Poverty, Dietary Imbalance and Sickness among Casual Labourer Households in Shillong (India)

SK Mishra
&
JW Lyngskor

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Department of Economics
North Eastern Hill University, Shillong (India)

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SK Mishra
JW Lyngskor
Dept. of Economics
NEHU, Shillong (India)

I. Introduction : Practice of traditional agriculture, infrastructural and industrial backwardness, and economic stagnation in the rural areas coupled with a high growth rate of population have led to a massive migration of the rural labour force into urban areas for some livelihood. The urban economies are not expanding fast enough to absorb such a sizeable influx of labour force. As a result, wage rates for unskilled workers remain stagnant at the subsistence level or drop even below that (Mishra and Lyngskor, 2004). These workers and their family members live in a miserable condition. Poor houses with inadequate space located in the slum areas, lack of regular supply of safe drinking water, inadequate and unhealthy sanitation, lack of nutritional diet, etc. are only a few of the adversities that describe their quality of life. They earn too little to buy enough of provisions to keep themselves physically fit. As a consequence, many of them and their family members suffer from the diseases caused or hosted by malnutrition.

The objective of this study is to bring out the case of poverty, undernourishment and health conditions of casual labourer households in Shillong, the capital city of Meghalaya, India. A large section of the unskilled labourers work as casual workers. Casual labourers are those workers who work for a very short duration (for a few hours, a day or at most a few days under a single contract) for an employer, and who are (usually) paid for their labour either at the end of the contract or at the end of a day. Casual workers are often unskilled or semi-skilled; they usually do not own any other factors of production (such as land, capital or implements needed to perform the job) except their labour power. Casual labourers earn their livelihood by selling their labour power and often regenerate their labour power by '*investing',* so to say*,* a large part of their wage earning on food articles. Thus, in case of a casual labourer, the dichotomy of consumption and investment collapses into a single category. Due to low level of consumption, casual labourers are often poor performers – their efficiency is low. The market forces often impose on them the vicious circle of inefficiency – low wage rates – deficient consumption - inefficiency.

The types of labourers that are included in our study are carpenters, mechanics, drivers, agricultural labourers, carriers, cleaners, house-maids, tea-sellers, bus conductors and helpers, sawmill workers, plumbers, porters in market place, coolie in construction work, dhobi, muster roll, etc. They come from various communities such as Nepalese, Assamese, Bengali, Bihari, Bodo, Khasi, etc. living in the town and its suburbs.

II. The Study Area : Barrabazzar is the main centre of trade and business in Shillong. All the agricultural and the non-agricultural goods are brought from the rural areas to be traded in this largest market of the state. Goods from other states also come here for redistribution to different villages of the state. Meghalaya imports almost all manufactured goods (save

cement and perhaps coal), fish, vegetables and meat from outside. Then these goods are distributed to various places in the state. Barrabazzar has the key role in these businesses.

III. The Data Base : We collected the primary data on income and consumption pattern during 1996-2000 to study the real wages of casual workers in Shillong (Mishra and Lyngskor, 2004). The first set of data was recorded in December 1996 and January 1997 and the last data were recorded in January 2000. Altogether there were seven rounds of survey, at an interval of six months that cover a period of a little over 3 years. We could collect expenditure data from 125 households.

We collected data on income, expenditure (on foodstuffs yielding energy), and consumption of various food items such as rice, atta (wheat flour), dal (pulses), sugar, potatoes, onions, mustard oil, fish, meat (goat), beef, green vegetables and milk. Using table-1 we converted these foodstuffs into their carbohydrate, protein, fat and calorific values. The income, expenditure (calexp, on foodstuff yielding energy), caloric value of the food intake and the percentage contribution of carbohydrates, protein and fat to the caloric value of food intakes of the sample (125) casual labourer households are presented in the first six columns of table-2. Measures of nutritional imbalance are presented in the last five columns of the same table.

Table 1. Nutritional Contents of Food Articles (per kg./lit) - Consumed by Casual Labourer Households

Contents	Rice	Dal	Sugar	Potato	Onion	M-Oil	Atta	Fish	Beef	Meat	Veget	Milk
Calorie	3622	2944	3850	960	333	8829	3640	3000	3706	2188	460	615
Carbohyd (g)	805	455	995	216	67	0	760	279	0	0	92	45
Protein (g)	65	214	0	24	33	0	104	114	224	297	25	33
Fat (g)	5	16	0	0	0	1000	8	164	306	94	0	33
Price (Kg/Lit)	11.25	25	17.45	5.88	6.50	45.38	10.15	69	50	85	9.33	10

Casual worker households often suffer malnourishment due to poverty. Additionally, cultural reason as well as ignorance is in the root of malnutrition. The method of cooking food often spoils a good part of its nutritional content. Carbohydrates are the cheapest source of energy while foods rich in proteins are the costliest (Mishra and Lyngskor, 2005). In Shillong green vegetables are very costly, often beyond the reach of the poor. Potatoes are popularly used for vegetables. Milk is supplied with a lot of water (often unsafe for drinking) added to it. Due to this, milk is a very costly source of nutrition. Due to all these reasons, unbalanced diet is very normal among the people.

Small children have higher protein requirements per calorie. They are more at risk of being given a low-protein diet. Hence, protein deficiency is more prominent among them. In most malnourished children, calorie deficiency and protein deficiency are combined (Encyclopædia Britannica, 2005), and these are reflected in stunted growth, rickety or skeletal appearance, distended belly and emaciated legs and arms, dry and baggy skin, anemia, cracked lips and corners of mouth, swelling (oedema) in legs and feet**,** sparse and dull brown hair, behavioral retardation (Brown and Pollitt, 1996; Aber and Bennett, 1997; Wikipedia, 2005), etc. Since their immune systems are weakened, they suffer from frequent infections, typically recurrent diarrhea, that weakens them further. Thus, small children suffering from chronic and severe malnourishment can be identified by their appearance. However, mild malnutrition cannot often be judged by appearance alone (Wachs, 1995).

Poverty and high rate of reproduction (including infant mortality) almost always go together. They jointly lead to poor health condition of children as well as mothers. Thus large family size (with many children spaced at short intervals) often goes with ill health of women. Emaciated women looking anemic and older than their age may suggest nutritional deficiency. Certain other symptoms of nutritional deficiency such as night-blindness, gastroenteritis problems, bleeding gums, recurrent diarrhea, joints aches, recurrent constipation and diarrhea, etc may be obtained by interrogation.

