Nutritional Aspects of Poverty Among Casual Labourer Households in Shillong (India)

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Working Paper – April, 2005

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I. Introduction : Generally, poverty of a household is defined in terms of per capita income. A certain income level is fixed to draw the poverty line and the households with per capita income less than that are considered 'Below Poverty Line' (BPL). About one third of India's population is held to be under poverty line. However, if we define poverty line on nutritional considerations, a much larger part of the total population in India is starved of a nutritional diet.

The objective of this paper is to report our findings as to the extent of poverty among the casual labourers of Shillong, the capital city of Meghalaya, India. Two views of poverty have been considered; first at the per capita (per month) income level and the second at the nutritional level. Nutritional level has been defined in terms of calorie, carbohydrate, protein and fat intakes of the casual labourer households.

II. The Characteristics of Casual Labourers : 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; they earn their livelihood by selling their labour power and often regenerate their labour power by '*investing',* so to say*,* a very 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.

III. 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 biggest market of the state. Goods from other states also come here for redistribution to the different villages of the state. Meghalaya produces potato, tomato, betel nut, ginger, timber, *tezpatta*, turmeric, broomstick, etc. abundantly to be sold to other states. Barrabazzar has the key role in this business. The state has to import almost all manufactured goods (save cement and perhaps coal) from outside. It imports fish and meat as well. Then these goods are distributed to various places in the state. Barrabazzar has a key role in this business as well.

There are no major industrial houses in and around the city, and therefore, it does not have any significant numbers of industrial workers. Yet, there are people working in small scale and cottage industries in and around the city. They are employed in the auto-servicing and repairing workshops, sawmills, steel-fabrication, printing press, furniture, body-building for trucks and buses, cement-block making, etc. Majority of these workers are employed in automobile workshops scattered all over the localities. Earlier there were also quite many sawmills the town, but now they suffer a setback because of the Supreme Court's ban on felling of timbers. Many sawmills have been closed down. As a result, a large number of people in the rural and urban areas are thrown out of employment. This has created immense hardship for the labourers who earlier earned their livelihood from the timber trade directly or indirectly. Consequently, many labourers from rural areas have migrated to the city and other places in search of livelihood. For their survival, these ejected labourers are willing to do any kind of work available to them such as coolie in market place, serving as cobbler, cleaning jobs, working in mines, etc.

Shillong, being the State Capital, houses most of the administrative offices of the State as well as the Central government. The employees of these govt. organizations reside in Shillong. Then there are the people engaged in semi-govt. organizations and the private establishments, etc. There are self-employed people working either as taxi or bus operators or in small trades and petty businesses like shop keeping, food catering, hawkers, etc. The percentage of people working in transport services is quite large because of the high concentration of cars per population in the city. The remaining lot of workers are engaged as casual workers at construction sites, as salesmen and saleswomen, maid-servants, drivers and helpers, bus managers, carpenters, muster-roll, *teer* (arrow) gambling business, vendors, coolies, and so on.

IV. 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 were 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.

Table 1. Summary Statistics of Income, Expenditure, Nutritional Intake and Other Relate 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; F = FAMILY = No. of Persons in the household.

V. Main Findings : We have found that the average family/household size of a casual wage worker 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.

Our main findings regarding the extent of poverty among the casual labourer households may be classified into two heads, the first based on the criterion of per capita (monthly) income of these households, and the second, based on criterion of per capita nutritional intakes of these households.

V.1. Extent of Poverty on the Criterion of Per Capita Income : 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, the poverty line for the urban areas of Meghalaya is 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. In these households 320 persons are there. Thus, of a total of 688 persons (in 125 labourer households), some 46.5 percent are below poverty line (table 2). It may also be noted that these BPL households often spend slightly more than their income. Therefore, they are also most likely to be indebted. That the BPL households spend slightly more than their income is found elsewhere also (Daimari and Mishra, 2005). Hence, this finding is not unexpected.

Table 2: Average Income and Expenditure in Different Per Capita Income (Rs/month) Groups of Casual Labourer Households in Shillong

PCY/M	H	F	CALEXP	EXPEND	INCOME
0-396 (BPL)	48	6.67	189.99	295.01	290.02
396-600	45	5.42	245.39	379.32	488.22
600-900	21	4.19	342.84	520.94	728.16
900 +	11	3.27	386.20	622.45	1217.65
0 - 1666	125	5.50	252.88	392.13	516.61

PCY/M=Per Capita Income Rs. per month; H=No. of Households; CALEXP = Expenditure (PC per month) on Food Articles with Calorie contents; EXPEND=Total Expenditure (PC per month) on all Food & Non-Food Articles; F = Persons in the household – All values from Calexp to Income are group averages.

Table 3: Regression Summary for Dependent Variable: EXPEND
Independent Variable: INCOME

	Beta	SEE of Beta	Regression Coefficient	SEE of Reg Coefficient	t(123)	Prob	Elasticity
Intercept			189.0858	18.2919	10.3371	0.0000	
INCOME	0.7526	0.05937	0.3930	0.03100	12.6765	0.0000	0.5178

Adjusted R^2= 0.56290707; F(1,123)=160.69 p< 0.00000 Std.Error of estimate (SEE) : 98.762

Regression analysis of per capita monthly consumption expenditure (EXPEND) on per capita monthly income (INCOME) suggests (table 3) that the income elasticity of consumption

expenditure is about 0.52. On the other hand, the income elasticity of consumption expenditure on food articles contributing to calorie (CALEXP) is about 0.48 (table 4). As the standard errors of estimate (SEE) and t-value of regression coefficients in the referred tables suggest, these coefficients are significant at 1 percent (or still lower) probability level and 123 degrees of freedom (df).

Table 4: Regression Summary for Dependent Variable: CALEXP Independent Variable: INCOME							
	Beta	SEE of Beta	Regression Coefficient	SEE of Reg Coefficient	t-value (df=123)	Prob	Elasticity
Intercept			132.1282	11.0242	11.9852	0.0000	
INCOME	0.7482	0.0598	0.2337	0.0187	12.5084	0.0000	0.4774
Adjusted R^2 = 0.55629058; F(1,123)=156.46 p<0.00000 Std.Error of estimate (SEE) : 59.522							

V.2. Nutritional Aspects of Consumption Expenditure: In table-5 we present the consumption of different food articles arranged on the criterion of per capita monthly income of the casual labourer households. This table provides us the data base on which the subsequent analysis rests. As usual, all values are per capita per month. Table-6.1 provides us the nutritional contents (carbohydrate, protein and fat) and energy (calorie) of different articles. The last row of this table provides the average retail prices of different food articles. Table 6.2 provides the purchasing power of a Rupee in terms of calorie, carbohydrate, protein and fat. We find that Atta (wheat flour) is the cheapest source of calorie, carbohydrate and protein, yet, due to food habits, its consumption is lower than rice. On the other hand, goat's meat is the costliest source of calorie, protein and fat while beef is the cheapest (among the non-vegetarian foods). Table 7 provides information on nutritional and calorific aspects of food expenditure of households against income, expenditure, family size etc. Figures 1 through 4 give an idea of availability of different nutritional components of food. Matrix-1 provides correlation among these variables.

