.4
DRY	A	21.5	28.2	39.2	36.2	26.9	28.2	33.1	28.2	37.7	33.7	41.5	41.1	48.9	44.2
	B	19.8	11.9	37.1	20.6	28.5	22.2	27.6	18.3	-	45.2	30.2	13.5	43.1	46.0
FLAKY	A	3.1	3.1	8.5	4.3	3.1	4.9	2.3	2.5	6.9	8.0	7.7	10.4	10.8	12.9
	B	0.9	1.6	1.7	0.8	0.9	-	-	-	6.0	0.8	2.6	-	2.6	4.0
INCREASED RETICULATION	A	-	-	-	-	-	-	-	0.6	-	-	3.1	0.6	49.5	60.7
	B	-	-	-	-	-	-	0.9	-	-	-	0.9	-	31.0	29.4
MOSAIC	A	-	-	-	-	-	-	-	-	-	-	1.5	0.6	20.8	30.1
	B	-	-	-	-	-	-	-	0.8	-	-	-	-	16.4	7.1
CUTIS ANSIRINA	A	-	0.6	12.3	11.0	12.3	9.8	15.4	9.2	8.5	6.1	22.3	12.9	1.5	-
	B	0.9	0.8	29.3	17.5	19.8	16.7	25.0	17.5	3.5	4.8	21.6	13.5	2.6	-
ACNE	A	3.1	-	-	-	-	-	-	-	-	-	-	-	-	-
	B	2.6	-	-	-	-	-	-	-	-	-	-	-	-	-
ATROPHIC	A	-	-	-	0.6	-	0.6	-	-	0.8	-	-	0.6	1.5	3.1
	B	-	-	-	-	-	-	-	-	-	-	0.9	-	4.3	-
FOLLICULAR HYPERKERATOSIS	A	0.8	-	-	4.3	0.8	3.1	7.7	8.6	10.8	5.5	15.4	7.4	-	-
	B	0.9	-	2.6	4.0	-	4.8	4.3	5.6	1.7	2.4	2.6	3.2	0.9	-
DYSSEBACIA	A	3.9	2.5	-	-	-	-	-	-	-	-	-	-	-	-
	B	1.7	1.6	-	0.8	-	-	-	-	-	-	-	-	-	-
SCABIES	A	-	-	-	-	-	1.2	-	-	-	-	-	-	-	-
	B	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TOTAL BOYS = 246

TOTAL GIRLS = 289

TABLE B (continued)

PER CENT FINDINGS ON TONGUES ALL AGES (RURAL AREAS)

Tongue		Pale		Red		Magenta		Pigmented Areas		Fissuring				Enlarged Papillae		Atrophied Papillae		Indentations		Other	
		M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Dorsum	a	0.8	1.2	-	0.6	-	-	-	-	2.3	3.1	-	-	0.8	4.9	-	-	0.8	-	3.9	8.6
	b	0.9	4.0	-	-	-	-	-	-	1.7	3.2	-	-	1.7	-	-	-	-	-	4.3	2.4
Tip	a	0.8	-	-	-	-	-	0.8	-	0.8	0.6	-	-	2.3	0.6	1.54	-	-	-	-	28.8
	b	0.9	-	-	-	-	-	-	-	1.7	-	-	-	0.9	0.8	-	-	-	-	-	19.1
Lateral Margin	a	0.8	-	-	-	-	-	-	-	-	0.6	-	-	-	0.6	0.8	0.6	1.5	-	3.1	6.1
	b	0.9	-	-	-	-	-	-	-	1.7	-	-	-	-	0.8	-	-	1.7	-	1.7	1.6

TABLE C

PERCENTAGE CLINICAL FINDINGS IN PRE-SCHOOLCHILDREN (URBAN AREAS)

Age	Total Number
1-4 years	49
5 years	12

PHYSIQUE

Age	Obese	Thin	Slender	Medium	Plump	Well-covered	Stocky
1-4 years	2	4.1	12.2	63.2	8.0	2.0	4.1
5 years	-	25.0	33.3	42.0	-	-	-

POSTURE

Age	Winged Scapulae	Protruberant Abdomen	Lordosis	Scoliosis
1-4 yrs	20.4	93.87	65.3	4.1
5 yrs	66.6	100.00	58.3	25.0

HAIR

Age	Dull	Scanty	Hypopigmentation	Dry	Ringworm
1-4 years	12.2	18.4	8.1	4.1	4.1
5 years	16.6	16.6	8.3	-	-

TONGUE

Age		Pale	Moderate Fissuring	Atrophied Papillae	Other
1-4 years	<u>Tip:</u>	-	-	2.0	6.1
	Lateral Margin	4.1	-	2.0	-
	Dorsum	-	-	-	-
5 years	<u>Tip:</u>	-	-	16.6	-
	Lateral Margin	-	16.6	-	-
	Dorsum	-	-	-	-

BUCCAL MUSOCA

Age	Pale	Pigmented	Buccal Freize
1-4 years	16.3	-	6.1
5 years	16.6	16.6	8.3

DEFORMITY

Age	Knock knees	Bow legs
1-4 years	32.7	6.1
5 years	16.6	-

LIPS

Age	Fissured	Angles Sodden
1-4 years	49.0	2.0
5 years	83.3	8.3

THROAT

Age	Red	Tonsils Enlarged
1-4 years	38.8	4.1
5 years	33.3	8.3

DISCHARGING NOSE

1-4 years	75.5
5 years	41.7

CIRCUMCORNEAL PIGMENTATION OF EYE

1-4 years	2.0
5 years	16.6

CARIOUS TEETH

1-4 years	8.0
5 years	16.6

PERTINENT STATISTICS IN PUBLIC HEALTH

1. INTRODUCTION :

In this chapter, the statistics which have a bearing on nutrition are discussed. There is no registration of Swazi births and deaths, and for figures of disease incidence recourse is made to the Annual Medical Reports, and to the actual hospital records. The subjects discussed are : - birth-weights, childhood mortality, morbidity and mortality from selected diseases, and parasitic infestation.

2. BIRTH-WEIGHTS :

2.1. Birth-weight and Maternal Diet:

It is maintained that the birth-weights of infants are related to the maternal diet and the ante-natal care received by the mother. After an improvement in these conditions, the birth-weights have shown an increase. However, Thomson <sup>1)</sup> postulates only a small correlation between birth-weights and any measure of the maternal diet.

2.2. The Sample:

Only a small percentage of Swazi babies are born in hospital. The majority are delivered by local 'midwives' and the babies are never weighed. The children born in a hospital may be a biased sample, in that the mother may be more enlightened on the advantages of medical care. Again, Government clinics are scattered throughout the country and, if a difficult delivery is suspected, the mother is advised to have the baby in hospital. Moreover, all mothers are encouraged to discard heavy labours a month prior to the birth and to await the baby at the hospital where amenities are provided. It is conceivable that in this last month the foetus will gain more weight than the unborn child of a woman engaged in heavy rural labour. Hospital records were examined for the birth-weights of 4,398 babies, two of the hospitals were Government (cost of all treatment is '10 cents) and two were private (fee-paying).

All multiple births were excluded, as were all premature babies (i.e. 5.8 lbs and under).

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1) A. M. Thomson, "Technique and perspective in clinical and dietary studies of human pregnancy". Proc. Nut. Soc. 16 (1957), 45.

2.3. Results:

TABLE 1

BIRTH-WEIGHTS OF SWAZI BORN IN HOSPITAL

Type of Hospital	Years Analysed	No. of Babies	Average Wt. (Males) lbs.	Average Wt. (Females) lbs.
Government	1958-1961	1, 026	Both 7.28	
Government	1957-1962	1, 098	7.3	7.0
Fee-paying	1958-1961	1, 585	6.5	6.3
Fee-paying	1955-1961	689	7.1	7.0
<b>Total</b>		<b>4, 398</b>	<b>6.93</b> Mean	<b>6.84</b> Mean

Table 1 shows the birth-weights of the Swazi babies, the mean birth-weight is 6.90 pounds. Boys are slightly heavier than girls. In Table 2 are displayed results obtained in other surveys elsewhere in Africa.

TABLE 2

MEAN BIRTH-WEIGHTS OF SINGLETON BABIES <sup>1)</sup>

Country	Investigator	Year	Africans	Europeans
Belgian Congo	Vincent	1932	6.13	
	Vincent	1956	6.59	
Uganda	Scotland	1956	6.41	
South Africa	Heyns & Hersch	1944	6.74	
South Africa	Salber & Bradshaw	1951	6.77	7.47
Kenya	Shaw	1933	(±1.12) 6.94	(±1.14)
Kenya	Michener	1932	7.00	

The Swazi birth-weights appear to be of much the same order as those in other parts of Africa.

1) H. C. Trowell, Non-Infective Disease in Africa,  
(London: E. Arnold Ltd., 1960) Table 71,  
p. 321.

#### 2.4. Factors Influencing Birth-weight:

1)  
Birth-weights are influenced by many factors, among them sex, birth-rank of the child, and the nutrition, social class and age of the mother, in addition to the length of gestation.

The records provided no information on nutrition of the mother and length of the gestation period. In some cases the age of the mother was recorded, but there is no proof of its accuracy.

It has been shown that the Swazi boys weighed only slightly more than the girls at birth. If the payment of fees is considered an indication of social class, then the mean weight of the children born in private hospitals (6.77 lbs.) is less than that (7.16 lbs.) of children delivered in Government hospitals.

TABLE 3

#### NO. OF PREGNANCIES AND WEIGHT OF BABY

Present Pregnancy:	1	2	3	4	5	6
No. of cases	220	172	132	93	39	22
Birth-weight lbs. ozs.	6.75	7.2	7.4	7.2	7.0	7.13

In Table 3 the weight of the baby has been related to the number of pregnancies of the mother. The birth-weight of the baby increases with birth rank up to the fourth pregnancy. Sabler, working in Durban, obtained similar results.<sup>2)</sup>

#### 2.5. Discussion:

Trowell<sup>3)</sup> remarks that the African pelvis of the female is usually smaller than the European so that the smaller African baby (compared to the European) is probably a benefit.

In some of the rural Government Clinics in Swaziland mothers have been anxious to reject the routine iron mixture given at ante-natal sessions. Their reason is the fear that the medicine will encourage the development of a large baby and a subsequent difficult labour.<sup>4)</sup>

1) Trowell, op. cit. 320.

2) E. J. Sabler and E. S. Bradshaw, "Birth Weights of South African Babies, S. A. Med. Jour., 27 (1953), 319.

