CHAPTER V

DIET ANALYSIS

I URBAN DIETARY HABITS

II RURAL DIETARY HABITS

III UNDER-NUTRITION AND MALNUTRITION
URBAN DIETARY HABITS

To detect the nutritional status of urban residents, a diet survey was conducted by the oral-questionnaire method in ten urban centres of the region, which were selected on the basis of their various characteristics. Two points were always kept in mind while conducting the survey, viz.: 1) The sample should cover all the communities of the respective towns in approximate proportion. 2) The families selected should be equally distributed over the town.

In these selected urban places some 318 families of different communities were interviewed by the author himself, through the oral-questionnaire method. Consumption of protective foods like green leafy vegetables, milk, ghee etc. was found to be more in urban places in comparison to the rural areas. Here each cultural group has its strong preferences for certain kinds of foods, timing, size and sequence of meals eaten, according to certain rituals.
The towns and their characteristics, on the basis of which they were selected, are as follows:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the town</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asiknagar</td>
<td>Jain community predominant.</td>
</tr>
<tr>
<td>2</td>
<td>Bairagarh</td>
<td>Sindhi community predominant; also an important business centre.</td>
</tr>
<tr>
<td>3</td>
<td>Basoda</td>
<td>Wheat market; also a big business centre.</td>
</tr>
<tr>
<td>4</td>
<td>Bhopal H.E. Township</td>
<td>Industrial township. Various communities; also various economic strata.</td>
</tr>
<tr>
<td>5</td>
<td>Bina</td>
<td>Important railway junction.</td>
</tr>
<tr>
<td>6</td>
<td>Beganganj</td>
<td>Muslim and 'Joni' communities predominant.</td>
</tr>
<tr>
<td>7</td>
<td>Chhatriganj</td>
<td>Muslim predominant town.</td>
</tr>
<tr>
<td>8</td>
<td>Khurai</td>
<td>Centre of wheat-producing area.</td>
</tr>
<tr>
<td>9</td>
<td>Rahatgarh</td>
<td>Developing town.</td>
</tr>
<tr>
<td>10</td>
<td>Sagar</td>
<td>Headquarter town.</td>
</tr>
</tbody>
</table>

The urban dwellers of the area in question normally take food three times in a day. The food commonly taken includes tea, coffee, milk, bread, biscuits, 'puris', sweets, etc. in the morning, bread, rice, vegetables and also very occasionally non-vegetarian food-stuffs at noon; while bread, 'puris', vegetables, milk, sweets etc. are taken at night.
Well-to-do families take fruits daily after meal, but it is not a common practice. Most of the population of the urban area is of vegetarian habits, both religious and economic factors being responsible for this. Non-vegetarian food habits were reported more commonly in the Heavy Electricals Township, but even here such foods are not taken every day.

DIET AND NUTRIENTS

The total per capita intake of different nutrients in the selected urban settlements is presented in Table 5.1 and on this basis their ranks have been calculated and given in Table 5.3 and 5.4. A lower rank indicates lower intake and higher deficiency. Thus Ghairatganj intake of calories is only 1733, which is the lowest amongst the ten towns. Its rank is 1, while Bairagarh whose intake of calories is highest, has the highest rank, i.e. 10. Totalling all the individual ranks, one gets the 'Accumulated Rank'. Where this figure is higher, the nutrient-intake is, as a whole, higher and the deficiency lower.

Among all the surveyed towns, Ghairatganj diet has been found quite deficient in respect of all important nutrients (Table 5.4), this town is predominantly occupied by the Muslim community. The highest figure has been reported by people of the HE. township, Bhopal.
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NUTRIENTS REQUIRED & NUTRIENTS CONSUMED

INTAKE PER CAPUT PER DIEM

CALORIE

0 400 800 1200 1600 2000 2400 CALORIES

0 20 40 60 80 gm

PROTEIN

0 1000 2000 3000 4000 I.U.

VITAMIN A

0 1000 2000 3000 4000 I.U.

VITAMIN B₂ (RIBOFLAVIN)

0 1 2 3 mg

VITAMIN B₁ (THIAMINE)

0 1 2 mg

CALCIUM

0 200 400 600 800 1000 mg

IRON

0 4 8 12 16 20 24 28 mg

SOURCE: BASED ON AUTHOR'S DIET SURVEY.
### Table 5.1
AVERAGE INTAKE IN DIFFERENT TOWNS

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name of the town</th>
<th>Calorie</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vit.A</th>
<th>Vit.B₁</th>
<th>Vit.B₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ashoknagar</td>
<td>2036</td>
<td>53.0</td>
<td>643</td>
<td>23.0</td>
<td>2301</td>
<td>1.50</td>
<td>1.40</td>
</tr>
<tr>
<td>2</td>
<td>Belfast</td>
<td>2109</td>
<td>63.0</td>
<td>591</td>
<td>15.0</td>
<td>2630</td>
<td>1.45</td>
<td>1.50</td>
</tr>
<tr>
<td>3</td>
<td>Basoda</td>
<td>1936</td>
<td>54.0</td>
<td>627</td>
<td>21.0</td>
<td>2089</td>
<td>1.45</td>
<td>1.40</td>
</tr>
<tr>
<td>4</td>
<td>Bhopal H.E. Township</td>
<td>2027</td>
<td>60.0</td>
<td>772</td>
<td>16.0</td>
<td>2771</td>
<td>1.45</td>
<td>1.60</td>
</tr>
<tr>
<td>5</td>
<td>Bina</td>
<td>1988</td>
<td>54.0</td>
<td>717</td>
<td>17.0</td>
<td>2212</td>
<td>1.40</td>
<td>1.40</td>
</tr>
<tr>
<td>6</td>
<td>Beganganj</td>
<td>1823</td>
<td>51.0</td>
<td>548</td>
<td>17.0</td>
<td>1854</td>
<td>1.40</td>
<td>1.40</td>
</tr>
<tr>
<td>7</td>
<td>Ghairatganj</td>
<td>1733</td>
<td>50.0</td>
<td>444</td>
<td>15.0</td>
<td>1680</td>
<td>1.35</td>
<td>1.20</td>
</tr>
<tr>
<td>8</td>
<td>Khural</td>
<td>1968</td>
<td>56.0</td>
<td>779</td>
<td>21.0</td>
<td>2049</td>
<td>1.45</td>
<td>1.40</td>
</tr>
<tr>
<td>9</td>
<td>Rahatgarh</td>
<td>1863</td>
<td>51.0</td>
<td>636</td>
<td>21.7</td>
<td>1925</td>
<td>1.50</td>
<td>1.30</td>
</tr>
<tr>
<td>10</td>
<td>Sagar</td>
<td>1956</td>
<td>53.3</td>
<td>586</td>
<td>10.6</td>
<td>1630</td>
<td>1.10</td>
<td>1.30</td>
</tr>
</tbody>
</table>

