

## Food Poverty and its Causes in Pakistan

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### I. INTRODUCTION

The issue of malnutrition is vital in Pakistan. Recent empirical literature on this issue highlights some causes of poverty and malnutrition such as lower purchasing power of money, larger household size, low education, large number of dependents, age of the head of the household etc. [See Ehtisham and Ludlow (1989) and Havinga *et al.* (1989)]. But we feel that much more can be explored other than what previous literature has contributed to explain the causes of poverty and malnutrition in Pakistan. For example how the poor perceive hunger or starvation in society, the role of traditional diet patterns in malnourishment and critical evaluation of poverty indices. Such information is also important for the correct application of food policies in the country.

Two steps are needed to explore this issue:

1. Correct evaluation of the severity of poverty; and
2. To collect maximum information about the causes of poverty.

Sen (1976) and Foster and Thorbecke (1984) have developed poverty indices under certain well specific axioms such as, the axioms of *monotonicity* and *transfer*.<sup>1</sup> These axioms impose certain restrictions which a group of household have to depict, otherwise, the indices convey incorrect or an inconsistent definition of poverty.

For example Sen [Eq. (1)] and Foster and Thorbecke [Eq.(2)] have developed the following indices to measure poverty:

$$P_2 = P_2^1 \cdot P_2^3 \dots \dots \dots \dots \dots \dots \dots \dots \quad (1)$$

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<sup>1</sup>Monotonicity Axiom: Given other things, a reduction in income of a poor household must increase the poverty level.

Transfer Axiom: Given other things, a pure transfer of income from a poor household to any other rich household must increase poverty.

$$P_2 = P_2^1 \cdot P_2^2 \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

$$P_2^1 = q/N$$

$$P_2^2 = \frac{1}{q} \sum_{i=1}^q \frac{(F_i - Z)}{Z}$$

$$P_2^3 = I + (1 - I)G$$

$$I = \sum_{i=1}^q \frac{(F_i - Z)}{qZ}$$

$$F_i - Z = 0 \text{ if } F_i > Z$$

$G$  = Gini coefficient of the poor households;

$Z$  = The minimum level of food expenditure per adult equivalent required to buy the RDA of energy intake [explained in Section II];

$RDA$  = Stands for the Required Daily Allowance of energy intake;

$N$  = Total sample size;

$q$  = Number of poor; and

$F$  = Food expenditure per adult equivalent.

These indices are the product of two factors, the number of poor households,  $P_2^1$ , and their deprivation for food items,  $P_2^2$  or  $P_2^3$ . Each combination of  $P_2^1$  and  $P_2^2$  gives the same level of poverty. Do infinite combinations of  $P_2^1$  and  $P_2^2$  serve the identical meaning of the poverty? For example, the people facing a famine (high level of food deprivation), although less in number in the region/country cannot be treated equally to those who are malnourished at the margin (less deprived) but are greater in number. Both the categories can depict the same level of poverty which can misguide the policy-makers.

$Z$  defined in Eq. (1) or in Eq. (2) shows the level of minimum food expenditure per adult equivalent required to meet  $RDA$  of energy for the human body. This level of expenditure keeps in view the preferences of the individuals in a household for food items. It's value depends on various physiological and environmental factors, and therefore, may vary across socio-economic groups and at the same time, there exists a least cost combination of the food items at given prices (call it  $Q$ ) which satisfy  $RDA$ 's of nutrients and ignores individual preferences such that  $Q \lesseqgtr Z$ . The households lie in between  $Q$  and  $Z$  (if  $Q < Z$ ) levels of food expenditure, are poor partially because of the food pattern they

enjoy and therefore we defined them as “Less Poor” households. The households which lie below  $Q$  are defined as “Real Poor” households as such households are poor and malnourished solely due to the lack of purchasing power of income which they earn. Therefore, a best food policy is the one which keeps in view different well-specified poverty levels. Now, the household lying between  $Q$  and  $Z$ , levels of food expenditure, mainly need a better *educational profile for balanced diet* at cheaper rates, rather than any direct subsidy because lower purchasing power is not the only reason of malnourishment in this group of households, whereas the “Real Poor” households need subsidised food, fixation of minimum wage legislation, social security programmes etc.