3) Trowell, loc. cit., 320.

4) N.N. Dlodlu, personal communication.

It remains to be seen whether improved nutrition in childhood favours increase in the size of the pelvis in the African woman. There is, however, plenty of confirmation that well-nourished girls have a superior chance of becoming well grown and healthy mothers and of having an uncomplicated pregnancy and labour. 1)

### 3. CHILDHOOD MORTALITY :

#### 3.1. Definitions:

For the purpose of this study the following definitions have been adopted :-

- (i) Stillbirth rate: the ratio of stillbirths per thousand live births.
- (ii) Neonatal mortality rate: the ratio of deaths of babies under four weeks of age per thousand live births.
- (iii) Infant mortality rate: the ratio of deaths of children under one year of age per thousand live births.

The rates are usually expressed per annum but, as will be explained, this has not been possible with the available data on childhood mortality in Swaziland. The childhood mortality rates of other populations, included for comparative purposes are, however, expressed on a per annum basis.

#### 3.2. Sources of Information:

Table 4 summarises the available information on childhood mortality in Swaziland. The first study made in 1934 2), is quoted by Keen who conducted the second one in 1942. 3) In 1947, Mastbaum conducted a study to determine the effect of malaria on the mortality, miscarriage and fertility rates. 4) At Hlatikulu hospital, in 1960-61, Macfadyen 5) enquired into the obstetric histories of women delivering a third or subsequent child. The Swaziland Sample Survey of 1960, questioned mothers on their reproductive history. 6)

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- 1) Thomson, op. cit., 50.
  - 2) Annual Medical and Sanitary Report of Swaziland 1934.
  - 3) P. Keen, "Infantile Mortality in Swaziland", Race Relations, Vol. 9, No. 2. (1942), 77.
  - 4) O. Mastbaum, Investigation in Vital Statistics on the Rural Population of Swaziland, 1947, unpublished.
  - 5) D. Macfadyen, "Childhood Mortality in Swaziland, 1962. For publication.
  - 6) Experiment in Swaziland, Ed. J. F. Holleman (2 Vols., Durban : Institute for Social Research, 1962), Vol. 1, 93.

TABLE 4  
CHILDHOOD MORTALITY AMONG THE SWAZI

Study : Date	Sample size Live births	Characteristics of Study	Still-birth rate	Infant mortality rate	Mortality rate 1-5 years	Notes
			per 1000 live births			
Medical Dept 1934	555	Histories of women attending clinic	97	265	95	Information taken from Keen (see text)
Keen 1942	1,836	Questioning of multiparae women. Divided sample into semi-educated and uneducated. Ages of death based on stages of development.	63	181	69	Lower birth and infant mortality rates among semi-educated. Considered malnutrition and malaria to be chief factors in infant mortality.
Mastbaum 1947	1,330	Histories of women in rural areas. Difficulty in assessing age of death.	-	137	109	Histories from 'aged' mothers demonstrates little change within one generation. No significant difference between semi-educated and uneducated.
Macfadyen 1961	2,547	Histories of all mothers delivering a third or subsequent child at Hlatikulu Hospital 1960 and 1961.	64	146	44	Mortality 1-5 years of age: 44 per 1000. Suggested that control of malaria has reduced mortality in this age group.
Sample Survey 1960	12,881	Random sample. Histories of women over 15 years of age, chiefly rural population.	-	147	109	Neonatal mortality rate: 88 per 1000.

### 3.3. Sampling:

The most usual method of calculating infant mortality is to obtain the total number of children born within the year and the number of children under one year dying within the same period. The entire population is generally included in this calculation. In Swaziland, there exists no system of registration of births or deaths for the Swazi population, although the Paramount Chief has advised the regional tribal committees that they should perform this duty. <sup>1)</sup> The investigations of childhood mortality in Swaziland are thus based on sample of varying size and composition, and the rates determined on the basis of histories of child bearing. In other words, the rates are longitudinal over a series of years, rather than cross-sectional for a particular year.

In the 1934 and the Macfadyen studies, the sample was drawn from the patients attending clinic or hospital and is thus biased in favour of those women receiving some medical attention. Some mothers enter hospital for delivery of their own volition, others are advised to do so by clinic nurses or doctors in view of possible complications. The patients delivering in hospital are drawn from both rural and urban backgrounds. Macfadyen questioned only mothers delivering a third or subsequent child because he was of the opinion that the first child meets his fate while being cared for by someone other than his mother. His sample consisted of 2,547 live births: the number of mothers questioned is not stated. <sup>2)</sup>

Mastbaum investigated the rural population only and questioned mothers in the Highveld, Middleveld and Bushveld of Swaziland. His calculations are based on samples of one hundred mothers in each of the three physiographic regions. <sup>3)</sup>

Keen <sup>4)</sup> questioned multiparae women of both the child bearing age and other women in the menopause. The majority of the women were interviewed in hospital or outpost clinics, the remainder in their Bushveld homes during the course of a malaria survey. Keen's study is based on histories obtained from 500 women.

The Sample Survey used a carefully designed statistical frame to sample the Swazi population on a random basis. Careful obstetric histories were obtained from all women over the age of fifteen years.

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- 1) Macfadyen, op. cit., 1.
  - 2) Macfadyen, op. cit., 5.
  - 3) Mastbaum, op. cit., 1-3
  - 4) Keen, op. cit., 77-80.

### 3.4. Collection of Data:

The 1934 and 1961 reports have no information on the collection of data. Badenhorst and Unterhalter <sup>1)</sup> have remarked on the Bantu distrust of being counted, however, Keen and Mastbaum both commented on the good memory of those questioned. The former, Keen, re-questioned the women at intervals as a check. The Sample Survey enumerators tabulated the children in chronological order and were thus able to detect any unduly large age gaps between children.

One of the difficulties in a survey of this kind is to obtain accurate information on age. The Sample Survey used a calendar of local historic events to check ages. Keen used the various stages of development (e.g. walking, crawling) in order to calculate age at death of a child. Mastbaum remarks <sup>2)</sup> that women could almost always recall if a child died in infancy, but were less accurate with older children.

Only Mastbaum <sup>3)</sup> describes field experience which demonstrated the difficulty of distinguishing between miscarriages and stillbirths.

The two studies that attempted to establish cause of death abandoned it owing to the vagueness of the responses.

### 3.5. Stillbirth Rate:

The studies provide very little data on the stillbirth rate, but indications are that it lies in the region of sixty five per thousand births. Mastbaum, in discussing the higher foetal mortality in the Bushveld found in his study, attributes it to malaria. Keen, however, in his Bushveld sample found a low incidence of stillbirths, but a high one in the urban area, which he hazarded might be due to the greater prevalence of syphilis in towns. Very possibly, the causation of stillbirths is complex, and the major causes cannot be identified, with certainty.

With the control of malaria in 1956, it would appear that the stillbirth rate has not greatly altered and that a greater factor in the prevention of stillbirths, is the hospitalization of the mother. However, not hospitalization per se, but the general and medical facilities available to the population.

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- 1) L. T. Badenhorst and B. Unterhalter, "A Study of Fertility in an Urban African Community", Population Studies, Vol. XV (July, 1961), 71.
- 2) Mastbaum, op. cit., 2.
- 3) Mastbaum, loc. cit.

As Macfadyen <sup>1)</sup> has demonstrated, although there has been an increase in the use of medical facilities on the part of the Swazi, approximately 70 per cent of the births occur in rural conditions without the attendance of any qualified midwives.

### 3.6. Neonatal Mortality Rate:

Only the sample survey provides any information on the neonatal mortality rate, when out of 147 deaths per thousand live births in the first year of life, 88 (or 60 per cent) occurred within the first four weeks.

It is generally recognized that the neonatal mortality rate, unlike the infant rate, is a less true indicator of the socio-economic status of the community. Deaths within the first week of life are often due to immaturity, birth injuries or congenital malformations. <sup>2)</sup>

Macfadyen analysed the causes of death in the children's ward during 1961. No children with infectious diseases are admitted to hospital, these diseases are probably a major cause of death in the rural areas. However, during the first year of life there were 59 deaths, of which neonatal tetanus was responsible for 3 (or 5 per cent) deaths. (This may be caused by the Swazi custom of inflicting small cuts into the umbilical cord with a knife, piece of glass or other instrument, and then rubbing in ashes in order to encourage the cord to fall off). Ten (or seventeen per cent) deaths were due to prematurity. It is generally agreed that the state of maternal nutrition has a very direct bearing upon stillbirths and prematurity. Kark <sup>3)</sup> has reported on a reduction in stillbirth and neonatal death rate among African and Indian communities after the use of food supplements and an intensive health education programme. He considers that, in South Africa, improved maternal nutrition is one of the most significant contributions towards the prevention of prematurity.

### 3.7. Infant Mortality Rate:

From the available evidence the infant mortality rate appears to lie in the region of 147 deaths per thousand live births. The difference of some 44 (181 and 137) points between the 1942 and 1947 study is not easy to explain, but they are probably due to sample size and unsatisfactory methods of

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- 1) Macfadyen, op. cit., 2.
  - 2) Stockwell, op. cit., 108.
  - 3) S. L. Kark, "Premature Birth, a review of its incidence and prevention", Medical Proceedings, Vol. 3 (6 July, 1951), 335.

sampling. Mastbaum <sup>1)</sup> comments on the large differences in child mortality between areas with identical climatic and parasitological conditions.

Both Mastbaum and Keen consider malaria to be a factor in infant mortality, but the results of their studies do not indicate that this disease is the chief cause. Malaria was controlled in the territory in 1956, but the effect of this is impossible to estimate because subsequent studies have included women whose child-bearing period covered the time when malaria was endemic in parts of the country.

Macfadyen's figures (admittedly small) demonstrate that 27 (or 45 per cent) of the children under one year of age died of gastro-enteritis or pneumonia (but it must be recalled that children with infectious diseases are not admitted to the hospital, and many in the rural areas may have succumbed to measles or whooping cough). In South Africa, gastro-enteritis is undoubtedly one of the chief killers of the infant and, moreover, this disease is related to living standards and conditions. The large figures in recent years for infantile gastro-enteritis would appear to bear out this statement.