We collected data on the health conditions of the members of the casual labourer households by inspection and some interrogation. We divided the population into three groups, children (male as well as female), adult women and adult men. We kept a special eye on small children below 5 years' age. We especially looked into the incidences that may visibly suggest malnutrition, particularly among the children.

IV. Major Energy-yielding Components of Diet : Carbohydrates, proteins and fats are the components of diet that contribute to the energy obtained from food. Carbohydrates provide most of the energy in the majority of human diets. Foods rich in carbohydrates are usually the most abundant and cheapest. The carbohydrates containing the most nutrients are the complex carbohydrates, such as unrefined grains, tubers, vegetables, and fruits. Simple carbohydrates or sugars are high in calories but low in nutrients.

Protein produces as much energy as carbohydrates. Moreover, protein is important for building body tissue and synthesizing enzymes. Enzymes are specialized organic substances that act to regulate the speed of chemical reactions in human metabolism. Twenty amino acids of the 100 or more occurring in nature make up protein. The human body cannot internally build these amino acids. Animals and plants are their readily available sources. Normal growth and health are dependent upon these essential amino acids. Thus, the relevance of proteins is not limited to generation of energy alone; they are needed for growth and maintenance of health as well.

Fats produce more than twice as much energy as carbohydrates. Fats are compact fuels efficiently stored in the body for later use when carbohydrates are in short supply. Dietary fats are broken down into fatty acids that pass into the blood. These fatty acids are either saturated or unsaturated. Saturated fats are derived mostly from animal sources.

As a thumb rule, every gram of carbohydrates and proteins produces 4 calories while every gram of fats produces 9 calories. However, depending on the type and the sources from which they originate and the manner in which food is prepared from the raw materials containing carbohydrates, proteins and fats, some deviation from this thumb rule is natural. Cooking methods affect availability of various vitamins as well. Our analysis suggests that while a gram of carbohydrates supplies 4.06 calories, a gram of proteins and fats each supplies 4.49 and 8.65 calories respectively.

V. A Balanced Diet : It is usually agreed that on an average a person has calorie requirement of 2200 units per day. Nevertheless, a balanced diet is defined in terms of percentages of calories obtained from carbohydrates, proteins and fats. According to the Zone Diet, the ideal

ratio of carbohydrates, proteins, and fats is 40-30-30 respectively (Sears, 2001). Other nutrition specialists use a ratio of 50-35-15, carbohydrates, proteins, and fats (Percival, 1996), which is a relatively low-fat diet.

An imbalance in diet is a deviation from the balanced diet so defined. The imbalance may be measured by any of the following measures. In these formulae, C, P and F stand for the percentage contribution of carbohydrates, protein and fats (respectively) to the total calories obtained from food.

i). Zone Componential Imbalance, $DZD = \sqrt{(C-40)^2 + (\mathrm{P}-30)^2 + (F-30)^2}$

ii). Low-fat Componential Imbalance, $DLF = \sqrt{(C-50)^2 + (\mathrm{P}-35)^2 + (F-15)^2}$

iii). Caloric Imbalance, $DC = \sqrt{(Calorie/22-100)^2}$

iv). Zone Nutritional Imbalance, $DZDC = \sqrt{(C-40)^2 + (\mathrm{P}-30)^2 + (F-30)^2 + (Calorie/22-100)^2}$

v). Low-fat Nutritional Imbalance, $DLFC = \sqrt{(C-50)^2 + (\mathrm{P}-35)^2 + (F-15)^2 + (Calorie/22-100)^2}$

Of these measures, the first is based on the Zone Diet definition of balanced food defined in terms of percentage contribution of carbohydrates, protein and fats to the total calories obtained from food. The second is based on the relatively low-fat diet. The third measure is the distance of the calorie value of food from the standard 2200 calorie per person per day. In the fourth and the fifth measures the componential proportions as well as calorie balance are integrated as per the Zone Diet and the low-fat diet regimens. These measures of imbalance for all (125) casual labourer households are presented in the last five columns of table 2.

Table 2. Income, Expenditure on Food, Nutritional Proportions and Measures of Dietary Imbalance among Casual Labourer Households in Shillong (India)

PC/M Income and Expenditure on Cal-yielding Food		Percent Contribution to Total Calorie Intake			Energy (PC/day)	Different Measures of Nutritional Imbalance in Diet				
Income	Calexp	Carbohyd	Protein	Fat	Calorie	DZD	DLF	DCAL	DZDC	DLFC
195.56	149.11	79.47	9.32	11.22	1104.09	48.36	49.45	49.90	69.32	62.60
195.71	149.00	82.69	9.45	7.86	1207.25	52.29	51.05	45.18	67.68	56.70
200.00	207.80	82.42	9.55	8.03	1573.80	51.96	50.88	28.60	57.76	35.48
200.00	199.00	74.87	11.36	13.78	1190.32	42.74	46.57	45.91	64.37	57.00
213.57	170.43	81.04	9.51	9.44	1189.83	50.26	50.17	45.90	67.26	57.38
213.64	118.18	80.39	9.76	9.86	814.17	49.47	49.77	62.91	79.55	80.45
220.00	180.25	81.36	9.20	9.44	1422.92	50.66	50.43	35.36	60.78	43.62
238.75	167.75	86.68	7.97	5.35	1341.58	57.20	53.58	38.82	66.35	49.71
240.00	181.33	78.87	10.12	11.01	1205.00	47.61	48.90	45.16	65.62	56.10
240.00	165.17	82.88	8.38	8.74	1347.79	52.51	51.45	38.73	63.77	48.38
244.29	207.14	76.08	9.78	14.14	1431.22	44.30	47.73	35.04	57.85	42.71
248.57	165.07	73.15	11.50	15.36	973.47	40.69	45.75	55.72	71.18	70.46
250.00	186.83	78.89	9.92	11.19	1203.32	47.64	48.97	45.30	65.75	56.32
250.00	157.60	78.87	10.73	10.40	1126.08	47.60	48.70	48.99	68.26	61.23
258.33	167.00	82.27	8.90	8.83	1265.83	51.77	50.98	42.54	65.75	53.16
258.75	112.50	79.95	8.89	11.17	856.61	48.95	49.83	61.18	78.07	78.08
260.00	105.43	83.27	7.77	8.95	809.65	53.00	51.83	63.04	81.11	81.08
262.50	214.25	80.17	9.14	10.69	1546.51	49.21	49.86	29.82	57.03	36.47
262.50	224.25	81.75	8.43	9.82	1648.70	51.14	50.86	25.00	55.74	31.27
264.00	187.00	79.49	9.70	10.81	1241.12	48.37	49.34	43.55	64.87	54.04

