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**GENDER DISCRIMINATION
IN NUTRITION**

06

Omeo Kumar Das Institute of
Social Change and Development
Guwahati, Assam

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CHAPTER I

Introduction

Nutrition is the act of nourishing the body and the science that deals with the study of all the processes concerned with growth, maintenance and repairment of the living body. Adequate nutrition is very essential for normal development and functioning of the body, so that work efficiency, resistance against infections and ability to repair body damage or injury can be efficiently maintained for survival. To maintain a good nutritional status, food security is one of the most essential prerequisites. But 826 million people in the world still live in hunger (FAO 2000). And, approximately 75 percentage of food insecure population belong to Asia, Pacific and Sub-Saharan Africa. The largest number of food insecure people live in India, numbering more than 200 million (Bhattacharyya, 2001). This food insecurity leads to high rate of undernourishment. 208 million people in India are suffering from malnutrition, (FAO, 2000) which is the single biggest cause of infant and child mortality in the country. This situation arises partly due to the non-availability of food in the market, lack of purchasing power of the families and partly due to the lack of access to clean and safe drinking water. In addition to these, some socio-cultural beliefs and man-made laws aggravate the nutritional status of the female segment of the population. The better nutritional status of the female is one the determinants of good health and nutritional status of the future generation. But the high rate of female mortality through ages in spite of her superior biological capacity to survive reflects the constant negligence and low value attached to her.

The low value given to the girl child is due to the fact that the son in the Indian society is regarded as the light of the house. *Ghar Ka Dipak* or the lamp of the clan *Kuldipak* and under the patriarchal and patrilocal set up it is expected that the son will carry the legitimate heir for the family and thus extend the family lineage. The son also has the cultural sanction to light the funeral pyre of his dead parents to help to attain salvation. Further, a son is considered

as a guarantee for social and economic security in old age. On the contrary, a girl is considered as a liability on account of dowry that has to be paid at the time of her marriage and it is also thought that expenditure incurred on her better development and welfare do not add anything to the parental family with no hope of any return as well. Such beliefs and attitudes of the parents adversely affect the well being of the girl child.

The earliest form of discrimination against the female child begins before her birth in the form of female foeticide. In India an estimated five million female foeticides are carried out in the country every year (Family Medicine India, January, 2001). And even if she is allowed to be born, she actually enters into a perilous cycle of deprivation and discrimination. Female infanticide, lack of access to better nutrition and medical care, lack of educational opportunities for girls, burden of household work on women and young girls, lack of freedom and mobility for girls, wife battering sexual harassment, lack of inheritance or property rights for women, lack of control over fertility and reproductive rights are some of the manifestations of women's deprivation. Gender discrimination in terms of nutrition is manifested through unequal food allocation in the family and inferior quality of food provided to the girl child which leads to poor physical constitution.

1.1. A Brief Review of Literature:

The present study reviews a good number of publications which provides guidance to carry th study in the right direction with proper methodology and to formulate the specific objectives. The collected reviews encompass both macro and micro level studies, conducted by the International agencies i.e. World Bank, Food and Agriculture Organization (FAO), World Health Organisation (WHO), United Nations International Child's Emergency Fund (UNICEF), International Labour Organisation (ILO), the national agencies i.e. National Nutrition Monitoring Bureau (NNMB), Indian Council of Medical Research (ICMR), Indian Council of Agricultural Research (ICAR) and National Sample Survey Organisation (NSSO), and the local agencies and the individual researchers.

The results yielded by the previous studies are presented below partitioning them into three different divisions depending upon the dimensions covered by the studies.

i. Gender discrimination in terms of growth potential/ physical development

- ii. Gender bias in calorie intake, and
- iii. Gender disparity in nutrition from the economic and sociological perspective.

i. Gender discrimination in terms of growth potential/ physical development:

Assessing the malnutrition in terms of acquired physical development, UNICEF Sample Survey (1980) reported that in West Bengal, the incidence of undernutrition in female children was uniformly large throughout almost all the ages compared to the male children, studied in terms of weight for age.

Srivastava *et. al.* (1980) conducted a study on rural pre-school children of Jhansi District and revealed that the boys were taller and heavier than girls.

Haddad *et. Al* (1996) reviewed that in South Asia, females had worse anthropometric scores than males, while in Africa girls were consistently better off than boys.

Strauss and Thomas (2001) analysed the anthropometric data of rural children of Ghana and found low health nutritional status of girls compared to boys. These biases have additional consequences in terms of productivity in the labour market.

Two studies conducted by World Bank (1990) revealed that the low weight for height is less common among women than men in Brazil and Upper-Volta, although women consumed a smaller percentage of their recommended intakes than men. The data of weight for age pulled form NNMB data(1975-79 and 1988-90) revealed that the prevalence of overweight/ obesity was higher among females.

Analysing the NNMB data (NNMB - Report for the Year1981, published by NIN in 1984), Kakwani found existence of a strong bias against male children.

A scrutiny of the above references exhibit better physical constitution of girls in some places while in some other places the boys' physical development has been found to be better than the girls. The following two references show no sex differentials in this regard.

Gopala by analyzing the NNMB data (1974-79) found that the Indian girls were not worse-off in attainment of potential body weight than their male

counterparts and height for age deficits was also comparable for both the sexes.

Though Krishnaswamy *et. al* found no sex differentials of height for age in NNMB data of 1988-90, 36 per cent of the children were found severely stunted, indicating chronic malnutrition.

ii. Gender bias in calorie intake :

Calculating the calorie intake, U.S. Interdepartmental Committee on Nutrition for National Defence (1964) revealed that in Jordan, the prevalence of malnutrition is higher in female than in male children.

Hendrikse and Sherman (1965) had found that in the University College Hospital of Idaban, while more boys were admitted to the wards than girls, taking all diagnosis into account, more girls than boys died of infectious diseases, such as measles which are known to have a synergistic relationship with malnutrition.

Chen, Hug and D'Souza (1980) revealed that the incidence of malnutrition among female children was greater than male children in rural Bangladesh. There was some evidence of excess mortality among children, and a suggestion that "excess" female mortality was consistently higher during the food shortage years 1974, vis-à-vis 1975-77.

It was also reported by Miller (1981) that girls' diet was comparatively inferior than the boys and discrimination was more marked in North India.

The study conducted by Bhatia *et. al* (1981) in Varanasi found that diets of Indian female farmers was 27 per cent less than their male counterparts.

Faruque *et. al* (1984) revealed that in Punjab, 74.8 per cent girls had normal nutrition compared to 84.9 per cent boys and severe malnutrition too was higher among girls.

The study conducted by Operation Research Group in Uttar Pradesh in 1986 reported a definite preference favouring boys with regard to cereals. They also reported that the boys had usually some pocket money and hence greater access to fruits and vegetables outside the home compared to girls.

Ghose (1986) observed the data of Safdarjung Hospital, New Delhi, and found that more boys attend the out-patients department compared to girls, but there was an overall higher incidence of severe malnutrition among girls, when verified using the Gomez scale.

McGuire *et. al* (1990) revealed that women often consume lower quality

vegetable protein while men receive larger share of the animal protein available. This situation was observed in Burkino Faso, where women consumed 0.8 grams of animal protein compared with men's consumption of 10.3 grams daily. Vitamin and mineral intakes of women show similar inadequacies in absolute terms and also in relation to men's diet. They also reported that in Brasil and Upper Volta, women consumed a smaller percentage of their recommended intakes than men. McGuire *et. al* in 1980 reported excessive food intake of women.

FAO (1990) studied the food consumption pattern in Bangladesh and Brazil and found that women and children, especially girls, eat after the male household head and other male members of the household had been served. And this situation may have negative impact on the quantity and quality of food consumed by women and girl children.

Pant (1995) revealed that the intake of protein after 7 years of age is well below the Recommended Dietary Allowance (RDA). In case of females it is lowest and varies between 66 per cent and 72 per cent of RDA, compared to 65 per cent to 89 per cent of RDA in case of male counterparts. The intake of iron and Vitamin A are lower in adolescent girls than those of boys of the same age group.

Indian Council of Medical Research (ICMR) in 1996 also found gender discrimination in intake of micro nutrients (vitamins and minerals) and macro nutrients (calories and proteins).

The above findings depict a discriminatory picture in terms of dietary intake. Following are the vindicative results of the above findings.

Rao (1984) while analysing the NNMB data 1975-1979 and 1980 found that the food intake of women is not worse off than men in India.

Vaidyanathan (*n.d.*) also revealed similar findings with Rao. Rao also pointed out that where the incidence of severe protein-calorie malnutrition is higher among girls, calorie intake is not comparatively lower in girls but this may be attributable to poor health care.

Gopalan in 1987 found that the nutritional status of rural girls of pre-school age had been found to be essentially similar to that of boys, which indicates no gender bias in nutrition care.

Rather, Rao in 1989 found the diets of women to be more adequate than that of men. Krishnaswamy *et. al.* (1997) by analysing the NNMB data revealed that the distribution of children according to nutritional grades was similar

between the sexes.

The NNMB data also revealed that the prevalence of overweight/ obesity was higher among females. There was no sex differential in the extent of chronic energy deficiency between the sexes.