In Macfadyen's study, 9 (or 15 per cent) of deaths in infants under one year were attributed to malnutrition. Both Keen and Mastbaum considered malnutrition one of the most important factors in the causes of death under one year of age. Gastro-enteritis is associated with infant feeding and management. While a baby receives adequate breast milk the risk of gastro-enteritis is small, but failure of the milk supply and recourse to inadequate or unsuitable supplementary feeding from unhygienic containers greatly increase chances of malnutrition or gastro-enteritis or both. Medical reports have persistently ascribed infant deaths to the early feeding of the Swazi child with a fine cereal gruel. The medical officers, faced with large numbers of outpatients daily, have little time to instruct mothers in the correct feeding of infants.

The infant mortality rate is regarded as a sensitive index of the level of living and sanitary conditions in developing countries. The post neonatal (i. e. deaths between 1 month and 12 months) appears to be an even more sensitive instrument <sup>2)</sup>, and when socio-economic conditions improve it declines relatively more than the neonatal death rate.

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- 1) Mastbaum, op.cit., 9.
  - 2) H. T. Phillips, An Inter-Racial Study in Social Conditions and Infant Mortality in Cape Town, Milbank Memorial Fund Quarterly, Vol. XXXV. (Jan. 1957), 24.

Keen and Mastbaum divided their mothers interviewed into the "semi-educated" (mainly the wives of Government servants, clerks, police, teachers, etc.), and the uneducated. Keen found that the first category had few children and the infant death rate was lower. Mastbaum failed to find a correlation between education and infant mortality, miscarriages and fertility rates, and he suggested that Keen's "semi-educated" women were also urban dwellers and thus had learned to make use of available medical facilities. Macfadyen has pointed out that since 1950 school enrolment has doubled and the proportion of Swazi attending out-patient clinics has increased four-fold since 1947. <sup>1)</sup> Both factors may cause a fall in the infant mortality rate within the next two decades.

### 3.8. Mortality in Children 1 to 5 Years of Age:

There is a wide range of figures for the Swazi child mortality rate in children one to five years, but on the basis of sample size and sampling method the figure 109 obtained by the Sample Survey (1960) is taken as an approximation of this ratio. In 1946, in 1-5 age group, there was a seasonal malaria parasite rate of 60-75 per cent in the Bushveld and by 1956 this had fallen to less than one per cent. It is possible that the mortality rate may have decreased in recent years, among other causes, due to the control of malaria.

It has been suggested that the mortality in the children aged 1-4 years is an index of the extent and seriousness of malnutrition. <sup>2)</sup> This disease may well be an important factor contributing to high mortality due to diarrhoea and respiratory infections in young children. (47 per cent of Macfadyen's child patients, aged between 1-5 years, died of malnutrition and 31 per cent of either pneumonia or gastro-enteritis).

### 3.9. Comparative Statistics:

The very incomplete registration of Bantu births and deaths has led to the production of unreliable statistics in South African cities. Sample surveys provide more reliable data, and some have estimated the rural rates to be greater than the urban ones.

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1) Macfadyen, op. cit., 2.

2) F.A.O. / W.H.O. Seminar on Problems of Food and Nutrition in Africa, South of the Sahara, op. cit., 11.

Table 5 shows the childhood mortality rates of the Swazi compared to other populations. In many developing countries of Asia, Africa and South America there are no reliable figures. It would seem that the infant mortality rate among the Swazi is somewhat worse than that found in Alexandra Township and better than that of Durban estimates. The European population of South Africa have an infant mortality rate of more than seven times smaller than the Swazi. Chile and India, both countries striving for improved economic conditions, appear to have lower infant mortality rates than the Swazi.

### 3.10. Measures to Reduce Childhood Mortality:

For every hundred live births there are approximately seven stillbirths. Of one hundred children born alive, 9 will die within the first month, 15 within the first year, and 11 between the ages of one and five years. Experience in other countries has demonstrated that, with a rise in per caput income and in standards of living, the childhood mortality rate will decrease, but what measures can accelerate this process?

Kark <sup>1)</sup> demonstrated that two different ethnic groups, Hindu and African, showed a considerable difference in neonatal mortality rates, the Hindu being much lower. The general social, environmental and maternal factors associated with infant survival could not explain this difference in neonatal mortality. The authors hypothesised that the difference might be explained by a difference in adjustment to poor environmental and nutritional conditions.

In the light of this evidence, it appears possible to reduce childhood mortality by an improvement in social conditions, without awaiting a change in economic levels. Possible preventive measures that might bring about this improvement include :-

- (i) Efforts to control communicable disease in both the mother (e.g. syphilis) and child (e.g. measles) will cut down both stillbirth rates and mortality in infants and pre-school children.
- (ii) Improvement of the maternal diet by health education and, if necessary, food supplements should lessen the incidence of stillbirths and prematurity.
- (iii) Attention to the improvement of environmental hygiene, child feeding and management could lower the incidence of mortality in children.

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1) S. L. Kark and J. Chester, "Survival in Infancy", S. A. J. of Laboratory and Clinical Medicine, Vol. 2. No. 2. (June, 1956), 134-159.

TABLE 5  
COMPARISONS OF CHILD MORTALITY

Country	Source of data	Late foetal death rate	Infant mortality rate	Notes
		per 1000 live births		
1. <u>Swaziland</u> Swazi	Sample Survey 1960	-	147	Mortality rate 1-5 years = 109
2. <u>South Africa</u>				
a) Bantu	Alexandra Township 1954*	-	131	Standard error 2.3 (Confidence limits 126 and 136) Neonatal mortality rate 108 Data acknowledged as unreliable
b) Bantu	Annual Medical Report, Durban 1961	37	167	
c) Asiatics	Annual Medical Report, Durban 1960	20	59	
d) Europeans	Annual Medical Report, Durban 1961	9	20	
3. Canada (1959)	U.N. Demographic Year Book 1960	14	28	-
4. Chile (1959)	U.N. Demographic Year Book 1960	26	120	Infant mortality rate: provisional
5. India (1958)	U.N. Demographic Year Book 1960	10	100	Infant mortality rate: provisional
Registration area India pre-1951	Cole and Hoover**	-	225	-
6. England and Wales (1958)	U.N. Demographic Year Book 1960	21	22	-

\* L.T. Badenhorst and B. Unterhalter, "A study of fertility in an urban community", Population Studies, Vol. XV (July, 1961), p. 85

\*\* A.J. Cole and E.M. Hoover, Population growth and economic development in low income countries, p. 44

#### 4. MORBIDITY AND MORTALITY :

##### 4.1. Sources of Information:

Information on morbidity and mortality was obtained from the Annual Medical Reports for Swaziland. Further data on infant mortality were gleaned from two published reports and several unpublished studies. The Annual Reports publish disease returns only on those patients treated in Government hospitals. There is no information on the possible number of undiagnosed cases in the Territory, nor on days lost in industrial concerns through ill-health.

##### 4.2. Morbidity and Mortality Due to Certain Diseases:

In Table 6 the morbidity from nutritional disease, for the years 1955-1960, is compared with that for other diseases. The first observation is that there is reported overall increase in all the diseases, probably due both to increased medical services obtainable, and also to a growing awareness by the population of the need to seek treatment at hospitals.

Where the percentages of disease incidence for each year are examined, the trend appears to be :-

- (a) A decrease in the incidence of pneumonia.
- (b) No change in the heart disease and infantile gastro-enteritis (between 4 weeks and two years) situation.
- (c) An increase in the incidence of nutritional diseases, and the increase is 10 per cent between 1955-1961.

When the mortality from these diseases is examined (Table 7), the mortality from pneumonia and infantile gastro-enteritis has risen, but from heart and nutritional disease has fallen.

The increase in infantile gastro-intestinal disease is attributed, in the 1955 and 1956 Annual Medical Reports, to the development of resistance by flies to the residual spraying for malaria control purposes. But in the 1957 report, lack of knowledge, on the part of the Swazi of the importance of general hygiene measures, is blamed for the increase. It is probably due to many factors, among which are nutritional, hygiene and vector resistance. The association of malnutrition with diarrhoea is most important, and is held greatly responsible, by many authorities, for high mortality in the age group 1-4 years. 1)

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1) R. C. Burgess, "Protein Malnutrition from the W.H.O. Viewpoint", Meeting Protein Needs of Infants and Children, (Washington National Academy of Sciences, 1961) 534.

TABLE 6  
COMPARATIVE MORBIDITY OF CERTAIN DISEASES\*

Disease	1955		1956		1957		1958		1959		1960		1961	
	No.	%	No.	%	No.	%								
Nutritional Disease	337	14.53	457	17.06	995	23.29	1459	19.33	2010	21.82	2196	20.52	2864	25.02
Tuberculosis	228	9.83	327	12.21	612	14.32	983	13.02	1015	11.02	1129	10.55	1222	10.61
Pneumonia	573	24.70	576	21.51	773	18.09	1288	17.06	1631	17.71	1857	17.36	1585	13.85
Infantile Gastro-Enteritis	997	42.97	1103	41.19	1485	34.75	2895	38.35	3597	39.05	4327	40.44	4746	41.46
Heart Disease	185	7.97	215	8.03	408	9.55	924	12.24	958	10.40	1191	11.13	1030	9.00
Total	2320	100.00	2678	100.00	4273	100.00	7549	100.00	9211	100.00	10700	100.00	11447	100.00

\* Figures obtained from the Annual Medical Reports, Swaziland, 1955-1961

TABLE 7  
COMPARATIVE MORTALITY OF SELECTED DISEASES\*

Disease	1955		1956		1957		1958		1959		1960		1961		Total	
	No.	%	No.	%												
Nutritional Disease	22	37.93	16	29.09	28	24.45	53	25.00	37	16.74	66	24.35	71	22.26	291	23.52
Tuberculosis	16	27.59	6	10.91	22	20.00	50	23.58	59	26.70	68	25.09	76	23.82	297	23.84
Pneumonia	6	10.34	12	21.82	30	27.27	45	21.22	47	21.27	63	23.25	50	15.67	253	20.30
Infantile Gastro-Enteritis	7	12.07	10	18.18	15	13.64	40	18.87	48	21.72	47	17.34	84	26.33	251	20.14
Heart Disease	7	12.07	11	20.00	15	13.64	24	11.32	30	13.57	27	9.97	38	11.91	152	12.20
Total	58	100.00	55	100.00	110	100.00	212	100.00	221	100.00	271	100.00	319	100.00	1246	100.00

\* Figures obtained from the Annual Medical Reports, Swaziland, 1955-1961

An intense campaign against tuberculosis has been started in Swaziland and statistics for the incidence of tuberculosis will probably increase greatly within the next few years.

It would seem that the increase in the cases of nutritional disease is more than can be attributed to mere increase in the detection of all disease.

