



# Report of the Nutrition Survey of the Dangs District (1951-52)

By

DR. M. V. RADHAKRISHNA RAO, M.B., B.S., Ph.D., F.I.N., F.A.Sc.,  
*Assistant Director, In-charge Department of Nutrition,  
Government of Bombay*

BOMBAY

THE GOVERNMENT CENTRAL PRESS

Government Publications Sales Depot, Institute of Science  
Building, Fort Road (for purchasers in Bombay City); from the Government  
Book Depot, Charni Road Gardens, Bombay 4 (for orders from the mofussil) or  
through the High Commissioner for India, India House, Aldwych, London, W.C.2  
or through any recognized Bookseller.

Price—Annas 10 or 1s. 1d.

1954

With compliments from:

Dr. M.V. Radhakrishna Rao,  
M.B., B.S., Ph.D., F.N.I., F.A.Sc.,  
Assistant Director, in-charge  
Department of Nutrition, Government of Bombay,  
C/o Haffkine Institute, Parél,  
Bombay 12.

DEPARTMENT OF NUTRITION, GOVERNMENT OF INDIA

DIET AND NUTRITION STUDIES AMONGST THE DANGIS.

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# DIET AND NUTRITION STUDIES AMONGST THE DANGIS.

## I. INTRODUCTION.

Although it is generally known that the Dangis are undernourished and generally malnourished, no specific data is available either on their dietary habits or their nutritional status. Any programme, which involves the uplift of the adivasis in general, and Dangis in particular, should be based on this knowledge, as the diet constitutes an important factor in building up good health.

Under instructions from the Government, a study of the dietary habits of the Dangi families and a clinical nutrition survey of the representative school children of the District, was undertaken by the Department of Nutrition in December 1951. A clinical appraisal of the incidence of deficiency states in the District was also carried out.

Accompanied by Dr. V. N. Jai, Medical Officer, and Smt. S. Udas, Senior Nutritionist, I visited the Dangs District in December 1951. Details of tour programme are given in Appendix A.

During the ten-day period, the party covered a distance of 270 miles by road, visited 20 villages (with Headquarters at Ahwa) and 13 schools. A diet survey based on the questionnaire-cum weighing method, was carried out in 36 families (in 20 villages) representing all the six ranges of the District and 475 school-children were clinically examined (in 13 schools). In addition, all the four Government Dispensaries were visited, and laboratory examination of blood and stool samples of selected patients and school children, was carried out.

## II. NATURE AND EXTENT OF THE PRESENT SURVEY WORK.

On reaching Ahwa, the District town and Headquarters for our work, Dr. K. K. Shah, Chief Medical Officer, Dangs and Shri K. T. Satarawala, Collector, and Shri N. K. Sangnalmath, Dy. Educational Inspector, were contacted for preliminary talks. As a result of the joint discussions with these officials, an itinerary of work was outlined. It included the names of villages and schools in the different 'ranges' selected for studying the dietetic pattern of the typical Dangi families and clinical nutrition survey of representative schoolchildren, respectively. In addition, visits to all the Government Dispensaries, were planned. The nature and extent of work is summarised as under:—

1. *Dietary habits of Dangi Families.*—42 families in 20 villages representing all the six 'ranges' of the Dangs District, were visited. Detailed enquiries about the food intake were made. Wherever possible, the quantity of foodstuffs for the whole day, was actually weighed and/or measured. A couple of tubers peculiar to this area, were brought to Bombay for laboratory examination.

2. *Dietetic Conditions in Residential Institutions.*—All the four 'hostels' meant for Dangi schoolchildren were visited, and detailed enquiries about the dietetic conditions, studied.

3. *Nutrition Survey of School children.*—A clinical nutrition survey of 475 children of 13 schools, at the school premises, was carried out by the 'Rapid Method'. The survey included the measuring of heights and weights.

4. *Government Dispensaries.*—In addition to the Sampson Dispensary (at Ahwa) which is shortly to be converted into a Cottage Hospital, the other three dispensaries at Waghai, Subir and Bardipada were visited. Detailed notes regarding

the incidence of common ailments, as well as that of deficiency states including anaemia, were made. Besides, enquiries were made regarding the stocks of vitaminal and mineral preparations, sulphonamide paste, milk powder etc. Quarterly returns for 1951 from each dispensary, were collected.

5. *Clinical and Laboratory Work at Sampson Dispensary Ahwa.*—

(i) All the in-patients (about 40) which were being treated at the Dispensary on the day of visit, were clinically examined. Based on the clinical diagnosis, recommendations were made regarding treatment—both dietetic and medicinal, on the spot. A few cases were selected for complete laboratory investigations.

(ii) Inspection was made of the reconstituted milk, etc. at the time of distribution of UNICEF Skim Milk to the deserving mothers and children.

(iii) Existing conditions including difficulties experienced by the staff, at the hospital kitchen (where the revised hospital diets have been recently introduced), were fully studied. Wherever necessary, suitable instructions were given to the staff nurse and the Medical Officer in-charge of the kitchen.

(iv) *Laboratory Investigations.*—For the detailed laboratory examination, typical cases of severe anaemia—both in children and adults, were selected. The series includes 13 in-patients of the Ahwa Hospital and 5 schoolchildren. The laboratory examination included complete blood counts, smear examination and examination of stool samples, wherever indicated.

### III. THE DANGS

1. This hilly tract of forest has had a chequered history since early nineteenth century, when it was mainly in the possession of about 14 Bhil chieftains, upto the recent integration of the area into Bombay State. It is bounded on the North and West, by Surat District, on the East by Khandesh and on the South, by Nasik District. (Refr. Map—Appendix B.)

2. *Area.*—The District of Dangs covers an area of about 660 sq. miles and is divided into 6 forest ‘ranges’. ‘Reserved forests’ form more than half of this area; whereas the remaining land (‘protected area’) comprises of about 310 villages, with a total population of about 47,000 (1951 census figures).

The soil around villages is black alluvial, and on the uplands, it is red. Ragi or ‘nagli’ (*Eleusine coracana*) is the main crop. Paddy, kodra, wari, ‘sava’, etc. are the other cereals grown locally, ‘Khursani’ (Nigerseeds) is produced on a large scale. The oil extracted from this oilseed, is used as a cooking medium.

Except for a metal road (about 40 miles) from Waghai in the West to the North of Sibir (Via Ahwa), there is hardly any motorable road. There are, on the other hand, innumerable small murrum and earth roads in all directions throughout the District. During the monsoon, means of communication is difficult in many parts. The total number of cattle is about 3,500. In summer, there is always a great scarcity of water, fodder, and vegetables.

3. *Ahwa.*—Ahwa (21 miles from the Rly. terminus Waghai) is the District Headquarters with a population of about 1,000. It is almost centrally situated in the District. It is the seat of all the Departments of the Government. Besides, there are three residential institutions for the schoolchildren, as follows:—

- (i) A Central Government Hostel.
- (ii) A Missionary Boarding School.
- (iii) A Swaraj Ashram.

4. *The Dangis.*—The Dangis are primitive in more than one respect. They could be broadly divided into four sects—the Kunbi, the Konkani, the Bhil and the Warli. They appear to be contented with what they can secure for existence—building material, food, clothing etc. They hardly seem to worry about anything else. Thus, they eat a lot when they have ample food (as during September-February period) and they starve for days together during summer time. They live in the usual cone-shaped hutments. A part of the hut is reserved for the cattle. Agriculture is their main activity. Both men and women work in the field. Many of them keep poultry. The 'Kunbis' are hard-working and, therefore, perhaps economically well-to-do, as compared to the Bhils who are employed by them on the farm. Since sometime, many Dangis are induced to work as labourers for the roads making, etc., by the Government.

#### IV. DETAILS OF SURVEY WORK.

##### (1) *Dietetic Studies (amongst the Dangi Families).*—

###### (i) Seasonwise Study—

From our preliminary information gathered from the joint discussions with the officials of the District, it became obvious that the dietetic intake of the population varies from one to the other season of the year. Generally speaking, the year could be conveniently divided (for the dietetic studies) into three periods as follows :—

- |                           |     |                                   |
|---------------------------|-----|-----------------------------------|
| (a) September to February | ... | (Post-monsoon and Winter months). |
| (b) March to May          | ... | (Summer).                         |
| (c) June to August        | ... | (Monsoon).                        |

The peculiarities in the above seasons are as under :—

(a) *September to February.*—During this period, nagli (as also maize for some-time) and pulses ('Kulith' and udid) are available in abundance. In addition, legumes (such as "papdi", cluster beans), brinjals, etc., are grown around the hutments. In the morning, nagli or maize is used in the form of 'conji', whereas in the evening, they are eaten as 'bhakar' with legumes, pulses and red chillies. Very little cooking oil is used.

(b) *March to May (Summer).*—This is a period of semi-starvation, for nagli and fresh vegetables are not easily available. However, those Dangis that are employed by Government for road-making, etc., purchase rationed cereals from their wages. The people mainly subsist on jungle tubers—such as 'kadukand', 'vazkand', etc. The method of preparing these roots being rather unusual, is described in detail in the 'Culinary methods'. The cooked pieces of roots after being salted, are consumed as such. They consume a large quantity of these wild roots.

(c) *June to August (Monsoon).*—With the onset of rains, they grow a number of leafy vegetables. Like the root and tubers in the summer, these leafy vegetables are consumed in large amounts during monsoon, in addition to pulses.

###### (ii) Family survey—

(a) On the advice of the the Deputy Educational Inspector-cum-Administrative Officer and the Chief Medical Officer, about 20 villages, representing all the six ranges of the District, were selected. On an average 2 families were visited in each village. (See Appendix C for details). Thus, 42 families were actually surveyed. However, 6 of them had to be dropped owing to incomplete information. The remaining 36 families consist of 207 persons, out of which 66 (33 per cent.) were adult men, 50 (23 per cent.) adult women and 91 (44. per cent.) children below age of 14

(b) *Technique*.—Each family was visited once only—preferably in the morning. In addition to noting the general family (non-dietary) data, such as the age, sex and occupation, etc., of the individual members, the head of the family and/or the housewife, was interrogated, for the collection of dietary data. However, with a view to secure more precise information on the consumption of different foods the raw foodstuffs for the whole day, were actually weighed and measured to the nearest ounce.

The details of food intake per consumption unit per day and the nutrient analyses from each of the 36 families, are appended to this report (Appendix D and E).

Similarly, the *average* intake of foodstuffs per C. U., per day, as also its nutrient analysis is appended (Appendix No. F).

(iii) *Composition of the diet*—

(a) *Cereals and pulses*.—As the diet study was undertaken in the month of December, the average diet revealed a high intake of ragi (About 20 ozs.), supplemented with a small intake of other cereals (such as jowar, maize and wari) and a meagre consumption (less than 1.0 oz.) of pulses. Pulses are consumed by 11 families only.

(b) *Protective Foods*.—Though during winter months (November to February) the food position in the Dangis is considered to be the best, the intake of 'protective foods', such as fresh vegetables, milk and milk products, is almost negligible. Only 8 families take milk and non-leafy vegetables. *Fruit intake is nil.*

(c) *Cooking oils*.—As the intake of pulses and vegetables is very small, the Dangis need very little of vegetable oils for cooking. In fact, 15 out of 36 families were not consuming vegetable oils at all. 'Khursani' and groundnut oils are the two oils commonly consumed.

(d) *Fleshy foods (and Eggs)*.—The Dangis go hunting only during the period of acute food scarcity, as in the summer months (March to June). Hence, they are perforce vegetarians for the greater part of the year. The diet, therefore, reveals a total absence of fleshy foods and also eggs, except for a negligible intake (less than 0.04 oz.) of dry fish, which is purchased occasionally by a few families only.