Source: Compiled from diet survey, conducted by the author.

### Table 5.2
VALUE OF DIFFERENT VITAMINS AND MINERAL SALTS THAT ARE ACTUALLY NEEDED

<table>
<thead>
<tr>
<th>Calorie</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vit.A</th>
<th>Vit.B₁</th>
<th>Vit.B₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>2400</td>
<td>60-80</td>
<td>1000</td>
<td>20-30</td>
<td>4000</td>
<td>1.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: Compiled from different sources.
Table 5.3
NUTRIENT-WISE RANK OF INTAKE

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the town</th>
<th>Calorie</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vit.A</th>
<th>Vit.B₅</th>
<th>Vit.B₂</th>
<th>Accumulated Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ashoknagar</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td></td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>Bairagarh</td>
<td>10</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>9</td>
<td>4</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>Basoda</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>4</td>
<td>Beglamganj</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>Bhopal, H.E. Township</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>3</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td>46</td>
</tr>
<tr>
<td>6</td>
<td>Bina</td>
<td>7</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>2</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>Ghiratganj</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>8</td>
<td>Khural</td>
<td>6</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>37</td>
</tr>
<tr>
<td>9</td>
<td>Rahatgarh</td>
<td>3</td>
<td>2</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>Sagar</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>23</td>
</tr>
</tbody>
</table>

Source: Compiled from diet survey, conducted by the author.

As far as under-nutrition is concerned, minimum calorie intake per caput was reported from Ghiratganj (Table 5.1), while more than 2000 calories intake was found in two separate townships of Bhopal, viz. Bairagarh, mainly occupied by the Sindhi community, and the H.E. township where various communities are living and in Ashoknagar. In the course of diet survey it was found that consumption of cereals was high in the diet of Bairagarh and Ashoknagar people, but people of the H.E. township took varieties of food-stuffs,
by which they got sufficient calories. In both the places the purchasing power of the people is better while their educational level is also reportedly good, so these facts automatically impress one's mind that economic condition and educational level are the main deciding factors in the diet of the people.

As a whole one could say that the diet of the residents of Ghairatganj is deficient in most of the essential nutrients, while the H.E. township (Govindpura, Bhopal) diet is far better than that of the other places in all respects. Due to lesser consumption of leafy vegetables and fruits, the intake of vitamin A is, however, found to be deficient throughout the study region (Table 5.1).

On the other hand, because of the greater degree of consumption of cereals by the urban people, the diet has not been much under-nourished, but it is no doubt malnourished due to the above-mentioned factors. Generally food-stuffs containing essential nutrients are costly, so that due to their low purchasing power people are unable to pay for nutritious foods. Besides this, ignorance regarding nutritious foods, faulty cooking methods are also responsible for the prevalent diets.

Due to a better economic and educational level the residents of the Bhopal H.E. township consume food which is quite good in respect of all the nutrients. Here defective traditional habits and faulty cooking methods are not present to influence
the diet, because here most of the housewives are educated.

The diet of the people of Basoda, Rahatgarh and Sagar is found deficient in some nutrients as given and arranged rank-wise in Table 5.1 and 5.3. These places are occupied by different communities and their respective dietary patterns are very well influenced by their community traditions. Poverty and ignorance were also noticed here among certain sections, during diet survey.

Table 5.4

ACCUMULATED RANK OF NUTRIENT INTAKE

<table>
<thead>
<tr>
<th>Rank</th>
<th>Place</th>
<th>Rank</th>
<th>Place</th>
<th>Rank</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chairatganj</td>
<td>10</td>
<td>Bina</td>
<td>6</td>
<td>Bhopal H.E.</td>
</tr>
<tr>
<td>2</td>
<td>Beganganj</td>
<td>18</td>
<td>7</td>
<td>14</td>
<td>Khurai</td>
</tr>
<tr>
<td>3</td>
<td>Sagar</td>
<td>23</td>
<td>8</td>
<td>17</td>
<td>Ashoknagar</td>
</tr>
<tr>
<td>4</td>
<td>Rahatgarh</td>
<td>28</td>
<td>9</td>
<td>19</td>
<td>Township</td>
</tr>
<tr>
<td>5</td>
<td>Basoda</td>
<td>31</td>
<td>10</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

Note: Lowest figure means highest deficiency.

Source: Calculated on the basis of diet survey conducted by the author.

Bairagarh is an important business centre and is mainly occupied by people of the Sindhi community, so that dietary characteristics of this community have been largely reported in the diet of this town. People of this community consume wheat for their mid-day meal, rice in the evening and bread
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RURAL COMMUNITY-WISE 'ACCUMULATED RANK' OF NUTRIENT-INTAKE

ACCUMULATED RANK OF NUTRIENT-INTAKE AMONG SELECTED TOWNS

THAKURS  BRAHMINS  PATELS  S C  MUSLIMS  SINDHIS  MARWARS  JANS

BIHOPAL  ASHOKNAGAR  KHURAI  BINA  BARIAGARH  BASODA  RAGHATGARH  SAGAR  BEGROMGANJ  GHATGANJ

SOURCE: BASED ON AUTHORED DIET SURVEY
and snacks at breakfast. Green gram, red gram and 'tur' are the main pulses which are commonly consumed. Unhusked green gram is consumed with rice. Red gram is mostly used in the form of flour for preparation of 'bhajias', curry and with green leafy vegetables. 'Palak' (a green leafy vegetables) is the main variety consumed by most of the families. Coriander leaves are used to prepare 'chutneys' and also as flavouring agents. Potatoes and onions are commonly used; particularly, onions are more or less included in most of the vegetable dishes. Tomatoes are used by the majority of the families; however, only well-to-do families use pure ghee for this purpose. Meat, fish and eggs are used by non-vegetarians but are found to be less than the minimum requirements.