#### 4.3. Nutritional Disease:

The returns for nutritional disease in Government hospitals were compiled from the Annual Medical Reports. In 1958, kwashiorkor which hitherto had been recorded under the classification of 'other deficiency states' was accorded a category of its own. The 'other deficiency states' were re-titled 'malnutrition unqualified'. A study of Table 8, in which these data are recorded, reveals that :

- (a) The greater percentage of cases (49%) are designated as 'malnutrition unqualified' (and is probably due to a deficiency of several nutrients.)
- (b) Beri-beri is a rare disease in the Territory, no cases having been diagnosed in Government hospitals since 1957.
- (c) The percentage incidence of scurvy appears to be decreasing.
- (d) Kwashiorkor, after a high incidence in 1958, is remaining fairly stable at around 20 per cent of all nutritional diseases. The high death rate from this disease is worth remarking.
- (e) There is a disquieting steady increase in the number of cases of pellagra reported.

Thus the chief nutritional disease problems of the Territory are general multiple deficiency conditions, pellagra and kwashiorkor. These results are not unexpected when one considers that the diet consists primarily of maize, and if one recalls the dietary study with the Vitamin lack, the maldistribution of protein foods, and the ill-effects of increasing urbanization and industrialization of Swaziland on the dietary.

#### 4.4. Pellagra:

The fieldworkers in the present study found few cases of pellagra. In general, the rural Swazi supplements maize with vegetables and legumes, which increase palatability, and increase the vitamin content of the diet. In the urban areas, where wild vegetables are not easily available, and the number of supplementary foods that can be purchased is limited by available money, the possibilities of the diet being deficient in tryptophan and niacin are much greater.

TABLE 8

## NUTRITIONAL DISEASE - MORBIDITY AND MORTALITY\*

Disease	1955		1956		1957		1958		1959		1960		1961		1958-1961	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Tot.	%
Pellagra	73	21.66	132	28.88	338	33.97	131 (5)	8.98	601 (3)	29.90	693 (5)	31.55	938 (6)	32.75	2363	27.70
Kwashiorkor	-	-	-	-	-	-	512 (26)	35.09	421 (21)	20.95	423 (30)	19.27	487 (24)	17.00	1843	21.60
Scurvy	7	2.08	2	0.44	1	0.10	48	3.29	53	2.64	40 (1)	1.83	13	0.45	154	1.81
Beri-beri	2	0.59	2	0.44	1	0.10	-	-	-	-	-	-	-	-	-	-
Malnutrition unqualified	-	-	-	-	-	-	768 (22)	52.64	935 (13)	46.51	1040 (30)	47.35	1426 (41)	49.80	4169	48.88
Other deficiency states	255 (22) <sup>+</sup>	75.67	321 (16)	70.24	655 (28)	65.83	-	-	-	-	-	-	-	-	-	-
Total	337 (22)	100.00	457 (16)	100.00	995 (28)	100.00	1459 (53)	100.00	2010 (37)	100.00	2196 (66)	100.00	2864 (71)	100.00	8529	99.99

\* Figures obtained from the Annual Medical Reports, Swaziland 1955-1961

+ Deaths in brackets

The disease is seasonal in incidence, being more prevalent at the end of the winter months when maize stocks are low, wild vegetables scarce, seasonal activities greatest and when the increasing sunlight brings out the photosensitive dermatosis.

Pellagra is well known to the Swazi (designated by them "the peeling disease"). Its presence does not always cause the sufferer to seek medical attention and it is frequently regarded as an annual visitation. The disease is attributed, by the majority of the Swazi, to excessive indulgence in local beer.

The role of alcohol in pellagra is not fully known but it does precipitate the disease condition. Pellagra is associated with dietetic imbalance and it is the chronic beer drinker whose diet is such. The exact niacin content of the local beers is not known, but as African beer is made from maize it is unlikely to be high in this vitamin. Serious beer drinking is an all day occupation, the participant rises early in the morning to seek the ambrosia, and will remain all day in social intercourse and drinking. The beer dulls appetite and after the inebriated person has walked home through the twilight, the desire and the preparation time for food is already past. It is not unusual for a Swazi to consume nothing but beer for several days on end.

Beer is offered as an incentive and reward for labour, the period after the harvest is celebrated with beer drinking parties. In the towns not only are more potent, less nutritious alcoholic drinks brewed, but European liquors are on sale to all.

The fieldworkers were puzzled at the absence of pellagra in some hardened beer drinkers whose waking hours were spent at the 'beerhall' and who, on return to the home, eat nothing. On investigation, it was discovered that some shrewd women sold cooked meat in small portions at the 'beerhall'. Beer dulls appetite in general, but arouses a craving for meat, particularly roast meat. Sometime during the day, the beer-drinker would purchase some meat, the latter being high in niacin, prevented the occurrence of pellagra.

The prevention of pellagra would appear to lie in the encouragement of traditional relishes in the rural areas, careful attention to the nutrient composition of workers' rations, and a study of the problem in the urban areas. In the towns, factors that should be considered are the adequacy of present wage levels, sources of high niacin foods and the possibility of the addition of niacin to a common food, e. g. bread.

#### 4.5. Kwashiorkor:

Kwashiorkor has been fully described on many occasions. It is proposed only to put forward those points that appertain to Swaziland.

Records of one hundred and forty-six cases of kwashiorkor were studied to determine the age incidence. The ages had been recorded to the nearest month up to the age of one year, and thereafter at three monthly intervals (e.g.  $1\frac{1}{4}$  years). The mean (arithmetic) age of incidence was nineteen months, and the age at the mode was two years. Twenty per cent of the cases occurred prior to one year of age and thirteen per cent after the age of two years.

From the records it was not possible to determine whether the incidence of kwashiorkor was higher in the rural or the urban areas.

Research workers in Durban<sup>1)</sup> found hair changes in 48% of kwashiorkor patients. In Swaziland, hair signs were nearly always present and at an early stage in the disease.

In kwashiorkor the aetiological factors, both direct and indirect, are many. Protein insufficiency at a time when the physiological demands for this nutrient are highest, is the biggest single cause. Also implicated by different authors, are precipitating disease, poor environmental hygiene, poverty, the expense of protein rich foods, a scarcity of suitable foods for a weaning child, and customs which separate child and mother.

Since 1958, the Medical Department has endeavoured to inform the population of the aetiology, symptoms and seriousness of kwashiorkor. However, at a Baby Show held at the Red Cross Clinic, one mother entered a baby with symptoms of pre-kwashiorkor including 'red' hair. The Swazi recognize the disease as one of recent origin, but do not ascribe a cause. Babies are not always taken to hospital, and once oedema sets in hope is abandoned. ("If a Swazi baby swells, it dies").

The weaning custom is to rub a very bitter or hot substance on the breast; the child is appeased with some food, frequently meat, and then sent to the grandmother to "forget the breast". In former days when each home had abundant milk, the child probably suffered little, but at the present time, the child frequently receives only porridge and vegetable relish.

Swaziland receives full cream and skimmed milk from I. N. I. C. E. F. This milk is available in hospitals and clinics for all children under the age of six years.

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1) J. Scragg "Kwashiorkor in African Children in Durban". British Medical Journal, (Dec. 17, 1960), 1761.

## 5. ENDEMIC GOITRE :

A full discussion of endemic goitre and the results of a goitre survey in Swaziland, are found in a Department of Nutrition publication. <sup>1)</sup> In brief, endemic goitre is attributed to iodine lack (or excess of fluorine), the pituitary gland responds to the deficiency with an increase of thyroid-stimulating hormone causing hyperplasia and swelling of the gland.

Thus, the size of the thyroid and the incidence and severity of endemic goitre are dependent on:-

- (i) Sufficiency of iodine intake ;
- (ii) the degree of iodine deficiency in food and water, and
- (iii) the presence of goitrogenic agents in food, water or pharmaceutical preparations.

Except for sea-foods, most foodstuffs are low in iodine, and the chief source for the body is that derived from drinking water.

Certain foods, notably the Brassicae (cabbage, etc.), groundnut, liver and fat, are goitrogenic. They only assume importance when eaten in large quantities and when the iodine content of drinking water is low.

At times of harvest the groundnut becomes the chief dietary ingredient, women too busy and tired to cook will eat the nuts as they are harvested. However, this is only for a short period of the year.

The goitre survey <sup>2)</sup> report deemed Swaziland a goitre area. The soils and drinking water sources are low in iodine, but not high in fluorine. An examination of Swazi schoolchildren revealed that the incidence of goitre averaged 26 per cent and ranged from 4 - 71 per cent of pupils in schools in different areas. The incidence of goitre was found to be almost directly proportional to the degree of iodine deficiency.

In conditions where there are low levels of iodine, and no excess fluorine in the drinking water, the authors of the report recommend the addition of iodine to salt in the proportion of 1 part per hundred thousand (1: 100,000).

The Swazi housewives universally purchase crude salt which they crush and use in cooking. Addition of iodine to table salt only, would benefit only the European population, when proposals to iodize salt in Swaziland are discussed, consideration should be given to this point.

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1) Endemic Goitre in the Union of South Africa and Some Neighbouring Territories, (Dept. of Nutrition, 1955).  
 2) Endemic Goitre, op.cit., 63-71.

## 6. PARASITIC PATTERNS :

### 6.1. Malaria:

Malaria has been controlled in the Territory since 1956, and routine measures to check on the efficacy of the control are performed by the Public Health Department. With the control of malaria, the Lowveld has become both habitable and an economically desirable place to live.

There are no statistics to indicate the effect of malaria eradication on the health of the population. However, a very experienced doctor <sup>1)</sup> in the Territory, has stated that a general improvement in child health is discernable since malaria control.

### 6.2. Helminths:

Officials of the Public Health Department in Swaziland conduct routine stool examinations for bilharzia. During these examinations other helminths were identified. In Table 9, the mean prevalence rate and range for some thirty-six areas are reproduced.

Hookworm infestation is not found in Swaziland. Ascaris Lumbricoides is one of the chief parasite areas and the highest rates are in schools and missions. If the eggs of ascaris, passed in the faeces, fall on sandy soil exposed to the hot sun, they die before the embryos can develop; for the eggs thrive in conditions of abundant moisture and shade, and in clay rather than sandy soil. One might suppose that in the rural areas the rate of infestation might be lessened, however, pigs and dogs probably ingest the faeces and disseminate the eggs. It has been shown <sup>2)</sup> there was no statistical difference between the mode of sanitation (water borne sewage, pit privies, or 'bush' methods) and the incidence of Ascaris.