Table 5. Consumption of Nutritional Food Articles
Quantity (kg/lit.) per Capita per Month (adjusted for persons in 0-14 age-group)

Percapita Iincome	F	Rice	Dal or Pulses	Sugar	Potato	Onion	Musta-rd Oil	Atta	Fish	Beef	Meat	Veg	Milk
195.56	9	6.81	0.16	0.46	0.96	0.55	0.24	0.22	0.04	0.44	0.1	0.48	0
195.71	7	6.69	0.4	0.45	1.7	0.35	0.22	1.13	0.05	0.17	0	1.07	0
200.00	5	9.6	0.16	0.46	2.38	0.46	0.22	0.87	0.12	0.4	0.19	0.86	0
200.00	4	6.4	0.5	0.29	3.06	0.38	0.2	0	0.14	1	0	2.14	0
213.57	7	7.07	0.34	0.69	2.43	0.35	0.21	0	0.1	0.34	0.2	0.28	0
213.64	11	4.69	0	0.29	2.47	0.78	0.1	0.16	0.12	0.44	0	0.51	0
220.00	8	7.67	0.3	0.75	2.13	0.31	0.28	1.18	0	0.3	0	0.74	1.25
238.75	8	8.33	0	0.79	4.25	0.62	0.19	0	0.11	0	0	1.61	0
240.00	6	6.74	0	0.57	1.7	1.03	0.13	0.59	0.2	0.83	0	1.07	0.17
240.00	6	8.53	0.33	0.96	0.85	0.38	0.26	0	0	0.33	0	0.89	0
244.29	7	8.57	0.11	0.94	0	0.7	0.22	0.11	0.1	1.37	0	0	0
248.57	14	5.11	0.14	0.5	2.19	0.62	0.09	0	0.04	1.29	0	0.77	0
250.00	6	7.11	0.33	0.53	1.79	0.46	0.28	0	0.14	0.33	0.24	1.79	0
250.00	10	6.71	0	0.35	1.79	0	0	0.54	0	1.2	0	0	0
258.33	6	8.33	0.07	0.76	0.23	0.31	0.13	0	0.06	0.4	0	0	2.5
258.75	8	5.56	0.13	0.21	0.96	0.19	0.25	0	0	0.13	0.12	0.94	0
260.00	7	4.89	0	0.56	1.46	0.88	0.22	0	0.05	0	0	1.38	0
262.50	4	9.96	0	0.7	1.28	0.42	0.2	0	0.29	0.9	0	0.62	0
262.50	4	9.78	0	0.97	1.06	1.38	0.4	0.89	0.51	0	0.24	0	0
264.00	5	7.11	0.16	0.78	2.04	0.25	0.15	0.08	0.07	0.48	0	0.32	3.6
264.00	5	7.47	0.48	0.69	0	0.62	0.26	0	0.26	0.6	0.24	0.43	0.8
264.22	9	7.9	0.89	0.69	2.12	0.68	0.18	0.33	0.13	0.44	0	0	0

266.67	3	9.96	0.67	0.67	4.76	0.51	0.35	0	0.48	0.67	0	1.43	3
270.00	8	6	0.12	0.49	0.74	0.38	0.15	0.37	0.29	0.15	0.24	0.8	1.13
280.00	6	6.76	0.13	0.39	2.27	0.41	0.26	0.13	0.27	0.8	0.16	0.54	0
288.00	5	5.8	0.16	0.55	3.4	1.11	0.13	2.36	0.23	0.4	0	0.86	4.48
288.00	5	7.43	0.4	0.48	2.86	0.31	0.44	0.3	0	0.4	0	0	0
296.25	8	8.89	0.06	0.73	1.38	0.77	0.05	1.6	0.36	0.3	0	1.07	0
304.00	5	10.13	0.32	0.44	2.38	0.49	0.31	0.47	0.07	0.48	0.19	0.32	0
316.25	4	6.6	0.28	0.6	2.13	0.77	0.19	0.69	0.22	0.45	0.24	1.34	0
316.67	6	6.67	0.17	0.53	3.4	0.51	0.13	0	0.12	1.33	0	0.45	2.5
320.00	5	6.4	0	0.69	2.38	0.28	0.12	0	0.29	1.2	0	0.43	1.4
330.00	4	4.67	1	0.73	3.57	0.38	0.5	0	0	0.13	0.24	2.14	0
333.33	3	10.67	0	0.5	2.38	0.31	0.22	0	0.07	0.67	0	0	3
340.00	10	6.84	0.45	0.77	0.43	0.38	0.54	0.44	0.2	0	0	0.73	0
341.11	9	7.7	0.78	0.87	3.31	0.68	0.44	0	0	0.44	0.24	0	1.11
342.86	7	7.31	0.29	0.82	2.72	0.44	0.31	3.1	0.33	0	0.27	1.22	1.89
350.00	2	8.89	0.5	0.52	8.5	0.77	0.55	0	0.29	1.2	0	2.14	0
352.86	14	6.1	0.04	0.5	0.22	0.2	0.06	0.13	0.21	0.29	0.1	0.15	0
355.45	11	7.47	0.15	0.98	2.47	0.45	0.14	0	0.33	0.44	0	1.95	1.36
357.14	7	9.69	0.27	0.74	2.04	0.26	0.31	0	0.21	0.14	0	0.77	0
367.50	6	4.99	0.16	0.86	3.4	0.77	0.37	0.99	0.14	0.8	0.16	2.14	0
371.43	7	10.67	0.41	0.74	3.89	0.66	0.31	1.69	0.09	0.69	0.13	0.61	0
373.75	8	8.76	0	0.78	5.53	0.77	0.21	0.25	0.15	0.6	0	0.6	0
375.00	8	5.19	0.3	0.52	1.06	0.77	0.19	0	0.09	0.68	0.12	2.48	0
375.00	4	6.93	0.24	0.4	2.89	0.54	0.4	0	0.14	1.2	0	1.88	0
378.00	5	7.47	0.2	0.72	4.76	0.55	0.22	0.3	0.14	0.96	0	0.96	0
387.50	4	3.91	0.21	0.52	3.4	0.46	0.77	0	0	0	0	1.82	0
400.00	7	4.32	0.1	0.34	3.89	1.1	0.38	0	0.17	1.03	0	1.84	0
404.17	6	9.78	0.3	0.52	5.44	0.72	0.51	0.82	0	0	1.18	2.14	0.33
408.00	5	8.89	0.48	0.78	1.87	0.74	0.62	1.1	0.06	0.4	0	3.22	0
412.50	4	4.89	0.35	0.5	0.94	0.62	0.1	0	0.14	1.2	0.12	0.67	0
416.67	6	5.87	0.24	0.57	0.85	0.62	0.33	0	0	1.33	0	0	1.5
416.67	6	6.22	0.33	0.34	1.98	0.51	0.17	0.33	0	1.17	0.31	2.14	0
417.50	8	6.1	0.5	0.36	1.49	0.42	0.37	0.54	0.51	1	0.71	2.68	0
424.00	5	8.89	0.08	0.39	0.34	0.12	0.31	0.12	0.17	0.48	0	1.71	0
433.33	6	6.98	0.16	0.59	3.57	0.31	0.4	0	0	0.67	0	1.29	0
435.00	2	11.11	0	1.15	0	1.54	0.2	2.22	0.14	0.6	0	0.54	0
440.00	8	8.83	0.2	0.46	0.21	0.58	0.19	0.22	0	0	0.96	2.68	0
442.00	5	5.33	0.19	0.7	2.72	0.31	0.22	0.2	0.35	0.48	0	2.57	2.16
444.40	5	4.85	0	0.32	2.72	0.31	0.44	0.3	0.26	0	0	3.86	3.6
450.00	4	8.89	0	0.26	4.59	0.54	0.28	0	0	1.2	0	1.07	0
450.00	4	10.67	0.36	0.72	2.08	0.58	1.1	1.23	0.16	0	0.53	1.61	0
452.50	8	6.61	0.05	1.25	3.06	0.27	0.44	0.25	0.49	0.6	0.15	0	0
457.14	7	9.97	0	0.39	0.85	0.22	0.28	0	0.17	0.69	0	0.31	0
458.33	6	9.93	0.54	0.91	0.68	0.36	0.59	0	0.1	0.3	0	1.43	0
460.00	6	9.78	0	1.15	0.57	0	0.37	1.23	0	0	0.37	1.93	0
466.67	3	7.47	0.48	0.38	6.8	0.77	0.55	0	0	0	0.63	2.57	5
473.33	6	8.89	0.33	0.64	2.38	0.51	0.33	0.36	0.11	0.33	0	2.68	0
473.75	8	10.83	0.18	1.09	4.25	0.48	0.69	0	0.07	1	0.15	1.34	0
487.50	6	9.78	0.37	0.6	0.71	0.64	0.13	0.66	0.06	0.8	0	2.68	0
488.75	8	9.33	0.5	0.5	1.79	0.38	0.28	0	0	0.5	0.18	0	0
490.00	6	8.34	0.16	0.7	0.99	0.31	0.28	0	0.24	0.67	0.24	0.89	1.25
496.67	3	8.89	0	0.65	2.83	0.62	0.18	0	0.24	1.33	0	1.79	0
498.00	5	9.99	0.38	0.88	0	0.37	0.33	0.59	0	0.8	0.38	0	0
498.75	4	8.22	0.2	0.29	0.64	0.77	0.39	0.22	0.05	1.2	0.24	5.36	4
500.00	4	6.67	0.2	0.82	3.19	1.15	0.24	2.36	0.36	0.4	0	1.34	3.75
500.00	5	8	1.34	1.46	6.8	0	1.54	2.96	0.46	0	0.42	3.22	0
500.00	5	10.4	0.86	0.77	2.72	1.54	0.62	2.36	0.58	0	0.42	4.29	3
500.00	4	8.53	0.24	0.49	1.49	0.46	0.3	0	0.16	0.5	0.47	1.34	0
528.00	5	11.38	0.48	0.28	1.36	0.49	0.37	0.47	0.32	0.96	0.19	1.29	0
540.00	5	5.87	0	0.41	2.55	0.62	0.09	0.89	0.39	1.44	0	2.57	0
554.00	5	6.4	0.42	0.69	2.38	0.49	0.32	0	0.58	1.2	0.19	1.29	3
555.56	9	6.12	0.23	0.74	0.38	0.48	0.34	0.2	0.09	0.27	0.13	1.52	1.67
556.00	5	12.27	0.38	0.7	4.9	0.92	0.4	0.2	0.19	0.96	0.24	2.14	0
560.00	5	5.6	0.38	0.83	8.5	0.71	0.44	0.39	0.13	0.96	0.19	1.46	0
567.00	4	13.87	0.25	0.52	2.04	0.46	0.28	1.08	0	0	0.24	4.02	0.6
571.43	7	11.17	0.16	0.66	0.85	0	0.44	0	0.12	0	0.34	2.14	0