(e) *Condiments and Spices*.—Apart from salt, moderate amount (0.2 oz.) of red chillies is used by all the Dangis families, to improve the palatability of the diet.

(f) *Tea*.—Some of the families inhabiting the villages at the borderline area, were observed to take tea, since sometime.

(g) Thus, even during the winter months, when the food position is perhaps the best in the year, the diet is mainly composed of starchy foods, such as cereals, dals and root vegetables, with the almost total exclusion of the more essential 'protective foods'.

(iv) *Nutrient Analysis*—

(a) *Adequacy (Caloric yield) of Diet*.—In view of the moderate activity of the adult Dangi, the energy yield of the diet in terms of calories, is below the accepted requirements (2,600), by over 200 calories in more than half the families, in spite of the very high intake of carbohydrates. The distribution of calories amongst the three proximate principles, indicates a preponderance of carbohydrates (85 per cent.) at the expense of proteins and fats. This is explained by the almost negligible consumption of cooking oils and animal foods,

in the diet. From the seasonwise study of their dietetic habits, it could be said that their diet from March to August (Summer and Monsoon) would be still more inadequate.

(b) *Proteins and fats*.—The intake of these proximate principles is much below the requirement, for the reasons mentioned above.

(c) *Carbohydrates*.—Both the total intake of carbohydrates (500 g.) and the percentage of calories derived from them (85 per cent.) are undesirably high with the obvious effect of increasing the need of B group of vitamins in the diet.

(d) *Calcium*.—The high intake of ragi (about 20 ozs.) provides a considerably large quantity of assimilable calcium in the diet. Thus, in spite of almost negligible consumption of milk and milk products and fresh vegetables, the calcium content (2.0 g.) of the average diet is above the optimum requirement. This may largely explain the very low incidence of both rickets in the very young children, and dental caries in school children.

(e) *Iron*.—The intake of iron usually depends upon, and mainly varies with, the extent to which fresh vegetables are consumed. As such, the Dangis' diet should reveal a gross deficiency of iron. But as they are consuming very large quantity of cereals (22 ozs.), the yield of iron is sufficient. Its intake ranges from 16 to 49 mg. The average intake of about 35 mg., could be considered as fairly adequate for this population.

(f) *Vitamin A*.—In the absence of any significant intake of protective foods in the diet, both vitamin A and its precursor carotene, fall far short of the minimum requirements. This extremely low intake (15 per cent. of optimum requirements) is perhaps responsible for the low resistance to and the comparatively high incidence of, infective diseases (such as conjunctivitis, chronic malaria, lung infections, etc.). Signs of vitamin A deficiency were frequently observed during the clinical nutrition survey of the school-children.

(g) *Vitamin B<sub>1</sub>*.—The high intake of cereals provides sufficient vitamin B<sub>1</sub> (and perhaps other factors of B-Complex) in the diet. It is found to be adequate even for the excessive amount of carbohydrates.

(h) *Vitamin C*.—The predominantly "starchy" diet hardly provides any vitamin C in the diet. The intake (about 10 mg.) is extremely low.

(v) *Peculiarities of Cooking*—

Whereas the cereals, pulses and fresh vegetables are prepared in the usual way, the wild, hairy tubers are treated in a rather peculiar manner, before being consumed. These tubers such as 'Kadukand', 'Vazkand' etc. (belonging to the genus *Dioscorea*) are boiled in water, peeled and then cut into small pieces. The latter, wrapped in a muslin cloth, are then put in a "topli" (a shallow bamboo basket). This basket is then immersed in the river water (near the bank) and kept there overnight. Next morning, it is brought back and cooked in water. The extra water is discarded and the cooked vegetable, after being salted, is consumed as such. It is estimated that about half the quantity (by weight) is lost in the heavy peeling of the thick hairy skin of the tubers. This peculiar method of cooking the tubers by all the Dangi families may be the result of their belief that the outer coverings contain some hitherto unknown, water-soluble poison.

(2) *Dietetic conditions in the Residential Institutions (school hostels)* —

A. *The Set up*.—There are three residential institutions, in the whole District and as mentioned earlier, all of them are situated at Ahwa. Only Dangi children



are admitted to these hostels. The salient features of each, are summarised below :—

(i) *The Central Government Hostel*.—A small hostel is attached to the Governmental primary school. There were 120 students on roll in the school during our visit, out of which 33 boys (between the ages of 9 and 12) were inmates of the hostel. Rs. 20 per month is the sanctioned grant, to meet the expenditure on food and fuel (as also petty toilet necessities). At present, a Senior teacher of the school is in-charge of the hostel, although a post of a Superintendent is recently sanctioned by the Government.

(ii) *The Mission Boarding School*.—Two American Missionaries (Mr. & Mrs. Shull) are at present managing a primary school and two hostels (one for boys and another for girls), founded in 1907. There were 115 students on roll in the school on the day of visit, out of which 49 (38 boys and 11 girls) between the ages of 9 and 12 were inmates of the respective hostels. The school, but not the hostel, gets a grant of about Rs. 125 per month from the Government. Cooking is done by the inmates, by turns. The school owns a plot of land on which cereals and vegetables are grown. The produce is utilised for the inmates themselves, thus reducing the cost of the hostel diets.

(iii) *The Swaraj Ashram*.—This Ashram, like any other Swaraj Ashram, has been founded, and managed, by a trained group of social workers affiliated to some central organisation for rural uplift. The Ashram, in addition to organising classes in vocational training, maintains a primary school and a hostel. There were 90 students on roll in the school on the day of visit, out of which 28 (25 boys and 3 girls) almost all above the age of 14 years, were inmates of the hostel. The school, but not the hostel gets a grant of Rs. 500 per year from the Government. Inmates are trained to help the cook in particular and the Ashram management in general, in the efficient maintenance of the hostel.

B. *The Mode of Study*.—During the visit to each hostel, all the essential points in the 'set-up' of the hostel, were noted down. In particular, the cooking arrangements, the pantry (if any), the distribution of meals in the whole day, and the manner of supervision of the diets, were recorded on the spot, after interrogating the workers concerned, whenever necessary. The timings of the meals were also noted down.

In addition, a standard form prepared by the Department, (Appended separately for the collection of a ten-days' dietary data, was handed over to the respective managements. The forms, after being duly filled in by the latter, were collected during our stay at Ahwa, (Appendix G).

From this data, the existing diet per head per day has been worked out for all the four hostels. These diets (four in all) together with their nutrient analyses as also the recommended diets for the three hostels, are enclosed herewith (Appendix H).

C. *The Diet*.—The salient features of the existing diet conditions in these institutions, are given below :—

(i) *Central Government Hostel*.—The usual menu for any day in the week, consists of just two meals. Jowar 'bhakar' and dal (or 'usal') are served at every meal. Vegetables are served once a week, and a feast is arranged, once a month. Though ragi is available in the open market and though it is consumed

in abundance by the Dangi families—particularly during this period(September—February) of the year, it is not secured for the inmates, for whom, only the rationed cereals are purchased. Even here, only the cheaper ones such as jowar, are preferred to rice and wheat, hence, cooked rice and wheat ‘chapatis’ are served only occasionally. No fleshy foods or eggs are served.

The diet thus totally lacks in ‘protective foods’ and is entirely composed of starchy foods.

The diet is inadequate in calories and in almost all the minerals and vitamins.

(ii) *The Mission Boarding School.*—The day’s diet is distributed between three meals—the breakfast, the lunch and the evening meal, on the line of western countries. As the cereals, such as jowar and ragi are grown on their own plot of land, the inmates are assured of getting these cereals almost daily in the menu. A small quantity of vegetables (also grown by them, except during summer) is served daily at lunch time. However, in the girls hostel, leafy vegetables are served, whereas in the boys hostel, an almost equal amount of ‘other’ vegetables (i.e. fresh non-leafy varieties) are served. Jaggery is used with wheat flour in the preparation of ‘conji’ which is served at breakfast time.

Meat or fish was served only once during the particular ten-day period for which the dietary data has been received from the hostel Superintendent. A small quantity (0.7 oz.) of skim milk powder is given in the form of reconstituted skim milk. The skim milk powder is imported directly from foreign countries.

The diet is inadequate in calories and the intake of animal proteins, fat, vitamin A and vitamin C is very low, due to the meagre consumption of ‘protective foods’ such as animal foods and fresh vegetables, and cooking oils.

(iii) *The Swaraj Ashram.*—The diet for the day is well-distributed between the breakfast, the lunch, the afternoon ‘tiffin’ and the evening meal. The choice and variety of foodstuffs included in each of the above, as also the timings, appear to be well-planned. However, the quantities in almost all the cases are insufficient. On the other hand, it is encouraging to note, that the management has arranged for some snacks daily between the two main meals, and fresh milk (4.0 ozs.) on alternate days. Ragi is not consumed by them as only the rationed cereals are purchased by the management. Appreciable quantities of fresh non-leafy vegetables as also fruits (bananas, dates etc.) form a part of the diet. The vegetables, though grown by the Ashramites, are not sufficient for the hostel; hence, permanent arrangements are made to secure them regularly from Gujarat. A fair amount of vegetable oil (usually ‘Khursani’) is used, for cooking purpose. Being an Ashram, fleshy foods and eggs are excluded from the diet.

The diet is inadequate in calories, and the intake of animal protein and vitamin A is very low, due to a meagre consumption of ‘protective foods.’

(3) *Clinical Nutrition Appraisal of the School Children —*

(i) There are about 90 primary schools (70 Government-owned and 20 Government-aided) in the six ranges of the District with a total of about 3,100 children on the roll. On the advice of the Deputy Educational Inspector-cum-Administrative Officer for the District, a few representative schools were selected from the different parts of the District, and all the children present in each school, on the day of visit, were surveyed at the school premises by the ‘Rapid method’ of clinical nutrition assessment. Altogether, 475 children—368 boys and 107 girls (over 15 per cent. of the total) were so examined. Most of them fall between the ages of 7 and 14 years.

(ii) The distribution of these children in the three grades of nutritional status\* is given, in the following table:—

Number examined.	Distribution in different grades.							
	Grade I.		II		III		II and III	
	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.	
Boys .. ..	368	66	17	282	77	22	6	83
Girls .. ..	107	18	17	83	77	6	6	83
Total .. ..	475	82	17	365	77	28	6	83

From the above, it is evident that just one out of every six Dañgi children (whether boy and girl) depicts good health and physique (17 per cent. in Grade I). The majority of the remaining show generalised undernourishment (77 per cent. in Grade II) and the few others show definite evidence of one or more deficiency states (6 per cent. in Grade III).

(iii) The details of the clinical findings, particularly the signs and symptoms of nutritional deficiencies commonly observed amongst these children (in Grades II and III) are given below:—

Signs and symptoms of nutritional deficiencies.	Children in Grade II.						Children in Grade III.					
	Boys.		Girls.		Total.		Boys.		Girls.		Total.	
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
†Poor Musculature.	136	37	36	34	172	36	11	3	4	4	15	3
†Def. Subc. Fat. ..	220	60	69	64	289	61	18	5	5	5	23	5
‡Dry and rough skin.	38	10	4	4	42	9	10	5	2	2	21	4
‡Xerosis of conjunctivae.	14	4	1	1	15	3	11	3	..	..	11	2
‡Bitot's spots ..	4	1	..	..	4	1	3	1	1	1	4	1
‡Night blindness ..	..	..	..	..	..	..	2	1	1	1	3	1
Angular stomatitis - (Vitamin B <sub>2</sub> deficiency).	7	2	..	..	7	1	5	1	2	2	7	1
Mild anaemia ..	10	3	2	2	12	3	2	1	1	1	3	1

\*Grade I (Physique and General Health, good).

Grade II (Undernourished).

Grade III (Evidence of malnutrition-single or multiple deficiency states, present).

