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Malnutrition and Poverty in Latin America*

by

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* Paper prepared for the United Nations, World Institute of Development Economics Research, Helsinki.

This paper is circulated for discussion purposes only and its contents should be considered preliminary.

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1. Introduction and Summary

The object of this paper is to review the state of malnutrition and poverty in Latin America. We will be particularly interested in quantifying the magnitudes of the problem, and in identifying who the poor and malnourished are. The former provides the reason for policy action while the latter provides the basis for policy strategy. Our focus throughout will be on food related issues. When we discuss poverty we will be restricting attention to an inability to purchase a minimally nutritious diet, and when we discuss malnutrition we will consider the physical consequences of prolonged dietary deficiency. We will not, therefore, spend much time on the satisfaction of other, non-food, basic needs, although this is clearly an area of great policy interest too.

A recent study, World Bank (1985), estimates that in 1980 almost 13% of the population of 24 Latin American and Caribbean countries had energy deficient diets falling below 90% of the FAO/WHO (1973) norms. This compared with incidences of food poverty of 44 percent in sub-Saharan Africa, 50% in South Asia and 14% in East Asia. According to these figures, therefore, the problem of food poverty in Latin America, while severe, is still not as bad as in most other areas of the developing world. However, as we shall see in Section 2, there is considerable variation among Latin American countries in terms of food poverty, ranging from lows of 1% to highs of almost 50%. It is the object of Section 2 to present and evaluate these country specific estimates of food poverty in Latin America. We will also consider direct measures of the effects of malnourishment, in terms of the growth of children, for example. There are wide variations in the estimates available, since methodologies and measures differ from study to study. However, some

patterns do emerge, among which is the uniformly higher incidence of poverty in rural areas when compared to urban areas. Poverty in Latin America is still very much a rural problem. In this the countries of Latin America are indeed rather like their counterparts in Asia and in Africa.

In Section 3 we move from a discussion of the magnitudes of the problem of malnutrition and poverty to considering who the poor are. In particular, we are interested in obtaining incidences of poverty and malnutrition across different socio-economic groups. But caution must be exercised in inferring continent-wide patterns. At a sufficiently fine level of disaggregation no general inferences can be drawn, important as it is to have such disaggregation for country specific analysis. However, at a somewhat more general level of aggregation patterns which are not too dissimilar to those found in South Asia are discernible. Within the rural sector, size of landholding is a significant influence on the risk of malnutrition, and agricultural workers and their families are particularly prone to being malnourished or below the food poverty line. Within the urban sector, slum dwellers have higher incidences of food poverty, as do families headed by manual workers. Also, at the national level, large families have significantly high incidence of poverty, as do children between the ages of 5 and 14. These characterisations of the poor and malnourished prove useful in the policy discussions of Section 4, to which we now turn.

Section 4 takes up two aspects of policy - the efficacy of growth in reducing malnutrition and poverty in Latin America, and the use of targeted redistributive measures. For the growth part of the story we calculate "crossover times" - the number of years required for the

average poor person to cross the poverty line if income grows at the average rate of growth of per capita GNP of the past twenty years. We find that for many Latin American countries these times are inordinately high - in excess of 30 to 40 years - which may indicate the need for purposive redistribution. Distribution neutral growth can be seen as one extreme of targeting - the increases in income are not targeted at all. But the other extreme, of 100% targeting where every person below the poverty line gets just enough to bring him up to the poverty line (no more, no less), is not feasible in most LDCs. The question then arises as to whether policy can be directed at broadly defined groups, and whether these groups can be ranked according to targeting priority. A model developed in Kanbur (1986) is used to show that if the object is to minimise the national poverty gap, groups should be ranked according to their incidences of poverty. The empirical findings of section 3, on the incidence of poverty and malnutrition by socio-economic groups, thus turn out to be relevant in designing a well targeted policy for alleviating poverty and malnutrition.

Section 5 concludes the paper with some topics for further research. At the level of Latin America as a whole, there is some payoff to reconciling the different estimates of the magnitudes of poverty to be found in different studies. However, in our view the really high payoff is to doing country specific studies of the pattern of poverty and malnutrition by socio-economic groupings. At the level of disaggregation where these become useful to national policy makers, they will cease to be useful in drawing continent-wide inferences on the pattern of poverty. But that is how it has to be, and we would argue for more detailed country level research.

2. Magnitudes of the Problem

2.1 Consumption Based Measures

The best known and most widely referred to measures of poverty for Latin America are those of Altimir (1982). The work on which this paper is based was done in the late 1970s and the data refer to years around 1970. Altimir estimated the incidence of poverty for a number of countries in Latin America based on two poverty lines - one which was constructed as the cost of a diet satisfying minimum nutritional requirements, and another which included non-food considerations as well. We shall start with a discussion of the methodology underlying the estimates, reproduced in Table 2.1.1.