Large household size and a higher dependency ratio reduces the level of nutrition in a household. While joint family system reduces the chances of food poverty due to economies of scale in diet and diversified sources of income, education in a household has a double impact on malnutrition. First, education in a household increases purchasing power and second it increases the knowledge about nutrients in a balanced diet and its outcomes.

The paper has been divided into four sections. Section II explains the data source and methodology while the analysis is discussed in Section III. Section IV concludes the study.

## II. DATA AND METHODOLOGY

In this paper, we used the Foster and Thorbecke model [Eq. 2] to measure the poverty level in Pakistan. They suggested to use a semi-log<sup>2</sup> function for energy demand, to compute the minimum level of food expenditure ( $Z$ ) required to meet RDA's and is denoted as:

$$K_i = a + b \text{Log } F_i \quad \dots \dots \dots \quad (3)$$

where:

$$K_i = \frac{\text{Actual Intake of Energy per Household}}{\text{Required Intake of Energy per Household,}^3}$$

$$Z = \text{Anti-log } (K - a)/b \text{ as } K = 1; \text{ and}$$

$$\text{Poverty Index} = P_2 = P_2^1 \cdot P_2^2$$

<sup>2</sup>Semi-log function is preferred because food expenditure elasticity declines as the expenditure on food goods increases.

<sup>3</sup>Required calories for each household are computed keeping in view age and sex distribution of household members.

$P_2^1$  and  $P_2^2$  are explained in the introduction.  $Q$ , the minimum cost for balanced diet (without incorporating people's preferences) is available in a study by Mahmood (1990). She computed Rs 76.00 per month per adult equivalent as the value for  $Q$  for the year 1984-85. Household and Income Expenditure Survey data has been used in this study for the year 1984-85.

### III. ANALYSIS

The poverty line,  $Z$ , can be selected arbitrarily or can be computed by the method explained earlier. We computed food expenditure Rs 246.00 for urban and Rs 149.00 for rural areas as the poverty lines. We observed that 76 percent households are poor in urban areas whereas this figure is 46 percent in the rural areas. These figures of poverty could be wrong due to wrong methodology being used to measure the number of poor households in the region/country. Let us consider the poverty level  $Q$  as the threshold level where required level of energy intake is met at the minimum cost ignoring the preferences for different food items [as  $Q < Z$ : according to Table 1]. Juxtaposition of Table 1 and Diagram 1 shows that 61 percent of the urban households can be considered as poor while in rural areas this figure is 38 percent [area A + D], instead of 76 percent and 46 percent respectively [area A + B + C + D]. Food deprivation is highest in region A both for rural and urban areas of Pakistan. The high figures of  $P_2^2$  in region