†Indicate evidence of generalised undernourishment.

‡Indicate evidence of vitamin A deficiency.

The above table reveals a very high prevalence of generalised undernourishment. Apart from the above, vitamin A deficiency is the only other significant and specific deficiency state, observed amongst them. This is mainly due to the almost negligible intake of 'protective foods', such as fresh vegetables and fruits, milk, and fleshy foods.

The other details regarding the clinical findings in the individual schools are tabulated rangewise in table I of Appendix J. From the figures given therein, it could be seen that the health of the Ahwa (District town) children is slightly better than that of the children belonging to the villages.

(iv) Incidence of clinical signs whose nutritional origin is not yet definitely established.

	Number.	Per cent.
Dental caries ... ..	24	5
Muddy conjunctivae ... ..	47	10
Pigmentation of conjunctivae ... ..	17	4
Pigmentation of tongue ... ..	10	2

In spite of the minimal intake of fresh vegetables and milk, the incidence (and degree) of dental caries amongst this group of growing population, is significantly lower than in a similar group of Bombay School Children. It is amply explained by the high consumption of Ragi—a millet, whose calcium content is about 10 times more than the commonly consumed cereals and millets.

The clinical importance of muddy conjunctivae and pigmentation of the conjunctivae, is not quite clear in the assessment of nutritional status. However the former is usually associated with low economic group of population and, either the exposure to glare, or insanitary conditions may perhaps be predisposing factors. On the other hand, pigmentation of conjunctivae, is seen both in the ill-nourished as well as healthy individuals. The nutritional significance of this condition still remains to be established.

(v) In the clinical examination, observations such as the presence of certain diseased conditions, as also the enlargement of spleen, were recorded so as to secure more precise information regarding the prevailing status of health of the Dangis in general. In the following table, details regarding the incidence of certain commonly observed abnormal findings, are given:—

Diseased conditions.	Boys Number.	Girls Number.	Total Number.	Per cent.
Enlargement of spleen ... ..	42	11	53	11
Scabies etc. ... ..	9	1	10	2
Pyorrhoea ... ..	8	2	10	2

Spleen was palpable in every 1 out of 9 children. History of malarial infection was given by almost all of these (11 per cent.) children. Skin infections such as scabies, ringworm, impetigo etc. were extremely uncommon; so also the incidence of Periodontal disease (pyorrhoea). However, it is interesting to note from the above table, that for every one of the above abnormal findings, the incidence amongst boys was much more than amongst girls.

(4) *Health conditions in the Dangs—*

(i) The figures for vital statistics were not available in the office of the Chief Medical Officer, Dangs.

(ii) However, from the Quarterly Returns (for the different ailments) maintained at the Government dispensaries, as also from the examination of patients, it was gathered that the commonly observed ailments and diseased conditions could be grouped as follows:—

(a) Malaria and other infective fevers ...	}	Extremely common.
(b) Eye infections ...		
(c) 'Coughs and Colds' ...	}	Quite prevalent.
(d) Dyspepsia ...		
(e) Tropical ulcers ...		
(f) Diarrhoeas (non-specific) ...	}	Present, but not very common.
(g) Anaemia ...		
(h) Scabies, ringworm, etc....		
(j) V.D. ...	}	Prevalent amongst the 'borderline' tribes.
(k) Rickets ...		
(l) Night blindness ...	}	Occasional occurrence.
(m) Malnutrition ...		

(iii) In the opinion of the Medical Officers I/C of the various dispensaries, the incidence of malnutrition was not high.

Apart from the occasional occurrence of night blindness amongst children (particularly in summer), anaemia of secondary type and rickets, the incidence of gross nutritional disorders was negligible.

(5) *Sampson Dispensary, Ahwa—*

(i) Being the District town Dispensary, it is the biggest Dispensary in the Dangs.

(ii) *Staff*—One Licentiate Doctor assists the Chief Medical Officer in the maintenance of this Dispensary, in addition to the usual staff consisting of a compounder, a nurse, a midwife, etc. (the details are given in Appendix K).

(iii) Though the conversion of this Dispensary to a cottage hospital is not yet effected, the Chief Medical Officer (Dr. K. K. Shah) has been endeavouring to hospitalise a few deserving patients in the small rooms (behind the Dispensary premises) since 1947. These patients are being treated with the limited nursing and other staff, sanctioned for the Dispensary.

(iv) On the day of our visit, there were 40 in-patients.

Male ...	13	(in a separate big room).
Female ...	12	} Accommodated in two adjoining rooms.
Maternity ...	2	
Children ...	13	

(v) Most of them were admitted for either fever, conjunctivitis, tropical ulcer, diarrhoea and/or general debility. Anaemic condition of varying degree was observed in almost all of them. Enlarged spleen has been observed in some; dry skin and angular stomatitis were present in a few cases.

One male patient who showed evidence of apprehensive insanity (melancholia), was isolated in a distant room.

(vi) After a detailed clinical examination, instructions were given to the Chief Medical Officer regarding the dietetic and nutritional treatment for the cases showing deficiency states.

(vii) *Hospital Diets.*—The revised diet scales for the Civil Hospitals, have been introduced for the in-patients since September 1951. The staff has been experiencing difficulty in securing bread, 'Nagli', fresh milk and vegetables. 'Dairy Pride' brand of full cream milk powder is used, to replace fresh milk in the diets.

(viii) From amongst the typically anaemic patients, a few were selected for complete haematologic and other examinations.

(6) *Laboratory Investigations (at Ahwa)*—

(i) In view of the availability of suitable in-patients at the Sampson Dispensary, a few cases mentioned above, were taken up for laboratory investigations. The details about the number of different examinations carried out are as under:—

Nature of examination.	Complete blood examination.	Blood smear examination.	Stool examination alone.	Total number of patients.
1	2	3	4	5
With stool examination .. ..	2	2	....	4
Without stool examination .. ..	5	1	....	6
Stool examination alone .. ..	...	....	3	3
Total .. ..	7	3	3	13

(ii) Details about the ages, sex, clinical history, clinical findings, etc. are given in Appendix L.

(iii) From consolidated tables (Appendix L) it is evident that microcytosis with varying degrees of hypochromia (deficient haemoglobin) is the common finding; spleen was palpable only in a few of these patients.

Examination of stools did not indicate any evidence of helminthic infection (such as Ankylostomiasis), to explain the anaemic condition.

(iv) In our opinion, therefore, dietetic deficiency (mainly iron-deficiency) appears to be the most important cause of anaemia, apart from malarial infection.

(v) *School Children.*—Haemoglobin estimation and blood smear examination of 4 anaemic school children, and stool examination of two children, were also carried out. The detail findings are given in Appendix M. There was no evidence of helminthic infection to explain the anaemic condition.

(7) *Medical Facilities in the Dangs—*

(i) In addition to the Dispensary at Ahwa, there are three other Dispensaries at Subir, Waghai and Bardipada. The last one is equipped with a mobile hospital unit for medical relief work from village to village.

(ii) Each Dispensary is in-charge of a Licentiate Doctor assisted by the usual staff sanctioned for any rural Dispensary.

(iii) The medical stores is satisfactorily equipped with the medicines. But, there was hardly any stock of vitamin tablets, except at the Sampson Dispensary, Ahwa.

(iv) Since January 1951, the Medical Officer at Waghai, has treated about 60 cases as in-patients, at the dispensary premises.

(v) The Medical Officer in-charge Bardipada Dispensary is supposed to visit the different villages in the Bardipada Range, in the hospital van, for five days in a week. On the 6th working day, he dispenses medicines to the local out-patients.

(vi) The Chief Medical Officer is also in-charge of the Public Health Unit of the District. In this unit, two Licentiate Doctors carry out the field work of rural medical relief, which includes distribution of vitamin tablets, certain stock mixtures and tablets, D. D. T. spraying etc.

(vii) In the absence of any facilities for operative treatment in the Dangs, the Surgical patients are advised to go to Bilimora (about 60 miles from Ahwa).

## V. SUMMARY FINDINGS.

A. *Food habits of the Dangi Families.*—(1) Dangis are vegetarian perforce ; they resort to fleshy foods, whenever an opportunity arises, as in the food scarcity period of summer months.

(2) ' Nagli ' is the staple food for the greater part of the year. Maize is grown and consumed at the end of monsoon.

(3) Though almost every family possesses a cow, milking of cows is not practised ; besides, the milk yield is also poor due to lack of foder ; hence, intake of milk and milk products is negligible.

(4) In the absence of adequate amounts of animal foods, the diet is mainly composed of starchy foods, such as cereals, dals and tubers.

(5) Except for a few fresh vegetables (grown around the hutments), the intake of fresh vegetables and fruits, is also comparatively negligible. However, a few tubers (belonging to the Genus *Dioscorea*) are commonly consumed during the summer months, when fresh vegetables are rather scarce.

(6) The diet is inadequate in quantity, though it is excessive in cereals and starchy tubers. This is mainly due to an almost total absence of cooking oils and animal foods in the diet.

(7) The diet reveals a deficiency in proteins (mainly animal proteins), fats vitamin A, and Vitamin C.

(8) The calcium content of the diet is high, in spite of negligible intake of milk and milk products and fresh vegetables. This is due to a very high intake of calcium-rich ' Nagli '. Similarly, the intake of iron and Vitamin B<sub>1</sub> is just adequate due to a very high consumption (about 22·0 ozs.) of cereals.

B. *Dietetic conditions in the three residential institutions (at Ahwa).*—(1) 'Nagli' an unrationed millet is not made available to the inmates of two hostels, because the Central Government Hostel and the Swaraj Ashram purchase only rationed cereals. However, the mission school authorities grow this millet in their farm, hence the mission school children consume this calcium-rich millet.

(2) The intake of 'protective foods' is more than in the Dangi families. This is mainly due to the efforts made by the hostel authorities (mission school and Swaraj Ashram) to grow fresh vegetables near the premises.

(3) Similar to the Dangi families, the inmates are perforce vegetarians as fleshy foods and eggs are *not* served to them. Occasionally, a small quantity of meat or fish is served, however, to the inmates of the mission hostels.

(4) The caloric yield of all the diets is inadequate, though excessive in carbohydrates. This is partly due to a very meagre intake of animal foods and cooking oils.

(5) The management of the Swaraj Ashram has arranged for some afternoon 'tiffin' (from bananas, ground-nuts, dates, 'chana' etc.) daily, and fresh milk (4.0 ozs.) on alternate days.

C. *Nutritional Status of the Dangi School Children.*—(1) Whereas the quarterly returns in the Government Dispensaries do not suggest a high incidence of malnutrition amongst the child patients, generalised undernourishment, stunted growth and marked deficiency of vitamin A were evident during the clinical nutrition examination of school children.

(2) The children of Ahwa town (inmates of the hostel) show a slightly better health and physique, than those belonging to the villages. It may be explained by the greater consumption of 'protective foods' by the former.

D. *Health of the Dangis.*—(1) Malaria and other infective fevers, conjunctivitis, non-specific diarrhoeas, tropical ulcer, 'coughs and colds', dyspepsia and general debility have been found to be the common major ailments amongst the adults.

(2) Apart from the occasional occurrence of night blindness amongst children (particularly in summer), rickets and anaemia of secondary type (particularly amongst mothers), the incidence of gross nutritional disorders has been insignificant.

(3) Protruded abdomen ('pot belly') has been very common amongst the women particularly the mothers. It may be the result of improper post-natal care.

(4) Evidence of malarial infection in the children is rather uncommon, except in the Bardipada school children.

(5) The incidence of non-nutritional diseases, such as chronic malaria, scabies, pyorrhoea, etc., has been found much more common in boys than in the girls.

E. *Laboratory findings.*—(1) Examination of stool samples did not indicate any evidence of helminthic infection (such as Ankylostomiasis).