The food poverty line (or destitution line, as Altimir terms it) is constructed separately for each country. The starting point is the minimum energy and protein standards recommended by FAO/WHO (1973), for moderate activity and for specified weights (65 k.g. for males, 55 k.g. for females). Based on this, per capita calorie and protein requirements were calculated using sex and age composition of each country "around 1970." The range of per head calorie requirements so calculated is between 2,260 and 2,350 k cals per day, while that of protein is between 40.2 and 43.3 grams per day. The average requirement is then applied to the intake distribution, but indirectly via the cost of a diet which would supply these requirements in each country. Those households whose per capita income is below the cost of such a minimum requirements diet are then classified as being in "destitution".

TABLE 2.1.1

ESTIMATES OF THE INCIDENCE OF POVERTY IN

LATIN AMERICA AROUND 1970

	% of households below the poverty line			% of households below the food poverty line		
	Urban	Rural	National	Urban	Rural	National
Argentina	5	19	8	1	1	1
Brazil	35	73	49	15	42	25
Colombia	38	54	45	14	23	18
Costa Rica	15	30	24	5	7	6
Chile	12	25	17	3	11	6
Honduras	40	75	65	15	57	45
Mexico	20	49	34	6	18	12
Peru	28	68	50	8	39	25
Uruguay	10	--	--	4	--	--
Venezuela	20	36	25	6	19	10
Latin America	26	62	40	10	34	19

Source: Reproduced from Altimir (1982) Table 12.

How is the minimum requirements food basket arrived at? Altimir is concerned to take into account the pattern of consumption in a country, arguing that if minimum requirements can be met with a basket that bears no relation to the foods consumed in that country, it would be unreasonable to choose that as a poverty line. Moreover, in order to be sure that we are within striking distance of the consumption pattern of the poor, it is their consumption pattern which has to be chosen as the reference. But how can we know who the poor are when it is the object of the exercise to identify the poor? Altimir chooses to focus on the food consumption patterns of "the lower income strata", by which is meant "the lowest 50% plus one half of the next 30%," (footnote (a) to Annex C) as revealed by surveys for Brazil (Rio de Janeiro), Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Peru (Lima). One question that arises immediately is why, if this information was available, it was not converted directly into calorie and protein intake and the numbers of those with intake below FAO/WHO requirements read off the intake distribution. Also, it is not clear how the consumption patterns for the lower strata were estimated for countries not covered in Annex C, although Altimir does note that "Account was also taken of available nutritional recommendations concerning specific foods in the exceptional case of countries in which such recommendations have been issued and were applicable to present purposes."

The Altimir method of arriving at minimum food baskets is thus not fully documented, and there appears to be a problem in using low income consumption patterns to generate poverty lines that are to be used to cut off low incomes. However, accepting these as given there is next the problem of pricing these baskets. This is done mainly for "the

capital cities of the countries under consideration". Adjustments to construct poverty lines in rural areas are largely ad hoc. For example "it is reasonable to regard the cost of standard minimum food baskets in rural areas as 25 percent below the budget estimated for the capital city of the particular country"; and "there would therefore seem to be general justification for assuming minimum food budgets for non-capital urban areas to be five percent lower than those estimated for the capital city of each country".

The resulting food poverty lines, converted to 1970 U.S. dollars using purchasing-power parities, are shown in Table 2.1.2. Also shown in Table 2.1.2 are overall poverty lines, which are obtained by modifying the food poverty lines to take account of non-food needs. Since our focus is on food we will not comment on these lines, except to note that "urban-area poverty lines [were] taken as corresponding to private consumption budgets amounting to double the corresponding minimum food budget", and that "the norm adopted in estimating rural-area poverty lines is that expenditure on non-food items represents only 75 percent of the value of the corresponding minimum food budgets". In contrast to this way of estimating poverty lines we have the method of Ahluwalia, Carter and Chenery (1979), who chose as their reference poverty line the 46th percentile of the Indian income distribution in 1975, and applied this to all countries after adjusting for purchasing power parities. These lines, for Latin American countries, are shown in Table 2.1.3. Before moving on to our main focus, on food poverty, let us dwell for a moment on a comparison of Tables 2.1.2 and 2.1.3. As can be seen the poverty lines used by ACC are on the whole lower than the overall poverty lines used by Altimir. In fact, they are more in keeping with his food

TABLE 2.1.2

POVERTY AND FOOD POVERTY LINES.
ANNUAL PER CAPITA BUDGETS IN 1970 U.S. DOLLARS

	POVERTY LINES				FOOD POVERTY LINES			
	Metro-politan area	Urban Average	Rural	National Average	Metro-politan area	Urban Average	Rural	Average
Argentina	319	319	210	296	160	160	120	151
Brazil	215	215	142	177	107	107	81	93
Colombia	302	291	199	252	151	146	113	132
Costa Rica	255	248	167	198	127	124	95	106
Chile	269	261	176	226	134	131	101	122
Ecuador	301	291	198	237	151	146	113	127
Honduras	217	209	142	162	109	105	81	87
Mexico	261	252	171	221	130	126	98	115
Peru	228	222	150	186	114	111	86	98
Uruguay	287	287	188	263	143	143	108	135
Venezuela	326	315	214	287	163	158	122	147