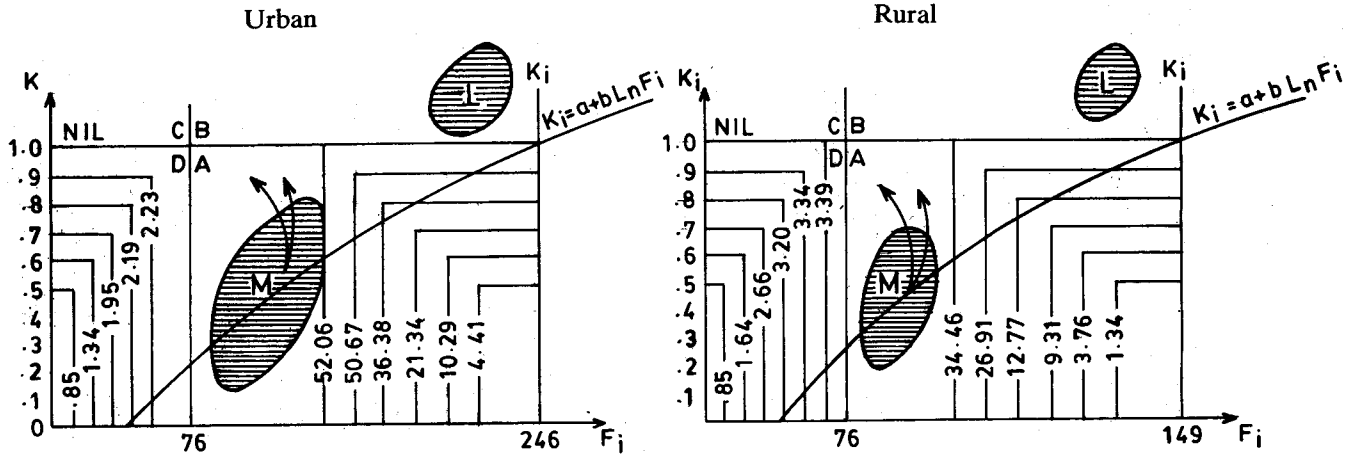
Table 1

#### *Food Poverty across Urban and Rural of Pakistan*

	$F_1 < Z$		$F_1 < Q$ and $K < 1$		$Q \leq F_1 < Z$ and $K < 1$		$Q \leq F_1 < Z$ and $K \geq 1$	
	U	R	U	R	U	R	U	R
$N$ (Sample Size)	7443	9104	7443	9104	7443	9104	7443	9104
$Z$ (in Rupees)	246	149	246	149	246	149	246	149
$q/N = P_2^1$	.76	.46	.02	.03	.59	.35	.14	.09
$\frac{1}{q} \sum_{i=1}^q (F - Z/Z)^2 = P_2^2$	.227	.180	.051	.053	.181	.129	.074	.029
$\frac{1}{N} \sum_{i=1}^q (F - Z/Z)^2 = P_2^2$	.177	.083	.001	.002	.107	.044	.011	.002

U = Urban; R = Rural.

Diagram 1.



(Figures Inside X-Y Plane are Reported in %)

A reveal that a large number of households declared as poor lie around and/or inside the region M. Does the figure of number of people per household lie in region A are also "Real Poor" or not? The answer to this question is determined by the technique one adopts to draw the poverty line. There is no standard technique available to draw a poverty line to differentiate the poor from the non-poor. However, the technique used by us provides a relatively more reliable number of households considered to be poor in the rural and urban areas of Pakistan [area A + D]. Because the poverty level  $Q$  is not desirable in society, the selection of food-stuff depends upon many other factors including familiarity, taste, prestige, religion and availability of food etc. Therefore the substitution of desirable food goods to least cost combination of food goods is essential in the society and will increase the poverty line from  $Q$  to  $Q + \Delta F_i$  such that  $(Q + \Delta F_i < Z$ ; and  $\Delta F_i > 0$  and  $K_i < 1$  [if  $Q < Z$ ].

The diagram provides some further information about malnourishment in Pakistan. It presents rural and urban picture separately. The households lying between 90 and 100 percent of RDA are better-off than those lying between 80 and 90 percent of RDA and likewise. All those who lie below 70 percent can be considered as really malnourished or starving (another angle of analysing severity of food poverty in Pakistan). 22.29 percent of the urban households and 12.03 percent of the rural households lie in this category. The threshold level which we standardized to check malnutrition i.e. 70 percent of RDA is not comparable among all households. It is common sense that height/weight, age, profession, health condition, metabolism etc. determine the nutrition requirements of a person. However, one can suggest that households in area A consuming less than 70 percent of RDA can improve their nutrition level by moving along with the arrow marked in the diagram by changing their diet pattern. This change is rational in area A but not in area D.