(2) Haemetological examination indicated that secondary anaemia (due mainly to iron-deficiency) was present in most of the patients. Similar examination in the clinically anaemic school children showed no pathognomonic abnormality.



## VI. RECOMMENDATIONS.

In general, the present state of affairs in the Dangs District is due to poverty, ignorance, superstition, scarcity of good drinking water and lack of protective foods. The nutritional status of the schoolchildren and mothers, is poor, and every effort should be made to improve their health. The following recommendations are mainly based on our observations and in effect, are only a continuation of the ameliorative measures which have already been taken up by the Government in the Dangs District.

A programme of 'mid-day meal' in the schools is an effective way of improving the health of schoolchildren, apart from inculcating proper food habits in them.

(A) *Ameliorative Measures*.—1 Ragi ('Nagli') upto 4 ozs. should be given free to every schoolchild throughout the District. Free if possible; at subsidised rates, if necessary.

(2) Similarly, vitamin tablets—1 of A-D and 1 of B-C (prepared by Haffkine Institute) should be distributed to the undernourished children under medical supervision.

(3) Skim milk powder (1 oz.) should be distributed to undernourished children and women particularly mothers, through the agency of a Health visitor.

(4) The system of part-payment of the wages *in kind*, to labourers (working on roads or in the forests, etc.) by giving fresh vegetables (upto 4 ozs. per head per day) should be introduced. It will provide essential nutrients to him and his family, and will at the same time, foster better food habits.

(B) *Medical and Public Health Measures*.—(1) To continue the D. D. T. spraying campaign till malarial mosquitoes are almost completely eliminated.

(2) To establish hospital facilities at the District, town of Ahwa.

(3) To provide more Mobile Hospital Units—for the relief of the villages in the interior. This is particularly necessary for the East and South-East areas (mainly Gulkund range).

(4) The appointment of a Health Visitor is particularly recommended in connection with the distribution of milk powder to the mothers and to advise them in proper ante-natal and post-natal care and in the care of children.

(5) The Government Dispensaries may be more adequately stocked with vitamin and iron tablets (for nutritional disorders including anæmias), sulphonamide paste (prepared at Haffkine Institute) for tropical ulcer and the newer antibiotics and sulphonamides for the check and rapid cure of the infectious eye diseases.

(C) *Residential Institutions (Hostels)*.—On the basis of study of the dietary habits as well as the economic conditions prevailing in the hostels, two diet scales have been recommended for them (*vide* reference Appendix H).

(D) *Intensive study project*.—Whereas the data collected by the Department during the 10-days, period of stay, is adequate for suggesting the measures detailed above, a well-planned project for an intensive study of the effects of these relief measures on their food habits and health, is very essential. For this purpose, a suitable place near Ahwa may be selected from where the educational,

socio-economic, agricultural and relief measures could well be co-ordinated to maximally benefit the population of the Dangs District. Such a study would include a detailed diet survey of the families in selected villages during a 'ten-day' period in two different seasons of the year. This is necessary as the dietary habits considerably vary during some parts of the year (e.g. March to May), when the food condition is extremely difficult. The experience gained from such a study project could be further utilised for a similar diet and nutrition study of the population groups in the schedule areas of certain other Districts of the Bombay State.

(E) *Educational Measures (through Health Visitors).*—(1) To induce the families to grow seasonal vegetables (and fruits) throughout the year.

(2) The necessity of consuming milk and milk products (including ghee, butter) should be stressed; simultaneously they should be induced to practise milking of cows regularly.

(F) *Agricultural Measures.*—(1) Paddy and other cereal crops may be introduced but *not* at the expense of the existing calcium-rich Ragi crop.

(2) Growing of oilseeds such as groundnuts, nigerseeds ('Khursani') and 'til' should be encouraged, so as to provide the necessary cooking oils and the protein-rich groundnuts to the Dangis.

(3) Advantage should be taken of Dangis' liking for eggs by providing healthy 'Poultry' to the individual families at subsidised rates. Eggs will thus provide a comparatively cheap source of animal proteins.

(4) To provide adequate fodder to the milch cattle of the District.

M. V. RADHAKRISHNA RAO,

M.B.B.S., Ph.D., B.M.S.(I),

Assistant Director, I/C Department of Nutrition.

Bombay, 30th June 1952.

## APPENDIX A.

## DETAILS OF TOUR PROGRAMME.

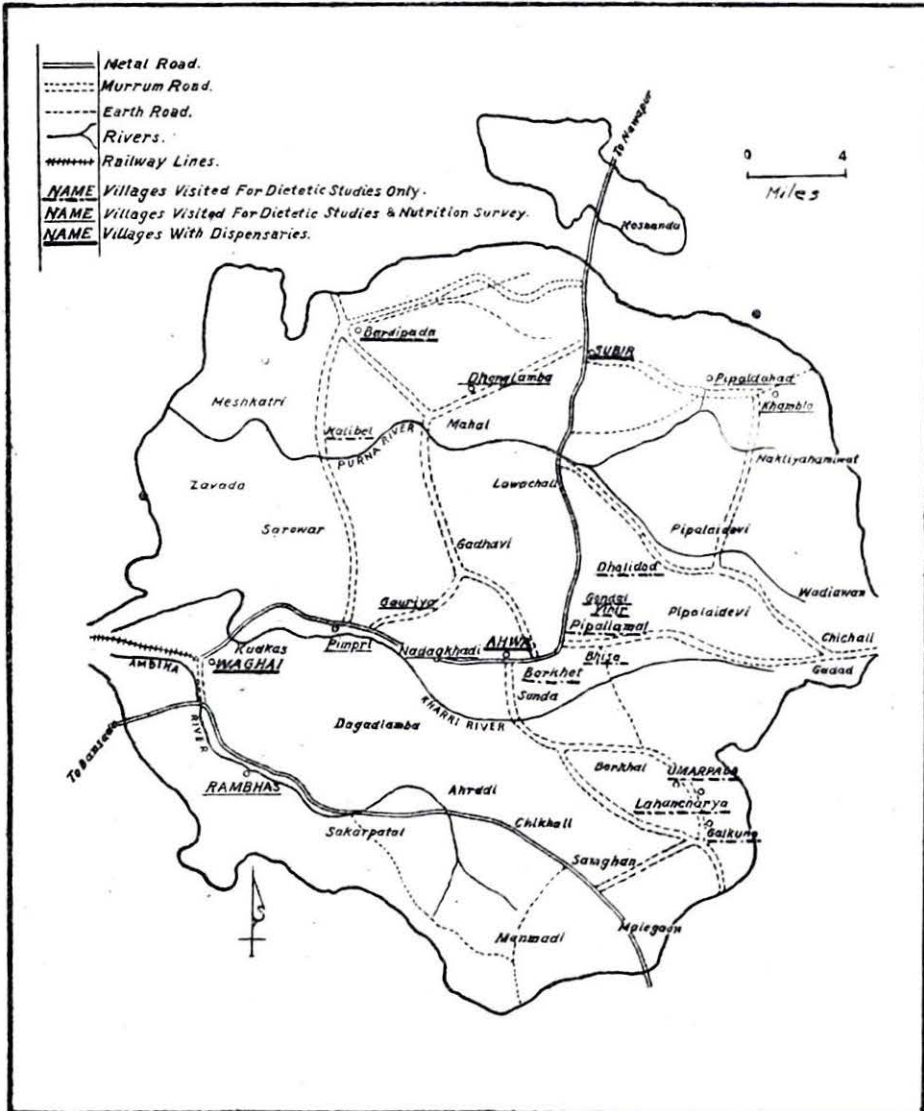
*Tour Programme of the Assistant Director in-charge Department of Nutrition in connection with the Nutrition Survey of the Dangs.*

*December 1951.*

- 16th Sunday ... Leave Bombay by Saurashtra Express at 7-45 a.m.  
Arrive Bilimora at 12-30 noon.  
Leave Bilimora for Ahwa by road at 2-0 p.m.  
Arrive Ahwa in the evening (about 6-30 p.m.).
- 17th Monday ... Joint discussion with the Collector of Dangs and the Chief Medical Officer regarding the details of the proposed nutrition survey.  
Visit to Government Hospital, Ahwa.
- 18th Tuesday to 20th Thursday. Nutrition survey of school children and visit to villages.
- 21st Friday ... Leave Ahwa for Bombay via Bilimora.  
Arrive Bombay by Saurashtra Express at 9-0 p.m.  
Dr. V. N. Jai and Shrimati S. Udas will stay on at Ahwa to continue the nutrition survey work.

APPENDIX B

MAP OF THE DANGS DISTRICT



## APPENDIX C.

## RANGEWISE DETAILS OF VILLAGES, SCHOOL AND DISPENSARIES VISITED.

Range.	Name of the Village.	Number of families		Number of School Children surveyed.	Distribution of Dispensaries.
		Visited.	with full information.		
1	2	3	4	5	6
Ahwa	Ahwa	Nil.	Nil.	229	1
	Gondalvahir	1	1	Nil.	....
	Dholidhod	2	2	Nil.	....
	Bhisa	2	2	Nil.	....
	Piplamal	2	2	Nil.	....
	Borketh	2	2	Nil.	....
	6	9	9	229	1
Galkund	Umarpada	2	2	Nil.	....
	Lahanchriya	2	2	Nil.	....
	Galkund	2	2	Nil.	....
	3	6	6	Nil.	Nil.
Subir	Subir	3	2	19	1
	Pipaldahad	2	2	18	....
	Khambla	4	4	50	....
	3	9	8	87	1
Bardipada	Bardipada	2	1	15	1
	Kalibel	1	Nil.	Nil.	....
	Dhongiamba	2	2	21	....
	3	5	3	34	1
Pimpri	Pimpri	2	2	21	Nil.
	Goukiya	4	3	21	....
	Nadagkhaci	3	1	15	....
	3	9	6	57	Nil.
Waghai	Waghai	1	1	47	1
	Rambhas	3	3	21	....
	2	4	4	68	1
Total	6	20	36	475	4

## APPENDIX

STATEMENT SHOWING DIET IN OZS. PER CONSUMPTION UNIT PER DAY

Family No.	Serial No.	Ragi.	Jowar	Maize	Wari.	Pulses.	Leafy vegetable.
1	1	8.9	8.9	....	....	....	....
2	2	....	9.0	4.5	....	1.3	....
3	3	14.7	....	....	....	1.5	....
4	4	21.8	....	....	....	....	....
5	5	....	....	....	20.0	3.4	....
6	6	25.4	....	....	....	....	....
7	7	25.3	....	....	....	....	....
8	8	24.0	....	....	....	4.8	....
10	9	25.0	....	....	....	2.2	....
11	10	19.2	....	5.3	....	....	....
12	11	18.4	....	7.9	....	....	....
13	12	4.6	....	4.1	....	3.2	4.6
14	13	27.6	....	....	....	....	....
15	14	16.9	....	....	....	....	....
16	15	22.4	....	....	....	....	....
17	16	23.4	....	....	....	....	....
19	17	25.0	....	....	....	....	....
21	18	28.7	....	....	....	....	....
22	19	23.0	....	....	....	....	....
23	20	20.0	....	....	....	....	....
24	21	26.0	....	....	....	....	..
25	22	21.0	....	....	....	....	....
29	23	26.1	....	....	....	....	....
30	24	32.4	....	....	....	....	....
31	25	30.0	....	....	....	....	....
32	26	28.0	....	3.3	....	....	....
33	27	18.2	....	....	....	....	....
34	28	23.5	....	....	....	2.0	....
35	29	28.0	....	....	....	....	....
36	30	31.0	....	....	....	....	....

D.