In other places the number of meals varies according to community and working hours. People commonly take their food three times in a day including breakfast at morning, which is the lowest intake as far as weight is concerned, while dishes and other food-stuffs vary according to taste and status. Vegetables and fruits are variously consumed by the people of the region according to season and purchasing power.

As far as the H.E. township is concerned, the entire township is occupied by workers of the factory belonging to various communities. The diet of the factory workers has been directly influenced by their community traditions, which they had brought with them when they migrated from their native
places. People of this township normally take their food three times in a day. Breakfast habits are found to be common here because workers have mostly to leave their homes for the factory before eight in the morning and they turn up for lunch after 12.30 p.m., so that they need to take a heavy breakfast. Breakfast normally includes, tea/coffee/milk, bread, 'puris' etc., while lunch includes 'chapati', rice, vegetables, pulses and fruits. At night most of the families eat 'chapati' with vegetable dishes; milk, curds etc., may also be included but this is not common practice. More than 75 per cent of the families of this township do not consume non-vegetarian foods daily, but as mentioned above, here the housewife prepares the food all the three times freshly and this is good practice, as far as nutrition points are concerned. Due to good purchasing power, fruit consumption is found to be more, in comparison to the other places.

ANALYSIS OF DIET STRUCTURE
ON THE BASIS OF NUTRIENTS

CALORIES

The distribution of average intake of calories in various places is presented in Table 5.1, and rank-wise intake in Table 5.3.

One of the important functions of food is to provide energy which is measured in terms of calories. The calorie requirement depends on the type of occupation, climate, sex,
age and several other considerations. In our country the daily requirements of calories have been placed at 2,400-3,900 per adult man and at 1,900-3,000 per adult woman.\(^1\)

Taking into account the distribution of persons in different age and sex-groups and in different activities in India, the average per caput requirement of calories would appear to be about 2,400.\(^1\) As against this the regional average varies from 1,733 to 2,109 per person per day among all the studied centres (Plate No. 7).

More than 2000 calories intake has been reported from the two townships of Bhopal, viz. Bajiragir (main business centre, predominantly occupied by the Sindhi community), H.E. township (industrial) and in Asoknagar. The caloric intake of these two townships has been reported as 2,109 and 2,027 respectively. This higher value is due to a greater purchasing power and higher educational level. On the other hand, the lowest was reported from Chaibatganj, viz. 1,733 per day per caput, where most of the people are engaged in bidi-making and in small-scale cultivation. One can easily observe poverty and lack of civic sense anywhere in this town. The Muslim community is predominant here and their cooking habits are found faulty.\(^2\) Due to their poor economic condition, their purchasing power is also considerably less, further their educational levels are also poor.

\(^1\) Diet Atlas of India, National Institute of Nutrition, Hyderabad, 1971, p. 44.

\(^2\) Observed during diet survey.
These two factors directly influence their diet. A slightly better condition regarding caloric intake has been reported from Begamganj, where mainly 'Sonis' and Muslims are found to live.

Besides community-wise analysis, the author has also studied the dietary pattern of the H.B. township according to pay-group.

Table 5.5
ANALYSIS OF DIET STRUCTURE ACCORDING TO INCOME GROUP OF H.B. TOWNSHIP

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Income</th>
<th>Calorie</th>
<th>Protein</th>
<th>Calcium</th>
<th>Vit.A I.U.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>gm</td>
<td>mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rs 200-499 p.m.</td>
<td>2066</td>
<td>59.2</td>
<td>676</td>
<td>2256</td>
</tr>
<tr>
<td>2</td>
<td>Rs 500-999 p.m.</td>
<td>2066</td>
<td>58.8</td>
<td>911</td>
<td>2958</td>
</tr>
<tr>
<td>3</td>
<td>Rs1,000-1,499 p.m.</td>
<td>2233</td>
<td>68.0</td>
<td>1183</td>
<td>3613</td>
</tr>
<tr>
<td>4</td>
<td>Rs1,500-and above</td>
<td>2353</td>
<td>83.0</td>
<td>1406</td>
<td>4876</td>
</tr>
</tbody>
</table>

Source: Diet survey conducted by the author.

As given in Table 5.5, the income-wise study of the H.B. township indicates that as the income increases the consumption of different nutrients also increases. The caloric intake of the Rs 200-499 group is 2066 per day per caput, while the highest was reported by the highest income-group, viz. Rs 1,500 and above.
The same has been reported with regard to the consumption of all the nutrients.

The intake of calorie of other studied towns varies from place to place, according to purchasing power, traditions and availability of food-stuffs.

PROTEIN

Protein is an important constituent of the diet and is essential for growth and replacement of tissue, wear and tear. The protein requirement is greater during periods of growth in children and under stress conditions, such as pregnancy and lactation. The nutrition expert group recommended in 1968 allowances for protein, for different conditions. Taking into account the age and sex composition of the population, the average per caput requirement of protein has been placed at about 44.0 gm per day. The all-India average per caput consumption has been estimated to be about 55 gm per day, while the average intake of Madhya Pradesh per day per caput is 30 grams.

REQUIREMENTS: According to Mitra (1963), the average protein consumption was 63 gm per consumption unit. These data would

1 Diet Atlas of India, National Institute of Nutrition, Hyderabad, pp. 46 and 119.

indicate that consumption of protein in healthy population varies between 50 and 100 gm. It is in fact very difficult to decide the optimum level of protein.