We also regressed income on food expenditure. This relationship will enable us to know how poor and malnourished households utilise their additional income to eliminate their hunger or starvation. "Real Poor" households has shown a negative or zero relationship between income and food whereas, "Less Poor" households have shown positive relationship between income and food but the magnitude of the slope coefficient is very small. Both categories of poor households are not giving priority to food expenditure in spite of the fact that they are deficient in food intake. Rather they substitute some portion of their food expenditure for the fulfilment of other immediate needs. One can call this behaviour of the poor as irrational if alleviating hunger is considered as first priority in the consumption pattern of the poor households. (See Table 2).

Table 2  
*Food-income Relationship across Regions*

Dependent Variable is Food Exp. per Adult Equivalent		$q$	Constant	Income per Adult Equivalent	$\bar{R}^2$	F-Ratio
$F_i < Q \& K_i < 1$		"Real Poor"				
Pakistan	U	166	68.20 (34.69)	-.022 (-2.18)	.022	4.75
Pakistan	R	309	66.38 (36.42)	-.017 (-1.56)	.004	2.15
$Q \leq F_i < Z \& K_i < 1$		"Less Poor"				
Pakistan	U	4396	142.75 (187.92)	.02 (15.95)	.054	254
Pakistan	R	3137	93.88 (104.74)	.086 (24.19)	.157	585

### Few Causes of Food Poverty in Pakistan

As mentioned in the introduction large household size, a large number of dependents in a household, a low education level are some of the few important factors behind food poverty in Pakistan. Table IA reported in the Appendix provides the following findings: an addition of a member in a household brings about an increase in poverty level of the household. This result is more consistent in the urban areas of Pakistan. Higher education<sup>4</sup> is reducing poverty in the country. Not a single educated family (Intermediate and above) has been observed in the category of "Real Poor" households. Ehtisham and Ludlow (1989) have provided a more disaggregated impact of education on poverty e.g. the poverty levels at various education levels. But their findings remained confined to all Pakistan and also to the education of the head of the household. But we believe that the educational level of the spouse cannot be ignored while analysing food poverty in a household because mostly she has the authority to purchase, cook and distribute the meal within a household. We observed that the educated spouse is also reducing food poverty even if husband is less educated. For example, in the case of "Less Poor" households, 38 household out of 100 are lying below the poverty line ( $Z$ ) and  $K_i < 1$  in urban areas where head and spouse both are educated upto the level of intermediate or above while 39 households out of 100 lie below poverty line ( $Z$ ) and  $K_i < 1$ , where spouse is educated upto intermediate

<sup>4</sup>We considered higher education as intermediate or above. We believe that education level intermediate or above of the head and spouse effects their productivity and managerial capabilities to manage food purchased and its distribution among household members.

or above and husband is below intermediate. But 55 households out of 100 lie below poverty line ( $Z$ ) and  $K_i < 1$  where the husband is educated to the level of intermediate or above and wife is educated below intermediate level. These results indicate that educated spouse (or wife) reduces malnutrition more as compared to educated Head (or husband). Higher dependency in a household is increasing malnutrition in urban and rural areas of Pakistan. Finally joint families are less malnourished than the nuclear families at the margin.

#### IV. CONCLUSION AND POLICY RECOMMENDATIONS

The inference from this study leads to the following results:

- (1) In urban areas 2 percent of the total urban households and in rural areas 3 percent of the rural households have been considered as "Real Poor" Households;
- (2) 59 percent of the urban households and 35 percent of the rural households have been recognized as "Less Poor";
- (3) The marginal propensity to consume for food ( $MPC_F$ ) is negative/or zero for "Real Poor" and positive for "Less Poor" households. The magnitude of  $MPC_F$  for "Less Poor" household is .024 for urban areas and .082 for rural areas;
- (4) Food deprivation ( $P_2^2$ ) shows that "Real Poor" households have been differentiated from "Less Poor" more on the basis of lower purchasing power rather than a traditional diet pattern. "Real Poor" households are more in percent in rural areas while in urban areas "Less Poor" are in greater percent;
- (5) Family Size has been observed positively related with poverty (or malnutrition) while education has a negative impact on it and wife's education particularly, depicts very strong negative impact on poverty or malnutrition;
- (6) With the increase in the number of dependents in the family the poverty level increases; and
- (7) Nominal difference in food poverty is observed across joint and nuclear family types. Joint families are better off than nuclear families.