As far as the breast-feeding of the girl child is concerned, Halder and Bhattacharyya (1969), Khan (1969), Kumar (1983) and Kelly *et. al* (n.d.) revealed similar findings that there was home preference for longer breast feeding for boys. Halder and Bhattacharyya further reported that the interval between births is shorter after the birth of a girl than the birth of a boy indicating an earlier onset of ovulation and conception.

iii. Gender discrimination in nutrition from economic and sociological perspective:

Sen and Sengupta in 1983 studied the nutritional status of two West Bengal villages and found that differences were more marked in Kuchli in spite of a better economic level which indicated that it is the boys who benefit from better income levels. It was also pointed out that the extent of discrimination sharpens in times of distress. McGuir *et. al.* reported that low income women consume less than their middle and higher income counterparts. Naik *et. al.* (1991) found comparable nutritional status in urban lower socio-economic groups. Pant (1995) reviewed that the intake of women in low income group is deficient by 500-600 calories. This is more severe in certain occupational groups like landless labourers. Busi *et. al.* (1999) found that the intake of both energy and protein by the men was higher than women in both lower and higher socio-economic groups of Visakhapatnam. The sex-wise difference were satisfactorily significant only among slum dwellers in the 26 to 30 and 31 to 35 age group. The results of the study conducted by Sunanda *et. al* in 2001 revealed that the preference was given to husbands and elders in the family but women and girls were given least priority in the allocation of food irrespective of the size of the land holdings. Haddad *et. al.* (1996) revealed that discrimination against female was greater in higher income families than among the poor. They also found a positive relationship of gender discrimination in nutrition and the system of dowry or bride price. It was reported that in India, where culture requires dowry, the bias against female is more, while in sub-Saharan Africa where there is the prevalence of bride-price, the daughters are slightly more nutritionally favoured than sons.

An ILO study in 1990, conducted in Andhra Pradesh in India, found that women in poor households ate their food first before they gave food to the men, while in upper caste households, women invariably served food to the men first.

The findings of the previous research studies give a picture of gender bias in nutrition across societies and overtime. There is discrepancy among the research findings regarding the existence, degree and dimension (bias against male or female) of gender discrimination in terms of attainment of potential growth and intra household food allocation or access to recommended dietary allowance. While some findings exhibit the imparity in food intake and attainment of potential physical growth, others find no such gender disparity, rather a few studies reveal that females are nutritionally better-off than their male counterparts in some societies. A perusal of the review of the issue from the economic and sociological prespective also show some contradictory results. While some researchers find gender inequality in nutrition to a greater extent in higher income groups, others reveal its existence among low income groups. A few studies also demonstrate the impact of cultural norms or rituals on the nutritional status of the women and the girl child.

1.2 Limitations of the Study:

The devaluation of the girl child is closely associated with dotal matters. In those societies, where the culture itself entails to paying a sizeable amount of dowry, the extent and evidence of malnutrition is higher amongst the females than their male counterparts. Conversely, the societies where the bridegroom has to pay bride price, the girls are nutritionally more favoured than the boys. The evidence of India and sub-Saharan Africa emphasizes this fact. In Assam, though the dowry is not customary, the parents give some property with their daughter at the time of her marriage as token of love, which sometimes is misunderstood by the groom's family and therefore end up claiming a big amount from the bridal family. The evidence of dowry related crimes and dowry deaths explicates the emergence of dowry system in Assam also. On the contrary, except for the Karbi community, in almost all other tribal societies of Assam bride price system is prevalent. The "Tiwas", popularly known as *Lalung*, is one of the tribal communities of Assam having the bride price system in their custom.

The position of Assam in the interstate comparison of Gender Empower-

ment Measure (GEM) of the Indian states. The 14th position of Assam in GEM (*Economic and Political Weekly, 1996*) indicates lower status of Assamese women in economic and political participation and in decision making. Though in GEM, nutritional status is not an indicator, there is greater possibility of having gender bias in nutritional status also.

Considering the customary laws of tribal and non-tribal societies and position of Assam in GEM, the present study intends to find out the gender bias with special focus on nutrition with the following specific objectives:

- a. To study the nutritional status in terms of attainment of potential physical growth with special focus on gender bias.
- b. To study the gender disparity in intra-family food allocation and estimate the calorie intake of the family members, and thereby find out the attitude of the food distributor towards food allocation
- c. To find out the impact of socio-economic and socio-cultural factors on disparity in nutrition.

1.3 Methodology:

In order to collect pertinent data for the study, the following methodology has been adopted

1. Locale of the study: Considering the concentration of Tiwa people, Morigaon district has been selected for the study. Tiwa concentration are mainly found in Nagaon and Morigaon districts of Assam and the Natiang Elaka of Jowai Sub-Division of Jaintia district of Meghalaya. Of the total population (6,39,682) of Morigaon district, 15.40 per cent population is Tiwa. (Census Report, 1991)

2. Sampling Design: Multi-stage sampling procedure has been used for the study. Among the five blocks of Morigaon district, Mayang block has the highest population of Tiwa people. Taking this fact into account, the block has been selected purposively in the first stage. In the second stage, selection of Gaon Panchayat has been done following the same criterion. The purpose of considering this criterion is to avoid the influence of other society (non-tribal) to the highest possible extent on their customs and traditional dietary practices. According to the 1991 census, 52.79 per cent of the population is Tiwa in Ghagua Gaon Panchayat. In the third stage, two villages have been selected from Ghagua Gaon Panchayat by applying purposive cum random sampling technique. One of the selected villages, Ghuli, is fully inhabited by the Tiwa people and the other vil-

lage Dibika is inhabited by the scheduled caste people.

Thirty households from each of the two villages have been selected by using purposive cum random sampling procedure. The criteria fixed for the selection of the households are:

- I. The households consist of both male and female members.
- II. Those households have been selected where children in the age group of 3 to 12/14 years are there. Finally the study draws two different sets of sample. They are-
 - a. One adult male and adult female from each household.
 - b. The children in the age group of 3-12/14 years, (3-12 years in case of girls, 3-14 years in case of boys) for the purpose of finding out the nutritional status in terms of attainment of potential growth. The age limit has been confined to 3-12/14 years, owing to the following reasons:

❖ The measurement of the standing height of infants and pre school children is either impossible or very inaccurate as they are not very co-operative with strangers. Besides, the length board used for measuring the length needs assistance of two or three people.

❖ Regarding the upper age limit, physical dimensions of the body are much influenced by (i) Biological factors (Sex, intrauterine environment birth order, birth weight, parental size, etc.) (2) Genetic background (3) Environmental factors (season, climate, socio-economic level, nutrition, exposure to infection/ infestation), and (4) Psychological factors.

Research studies suggest that environmental influences, specially nutrition, plays an important role in infants growth than genetic background or other biological factors (Habicht *et. al.* 1974). The physical dimensions of the body are much influenced by nutrition particularly in rapidly growing period of early childhood. Well-to-do and well-fed Indian children upto 14 years of age in case of boys and 12 years in case of girls are found to be growing similar to western children. This suggests that upto this age, the genetic role is minimum but environmental influences like nutrition, health factors like exposure to infection is mainly responsible for the growth. However, for growth during adolescence more than nutrition, health factors like exposure to infection is mainly responsible for the growth. However, for growth during adolescence more than nutrition and envi-

1.4 Methods of Data Collection:

Among the different methods of assessing nutritional status, Anthropometric Measurements and Diet Survey Method have been used for the present study. Anthropometric Measurement: Anthropometry has been defined by Jelliffe (1966) as the "Measurement of the creations of the physical dimensions and the gross composition of the human body at different age levels and degrees of nutrition." Different Anthropometric measurements commonly used in nutrition survey are:

- Weight for Age
- Length (Upto 3 years) for Age
- Height (Over 3 Years for Age)
- Skin fold over biceps and triceps
- Arm Circumference
- Body Mass Index (BMI)

In the present study two parameters, weight for age, height for age and BMI are taken. Weight for age and height for age are compared with NCHS (US National Centre for Health Sciences) standard. Five different types of standards are available. They are:

- Local standards developed by ICMR
- International standards
- Harvard standards
- Standards used in Road-to-Health card
- NCHS (U.S. National Centre for Health Sciences)

World Health Organisation (WHO) recommends NCHS standard for use by all the countries (WHO,1978) and owing to this reason this standard has been followed for assessing the nutritional status in terms of growth performance.

The Reference body weights and heights of children and adolescents (3-12, 3-14 years) according to NCHS is presented in table 1.

Table 1: Reference body weights & heights of children & adolescents according to NCHS

Age (Years)	Boys		Girls	
	Height (cm)	Weight (cm)	Height (cm)	Weight (cm)
3	94.9	14.6	93.1	14.1
4	102.9	16.7	101.6	16.0
5	109.0	18.7	108.4	17.7
6	116.1	20.7	114.6	19.5
7	121.7	22.9	120.6	21.8
8	127	25.3	126.4	24.8
9	132.2	28.1	132.2	28.5
10	137.7	31.4	138.3	32.5
11	140	32.2	142	38.7
12	147	37.0	148	38.7
13	153	40.9	155	44.0
14	160	47.0	156	48.0

Source: Nutrient Requirements and Recommended Dietary Allowances for Indians, ICMR,1998

To find out the gross composition of the body, Body Mass Index (BIM) has been calculated by using the following formula:

$$\text{BMI} = \text{Weight (In kg)} / \text{Height}^2 (\text{In metre})$$

The calculated values have been classified according to Garrow's classification (1987). ICMR approved Garrow's BMI classification which is suitable for Indian population. Garrow's classification is presented in table 2.

Table 2: Garrow's BMI Classification

Categories	Extent of malnutrition
16-17	Chronic Energy Deficiency, Grade II
17-18.5	Chronic Energy Deficiency, Grade I
18.5-20	Low Weight Normal
20-25	Normal
25-30	Obese (Grade I)
> 27	Obese (Grade II)

1.4.1 Diet Survey:

To find out the daily dietary intake, 24 hours dietary recall method has been applied. In this method the respondents are asked to recall the total number of meals she/ he had inside and outside the home, volume consumed and recipe followed on the previous day. This method of diet survey helps to obtain information on various aspects like dietary pattern, likings and dislikings, taboos and superstitions regarding some category of food.