575.00	3	9.48	0.4	0.32	1.7	1.03	0.39	0	0	2.4	0	3.57	0
575.00	4	8	0.18	1	0	0.5	0.44	0.67	0.29	0.6	0.29	0.54	1.4
593.13	8	5.91	0.48	0.5	4.25	1.08	0.55	0.22	0.11	1.2	0.15	1.23	0
599.33	6	12.44	0.17	0.65	1.98	0.51	0.37	0	0	0.83	0.2	2.5	0.83
600.00	3	8.89	0	0.67	4.76	1.03	0.66	0	0.19	2.33	0.31	3.57	0
608.57	7	11.68	0.21	1.18	7.77	1.32	0.31	0.28	0	2.4	0.27	2.76	0
610.00	7	9.9	0	2.05	0.49	0.33	0.2	0	0.43	0.69	0	2.76	0
612.50	4	5.67	0.24	0.54	2.13	1.15	0.55	0.25	0.16	1.5	0.24	3.22	0
618.33	3	10.37	0.53	0.76	3.4	1.64	0.73	0.13	0.14	1.6	0.47	2.5	0
660.00	5	11.02	1.04	0.83	2.04	1.72	1.54	0.99	1.16	0	0.21	4.29	0
678.33	6	5.93	0	1.3	1.7	1.54	0.26	0	0.24	1.6	0.24	1.43	0
687.50	4	6.67	0.4	0.73	0.85	0.31	0.19	0.99	0.8	0.35	0.47	4.02	1.25
690.00	2	13.33	0.88	0.97	3.4	0.62	0.44	0	0.14	1.2	0.47	1.34	0
690.00	5	7.47	0.1	0.87	2.38	0.74	0.66	2.36	0.52	1.6	0	3	2.32
690.00	4	10.67	1	0.52	2.08	0.38	0.28	1.08	0.16	0.5	0.12	4.82	0
700.00	2	9.78	0.56	0.52	1.87	1.92	0.77	1.23	0.87	0	0	4.72	0
705.00	7	8.89	0	0.38	0.85	0.53	0.31	0.28	0	0.57	0.27	0.73	0
720.00	2	8.89	0.56	0.72	5.78	1.92	0.66	0.59	0.14	2.4	0.47	2.57	0
768.00	5	10.35	0.9	0.91	4.76	0.92	0.4	0	0	2.8	0.56	3.86	0
780.00	4	11	0.56	0.77	2.34	2.38	1.06	0	0.98	0.45	0	3	4.2
800.00	2	11.11	0	0.97	0	3.08	0.77	0	1.16	0	0.47	6.43	0
820.00	3	16.89	0	0.74	3.4	1.03	0	1.64	0.23	3	0.16	3.57	0
822.22	9	8.79	0.25	1.18	2.27	0.43	0.2	0	0.12	0.93	0.52	2.38	0
841.67	3	6.28	0.13	0.88	2.83	0.82	0.26	0.33	0.24	2.4	0.16	1.07	0
889.33	3	14.22	0.64	0.97	11.9	1.23	0.44	0.33	0.48	1.67	0	2.43	0
900.00	1	13.33	0	1.15	10.2	1.85	0.88	0	0.72	2	0	2.36	0
946.00	5	7.82	0.48	0.72	1.7	0.62	0.26	2.66	0.52	1.12	0.38	2.14	0
982.50	2	14	0.8	1.03	4.25	0.31	0.39	0.59	0.65	2.4	0.47	1.34	0
989.60	5	10.24	0.58	0.78	2.86	0.74	0.44	1.58	0.13	0	0.89	2.14	0
1000.00	4	6.33	0.72	0.33	1.49	0.46	0.3	0	0	0.6	0.47	3.22	13.88
1076.00	4	8.89	0.5	0.49	0.43	1.92	0.94	0	0.14	0.75	0.29	0.27	0
1100.00	2	11.73	0.2	1.03	2.21	1.92	0.88	0.49	0.29	2.4	0.59	3.7	0
1125.00	1	12.8	0	0	0	0.46	0.79	0	0.36	0	0.94	25.72	0
1231.67	6	8.89	0.16	0.81	1.98	0.62	0.29	0.33	0.29	0.67	0.24	0	0
1610.00	1	23.47	0.52	1.03	2.55	0.92	0.55	0	0	2	0	7.5	0
1666.67	3	17.33	0	1.3	12.47	2.31	0.73	0.66	0	0	0.59	3.57	0
1666.67	3	17.07	1.04	1.34	7.48	1.28	0.44	0	0.77	0.33	0	3.29	0

* F = Household Size or no. of family members in the household

Table 6.1. 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

Table 6.2. Nutritional value of Food Articles Per Rupee Cost												
Contents	Rice	Dal or Pulses	Sugar	Potato	Onion	Mustard Oil	Atta or Flour	Fish	Beef	Meat	Vege-tables	Milk
Calorie	321.96	117.76	220.63	163.27	51.23	194.56	358.62	43.48	74.12	25.74	49.30	61.50
Carboh (g)	71.56	18.20	57.02	36.73	10.31	0.00	74.88	4.04	0.00	0.00	9.86	4.50
Protein (g)	5.78	8.56	0.00	4.08	5.08	0.00	10.25	1.65	4.48	3.49	2.68	3.30
Fat (g)	0.44	0.64	0.00	0.00	0.00	22.04	0.79	2.38	6.12	1.11	0.00	3.30
The Cheapest Source of a particular Nutritional ingredient						Color Index	The Costliest Source of a particular Nutritional ingredient					