Based on several recommendations, the daily protein allowances for the Indian adult may be computed as 1.0 gm per day per kg body weight. The total daily allowances of protein for an average man weighting 55 kg will be 55 gm and for an average woman weighting 45 kg, 45 gm.

Additional proteins will be required in different physiological conditions, like adolescence, lactation and pregnancy. The Food and Agriculture organisation (FAO) gives a total of 61 gm of protein per capita per day as the mean requirement for the developing countries.

As far as the study region is concerned, the highest protein intake has been reported from the Bhupal H.E. township, viz. 60 gm per day per caput, while the lowest is from Ghiratganj, viz. 50 gm. Details regarding protein consumption in different places have been given in Table 5.1 (Plate No. 7).

As already discussed, good educational level and purchasing power are the main deciding factors in the consumption of food-stuffs. Due to these factors, the protein intake has


been found maximum in the H.E. township, while the lowest is consumed by people of Chailatganj, where poverty and lack of civic sense influence the diet directly.

Satisfactory protein intake is found in the diet of the people of Sagar, Ashoknagar, Khurai etc., mainly due to consumption of protein-rich foods. These are also the main wheat-producing areas of the study region.

The case of Bairagarh is quite different, here people are not much habituated to taking cereals in large quantities, they mostly consume food-stuffs containing less of proteins.

The protein intake of the other places of the study region varies from 50 to 54 gm per day per caput. The consumption of protein intake of the H.E. township has also been calculated on the basis of income and it has been found that the intake rises with the increase of pay, as given in Table 5.5.

It has also been noticed in regard to the consumption of protein that, as the consumption of calories increases, the consumption of protein automatically rises throughout the region.

The above average figures still say nothing about what protein of the population has an adequate diet. In 1966 the FAO stated that 33 per cent of the population of the developing countries suffered from protein deficiency.¹

After a more complete study, especially for the filling of the protein gap, it would be quite essential that mass purchasing power be raised, the infrastructure, hygienic conditions and the level of education improved and other measures taken.

IRON

Iron is a necessary part of the red pigment (haemoglobin) of blood. Iron in the diet is essential to enable the cells of the body to oxidise food materials. The question of iron requirement assumes special significance in the context of widespread prevalence of iron-deficiency anaemia in India. Nutrition surveys carried out by the Nutritional Research Laboratories indicate that about 20 per cent of the Indian population suffers from iron-deficiency anaemia. The Nutrition Advisory Committee recommended in 1944 dietary allowances of iron for adults, i.e. 20-30 mg.

INTAKE OF DIETARY IRON BY INDIANS: Results of diet surveys in India indicate that the average intake of iron is 30 mg per day per consumption unit, the intake varies from 6 mg to 109 mg per day per caput. On the basis of these surveys, it has been found that 6 per cent of the studied families had dietary iron intake less than 15 mg and 10 per cent, less than 20 mg.

1 C. Gopalan: op. cit., p. 35.
2 C. Gopalan: op. cit., p. 36.
In the study region the average intake of iron varies from place to place, from 10.6 mg to 23.0 mg per day per caput. The intake in most of the families is below the recommended allowance of 20-30 mg.

The deficiency of iron as reported in various places is only due to the lack of iron-rich food-stuff in the daily diet. Eggs, milk, green vegetables etc. are the main iron-rich foods. It has been observed that consumption of these food-stuffs is inadequate in the studied towns. The diet of the N.E. township of Bhopal has also not been found satisfactory as far as iron intake is concerned; it is only 16 mg per day per caput, in spite of the greater purchasing power of the residents of this township.

CALCIUM

The body of the adult normally contains about 1200 mg of calcium. Atleast 99 per cent of this amount is present in the skeleton where calcium salt held in a cellular matrix provides the hard structure of the bones and teeth. Obviously all of this calcium comes from the diet. Among common foods, milk is the richest source of this mineral, that is why, milk and cheese are specially valuable for growing children. Half a litre of cow's milk contains about 0.6 gm of calcium.

The Nutrition Advisory Committee recommended in 1944 a daily allowance of calcium as follow: 1.0 gm for an adult,
1.5 gm for a pregnant woman, 2.0 gm for the lactating mother
and 1.0 to 1.5 gm for children. In recent years the allowances
of calcium have been reduced in many countries. Recommended
adult allowances now vary from 0.5 to 0.8 gm per day per caput
instead of 1.0 gm per day.

DIET SURVEY DATA: Diet surveys carried out in India have
shown that the average calcium intake is in the neighbourhood
of 469 mg per day per caput while in the study region the
average intake, varies from 444 mg to 779 mg per day per caput.
More than 50 per cent of this calcium in the studied towns
is derived from cereals and vegetable foods. The average
intake of calcium of the rice-eating Bengali and South Indian
families may be lower than the above figures. Details of
calcium intake by different families of the various places have
been given in Table 5.1 and Plate No. 5.

VITAMINS

At every place in the body one meets catalysts at
work; in fact, the processes we call life could not go on
without them. Many of them are manufactured in the body from
the food we eat. But some of the catalysts used by the body
have to come from the food ready manufactured or in a form
which they can easily be produced. These food catalysts are

1 ibid., p. 29.
EASTERN MALWA PLATEAU

URBAN PROTEIN & CALORIE INTAKE

SOURCE: BASED ON AUTHOR'S DIET SURVEY.
the vitamins.¹ We could define vitamins as "organic substances which the body requires in small amounts for its metabolism."