Since this method can reveal amount and type of food allotted to the individual family members, it has been considered as one of the suitable methods to fulfill the purpose of the present study. The total food intake of an individual member has been converted to total energy intake by using the food composition tables that have been worked out by National Institute of Nutrition and other food and nutrition laboratories of India.

The calculated value of energy intake has been compared with the value recommended by the expert committee of the ICMR (1988). The Task Force on Projections of Minimum Needs and Effective Consumption Demand (1979) estimated that on an average, 2400 kcal per capita per day met the energy requirements of the population residing in rural India. For those, residing in urban India, the corresponding calorie intake was estimated at 2100 kcal per capita per day (Malhotra, 1997). This is an average estimation of caloric intake for adults which has been fixed without considering the factors like sex, physical activity and physiological condition (i.e. pregnancy and lactation). In the present study the percentage of the calorie intake has been calculated referring the RDA for Indians taking the necessary factors into account. The Recommended Dietary Allowances for Indians according to sex, physical activity and physiological condition is presented in table 3.

Table 3: Recommended Dietary Allowances for Indians

Group	Particulars	Net Energy
Man	Sedentary Worker	2425
	Moderate Worker	2875
	Heavy Worker	3800
Woman	Sedentary Worker	1875
	Moderate Worker	2225

	Heavy Worker	2925
	Pregnant Woman	+300
	Lactation	+550
	0-6 Month	+400
	6-12 Month	

Source: Nutritive value of Indian Foods, NIN, ICMR, 1996

Interview Schedule:

An interview schedule has been constructed to collect data on the socio-economic status and food availability.

In addition to the above-mentioned techniques, a number of small group discussions have been conducted to collect information regarding the customs and discriminatory practices prevailing in their societies.

CHAPTER II

Demographic and Socio-Economic Structure

2.1. Age and Sex Composition of the Population:

The data on age and sex composition of the population has been presented in table 1. In Dibika village, the female percentage exceeds male in three age groups '4-14 years', '26-45 years' and '60 years and above', while in the other age groups percentage of male exceeds the female.

In Ghuli also, in three age groups '15-25 years', '25-45 years', and '60 years and above', the percentage of female has been found to be higher than male.

Sex ratio is the number of females per 1,000 males in the population. In the study villages, the sex ratio is favourable to female, being 1005 in Dibika village and 1064 in Ghuli village. In both the villages, the sex ratio exceeds the national average (933) and in Ghuli village, it is even more than the sex ratio of Kerala (1058), the state which leads the Indian states in terms of sex-ratio.

Though the high sex ratio depicts higher status of women in the society, in the study villages the high sex ratio may be attributable to the fact that a large number of marriageable girls are unmarried due to the deplorable road condition in the area.

Table 1: Age and sex composition of the population

Age (years)	Dibika Village		Ghuli Village	
	Male	Female	Male	Female
0-3	23(6.28)	19(5.16)	14(5.96)	12(4.80)
4-14	89 (24.32)	91 (24.73)	59 (25.11)	58 (23.20)
15-25	78 (21.32)	77 (20.92)	50 (21.28)	55 (22.00)
26-45	82 (22.40)	90 (24.46)	52 (22.13)	63 (25.20)
46-59	62 (16.94)	57 (15.49)	43 (18.29)	41 (16.40)
60 and above	32 (8.74)	34 (9.23)	17 (7.23)	21 (8.40)
Total	366	368	235	250
Sex ratio	1005		1064	

Source: Anganwadi centres of the sample villages

2.2 Activity Status of the Population

Table 2 provides information on the activity status of the population. In Dibika village for 25.32 per cent male, agriculture is the primary occupation. Agriculture and live-stock rearing are the secondary activities for 11.39 per cent male of Dibika village. 16.46 per cent male are wage-earners. Only 1.26 per cent male have salaried jobs, 2.54 per cent are unemployed. Among the females of Dibika, 28.94 per cent are engaged in agriculture and live-stock rearing, 47.36 per cent of them are students and 14.48 per cent are inactive. Weaving though is the secondary activity for 30.26 per cent of the females, 2.63 per cent of the female consider weaving as their primary activity. 1.31 per cent women have salaried jobs while an equal percentage (1.31 per cent) of women are engaged in stone-cutting.

Regarding the activity status of the male of Ghuli village, highest percentage (33.33 per cent) are students. For 26.67 per cent of the male, agriculture and allied activities are the primary occupation. Stone-cutting is the primary activity for 15.55 per cent male of Ghuli. 13.33 per cent of the male are inactive and 8.89 per cent earn their livelihood by working as daily wage earners. A meagre per cent (2.22) of male are retired teachers. Almost one third (30.86 per cent) of the female of Ghuli village are students, 24.69 per cent are into agriculture and livestock

rearing. 30.86 per cent women are engaged in stone-cutting which they consider as the secondary activity. Weaving is the primary activity for 22.23 per cent of the females. 16.05 per cent females of Ghuli are inactive and 1.23 per cent have salaried jobs.

2.3. Educational Attainment of the Population

In Dibika village, the literacy rate for male is 83.78, while the corresponding percentage for female is 61.11. The combined literacy rate in the village has been found to be 75.71. The literacy rate of male in Ghuli is 87.95, while for female it is 72.00 per cent. The combined literacy rate in this village is 80.40 per cent. Literacy rate of Assam is 68.28, being 71.93 per cent for male and 59.03 per cent for female. (Census, 2001). The combined as well as the male and female literacy rate are found to be higher in Ghuli than Dibika. But comparison of literacy rates with state (Assam) data reflects an encouraging picture in both the villages. The literacy rates (i.e. combined as well as male and female literacy rate) are higher than the state.

A few school drop-outs are found, numbering three and four respectively in Ghuli and Dibika. Almost equal number of boys and girls are found to be drop-outs. The parents of the drop-out children when asked about the reasons for not sending their children to schools, it is revealed that they are not reluctant to send their children to schools, but the children themselves are not interested to continue their schooling. Most of the parents are ready to provide the possible opportunities to their children according to their aptitude and intelligence to help them to enjoy a better future. No gender bias has been found in the minds of the parents in terms of providing educational opportunities in the study villages.

2.4 Household Particulars

The data presented in table 4 shows that in Dibika village, 53.33 per cent families have traditional houses, while 46.67 have modified type of houses. In Ghuli Village, a large per cent (80.00) have traditional houses and 20.00 per cent have modified type of houses. In Dibika village (inhabited by scheduled caste people), four houses have been allotted under the scheme Indira Awas Yojna (IAY) and in Ghuli (inhabited by scheduled tribe), two families are IAY beneficiaries. Regarding electrification, 66.67 per cent

Table 2: Distribution of population according to activity status

Activity Status	DIBIKA VILLAGE				GHULI VILLAGE			
	Male N=79		Female N=76		Male N=90		Female N=81	
	Primary Activity	Secondary Activity	Primary Activity	Secondary Activity	Primary Activity	Secondary Activity	Primary Activity	Secondary Activity
salaried jobs	1 (1.26)	-	1 (1.31)	-	-	-	1 (1.23)	-
Daily Wage earners	13 (16.46)	6 (7.59)	3 (3.95)	-	8 (8.89)	-	2 (2.47)	-
self-employed agri and allied activities	20 (25.32)	9 (11.39)	22 (28.94)	2 (2.63)	24 (26.67)	10 (11.11)	20 (24.69)	-
self-employed household industry and craft	-	-	2 (2.63)	23 (30.26)	-	-	18 (22.23)	-
self-employed in other areas	1 (1.26)	-	1 (1.31)	-	13 (14.44)	14 (15.55)	25 (30.86)	-
students	35 (44.30)	-	36 (47.36)	-	30 (33.33)	-	35 (30.86)	-
Inemployed	2 (2.54)	-	-	-	1 (1.11)	-	2 (2.47)	-
inactive	7 (8.86)	-	11 (14.48)	-	12 (13.33)	-	13 (16.05)	-
Others	-	-	-	-	2	-	-	-

Source: Field Survey
 Figures in the parentheses denote percentage to its relevant columns

defecate. As both the villages are surrounded by hills, the villagers usually go to the hill forest for defecation. Only a meagre per cent have sanitary latrines, 6.67 per cent families in Dibika.

The above findings about the basic amenities of life in the study villages reflect a poor picture. Rural electrification and provision of safe drinking water are two of the major thrust areas of India's National Five Year Plans. But till the date of survey, a large segment of the population are still deprived of these basic infrastructural facilities.

Regarding the place of defecation, it is observed that the people do not consider the lack of latrine as a problem. Most of them consider the hill forest as the most suitable place for defecation. For many people, lack of latrine is an unfelt need which seems to be due to lack of consciousness to maintain hygiene and sanitation. There is also evidence of fox-biting in the hill forest while going for defecation. Consciousness has dawned upon some young boys and girls on this problem.

2.7 Operational Land Holding

Table 6 reveals that 63.34 per cent households in Dibika village belong to the marginal farmer's category, while the corresponding percentage for Ghuli village is 60.00. The households belonging to the small farmer's category are 33.33 per cent and 23.33 per cent in Dibika and Ghuli respectively. 13.00 per cent households have 15.01-30 *bighas* of operational land in Ghuli while no household has been found in this category in Dibika. 3.33 per cent households of both the villages belong to the medium farmer's category.