Source: Reproduced from Altimir (1982).

poverty lines. Not surprisingly, the incidences of poverty obtained by Ahluwalia, Carter and Chenery (1979) are more comparable to the incidences of food poverty obtained by Altimir. But even with this comparison there are some big difference. The ACC estimate of the incidence of poverty in Argentina exceeds the Altimir estimate by 4 percentage points while their estimate for Brazil is less than the Altimir estimate by a full 10 percentage points. Now the methods and data underlying these estimates differ greatly so it should not be surprising that estimated incidences of poverty differ (for a critique of the ACC methodology, see Anand and Kanbur, 1986). What is important to realise is that there are different methodologies, and widely differing estimates can arise (a sensitivity analysis for the specific case of Brazil is to be found in Hicks and Vetter, 1983).

Turning now specifically to food poverty, let us consider Altimir's estimates in Table 2.1.1. We see here a varied pattern across Latin America, from an incidence of 1% for Argentina to a staggering incidence of 45% in Honduras. For the two largest Latin American countries, the incidences are 25% in Brazil and 12% in Mexico. Comparing the rural and the urban sectors, we see that incidence of food poverty is greater in the rural sector than in the urban sector for every country except for Argentina, where it is equal to the urban incidence of food poverty. This pattern is of course similar to the one found in Asia. However, the much greater degree of urbanisation in Latin America means that a greater proportion of the national poor are to be found in urban areas when compared to Asia.

The Altimir estimates of poverty, while widely cited, are not the only ones available. Table 2.1.4 presents estimates for food poverty for

TABLE 2.1.3

Purchasing Power parity

Poverty Lines in 1970 U.S. Dollars and % of Individuals in Poverty in 1975, from Ahluwalia, Carter and Chenery

	Poverty Lines	% in Poverty
Argentina	130	5
Brazil	152	15
Colombia	165	19
Costa Rica	-	-
Chile	141	11
Honduras	-	-
Mexico	128	14
Peru	161	18
Uruguay	-	-
Venezuela	121	9

Source: Ahluwalia, Carter and Chenery (1979)

six Central American countries around 1980. In all, CEPAL estimates that in these six countries 13.6 million people, 60.4% of the total population, were in overall poverty, and of these, 8.5 million, or 37.7% of the total population were in extreme or food poverty. We cannot, of course, directly compare the estimates in Tables 2.1.1 and 2.1.4. The time periods differ as do the methodologies. Focusing on Table 2.1.4, we see that within Central America itself the incidence food poverty is below 20% only for Costa Rica; for four out of the six countries it exceeds 30%. In keeping with the pattern observed in Table 2.1.1, the incidence of rural poverty exceeds urban poverty by a large margin. However, as noted earlier, rates of urbanization in Latin America are high by the standards of developing countries in other continents. Central American urbanization rates are lower than for other Latin American countries (ranging from 39% for Honduras to 56% in Nicaragua, compared to 72% in Brazil and 84% in Argentina, for example - figures for 1984, World Bank (1986)), with the result that the majority of the poor do in fact reside in rural areas. In Central America, at any rate, poverty alleviation strategy will have to have a large rural component, and this is taken up later on in the paper.

Following up on the greater degree of urbanization in Latin America when compared to Asia or Africa, it would be interesting to get a more detailed account of the extent of urban poverty in Latin America. The results in Table 2.1.1 suggest an incidence of urban food poverty in 1970 ranging from 1 percent for Argentina to 15 percent in Brazil and Honduras (with Colombia close behind at 14 percent). In Central America in 1980, Table 2.1.4 suggests a range of incidence from 7.4 percent in Costa Rica to 44.5 percent in El Salvador. However, these are broad aggregates for

TABLE 2.1.4

ESTIMATES OF HOUSEHOLDS BELOW THE FOOD POVERTY AND

OVERALL POVERTY LINES IN CENTRAL AMERICA, 1980.

	% of households below the poverty line			% of households below the food poverty line		
	Urban	Rural	Total	Urban	Rural	Total
Costa Rica	13.6	34.2	24.8	7.4	18.7	13.6
El Salvador	57.6	76.4	68.1	44.5	55.4	50.6
Guatemala	58.1	66.2	63.4	22.8	36.2	31.6
Honduras	43.9	80.2	68.2	30.6	69.7	56.7
Nicaragua	45.6	80.0	61.5	21.6	50.0	34.7
Panama	42.9	67.3	53.9	11.8	38.3	23.7

Source: CEPAL (1983), Table 2.

all urban areas in these countries. An interesting study by Musgrove (1985) focuses on ten cities in Colombia, Chile, Ecuador, Peru and Venezuela (the cities are: Bogota, Barranquilla, Cali, Medellin, Santiago, Quito, Guayaquil, Lima, Caracas and Maracaibo). The study is based on household budget data collected between 1966 and 1969 (see Musgrove, 1978). However, its detail makes this a valuable study for us in this section, and in subsequent sections which look more closely at the characteristics of the poor.