Taenia Saginata is found in the flesh of cattle or allied animals. The Swazi method of roasting the chunks of meat (butchered locally) over an open fire, causes the surface of the meat to be seared, but does not destroy the cysts in the interior of the joint.

Animals slaughtered at abattoirs are inspected for disease and parasitic infestation. It is the animal that dies or is butchered in the rural areas that escapes inspection.

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1) Dr. David Hynd, personal communication.

2) Dr. Z. Jacobson, Medical School, University of Natal.

TABLE 9

PREVALENCE RATES (AS A PERCENTAGE) FOR CERTAIN HELMINTHS

	<i>Ascaris lumbricoides</i>	<i>Taenia saginta</i>	<i>Trichuris</i>	<i>Enterobius vermiculata</i>	<i>Strongyloides</i> spp.	<i>Hymenolepis nana</i>
Mean Prevalence rate	10.8	5.0	3.2	0.7	1.4	0.2
Range	(0-33.8)	(0-20.6)	(0-25.0)	(0-5.0)	(0-5.2)	(0-3.4)

### 6.3. Discussion:

A suggestion, attributed to Platt <sup>1)</sup>, is that "a greater contribution to the eradication of protein malnutrition may be to control infections by malaria, to improve the environmental sanitation rather than only to correct the protein intake".

Kwashiorkor has been found in children with no parasites and with those infected heavily. There appears to be little relation to the parasitic load and the development of kwashiorkor, although it would seem feasible that the parasitic infestation prepares the ground for this disease.

Resistance to an infestation of parasites depends on the protein available for anti-body formation. Good nutrition is essential for the development and maintenance of immunity. When the dietary protein is inadequate, the failure of immunity allows for the unimpeded multiplication of parasites or the continued acquisition of new ones which further lowers the resistance of the host and establishes a vicious circle. <sup>2)</sup>

Children form that section of the population most heavily infested with parasites and it is they who have the least adequate levels of dietary protein. In order to alleviate irritation, pain, debility and other more serious symptoms, the control of parasites would appear to be indicated. Chandler <sup>3)</sup> describes how in endemic localities, treatment of parasites without any improvement in sanitation does little for the treated population, reverts back to a pre-treatment level of infection within a year. However, when re-infection is stopped the worms are lost in about 9-12 months, even without treatment.

It is beyond the scope of this study to advise on parasite control, but it is suggested that, as far as possible, environmental sanitation should be controlled, so that drinking water is not polluted, and personal hygiene encouraged among all age groups.

In addition, the control of communicable disease and of gastro-enteritis will reduce childhood mortality more speedily than efforts to rid the population of parasites.

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- 1) C. Gopalan, Meeting Protein Needs of Infants and Children, op. cit., 175.
  - 2) A. C. Chandler, Introduction to Parasitology, (9th edition, New York: John Wiley and Sons Inc., 1955), 25.
  - 3) Chandler, op. cit., 444.

## CHAPTER VIII

### AGENCIES CONCERNED WITH NUTRITION

#### 1. INTRODUCTION :

In Swaziland at the present time, various agencies are concerned with nutrition. To a large extent there is little co-ordination between each group, but each works independently to achieve better nutritional standards. The lack of co-ordination is due to the absence of a person or group of persons whose speciality is nutrition. Credit must be given to the agencies who are performing a good job, often under difficult conditions.

#### 2. INTERNATIONAL BODIES :

##### 2.1. U. N. I. C. E. F. :

Since 1961, dried skimmed and full cream milk has been made available to Swaziland by U. N. I. C. E. F. The milk is distributed to all hospitals and clinics who allot it to Swazi children under the age of six years, particularly the mal-nourished. In addition, officials of U. N. I. C. E. F. have investigated the potential of the dairy industry and the by-products thereof.

##### 2.2. Oxfam:

Oxfam has recently granted the Medical Department a sum of R27,000 (£13,500) to establish a Health and Nutrition Education Unit in the Territory.

#### 3. GOVERNMENT DEPARTMENTS :

##### 3.1. The Medical Department:

The health of the Territory is guarded by this Department which, in addition to its own services, subsidizes the medical work of the Missions. Table 1 summarizes the position of the staffing and facilities available in 1961.

TABLE 1

#### SWAZI MEDICAL SERVICES - 1961<sup>1)</sup>

Hospitals	Beds	Clinics	Physicians	Medical Assistants	Nurses	Auxiliary Staff
7*	722	26*	35*	2	153+	13

\* In addition one mine has its own hospital and other large industries have their own clinics and doctors.  
+ Does not include probationer nurses.

1) Data from Swaziland, 1961. (Her Majesty's Stationery Office, 1961) 52.

Preventive medical services are provided by a Medical Officer of Health and deal with general public health matters, malarial control and bilharzia investigational work.

There is a training school for nurses attached to the Nazarene Mission in Manzini. The Medical Services employ no Health Visitors or Social Workers.

The Maternal and Child Health Services are still embryonic. Ante-natal and post-natal care is given by the doctors at the hospitals, and at the clinics. The majority of the rural women never see a medical person during pregnancy and deliver with the aid of local "midwives". Some of the Missions provide a School Medical service for their schools.

The Territory has two private dental practitioners. Extractions are carried out by doctors in out-patient clinic, but no remedial work is attempted.

The chief disease problems of the Territory are tuberculosis, malnutrition, gastro-enteritis and pneumonia.

Nutrition education is disseminated at clinic sessions, but the large number of patients, limited personnel and cramped quarters allow little opportunity for any really valuable contribution. The Public Health Department has recently instituted a series of rural meetings, at which personnel address the people on a number of subjects including nutrition.

### 3.2. Department of Land Utilization:

This Department deals with all aspects of agricultural and veterinary services, including research. Already established are an Agricultural Training Centre and a similar one for Cattle Guards in Swazi. Plans are being made for the opening of an Agricultural Training College in 1964. A large number of staff are engaged in extension work among the rural Swazi.

The chief problem of the Department is the overstocking on the Swazi areas. Certain parts of the country have already been eroded and others are in imminent danger. De-stocking is hampered by the traditional Swazi attitude towards cattle.

The channels through which agricultural education is dispersed include :- the Swazi Farmer's Associations and Women's Associations, which are concerned with Home Economics. A woman extension officer has recently been appointed to be in charge of this section, and under her charge are five domestic science demonstrators, whose function is to estimate the interest and skills of the rural Swazi women in home economics.

The annual Agricultural Show at Manzini is the shop window of Swaziland agricultural achievements and exhibitions of an education nature are arranged at this time.

A Schools Week is held once a year to interest school children in agriculture.

### 3.3. Department of Education:

The Department of Education is concerned with education up to and including secondary school level and, in addition, provides technical training at a Trade School. Grants-in-aid are made to mission schools, and to a mission-run Teacher Training Centre and Housecraft. A Government Teachers' Training College was opened in 1962.

A Domestic Science Organizer is responsible for that subject throughout the Territory. Domestic Science is taught in Government Schools to all girls in Standard V and VI. The syllabus for the first year is so designed that all cookery can be done out of doors. The children learn the routine for the cleaning of rooms and utensils and are introduced to the methods of cooking by the preparation of simple local foods, e.g. thin porridge and bean stew. By the third term in Standard V they are cooking steamed puddings.

In Standard VI the iron stove is introduced, and the children learn to make jam and bottle fruit. Instruction is given to the basic principles of nutrition, and in meal planning.

The policy of the domestic science course appears to be to teach the children how to make use of the foods and resources available at home, but also to introduce to them foods, situations and equipment normally associated with the Western way of life. In theory this is an excellent principle for a society and generation in transition.

In spite of the early emphasis on the use of local foods and cooking methods, there is a dichotomy in most school girls' minds between home cookery and that which is learnt at school. Rural children are taught the principles of housecraft from the time that they can walk, but they seem to have difficulty in transferring the lessons learnt at school into the home situation.

A study of the essays written by the school children on "Foods - those I like and those I dislike" revealed to some extent the knowledge of nutrition principles. There were wide variations from school to school and individual to individual, but a tendency to imagine such elements as calories, protein and vitamins in an abstract way. One is left with the impression of incomplete understanding. However, some children did comment on the lamentable difference between the foods that they are taught are good for them and those they receive at home.

In addition to the education of school children, the Department fosters Women's Clubs where instruction is given in homemaking and allied arts.

Many rural schools have school gardens, which are tended by the children under the supervision of a teacher. During school holidays there is a tendency for the gardens to become overgrown.

#### 4. VOLUNTARY AGENCIES :

Social welfare work is carried out mainly by the voluntary services, which include the British Red Cross, Child Welfare Society, M. O. T. H. S., Masonic Lodges, Rotary and Missions<sup>1)</sup>. The Red Cross operates baby clinics in six towns in the Territory. The clinics are very valuable in helping mothers with advice, powdered milk and food for the needy. Interest is stimulated with Annual Baby Shows. In 1962, the Rotary Club at Manzini produced a pamphlet in si Swati on the value of a well-balanced diet. Narrated in story form it attacked in a new, and theoretically highly acceptable way, the malpractices leading to malnutrition.

A voluntary society that is paving the way for more written advice is one aiming at combating adult illiteracy. The pupils are taught to read and write in si Swati.

#### 5. TOWNSHIPS :

Most of the extension services are geared for the rural areas. The towns at the moment are under the management of a local village committee but it is hoped that in the coming year Township Boards will be established.

Voluntary agencies such as the Red Cross and the Y. W. C. A., function in the townships already.

#### 6. SUMMARY :

This chapter has attempted to describe briefly those agencies that are already tackling some aspect of nutrition education. In the final chapter recommendations are made involving the well-established departments.

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1) Swaziland 1960, op.cit. 56.

CHAPTER IXSUMMARY, CONCLUSIONS AND RECOMMENDATIONS1. SUMMARY:

The nutrition study of the Swazi commenced in Durban in December, 1960 and was completed in March, 1963. Some fourteen months were spent in the field, and during this period the nutrition of 2,074 persons was investigated. Of this total number some 708 persons were re-examined to estimate the seasonal effect on dietary patterns.

The harvest of 1961 was a poor one, in some areas disastrous. The hunger was mitigated from two sources: first, the Government made available grain for purchase on long term credit, and U. N. I. C. E. F. commenced sending dried milk to Swaziland for the young children.