## OF THE 36 FAMILIES SURVEYED IN DANGS DISTRICT.

Root vege- table.	Other vege- table.	Fruit	Sugar and Jaggery.	Vegetable oil and fats.	Milk	Dried fish.	Red chillies.
....	....	....	....	....	....	....	0.4
....	....	....	....	....	....	....	0.2
....	....	....	....	0.2	....	0.1	0.3
....	4.5	....	....	....	....	....	0.3
....	....	....	....	0.3	....	0.3	0.4
....	6.0	....	....	0.2	....	0.1	0.4
....	4.2	....	....	....	4.2	....	0.3
....	....	....	....	0.1	2.8	0.1	....
....	....	....	....	....	....	0.2	0.4
....	....	....	....	....	....	....	0.3
....	....	....	....	0.3	4.2	0.1	....
....	....	....	....	....	2.2	....	0.4
....	4.8	....	....	....	....	....	....
....	3.2	....	....	....	....	....	0.2
....	....	....	....	....	....	....	0.4
....	....	....	....	0.1	....	0.1	0.4
....	....	....	....	0.2	....	0.1	0.4
....	....	....	....	0.2	....	0.1	....
....	....	....	....	....	6.2	....	0.3
....	4.3	....	....	0.2	....	....	....
....	....	....	....	0.2	6.1	....	....
....	4.5	....	....	....	....	....	0.3
....	....	....	....	0.2	....	....	0.3
....	....	....	....	....	....	....	0.4
....	....	....	....	0.3	....	0.1	....
....	....	....	....	0.2	....	....	0.2
....	....	....	....	0.1	....	....	....
0.4	....	....	....	0.3	....	0.04	....
....	....	....	....	0.5	....	....	....
....	4.4	....	....	0.1	....	....	0.4

## APPENDIX

Family No.	Serial No.	Ragi.	Jowar	Maize	Wari.	Pulses.	Leafy vegetable.
37	31	21.3	....	....	....	....	....
38	32	11.0	....	....	....	....	....
39	33	21.0	2.6	....	....	1.4	....
40	34	6.3	6.3	....	....	0.5	....
41	35	17.0	....	....	....	2.3	....
42	36	14.0	....	....	1.7	3.2	....
<b>Average</b>	..	20.3	0.7	0.7	0.6	0.8	0.13
<b>Minimum</b>	..	....	....	....	....	....	....
		to	to	to	to	to	to
<b>Maximum</b>	..	32.4	9.0	7.9	20.0	5.0	4.6
<b>Number of families consuming.</b>		34	4	5	2	11	1



D—contd.

Root vegetable.	Other vegetable.	Fruit.	Sugar and Jaggery.	Vegetable oil and fats.	Milk.	Dried fish.	Red chillies.
....	....	....	....	0.2	....	0.1	0.2
....	....	....	....	....	....	....	0.3
....	....	....	....	0.2	2.8	....	....
....	....	....	....	0.2	3.4	....	....
....	....	....	....	0.1	....	0.04	0.2
....	....	....	....	0.5	....	....	....
0.01	1.0	....	....	0.1	0.9	0.04	0.2
....	....	....	....	....	....	....	....
to	to	to	to	to	to	to	to
0.40	6.0	....	....	0.5	6.2	0.3	0.4
1	8	....	....	22	8	13	23

## STATEMENT SHOWING THE NUTRIENT ANALYSIS OF THE DIETS

Reference No.	Serial No.	Protein (in g.).	Fat (in g.).	Carbohydrate (in g.).	Calcium (in g.).	Phosphorus (in g.).
1	1	46.3	8.7	383.6	0.93	1.43
2	2	51.4	9.6	295.9	0.12 †	1.33
3	3	42.4	12.7	351.4	1.49	1.32
4	4	46.1	9.4	473.1	2.12	1.78
5	5	69.1	23.3	477.6	0.45	5.28 *
6	6	57.2	17.2	568.1	2.48	2.10
7	7	59.5	18.2	566.4	2.69	2.29
8	8	86.4	18.2	600.4	2.53	2.64
10	9	70.0 *	11.4	581.0	2.42	2.29
11	10	56.7	13.5	519.2	1.84	2.00
12	11	68.1	30.9 *	553.6	2.01	2.33
13	12	52.7	11.8	249.5	1.13	1.23
14	13	58.1	11.5	609.5	2.65	2.20
15	14	36.6	7.4	375.6	1.66	1.37
16	15	46.6	9.7	489.7	2.12	1.77
17	16	49.6	12.9	511.5	2.22	1.85
19	17	52.8	16.4	546.2	2.37	1.97
21	18	58.4	17.2	622.9	2.70	2.22
22	19	54.8	20.3	509.9	2.55	2.05
23	20	42.6	14.0	443.5	1.93	1.61
24	21	59.3	26.4	572.1	2.81	2.25
26	22	46.1	9.4	468.3	2.04	1.72
29	23	53.4	16.6	569.1	2.47	2.04
30	24	66.6	13.7	706.8 *	3.06 *	2.53
31	25	61.0	20.5	651.1	2.83	2.32
32	26	67.5	20.5	671.4	2.65	2.48
33	27	36.4	10.1	394.9	1.71	1.40
34	28	62.9	19.3	547.8	2.35	2.05

\* Maximum ..

† Minimum ..

## E.

## OF THE 36 FAMILIES SURVEYED IN DANGS DISTRICT.

Iron (in mg.).	Vitamin A (in I. U.).	Vitamin B1 (in I. U.).	Vitamin C (in mg.).	Calories.	Percentages.		
					Protein.	Fat.	Carbo- hydrate.
29.7	590	650	.... †	1798	10	4	86
20.5	408	297	....	1476	14	6	80
26.5	370	649	....	1690	10	7	83
35.6	598	895	31	2170	9	4	87
25.2	690	392	....	2396	11	9	80
42.0	729	1048	42	2656	9	5	86
40.9	790	1054	33	2668	9	6	85
41.5	654	974	....	2910	12	6	82
40.2	613	1002	....	2706	10	4	86
32.2	433	768	....	2425	9	5	86
32.6	503	757	....	2765	10	12	78
32.5	7457 *	216 †	83 *	1315	16	8	76
44.3	672	1128	34	2774	8	4	88
27.4	451	692	22	1716	9	3	88
33.9	514	896	....	2232	8	4	88
35.4	539	936	....	2360	8	4	88
37.8	571	1000	....	2544	8	6	86
43.1	579	1148	....	2879	8	5	87
35.1	701	951	....	2441	9	7	84
32.6	508	822	30	2070	8	6	86
39.4	709	1071	....	2763	9	9	82
34.4	582	863	31	2142	8	4	88
39.4	571	1044	....	2640	8	6	86
48.9	714	1298 *	....	3217 *	8	4	88
45.0	605	1200	....	3033	8	6	86
44.1	593	1120	....	3140	8	6	86
27.3	364	728	....	1816	9	5	86
41.1	574	1020	....	2617	9	7	84

(a) No ragi in the diet.

(b) Consumption of 20 ozs. of 'wari'.

(c) Consumption of leafy vegetables.

## APPENDIX

Reference No.	Serial No.	Protein (in g.).	Fat (in g.).	Carbohydrate (in g.).	Calcium (in g.).	Phosphorus (in g.).
35	29	56.0	25.2	607.6	2.63	2.16
36	30	66.5	16.4	686.0	2.99	2.50
37	31	44.5	14.6	464.1	2.02	1.67
38	32	23.4 †	4.9 †	241.4 †	1.04	0.88 †
39	33	62.7	20.6	537.9	2.25	2.07
40	34	69.6	19.1	358.9	1.15	1.62
41	35	68.0	12.6	398.2	0.30	1.60
42	36	53.3	22.0	394.0	1.52	1.81
Average	..	55.6	15.7	500.0	2.01	2.00
Minimum	..	23.4	4.9	241.4	0.12 (a)	0.88
Maximum	..	86.4	30.9	706.8	3.06	5.28 (b)

\* Maximum.

† Minimum

(a) No ragi in the diet.

(b) Consumption of 20.0 oz. of 'wari'.

(c) Consumption of leafy vegetables.

~~Contd.~~

Iron (in mg.)	Vitamin A (in I. U.)	Vitamin B1 (in I. U.)	Vitamin C (in mg.)	Calories.	Percentages.		
					Protein.	Fat.	Carbo- hydrate.
42.0	560	1120	....	2381	8	8	84
49.4	795	1262	31	3157	8	5	87
32.1	464	852	....	2166	8	6	86
16.7 †	269 †	440	....	1103 †	9	4	87
40.3	633	996	....	2587	10	7	83
35.0	567	675	....	1875	14	9	77
36.5	739	653	....	1978	14	5	81
31.4	382	715	...	1987	11	9	80
35.9	764	870	9	2364			
16.7	269	216	....	1103			
49.4	7457 (e)	1296	83	3217			

## APPENDIX F.

## AVERAGE DIET OF THE DANGI FAMILY.

*Department of Nutrition, Government of Bombay.*

Composition and Analysis of Foods

[per Head (C. U. 1) per Day.]

*Subject—*

## 1. Foodstuffs—

				Existing Diet. (in ounces). (December 1951).
Ragi	...	...	...	20·3
Jowar	...	...	...	0·7
Maize	...	...	...	0·7
Wari	...	...	...	0·6
Pulses and dals	...	...	...	0·8
Leafy vegetable...	...	...	...	0·13
✓ Root vegetables...	...	...	...	0·01
✓ Other vegetables	...	...	...	1·0
Fruits	...	...	...	.....
• Sugar and Jaggery	...	...	...	.....
Vegetable oils/fats	...	...	...	0·1
Butter and ghee	...	...	...	.....
Milk, curds	...	...	...	0·9
Fish (dry)	...	...	...	0·04
Eggs	...	...	...	.....
Red chillies	...	...	...	0·2

## 2. Nutrient Analysis—

Total Proteins	(in g.)	...	...	54·8
Animal Proteins	(in g.)	...	...	1·6
Fats	(in g.)	...	...	14·6
Carbohydrates	(in g.)	...	...	499·8
Calcium	(in g.)	...	...	2·04
Phosphorus	(in g.)	...	...	1·99
Iron	(in mg.)	...	...	35·6
Vitamin A	(in I. U.)	...	...	767
Vitamin B-1	(in I. U.)	...	...	876
Vitamin C	(in mg.)	...	...	9
CALORIES	...	...	...	2349

## 3. Distribution of calories—

Proteins	(in %)	...	9
Fats	(in %)	...	6
Carbohydrates	(in %)	...	85

APPENDIX G.

DEPARTMENT OF NUTRITION, GOVERNMENT OF BOMBAY.

*Statement showing the total Daily Issue of Foodstuffs for the full-Meal served at the Institution on ten consecutive working days.*

(Date : From \_\_\_\_\_ to \_\_\_\_\_ )

Name of the Institution :

Address :

Total number of inmates :

Name of foodstuff	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day	9th day	10th day	Remarks.
Rice ... .. Lbs.											
Wheat ... .. Lbs.											
Other cereals* ... Lbs.											
Pulses* ... .. Lbs.											
Leafy vegetables* Lbs.											
Root vegetables* ... Lbs.											
Other vegetables* ... Lbs.											
Fruits* ... .. Lbs.											
Sugar and Jaggery Lbs.											
Vegetable oils/fats Lbs.											
Ghee and butter ... Lbs.											
Milk, curds, etc. ... Lbs.											
Meat and Fish ... Lbs.											
Eggs ... .. No.											
Other foods ... ..											
Number of meals served daily.											

\*Please give names in detail.

APPENDIX G—*contd.*

THE MENU FOR THE CONSECUTIVE WORKING DAYS.

	Serving Time.	1st day	2nd day	3rd day	4th day	5th day	6th day	7th day	8th day	9th day	10th day	Remarks
Breakfast ...												
Mid-day meal ...												
Afternoon tea Snacks etc ...												
Evening meal ...												