Musgrove's (1985) study relies on estimates of the costs of minimum diets in the five countries by Arellano (1975, 1977). Arellano's methodology is similar to that of Altimir (1982). He uses the FAO/WHO guidelines supplemented by recommendations by the Chilean National Health Service (Servicio Nacional de Salud (Chile), 1974) and calculates minimum costs by using consumption patterns and prices from Salazar-Carillo (1978). Given the cost of the minimum requirements diet, which can be calculated once the family's age and sex composition is known, the distribution of families or individuals according to food expenditure as a percentage of the minimum cost can be constructed. Musgrove's results are reproduced in our Table 2.1.5. As can be seen, the incidence of food poverty amongst individuals varies from a low of 22.6% in Barranquilla to a high of 65.7 percent in Quito. The incidence among families is lower in every city - the figures for Barranquilla and Quito are 18.0% and 56.4%. This is related to the fact that families in food deficit tend to be larger (see Musgrove's Table 5). However, the extent of <u>severe</u> food deprivation in Latin American cities also stands out from Table 2.1.5. In every city except Caracas and Lima the percentage of individuals with food expenditure below 65% of the minimum exceeds 10% -

TABLE 2.1.5

DISTRIBUTIONS OF POPULATION BY FOOD EXPENDITURE RELATIVE TO COST OF MINIMUM DIET FOR TEN CITIES

	Food Expenditure as a Percentage Cost of Minimum Diet					Incidence of absolute Poverty
	0-64	65-99	100-149	150-499	≥500	
Bogota:						
Share of population (families)	11.8	17.0	27.5	39.1	4.6	28.9
Share of population (individuals)	16.0	19.3	27.3	33.8	3.6	35.3
Barranquilla:						
Share of population (families)	7.1	10.9	28.2	50.4	3.4	18.0
Share of population (individuals)	10.2	12.4	30.1	44.4	3.0	22.6
Cali:						
Share of population (families)	11.1	19.2	22.7	43.2	3.9	30.3
Share of population (individuals)	14.4	22.9	22.1	37.2	3.3	37.3
Medellin:						
Share of population (families)	24.3	21.1	19.7	32.4	2.6	45.4
Share of population (individuals)	32.8	23.0	17.1	25.4	1.6	61.8
Santiago						
Share of population (families)	8.9	16.6	24.8	45.4	4.3	25.5
Share of population (individuals)	13.0	20.9	26.6	37.3	2.1	33.9
Quito:						
Share of population (families)	31.0	25.5	20.3	23.0	0.3	56.4
Share of population (individuals)	40.2	25.5	18.5	15.7	0.1	65.7

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TABLE 2.1.5

DISTRIBUTIONS POPULATION BY FOOD EXPENDITURE RELATIVE TO COST OF MINIMUM DIET FOR TEN CITIES

	Food Expenditure as a Percentage Cost of Minimum Diet					Incidence of absolute Poverty
	0-64	65-99	100-149	150-499	≥500	
Guayaquil:						
Share of population (families)	25.8	26.7	23.1	24.0	0.4	52.5
Share of population (individuals)	32.8	29.5	19.5	18.0	0.3	62.3
Lima:						
Share of population (families)	3.9	16.2	31.7	46.1	2.2	20.1
Share of population (individuals)	4.5	20.3	34.2	39.5	1.1	24.8
Caracas:						
Share of population (families)	6.4	11.6	21.8	57.7	2.4	18.1
Share of population (individuals)	9.9	16.6	25.0	47.1	1.4	26.5
Maracaibo:						
Share of population (families)	11.9	19.3	28.9	39.1	0.8	31.1
Share of population (individuals)	13.5	21.9	31.1	33.3	0.2	35.4

Source: Reproduced from Musgrove (1985), Table 3.

in Caracas it is 9.9% and in Lima, the best out of the ten cities, it is 4.5%.