Table 7. Household-wise Income, Expenditure, Family Size and Nutritional Contents of Foof Intake among Casual Labourer Households [* = per capita per month; ** = per capita per day (or pcpd))								
Sl No.	INCOME (Rs.)*	EXPEND (Rs.)*	CALEXP (Rs)*	F. Size (No.)	CALORIE **	CARBOHYd (gram)**	PROTEIN (gram)**	FAT (gram)**
1	195.56	227.78	149.11	9	1104.09	215.98	22.86	14.30
2	195.71	240.71	149.00	7	1207.25	245.90	25.36	10.97
3	200.00	311.80	207.80	5	1573.80	319.24	33.41	14.58
4	200.00	355.25	199.00	4	1190.32	219.68	30.08	18.97
5	213.57	246.71	170.43	7	1189.83	237.82	25.20	13.00
6	213.64	191.45	118.18	11	814.17	161.73	17.72	9.30
7	220.00	257.75	180.25	8	1422.92	285.30	29.13	15.52
8	238.75	227.63	167.75	8	1341.58	287.67	23.89	8.32
9	240.00	251.83	181.33	6	1205.00	234.65	27.18	15.36
10	240.00	253.83	165.17	6	1347.79	275.43	25.14	13.63
11	244.29	242.86	207.14	7	1431.22	268.09	31.11	23.37
12	248.57	257.79	165.07	14	973.47	175.71	24.93	17.30
13	250.00	297.33	186.83	6	1203.32	234.08	26.56	15.58
14	250.00	250.10	157.60	10	1126.08	218.23	26.80	13.50
15	258.33	288.17	167.00	6	1265.83	256.45	25.04	12.92
16	258.75	171.50	112.50	8	856.61	168.35	16.89	11.03
17	260.00	241.57	105.43	7	809.65	166.96	14.07	8.42
18	262.50	282.50	214.25	4	1546.51	305.23	31.40	19.09
19	262.50	350.50	224.25	4	1648.70	332.61	30.96	18.74
20	264.00	244.00	187.00	5	1241.12	243.39	26.81	15.53
21	264.00	327.00	204.00	5	1261.55	236.93	29.37	19.34
22	264.22	253.56	182.56	9	1365.44	274.72	30.83	13.08
23	266.67	527.00	297.67	3	1829.42	348.40	42.05	26.44
24	270.00	228.00	162.50	8	1016.46	201.47	22.66	11.27
25	280.00	291.17	191.83	6	1194.22	221.02	27.33	20.03
26	288.00	289.80	224.80	5	1409.70	274.54	35.34	16.28
27	288.00	320.60	163.80	5	1308.17	250.24	25.61	20.28
28	296.25	242.63	195.75	8	1523.91	322.49	31.69	8.64
29	304.00	306.60	213.60	5	1625.82	323.04	34.30	18.19
30	316.25	371.25	195.00	4	1233.30	241.94	28.93	14.31
31	316.67	298.83	222.17	6	1277.16	231.00	32.46	22.51
32	320.00	353.60	203.20	5	1188.36	218.50	28.04	20.43
33	330.00	335.00	182.50	4	1087.63	197.81	25.66	20.06
34	333.33	428.00	223.00	3	1648.01	325.87	33.93	19.63
35	340.00	224.50	156.00	10	1230.27	235.09	21.69	20.59
36	341.11	341.22	218.44	9	1455.41	274.32	32.53	22.83
37	342.86	377.86	244.29	7	1685.69	336.49	38.34	17.26
38	350.00	511.50	301.50	2	1841.58	335.56	42.32	33.91
39	352.86	169.00	123.29	14	913.67	188.61	18.43	7.49
40	355.45	288.09	205.09	11	1312.74	265.10	27.39	13.78
41	357.14	304.14	185.29	7	1500.87	308.24	27.32	14.67
42	367.50	282.50	209.67	6	1232.19	223.99	28.82	22.94
43	371.43	297.86	259.57	7	1964.59	392.08	43.03	20.72
44	373.75	294.75	207.38	8	1533.69	312.03	30.67	15.47
45	375.00	216.38	168.13	8	960.94	178.86	23.75	15.16
46	375.00	389.75	217.00	4	1318.83	231.94	30.69	27.62
47	378.00	338.20	213.20	5	1420.79	274.70	31.56	19.32
48	387.50	360.75	133.25	4	927.83	156.44	14.71	26.43

49	400.00	377.86	184.14	7	995.99	166.40	24.27	24.88
50	404.17	476.50	318.17	6	1834.24	352.83	45.15	23.07
51	408.00	383.40	234.60	5	1709.30	325.11	34.71	27.11
52	412.50	214.75	172.75	4	936.56	164.62	25.76	17.72
53	416.67	367.17	187.67	6	1131.66	189.81	27.37	27.32
54	416.67	387.67	215.17	6	1186.03	213.50	32.71	19.87
55	417.50	392.88	291.25	8	1325.90	221.51	38.98	28.97
56	424.00	276.40	178.80	5	1351.74	265.28	26.31	17.72
57	433.33	290.67	179.50	6	1272.09	239.64	25.54	21.42
58	435.00	288.50	231.50	2	1930.64	398.90	38.92	16.00
59	440.00	348.13	234.63	8	1351.61	271.83	33.86	10.98
60	442.00	298.60	200.60	5	1109.46	208.84	25.55	17.56
61	444.40	237.20	191.20	5	1041.98	188.29	22.23	20.94
62	450.00	403.25	217.50	4	1506.61	284.71	33.38	23.06
63	450.00	418.75	291.25	4	2041.26	369.51	39.45	41.50
64	452.50	316.25	216.00	8	1358.17	253.11	26.12	25.13
65	457.14	286.29	186.86	7	1472.80	289.61	28.58	18.96
66	458.33	344.00	209.00	6	1637.04	315.84	30.12	25.22
67	460.00	335.17	212.17	6	1661.31	341.75	31.18	15.45
68	466.67	419.33	300.00	3	1573.62	286.39	39.77	27.31
69	473.33	349.17	204.67	6	1503.32	301.42	30.44	16.72
70	473.75	485.38	284.75	8	1971.50	365.92	39.01	35.95
71	487.50	330.33	219.83	6	1588.16	319.98	35.82	14.82
72	488.75	265.88	191.75	8	1458.47	288.26	31.15	16.82
73	490.00	372.83	221.17	6	1393.52	264.09	30.75	21.08
74	496.67	470.33	240.33	3	1522.90	289.59	34.54	22.36
75	498.00	304.20	232.80	5	1655.70	318.79	36.54	22.38
76	498.75	482.25	304.75	4	1554.70	268.03	41.75	32.20
77	500.00	412.75	250.25	4	1584.81	307.61	37.47	20.02
78	500.00	525.80	387.00	5	2440.71	421.51	51.18	58.00
79	500.00	479.00	376.00	5	2227.70	423.51	53.96	31.27
80	500.00	369.75	224.75	4	1389.96	266.13	32.00	19.00
81	528.00	369.80	275.80	5	1856.09	351.66	42.68	26.75
82	540.00	422.20	228.20	5	1240.57	224.91	32.90	21.04
83	554.00	426.80	284.00	5	1379.61	233.07	36.73	31.26
84	555.56	309.78	171.78	9	1107.62	209.13	23.17	18.02
85	556.00	399.60	315.60	5	2105.43	408.96	46.97	27.22
86	560.00	302.40	252.20	5	1444.44	261.91	34.54	27.00
87	567.00	415.75	273.25	4	2141.11	449.52	44.10	13.48
88	571.43	446.29	223.43	7	1675.30	337.84	31.63	18.34
89	575.00	540.00	310.00	3	1756.70	296.55	46.78	39.27
90	575.00	344.75	236.00	4	1489.45	275.11	31.93	26.43
91	593.13	368.00	238.00	8	1350.39	225.83	33.47	32.94
92	599.33	335.50	277.17	6	1952.40	382.25	41.48	24.50
93	600.00	678.00	366.33	3	1901.48	310.06	48.37	49.26
94	608.57	513.86	397.14	7	2329.20	430.18	58.34	37.79
95	610.00	397.71	251.43	7	1707.10	350.37	31.29	17.71
96	612.50	303.75	263.00	4	1318.71	209.30	34.70	36.40
97	618.33	594.67	362.00	3	2043.43	351.91	50.44	44.94
98	660.00	610.00	405.60	5	2393.87	406.56	48.31	60.99
99	678.33	359.33	251.00	6	1291.88	224.54	32.33	28.04
100	687.50	427.25	286.00	4	1389.69	262.79	36.79	18.71
101	690.00	592.50	355.50	2	2282.46	434.48	53.82	31.84