Table 5: Distribution of households according to type of water source and sanitation

Drinking water and sanitation		Dibika Village N=30	Ghuli Village N=30	Combined N=60
Type of water source	Pond	-	11 (36.66)	11 (18.33)
	Well	1 (3.33)	15 (50.00)	16 (26.67)
	Tube-well	29 (96.67)	2 (6.67)	31 (51.67)
	Streams	-	2 (6.67)	2 (3.33)
Place of defecation	Open space	27 (90.00)	26 (86.67)	53 (88.34)
	Non-sanitary latrine	2 (6.67)	3 (10.0)	5 (8.33)
	Sanitary latrine	1 (3.33)	1 (3.33)	2 (3.33)

Source: Field Survey

Figures in the parentheses denote percentage to the total

Table 6 : Distribution of households according to operational land holdings

Operational land holdings (In Bigha)	Dibika Village N=30	Ghuli Village N=30	Combined N=60
0-7.5 (Marginal Farmers)	19 (63.34)	18 (60.00)	37 (61.67)
7.5-15 (Small Farmers)	10 (33.33)	7 (23.33)	17 (28.33)
15.01-30 (Small Medium Farmers)	-	4 (13.33)	4 (6.67)
30.01-75 (Medium Farmers)	1 (3.33)	1 (3.33)	2 (3.33)

Source: Field Survey

Figures in the parentheses denote percentage to the column total.

2.8 Annual Income

The data presented in table 7 shows that 40.00 per cent households have their annual income below Rs. 22,000 in Dibika, while in Ghuli, the percentage having income below Rs. 22,000 is found to be 23.00. In Dibika village 16.67 per cent households belong to the income group Rs. 22,001- Rs. 23,000 and the corresponding percentage is almost double in Ghuli village, it being 33.33. 10.00 per cent households of Dibika village and 16.67 per cent households of Ghuli village belong to the income group Rs. 32,001- Rs. 42,000. 13.33 percent households belong to the income group Rs. 42,001-Rs. 52,000 in Dibika, while the corresponding percentage in Ghuli is 6.67. Equal percentage of households (percentage being 20.00) in both the villages have annual income above Rs. 52,000.

Table 7: Distribution of households according to income

Annual income (In Rs.)	Dibika Village N=30	Ghuli Village N=30	Combined N=60
Below 22,000	12 (40.00)	7 (23.33)	19 (31.67)
22,001-32,000	5 (16.67)	10 (33.33)	15 (25.00)
32,001-42,000	3 (10.00)	5 (16.67)	8 (13.33)
42,001-52,000	4 (13.33)	2 (6.67)	6 (20.00)
Above 52,000	6 (20.00)	6 (20.00)	12 (20.00)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total

2.9 Sufficiency of Food Items From Home Production (Rice)

A perusal of table 8 reveals that 46.67 per cent households in both the villages have surplus production of rice. 16.67 per cent and 10.00 per cent households in Dibika village and Ghuli village respectively have less than three months sufficiency of rice. 20.00 per cent and 10.00 per cent households in Dibika and Ghuli villages respec-

tively depend on home produce (rice) for 3-6 months and 3.33 per cent in Dibika village and 20.00 per cent in Ghuli village have sufficiency of rice for 9-12 months respectively.

Table 8: Distribution of households according to sufficiency in home production (Rice)

Sufficiency in home production	Dibika Village N=30	Ghuli Village N=30	Combined N=60
< 3 months	5 (16.67)	3 (10.00)	8 (13.33)
3-6 months	6 (20.00)	3 (10.00)	9 (15.00)
6-9 months	4 (13.33)	4 (13.33)	8 (13.33)
9-12 months	1 (3.33)	6 (20.00)	7 (11.67)
Surplus production	14 (46.67)	14 (46.67)	28 (46.67)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total

2.10 Production of Fruits and Vegetables

It is observed that the people of Ghuli village are engaged more in fruits and vegetable production than the people of Dibika village. Three families of Ghuli village produce fruits and vegetables on a large-scale. Most of the other families though also produce fruits and vegetables but it seems to be insufficient to meet the daily requirement of the family but people are not interested either to purchase fruits and vegetables to meet their needs.

In Dibika village also, most of the families have small scale (home stead) production of fruits and vegetables but the production is not sufficient enough to meet their needs. The people of these villages also are not very interested to purchase fruits and vegetables from markets.

The families which have large-scale production of fruits and vegetables use hill area for production. The vegetables produced by these families are

mostly chillies, okras, brinjals, ginger, ridge gourds, sweet gourds, colocasia and bitter gourds during summer days and potatoes, onions, coriander and carrots in the winter. Among the fruits, banana is produced on a large-scale.

The households who have only small production of fruits and vegetables, chillies, papayas, bananas, coconuts and guavas constitute the common vegetables and fruits.

2.11 Live-stock Particulars :

Almost one third of the sample households have possession of live-stock in both the villages. Of course, the kind and number of live-stock varies. Poultry (pigeon, hen, duck, goose) and cattle (cow, bullock, goat) are the common live-stock possessed by these people. Bee keeping is practised in one household of Ghuli village and a fishery is found in one of the households in Dibika village.

CHAPTER III

Nutritional Scenario of the Study Villages

3.1 Nutritional status of the children:

Three parameters weight for age, height for age and Body Mass Index (BMI) have been used to measure the nutritional status of the children.

3.1.1 Weight and Height for Age of the Children

Body weight is a sensitive indicator of current nutritional status. The weight deficit for age, depicts short-term malnutrition while below height-for age is a determinant of long term nutritional deficiency (growth retardation/stunting). The data presented in table 1 shows that 81.25 per cent boys and 83.33 per cent girls of Dibika have weight below the standard weight for their age. Comparatively the children of Ghuli are better-off, but nothing to be complacent about because more than one third of the children of this village also have low weight. It is found that 70.00 per cent of the boys and 76.32 per cent of the girls have weight below for their age in Ghuli.

A large percentage of the children of Dibika village are below height for age. 84.38 per cent boys are suffering from height deficiency while the percentage of the girls for the same is 70.00. In Ghuli, 62.50 per of the boys have below height while the corresponding percentage of girl child is found to be 68.42.

The results obtained by using these two parameters reflect a very poor nutritional scenario both in terms of short term (wasting) and long term (stunting) malnutrition. The scrutiny of data from gender perspective shows that the percentage of female malnourished children in Dibika exceeds the percentage of male by 2.08, while the corresponding difference in Ghuli village account for 6.02. The gap between male and female in terms of height for age is 5.92 in Ghuli village, favouring the nutritional status of male child, while in Dibika, the percentage of normal height is higher among the girls than that of the boys by 14.08.

Table 1: Distribution of children according to weight and height for age

Parameters	Dibika Village				Ghuli Village			
	Boys N=32		Girls N=30		Boys N=40		Girls N=38	
	Normal normal	Below	Normal normal	Below	Normal normal	Below	Normal normal	Below normal
Weight for age	6 (18.75)	26 (81.25)	5 (16.67)	25 (83.33)	12 (30.00)	28 (70.00)	9 (23.68)	29 (76.32)
Height for age	5 (15.62)	27 (84.38)	9 (30.00)	21 (70.50)	15 (62.50)	25 (62.50)	12 (31.58)	26 (68.42)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total

3.1.2 Body Mass Index of the Children

The data on the gross composition of the body (BMI) are presented in three tables. (Table 2,3 and 4)

It is found from Table 2 that 46.80 per cent boys and 93.33 per cent girls have BMI below 18.5 in Dibika village while in Ghuli village the percentage are 92.50 and 81.58 for boys and girls respectively. The data of the present study is not immediately comparable to the state data due to the variation in the age group, but it can be inferred that the nutritional status of the study villages are abysmally poor than that of the state. Only a meagre per cent have BMI of more than 18.5. 4.83 per cent children in Dibika village and 9.29 per cent children in Ghuli village have more than 18.5. The normal BMI is highest among the girls of Ghuli village, the percentage being 18.42.

Table 2: Distribution of children according to Body Mass Index (BMI)

BMI Value	Dibika Village			Ghuli Village			Combined		
	Boys N=32	Girls N=30	Total N=62	Boys N=40	Girls N=38	Total N=78	Boys N=72	Girls N=68	Total N=140
Below normal (<18.5)	31 (96.88)	28 (93.33)	59 (95.16)	37 (92.50)	31 (81.58)	68 (87.18)	68 (94.44)	59 (86.76)	127 (90.71)
Low weight normal +Normal (18.5-25)	1 (3.12)	2 (6.67)	3 (4.83)	3 (7.50)	7 (18.42)	10 (12.82)	4 (5.56)	9 (13.24)	13 (9.29)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total

Table 3: Distribution of children according to BMI Value (Further break-up of Table 2)

BMI Class (Garrow's class 1987) Modified	Dibika Village			Ghuli Village			Combined		
	Boys N=32	Girls N=30	Total N=62	Boys N=40	Girls N=38	Total N=78	Boys N=72	Girls N=68	Total N=140
Below 16 CED Grade II	24 (75.00)	24 (80.00)	48 (77.42)	29 (72.50)	22 (57.89)	51 (65.38)	53 (73.61)	49 (67.64)	99 (70.71)
16.0-17.0 CED Grade II	4 (12.50)	2 (6.67)	6 (9.68)	3 (7.50)	4 (10.53)	7 (8.98)	7 (9.72)	6 (8.82)	13 (9.29)
17.0-18.5 CED Grade I	3 (9.37)	2 (6.67)	5 (8.07)	5 (12.82)	5 (13.16)	10 (12.82)	8 (11.11)	7 (10.29)	15 (10.71)
18.5-20.0 Low weight normal	-	1 (3.33)	1 (1.61)	-	4 (10.53)	4 (5.13)	-	5 (7.25)	5 (3.58)
20.0-25.0 Normal	1 (3.12)	1 (3.33)	2 (3.22)	3 (7.89)	3 (7.50)	6 (7.69)	4 (5.56)	4 (5.89)	8 (5.71)

Source: Field Survey
Figures in the parentheses denote percentage to its relevant columns

Table 3 is the further break-up of table 2. The data presented in table 3 shows that according to Garrow's BMI classification (1987), In Dibika 75.00 per cent of the boys and 80.00 per cent of the girls are suffering from Chronic Energy Deficiency (CED) Grade III and in Ghuli, the cases of CED Grade III is 72.50 per cent and 57.89 per cent for boys and girls respectively, indicating a little better nutritional status. A very meagre per cent (3.12 per cent) of boys and 3.33 per cent of girls have normal BMI in Dibika village. The per cent of normal BMI is found almost double for both boys and girls in Ghuli village than that of Dibika village. The combined total of the children, having normal BMI, (5.71 per cent) reflects a poor nutritional status of the study villages.