There are some interesting discrepancies between the picture in Table 2.1.5 and that painted by Altimir's figures in Table 2.1.1. For example, according to Altimir only 3% of urban households were below the poverty line in Chile. However, Musgrove's calculations show that in Santiago 25.5% of all families had an inadequate food intake ie were below the poverty line. Similarly, Altimir's calculations show that only 6% of urban households in Venequela were below the poverty line, while Musgrove's figures show that in Caracas 18.1% of families were below the poverty line. These are large differences. How can they be resolved? The obvious possibility is that the two sets of poverty lines are different. However, as Musgrove's (1985) Table 2 demonstrates, Arellano's estimate of poverty lines for these two cities at 1968 purchasing power parity are almost identical to the corresponding estimates by Altimir at 1970 purchasing power parity (for metropolitan areas in Chile and for urban areas as a whole in Venezuela). Could Altimir's broader coverage in urban areas account for the difference? This is possible, given that in Chile the percentage of urban population living in the largest city is 44% while in Venezuela it is 26%. However, given that Altimir only makes a 5% adjustment to the poverty line in going from metropolitan to non-metropolitan areas the distribution of income in the two groups would have to be markedly different to generate such large differences. In any case, for Venezuela the other city of Maracaibo shows an incidence of food poverty of 31.1% in Musgrove's figures. In the absence of any obvious reconciling factors, we leave these wide discrepancies as a caution to those seeking to arrive at definitive statements of Latin

American poverty on the basis of the current literature - the poverty is undoubtedly severe, but there are some differences in the exact quantitative magnitudes of the estimates.

2.2 The Effects of Malnourishment

The consequences of prolonged deficiencies in dietary intake are manyfold. As well as greater susceptibility to disease, malnutrition affects the normal growth pattern of children, and malnutrition in pregnant women has severe implications for the survival and health of the newborn child. The effects on growth pattern of children have been discussed extensively in the nutritional literature, and the well known Gomez (1955) classification is used to distinguish between the extent to which children have low weights for age when compared to a reference population. World Bank (1983) provides data on extent of malnourishment for Brazil, based on the 1974/75 Estudo Nacional da Despesa Familiar (ENDEF), or National Household Expenditure Study conducted by Fundacao Instituto Brasiliero de Geografio e Estatistica (FIBGE). These are reproduced in Table 2.2.1. As can be seen, over 37 percent of Brazilian children suffer from first degree malnutrition (ie 76-90% of normal weight for age). The incidence is highest among 5-10 year olds, with over 43% of this age group being in the first degree malnourishment category. The lowest incidence of first degree malnourishment is amongst infants. The picture is reversed for the most extreme form of malnutrition in the Gomez classification (third degree - 60% or less of normal weight for age). The highest incidence of this is amongst infants, at 2.5%. Overall, in Brazil 0.9% of children were suffering from the most severe manifestations of malnutrition. If one took an intermediate

TABLE 2.2.1

Brazil: Different Degrees of Malnourishment in Children, 1975

Age Group	First Degree	Second Degree	Third Degree
Birth - 5.99 months	17.4	8.9	2.5
6.00 - 11.99 months	22.3	11.0	1.4
1.00 - 1.99 years	32.2	11.1	0.6
2.00 - 4.99 years	38.1	14.8	0.2
5.00 - 9.99 years	43.1	25.9	0.4
10.00 - 14.99 years	36.8	27.5	1.6
15.00 - 17.99 years	37.1	13.4	0.9
Total	37.2	20.2	0.9

Source: Reproduced from World Bank (1983) Volume II Tables 17, 18 and 19.

TABLE 2.2.2

LATIN AMERICA AND THE CARIBBEAN: MALNUTRITION IN CHILDREN UNDER 5

Country	Year	Incidence of Malnourishment in Sample I	II	III
Antigue	1975	35.5	6.8	0.8
Bahamas	1974	14.6	0.6	0.9
Barbados	1969	39.0	11.0	1.2
Belize	1973	40.0	18.0	1.2
Bolivia	1966-1969	29.0	10.2	0.7
Brazil	1968	48.4	17.2	2.7
Chile	1975	13.7	3.2	0.9
Colombia	1966	45.6	19.3	1.7
Costa Rica	1966	43.7	12.2	1.5
Dominica	1970	19.7	5.1	3.4
Dominican Republic	1969	49.0	23.0	4.0
Ecuador	1965-1969	28.9	9.6	1.2
El Salvador	1965	48.5	22.9	3.1
Guatemala	1965	49.0	26.5	5.9
Guyana	1971	43.0	16.0	1.7
Honduras	1966	43.0	27.2	2.3
Jamaica	1970	39.0	9.4	1.4
Montserrat	1971	28.0	3.5	0.0
Nicaragua	1966	41.8	13.2	1.8
Panama	1967	48.8	10.8	1.1
Paraguay	1973	4.9	2.2	0.7
Peru	1965-1971	32.8	10.9	0.8
St. Kitts-Nevis and Anguilla	1974	33.3	5.4	0.1
St. Lucia	1974	33.0	9.0	1.9
St. Vincent	1967	47.0	14.0	1.5
Venezuela	1974	35.3	12.2	1.4

Source: Daza (1979), compiled from Pan American Health Organization data.

positions between these two extremes and focused on second degree malnutrition (61% - 75% of normal weight for age), then around 20% of Brazilian children would be classified as malnourished.