102	690.00	569.20	341.60	5	1931.51	326.91	46.77	45.64
103	690.00	463.00	283.50	4	1897.74	378.18	45.62	18.28
104	700.00	599.50	308.00	2	1918.84	359.65	40.30	32.68
105	705.00	308.71	190.43	7	1381.67	267.79	29.03	18.55
106	720.00	604.50	403.00	2	2076.94	340.96	57.28	50.66
107	768.00	522.20	430.60	5	2180.87	369.72	63.33	45.85
108	780.00	550.00	388.75	4	2180.78	375.98	46.52	52.03
109	800.00	672.00	377.00	2	1975.50	367.68	41.88	35.33
110	820.00	655.33	458.67	3	2913.38	559.17	73.97	35.61
111	822.22	393.56	272.44	9	1574.79	304.51	37.65	20.04
112	841.67	466.33	286.33	3	1448.67	235.75	40.15	36.16
113	889.33	619.33	433.67	3	2759.66	532.15	63.71	37.12
114	900.00	717.00	454.00	1	2718.13	487.34	58.71	55.89
115	946.00	426.00	309.60	5	1795.07	333.41	47.51	26.39
116	982.50	713.00	463.50	2	2643.07	478.36	67.99	45.42
117	989.60	420.40	305.80	5	1924.98	379.48	45.99	20.60
118	1000.00	557.50	359.25	4	1460.64	234.17	47.63	34.30
119	1076.00	511.00	253.50	4	1628.92	271.90	34.51	42.41
120	1100.00	876.00	450.00	2	2403.73	398.61	60.37	59.44
121	1125.00	576.00	528.00	1	2281.92	426.72	60.35	33.38
122	1231.67	288.00	223.83	6	1517.87	294.54	32.29	20.49
123	1610.00	1068.00	511.00	1	3632.57	715.24	78.80	42.92
124	1666.67	683.33	429.33	3	3076.51	630.75	61.17	29.25
125	1666.67	727.67	414.33	3	2886.22	592.23	59.93	25.64

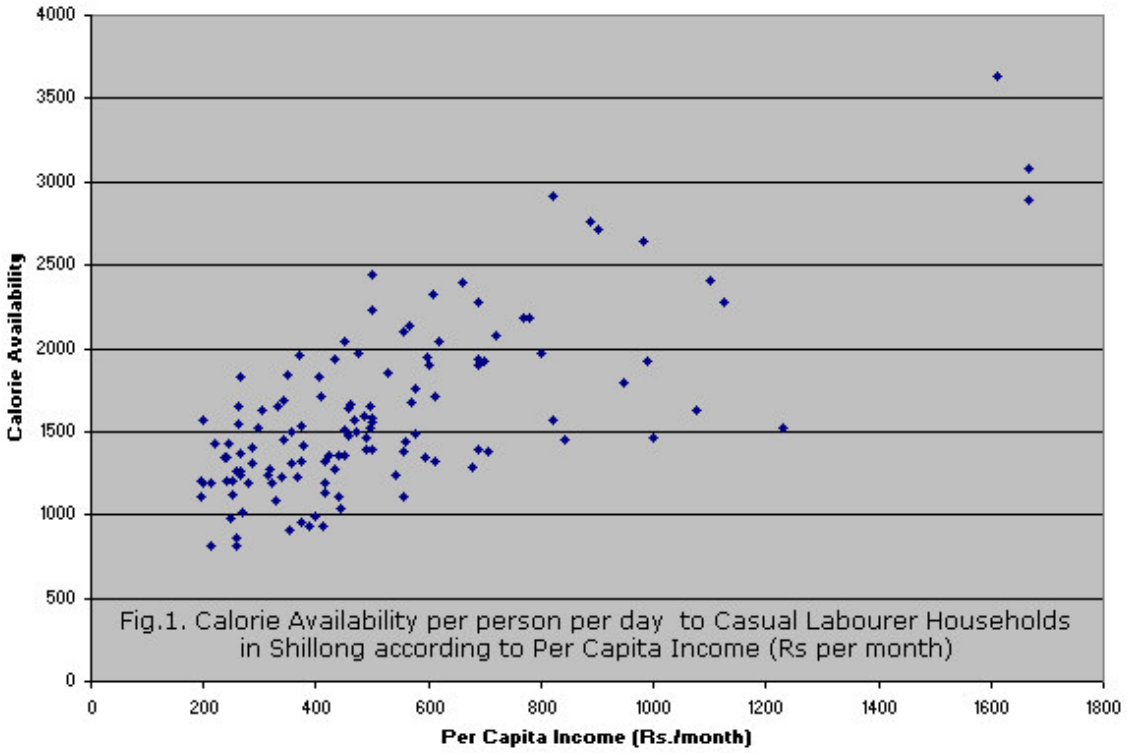


Fig.1. Calorie Availability per person per day to Casual Labourer Households in Shillong according to Per Capita Income (Rs per month)

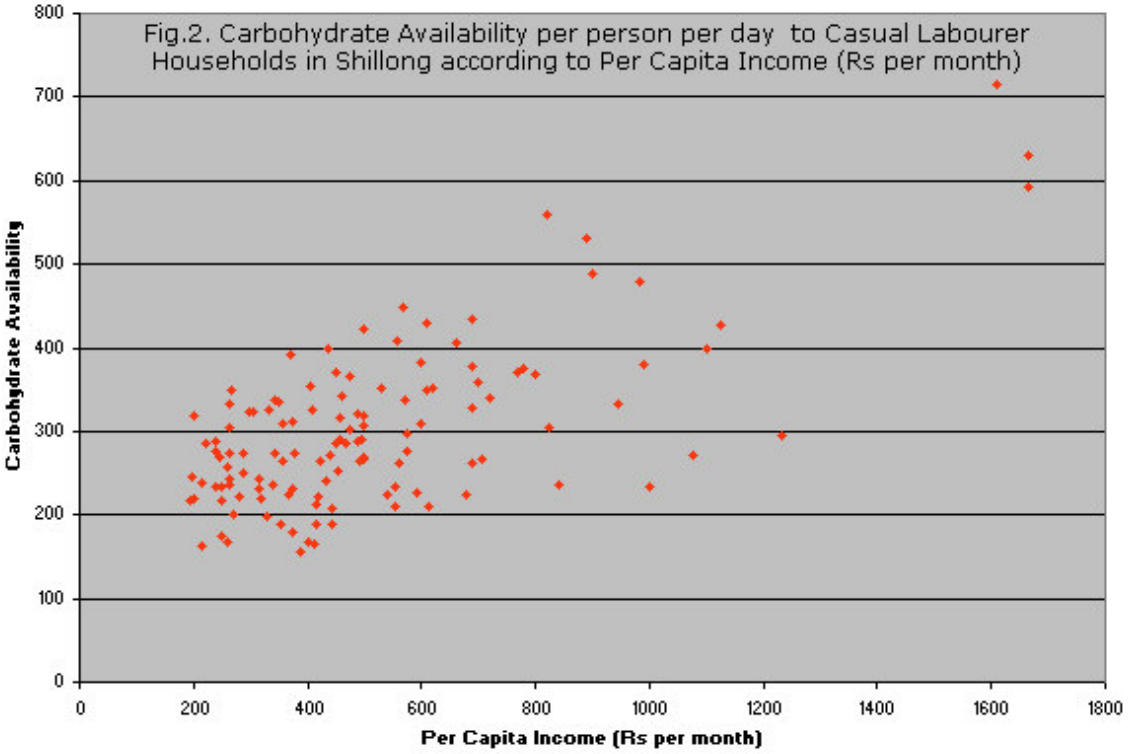


Fig.2. Carbohydrate Availability per person per day to Casual Labourer Households in Shillong according to Per Capita Income (Rs per month)
Carbohydrate Availability
Per Capita Income (Rs per month)
0
100
200
300
400
500
600
700
800
0
200
400
600
800
1000
1200
1400
1600
1800