VITAMIN ALLOWANCES RECOMMENDED BY NATIONAL AND INTERNATIONAL NUTRITION ADVISORY BODIES : If one studies the latest recommendations of vitamin allowances for the adult adopted by different countries and by the expert group of FAO/WHO 1967, it may be noticed that the allowances recommended by different countries are within a narrow range. Vitamin A allowances range from 2000 to 5000 I.U. (International Units). ²

VITAMIN A

This is an organic compound found richly in the animal kingdom. The body has the capacity of converting this compound into vitamin A. The recommendation for young men and women, 18-35 years of age, is 5000 I.U., the same daily allowance is recommended for older adults also.³ The most important sources of vitamin A are fish liver oil, liver, butter fat and egg yolk. The most important sources of provitamin are the yellow, yellowish red and green vegetables and fruits. The yellow carotenes in the green products is marked by the presence of chlorophyll. Among the excellent sources of

² C. Gopalan: op. cit., p. 41.
carotene are carrots, sweet potatoes, apricots, spinach, tomatoes and banana.

Deficiency of this vitamin is responsible for deterioration of eye-sight in the Indian children. The high incidence of vitamin A deficiency in Indian children is due to the poor health of the Indian mother. The breast milk of the average Indian mother is generally deficient in this vitamin. Deficiency of this vitamin is found throughout the region, because people of the area are question live basically on a cereal diet and cereals are miserably short of vitamin A.

DIET SURVEY DATA: Clinical observations by workers in the Nutrition Research Laboratories indicate that the administration of 4000-5000 I.U. of vitamin A per day would clear up bitot-spot (eye troubles) and cure nightblindness in children within a week's time.1

As far as the studied towns are concerned, the intake of vitamin A varies from 1630 I.U. in Sagar to 2771 I.U. per day per caput in the H.E. township. The maximum consumption of this vitamin is also very deficient. It has been observed during the diet survey and has also been worked out during an analysis of the data of this survey, that the intake of non-vegetarian stuffs as well as green leafy vegetables is not

1 C. Gopalan: op. cit., p. 47.
adequate. It was also noticed that ignorance regarding the importance of nutrients also played an important role here. On the other hand, due to the low purchasing power, people of the region are not able to buy costly fruits and other vegetables which are rich in vitamin A. Although green leafy vegetables are found throughout the region, the author would like to make it clear here that due to faulty cooking methods, this vitamin is generally burnt in the kitchen itself.

The lower intake (of vitamin A) of the people of Ghairatganj, viz. 1680 I.U. per day per caput, is mainly due to poverty, because of which they are not able to consume non-vegetarian foods as well as vitamin A rich fruits and vegetables. Their diet is mainly based on cereals and other locally produced items.

The intake of other towns of the studied region has been given separately in Table 5.1, rankwise in Table 5.3 and shown in Plate No. 5. This study clearly shows that the intake of vitamin A in the entire region is not adequate. On the basis of personal observations the following causes may be cited as being responsible for the lesser intake of vitamin A:

1 Lesser consumption of green leafy vegetables. This may also be due to lack of civic sense.

2 Due to poverty, costly fruits with high vitamin A content
cannot be taken by the people of the region.

3 Faulty cooking methods, by which much of the portion of vitamin A is burnt in the kitchen itself.

B-GROUP VITAMINS

THIAMINE (B1): The average intake of thiamine in this country, as indicated by several diet survey data, appears to be adequate, especially when considered in relation to the inadequate caloric intake. Important sources of this vitamin are fruits, pulses, grain cereals, nuts, milk, oil-seeds etc.

As most of the urban diets consist of cereals, this vitamin is adequately supplied. Consumption of this vitamin varies from place to place. Details of intake in various places, by different families, are given in Table 5.1 and rankwise in Table 5.3.

RIBOFLAVIN (B2): This vitamin can be extracted from many foods, notably butter, egg yolk, liver and milk. Results of diet surveys carried out in India indicate that the intake varies over a wide range and even the average intakes are below the requirement figure. These values were calculated from diet survey data using food consumption Table 2.

1 C. Gopalan: op. cit., p. 57.
2 Ibid., p. 61.
The intake in the studied towns of the region varies from 1.2 mg to 1.8 mg per day per caput. The deficiency of this vitamin is due to the fact that the sources of this vitamin are costly and due to the low buying power, most of the people are unable to buy these stuffs. Besides this, faulty cooking practice, by which much loss of this vitamin occurs in the kitchen itself, is also responsible for the low intake of riboflavin.

Table 5.4 shows the accumulated rank of intake of different nutrients. It is very clear from this table that the diet of the people of the H.B. township is best as far as the study region is concerned, while Chairatganj diet has been found deficient in most of the essential nutrients in comparison to the other studied towns of the region (Plate No. 6).

RURAL DIETARY HABITS

To detect nutritional deficiency in the diet of the rural people of the study region, a diet survey was conducted through the oral questionnaire method in which the author himself interviewed 239 families of different communities spread over 35 villages. In selecting families in any village, the following points were kept in mind:

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1 See Appendix 4 A for list of villages. Selection of villages, families etc. has been discussed in Chapter IV.
1) The survey should not be concentrated in any particular part of the village, but should be equally distributed over the entire village.

2) The survey should also cover the communities of the village in the same proportion as are found in the total population.

In rural areas people are mostly engaged in cultivation or in connected activities, so that availability of food-stuff influences their diet. As far as purchasing power is concerned, in rural areas, this is not very important, because people mostly get their food items from their own local production. Here dietary difference can be seen among different communities, because religious concepts, traditions etc. are the main deciding factors of the diet of the respective communities. Besides this, choice and method of preparation have also been found to be different in different communities.

The rural people of the study region normally take their food three times in a day. The so-called 'breakfast' of these people is heavy and generally includes tea, milk, 'puri', 'chapati' etc. Its quality varies according to the economic condition of the respective families. Normally the working group takes 'chapati', with vegetables or milk (depending upon availability) in large quantities. Others may take tea, 'puri', 'halwa' etc. Bread, rice, pulses,
vegetables, etc., are normally taken by all the families at noon; only non-vegetarian families take meat instead of vegetables occasionally. In the entire region, not a single family has, however, been reported to take non-vegetarian food-stuff daily. At night the rural people of the region consume bread, vegetables and milk, the consumption of the last item depending upon the production of milk in the home itself.

Fruit consumption is also directly related to the economic condition of the family, and only well-to-do families take fruits which are available, i.e. mango in summer, 'papaya' and 'kakli' in the rainy season and banana, groundnut, 'bahi' in the winter season; their respective consumption depends entirely upon local production.