Data on malnourishment of children dissaggregated by age are not, unfortunately, available for the whole of Latin America. However, Table 2.2.2 presents data on incidence of Grades I, II and III malnourishment in children under the age of 5 for 26 countries in Latin America and the Caribbean. Comparing across Latin America, we see that Guatemala, Dominican Republican, El Salvador, Panama, Nicaragua, Guyana, Costa Rica, Colombia, Brazil, Belize and Honduras all had incidence of Grade I malnourishment in the under 5s running at over 40%. Guatemala had the highest incidence of extreme malnourishment at 5.9%.

More recent cross-sectional information on the effects of malnourishment among children in Latin America is available from UNICEF (1986), reproduced in Table 2.2.3. This information is not directly comparable to that in Table 2.2.2, since it is restricted to children between the ages of 12 and 23 months, and defines the incidence of acute malnourishment not according to the Gomez classification but as "the percentage of children with greater than minus two standard deviations from the 50th percentile of the weight-for-height reference population, ie roughly less than 77% of the median weight-for-height of the United States National Center for Health Statistics reference population." However, the information once again raises the question of the appropriate standard of comparison since not only are the absolute magnitudes of incidence very different (acute malnourishment in Brazil, for example, is reported as

TABLE 2.2.3

Latin America and the Caribbean:
Incidence of Acute Malnourishment among children aged 12-23 months,
Based on Weight-For-Height Comparisons, 1980.

Country	Incidence (%)
Bolivia	1
Brazil	6
Chile	11
Colombia	10
Dominican Republic	4
Jamaica	14
Panama	8

Source: Compiled from UNICEF (1986).

TABLE 2.2.4

Latin America: Infant Mortality Rates and Child Death Rates (Aged 1-4)

Country	Infant Mortality Rate (aged under 1) (per 1000 live births)		Child Death Rate (aged 1-4) (per 1000 children in the age group)	
	1965	1984	1965	1984
Argentina	59	34	4	1
Bolivia	161	118	37	20
Brazil	104	68	14	6
Chile	110	22	14	1
Colombia	99	48	8	3
Costa Rica	72	19	8	-
Ecuador	113	67	22	5
El Salvador	120	66	20	5
Guatemala	114	66	16	5
Honduras	131	77	24	7
Mexico	84	51	9	3
Nicaragua	123	70	24	6
Panama	59	25	4	1
Paraguay	74	44	7	2
Peru	131	95	24	11
Uruguay	47	29	3	1
Venezuela	67	38	6	2

Source: World Bank (1986), Table 27.

being less than 2% on the Gomez classification in Table 2.2.1 while it is 6% according to the UNICEF standards) but the relative rankings of countries can change too.

So far we have focussed on the effects of malnutrition on the growth of children in Latin America. However, malnutrition can have other effects too. It can, for example, influence cognitive development (see Berg, 1981). Pollitt (1980) surveys some of the relevant evidence for Latin America. Citing the work of Brockman and Ricciuti (1971), and Pollitt (1974) in Peru, and Monckeberg (1968) in Chile, on nutritionally rehabilitated marasmic children, he argues that their performance on intelligence and developmental test was significantly below the average. But for children with kwashiorkor the work of Barreda-Moncada (1963), Birch et. al. (1971) and Cravioto and Robles (1965), in Venezuela, Jamaica and Mexico respectively, did not show up any permanent effects.

The most extreme form of relationship between malnourishment and its consequences is the role of malnourishment in infant mortality. Table 2.2.4 presents World Bank data on infant mortality rates for Latin American countries. As they stand the data show remarkable declines in infant mortality rates and child death rates in Latin America over the past 20 years. However, the death rates are still high compared to industrial market economies (9 per 1000 live births in 1984 for the infant mortality rate, almost zero for the child death rate) or some other developing economies in Asia (for Korea the two figures were 28 and 2 in 1984; for Sri Lanka they were 37 and 2 in the same year).

Of course, the figures in Table 2.2.4 establish only the broadest of trends and comparisons; they cannot, in particular, shed light on the role of malnourishment in child mortality. For this more detailed

TABLE 2.2.5

NUTRITIONAL DEFICIENCY AND IMMATURITY ASSOCIATED WITH DEATH AMONG CHILDREN UNDER 5, SELECTED AREAS IN LATIN AMERICA AND THE CARIBBEAN

Countries, project sites, and areas studied	Total Deaths		% of Total Deaths		
	Number	Rate per 100,000 of Population	Nutritional deficiency	Immaturity	Both Causes
ARGENTINA					
Choco Province					
Resistencia	804	2,070	40.0%	22.1%	62.2%
Rural Departments	837	2,357	37.6	13.6	51.3
San Juan Province					
San Juan (city)	326	1,291	20.2	33.1	53.4
Suburban Departments	780	2,194	27.4	30.4	57.8
Rural Departments	1,050	2,403	31.1	23.7	54.9
BOLIVIA					
La Paz	4,115	2,660	36.0	11.5	47.6
Viacha	161	4,806	30.4	10.6	41.0
BRAZIL					
Recife	3,635	2,933	46.2	20.2	66.4
Ribeirão Preto					
Ribeirão Preto (city)	464	1,088	34.5	35.3	69.8
Franca	434	1,942	36.4	27.6	64.1
Communities	228	1,300	38.2	28.5	66.7
São Paulo	4,312	1,769	30.4	28.4	58.8
CHILE					
Santiago	2,489	1,298	23.7	31.8	55.5
Comunas	225	1,395	35.6	17.8	53.3