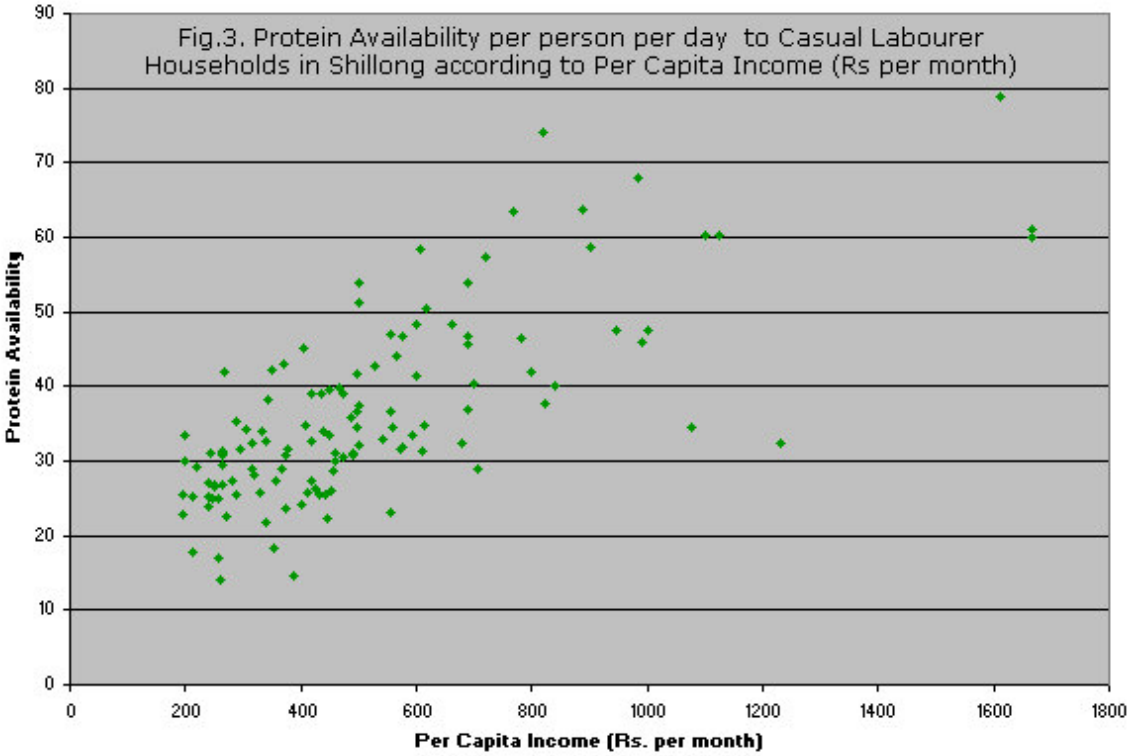
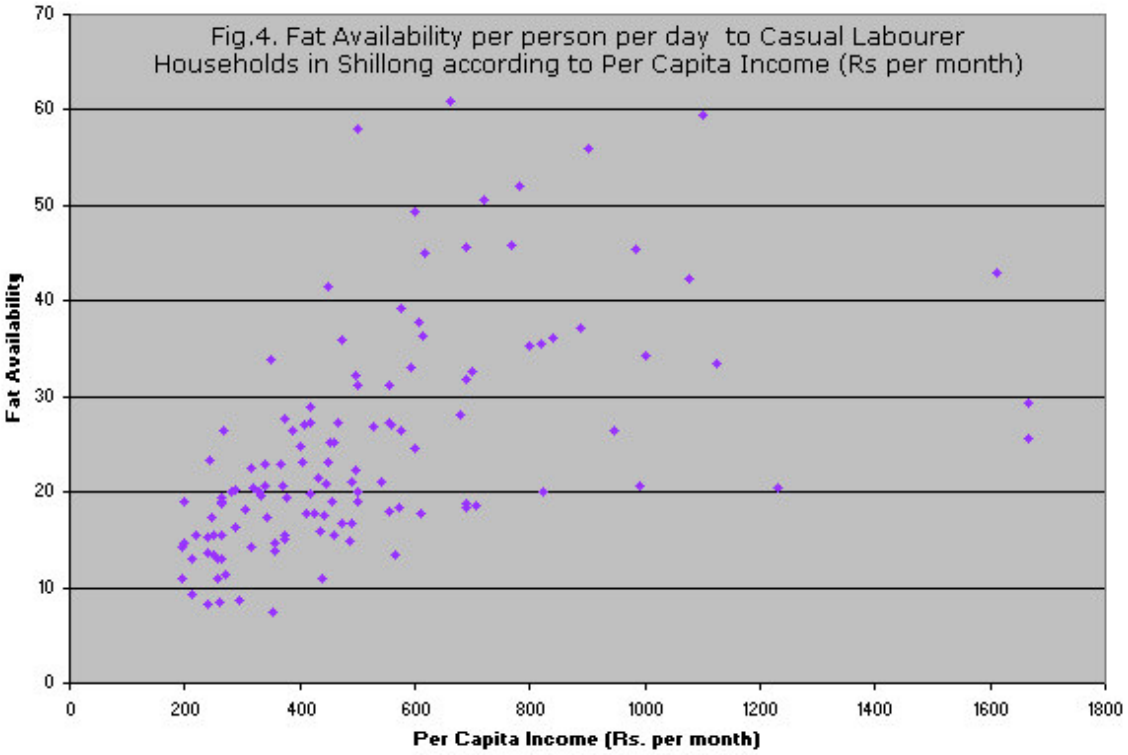


Fig.3. Protein Availability per person per day to Casual Labourer Households in Shillong according to Per Capita Income (Rs per month)
Protein Availability
Per Capita Income (Rs. per month)
0
10
20
30
40
50
60
70
80
90
0
200
400
600
800
1000
1200
1400
1600
1800



Matrix-1. Correlation among Income, Expenditure, Household size and Nutritional Components of Food Available to Casual Labourer Households in Shillong								
	CALORIE	CARBO	PROTEIN	FAT	INCOME	EXPEND	CALEXP	FAMILY
CALORIE	1.0000	0.9757	0.9317	0.6521	0.7154	0.8403	0.8959	-0.5605
CARBOH	0.9757	1.0000	0.8628	0.4743	0.6716	0.7475	0.8013	-0.4926
PROTEIN	0.9317	0.8628	1.0000	0.7165	0.7227	0.8702	0.9649	-0.5923
FAT	0.6521	0.4743	0.7165	1.0000	0.5440	0.7853	0.8029	-0.5414
INCOME	0.7154	0.6716	0.7227	0.5440	1.0000	0.7526	0.7482	-0.4653
EXPEND	0.8403	0.7475	0.8702	0.7853	0.7526	1.0000	0.9011	-0.6603
CALEXP	0.8959	0.8013	0.9649	0.8029	0.7482	0.9011	1.0000	-0.6189
FAMILY	-0.5605	-0.4926	-0.5923	-0.5414	-0.4653	-0.6603	-0.6189	1.0000

Table 8. Average Income, Expenditure and Nutritional Contents (pcpd or per capita per day) of Food Intakes in Different Per Capita Income (Rs/month) Groups of Casual Labourer Households									
PCY (Rs/month)	H (No)	CALORIE (pcpd)	CARBOHYD (gram pcpd)	PROTEIN (gram pcpd)	FAT (gram pcpd)	F (No.)	CALEXP (Rs./month)	EXPEND (Rs./month)	INCOME (Rs./month)
Rs. 0-396	48	1307.66	254.87	28.21	17.04	6.67	189.99	295.01	290.02
Rs. 396-600	45	1558.22	292.20	35.10	24.81	5.42	245.39	379.32	488.22
Rs. 600-900	21	1986.42	360.76	47.19	36.20	4.19	342.84	520.94	728.16
Rs. 900 +	11	2295.59	432.31	54.23	34.57	3.27	386.20	622.45	1217.65
Rs. 0- 1666	125	1598.83	1598.83	1598.83	1598.83	5.50	252.88	392.13	516.61
PCY/M=Per Capita Income Rs. per month; H=No. of Households; CALEXP = Expenditure on Food Articles with Calorie contents; EXP=Total Expenditure on all Food & Non-Food Articles; F = No. of Persons in the household – All values from Calorie to Income are group averages.									

Table 8 provides information on the income, expenditure, nutritional implications of expenditure, etc. of the households in different income groups. We observe that in case of the BPL households mean per capita calorie availability (per day) is only 11308, which increases gradually with an increase in income to cross 2000/day limit only when per capita per month

income is above Rs. 900. However, in Rs. 900+ (per capita per month) income group only 11 households are there. They make only 8.8 percent of the total number of households. Even if we make a little compromise to set the required calorie requirement at 1900 per person per day, only 32 (25.6 percent of the total) households can avail themselves of that. Thus at any standard, no less than 3/4th of the casual labourer households suffer from malnutrition. This suggests that to ensure enough nutrition, the per capita income requirement is Rs. 800/month at least.