The data presented in the table 4 shows the mean BMI of the boys and girls of both the villages separately. The mean BMI is highest for the girls of Ghuli village (mean 17.64) followed by the boys of the same village, the mean value being 15.55. The mean BMI is 15.20 and 15.00 for the boys and the girls of Dibika village respectively. The lower end of Garrow's BMI classification is 16. But the mean BMI of the sample is 15.85 indicating a higher degree of malnutrition in the study area.

Table 4. Mean of Body Mass Index

	Dibika Village		Ghuli Village	
	Boys	Girls	Boys	Girls
Mean BMI	15.20	15.00	15.55	17.64
	15.10		16.60	
	15.85			

Two acute cases of malnutrition have been found in Dibika village. One girl has BMI of 9.64 and a boy has BMI of 10.49 in this village, which are below the lower end of Garrow's classification.

The comparison of the tables incorporated to examine the nutritional status of the children (Table 1,2,3 and 4) reveals that the results obtained by using three different parameters yield unidentical nutritional status. Though the results of weight and height for age is not very compatible with the results of Body Mass Index, being age independent parameter and reflection of gross composition of the body, it is considered prudent to use the BMI for analysis in the subsequent chapters.

3.2 Intra Household Food Allocation and Calorie Intake by Male and Female Members: A Comparison:

Caloric intake of an individual depends upon the food consumed by him/her. The intra household food allocation has an impact on the calorie received by the individual. So, an attempt has been made to find out the level by adequacy of calorie intake by adult males and females. The data presented in the table 5 provides information on the adequacy of calorie intake by the male and female members.

It is found that a meagre per cent (9.17 per cent) of the sample have daily dietary intake (DDI) below 60 per cent of RDA. In Dibika village 36.67 per cent male and 40.00 per cent female have their calorie intake in between '60 per cent-75 per cent of RDA'. Equal percentage of male in Ghuli village have their calorie intake with the male of Dibika village, while the female accounts to be 50.00 per cent. The level of adequacy is 75 per cent-90 per cent of RDA' for 43.33 per cent male and 40.00 per cent female in Dibika village while the percentages are 33.34 and 20.00 in Ghuli village for male and female respectively. In Dibika village, 10.00 per cent males and 16.67 per cent females have their DDI in between 90 per cent-100 per cent of RDA' and the percentages for male and female in Ghuli accounts for 13.33 and 16.67 for this level of adequacy. In both the villages, 3.33 per cent males are found to receive above '100 per cent of RDA'. No female has been found to have more than 100 per cent RDA in, both the villages. Almost three fourth of the sample concentrates in the category of '60 per cent-90 per cent of RDA' (combining the two categories 60 per cent-75 per cent and 75 per cent-90 per cent). The data does not reflect

sharp gender variation in terms of calorie intake. The female calorie intake juxtaposes the calorie intake of their male counterparts.

Table 5: Distribution of male & female members according to level of adequacy in calorie intake

DDI	Dibika Village			Ghuli Village			Combined		
	Male N=30	Female N=30	Total N=60	Male N=30	Female N=30	Total N=60	Male N=60	Female N=60	Total N=120
Below 60 per cent of RDA	2 (6.67)	1 (3.33)	3 (5.00)	4 (13.33)	4 (13.33)	8 (13.33)	6 (10.00)	5 (8.33)	11 (9.17)
60 per cent-75 per cent of RDA	11 (36.67)	12 (40.00)	23 (38.33)	11 (36.67)	15 (50.00)	26 (43.33)	22 (36.67)	27 (45.00)	49 (40.83)
75 per cent-90 per cent of RDA	13 (43.33)	12 (40.00)	25 (41.67)	6 (33.34)	10 (20.00)	16 (26.67)	18 (38.33)	23 (30.00)	41 (34.17)
90 per cent-100 per cent	3 (10.00)	5 (16.67)	8 (13.33)	4 (13.33)	5 (16.67)	9 (15.00)	7 (11.67)	10 (16.67)	17 (14.17)
Above 100 per cent of RDA	-	1 (3.33)	1 (1.67)	-	1 (3.33)	1 (1.67)	-	2 (3.33)	2 (1.67)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total

*RDA: Recommended Dietary Allowance

The mean of the percentage of Daily Dietary Intake (the mean has been calculated from the percentage of adequacy of RDA, not from the absolute amount of calorie intake) has been calculated and presented in table 6. The data shows that the mean value for male and female are 74.67 and 72.98 in Dibika village respectively. In Ghuli village, the mean has been found to be 74.60 for males, while the corresponding value is 78.48 for the females. In Ghuli inhabited by the scheduled tribe, the mean value is found to be higher among the females by 3.9 while in Dibika, it is higher for male by 1.7. The combined mean of male and female members reflects that the overall calorie intake is more in Ghuli village than Dibika village.

Table 6: Mean of the percentage of Daily Dietary Intake (DDI)

Mean percentage of DDI	Dibika Village		Ghuli Village	
	Male	Female	Male	Female
	74.67	72.98	74.60	78.48
	73.83		76.54	

Source: Field Survey

An attempt has been made to find out the households according to the comparative adequacy of calorie intake by adult male and female members (the comparison has been made on the basis of the percentage of DDI, calculated from RDA, not on the basis of absolute amount of calorie intake). The data presented in table 7 shows the comparative analysis. It is found that in Dibika village, 56.67 per cent households have percentage of DDI for male, while in Ghuli, the corresponding percentage is found to be 53.33. It may be due to the fact that in the present study the sample drawn to measure the calorie intake are one adult male and one adult female from the sample households and in most of the households the female, being the food distributor of the family, sacrifices her share for other members, keeping a smaller share for her own.

Table 7: Distribution of households according to adequacy of calorie intake by male and female members

Dibika N=30		Ghuli N=30		Combined N=60	
DDI of Female <DDI of Male	DDI of Male <DDI of Female	DDI of Female <DDI of Male	DDI of Male <DDI of Female	DDI of Female <DDI of Male	DDI of Male <DDI of Female
17 (56.67)	13 (43.33)	16 (53.33)	14 (46.67)	33 (55.00)	27 (45.00)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total

A perusal of the previous findings presented in this chapter reveals that

comparatively more gloomy in Dibika village (i.e. the village inhabited by the scheduled caste people).

This may be partly attributed to the fact that the problem of alcoholism is prevalent in this village. The data related to socio-economic status of the two villages does not exhibit wide variation. But, the expenditure incurred on alcohol reduces the buying capacity of the households of Dibika village thus lowering down the quantity and quality of food for the family members.

Traditionally "Zu" (rice beer) has been a food item for the Tiwa people and milk is not considered as food item by them because Zu and milk do not go together. But having been oppressed by the problem of alcoholism and realising the negative impact of this traditional practice, few years ago, taking of Zu in the village has been prohibited (except on few occasions) by the people of the Ghuli village. And now they do not consider milk as an unnecessary food item.

The table showing the activity status (table 2 of Chapter II) of the population of both the villages reflects that female of both the villages are engaged in some or other activities. Generally the income of the women is not visible and also does not receive proper dignity. But, in Ghuli village 30.86 per cent females are engaged in stone-cutting in the nearby hills. All these stone-cutter females are housewives. Though stone-cutting was secondary activity for them, nevertheless they can earn some amount of money on their own. It is found that women's earning has a positive correlation with children's health, nutrition and education status. Studies have shown that women contribute a much larger share of their earnings for basic family maintenance than men (Sharma, 2000). Since the earning of the women in Ghuli is monetised to some extent they can contribute their income for the well being of their children as well as for the other family members. In Dibika Village, women are mostly engaged in agriculture and allied activities and also in household crafts. Since their earnings are not visible and recognised their purchasing power is also minimum.

Further, the data related to the nutritional status of the children and calorie intake of adult members shows that the mean BMI value as well as the per-

centage of normal BMI are highest among the girls of Ghuli village. It is also found that the mean of the percentage of adequacy of calorie intake is also highest among the females of Ghuli village, indicating a slightly better nutritional status than the other categories.

It was reviewed that where the culture requires bridegrooms to pay a bride-price, daughters are slightly more nutritionally favoured than sons (Haddad *et.al* 1996). The bride price system has been there in the custom of the Tiwa community. A very small amount is paid in the form of money (Rs. 7.00 or Rs. 9.00) and *bhar* (consists of food items) to the bridal family at the time of marriage. But in Ghuli village, the bride price system is not very common and many people are not aware about the custom. The practice is not at all comparable to the dowry system. According to the affordability of the bridal family, a sizeable amount of property is given as a gift to the bride, like the non-tribals. So the higher nutritional status of the female of Ghuli village cannot be defined from the view point of this custom. It was also reviewed that mother's income has positive correlation with the wellbeing of the girl child in a family. The higher nutritional status of female of the village may be attributed to this reason.