To be filled in and returned to—

The Assistant Director,

In-charge Department of Nutrition,

C/o Haffkine Institute, Parel, Bombay 12.

Signature :

Designation :

Date :



## APPENDIX H.

## INSTITUTIONAL DIETS, AHWA.

1	Existing Diets per head per day (in lbs.)				Recommended Diets per head per day (in ozs.)	
	2 Government. Central School Hostel (C.U. 0·8).	3 Mission hostel for boys (C.U. 0·8.)	4 Mission hostel for Girls (C.U. 0·8.)	5 Swaraj Ashram (C. U. 1·0.)	6 For Govern- ment Central School and Mission Hostels (C.U. 0·8.)	7 For Swaraj Ashram (C.U. 1·0.)
<b>1. Foodstuffs.</b>						
Rice .. ..	2·2	0·9	0·5	1·4	2·0	2·0
Wheat .. ..	4·4	2·3	1·6	2·7	4·0	4·0
Jowar .. ..	6·1	5·2	5·2	6·7	2·0	2·0
Ragi .. ..	....	5·1	5·1	....	4·0	6·0
Pulses .. ..	3·9	3·6	3·7	2·9	3·0	4·0
Leafy vegetables ..	....	....	0·7	....	2·0	3·0
Root Vegetables ..	....	0·8	0·6	0·3	1·5	2·0
Other vegetables ..	....	0·8	....	2·9	1·5	3·0
Fruits .. ..	....	....	....	2·25	....	2·25
Sugar and Jaggery.	0·4	0·3	0·2	0·6	1·0	1·5
Vegetable oil .. ..	0·5	0·2	0·2	0·8	1·5	1·5
Butter and Ghee ..	0·2	....	....	....	....	....
Fresh milk .. ..	....	....	....	4·0*	4·0	4·0
Skim milk powder..	....	0·7	0·7	....	1·0	1·2
Fish and Meat .. ..	....	0·2	0·2	....	2·0†	....
Oil seeds and Nuts.	....	....	....	0·5	1·0	1·0
Dates .. ..	....	....	....	0·5	....	....

\*On alternate days.

†Twice a week.

APPENDIX H—*contd.*

1. Foodstuffs.	Existing Diets per head per day (in ozs.)				Recommended Diets per head per day (in ozs.)	
	Government. Central School (C.U.-O. 8)	Mission hostel for boys (C.U.-O. 8.)	Mission hostel for Girls (C.U.-O. 1.)	Swaraj Ashram (C. U.-I. O)	For Govern- ment Central Mission Hostels (C.U.-O. 8.)	For Swaraj Ashram (C.U.I.O.)
1	2	3	4	5	6	7
<b>2. Nutrient Analysis.</b>						
Total Proteins (in g.)	63.2	68.3	65.6	60.0	80.7	94.1
Animal proteins (in g.)	....	8.7	8.7	2.4	18.7	17.7
Fats .. (in g.)	26.5	13.7	13.3	38.6	69.1	68.4
Carbohydrates (in g.)	341.3	370.9	344.1	334.8	368.5	474.0
Calcium (in g.)	0.26	1.13	1.02	0.39	1.43	1.84
Phosphorus (in g.)	1.36	1.63	1.55	1.28	1.86	1.22
Iron (in mg.)	25.87	28.59	28.24	22.58	28.98	40.63
Vitamin A (in I.U.)	693	661	1,581	776	3,579	5,251
Vitamin B1 (in I.U.)	579	640	597	537	684	809
Vitamin C (in mg.)	....	11	14	26	54	87
*Calories ..	1,857	1,879	1,758	1,927	2,419	2,889
<b>3. Distribution of Calories.</b>						
..	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Proteins ..	14	15	15	12	13	13
Fats ..	13	6	7	18	26	21
Carbohydrates ..	73	79	78	70	61	66.

## APPENDIX J.

## REPORT ON THE CLINICAL NUTRITION SURVEY OF THE CHILDREN OF THE VARIOUS SCHOOLS IN THE DANGS DISTRICT.

(The survey was carried out during the month of December 1951.)

1. A nutrition survey of the children from the various schools all over the Dangs District was carried out by the Department in the month of December 1951, by the rapid method.

2. The total number of children examined from the three schools in Ahwa and ten village schools was 475—368 boys and 107 girls. The age range covered is from 6 years to 20 years.

3. Table I gives the number of students examined from each school and the distribution of boys and girls in the three grades of nutritional status.\* Of the 475 students examined, 82 i.e. 17 per cent. are in grade I, 365 i. e. 77 per cent. are in grade II and 28 i. e. 6 per cent. are in grade III of the nutritional status. Thus, five out of six children are undernourished. The nutritional status of the school children from the Dangs District is, therefore, not very satisfactory.

4. On the whole, out of the 368 boys, 64 boys i. e. 17 per cent. are in grade I; 282 boys i. e. 77 per cent. are in grade II and 22 boys i. e. 6 per cent. are in grade III of the nutritional status.

5. Of the 107 girls, 18 i. e. 17 per cent. are in grade I, 83 i. e. 77 per cent. are in grade II and 6 i. e. 6 per cent. are in grade III. It will be seen from this that unlike our previous findings of the nutrition surveys of the Bombay schools, where girls have invariably shown better standard of nutritional status, here both boys and girls have the same distribution in the three grades of nutritional status. Thus showing that boys and girls have same standard of nutritional status. Three boys showed pigmentation of conjunctivae, though they were classed in grade I.

6. Table II shows the distribution of boys and girls in the three grades of nutritional status according to age. (19 children from Subir have been omitted from this analysis—added at the end, as the age, and heights and weights of these children were not noted). It will be seen from this table that the children in the higher age groups have a better standard of nutrition than the younger children.

7. Out of the 282 boys and 83 girls in grade II, 36 boys i. e. 13 per cent. and 9 girls i. e. 11 per cent. were put in grade II because of subjective feeling of undernourishment, including underweight; they showed no other sign of malnutrition. The remaining 246 boys and 72 girls showed single or multiple signs of malnourishment. These are as shown below. The details are given in table IV :—

	<i>Boys</i> (246)	<i>Girls</i> (72)
(1) Poor musculature ... ..	136	36
(2) Deficient subcutaneous fat ... ..	220	69
(3) Dry and/or rough skin ... ..	38	4
(4) Xerosis of conjunctivae ... ..	14	1
(5) Bitot's spots ... ..	4	...
(6) Night blindness ... ..	2	1
(7) Angular stomatitis ... ..	7	...
(8) Mild anaemia ... ..	10	2
(9) Pigmentation of conjunctivae ... ..	3	6
(10) Dental caries ... ..	12	8

\*Three grades of nutritional status :

Grade I—Physique and general health good.

Grade II—Undernourished.

Grade III—Evidence of malnutrition—single or multiple deficiency states.

8. It will be seen from this that Deficient subcutaneous fat (220 boys and 69 girls) and Poor musculature (136 boys and 36 girls) are two signs of malnourishment with a very high degree of occurrence. The other symptoms found are, Mild anaemia (10 boys and 2 girls), Xerosis of conjunctivae (14 boys and 1 girl), Pigmentation of conjunctivae (3 boys and 6 girls), Bitot's spots (4 boys) Angular stomatitis (7 boys), Dry and/or rough skin (38 boys and 4 girls), and Dental caries (12 boys and 8 girls).

9. There are 22 boys and 6 girls in the nutritional grade III. The signs of malnutrition observed among these children are as follows. The details are given in table V :—

			Boys (22)	Girls (6)
1.	Poor Musculature	...	11	4
2.	Deficient subcutaneous fat	...	18	5
3.	Dry and/or rough skin	...	19	2
4.	Xerosis of conjunctivae	...	11*	...
5.	Bitot's spots	...	2	1†
6.	Angular stomatitis	...	5	2
7.	Mild anaemia	...	2	1
8.	Pigmentation of conjunctivae	...	3	...
9.	Dental caries	...	3	1

10. It will be seen from this that Poor musculature (11 boys and 4 girls), Deficient subcutaneous fat (18 boys and 5 girls), Xerosis of conjunctivae (11 boys) and Dry and/or rough skin (19 boys and 2 girls) are the four symptoms with a very common occurrence in the children in grade III. The other symptoms observed are Mild anaemia (2 boys and 1 girl), Angular stomatitis (5 boys and 2 girls), Dental caries (3 boys and 1 girl), Bitot's spots (2 boys and 1 girl), and Pigmentation of conjunctivae (3 boys).

11. On the whole, the main nutritional deficiencies observed in these children are Poor musculature, Deficient subcutaneous fat, Xerosis or pigmentation of the conjunctivae and Dry and/or rough skin—mainly fat and vitamin A deficiencies.

12. Table III shows the average height and weight of boys and girls for each age group. The same are represented on graphs I and II respectively along with the standard height and weight curves of Parsi children (1941). Except in the age groups "13" "15" and "16" boys are taller and heavier than girls. No general conclusion can, however, be drawn as the number of girls in these three age groups is very small.

13. Comparison with the standard, Height—Although the height curves for boys and girls are below the standard curve, in no age group the difference in the two curves is more than four inches, in the case of boys, and seven inches in the case of girls. Actually, in the age group 16 years, the average height for girls is more than the standard; but there is only one girl in this age group.

*Weight.*—Both the curves (for boys and girls) are below the standard curve and the difference in some places is as high as 20–23 lbs.

\* One of them showed pigmentation of conjunctivae also. One more boy showed Bitot's spots also.

† This girl also showed pigmentation of conjunctivae.

14. In summarising, the following points may be noted.

(i) The nutritional status of the school children from the Dangs District is not very satisfactory, with only 17 per cent. in grade I of the nutritional status.

(ii) The nutritional status of children from Ahwa is slightly better than the children from the villages (see table I)

(iii) The nutritional status of children in the higher age group is better than those in the lower age group (see table II).

(iv) The main deficiencies observed are : Poor musculature, Deficient subcutaneous fat, Xerosis or pigmentation of the conjunctivae and Dry and/or rough skin.

(v) The occurrence of dental caries is comparatively lower than among the Bombay School children.

(vi) The average heights and weights of children are lower than the standard heights and weights. In general the boys are taller and heavier than the girls with very few exceptions.

15. In addition to the usual signs and symptoms discussed above, several other signs especially muddy conjunctivae and "enlarged spleen" were also noted. These are shown below. The details have been shown in table VI :—

		<i>Boys</i>	<i>Girls.</i>
1. Muddy conjunctivae	...	41	6
2. Pigmentation of the tongue	...	9	1
3. Enlarged spleen	...	42	11
4. Scabies, etc.	..	9	1
5. Pyorrhoea	...	8	2
6. Prominent abdomen	...	1	1
7. Ulcer on the leg	...	1	...
8. Conjunctivitis	...	1	...

The above have, if any, an indirect effect on health as can be seen from table VI. Most of these symptoms have been observed in boys and girls in grades II and III.

## CLINICAL NUTRITION SURVEY (RAPID METHOD)

TABLE

*Statement showing the distribution of boys and girls in the three*

Place.	Number of children examined.	Number of boys examined.	I		II		III	
			No.	Per cent.	No.	Per cent.	No.	Per cent.
<i>Ahwa—</i>								
Government Central School, Ahwa.	80	70	29	41	36	52	5	7
Aashram Shala, Ahwa ...	55	43	6	14	37	86	...	...
Mission Boarding School, Ahwa ...	94	59	16	27	41	70	2	3
<i>Bardipada—</i>								
Dhongiamba ...	21	16	2	13	13	81	1	6
Bardipada ...	13	13	...	...	11	85	2	5
<i>Pimpri—</i>								
Gauriya ...	21	19	...	...	19	100	...	...
Nadagkhadi ...	15	15	...	...	15	100	...	...
Pimpri ...	21	15	2	13	11	74	2	13
<i>Waghai—</i>								
Waghai ...	21	17	...	...	17	100	...	...
Rambhas ...	47	31	...	...	31	100	...	...
<i>Subir—</i>								
Khambla ...	50	35	8	23	22	63	5	14
Subir ...	19	17	...	...	17	100	...	...
Pipaldahad ...	18	18	1	5	12	67	5	28
Total ...	475	368	64	17	282	77	22	6

OF THE CHILDREN FROM DANGS DISTRICT.