Table 9: Regression Summary for Dependent Variable: CALORIE
Independent Variable: INCOME

	Beta	SEE of Beta	Regression Coefficient	SEE of Reg Coefficient	t-value (df=123)	Prob	Elasticity
Intercept			954.4899	64.7979	14.7303	0.0000	
INCOME	0.7154	0.0630	1.2472	0.1098	11.3559	0.0000	0.4030
Adjusted R^2 = 0. 50784617; F(1,123)=128.95 p< 0.00000 Std.Error of estimate (SEE) : 349.86							

Table 10: Regression Summary for Dependent Variable: CARBOHYD
Independent Variable: INCOME

	Beta	SEE of Beta	Regression Coefficient	SEE of Reg Coefficient	t-value (df=123)	Prob	Elasticity
Intercept			184.5718	13.3068	13.8705	0.0000	
INCOME	0.6716	0.0668	0.2268	0.0226	10.0532	0.0000	0.3883
Adjusted R^2 = 0. 44659262; F(1,123)=101.07 p< 0.00000 Std.Error of estimate (SEE) : 71.846							

Table 11: Regression Summary for Dependent Variable: PROTEIN
Independent Variable: INCOME

	Beta	SEE of Beta	Regression Coefficient	SEE of Reg Coefficient	t-value (df=123)	Prob	Elasticity
Intercept			20.1602	1.5763	12.7895	0.0000	
INCOME	0.7227	0.0623	0.0310	0.0027	11.5959	0.0000	0.4428
Adjusted R^2 = 0. 51838136; F(1,123)=134.47 p< 0.00000 Std.Error of estimate (SEE) : 8.5108							

Table 12: Regression Summary for Dependent Variable: FAT
Independent Variable: INCOME

	Beta	SEE of Beta	Regression Coefficient	SEE of Reg Coefficient	t-value (df=123)	Prob	Elasticity
Intercept			13.2369	1.8048	7.3345	0.0000	
INCOME	0.5439	0.075659	0.02199	0.003059	7.1898	0.0000	0.4618
Adjusted R^2 = 0.29018532; F(1,123)=51.693 p< 0.00000 Std.Error of estimate (SEE) : 9.7443							

Tables 9 through 12 suggest how the availability of different nutritional contents responds to per capita income per month. In general, casual worker households eat protein-deficient food. Of all the ingredients, fats are the most income-elastic and carbohydrates are the least income elastic.

Although beef is the cheapest non-vegetarian source of calorie, protein and fat, some casual labourer households would not eat beef on account of religious taboo. Therefore, income elasticities for calorie, carbohydrate, protein and fat across the beef-eaters and non-beef-eaters are likely to vary. In table 13 we present these elasticities. We find that while income elasticities of calorie, protein and fat intakes of non-beef-eaters are smaller than those of the beef-eaters, the income elasticity of carbohydrate consumption is larger for the non-beef-eaters. These results are as expected. As we observe in table 14, the percentage contribution of carbohydrates to total calorie intake of non-beef-eater households is larger than in case of beef-eater households.

Further, the contribution of carbohydrates to calorie intake decreases with an increase in per capita income.

Table 13. Income Elasticities of Availability of Nutritional Ingredients of Food for Beef-eater and Non-beef-eater Casual Labourer Households in Shillong				
Group of Households	Calorie	Carbohydrate	Protein	Fat
Non-Beef-eaters	0.3795	0.3947	0.4252	0.2654
Beef-eaters	0.4029	0.3766	0.4485	0.5176

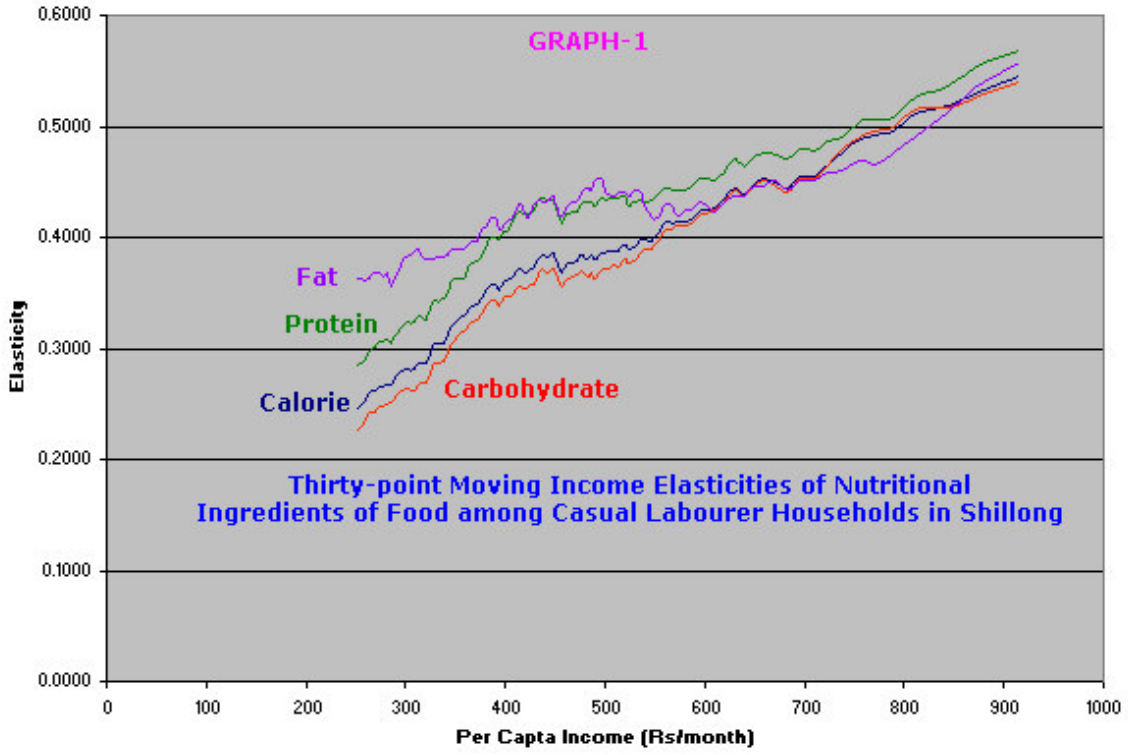
Table 14. Percentage Contribution of Different Nutritional Ingredients to Total Calorie Intake of Casual Labourer Households in Shillong						
Ingredients	Per Capita Income Rs. Per Month			All Households	Non-Beef-eaters	Beef eaters
	BPL 0 - 396	396 - 600	Above 600			
Carbohydrate	79.0412	76.1013	74.6389	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

5.3. Variable Income Elasticities of Nutritional Availability: In the preceding sections we have obtained elasticities as $\eta = (\partial f(x)/\partial x)(\bar{x}/\bar{f}(x))$ where the first factor, $(\partial f(x)/\partial x)$, is the regression coefficient obtained from all 125 observations and the second factor is the ratio of mean values of the independent variable, x, and the dependent variable, $f(x)$, obtained from all 125 observations. Thus, these elasticities are measured at the overall mean level.

Table 15. Thirty-point Moving Income Elasticities of Nutritional Ingredients of Food Availability to Casual Labourer Households in Shillong						
Sub-sample		Income per capita per Month	Thirty-Point Moving Income elasticities of Nutritional Ingredients			
From	Through		Calorie	Carbohydrate	Protein	Fat
1	30	251.7853	0.2462	0.2270	0.2846	0.3632
2	31	255.8223	0.2490	0.2302	0.2859	0.3625
3	32	259.9653	0.2532	0.2347	0.2896	0.3611
4	33	264.2987	0.2607	0.2426	0.2972	0.3629
5	34	268.7430	0.2619	0.2432	0.3007	0.3685
6	35	272.9573	0.2657	0.2471	0.3068	0.3685
7	36	277.2063	0.2654	0.2472	0.3061	0.3641
8	37	281.3017	0.2676	0.2492	0.3072	0.3682
9	38	285.0100	0.2677	0.2509	0.3047	0.3551
10	39	288.7720	0.2732	0.2557	0.3118	0.3652
11	40	292.6203	0.2771	0.2595	0.3152	0.3699
12	41	296.3820	0.2802	0.2615	0.3206	0.3810
13	42	300.3463	0.2821	0.2633	0.3235	0.3819
14	43	304.3940	0.2805	0.2615	0.3217	0.3833
15	44	308.5190	0.2815	0.2620	0.3246	0.3870
16	45	312.4080	0.2872	0.2679	0.3292	0.3902
17	46	316.2830	0.2875	0.2691	0.3281	0.3831
18	47	320.2163	0.2868	0.2688	0.3259	0.3802
19	48	324.3830	0.2949	0.2774	0.3362	0.3801