The families surveyed have been divided into nine groups on the basis of community structure, because in rural areas dietary habits have been found to differ according to community. All the family charts were first analysed on the basis of nutritive values of the food-stuffs which they eat; the per-day per-caput intake was calculated and then the average for the community was worked out.

Amongst the families interviewed the number of scheduled caste families was maximum while the number of Jains was least. Details are given in Table 5, 6.
Among all the surveyed communities in the rural area, the diet of the Jain community has been found deficient in most of the nutrients which may be due to the fact that this community is mostly bounded by traditional concepts and religious beliefs, so that their diet has been much influenced by these beliefs. As far as the surveyed area is concerned, not a single Jain family has been reported as non-vegetarian. Jains are not generally engaged in cultivation work, but they own small shops and some cultivable land, which is generally worked by hired labourers. Green vegetables and fruits and those vegetables which are a product from inside the earth are generally restricted in this community. These are the main factors which determines the diet of the Jain community. On the other hand, the diet of the Thakurs and Brahmans was found to be less deficient in comparison to other communities. Generally Brahmans are engaged in cultivation and they also maintain small dairies, so that milk consumption has been reported to be satisfactory. In the study region many families of this community also have vegetable gardens.

Table 5.6

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Name of the community</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scheduled Caste</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>Brahmin</td>
<td>37</td>
</tr>
<tr>
<td>3</td>
<td>Patel</td>
<td>37</td>
</tr>
<tr>
<td>4</td>
<td>Thakur</td>
<td>31</td>
</tr>
<tr>
<td>5</td>
<td>Sindh</td>
<td>18</td>
</tr>
<tr>
<td>6</td>
<td>Muslim</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>Marwari</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>Jain</td>
<td>12</td>
</tr>
<tr>
<td>9</td>
<td>Other communities</td>
<td>24</td>
</tr>
</tbody>
</table>

Source: Diet survey.
Details regarding the intake of different nutrients are given in Table 5.7 and Plate Nos. 5 and 6.

Table 5.7

AVERAGE INTAKE IN DIFFERENT COMMUNITIES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Community</th>
<th>Calories</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vit.A</th>
<th>Vit.B₁</th>
<th>Vit.B₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scheduled caste</td>
<td>2129</td>
<td>61.0</td>
<td>448</td>
<td>22.0</td>
<td>1937</td>
<td>1.6</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>Brahmin</td>
<td>2143</td>
<td>61.0</td>
<td>557</td>
<td>20.0</td>
<td>2003</td>
<td>1.6</td>
<td>1.9</td>
</tr>
<tr>
<td>3</td>
<td>Patel</td>
<td>1981</td>
<td>54.0</td>
<td>605</td>
<td>19.0</td>
<td>2108</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>4</td>
<td>Thakur</td>
<td>2172</td>
<td>60.0</td>
<td>577</td>
<td>21.0</td>
<td>2172</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>5</td>
<td>Sindhi</td>
<td>1979</td>
<td>53.0</td>
<td>553</td>
<td>15.0</td>
<td>2018</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>6</td>
<td>Muslim</td>
<td>1955</td>
<td>57.0</td>
<td>484</td>
<td>19.0</td>
<td>2537</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>7</td>
<td>Marwari</td>
<td>1849</td>
<td>52.0</td>
<td>524</td>
<td>17.0</td>
<td>1944</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>8</td>
<td>Jains</td>
<td>1940</td>
<td>51.0</td>
<td>515</td>
<td>16.0</td>
<td>1861</td>
<td>1.4</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Source: Compiled on the basis of the author's diet survey.

As a whole, the diets of Brahmins, Thakurs and Patels are better than those of other communities of the rural areas (Table 5.7). More or less the people of the former communities are engaged in cultivation and their economic status is also found to be better than that of others. People of the Thakur community also have non-vegetarian food habits which give them a good amount of nutrients. This community reportedly has
good dietary habits of vegetarian stuffs also. They generally maintain vegetable gardens and also own cows or buffaloes, so that they get sufficient vegetables as well as milk. More or less similar conditions have been found among the Patel community.

Table 5.9
NUTRIENT-WISE RANK OF INTAKE AMONG DIFFERENT COMMUNITIES

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Community</th>
<th>Calorie</th>
<th>Protein</th>
<th>Calcium</th>
<th>Iron</th>
<th>Vit.A</th>
<th>Vit.B₁</th>
<th>Vit.B₂</th>
<th>Accumulated Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scheduled Caste</td>
<td>6</td>
<td>7</td>
<td>1</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>Brahmin</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>Patel</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>33</td>
</tr>
<tr>
<td>4</td>
<td>Thakur</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>41</td>
</tr>
<tr>
<td>5</td>
<td>Sindhi</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>26</td>
</tr>
<tr>
<td>6</td>
<td>Muslim</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Marwari</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>8</td>
<td>Jain</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: Calculated on the basis of diet survey conducted by the author.

On the other hand, the diets of Jains and Marwaris are found to be quite deficient (Table 5.9); this is possibly because people of these communities are mostly engaged in small

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1 Please see p. 94 for explanation of the terms 'Rank' and 'Accumulated Rank'.


business and have small cultivation; further, their diet is also directly influenced by their traditions and religious beliefs, so that food-stuffs containing many good nutrients are not taken by them.

The diet of the scheduled castes and the Muslim and Sindhi communities of the study region has been found to be quite normal.

Table 5.9

ACCUMULATED RANK OF NUTRIENT INTAKE

<table>
<thead>
<tr>
<th>Rank</th>
<th>Community</th>
<th>Rank</th>
<th>Community</th>
<th>Rank</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thakur</td>
<td>5</td>
<td>Muslim</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Brahmin</td>
<td>6</td>
<td>Sindhi</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Patel</td>
<td>7</td>
<td>Marwari</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Scheduled Caste</td>
<td>8</td>
<td>Jain</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Source: Diet survey conducted by the author.