The Swazi are, by tradition, cultivating pastoralists. A large majority aim, not entirely successfully, at producing sufficient food for domestic consumption, but wage earnings, derived from migratory labour sorties within and without the territory provide for most of the cash needs. A small group of potential master farmers are involved in cashcropping.

The use of contour ploughing and kraal manure is now almost universal, and an increasing quantity of fertiliser is being purchased. Crops vary from one physiographic region to another but the chief ones are maize, sorghum, several varieties of legumes, vegetables and fruit. Cash crops include: wattle, cotton and tobacco. Cattle are prized for both wealth and status properties; but the land is heavily overstocked.

In the rural areas two meals a day are eaten. The basic pattern of eating consists of a cereal, either maize or sorghum, accompanied by a relish, unless the cereal is eaten in its soured form. Meat and African beer are the superlative Swazi foods. The dietary patterns vary with the physiographic regions and with the seasons. Certain taboos on food favour the men and deprive the women and children.

The Swazi diet on a per head basis was found to be deficient in calories, calcium, Vitamin A, riboflavin and niacin. There were adequate quantities of iron, thiamine and ascorbic acid. Evidence suggests that the most poorly nourished population members are the child from weaning to five years and the pregnant and lactating woman.

The height and weight curves based on the means of Swazi schoolchildren are equivalent to the twenty-fifth percentile of the Stuart standards.

The subcutaneous fat of the Swazi girls and boys up to the age of fifteen years is below that of the children used in establishing British norms. After the age of fifteen years the Swazi girls have a greater skinfold thickness than their English counterparts.

Physical examination of children up to the age of eighteen years revealed that, apart from a few cases of kwashiorkor and pre-kwashiorkor there were no gross lesions attributable to defective nutrition, but there were many small signs that could be due to sub-optimal nutrition and the interaction of other factors. In 1955, Swaziland was declared a goitre area by the South African Goitre Research Committee.

The mean birthweight of Swazi babies is 6.90 lbs, which is 9 ozs. less than that of European babies. The difference may be attributed to a small extent to differences in nutrition.

The infant mortality rate is 147 per thousand for the territory as a whole, but is higher in rural than in urban areas.

The diseases most frequently encountered in clinical work are tuberculosis, pneumonia, malnutrition and gastro-enteritis. Nutritional disease has increased in incidence since 1955.

## 2. SIGNIFICANCE OF FINDINGS :

In the absence of biochemical investigation into the level of nutrients in the serum, it is not possible to make any definite statements on the significance of the findings. However, the evidence implies several unsatisfactory nutritional situations.

Maize plays an unrivalled role in the diet of the Swazi, and during years of poor harvest the community, farming at subsistence level, is exposed to the peril of famine. Even in a good year many homes experience periods of shortage.

### 2.1. Calories:

The dietary study has demonstrated a deficiency of calories in diet, and the evidence from height and weight measurements together with that from subcutaneous fat estimates, supports this. In these circumstances the lack of calorie reserves in foodstuffs, in the daily intake and in body fat stores, is of vital importance in relation to the times of food shortage. The population has no reserves on which to draw; this situation is aggravated by the fact that, at the end of the winter when the shortages are greater, the seasonal activities are most demanding.

## 2.2. Protein:

In the light of the calorie deficiency, the protein intake per person cannot be regarded with equanimity. For under these circumstances protein must be diverted from its essential growth and repair functions to satisfying energy demands. The presence of kwashiorkor is evidence of the maldistribution of protein within food consumption groups.

## 2.3. Calcium:

The lack of clinical evidence associated with purportedly inadequate intakes of calcium in the human population of Swaziland, suggest that the low level is not a matter for great concern and it is possible that the Swazi are well adapted to these levels. Biochemical tests should be performed to verify this supposition.

## 2.4. Vitamin A:

The Vitamin A levels, on the other hand, cannot be disregarded. The presence of hyperkeratosis and phrynoderma in many of the children may well be associated with an inadequate intake of this vitamin. However, the absence on examination of the eye of Bitots' spots and keratomalacia suggest that the deficiency is not very grave.

## 2.5. Niacin:

In a country whose staple food is maize any deficiency of niacin intake is a serious matter. This is emphasized by the large annual increase in the numbers of cases of pellagra diagnosed in recent years.

## 2.6. Riboflavin:

The absence of clinical findings directly attributable to riboflavin deficiency indicates that the dietary inadequacy is not yet sufficiently serious to cause physical manifestations.

## 2.7. Iron:

Adequate to abundant levels of iron intake were found. The incidence of siderosis is not known. The iron intake is probably sufficient to cope with the demands of both the intestinal parasite and its host. The presence of anaemia in the population requires further investigation so that the role of iron deficiency in this syndrome may be determined.

## 2.8. Iodine:

Several years ago the incidence of goitre was such that a recommendation for the iodization of salt was made, but this has not been put into practice.

## 2.9. Gastro-Enteritis:

The high incidence of gastro-enteritis and more particularly of infantile gastro-enteritis points to inadequate environmental hygiene and poor dietary practices.

## 2.10. Child Rearing Practices:

The present child-rearing practices, and the incidence of kwashiorkor, gastro-enteritis and infant mortality rate call for an early revision of the services and facilities available for instruction in puericulture.

## 2.11. Intestinal Parasites:

The population is to some extent incapacitated by the presence of intestinal parasites which is manifest in mental and physical apathy. In addition, malnutrition lowers the individual's resistance to further infection and enhances the effect of this infection.

## 2.12. Basic Causes of Malnutrition:

Malnutrition has been ascribed to many factors: inadequate food supplies, absence of nourishing foods, the ignorance of consumers in the practice of infant feeding and sound food purchasing. One of the most important causes is a low standard of living; the economic level of the Swazi prevents them from purchasing the additional imported food available to the European. It is possible to forecast that a decrease in the infant mortality rate without decline in the birth rate will in the near future place a further strain on the economy of the Territory. In both the new centres of industrialization and in the rural areas, demands for other goods and services may take priority over the food purchases of the family. New food tastes influenced by advertising, will crave 'cool drinks', sweets and possibly alcoholic drinks.

In the U. S. A. experience with immigrants has shown that "given time and increasing economic security, the initial deterioration in diet, due to the buying of prestige foods, rights itself in the second or third generation" <sup>1)</sup>.

In the urban areas and in many rural areas an improvement in the standard of living and in purchasing power is a necessary precedent to improvement in nutrition. Once the former has been achieved the latter can be catalysed by education.

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1) Malnutrition and Food Habits. op.cit. 54.

### 3. RECOMMENDATIONS FOR FURTHER STUDY :

From the planning stage to the end of the survey, I have constantly wished for more money, more time, more personnel to investigate other aspects or to probe more deeply into those under review.

The statistical matrix devised by the Sample Survey of 1960 is readily accessible for subsequent surveys. Aspects that would complement the present study are :

1. Heights, weights and skinfold thickness of adults.
2. Length (or heights) and weights of infants and children up to five years of age.
3. Further helminthic surveys.
4. Level of nutrients in the serum.
5. Anaemia, the clinical and biochemical picture.
6. Laboratory analyses of local foods, and of the herbs used by the izinyanga.

### 4. RECOMMENDATIONS FOR NUTRITIONAL IMPROVEMENT :

#### 4.1. Introduction:

It is with some diffidence that the role of analyst is discarded and that an attempt is made to recommend measures to improve the nutritional status of the Swazi.

These recommendations are put forward in the hope that they will form a basis for discussion and planning. It is not intended that they are 'answers' but possible solutions. As a preliminary suggestion it is recommended that a Conference be held of officials from the Government departments concerned, together with representatives of voluntary agencies and of the Swazi people, rural and urban. If members of the International Agencies (F.A.O., W.H.O. and U.N.I.C.E.F.) were to accept an invitation to attend, the Conference would be assured not only of advice based on long and wide experience, but possibly also of aid.

The recommendations have been drawn up after consulting some of the literature released by the International Agencies, but the specific problems and situations existing in Swaziland have always been kept in mind. Thus the chief agricultural problem of overstocking has been recognized and no recommendation is made which would aggravate this situation. The existence of

the migrant labour market and of increasing industrialization and urbanization with the prospect of a rise in purchasing power, has likewise been considered.

#### 4.2. Nutritional Change:

No apology is made for putting forward some views that may be obvious, but nevertheless essential for the success of nutritional improvement.

It is important that changes introduced into a society are not disruptive and that the measure to be introduced is necessary for improved health. As far as possible, the change must fit into the cultural framework of the people. Measures that provide new or supplementary foods must do so at minimal cost so that the food reaches the poorest members of the community. An example of such a product is the proposed skimmed milk product which closely resembles emasi, the traditional food of the people. This food will utilize unused skimmed milk from the rural dairies and will be retailed at around 2½ cents per pint.

The Swazi has a storehouse of empirical knowledge which should be investigated and at times drawn upon. For example, many of the wild vegetables used are excellent sources of nutrients. Again, the Swazi mother's practice of the early introduction of mixed feeding is to be commended.

The factors that cause persons to select certain foods are not fully known <sup>1)</sup>. An incentive is frequently required to change food habits (white bread may be chosen in preference to maize because it is both time- and labour-saving and because it is a 'status' food). Any food that is introduced must be acceptable to the population or it will fail, whatever its nutrient value. An incentive for most mothers to improve the family's nutrition is the health of the children, (the relation between food and health is fairly well recognized).

Any new measure should be discussed with the people involved. The objectives of the scheme should be clearly defined and frequent evaluation made to detect whether these are being achieved.

A pilot project is a necessary precedent to a large-scale scheme. The sample areas used by the nutrition study provide such a community for pilot schemes. The conditions in these areas have been carefully investigated and form a baseline for

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1) Long term research on this problem is being carried out at the University of London.

evaluation. "Moreover, <sup>1)</sup> the people in a survey area expect some practical results from the investigation in which they have co-operated. The survey will have aroused local interest, a first necessity to the success of any constructive program. The early application of the results of a survey in an area is therefore essential."

## 5. FOOD PRODUCTION PROGRAMS :

Detailed planning of agricultural policy is left to the experts. The present section seeks to recommend lines along which policy planning can run.

It is recognized that the climatic and physiographic differences necessitate different agricultural practices.

The recommendations are based on the fact that the staple food is maize, a highly nutritious food, easily grown and producing yields in regions where other cereals can be grown only with difficulty. The chief nutritional defect in maize is niacin; moreover a large proportion of the proteins in maize are deficient in tryptophan, while lysine quantities are limited.