I.

*nutritional grades, at different places.*

Number of girls examined.	I		II		III	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
10	5	50	5	50	...	...
12	2	17	10	83	...	...
35	9	26	25	71	1	3
5	...	...	5	100	...	...
...	...	...	...	...	...	...
2	...	...	2	100	...	...
..	...	...	...	...	...	...
6	1	17	5	83	...	...
4	...	...	4	100	...	...
16	...	...	12	75	4	25
15	1	7	13	90	1	7
2	...	...	2	100	...	...
...	...	...	...	...	...	...
107	18	17	83	77	6	6

## CLINICAL NUTRITION SURVEY (RAPID METHOD)

TABLE

*Statement showing the distribution of boys and girls in the*

Age in Years.	Number of children examined.	Number of boys examined.	I		II		III		
			No.	Per cent.	No.	Per cent.	No.	Per cent.	
6	10	7	2	29	5	71	...	...	
7	40	20	2	10	18	90	...	...	
8	56	52	3	6	48	92	1	2	
9	54	40	5	13	32	80	3	7	
10	83	58	4	7	49	84	5	9	
11	68	52	6	11	42	81	4	8	
12	40	31	5	16	23	74	3	10	
13	36	32	8	25	20	63	4	12	
14	29	26	10	38	15	58	1	4	
15	15	12	6	50	6	50	...	...	
16	6	5	4	80	...	...	1	20	
17	2	2	1	50	1	50	...	...	
18	5	5	3	60	2	40	...	...	
19	2	2	2	100	...	...	...	...	
20	2	2	2	100	...	...	...	...	
?	8	5	1	20	4	80	...	...	
<b>Total</b>	<b>...</b>	<b>456</b>	<b>351</b>	<b>64</b>	<b>18</b>	<b>265</b>	<b>76</b>	<b>22</b>	<b>6</b>
<b>Subir (7-11)</b>		<b>19</b>	<b>17</b>	<b>...</b>	<b>...</b>	<b>17</b>	<b>100</b>	<b>...</b>	<b>...</b>
<b>Total</b>	<b>...</b>	<b>475</b>	<b>368</b>	<b>64</b>	<b>17</b>	<b>282</b>	<b>77</b>	<b>22</b>	<b>6</b>



## OF THE CHILDREN FROM DANGS DISTRICT.

## II.

*three nutritional grades, according to age.*

Number of girls examined.	I		II		III	
	No.	Per cent.	No.	Per cent.	No.	Per cent.
3	2	67	1	33	.....	.....
20	.....	.....	16	80	4	20
4	.....	.....	4	100	.....	.....
14	1	7	13	93	.....	.....
25	2	8	22	88	1	4
16	5	31	10	63	1	6
9	.....	.....	9	100	.....	.....
4	1	25	3	75	.....	.....
3	2	67	1	33	.....	.....
3	3	100	.....	.....	.....	.....
1	1	100	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....
3	1	33	2	67	.....	.....
105	18	18	81	78	6	6
2	.....	.....	2	100	.....	.....
107	18	17	83	77	6	6

**CLINICAL NUTRITION SURVEY (RAPID METHOD) OF THE  
CHILDREN FROM DANGS DISTRICT.**

**TABLE III.**

*Statement showing the average height and weight of boys and Girls.*

Age in years.	No. of boys.	Average height in inches.	Average weight in pounds.	No. of Girls.	Average height in inches.	Average weight in pounds.	Remarks.
6	7	44.4	41.7	3	39.3	30.7	
7	20	42.5	37.5	20	43.3	36.2	
8	52	45.5	40.9	4	44.4	38.0	
9	39*	47.7	46.3	14	47.4	42.8	*Height and weight were not measured of one boy, although he was clinically examined.
10	58	48.4	46.7	25	46.1	44.6	
11	51*	51.3	52.3	16	49.7	51.4	
12	31	50.2	53.9	9	50.9	53.1	
13	32	53.4	59.2	4	52.1	62.9	
14	25*	57.2	71.3	3	56.3	66.3	
15	12	57.4	71.7	3	59.8	76.7	
16	5	60.0	79.0	1	64.0	100.0	
17	2	62.3	88.0	...	...	...	
18	5	61.1	93.0	...	...	...	
19	2	67.5	99.0	...	...	...	
20	2	62.8	98.0	...	...	...	

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**TABLE IV**

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## CLINICAL NUTRITION SURVEY (RAPID METHOD)

TABLE

*Statement showing occurrence of various symptoms*

Age in years.	No. of boys in Grade II.	Grade II without symptom.	IIa	IIb	IIc	IIIb	IIIc	IIId	IIIe	IIIf
6	5	1	1	4	...	1	...	...	...	1
7	18	2	10	16	2	...	1	2	...	...
8	48	4	33	44	3	1	1	3	2	2
9	32	5	18	26	...	1	1	1	4	4
10	49	4	29	44	1	1	...	5	4	4
11	42	5	19	37	...	1	1	1	5	5
12	23	3	13	18	...	3	1	...	2	2
13	20	4	7	16	3	1	...	...	2	2
14	15	6	2	8	...	...	2	...	1	1
15	6	...	2	4	1	...	...	...	2	2
16	...	...	...	...	...	...	...	...	...	...
17	1	1	...	...	...	...	...	...	...	...
18	2	...	1	2	...	...	...	...	...	...
19	...	...	...	...	...	...	...	...	...	...
20	...	...	...	...	...	...	...	...	...	...
?	4	1	1	1	...	...	...	...	...	...
Subir	17	...	...	...	...	8	...	...	15	15
Total	282	36	136	220	10	17	7	12	38	38

## OF THE CHILDREN FROM DANGS DISTRICT.

## IV.

*in Boys and Girls in Grade II according to age.*

No. of girls in Grade II.	Grade II without symptom.	IIa	IIb	IIc	IIb	IIId	IIIe	III <sub>f</sub>
1	...	...	1	...	...	...	...	...
16	1	8	15	...	1	...	3	...
4	...	4	4	...	...	...	...	...
13	1	5	12	...	2	...	1	...
22	3	9	16	2	...	...	1	2
10	1	6	9	...	1	...	1	1
9	3	2	6	...	...	...	2	...
3	...	1	2	...	1	...	...	...
1	...	1	1	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...
2	...	...	1	...	...	...	...	1
2	...	...	2	...	...	...	...	...
83	9	36	69	2	5	...	8	4

## CLINICAL NUTRITION SURVEY (RAPID METHOD)

TABLE

*Statement showing occurrence of various symptoms in*

Age in years	No. of boys in grade III	IIa	IIb	IIc	IIIb	IIIc	IIId	IIIe	IIIf
6	...	...	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...	...	...
8	1	...	1	...	...	...	...	...	1
9	3	1	2	...	1	3	...	...	2
10	5	3	3	1	3	1	2	...	4
11	4	2	4	1	3	...	...	...	4
12	3	2	3	...	3	...	...	...	3
13	4	2	4	...	3	1	...	...	4
14	1	...	...	...	1	...	...	...	1
15	...	...	...	...	...	...	...	...	...
16	1	1	1	...	1	...	1	...	...
17 to 20	...	...	...	...	...	...	...	...	...
Subir (7-11)	...	...	...	...	...	...	...	...	...
<b>Total</b>	<b>22</b>	<b>11</b>	<b>18</b>	<b>2</b>	<b>15</b>	<b>5</b>	<b>3</b>	<b>19</b>	

OF THE CHILDREN FROM DANGS DISTRICTS.

V.

*Boys and Girls in grade III according to age.*

No. of Girls in Grade III	IIa	IIb	IIc	IIIb	IIIa	IIIc	IIIf
...	...	...	...	...	...	...	...
4	3	4	1	1	2	1	1
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
1	1	1	...	1	...	...	1
1	...	...	...	1	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...
6	4	5	1	3	2	1	2

CLINICAL NUTRITION SURVEY (RAPID METHOD) OF THE  
CHILDREN FROM DANGS DISTRICT.

TABLE VI.

*Statement showing the symptoms observed in addition to the usual symptoms in the schedule for the Rapid Clinical Nutrition Survey.*

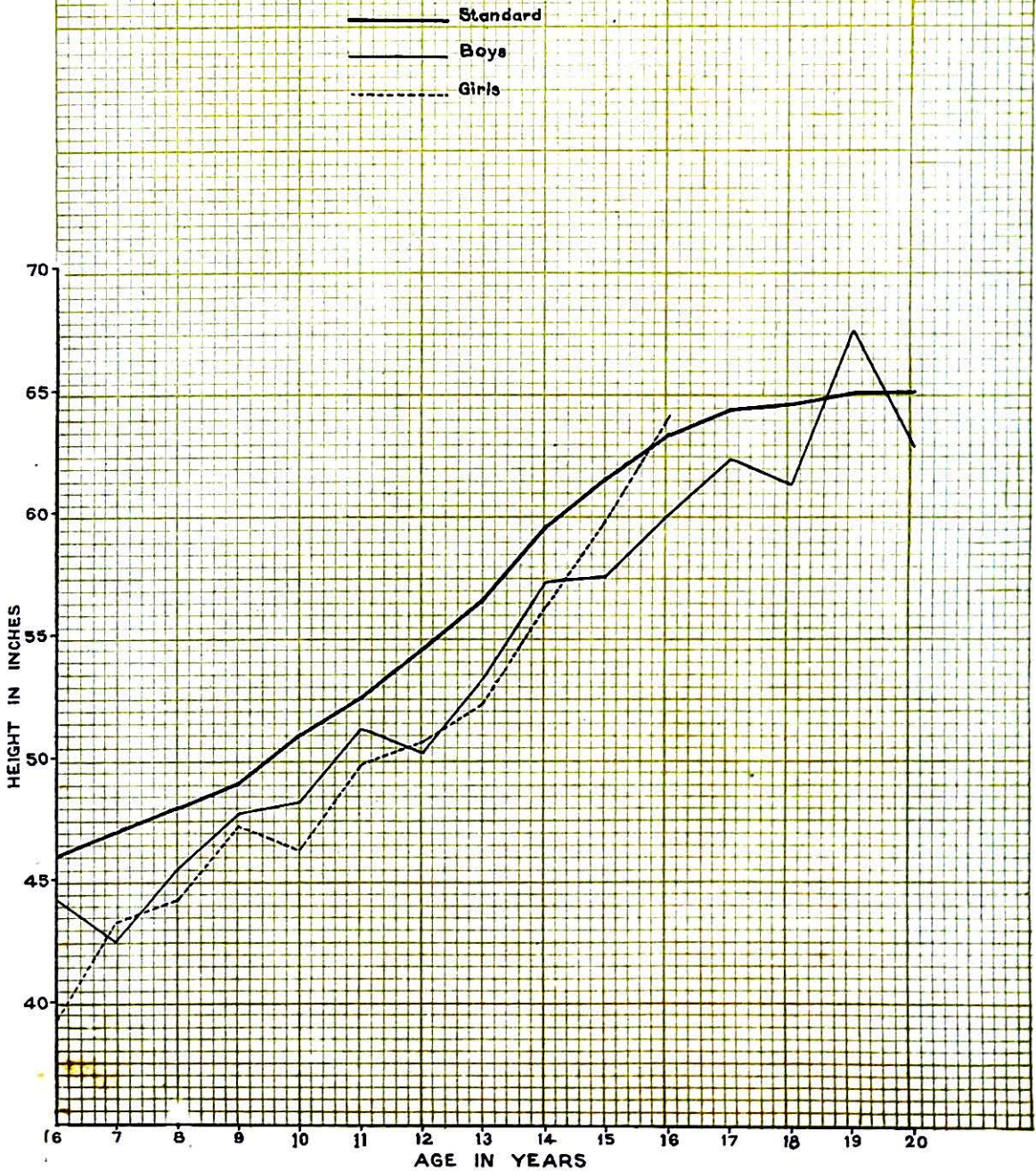
Sex.	Grade	Muddy Con- junctiva	Enlarg- ed Spleen.	Scabies etc.	Pig- mentat. of the tongue.	Pyor- rhoea.	Night blind- ness.	Promi- nent abdomen.	Ulcer on leg.	Conjun- ctivitis.
Boys	I ..	9	2	2	2	..	..	..	1	..
	II a*	7	..	2	..	..	..	..	..	..
	b@	25	31	5	7	7	..	1	..	1
	III ..	..	9	..	..	1	2	..	..	..
Total		41	42	9	9	8	2	1	1	1
Girls	I ..	..	..	..	..	..	..	..	..	..
	IIa ..	..	..	..	..	..	..	..	..	..
	b ..	6	7	1	1	2	..	1	..	..
	III ..	..	4	..	..	..	1	..	..	..
Total ..		6	11	1	1	2	1	1	..	..
Total.		47	53	10	10	10	3	2	1	1

\* Children in grade II without showing any deficiency symptoms.