264.00	204.00	76.26	10.47	13.27	1261.55	44.45	47.54	42.72	62.78	52.74
264.22	182.56	81.58	10.14	8.28	1365.44	50.94	50.28	37.92	62.35	46.88
266.67	297.67	77.19	10.32	12.49	1829.42	45.58	48.02	16.79	49.49	21.78
270.00	162.50	80.39	10.02	9.59	1016.46	49.47	49.69	53.80	72.54	67.95
280.00	191.83	75.18	10.30	14.53	1194.22	43.19	47.12	45.80	64.54	56.92
288.00	224.80	78.80	11.24	9.96	1409.70	47.53	48.52	35.77	59.42	43.59
288.00	163.80	77.75	8.81	13.43	1308.17	46.35	48.85	40.67	62.26	50.18
296.25	195.75	85.77	9.34	4.90	1523.91	56.14	52.77	30.69	61.19	39.26
304.00	213.60	80.80	9.50	9.70	1625.82	49.97	50.05	26.29	55.61	32.33
316.25	195.00	79.46	10.52	10.02	1233.30	48.32	49.06	43.87	64.99	54.39
316.67	222.17	73.35	11.42	15.24	1277.16	40.93	45.87	41.94	61.08	51.82
320.00	203.20	74.54	10.60	14.86	1188.36	42.41	46.72	45.97	64.39	57.15
330.00	182.50	73.54	10.57	15.90	1087.63	41.25	46.31	50.41	67.34	63.25
333.33	223.00	80.40	9.27	10.32	1648.01	49.49	49.92	25.28	54.92	31.11
340.00	156.00	77.59	7.93	14.49	1230.27	46.27	49.15	44.14	64.65	54.88
341.11	218.44	76.41	10.04	13.56	1455.41	44.66	47.77	33.82	57.22	41.10
342.86	244.29	80.93	10.21	8.85	1685.69	50.14	49.92	23.36	54.29	28.95
350.00	301.50	73.79	10.31	15.90	1841.58	41.58	46.53	16.17	47.63	21.61
352.86	123.29	83.83	9.07	7.10	913.67	53.70	51.75	58.52	77.84	74.92
355.45	205.09	81.62	9.34	9.04	1312.74	50.97	50.52	40.12	63.80	49.82
357.14	185.29	83.36	8.19	8.46	1500.87	53.10	51.75	31.83	60.17	39.84
367.50	209.67	73.48	10.47	16.04	1232.19	41.19	46.33	43.81	62.54	54.36
371.43	259.57	81.02	9.85	9.13	1964.59	50.24	50.06	10.79	50.29	19.00
373.75	207.38	82.34	8.96	8.70	1533.69	51.85	51.00	30.14	58.54	37.37
375.00	168.13	75.31	11.08	13.61	960.94	43.28	46.88	56.22	72.26	71.03
375.00	217.00	71.40	10.47	18.13	1318.83	38.84	45.53	40.12	59.40	49.76
378.00	213.20	78.29	9.97	11.74	1420.79	46.92	48.67	35.32	59.01	43.09
387.50	133.25	68.29	7.11	24.60	927.83	36.79	46.61	57.77	72.52	74.00
400.00	184.14	67.56	10.91	21.53	995.99	34.58	43.98	54.59	69.26	69.76
404.17	318.17	78.06	11.06	10.88	1834.24	46.61	48.20	16.67	49.85	21.59
408.00	234.60	77.16	9.12	13.71	1709.30	45.63	48.47	22.33	51.80	27.43
412.50	172.75	71.29	12.36	16.36	936.56	38.42	44.60	57.43	71.99	72.97
416.67	187.67	68.18	10.89	20.92	1131.66	35.24	44.19	48.68	64.80	61.70
416.67	215.17	73.09	12.40	14.50	1186.03	40.56	45.37	46.15	63.86	57.42
417.50	291.25	67.85	13.23	18.92	1325.90	34.35	42.85	39.82	58.05	50.08
424.00	178.80	79.86	8.77	11.37	1351.74	48.85	49.83	38.76	62.06	47.84
433.33	179.50	76.42	9.02	14.56	1272.09	44.78	48.19	42.19	62.68	52.16
435.00	231.50	83.78	9.06	7.16	1930.64	53.64	51.73	12.23	52.73	21.22
440.00	234.63	81.69	11.27	7.03	1351.61	51.15	50.07	38.66	62.81	47.78
442.00	200.60	76.06	10.31	13.64	1109.46	44.23	47.51	49.38	67.44	61.73
444.40	191.20	73.11	9.56	17.33	1041.98	40.92	46.61	52.52	68.95	66.21
450.00	217.50	76.77	9.97	13.25	1506.61	45.10	47.96	31.64	56.14	38.34
450.00	291.25	73.65	8.71	17.64	2041.26	41.70	47.24	7.52	45.72	18.20
452.50	216.00	75.42	8.62	15.96	1358.17	43.69	47.96	38.13	59.70	46.87
457.14	186.86	80.07	8.75	11.18	1472.80	49.11	49.94	33.32	58.93	40.87
458.33	209.00	78.38	8.28	13.34	1637.04	47.14	49.34	25.71	54.12	31.46
460.00	212.17	83.51	8.44	8.05	1661.31	53.29	51.75	24.56	56.73	31.40
466.67	300.00	73.68	11.34	14.98	1573.62	41.34	46.05	28.35	52.82	34.34
473.33	204.67	81.29	9.10	9.61	1503.32	50.57	50.42	31.65	58.67	38.95
473.75	284.75	75.33	8.90	15.78	1971.50	43.54	47.79	10.45	47.00	18.31
487.50	219.83	81.78	10.14	8.08	1588.16	51.19	50.38	27.87	56.93	34.36
488.75	191.75	80.38	9.62	10.00	1458.47	49.46	49.80	33.89	59.32	41.53
490.00	221.17	76.97	9.93	13.10	1393.52	45.34	48.07	36.75	59.26	44.90