It is obvious from the above discussion that in Pakistan "Real Poor" households should be targeted. However, to improve nutrition level of all poor (Real and Less), better food policies can be formulated in the light of two studies



conducted by Malik and Saqib (1989) and Afridi *et al.* (1984) which explicitly show that poor households pay more indirect taxes and bear higher inflation than the rich. Findings of these two studies bring about a policy implication that the goods/services used by the poor as necessities of life should be taxed at a very low rate. Further there is a need for further research to know the true attitude of the poor for hunger. This is important because our study conveys that food policies which increases the income level of the poor may or may not increase their nutritional status.

Table IA  
Poverty Index across Socio-economic Groups

	N	$Q \leq F_i < Z \text{ \& } K_i < 1$			$Q \leq F_i < Z \text{ \& } K_i \geq 1$			$Q < F_i \text{ \& } K_i < 1$			$F_i < Z$		
		$P_2^1$	$P_2^2$	$P_2$	$P_2^1$	$P_2^2$	$P_2$	$P_2^1$	$P_2^2$	$P_2$	$P_2^1$	$P_2^2$	$P_2$
<b>Family Size</b>													
<i>Urban</i>													
0-3	1148	.259	.113	.029	.148	.053	.008	.0078	.22	.002	.41	.10	.041
4-6	2620	.540	.068	.037	.153	.065	.010	.0122	.06	.001	.71	.14	.096
7-10	2823	.741	.246	.183	.144	.113	.016	.0347	.03	.001	.92	.24	.219
11+	811	.760	.227	.172	.111	.099	.011	.0345	.04	.001	.90	.32	.202
<i>Rural</i>													
0-3	1706	.181	.071	.013	.079	.027	.002	.0106	.11	.001	.27	.07	.019
4-6	3801	.718	.071	.023	.088	.029	.003	.0234	.05	.001	.43	.08	.033
7-10	2957	.452	.074	.033	.093	.028	.003	.0575	.05	.003	.60	.09	.055
11+	645	.0519	.077	.040	.132	.046	.006	.0511	.04	.002	.70	.09	.064
<b>Dependents Ratio</b>													
<i>Urban</i>													
0-.1	1173	.51	.265	.136	.300	.160	.049	.006	.001	.207	.82	.23	.188
.1-.3	1046	.636	.183	.116	.161	.087	.014	.016	.001	.091	.81	.17	.140
.3-.5	2462	.554	.136	.075	.102	.053	.005	.022	.001	.061	.68	.14	.092
.5-.7	1921	.680	.208	.141	.144	.086	.012	.026	.0006	.024	.85	.20	.168
.7-1.0	840	.555	.108	.060	.075	.037	.003	.045	.001	.026	.68	.12	.081
<i>Rural</i>													
0-.1	913	.266	.062	.016	.101	.030	.003	.016	.002	.137	.38	.07	.026
.1-.3	997	.248	.068	.017	.084	.032	.003	.033	.001	.043	.47	.08	.038
.3-.5	3238	.342	.070	.024	.083	.027	.002	.027	.001	.050	.45	.08	.035

Continued-

Table IA-(Continued)