@ Children in grade II showing deficiency symptoms.

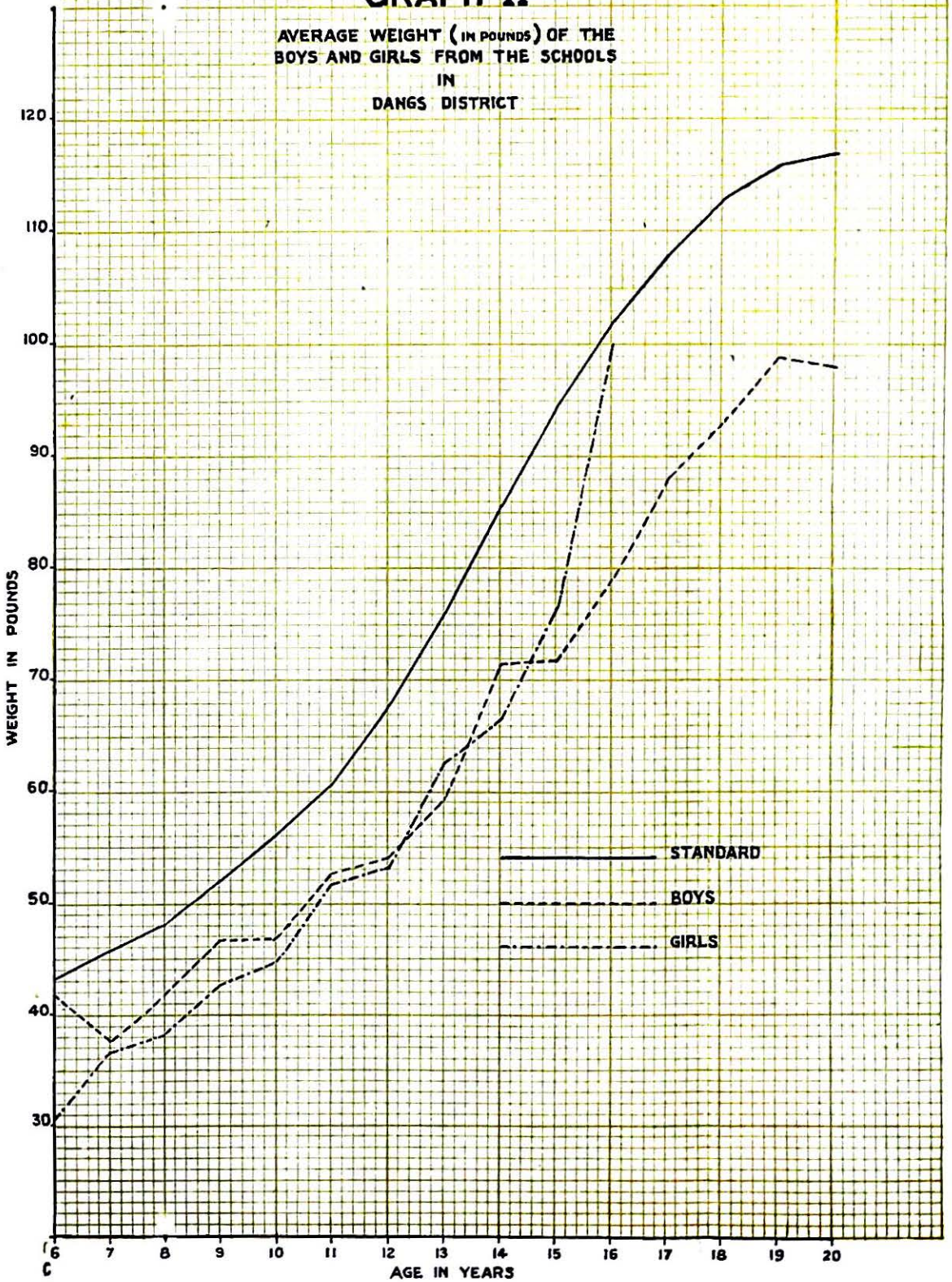


**GRAPH I**  
**AVERAGE HEIGHT (in inches) OF THE**  
**BOYS AND GIRLS FROM THE SCHOOLS**  
**IN**  
**DANGS DISTRICT**



# GRAPH II

AVERAGE WEIGHT (IN POUNDS) OF THE  
BOYS AND GIRLS FROM THE SCHOOLS  
IN  
DANGS DISTRICT



## DEPARTMENT OF NUTRITION, GOVERNMENT OF BOMBAY.

## Schedule for Rapid Clinical Nutrition Survey.

Serial No..... Date .....

Name: .....

Age : .....Years .....Months. Sex : ..... Place :.....

Weight : lbs. Height : inches.

Haemoglobin : g/100 ml. Std. Div.

## GRADE I.

## GRADE II.

- (a) Poor musculature.
- (b) Deficient subcutaneous fat.
- (c) Mild anaemia.
- (d) Lack of interest in surroundings.
- (e) Mild signs of not more than one of the specific nutritional disorders or deficiencies mentioned under Grade III.

## GRADE III

- (a) Gross muscular wasting.
- (b) (i) Xerosis or pigmentation of conjunctive.
- (ii) Bitot's spots.
- (iii) Xerosis of cornea.
- (iv) Angular conjunctivitis.
- (c) Marked anaemia.
- (d) (i) Red and/or raw tongue; Glazed tongue;
- Stomatitis.
- (ii) Bleeding gums.
- (e) Dental caries,

- (f) Dry and/or rough skin.  
Hyperkeratosis.  
Crazy pavement epithelium.
- (g) Oedema—localised or generalised.
- (h) Tenderness of the Calf muscles.

Special remarks (if any):—

### APPENDIX K.

#### MEDICAL STAFF FOR THE GOVERNMENT DISPENSARIES.

##### I. Sampson Dispensary—Ahwa—

Dr. K. K. Shah, M.B.B.S., ... Chief Medical Officer (for the entire District).

One Licentiate Doctor ... Medical Officer in-charge Dispensary.

Two Licentiate Doctors ... For Rural Medical Relief (Distribution of vitamin tablets etc.) and D. D. T. spraying operations for the entire District.

II. Waghai Dispensary at Waghai } One Licentiate Doctor in-charge  
each Dispensary.

III. Subir Dispensary at Subir }

IV. Mobile Hospital Unit ... Headquarters at Bardipada—

One Licentiate Doctor in-charge of the Dispensary at Bardipada and Mobile Hospital. Van for field-work in the Bardipada Range.

#### NON-MEDICAL STAFF.

This includes the compounders, dressers, staff nurse, mid-wife, sweepers, peons etc., usually sanctioned for rural Dispensaries. In addition, there are a staff nurse, midwife, wardboys, vaccinators, sanitary inspector, insect collectors for the Sampson Dispensary and Public Health Work in the entire District.

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APPENDIX L.

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No. 1 Bk Q 26-4

## APPENDIX

## CLINICAL AND LABORATORY FINDINGS

Serial No.	Name	Sex	Age	Clinical Findings	Hb. in g.	RBC in mil.	C. I.	Total W.B.C.
1	Bhirdu	F	20	Pregnant 6 m. moderate anaemia ; oedema feet <i>spl. ++</i>	3.9	1.13	1.2	4,600
2	Bayajp	F	20	Non-pregnant moderate anaemia <i>spl. just palpable.</i>	4.0	2.7	0.5	4,200
3	Kala	M	8 (months)	Admitted for trachoma ; mild anaemia	...	...	...	...
4	Mohana	F	4	Admitted for fever ; mild anaemia.	...	...	...	...
5	Kasi	F	2	As above.	...	...	...	...
6	Sarabai	F	52	Pain abdomen, mild anaemia.	...	...	...	...
7	Vimal	F	12	Abscesses Inguinal area	...	...	...	...
8	Lashi	F	25	Tropical ulcer—rt. knee	...	...	...	...
9	Mohanlal	M	34	Fever with rigor ; mild anaemia ; <i>spl. ++</i>	11	4.2	0.9	5,150
10	Chindu	M	25	Tropical ulcer	15	5.1	1.0	5,025
11	Chambu	M	25	Tropical ulcer ; moderate anaemia.	7.5	2.7	0.9	6,100
12	Pilo	M	28	General debility ; mild anaemia.	12	3.95	1.0	6,050
13	Bhawji	M	13	Eczematous dermatitis-feet ; moderate anaemia.	8	2.78	0.95	6,775

L.

## OF ANAEMIC PATIENTS:

Differential-WBC counts				Blood smear examination (Positive findings)	Stool Report (Helminthic Ova and or cysts.
P Per cent.	L Per cent.	LM Per cent.	E Per cent.		
45	55	...	...	Microcytes : Plenty ; Macro-+ aniso++ Dehaem. +	Negative.
44	53	...	3	Many macro. Few Micro. Aniso++	Negative.
46	54	...	...	Dehaem+++	Plenty of undigested material.
22	76	...	2	Both micro & macro. Aniso+++ Dehaem. +	Negative.
42	56	...	2	Micro+++ Macro. + Aniso.++ Dehaem.	.....
...	...	...	...	..	Negative.
...	...	...	...	..	Negative.
...	...	...	...	..	Negative.
26	66	...	8	Norm.+++ Macro. + Aniso +	.....
37	52	...	11	Norm.+++ Macro. +	.....
44	52	...	4	Micro-+++ Macro+ Dehaem + Aniso+	.....
41	58	...	1	Dehaem++	.....
63	34	...	3	Micro-+++ Macro. + Aniso. ++ Dehaem++	.....

## APPENDIX M.

## LABORATORY FINDINGS OF ANAEMIC MISSION SCHOOL CHILDREN.

Serial No.	Name.	Sex.	Standard.	Hb. (in g.)			Differential WBC	Nature of RBCs.	Stool Examination.
				P. :	L. :	E.			
1	Ganpat	M	IV	10.8	50	38	12	Aniso+Many macrocytes.	
2	Soma	M	IV	10.8	..	..	..		
3	Latika	F	III	11.0	34	57	9	Dehaem+Aniso++ Macro. and Microcytes.	
4	Vijaya	F	III	12.0	48	44	8	Aniso+a few macrocytes.	Negative.
5	Manohar	M	III	..	..	..	..		Negative.