All these communities are habituated to non-vegetarian as well as vegetarian food and are also active workers of different fields. Sindhis mainly live in the study region for business purposes. Due to community tradition, there is no tight bar on taking various foods. Besides this, due to good economic condition also, their diet has not been to be found much deficient. Details regarding different nutrients by different families are given in Table 5.7 and their ranks in Table 5.8.
As far as the scheduled caste families are concerned, the number of families interviewed is maximum in comparison to other communities (Table 5.6). The economic conditions of these people are not good, at the same time there is no restriction regarding the food they eat, they are non-vegetarian as well as vegetarian, so that these people consume various types of food-stuffs frequently. Muslim families are few and most of them are engaged in bidi-making and in small cultivation. Females are mostly engaged in bidi-making, due to certain advantages. Generally the size of the family is rather large in this community, further their cooking methods are also faulty. These factors are responsible for their poor diet, in which many essential nutrients are lacking.

ANALYSIS OF DIET STRUCTURE
ON THE BASIS OF NUTRIENTS

CALORIES

Average community-wise consumption has been given in Table 5.7, their rank in Table 5.8.

Detailed facts and figures of calorie content, requirements, recommendation etc. have already been discussed in previous pages, in connection with the analysis of urban diets. The average per caput requirement according to age, sex and activities would appear to be about 2400.1 As against

1 Diet Atlas of India, op. cit., p. 4
this the average caloric consumption in different communities in the study region varies from 1849 to 2172 per day per caput. The average intake of the rural area comes to about 2070 calories per day per caput.

The maximum caloric consumption has been reported by the Thakur community, viz. 2172, which is mainly due to their good economic condition as well as due to the fact that both types of dietary habits are found in them, while the lowest is found among the Marwaris, viz. 1849: this may be due to their low purchasing power and also traditions which are blindly followed by the people. Lack of civic sense is also responsible for their under-nutrition as well as for mal-nutrition.

The caloric consumption of the Brahmans (2143) is also found to be quite satisfactory, which is also due to their good economic conditions and their greater milk consumption with a high consumption of vegetables. Educational level of this community is also found to be fairly high, so that cooking methods are not too defective. The caloric intake of the scheduled caste families which is 2129 per day per caput, is not equal to the recommended allowance, but is satisfactory. Both types of food habits are found among them, further, there is no restriction regarding dietary habits, so that under-nutrition is not particularly prevalent here.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Nutrients</th>
<th>Intake</th>
<th>Desirable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Calories</td>
<td>2070</td>
<td>2400</td>
</tr>
<tr>
<td>2</td>
<td>Protein (gm)</td>
<td>98</td>
<td>60-80</td>
</tr>
<tr>
<td>3</td>
<td>Calcium (mg)</td>
<td>543</td>
<td>1000</td>
</tr>
<tr>
<td>4</td>
<td>Iron (mg)</td>
<td>20</td>
<td>20-30</td>
</tr>
<tr>
<td>5</td>
<td>Vitamin A (I.U.)</td>
<td>2023</td>
<td>4000</td>
</tr>
<tr>
<td>6</td>
<td>$B_1$-Thamine (mg)</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>7</td>
<td>$B_2$-Riboflavin (mg)</td>
<td>1.6</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: Diet survey.

Under-nutrition was found to be most acute amongst the Marwaris, followed by the Jat community, and the causes for this have already been discussed. It can be seen that consumption varies according to purchasing power, tradition, availability of food-stuffs, religious concepts etc.

Protein: Under stress condition, such as pregnancy or lactation and during the period of growth in children, the requirement of protein is greater. Details regarding its consumption and recommendation etc. have already been discussed during the analysis of urban diet. The average consumption in our country has been estimated at about 56 gm per day,
while in Madhya Pradesh this figure goes up to 98 gm.  
According to surveys by Mitra, this consumption varies from 
50-100 gm per day per caput, while in the rural areas of the 
study region the consumption varies from 51 to 64 gm, the 
average consumption being around 58 gm per day per caput.

In the rural areas the highest intake of protein has 
been found amongst the Brahmins and scheduled caste communities 
(Tables 5.7 & 5.8). In Brahmin families the protein intake 
is normal only due to the fact that the consumption of pulses 
is much greater than in comparison to others. As far as 
protein intake amongst scheduled caste is concerned, this is 
also found to be satisfactory due to the fact that although 
as in the case of Brahmins, their diet is also based on cereals, 
they have both types of habits, without any restriction. The 
lowest intake was reported by the Jains as well as the Marwari 
families, they do not consume non-vegetarian foods, and further 
they are also unable to take many other food-stuffs, due to 
religious inhibitions.

Protein intake among Thakur families is also found 
satisfactory, average intake being 60 gm per day per caput. 
The reasons for this are as follows: (i) Consumption of 
vegetarian as well as non-vegetarian food-stuffs, (ii) No 
religious inhibitions regarding consumption of food-stuffs.

1 ibid., pp. 48, 119.
CALCIUM: Requirements, recommendations and the reports and conclusions of other surveys have all already been mentioned and analysed during a discussion on the urban dietary habits.

According to the Mitra survey report 1953\(^1\), the average calcium intake is 467 mg per day per caput, while the average consumption of rural families comes to around 543 mg per day per caput, it however, varies from community to community, from 449 to 605 mg per day per caput.

The maximum daily intake of calcium was reported by the Patel families, this may due to the surplus availability and consumption of vegetables. This is followed by the intake of the Thakur community, which is due to their non-vegetarian habits, while consumption of Brahmins is 587 mg, whose diet basically contain cereals and pulses. Fruit and milk consumption depends upon personal supply.

Lowest calcium intake was reported by the scheduled caste families followed by the Muslim communities, viz. 449 and 484 mg, per day per caput respectively as given in Table 5.7. This is because milk and fruit consumption is very much less in these communities. Details regarding consumption of calcium by different communities are given in Table 5.7.