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TABLE 2.2.5

NUTRITIONAL DEFICIENCY AND IMMATURITY ASSOCIATED WITH DEATH AMONG CHILDREN UNDER 5, SELECTED AREAS IN LATIN AMERICA AND THE CARIBBEAN

Countries, project sites, and areas studied	Total Deaths		% of Total Deaths		
	Number	Rate per 100,000 of Population	Nutritional deficiency	Immaturity	Both Causes
COLOMBIA					
Cali	1,627	1,607	36.4	19.7	56.2
Cartagena	1,255	1,459	44.7	20.2	64.9
Medellín	1,348	1,444	42.3	19.7	61.9
EL SALVADOR					
San Salvador	2,738	2,636	37.2	17.1	54.3
Rural Municipios	1,082	5,049	46.9	7.9	54.8
MEXICO					
Monterrey	3,953	1,813	36.1	18.3	54.5

Source: Reproduced from Daza (1979), Table 2; data compiled from studies in Puffer and Serrano (1973)

investigations are needed, and Table 2.2.5 summarizes the results of a number of studies from Puffer and Serrano (1973). They show the uniformly high percentage of total deaths of children under the age of 5 that can be attributed to nutritional deficiency, the lowest figure being 20.2% in San Juan city in Argentina, the largest being 46.9% in rural municipios in El Salvador. While open to interpretation because of the exact definition of nutritional deficiency, these figures do suggest that a major requirement in the reduction of child mortality will continue to be the reduction of malnourishment in children.

So much for the effects of malnutrition on children. What about adults? Here too we could compare weights with reference groups, but more interesting are other aspects such as work capacity. Viteri (1971) argued, based on a sample of Guatemalan men, that those who are poorly nourished also have lower working capacity, the latter being measured in terms of the earlier appearance of oxygen debt and of decreased tolerance to oxygen debt, compared to a reference group of well nourished men. Similarly, he showed that sustained rehabilitation of nutrition in those who had previously been chronically undernourished did in fact increase their work capacity. In a follow up study in Guatemala, Flores et. al. (1984) studied 58 sugar-cane cutters and 56 coffee pickers. Their results are reproduced in Table 2.2.6, together with the comparator figures for 22 "well-nourished" men taken from Viteri (1971). While these figures, too, have to be treated with care (for one thing the reference group is much younger than the experimental group) they do suggest a relationship between malnutrition (as measured by anthropometric meassures such as body weight, height, weight/height etc.) and maximal work capacity. The economic consequences of this relationship

between malnourishment and productivity have been explored by Bliss and Stern (1978) and by Dasgupta and Ray (1986). But there is the further question of how malnutrition among men compares with that among women in Latin America. The evidence on this is scanty, but in a study of agricultural migrant workers in Southern Brazil, Desai et. al. (1980) found that low weight for height is less common among women than among men, although in weight, triceps skinfold and in arm circumference women were much below the standard on average. The results are summarized in Hamilton, Popkin and Spicer (1984), and are reproduced in Table 2.2.7.

To conclude this section, we note that the problem of malnutrition is severe in Latin America. This is so whether malnutrition is measured by inability to purchase a minimally nutritious diet, or whether it is measured by its consequences in children or in adults. However, a note of caution is needed - while the weight of the evidence does suggest an overall severity in the problem, there are discrepancies between different studies. These arise largely because they adopt different methodologies. Altimir (1982) calculates food poverty lines for each country separately, using the prices and composition patterns in that country, while Ahluwalia, Carter and Chenery (1979) simply translate the Indian poverty line to Latin American (and all other) countries. Similarly, while World Bank (1983) uses weight for age to classify malnutrition, UNICEF (1986) uses weight for height. Thus the rankings of countries within Latin America, as well as comparisons of Latin American countries with other LDCs, may differ from study to study. This is a problem we will have to live with given the literature as it now stands. But it does indicate that care is needed in drawing inferences and that a fruitful direction for further research is to reconcile these differences.

TABLE 2.2.6

Age, Anthropometric Measurements, and Physical Working Capacity of Two Samples of Agricultural Workers and Well-Nourished Men in Guatemala ($\bar{X}\pm$S.E.)