496.67	240.33	77.12	10.19	12.69	1522.90	45.49	48.04	30.77	55.79	37.23
498.00	232.80	78.33	9.95	11.72	1655.70	46.96	48.69	24.98	53.49	30.33
498.75	304.75	69.99	12.08	17.93	1554.70	36.97	44.21	29.41	52.11	36.43
500.00	250.25	78.51	10.59	10.89	1584.81	47.17	48.57	27.77	54.87	33.56
500.00	387.00	70.03	9.42	20.54	2440.71	37.62	45.61	10.95	44.96	20.06
500.00	376.00	77.01	10.87	12.12	2227.70	45.33	47.75	1.38	46.39	19.28
500.00	224.75	77.80	10.36	11.84	1389.96	46.30	48.30	36.94	59.71	45.12
528.00	275.80	77.13	10.37	12.51	1856.09	45.49	47.98	15.95	49.17	21.07
540.00	228.20	73.45	11.90	14.65	1240.57	41.02	45.72	43.55	62.17	53.92
554.00	284.00	68.47	11.95	19.58	1379.61	35.28	43.71	37.25	56.60	46.64
555.56	171.78	76.54	9.40	14.06	1107.62	44.88	48.08	49.63	67.91	62.13
556.00	315.60	78.80	10.03	11.18	2105.43	47.52	48.89	4.32	47.78	18.22
560.00	252.20	73.21	10.69	16.09	1444.44	40.86	46.12	34.05	56.01	41.59
567.00	273.25	85.28	9.27	5.45	2141.11	55.52	52.51	2.83	52.59	22.21
571.43	223.43	82.01	8.50	9.49	1675.30	51.45	50.97	24.05	55.48	30.29
575.00	310.00	68.63	11.99	19.38	1756.70	35.45	43.74	20.34	47.25	27.03
575.00	236.00	75.00	9.64	15.36	1489.45	43.05	47.32	32.38	55.85	39.37
593.13	238.00	67.79	11.13	21.08	1350.39	34.75	43.93	38.59	57.49	48.55
599.33	277.17	79.56	9.57	10.87	1952.40	48.46	49.42	11.43	49.48	18.81
600.00	366.33	66.16	11.43	22.41	1901.48	32.97	43.26	13.61	44.38	23.35
608.57	397.14	74.77	11.23	14.00	2329.20	42.62	46.57	6.07	45.51	17.46
610.00	251.43	82.87	8.20	8.93	1707.10	52.51	51.50	22.06	55.28	28.55
612.50	263.00	64.33	11.82	23.85	1318.71	30.99	42.51	40.03	57.96	51.44
618.33	362.00	69.88	11.10	19.02	2043.43	37.02	44.65	7.17	43.76	19.35
660.00	405.60	68.90	9.07	22.03	2393.87	36.56	45.48	8.78	44.27	20.16
678.33	251.00	70.14	11.19	18.67	1291.88	37.29	44.70	40.99	59.57	51.10
687.50	286.00	76.52	11.87	11.62	1389.69	44.73	47.18	36.69	58.80	44.64
690.00	355.50	77.31	10.61	12.08	2282.46	45.71	47.98	3.60	46.72	18.16
690.00	341.60	68.67	10.88	20.44	1931.51	35.76	44.35	12.25	44.60	21.16
690.00	283.50	80.86	10.81	8.33	1897.74	50.07	49.72	13.78	50.81	20.20
700.00	308.00	75.88	9.42	14.70	1918.84	44.11	47.79	12.63	47.70	19.06
705.00	190.43	78.88	9.47	11.65	1381.67	47.64	49.12	37.42	60.64	45.91
720.00	403.00	66.54	12.38	21.08	2076.94	33.08	42.82	5.54	42.48	21.62
768.00	430.60	68.77	13.05	18.18	2180.87	35.42	43.28	0.89	42.50	21.93
780.00	388.75	69.83	9.57	20.60	2180.78	37.35	45.46	0.74	43.52	21.75
800.00	377.00	75.13	9.48	15.39	1975.50	43.23	47.45	9.78	46.64	17.99
820.00	458.67	77.98	11.43	10.59	2913.38	46.53	48.05	32.18	56.87	38.90
822.22	272.44	78.29	10.72	10.98	1574.79	46.90	48.42	28.30	55.01	34.17
841.67	286.33	65.98	12.45	21.58	1448.67	32.46	42.61	34.13	54.13	43.54
889.33	433.67	78.04	10.35	11.61	2759.66	46.60	48.42	25.70	53.62	31.09
900.00	454.00	72.57	9.69	17.74	2718.13	40.30	46.35	23.79	50.39	29.43
946.00	309.60	75.38	11.90	12.72	1795.07	43.33	46.62	18.46	48.94	23.07
982.50	463.50	73.54	11.58	14.89	2643.07	41.14	45.89	19.92	48.72	24.86
989.60	305.80	80.00	10.74	9.26	1924.98	49.00	49.28	12.55	49.90	19.20
1000.00	359.25	65.04	14.65	20.31	1460.64	30.92	41.11	33.62	53.43	43.34
1076.00	253.50	67.88	9.55	22.57	1628.92	35.37	44.90	26.16	50.35	33.48
1100.00	450.00	67.31	11.29	21.40	2403.73	34.20	43.68	9.17	43.46	21.05
1125.00	528.00	75.56	11.84	12.60	2281.92	43.56	46.72	4.11	45.61	17.73
1231.67	223.83	78.75	9.57	11.68	1517.87	47.49	49.03	31.05	56.85	37.75
1610.00	511.00	80.00	9.76	10.24	3632.57	48.99	49.57	64.81	80.90	83.04
1666.67	429.33	82.90	8.91	8.19	3076.51	52.54	51.31	40.26	64.68	50.31
1666.67	414.33	83.03	9.31	7.66	2886.22	52.71	51.27	31.49	59.66	39.19

Note : Income = Per Capita Income (in Rs.per month); Calexp = Per Capita Expenditure (Rs. per month) on food stuff yielding energy; Measures of Nutritional Imbalance as defined in the text.