5-7	2502	.400	.076	.030	.105	.030	.003	.044	.002	.046	.55	.09	.003
7-1.0	1131	.406	.075	.030	.080	.030	.080	.030	.002	.056	.54	.10	.05
<b>Education Head Spouse</b>													
<i>Urban</i>													
E E	135	.376	.151	.057	.098	.060	.006	-	-	-	.47	.134	.063
E U	628	.549	.172	.094	.142	.088	.013	-	-	-	.69	.155	.107
U E	33	.394	.159	.062	.152	.117	.018	.030	.085	.003	.58	.160	.093
U U	6648	.597	.171	.102	.137	.067	.009	.025	.051	.001	.76	.164	.125
<i>Rural</i>													
E E	-	-	-	-	-	-	-	-	-	-	-	-	-
E U	142	.338	.063	.021	.070	.012	.0008	.0001	.012	.0	.41	.061	.025
U E	-	-	-	-	-	-	-	-	-	-	-	-	-
U U	8956	.346	.072	.025	.086	.029	.003	.0345	.053	.002	.47	.083	.039
<b>Family Type</b>													
<i>Urban</i>													
Nuclear	2739	.621	.179	.111	.131	.072	.009	.022	.076	.002	.775	.171	.133
Joint	4703	.571	.183	.104	.153	.075	.011	.022	.037	.001	.746	.172	.128
<i>Rural</i>													
Nuclear	3025	.355	.067	.024	.081	.028	.002	.035	.048	.002	.472	.079	.037
Joint	6075	.339	.076	.026	.086	.031	.003	.033	.056	.022	.759	.087	.040

U = Matriculate or below.

E = Intermediate or above.

$$\text{Dependents Ratio} = \frac{\text{Family members of Age } < 15 + \text{Age } 65 +}{\text{All family members.}}$$

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**Comments on  
"Food Poverty and its Causes in Pakistan"**

First of all, I would like to express my appreciation for the efforts and hardwork that the authors have put in this paper. One of the contributions of the paper, which I see, is that a relatively new poverty index developed by Foster, Greer and Thorbecke (1984) has been used to estimate the intensity of poverty. Generally, the head-count ratio is used to estimate the incidence of poverty. The head-count ratio determines number of the poor households but does not tell how poor are the poor households. Therefore, the poverty gap is estimated to ascertain the intensity of poverty. The poverty gap, however, does not capture the distribution of income among the poor. A. K. Sen developed a poverty index based on the head-count ratio, poverty gap and distribution of income among the poor. The poverty index used in this paper is similar to Sen's index of poverty. A useful property of the index is its decomposability, not exploited by the authors of the present paper. They have estimated a poverty index for different regions of the country, for households of different sizes and for many other groups of the households. The decomposability property of the index allows to determine the contribution of each group to overall poverty, which has not been accomplished in the present paper. The authors can cover this point without much effort because this extension of their work is fairly simple and straightforward.

Two groups of the poor have been identified by using two different poverty lines and are called 'less poor' and 'real poor'. Less poor are those households whose food expenditure are lower than the poverty line called  $Z$ , estimated by taking into account the existing consumption patterns of the households. Real poor households are those with food expenditure lower than the poverty line called  $Q$ , which ignores food preferences of the households and is based on the least cost of obtaining the required amount of calories. This poverty line has been borrowed from an unpublished paper of the authors. Hence, there is a need to briefly explain in the paper the methodology of estimating the poverty line  $Q$ .

Interestingly, the poverty line  $Q$  is the same for different regions of the country (i.e. Rs 76 per adult equivalent per month). While the poverty line  $Z$ , that takes into account consumption preferences of the households, is different

for different regions. There are two important factors that enter into the estimation of a poverty line: consumption patterns and price levels. If these two vary in different regions, poverty lines will be different. In estimation of the poverty line  $Q$ , consumption preferences of the households do not play any role. However, price levels in different regions are not the same and this should have made poverty lines different for different regions of the country.

An interesting result of the paper, just looking at the head-count ratio definition of poverty, is that incidence of poverty is extremely high in terms of the less poor. For example, 76 percent households are poor in the urban areas and 46 percent households are poor in the rural areas. However, the incidence of poverty in terms of the real poor is negligible—only 2 percent of the urban and 3 percent of the rural households. The message is that people are suffering from food poverty simply because they are not aware of nutritional value of various food items and by educating them, food poverty can almost be eliminated. I think this is a bit exaggerated. In fact, one poverty line called  $Z$ , used for estimation of the less poor, is on the high side and consequently shows very high incidence of poverty. The other poverty line called  $Q$ , used for estimation of the real poor, appears on the low side and therefore shows very low incidence of poverty.

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