### 5.1. Other Cereals:

Millet is unknown in Swaziland and there appears to be no valid reason to introduce it. The development of a bird-resistant, palatable sorghum would greatly aid the nutritional status of the Lowveld areas. Sorghum is a traditional Swazi food, and is still much favoured.

### 5.2. Roots and Tubers:

It is recommended that no encouragement be given to the cultivation of starchy roots and tubers (e.g. cassava) which provide little other than carbohydrate. The development of an acceptable yellow sweet potato would provide carotene but less so than the vegetable carrot.

### 5.3. Pulses, Nuts and Seeds:

The cultivation of these foods has long been encouraged in Swaziland, and this policy should be pursued with greater emphasis. Pulses provide not only the amino acids, tryptophan and lysine, but also niacin. Further, they contain considerable amounts of iron, calcium, copper manganese, and are a source of B complex vitamins. Almost all beans are nutritionally favourable; those already known to the Swazi are the jugo bean (Voandzeia subterranea Thou) and mung bean (Phaseolus mungo li nn). The groundnut (Arachis hypogaea Linn) is particularly rich in niacin.

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1) E. Reh, Manual on Household Food Consumption Surveys (Second Draft: Rome: F. A. O. of the United Nations, 1960), 92.

Sprouted dried beans not only contain ascorbic acid, but also they elaborate an increased amount of niacin during germination, the mung bean and the chick pea (Cicer arietinum) being among those eaten when sprouted. The consumption of legumes in this form should be encouraged.

Soya beans are an excellent source of the amino-acid lysine, and of calcium. Moreover, they withstand storage over long periods. The drawback to this food is the difficulty of including them in the diet without processing into milk, vermicelli or some other form. Sesame is mentioned as a good source of protein and fat.

Some research is required on a simple method of making beans more "digestible". Prior blanching of the beans and the addition of salt at the end of cooking are said to render the skins more tender. Some co-ordination between Home Economics teachers (Department of Education) and the women domestic science teachers (Department of Land Utilization) should overcome this problem.

#### 5.4. Vegetables:

It is recommended that the edible wild vegetables be sought and given prominence. The suggestion <sup>1)</sup> that these be planted in the demonstration plots, is of value. (At the Manzini Agricultural Show the wild vegetables on exhibition aroused excited comment).

The cultivation of yellow vegetables containing carotene is to be encouraged. Tomatoes are popular but are prone to disease. The value of pumpkins is great: not only do the leaves contain good amounts of carotene, but the pips are a source of fat.

Methods of preserving vegetables, for use during the late winter months, should be sought and practised.

#### 5.5. Fruit:

The consumption of wild fruit, abundant still in the bushveld, should be advocated. The marula provides not only a potent drink, but also an edible fruit and stone. Guavas and citrus fruit are sources of pro-vitamin A; and banana is a good fruit for the young baby. Many families have already planted paw-paw trees near the homestead.

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1) Made by Mr. G. Varty at a meeting on nutritional improvement. Mbabane, October, 1962.

#### 5.6. Livestock:

Owing to the existing overgrazing any suggestions of increase in the numbers of livestock must be dismissed. The correct feeding and management of the existing cows is to be encouraged so that milk production may be increased.

The taboo on eggs for young girls and women might well disappear if eggs became more plentiful, for they are already accepted in cakes and puddings. Eggs are also excellent food for babies. Discussions with the officers of the Department of Land Utilization revealed that, when families were given roosters of a superior strain, these were killed and eaten, and not used for breeding purposes. It may, therefore, well be that the demand for eggs will have to be fostered before superior strains are made available (by purchase) to keen families. The susceptibility of fowls to disease is another problem.

The keeping of domestic rabbits as a source of animal protein has been suggested and might well be encouraged in schools.

There is no taboo on fish, but fish-eating has never been a habit. However, many children enjoy the sport of fishing, and canned fish is popular. The stocking of dams and ponds with fish provides a very quick turnover of protein. A start has already been made in Swaziland with tilapia, and the tendency of this species to overpopulate the dams with excessive numbers of tiny stunted fish has eventuated. It is recommended that fish farming be encouraged as a potential chief source of animal protein. This may require the appointment of a fisheries officer. At the same time the Domestic Science teachers should give instruction in the preparation and cooking of fish.

#### 5.7. Storage of Foods:

It is recommended that the storage of foods be fully investigated and the encouragement of the use of metal tanks be continued. In this way the loss of foods through pests and animal theft can be reduced.

#### 5.8. Research:

The present research personnel in Swaziland are doing excellent work. It is to be hoped that they will bear in mind the dietary deficiencies revealed in this study and concentrate on foodstuffs that will help to eradicate malnutrition.

#### 5.9. Transport and Marketing Facilities:

The Middleveld at times has a glut of vegetables and fruit (e.g. tomatoes) which do not reach the urban areas or the needy Highveld. The difficulty is caused by the lack of transport and marketing facilities. For one woman to take a basket of tomatoes to the town would mean that the profits are lost in bus fares. In some areas a woman will come to a bus route to spend all day selling her small piles of vegetables and fruit.

It would not appear a very difficult task to organize the women into a community market. A few of the women could undertake the marketing for the others, and local transport might be organized to take large quantities to the town. Urban shops might well send out for the fruit and vegetables. The operation of the market should be the responsibility of the women themselves. The difficulties foreseen include the possibility of graft.

#### 5.10. The Lowveld:

This area requires prior attention, and has received least; for there are few Land Utilization Officers in the Lowveld. During the summer months milk, edible plants and fruits are plentiful, but during the winter months, particularly after a bad harvest, there is often semi-starvation. It is recommended that further attention be paid to the cultivation of protein-rich crops in the Lowveld.

#### 5.11. The Highveld:

The Highveld is climatically unsuited for the cultivation of certain legumes and many vegetables. The answer to the protein and vitamin B complex shortages would appear to be in the development of livestock, but this is made difficult by the present overstocking. The Highveld <sup>1)</sup> has the highest cash incomes of the four physiographic areas. If the legumes and vegetable products of the Middleveld were made available to the Highveld area the people could purchase these. In the Highveld the cultivation of some of the indigenous wild vegetables in gardens would add variety to a monotonous diet.

#### 5.12. The Housewives:

"The influence of Swazi women and their ability to stifle or induce rural betterment is not underrated by the Department" <sup>2)</sup>.

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1) Experiment in Swaziland, op. cit. Part II, Chapter VIII  
377.

2) Annual Report of the Department of Land Utilization,  
(Swaziland 1961), Vol I, 27.

The Home Economics Officer, through Women's Associations, stimulates better standards of home-craft and, it is hoped, will thus give the farmer an incentive to produce more.

The rural housewife has numerous household tasks to perform in addition to caring for the children. If her husband is employed in migrant work, the burden of crop production falls on her. An endeavour should be made to lighten the task of women (e.g. handmills) and to extend agricultural services to them. (it is the women who have persuaded husbands to use fertilizer, saying that, if they have to harvest the crop it should, at least, be a good one). One of the difficulties is that a woman whose husband is absent cannot make any policy decisions without his approval, and communications between the rural areas of Swaziland and the Rand mines are poor.

## 6. SUPPLEMENTARY FEEDING PROGRAMMES:

### 6.1. The Need for Supplementary Foods:

There is no need to supplement the diet of the whole of the Swazi population, but this study has revealed the probably deficient diets of the pregnant and lactating woman, and of the child from one to five years of age. The spread of education in the territory within recent years has brought it within the reach of the under-nourished child, whose family hitherto could not afford to send him away for schooling. The rural children travel long distances to school, often without a meal prior to school and missing a meal at midday.

### 6.2. Aims of a Supplementary Feeding Programme:

The objects of a supplementary feeding programme should include :-

- (a) Utilization of local foods.
- (b) The provision of those nutrients which are deficient in the home diet.
- (c) The preparation and consumption of foods in such a way that they sufficiently resemble home conditions so that the recipient can see a connection between the supplementary food and the home meal <sup>1)</sup>.
- (d) Endeavour to ensure that the supplementary food and its presentation contributes to the education in correct feeding.

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1) H. L. Scott, "School-feeding: Some present-day concepts and activities", Journal of Tropical Pediatrics, 3 (March, 1953), 171.

### 6.3. Difficulties Facing Supplementary Feeding Programmes:

The chief reason for the slow progress in supplementary feeding is the problem of overcoming prior difficulties. First, the vulnerable groups have to be reached, rural schools are widely scattered and transport facilities are poor in many areas. Only a small proportion of pregnant women attend clinics. The hardest to reach are the pre-school child and the child of school age not attending school.

Other problems include the cost of the feeding programme, the organization of food distribution in local areas, (many teachers and clinic nurses are already fully occupied with routine work). Inadequate supervision of stores and lack of facilities are further deterrents, although clinics have running water, many schools have not.

### 6.4. Preliminaries to a Feeding Programme:

For a supplementary feeding programme to succeed both local authorities and the people should be interested in and appreciate the value of such a programme. In 1938, for instance, Keen <sup>1)</sup> drew attention to the cessation in height and weight gain and the poor standard of work among day boys, which he attributed to lack of food prior to the return home at the end of the day. The Swazi members of the school board, however, pointed out that grown Swazi men are used to going a whole day without food, "and the matter was to some extent ridiculed".

Some parents <sup>2)</sup>, knowing that their children receive food at school, may tend to neglect the child's diet at home. They need to be fully informed of the role of the school meal, and be urged to ensure that the meals at home and school together provide a nutritionally satisfactory diet.

### 6.5. Recommendations for Supplementary Feeding:

As in other countries, "the nature <sup>3)</sup> and importance attached to feeding programmes must be a compromise between the nutritional needs of the vulnerable groups and the possibilities with respect to personnel and resources of the countries to develop supplementary feeding".

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- 1) Keen, op. cit. 28.
  - 2) Scott, op. cit. 172.
  - 3) F. A. O. / W. H. O. Seminar on Problems of Food and Nutrition in Africa South of the Sahara, op. cit. 41.

As a feeding programme requires careful organization of its physical and technical aspects, it is recommended that all programmes be started with a pilot project, preferably in the rural area.

In Swaziland the best centres for the distribution of supplementary foods are schools, clinics and creches. The distribution of such foods may also encourage attendance at clinics.

Although the ideal supplement would be a nourishing, well-cooked meal of traditional foods with a high calorie, high protein, high Vitamin A and B complex content, with the present staff and facilities this is not possible. School gardens are never likely to provide sufficient food for a year-round dietary supplement. Facilities for cooking the food are not available in many schools. For these reasons the use of a pre-cooked food preparation of high quality is indicated. It should have a fairly long shelf life and be easily stored. Naturally the consistency and flavour must be acceptable to the people. Distribution of the food should not involve much equipment, e.g. plates, spoons.