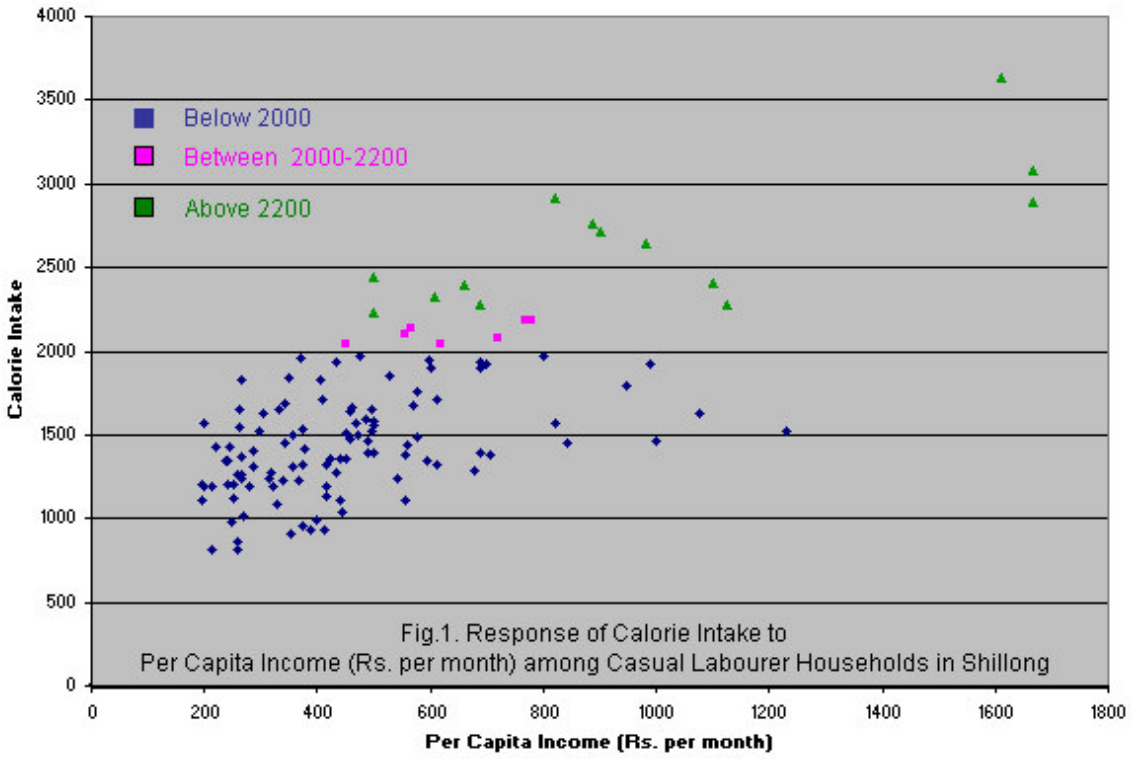


Fig.1. Response of Calorie Intake to
Per Capita Income (Rs. per month) among Casual Labourer Households in Shillong

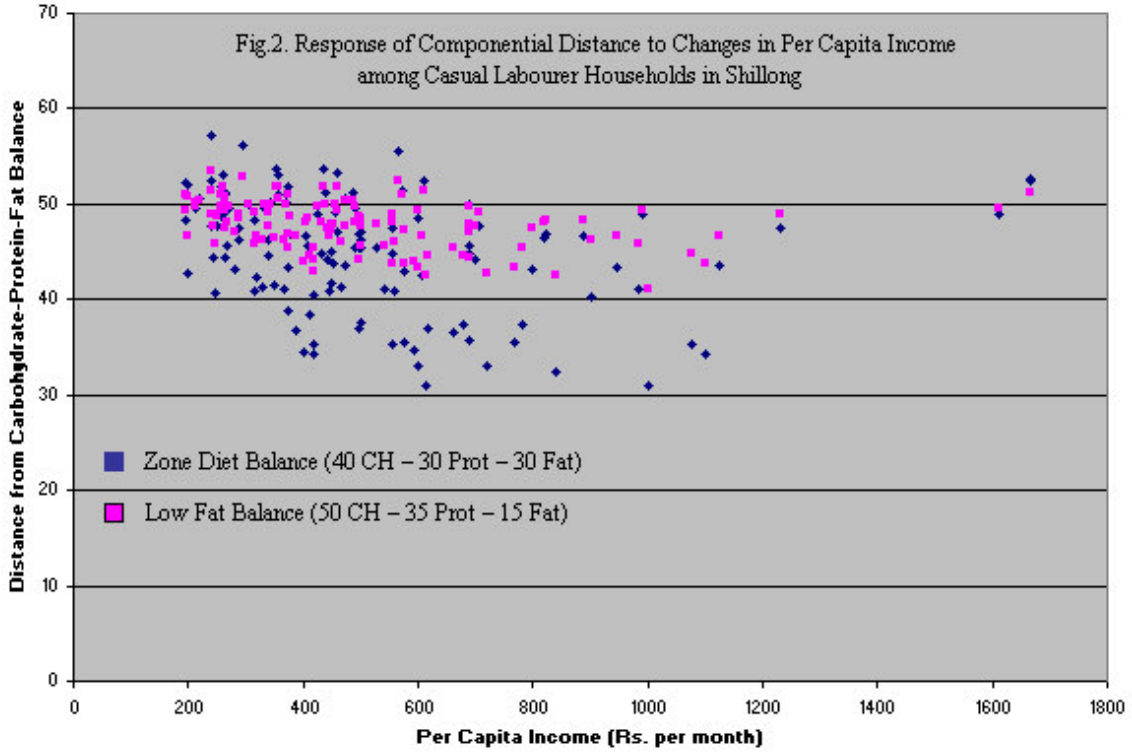
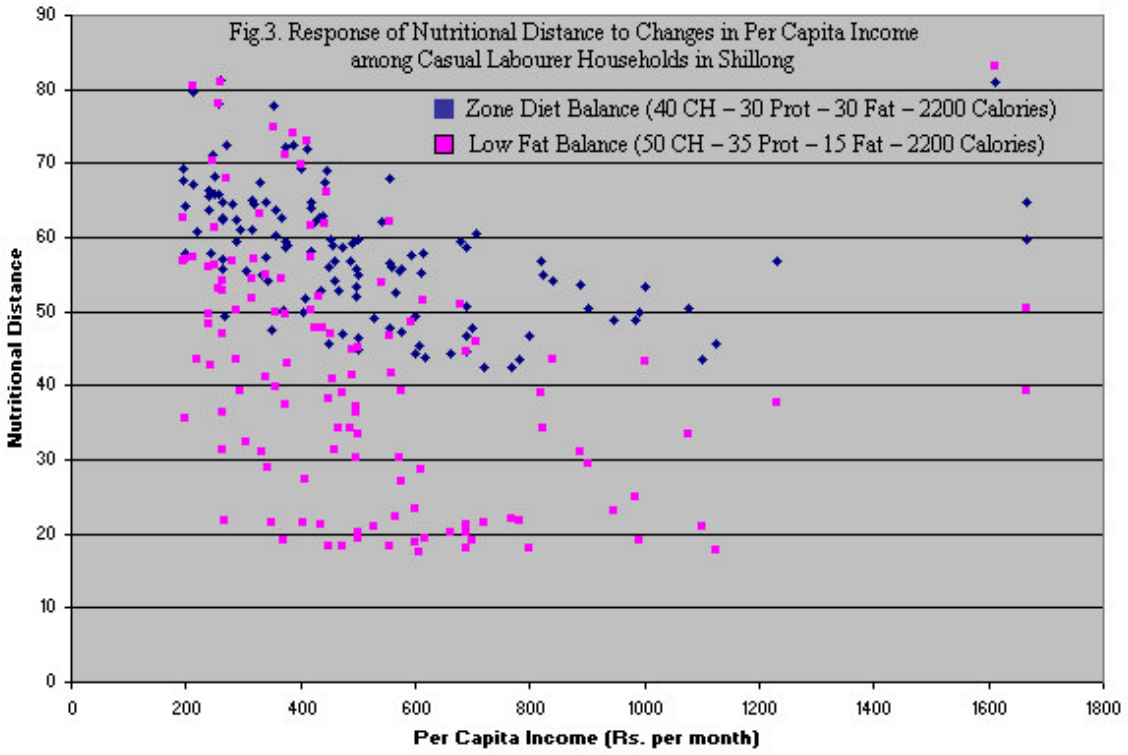