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\(^1\) C. Gopalan: op. cit., p. 30
IRON: Details have already been discussed in earlier pages. The Nutrition Advisory Committee recommended in 1944, dietary allowances of iron for adults, viz. 20-30 mg.

According to other workers the average intake of iron is 30 mg per day per consumption unit, while it actually varies from 6 mg to 109 mg. In the study region the rural intake varies from 15-22 mg per day per caput, while the average consumption comes to about 20 mg. The lowest intake has been reported by the Sindhi community, and the maximum by the scheduled castes.

Deficiency of this mineral has been found in many families in the study region and this is only due to the lesser consumption of iron-rich food-stuffs in the daily diet. Green leafy vegetables, milk, egg, etc. are the rich sources, which are also easily available, but it has been found in various families that consumption of the above-said food-stuffs is inadequate. Here ignorance is mainly responsible; to a certain extent, the lower purchasing power also affects the intake of iron.

Vitamin-A deficiency was noticed in all the communities and the following are the main factors responsible for this deficiency.

1. The diet of the people of the region is basically one of cereals, which is short of vitamin A.
Due to faulty cooking methods, much of this vitamin is lost in the kitchen itself, whatever one may get from green leafy vegetables.

The average consumption of vitamin A in the rural area comes to 2023 I.U. per day per caput which is just more than 30 per cent of the total recommended allowance (Plate No. 5). The intake of vitamin A varies from 1861 I.U. to 2637 in different communities. In the course of diet survey, it was found that consumption of non-vegetarian stuff, green leafy vegetable, fruits etc. was inadequate. Butter and milk consumption was also not found to be adequate. It is mainly due to the high cost of these stuffs that people are not able to consume them daily.

VITAMIN B GROUP

THIAMINE (Vit. B₁) : As has already been discussed the rural diet of the region basically depends on cereals which are the main source of B₁ vitamin, so that the intake of this vitamin is found adequate in all the communities. The consumption varies from 1.4 to 1.6 mg per day per caput, while the desirable amount is 1.5 mg per head per caput. The average intake of the rural area has been worked out to be 1.5 mg per day per caput.

RIBOFLAVIN (Vit. B₂) : The intake of vitamin B₂ varies in rural people among different communities from 1.2 to 1.9 mg per day
per caput. The intake of this vitamin is also not found to be very deficient, although the sources of this vitamin are costly. Details regarding consumption, requirements and recommendations have already been discussed during an analysis of urban dietary habits. Details regarding intake are given in Table 5.7.

UNDER-NUTRITION AND MALNUTRITION

Under-nutrition is that which occurs due to the lack of enough calories, while malnutrition is a state of impaired functional ability or deficient structural integrity or development brought about by a discrepancy between the supply to the body tissues of essential nutrients and the specific biological demand for them.

According to P.V. Sukhatme "one out of every two Indians suffers either from under-nutrition or malnutrition or both".¹ In the study unit, the diet of none of the families was found to be standard in any respect. Lack of calories, proteins, vitamins and minerals in the diet is mainly responsible for the poor body weight, poor development of muscles and low resistance to diseases. All these are also responsible for lack of stamina which in turn is responsible for low productivity, leading to poverty. It is a vicious circle, which is

generally found in the area and can be stated as follows.

Under-nutrition

---low resistance, ---lack of stamina
and/or

---poor weight---muscle development poor
malnutrition

---low productivity---Poverty

In this way one could say that food is the most basic item and it is a determinant of the scale of physical and mental activity of the people.

In the study region, under-nutrition and malnutrition can be divided into two groups: A. Primary and B. Secondary. Primary malnutrition occurs due to an inadequate intake of nutrients in relation to the normal body requirement and may be due to faulty selection of foods, lack of money to purchase adequate food or actual shortage; while secondary malnutrition results from factors that interfere with ingestion, absorption or utilization of essential nutrients or from stress factors that increase their requirement, destruction or excretion.

On the basis of the survey conducted by the author it may be said that the main victims of malnutrition are infants, pre-school children, and the elderly and pregnant women, in particular those in whom the pregnancy occurs during very early adolescence or in whom pregnancies are closely spaced. Besides poverty, illness, ignorance of the relationship of diet to
health, indifference to the importance of good nutritional practice, loneliness etc. are also responsible for the prevalence of malnutrition and under-nutrition in the study area. Malnutrition is most common in large families and it naturally increases with each additional birth.

According to Dr C. Gopalan protein - calorie malnutrition (PCM) among children is probably the most important and widespread nutritional problem in our country today. An extensive survey carried out by the Nutrition Laboratories has found that nearly 2 per cent of the children between 1 and 6 years of age belonging to the poor socio-economic group were suffering from frank signs of P.C.M. This is a very serious problem because the human brain reaches 90 per cent of its normal structural development in the first four years of age only. Such data for the study unit are not available, but it is generally a fact that a majority of the infants comes under this group.

The diet of the region may be broadly grouped into three (Plate No. 5) classes:

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### Table 8.11
AVERAGE INTAKE OF NUTRIENTS

<table>
<thead>
<tr>
<th>Name of group</th>
<th>Calories</th>
<th>Protein</th>
<th>Calcium</th>
<th>Vitamin A</th>
<th>Vitamin $B_1$</th>
<th>Vitamin $B_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>2070</td>
<td>58</td>
<td>543</td>
<td>2023</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Urban</td>
<td>1987</td>
<td>57</td>
<td>650</td>
<td>2158</td>
<td>1.5</td>
<td>1.4</td>
</tr>
<tr>
<td>Bhopal</td>
<td>2074</td>
<td>60</td>
<td>772</td>
<td>2771</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>H.E. Township</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Diet survey.

If we analyse the diet of the area on the basis of this table, it is clear that it suffers from both under-nutrition as well as malnutrition. The best diet in the region is reported from the Bhopal H.E. Township. The diet of the rural people is found more imbalanced than that of the people of the urban areas, because rural diets basically depend on cereals. The diet of Bhopal H.E. Township is nutritionally not so poor because of the purchasing power of the people of the township, and also because ignorance etc. does not affect their diet.