CHAPTER IV

Impact of Socio-Economic and Socio-Cultural Variable on Gender Discrimination in terms of Nutrition

The influence of gender sensitivity on the nutritional status and food consumption are closely associated with some socio-economic and socio cultural factors. One single factor does not have individual impact on the nutritional status as well as food consumption. The findings presented in chapter III do not reflect sharp or wide gender bias in terms of both attainment of potential physical growth of the children as well as the caloric intake by the adult members. Rather, some results depict better nutrition of females in the study villages. Chapter III does not necessarily require its subsequent chapters to reiterate the discriminatory practices in terms of nutrition. Whatever little differentiation has been observed may be due to individual likings and disliking for food and/or may be due to the subtle impact of socio-economic and socio-cultural factors on gender disparity in the society. To explore the genuine reasons of malnutrition and variation in calorie intake by male and female members, an attempt is made to examine the situation in the light of some socio economic variables which in turn will be helpful to find out the causes of the little gender variations in the study villages.

4.1 Operational Land Holding and Nutrition

4.1.1 Operational land holding and Body Mass Index

Table 1 shows the relationship between operational land holding and Body Mass Index of the children. 94.87 per cent boys who belong to marginal farmer

households, have BMI below 18.5 while the corresponding percentage for the boys belonging to medium farmer households is 100.00. Of course, the percentage of boys having below normal BMI is 75.00 who belong to large farmer families. Equal percentage (percentage being 87.50) of girls of three different categories i.e. marginal farmers, small farmers and medium farmers households have BMI below 18.5. The corresponding percentage of girls belonging to large farmer families is found to be 100.00. The data depicts absence of impact of operational land holding on BMI and gender bias.

Table 1: Distribution of children according to operational land holdings and Body Mass Index

Operational land holdings (In Bigha)	Boys		No.	Girls		No.
	BMI below 18.5%	BMI above 18.5%		BMI below 18.5 %	BMI above 18.5 %	
0.75	37 (94.87)	2 (5.13)	39	35 (87.50)	5 (12.50)	40
7.6-15	23 (92.00)	2 (8.00)	25	15 (87.50)	3 (16.67)	18
15.01-30	4 (100.00)	-	4	7 (87.50)	1 (12.50)	8
30.1-75	3 (75.00)	1 (25.00)	4	2 (100.00)	-	2

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.1.2 Operational land holding and comparative adequacy of calorie intake by male and female members

Among the households, belonging to the marginal farmers' category, in 54.04 per cent households females have greater adequacy of caloric intake than their male counterparts. In two categories i.e. the households having 7.6-15 bighas and 30.1-75 bighas, the percentage of households is found higher where the adequacy of calorie intake of male is more than the female members. It is observed that along with the increasing size of operational land holding, male mem-

Table 2: Distribution of households according to operation land holdings and comparative adequacy of calorie intake by male and female members

	DDI of Female < DDI of Male	DDI of Male < DDI of Female	n
0-7.5	17 (45.95)	20 (54.04)	37
7.6-15	12 (70.59)	5 (29.41)	17
15.01-30	2 (50.00)	2 (50.00)	4
30.1-75	2 (100.00)	-	2

Source: Field Survey

Figures in the parentheses denote percentage to the row total (n)

4.2 Annual Income and Nutrition

Some studies revealed gender inequality in nutrition to a greater extent, in higher income group while it was found comparable among boys and girls irrespective of income by some other studies.

The following findings shows the impact of income on the nutritional status in the study villages.

4.2.1 Income and Body Mass Index

The findings presented in table 3 shows that 100.00 per cent boys belonging to the income group below Rs. 22,000 have BMI below 18.5. In the income group Rs. 22,001 to Rs. 32,000, 90.91 per cent boys have below normal BMI. But again 100.00 per cent boys belonging to the households having annual income Rs. 42,001-Rs.52,000, have BMI below 18.5. Had there been any impact of income on the nutritional status of the children in the study villages, the percentage of malnourished boys and girls would have been greater in lower income groups and there would have been a gradual increment in the percentage

Table 3: Distribution of households according to annual income

Annual income (In Rs.)	Boys			Girls		
	BMI below 18.5 per cent	BMI above 18.5 per cent	n	BMI below 18.5 per cent	BMI above 18.5 per cent	n
Below 22,000	14 (100.00)	-	14	21 (87.50)	3 (12.50)	24
22,001-32,000	20 (90.91)	2 (9.09)	22	11 (91.67)	1 (8.33)	12
32,001-42,000	8 (88.89)	1 (1.11)	9	7 (87.5)	1 (12.5)	8
42,001-52,000	8 (100.00)	-	8	7 (7.78)	2 (2.22)	9
Above 52,000	14 (93.33)	1 (6.67)	15	13 (86.67)	2 (13.33)	15

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.2.2 Income and comparative adequacy of calorie Intake by male and female adults:

Table 4 reveals the distribution of households according to comparative adequacy of caloric intake by male and female members and level of income in three different level of annual income i.e. income group "below Rs.22,000", "Rs. 22,001-Rs. 32,000" and "Rs. 32,001-Rs. 42,000", the percentage of households are more where females have greater adequacy of calorie intake. Among the households having higher income "Rs.42,000-Rs.52,000" and "above Rs.52,000", the percentage of households is found more, where the male have greater adequacy of calorie intake. From this table it can be inferred that in the study villages, the male have greater adequacy of calorie intake in higher income groups. while the female have more adequacy of

Table 4: Distribution of households according to annual income and comparative adequacy of calorie intake by male and female members

Annual income	DDI of Female < DDI of Male	DDI of Male < DDI of Female	N
Below 22,000	9 (47.37)	10 (52.63)	19
22,001-32,000	5 (33.33)	10 (66.67)	15
32,001-42,000	3 (37.50)	5 (62.50)	8
42,001-52,000	8 (83.33)	1 (16.67)	6
Above 52,000	11 (91.67)	1 (8.33)	12

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.3 Sufficiency in Home Production and Nutrition:

Most of the people of the study villages consume a larger amount of food grains (rice) to offset the lack of other more expensive food items in the diet. Though there is consumption of meat, egg, fruits, vegetables and milk, all these are optional to their diet (not on a regular basis). Of course, fish is generally included in their daily diet during the rainy days. A mixture of bamboo shoot and dried fish is a popular food item among the Tiwa community. In Ghuli village, however, the mixture finds a rare place in the diet.

Optimal nutrition demands intake of a wide range of foods which taken together in judicious combination can provide the essential nutrients that one needs. Ensuring good nutrition is not just equivalent to avoidance of hunger. The avoidance of hunger can be achieved through the intake of a single staple cereal. And in the study villages since all other food items are optional, rice is considered as food security for them. Table 5 and table 6 show the status of gross composition of the body and adequacy of calorie intake by male and female members according to sufficiency in home production of rice.

4.3.1 Sufficiency in home production (rice) and Body Mass Index

It is evident from table 5 that up to nine months of sufficiency in produc

months sufficiency and 92.10 percent boys from surplus production households, have BMI below 18.5 per cent. It is seen that the little percentage of boys having normal BMI, belong to 9-12 months sufficiency and surplus production households. Regarding the BMI level of girl child there has not been any uniform increasing or decreasing trend through out the different categories of sufficiency. 80.00 per cent of girls below three months sufficiency, 90.90 per cent of 9-12 months sufficiency and 85.71 per cent of surplus production households are malnourished, having BMI below 18.5. Here also no impact of home sufficiency of rice on the nutritional status of children is clearly observable.

Table 5: Distribution of children according to home production (Rice) and BMI level

Rice	Boys		n	Girls		n
	BMI < 18.5	BMI > 18.5		BMI < 18.5	BMI > 18.5	
<3	8 (100.00)	-	8	8 (80.00)	2 (20.00)	10
3-6	11 (100.00)	-	11	9 (90.00)	1 (10.00)	10
6-9	7 (100.00)	-	7	8 (88.89)	1 (11.11)	9
9-12	7 (87.5)	1 (12.50)	8	10 (90.90)	1 (9.10)	11
Surplus production	35 (92.10)	3 (7.90)	38	24 (85.71)	4 (14.29)	28

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.3.2 Sufficiency of home production in rice and comparative adequacy of calorie intake by male and female

Table 6 shows the distribution of households according to sufficiency of home production of rice and comparative adequacy of calorie intake by male and female members. The greater percentage of adequacy of calorie intake

of 9-12 months sufficiency. Conversely, the greater percentage of calorie intake by female members follow a declining trend with the increasing level of sufficiency-except the 9-12 months sufficiency category. Had there being no exception in the 9-12 months sufficiency category, it could have been inferred that with the increasing sufficiency in rice production, the male members in a family tends to receive more adequate diet than their female counterparts.

Table 6: Distribution of households according to the sufficiency in rice production and comparative adequacy of calorie intake by male and female members

Rice Production Sufficient	DDI Female < DDI Male	DDI Male < DDI Female	n
< 3 Months	3 (37.50)	5 (62.50)	8
3-6 Months	5 (55.56)	4 (44.44)	9
6-9 Months	5 (62.50)	3 (37.50)	8
9-12 Months	1 (14.29)	6 (85.71)	7
> 12 Months	18 (64.29)	10 (35.71)	28

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.4 Parents educational attainment and Body Mass Index

Parents educational status is considered to have a greater impact on the nutritional status of the children. The tables 7 and 8 reflect the influence of educational attainment of mother and father on the nutritional status of the children.