Fig.2. Response of Componential Distance to Changes in Per Capita Income
among Casual Labourer Households in Shillong



VI. Main Findings on Poverty and Dietary Imbalance : Our main findings on income, total expenditure, expenditure on calorie-yielding food articles (calexp) and nutritional ingredients of food intake by the casual labourer households are presented in table 3. We have found that the average family/household size of a casual labourer is 5.5 persons. The average per capita (per month) income and consumption expenditure of these households are Rs. 516.61 and Rs. 392.13 respectively. Of this gross (monthly) consumption expenditure (Rs. 392.13), Rs. 252.88 only is spent on the food articles containing energy, which is as low as Rs. 8.26 per day (table 1). Note that the average price of a kilogram of rice (the staple food grain) is Rs. 11.25.

Table 3. Summary Statistics of Income, Expenditure, Nutritional Intake and Other Related Aspects of Casual Labourer Households in Shillong

Variables Unit :Gram = g	No. of Households	Mean (gram)	Min (gram)	Max (gram)	Std Dev (gram)	Coeff of Variation
FAT (g per capita per day)	125	24.599	7.492	60.988	11.566	0.4702
PROTEIN (g PC per day)	125	36.166	14.071	78.796	12.264	0.3391
CARBOH (g PC per day)	125	301.714	156.439	715.241	96.579	0.3201
CALORIE (PC per day)	125	1598.831	809.647	3632.568	498.702	0.3119
FAMILY (Number)	125	5.504	1.000	14.000	2.392	0.4345
CALEXP (Rs PC/month)	125	252.879	105.429	528.000	89.357	0.3534
EXPEND (Rs PC/month)	125	392.132	169.000	1068.000	149.384	0.3810
INCOME (Rs PC/month)	125	516.614	195.556	1666.667	286.054	0.5537

INCOME=Per Capita Income Rs. per month; CALEXP = Expenditure on Food Articles with Calorie contents; EXPEND=Total Expenditure on all Food & Non-Food Articles; FAMILY = No. of Persons in the household.

To determine the extent of poverty among the casual labourer households under study, we have to fix the poverty line first. Poverty line for the township of Shillong is not available from the extraneous sources. However, according to Planning Commission (India), the poverty line for the urban areas of Meghalaya is at Rs. 344 (per person per month) for the year 1999-2000. This figure is based on the poverty line fixed for Assam. However, as Shillong is relatively a costlier town (than any city/town in Assam), our experience suggests that a factor of 1.15 may be used to inflate the said poverty line. Accordingly, we fix the poverty line for Shillong at Rs. 395.6. Forty-eight households (38.4 percent of the total 125 households) are below this poverty line (BPL). In these BPL households 320 persons are there. Thus, of a total of 688 persons (in 125 labourer households), some 46.5 percent are below poverty line. There are no households in Rs. 395-400 per capita/month income group.

The average energy intake among the BPL households is a meager 1307.66 calories per person per day. The number of households with per capita (per day) calorie intake less than 2000 is 104 in number. Only 19 households have calorie intake larger than 2000, and of them only 14 get more than 2200 calories. Of 125 households, the majority (93) has no milk consumption. Dietary imbalance of food intakes of the casual labourer households is presented in Fig.1 through Fig.3.

As table-4 suggests, casual labourer households eat protein deficient diet. Their main source of energy is carbohydrate. Among the BPL households, the carbohydrates supply 79 percent of energy, which is slightly less (76.5 percent) among the marginally better off households. Among the households "above poverty line" (APL) also, the contribution of protein to energy is only 10.16 percent, far lower than the prescribed standards. Some households do not eat beef due to the religious taboo. Among such households proteins contribute only 9.55 percent of the energy intake (on an average).

Table 4. Percentage Contribution of Different Nutritional Ingredients to Total Calorie Intake of Casual Labourer Households in Shillong

Ingredients	Per Capita Income Rs. Per Month			All Households	Non-Beef-eaters	Beef eaters
	BPL 0 - 396	396 - 600	Above 600			
Carbohydrate	79.0412	76.1013	74.6389	76.5344	77.8340	76.2170
Fat	11.2686	13.7733	14.7170	13.3030	12.6135	13.4714
Protein	9.6903	10.1253	10.6441	10.1626	9.5525	10.3116
Total	100.0000	100.0000	100.0000	100.0000	100.0000	100.0000

VII. Sickness among the Casual Labourer Households : As presented in table 5, overall, the incidence of sickness decreases with an increase in per capita income. Of a total of 72 sick persons, 56 (77.78 percent) are in the BPL households (in the Rs. 0-400 per capita per month income range). These 56 sick persons make 17.5 percent of the total (320 in number) in that income group. Of these 56 sick persons, 30 (53.57 percent) are children and 18 (32.14 percent) are adult women. The incidence of sickness among children falls steeply with an increase in income and we observe that in the Rs. 400-600 income group only three children (25 percent of 12 sick persons in that income group) are sick. Fig.4 shows the fall in incidence of sickness with an increase in per capita income.