At the present time such a food is not manufactured in Swaziland, but a wholesale company might be found willing to stock the food and to distribute it to rural areas, thus relieving pressure on Government departments and personnel. The dried milk, supply by U. N. I. C. E. F. and distributed through hospitals and clinics, is doing much to cure and prevent malnutrition but it cannot, and should not, be regarded as a permanent source of supply.

The aim of the supplementary programme is to use local food resources and it is to be hoped that local production will rise to this need. If milk production can be sufficiently stimulated to make enough packaged emasi available for this purpose, this would be one way. It may also prove possible to include citrus fruit in the supplementary feeding.

There is much evidence in Swaziland that a product which is distributed free or at a subsidized price, is spurned as 'useless' or 'near-useless'. However, to charge for the supplementary food would cause problems over the administration and many would not participate. The answer lies in the careful explanation of the purpose and content of the supplementary food.

## 7. NUTRITION EDUCATION :

There is evidence that nutrition education can bring about a real improvement in diet, and consequently, in health.

### 7.1. Aims of a Nutrition Education Programme:

It is recommended that the aims of such a programme be clearly defined, with due cognizance of the local conditions, problems and priorities.

### 7.2. Organization:

The programme should be organized by personnel with a knowledge of nutrition. The project may be initiated on a small scale. Felt and expressed needs may provide suitable openings for effective action. In Swaziland, one such expressed need is for information on child management.

The best method of reaching the Swazi people is through the existing channels of communication. In the rural areas the Farmers' Associations, Women's Clubs, Clinics and Schools are examples of organizations that can be so used to disseminate nutrition education. At present, extension, clinic and school staff cannot be burdened with a large programme of nutrition instruction, but after suitable training they might well be able to introduce it into their routine work.

In urban areas it is sometimes more difficult to reach people. Clinics, schools, Y. W. C. A. and Church groups are suitable channels. Patients convalescing in hospitals, or mothers awaiting babies, are suitable audiences.

The establishment of an Agricultural College and Short Course College presents an ideal centre for refresher courses or workshops on Nutrition Education, and also a place where community leaders can be instructed in the basic principles.

During the course of their training, nurses, teachers and land utilization officers should receive instruction in the basic principles of nutrition.

Hygiene and domestic science classes already include nutrition in their syllabus. Attention is directed to the necessity for the teaching to be strictly relevant to local conditions.

Plans are already underway for the formation of a Nutrition Education Unit. It is to be staffed by two Public Health officials and is to be mobile. The unit can best serve the purpose of Nutrition Education as a tool for the introduction and emphasis of nutrition principles, in rural areas at Agricultural Shows and urban market places. For example, the unit could move into a rural area and after enlisting the support of the community leader could, for a

period, bring all the local institutions, e.g. the clinic, school and church organizations, to bear upon the subject of nutrition.

There is much controversy over the value of school gardens, but they function best when the teachers are convinced of the value of scientific agricultural methods, when the gardens are of manageable size and when the work is confined to the more senior school classes and placed on a competitive basis.

### 7.3. Methodology:

It is not proposed to describe here the methods available for teaching nutrition <sup>1)</sup>. However, the use of the discussions group is of great value in Swazi communities, in which lengthy discussion and deliberation often precede decisions. When these discussions are accompanied by practical demonstrations in normal surroundings their value is greatly enhanced (e.g. teaching of infant feeding using flannelgraph and discussion technique to an audience of both men and women).

The huts attached to demonstration plots (run by the Department of Land Utilization) or those built for the Domestic Science demonstrators, might well be used to demonstrate methods of homestead hygiene and sanitation.

### 7.4. Evaluation:

Evaluation of the nutrition programme will be necessary occasionally. If the project has been well organized with clearly defined aims, changes in medical, social and economic conditions can serve as a basis for evaluation.

### 7.5. Training of Personnel:

This subject is dealt with adequately elsewhere in other publications <sup>2)</sup>. Attention is drawn to the difficulty of inducing highly trained African staff to live for a long period of time in the rural areas. Even among those moored by family ties there is an understandable tendency to wish to live in urban areas, where they can associate with others of similar education.

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1) See J. A. S. Ritchie, Teaching Better Nutrition, (F. A. O., Nutritional Studies No. 6: Rome, F. A. O. 1950).

2) Ritchie, op. cit. 37 - 51.

8. OTHER RECOMMENDATIONS :

- (i) The iodization of both table and cooking salt (International agencies have given such equipment to other countries). In order to offset the cost (unknown) of such iodization it may be necessary to enforce price control, which would benefit many of the rural people who are forced to pay high prices for this commodity.
- (ii) The registration of the births and deaths of the Swazi population.
- (iii) Family budget investigations, particularly in urban and peri-urban areas, and advice to the women in their choice and purchase of foods.
- (iv) The development and expansion of mother and child health services in hospitals and rural clinics, and the recording of weights of infants and adults.
- (v) The organization of a school medical service so that all schoolchildren receive an annual medical and dental examination, while a biannual record is kept of their weight and height.
- (vi) Measures to be taken to eradicate communicable disease in the Territory.
- (vii) The expansion of laboratory facilities so that they might be used for public health, agriculture and livestock investigations. This laboratory could provide information on intestinal parasites, anaemias, level of nutrition in the serum, environmental sanitation and communicable disease.
- (viii) The appointment of a nutritionist to co-ordinate all the nutrition activities of the various institutions in the Territory.

9. ORGANIZATION OF NUTRITION SERVICES :9.1. The Need for Co-ordination:

The 1940 report on nutrition in Swaziland, prepared by a committee consisting of the Principal Medical Officer, the Principal Veterinary and Agricultural Officer, and the Superintendent of Education, recognized the need for co-operation between Government departments but "the practice of co-operation is difficult to achieve without some permanent and directive body". The committee issued no further reports and is presumed to have succumbed to the fate it had earlier foreseen.

Nutrition involves a great number of Government departments and scientific disciplines. It is necessary to have, within an appropriate department, a unit, (possibly composed of one suitably qualified nutritionist) with the responsibility "to recommend and initiate action programmes based on accurate knowledge of the existing situation and scientific data in all the departments concerned in the treatment and prevention of disease due to malnutrition" <sup>1)</sup>. Without the services of such a unit the activities of a Nutrition Committee will be short-lived.

Once the Nutrition Unit is established, is it necessary to have a Committee? The planning and execution of food and nutrition policy require great co-ordination of effort if a programme at Territorial level is to be evolved. When representatives of the Department of Land Utilization and the Medical Services met to discuss results of the Nutrition Study, they found not only that the two departments faced similar problems, but that by co-operation they could achieve twice as much in preventive measures as a single department could accomplish.

#### 9.2. Scheme for the Organization of Nutrition Services:

In Table 1 a possible scheme for the organization of nutrition services in Swaziland is presented. Financial stringencies have been borne in mind and the only newly-created post is that for a nutritionist who would be the key person in the scheme.

The success or failure of the proposed committee turns on the degree of authority given to the committee, the funds available, and the degree of interest in nutrition prevailing at the highest level of administration.

It is hoped that this present study will provide the basic data on which the working committee can base policy, but in order to keep abreast of the latest research and developments, the committee should exchange information with other countries and organizations facing similar problems.

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1) F.A.O. W.H.O. Seminar on Problems of Food and Nutrition in Africa South of the Sahara, op. cit. 72.

TABLE 1

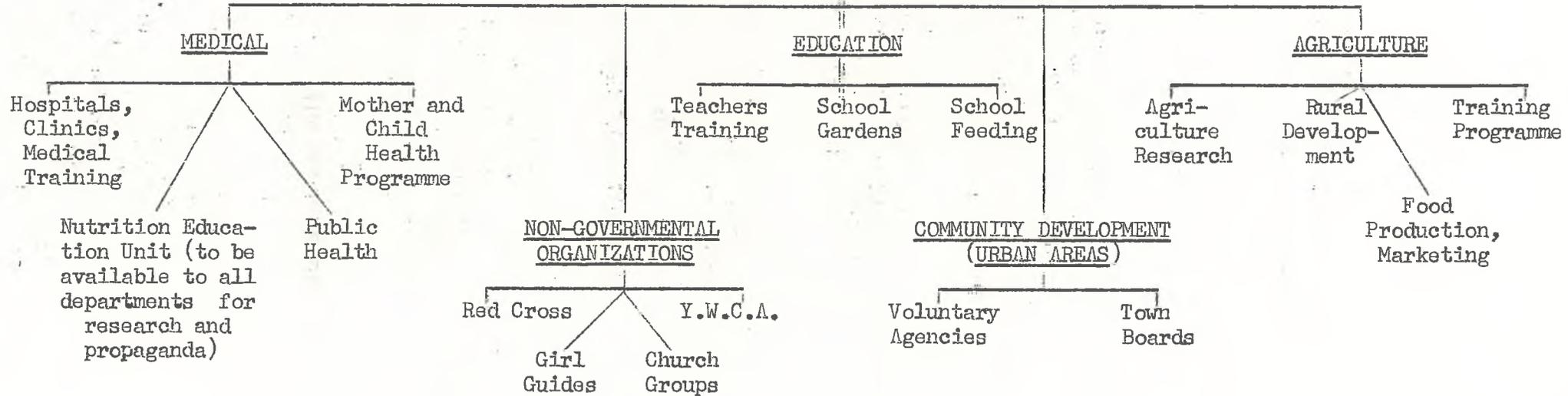
POSSIBLE SCHEME FOR THE ORGANIZATION OF NUTRITION SERVICES IN SWAZILAND

FOOD AND NUTRITION COMMITTEE

Representatives of:-  
 i) The Administration      iv) Medicine  
 ii) Department of Labour      v) Agriculture  
 iii) Communications      vi) Public Relations  
 plus:- a medical or non-medical nutritionist

- a) International bodies;      liaison with      SECRETARIAT or WORKING COMMITTEE:- Composed of Representatives of the Food and Nutrition Committee and Representatives of Voluntary Groups
- b) Other African countries with similar problems;
- c) Research Organizations.
- Concerned with:-  
 a) Food production, technology, marketing  
 b) Medical aspects of nutrition  
 c) Nutrition education  
 (The executive secretary possibly being a nutritionist)

DEPARTMENTAL ACTIVITIES CONCERNED WITH NUTRITION



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