4.4.1 Mother's education and Body Mass Index of the children

The data presented in table 7 show that the percentage of the boys having normal BMI concentrates in the households where mothers are illiterate and just literate. No variation has been observed in the latter categories. All the boys belonging to the households in which mothers have higher level of education are malnourished in the study villages. In case of the girls also, better nutritional status of the daughters of educated mothers is not observed. While 7.41 per cent girls of illiterate mother's are found in good nutritional status, no girl of the mothers having higher education (high school completed, higher

Table 7: Mother's education and BMI of children

Educational attainment of mother	Boys			Girls		
	BMI below 18.5	BMI above 18.5	n	BMI below 18.5	BMI above 18.5	n
1	40 (93.02)	3 (6.98)	43	25 (92.59)	2 (7.41)	27
2	8 (88.89)	1 (11.11)	9	17 (80.95)	4 (19.05)	5
3	10 (100.00)	-	10	4 (80.00)	1 (20.00)	5
4	3 (100.00)	-	3	3 (60.00)	2 (40.00)	5
5	5 (100.00)	-	5	6 (100.00)	-	6
6	1 (100.00)	-	1	1 (100.00)	-	1
7	1 (100.00)	-	1	3 (100.00)	-	3

1. Illiterate 2. Literate but not completed Primary 3. Completed Primary but not Middle School 4. Completed Middle School but not High School 5. Completed High School but not Higher Secondary 6. Completed Higher Secondary but not Graduation 7. Graduation and above

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.4.2 Father's education and Body Mass Index of the children

Table 8 exhibits the relationship of father's educational attainment with the nutritional status of the children. The data shows almost an identical trend with the data of table 7, i.e. showing relationship between mothers' education and BMI level of the children. No boys and girls have been found having normal BMI from those households where fathers have higher educational attainment. In case of boys having BMI above 18.5, all of them belong to those households where fathers are illiterate, have completed primary and middle schooling. Similarly among the well-nourished girls, a large percentage belong to those

Table 8: Father's education and BMI of children

Educa-tional attainment of mother	Boys			Girls		
	BMI below 18.5	BMI above 18.5	n	BMI below 18.5	BMI above 18.5	n
1	23(95.83)	1(4.17)	24	13(76.47)	4(23.53)	17
2	11(91.83)	1(8.33)	12	10(83.33)	2(16.67)	12
3	15(100.00)	-	15	13(92.86)	1(7.14)	14
4	12(85.71)	2(14.29)	14	12(92.30)	1(7.70)	13
5	3(100.00)	-	3	5(83.33)	1(16.67)	6
6	3(100.00)	-	3	3(100.00)	-	3
7	1(100.00)	-	1	3(100.00)	-	1

1. Illiterate 2. Literate but not completed Primary 3. Completed Primary but not Middle School 4. Completed Middle School but not High School 5. Completed High School but not Higher Secondary 6. Completed Higher Secondary but not Graduation 7. Graduation and above

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.5 Type of Family and Nutrition

4.5.1 Type of family and Body Mass Index

The data presented in table 9 shows the BMI level of the children according to the type of the family. It is seen that 96.30 per cent of the boys belonging to nuclear families have BMI below 18.5, while the corresponding percentage for joint families is 88.89. Among the girls of the nuclear family, 86.05 per cent are undernourished while the percentage for joint family is 80.00. Had there been any impact of the type of family on the nutritional status of the children, the percentage of the malnourished children would have been much larger from the joint families. Similarly the percentage of girls having BMI above 18.5 is 12.00 in joint families while the corresponding percentage for nuclear family is 13.95. The data does not reflect any impact of the type of family on gender

Table 9: Distribution of children according to type of family and Body Mass Index

Nuclear				Joint			
Boys N=54		Girls N=43		Boys N=18		Girls N=25	
BMI below 18.5	BMI above 18.5	BMI below 18.5	BMI above 18.5	BMI below 18.5	BMI above 18.5	BMI below 18.5	BMI above 18.5
52 (12.00)	2 (3.70)	37 (86.05)	6 (13.95)	16 (88.89)	2 (11.11)	22 (88.00)	3 (96.30)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total (n)

Table 10 shows the relationship between type of family and comparative adequacy of caloric intake by male and female members. In 55.56 per cent households, having nuclear structure, males have more adequacy of caloric intake while corresponding percentage for joint family is found to be 53.55. In 44.44 per cent households having nuclear structure, females have more adequate diet than males. The percentage is 46.67 in joint families. Had there been any impact of family type on gender bias in terms of calorie intake, the data would have shown much lower percentage of households having more adequacy of calorie intake by female members in joint families.

Table 10: Distribution of households according to type of family and comparative adequacy of calorie intake by male and female members

Nuclear Family (N=45)		Joint Family (N=15)	
DDI of Female < DDI of Male	DDI of Male < DDI of Female	DDI of Female < DDI of Male	DDI of Male < DDI of Female
25 (55.56)	20 (44.44)	8 (53.33)	7 (46.67)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total (n)

4.6 Size of Family and Nutrition

4.6.1 Size of family and Body Mass Index

A perusal of the table 11 reveals that among the boys who belong to small families, 94.44 per cent have BMI below 18.5. The corresponding percentage for large families is found to be the same (94.44 per cent). For the girls belonging to small families, 86.49 percent have BMI below 18.5, while the percentage for the girls of large families with BMI below 18.5 is accounted for 87.10. The data of small family juxtaposes upon the data for the large families, indicating zero influence of family size on nutrition as well as on gender bias.

Table 11: Distribution of children according to type of family and Body Mass Index

Small Family				Large Family			
Boys N=36		Girls N=37		Boys N=36		Girls N=31	
BMI below 18.5	BMI above 18.5	BMI below 18.5	BMI above 18.5	BMI below 18.5	BMI above 18.5	BMI below 18.5	BMI above 18.5
34 (94.44)	2 (5.56)	32 (86.49)	5 (13.51)	34 (94.44)	2 (5.56)	27 (87.10)	4 (12.90)

Source: Field Survey

Figures in the parentheses denote percentage to the respective row total (n)

4.6.2 Size of family and comparative adequacy of calorie intake by male and female members:

The data presented in table 12 shows that in 53.12 per cent small families, males have more adequate calorie intake than females, while the corresponding percentage for large families is found to be 57.14. In 46.88 per cent small families, females have more adequate calorie intake while the percentage for the same in large families accounts for 42.86. The data does not show any sharp variation and it can be inferred that the size of the family does not have any impact on the

Table 12: Distribution of households according to size of the family and the comparative adequacy of calorie intake by male and female members

Nuclear Family (N=32)		Joint Family (N=28)	
DDI of Female < DDI of Male	DDI of Male < DDI of Female	DDI of Female < DDI of Male	DDI of Male < DDI of Female
17 (53.12)	15 (46.88)	16 (57.14)	12 (42.86)

Source: Field Survey

Figures in the parentheses denote percentage to the respective column total (n)

4.7 Production of Fruits and Vegetables and Nutrition :

It was found that among the households where there is large production (surplus production) of fruits and vegetables, the caloric intake of both male and female members is adequate (almost 90.00 per cent of RDA). And among the eleven children (7 girls and 4 boys) belonging to these three families, two girls have normal BMI. It is observed that the intake of fruits and vegetables is not considered very important in both the villages and production of green leafy vegetables is also not given proper attention.

4.8 Lice-stock Possession and Nutrition

(Since the kind and number of livestock varies, the relationship of possession of live-stock with BMI of children and comparative adequacy of calorie intake could not be quantified.)

Repetition of same recipe or monotonous diet lowers down the amount of food consumed by an individual. Possession of different kinds of live-stocks (i.e., which yields milk, egg, honey, or which can be used as food item) helps to add variety to the diet due to the easy availability of different food items within the household. In the study villages also it is observed that the households, having these type of live-stocks have higher adequacy of caloric intake than the

One of the objectives of the present study has been to assess the calorie intake of male and female adults and thereby to find out the bias in intra household food allocation. The adequacy of no other nutrient is calculated except calorie. But by observing their dietary pattern it is found that most of their nutrient (macro as well as micro) requirements are not given proper attention. Although most of them are found to be food secured, they are not nutritionally secured. It is mainly due to lack of consciousness to consume a balance diet.

Attitude of the food distributor towards allocation of food has a great impact on food received by the individual family member. No gender bias is found in the minds of the food distributors in allocation of food. It is revealed that the food is generally allotted by considering the age, type of physical activity and personal likings and dislikings of the members.

CHAPTER V

Summary and Conclusion

The nutritional status was found to be very poor in both the study villages. Children were suffering from short-term as well as long-term nutritional deficiency. The gross-composition of the body (i.e. body Mass Index) reflects an abysmally poor nutritional picture of the children in the study villages. Mean of the calorie intake was found to be less than 80 per cent of RDA for both male and female adults in both the villages. No gender bias has been found in terms of nutrition as well as in providing facilities for education.

The Body Mass Index as well as the calorie intake was found lower among the people of Dibika village than that of Ghuli village which is attributable to the problem of alcoholism in Dibika village and the resultant low purchasing power of the families. The mean BMI was found highest among the girls of Ghuli village and calorie intake was also highest among the females of Ghuli. Both of these can be explained from the point of women's monetised form of income and their contribution to basic family maintenance. No strong impact of socio-economic and socio-cultural factors have been found on Body Mass Index and calorie intake.

Both food and non-food factors assume importance in determining nutritional status of an individual. In addition to the availability of food in the market and purchasing power of the family, safe environmental and sanitary conditions influence the nutritional status of an individual to a large extent. In the study villages, hygiene and sanitation are not given adequate importance.