Table 5. Poverty, Nutritional Intake and Deficiency Sickness among Casual Labourer Households in Shillong									
Per Capita Income Range Rs. per month	No. of Households in the income group	No. of Persons in the income group	Mean per capita income Rs. per month	Calorie intake person per day	Protein gram per person per day	No. of Deficiency Sick Persons in the income group			
						Children	Women	Men	Total
0-400	48	320	290.02	1307.66	28.21	30	18	8	56
400-600	45	244	488.22	1558.22	35.10	3	4	5	12
600 +	32	124	896.42	2092.70	49.61	1	1	2	4
All	125	688	516.61	1598.83	36.17	34	23	15	72

Table 6. Incidence of Health Disorders among Casual Labourer Households in Shillong				
Per Capita Income Range	Rs. 0-400 per Capita per month	Rs. 400-600 per Capita per month	Above Rs. 600 per Capita per month	All 125 households
Children 0-14 years age group	**30**	**3**	**1**	**4**
Children 0-5 years age group	**21**	**2**	**1**	**24**
Emaciated, rickety or marasmic	11	1	0	12
Stunted growth	4	1	1	6
Swollen feet, lethargic	2	0	0	2
Anemic with recurrent diarrhea	2	0	0	2
Cracked lips and mouth corner	2	0	0	2
Children 5-14 years age group	**9**	**1**	**0**	**10**
Night-blindness	4	1	0	5
Emaciated pale appearance	3	0	0	3
Height much below age	1	0	0	1
Cracked lips and mouth corner	1	0	0	1
Adult Women	**18**	**4**	**1**	**23**
Emaciated; looks older than age	10	2	0	12
Night-blindness	3	1	1	5
Gastroenteritis/stomach ulcer	2	0	0	2
Recurrent constipation and diarrhea	2	1	0	3
Tuberculosis	1	0	0	1
Asthma	1	0	0	1
Adult Men	**8**	**5**	**2**	**15**
Emaciated; looks older than age	4	2	2	8
Night-blindness	2	1	0	3
Recurrent constipation and diarrhea	1	1	0	2
Swollen and painful joints	1	0	0	1
Recurrent Fever	0	1	0	1

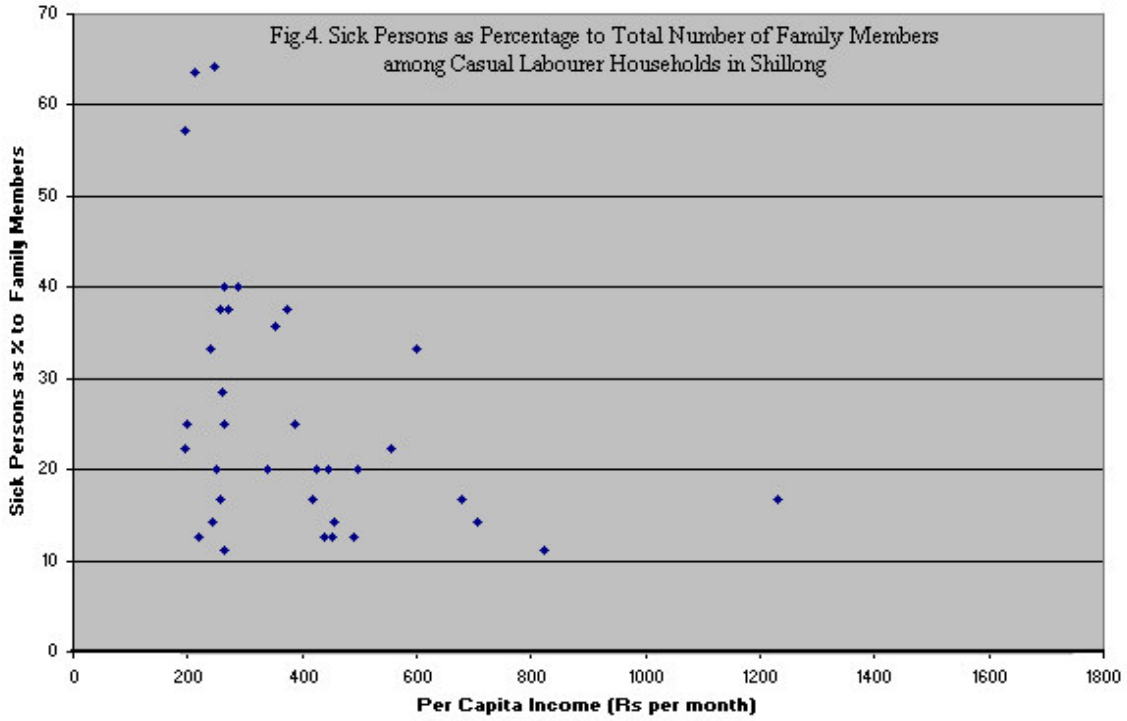


Table-6 presents different types of sickness among the family members of the casual labourer households. Deficiency diseases among children are mostly in the BPL households. A perusal of tables 7 through 9 indicates that per capita income can significantly explain sickness among children and women, but it cannot explain sickness among the men in the casual labourer households.

Table 7. Regression Summary for Dependent Variable: Children as percent to total Sick Persons in Casual Labourer Households; Independent Variable : Per Capita Income (Rs./month)

Variables	Beta Coefficient	SEE of Beta Coefficient	Regression Coefficient	SEE of Reg Coefficient	Student's t value	Prob of being zero
Intercept			7.805980	1.529286	5.10433	0.000001
INCOME	-0.287076	0.086372	-0.008616	0.002592	-3.32373	0.001171
Adjusted R^2= 0.07495256; F(1,123)=11.047 p<0.00117 Std.Error of estimate: 8.2569						

Table 8. Regression Summary for Dependent Variable: Women as percent to total Sick Persons in Casual Labourer Households; Independent Variable : Per Capita Income (Rs./month)

Variables	Beta Coefficient	SEE of Beta Coefficient	Regression Coefficient	SEE of Reg Coefficient	Student's t value	Prob of being zero
Intercept			5.557631	1.030529	5.39299	0.000000
INCOME	-0.296250	0.086119	-0.006009	0.001747	-3.43999	0.000795
Adjusted R^2= 0.08034754; F(1,123)=11.834 p<0.00079 Std.Error of estimate: 5.5640						

Table 9. Regression Summary for Dependent Variable: Men as percent to total Sick Persons in Casual Labourer Households; Independent Variable : Per Capita Income (Rs./month)

Variables	Beta Coefficient	SEE of Beta Coefficient	Regression Coefficient	SEE of Reg Coefficient	Student's t value	Prob of being zero
Intercept			2.222409	0.903982	2.458467	0.015345
INCOME	-0.062886	0.089988	-0.001071	0.001532	-0.698818	0.485985
R^2= .00395460; F(1,123)=0.48835 p<0.48598 Std.Error of estimate: 4.8808						