20	49	328.9663	0.3039	0.2873	0.3435	0.3813
21	50	333.6387	0.3037	0.2873	0.3414	0.3817
22	51	338.4387	0.3048	0.2882	0.3443	0.3820
23	52	343.3813	0.3125	0.2965	0.3513	0.3846
24	53	348.3813	0.3225	0.3070	0.3622	0.3896
25	54	353.2703	0.3257	0.3109	0.3632	0.3894
26	55	357.8537	0.3288	0.3149	0.3633	0.3886
27	56	362.3870	0.3335	0.3192	0.3715	0.3926
28	57	367.2313	0.3382	0.3240	0.3765	0.3971
29	58	371.8563	0.3391	0.3248	0.3782	0.3973
30	59	376.3897	0.3455	0.3310	0.3830	0.4069
31	60	380.5813	0.3504	0.3361	0.3887	0.4093
32	61	384.8390	0.3564	0.3417	0.3976	0.4149
33	62	389.1723	0.3576	0.3426	0.3997	0.4178
34	63	393.1723	0.3530	0.3386	0.3977	0.4079
35	64	397.1447	0.3591	0.3452	0.4052	0.4085
36	65	401.0493	0.3605	0.3462	0.4061	0.4135
37	66	404.9567	0.3624	0.3477	0.4111	0.4160
38	67	408.8613	0.3661	0.3509	0.4184	0.4212
39	68	412.7503	0.3720	0.3564	0.4235	0.4296
40	69	416.7660	0.3704	0.3548	0.4221	0.4276
41	70	420.7093	0.3681	0.3537	0.4207	0.4172
42	71	425.0547	0.3712	0.3568	0.4212	0.4215
43	72	429.0963	0.3727	0.3574	0.4242	0.4294
44	73	433.0487	0.3812	0.3664	0.4337	0.4331
45	74	437.1460	0.3849	0.3709	0.4360	0.4327
46	75	441.2460	0.3823	0.3680	0.4342	0.4321
47	76	445.3710	0.3837	0.3698	0.4332	0.4332
48	77	449.4377	0.3858	0.3717	0.4344	0.4367
49	78	453.1877	0.3760	0.3631	0.4221	0.4208
50	79	456.5210	0.3687	0.3550	0.4129	0.4201
51	80	459.7153	0.3748	0.3611	0.4212	0.4254
52	81	463.7153	0.3769	0.3631	0.4215	0.4294
53	82	467.9653	0.3778	0.3639	0.4224	0.4313
54	83	472.5430	0.3795	0.3656	0.4227	0.4331
55	84	477.1727	0.3839	0.3694	0.4308	0.4385
56	85	481.7893	0.3812	0.3652	0.4316	0.4438
57	86	486.3227	0.3840	0.3688	0.4323	0.4423
58	87	490.7783	0.3806	0.3636	0.4286	0.4512
59	88	495.3260	0.3861	0.3695	0.4356	0.4539
60	89	499.8260	0.3864	0.3718	0.4342	0.4407
61	90	504.2593	0.3868	0.3724	0.4355	0.4394
62	91	509.2170	0.3881	0.3746	0.4352	0.4368
63	92	514.1947	0.3884	0.3743	0.4362	0.4403
64	93	519.1947	0.3933	0.3803	0.4369	0.4401
65	94	524.3970	0.3896	0.3770	0.4288	0.4374
66	95	529.4923	0.3915	0.3782	0.4319	0.4424
67	96	534.6313	0.3978	0.3862	0.4344	0.4404
68	97	539.9090	0.3987	0.3896	0.4314	0.4290
69	98	546.3533	0.3971	0.3893	0.4334	0.4172
70	99	553.1867	0.4037	0.3973	0.4381	0.4169
71	100	560.3117	0.4136	0.4069	0.4446	0.4308
72	101	567.0617	0.4129	0.4068	0.4431	0.4275

73	102	573.7700	0.4140	0.4099	0.4426	0.4188
74	103	580.4367	0.4148	0.4098	0.4422	0.4250
75	104	587.2143	0.4164	0.4116	0.4453	0.4250
76	105	594.1143	0.4235	0.4186	0.4533	0.4319
77	106	601.4893	0.4246	0.4206	0.4532	0.4285
78	107	610.4227	0.4261	0.4242	0.4505	0.4231
79	108	619.7560	0.4347	0.4327	0.4590	0.4322
80	109	629.7560	0.4438	0.4422	0.4710	0.4373
81	110	640.4227	0.4388	0.4365	0.4633	0.4371
82	111	650.2300	0.4478	0.4453	0.4723	0.4469
83	112	660.2857	0.4530	0.4517	0.4769	0.4468
84	113	671.4633	0.4493	0.4459	0.4750	0.4516
85	114	682.9447	0.4442	0.4415	0.4704	0.4423
86	115	695.9447	0.4551	0.4532	0.4792	0.4511
87	116	710.0280	0.4548	0.4530	0.4770	0.4520
88	117	724.1147	0.4655	0.4650	0.4858	0.4578
89	118	738.4003	0.4764	0.4789	0.4898	0.4598
90	119	755.1003	0.4883	0.4909	0.5053	0.4688
91	120	772.6003	0.4918	0.4964	0.5066	0.4652
92	121	790.3293	0.4953	0.4983	0.5086	0.4757
93	122	811.4073	0.5122	0.5158	0.5255	0.4902
94	123	845.0740	0.5183	0.5176	0.5360	0.5135
95	124	880.3440	0.5334	0.5297	0.5573	0.5392
96	125	915.5663	0.5444	0.5393	0.5685	0.5567



Now we propose to measure elasticities at moving means, taking 30 observations at a time. To be more explicit, we measure the elasticity as

$$\eta_i = \left(\frac{\partial f(x)}{\partial x}\right)\left(\frac{\frac{1}{30}\sum_{j=i-29}^{i} x_j}{\frac{1}{30}\sum_{j=i-29}^{i} f(x_j)}\right) \quad ; \quad i = 30, 31, ..., 125$$

where x is arranged in an ascending order (along with the corresponding $f(x)$). The first factor, $(\partial f(x)/\partial x)$, is the regression coefficient obtained from all 125 observations. These elasticities would suggest us their response to increase in the values of the independent variable. We have chosen 30 observations to use at a time since it gives us a sufficiently good sub-sample. These moving income elasticities are presented in table 15.

It is interesting to note (see Graph 1) that income elasticites of calorie availability and carbohydrate availability move close to each other. Income elasticities of protein are always higher than carbohydrate (and calorie). Elasticities of fat are initially larger than others, but with an increase in per capita income they slide down others. At small income levels relatively high-fat-low-protein articles are consumed while with an increase in income relatively low-fat-high-protein articles are consumed. Beef is not only cheaper; it has higher fat and calorie contents (vis-à-vis protein) than fish or meat (goat-meat). Initially, up to (about) per capita income of Rs. 450 or so, increase in elasticities of all components of nutrition is steeper but afterwards the steepness changes indicating to structural break or something of that sort. Initially, at lower levels of income, elasticities of different components are more dispersed, but at a relatively higher level of income the inter-componential dispersion is markedly reduced.

VI. Concluding Remarks : Our findings do not corroborate Behrman and Deolalikar (1987), who showed that the income elasticity of calorie intake was quite low, and not significantly different from zero in statistical terms. If the income elasticity were close to zero, its implication is that improvement in the income of the poor will have little impact on the extent of malnutrition. Then the developmental policies intended to improve nutrition will have to use policy instruments which attack malnutrition directly rather than relying simply on raising income (Subramanian, 2001). But that is not the case as shown by our study. Our study is based on a micro-level data as that of Behrman and Deolalikar, hence regarding generalization for policy implications, these studies are on equal footing.

Our findings support Strauss and Thomas (1990), Ravallion (1990). Bouis and Haddad (1992), and Subramanian and Deaton (1996), who find that income elasticities of energy component of food, although small, are yet significantly different from and much larger than zero. Subramanian and Deaton (1996), based on the National Sample Survey data, estimated the expenditure elasticity of calorie intake in rural Maharashtra and found them to lie in the range of 0.3-0.5 and in any case statistically different from zero. In our study, we find that income elasticities of calorie availability (to casual labourers in Shillong) are close to 0.4, which corroborate Subramanian and Deaton (1996). We also find that not only calories, but other nutritional ingredients of food such as carbohydrate, protein and fat availabilities (intakes) also have income elasticities significantly larger than zero and, therefore, raising income to Rs. 800 (per capita per month) or so we may overcome the mal-nutrition problem among the poor.

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