In the light of the results of the present study, the following recommendations can be made:

- (i) The absence of gender bias in the study areas should be encouraged in other areas.
- (ii) The people should be made aware about the nutrition facts and importance of fruits and vegetables in their diet, Possession of different kinds of live-stocks (i.e. egg, milk, meat and honey) including fishery should be encouraged to have an easily available balance diet.
- (iii) Since there is relation between women's earnings and well-being of the children, efforts should be made to widen the opportunity for women's employment.
- (iv) The unfelt need of the people about drinking water and latrine should be converted to felt needs which will help them to realize about the importance of safe drinking water and provision of safe place for defecation.

BIBLIOGRAPHY

- Awasthi, N and Kumar, A.R. (1999), "Nutritional Status of Hill Primary School Children," *The Indian Journal of Nutritional Dietet* 36 (10) pp-453-459.
- Barman, K.K. (1994), "Nutritional Status of India's Children and Women: A Sociological Perspective." *IASSI Quarterly*, Vol 12, pp 137-146.
- Bhatia, B.D, Banerjee, D, Agarwal, D.K. and K.N. Agarwal (1981), *Dietary Intakes of Urban and Rural Pregnant, Lactating and Non-Pregnant Non-Lactating Vegetarian Women of Varanasi. Ind.*
- Bhattacharyya, B (2001), "Food Security: NAP and WTO", *National Bank News Review*, Vol 17, No 4, pp 28-34.
- Busi, R. and Sai Leela M (1999), "Energy and Protein Intake of Adults in An Urban Area: Effect of Biological and Socio-Economic Factors", *The Indian Journal of Nutritional Dietet*, 36(90) pp-405-411.
- Chen, Hung and D'Souza (1980), "Calorie and Protein Intake by Age and Sex in Matlab", Bangladesh (June-August, 1978) in Sen, Amartya (1981) *Poverty and Femine: An Essay on Entitlement and Deprivation*, Clarendon Press, Oxford.
- Contiero, E and M. Folin (1994), "Trace Elements Nutritional Status: Use of Air as a Diagnostic Tool", *Biological trace elem. Res* 40(2): 151-160, in Das, M (1995) *Nutritional Profile of the Adolescent Girls (9-17 years) of Doom Dooma Town, Assam*, An unpublished thesis submitted to AAU Central Library.
- FAO (1990), "Women in Agricultural Development," in *Gender Issue in Rural Food Security in Developing Countries*, Food and Agriculture Organisation, Rome, Italy.
- Faruque, R. and C. Taylor (1984), "The Narangwal Experiment", the John Hopkins University Press, In Ghose Shanti(ed) (1986), *The Female Child in India - A Struggle for Survival*.

webpage: www.nutritionfoundationofindia.org.

Gillespie, Stuart (n.d.) "Child Nutrition in India: Findings from The National Family Health Survey (1992-93)" Webpage: www.nutritionfoundationofindia.org

Gopalan, C. (1987), NFI Bulletin, 8(4) in Sri Kantia, S.G "The National Nutrition Monitoring Bureau", Online webpage: nutritionfourdationotindia.org.

Haddad, et al. (1996), "Food Security and Nutrition Implications of Intrahousehold Bias: A Review of Literature".

Halder and Bhattacharya (1969), "Fertility and Sex Sequence of Children of Indian Couples." Sankhya Series 6,31 (144), in Ghose Shanti (1986) *idem*

Hendrikse, R.G. and P.M. Sherman (1965), "Morbidity and Mortality from Measles in Children seen at University College Hospital, Idaban, Arch. Ges." Virus-forsch 16:1. in FAO: (1972) "Learning Better Nutrition". FAO. Rome, Italy.

Indian Council of Agricultural Research (2000), "All India Co-ordinated Research on Home Science" ICAR, New Delhi.

J. Med. Res, 74, pp. 680-687, In Busi B.R. and Sai Leela, M (1999) "Energy and Protein Intake of Adults In an Urban Area-Effect of Biological and Socio-Economic Factors." *The Ind. J. Nutr. Dietet*, 36(9) pp.405-411.

Kakwani, N, Wider (UNU) Working paper pp 9, 1986, in, Gopalan, C, "Gender Bias in Health and Nutrition Care—Reviews and Comments", Online webpage: www.nutritionfoundationofindia.org.

Kelly, N.O. Livinson, F.J., quoted by Miller, D. (1981), "The Endangered Sex", Cornell University Press, Ithaca and London, in Ghose, Shanti (1986) *idem*.

Khan et. al. (1986), "Health Practices in Uttar Pradesh," Operation Research Group, Baroda, in Ghose, Shanti (1986) *idem*.

Krisnaswamy, K., Vijayaraghavan, K., Sastry, J.G, Rao, D.H., Brahamam, G.N.V. Radhaiah, G., Kashinath, K. and M. V. Rao (1997), *25 Years of National Nutrition Monitoring Bureau (1972-1997)* NIN, ICMR, Hyderabad-7.

Kumar (1983), ICMR Ford Foundation Workshop on Child Health, in Ghose, Shanti (1986) *idem*.

McGuire, J.S. and B. M. Rankin (1990). *Helping Women Improve Nutrition in the*

Miller (1980), in "Development of Rural Children", R.D.D. 4. IGNOU, 1999.

Mukherjee, S. (2002), "Give us today our daily bread", *The Telegraph*, 24th July, 2002.

Nail, V.A. Kowli, S.S. Gorey, R. and V. R. Bhalerao (1991), "Exposition of the Status of Girl Child in Urban Areas," Postgrad. Med, In Das, Majuri (1995) *Nutritional Profile of Adolescent Girls (9-17 Years) of Doam Dooma Town, Assam*", An unpublished Thesis submitted to Assam Agricultural University, Central Library.

NNMB Report for period 1974-779, NIN, ICMR, Hyderabad (Published in 1990), in Gopalan, C. "Gender Bias in Health and Nutrition Care-Reviews and Comments" webpage: www.nutritionfoundationofindia.org

Pant, Niranjana (1995), *Status of Girl Child and Women in India*, APH Publishing Corporation, New Delhi-2.

Prasant, P (1996), "Social Welfare, Poverty Alleviation and New Economic Policy," Haryana Institute of Public Administration, Gurgaon.

Rao, Narasingha. "Nutrient Requirements and RDA of Girls and Women in India," in *Women and Nutrition in India*. Gopalan, C and Kaur, S (eds) Special Publication series 5, Nutrition Foundation of India, New Delhi, 1989, 63-107 in Busi, B.R. and sai Leela, M (1999) *idem*.

Sakti, Padhi (2001), "Infant and Child Survival in Orissa- An Analysis With NFHS Data", *Economic & Political Weekly*, XXXVI, 34.

Sen and Sengupta, (1983), "Severity of Malnutrition in Two West Bengal Villages" *Economic & Political Weekly*, 18 (885-864), in Ghose Shanti (1986) *"The Female Child in India- A Struggle For Survival"*, on line Webpage: www.nutritionfoundationofindia.org.

Srivastava et al (1980), in "Development of Rural Children", RDD (4) IGNOU, 1999

Strauss, J and D. Thomas, "Health, Nutrition and Economic Development", *Journal of Economic Literature*, 36:766817, in Kwaako, P.O. (2001), "An Enquiry into the Prevalence of Gender Discrimination among the Rural Ashanti People of Ghana, Webpage: www.hinduonnet.com.

Sunanda Sharm, Prema Kumari, and K Nagabhushanam (2000), "Preference for Food Distribution and Food Beliefs Among Women Under Special Conditions in Sericulture Households." *The Indian Journal of Nutritional Diet*, 2001, 38 (i), pp. 27-31.

U.S. International Committee on Nutrition For National Defence (1964), "Nutrition Survey on Infants and Preschool Children in Jordan", Washington, D.C., National

APPENDIX I

Table 1: Distribution of children according to height for age

Age	Dibika Village				Ghull Village			
	Boys		Girls		Boys		Girls	
	Total No	Below Height	Total No	Below Height	Total No	Below Height	Total No	Below Height
3	5	5	4	3	7	5	6	5
4	0	0	1	1	4	3	3	3
5	4	4	3	3	4	1	2	2
6	2	2	5	4	4	1	5	4
7	6	4	1	0	6	4	4	3
8	5	4	5	5	4	2	0	0
9	2	2	0	1	1	1	3	3
10	1	1	5	2	1	1	2	1
11	3	3	0	0	2	1	3	1
12	3	1	5	2	5	5	10	4
13	0	0	0	0	1	0	0	0
14	1	1	0	0	1	1	0	0
Total	32	27	30	21	40	25	38	26
Percentage		84.38		70.00		62.50		68.42

Source: Field Survey

Table 2: Distribution of children according to weight for age

Age	Dibika Village				Ghull Village			
	Boys		Girls		Boys		Girls	
	Total No	Below Weight	Total No	Below Weight	Total No	Below Weight	Total No	Below Weight
3	5	4	4	4	7	5	6	6
4	0	0	1	1	4	3	3	3
5	4	3	3	3	4	2	2	2
6	2	2	5	4	4	2	5	5
7	6	5	1	1	6	4	4	2
8	5	4	5	4	4	3	0	0
9	2	2	0	1	1	1	3	3
10	1	1	5	3	1	1	2	2
11	3	3	0	0	2	1	3	2
12	3	1	5	4	5	5	10	14
13	0	0	0	0	1	1	0	0
14	1	1	0	0	1	0	0	0
Total	32	26	30	25	40	28	38	29
Percentage		81.25		83.33		70.00		32

Source: Field Survey