VIII. Probability of at least One Member of the Household being Overtly Sick : A logit analysis (Intriligator, 1978; pp. 173-176) of the overt sickness of a member of a casual labourer household reveals that the probability of sickness declines with an increase in per capita income. For logit analysis we define four binary variables, C (children of either sex in age group 0-14 years), W (adult women), M (adult men) and T (any member). If at least one member of a particular age-sex group (child, adult woman or adult man, or any unspecified member, as the case may be) is found overtly sick, we assign a value of unity to the variable, else it takes on a value of zero. Per capita income of the household (PC income) is used as the explanatory variable. As shown in Fig.5, the probability of at least one adult woman in the household being overtly sick is the highest in the extremely low-income households, but it declines very sharply as income increases. On the other hand, the probability of at least one adult male member being overtly sick is much lower, but its rate of decline with increase in income is not sharp. The probability of at least one child (in the 0-14 years age group) being overtly sick is high in low-income households, but it is less than that of the adult woman up to the per capita income group below Rs. 250 or so. After that it overtakes the probability of a woman being sick. The logit regression results are presented in table 10.

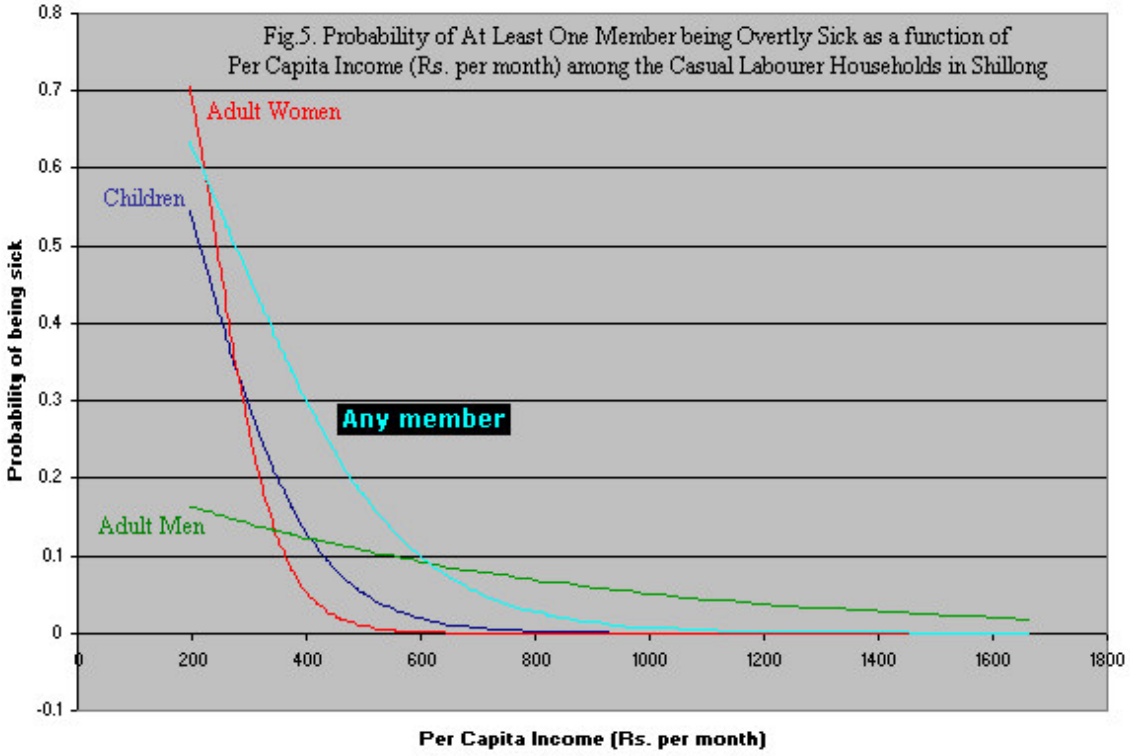


Table 10. Logit Regression of at least one Member being Overtly Sick explained by Per Capita Income

Members	Children (C)		Adult Woman (W)		Adult Man (M)		Any Member (T)	
Regressor	Constant	PC Income	Constant	PC Income	Constant	PC Income	Constant	PC Income
Coefficient	2.172570	-0.01019	4.478395	-0.01841	-1.32152	-0.001608	1.887544	-0.00683
Std.Err.	1.009484	0.00348	1.858558	0.00707	0.80935	0.001930	0.867827	0.00255
t(123)	2.152158	-2.92957	2.409607	-2.60247	-1.63283	-0.833324	2.175022	-2.67859
p-level	0.033338	0.00405	0.017451	0.01039	0.10506	0.406277	0.031542	0.00840
Correlation	0.41402		0.47479		0.09519		0.36971	

IX. Concluding Remarks : Overall, we find that casual labourer households in Shillong are poor; their per capita income (per month) is Rs. 516.6 on an average and they spend a meager amount (Rs. 252.9 only or 48.95 percent of income) on food articles yielding energy. Some 38.4 percent of these households are below poverty line (fixed at Rs. 396 per capita per month). Poorer households have larger family size. Consequently, some 46.5 percent persons in the sample households are below poverty line. The mean energy intake of these households is slightly less than 1600 calories per person per day. The average energy intake among the BPL households is a meager 1307.66 calories per person per day. Only 19 households have calorie intake larger than 2000, and of them only 14 get more than 2200 calories. Of 125 households, the majority (93) has no milk consumption.

Overall, carbohydrates supply 76.5 percent of the energy intake and the contribution of proteins to the calorie intake is ranging between 9.55 and 10.64 percent across different income and food habit groups, with the mean value of 10.16 percent. Irrespective of the per capita income group that they belong to, the casual labourer households, without a single exception, eat diets deficient in proteins far below the prescribed norms.

Of the total number of 688 persons in 125 households, 72 (8.14 percent) are found chronically sick. Among the 72 sick persons, 56 (78.78 percent) are in the BPL income group, 34 (47.22 percent) are children in 0-14 years age group, and 23 (31.94 percent) are adult women. Among the sick, the overwhelming majority indicates nutritional deficiency. Children and women are hit most hard by the dietary imbalance. The probability of a person being overtly sick is very high (0.5 or more) in the extremely poor households. The probability of finding an overtly sick person at about per capita income of Rs. 600 per month is 0.10 and it declines sharply with an increase in income.

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