Variable	Sugar-cane Cutters		Coffee Pickers		Well-Nourished Men	
Age (years)	35.1	+1.2	38.1	±1.4	18.8	±0.4
Body weight (kg)	52.6	±0.7	54.9	±0.8	60.8	±1.1
Height (cm)	159.3	±0.7	163.9	±0.9	166	±1.0
Weight/Height (kg/cm)	33.0	±0.4	33.4	±0.4	36.6	±0.6
Mid-upper arm circumference (mm)	251	±2	254	±2	281	±3
Leg circumference (mm)	315	±2	328	±3	352	±3
Triceps skinfold (mm)	4.5	±0.2	4.9	±0.2	8.7	±0.5
Arm muscle circumference (mm)	236	±1.8	238	±1.7	253	±3
Body surface (m^2)	1.53	±0.01	1.58	±0.01	1.67	±0.02
Oxygen uptake at 150 beats/min (ml/min)	1,761	±38	1,968	±35		
Maximal work capacity (ml/min)	2,341	±58	2,685	±54	2,800	±124
Maximal work capacity per kg body weight (ml/kg/min)	44.5	±0.9	49.1	±0.8	46.3	±0.8

Source: Reproduced from Flores et. al. (1984)

TABLE 2.2.7

Brazil: Anthropometric Comparisons-Men and Women

	No. in Sample	Mean weight as % of Standard	Mean Triceps skinfolds as % of standard	Mean Arm Circumference as % standard	Mean Arm Muscle Circumference as % of Std	Weight for height Relative to standard % in sample		
						>90%	81-90%	<80%
Females	85	110	87	97	100	80	14.1	5.9
Males	39	95	40	93	101	66.7	23.1	10.2

Source: Desai et. al. (1980), summarized in Hamilton, Pokin and Spicer (1984).

3. Characteristics of the Poor and Malnourished

Who are the poor and malnourished in Latin America? An answer to this question is obviously important both in terms of beginning an analysis of the causes of poverty and malnourishment in Latin America, as well as the design of policy to aid the malnourished. The policy aspects of the question will be taken up in the next section. In what follows we concentrate on the characteristics of malnourished and poor households. We are interested primarily in the incidence of poverty and malnourishment in groups defined by geographical and socio-economic characteristics, since we will use this to derive rankings of groups towards which policy should be targeted.

Let us start with the basic distinction between rural and urban poor which we have already touched on in the previous section. As is clear from Tables 2.1.1 and 2.1.4, the incidence of poverty in the rural areas of Latin America is uniformly, and in many cases dramatically, higher than the incidence of poverty in urban areas. However, the extent of urbanization is much higher in Latin America than in comparable LDCs. Thus in Brazil the rate of urbanization was 51% in 1965 and 72% in 1984. In Colombia the figures are 40% and 54%. Hence while it is still true that both in incidence and in absolute numbers poverty is a rural phenomenon in Latin America as a whole, it is much less so than in poor Asian countries, which combine high incidences of rural poverty with low rates of urbanization.

If we were considering policies at the broadest level, designed to raise incomes in rural areas as a whole or urban areas as a whole, then it can be argued that the high incidences of rural poverty indicated a targeting towards policies that benefit rural incomes - (See Kanbur,

1986). However, most often the policy discussion is at a finer level of disaggregation, and we need to characterize poverty within the urban and the rural sector. Starting with the urban sector, consider Table 3.1, which reports the results of the study of poverty in ten Latin American cities by Musgrove (1985). It will be recalled from the discussion in Section 2 that poverty is defined in terms of the cost of a minimum diet, so that we are focusing attention on food poverty. Table 3.1 shows incidence of poverty by occupation of family head, and the results are striking though perhaps not surprising. The incidence of poverty is by and large highest among families headed by manual workers. In those cases where this is not true, the leading occupational group in terms of poverty incidence is personal services. Office workers have relatively low incidences of poverty. The implications of this structure of incidence for the impact of recession on urban food poverty in Latin America is clear - high unemployment rates will inevitably hit manual workers, and will translate themselves into poverty and malnourishment with maximum effect (see World Bank, 1987). The counteracting policy is the mirror image of this - actions to protect the incomes of manual workers will be the best targeted strategy from the point of view of alleviating poverty. Another striking result from Musgrove's (1985) study (see his table 6) is that the incidence of poverty is much higher among large families than among small families. From the point of view of targeting, therefore, measures which condition benefits on number of children in a family are likely to be well targeted (see also Ferber and Musgrove (1983) for more detailed analysis for Bogota, Medellin, and Lima on characteristics of poor households).

TABLE 3.1

PERCENTAGE OF FAMILIES IN ABSOLUTE POVERTY
(FOOD EXPENDITURE LESS THAN NORM) BY CITY AND
OCCUPATION OF FAMILY HEAD

City	Office Workers	Vendors	Drivers	Manual Workers	Personal Services	All Families
Bogota:	18.3	24.1	34.5	41.3	46.5	28.9
Barranquilla:	0.0	14.6	19.8	18.9	42.8	18.0
Cali:	9.1	25.2	31.8	39.8	58.1	30.3
Medellin	31.7	37.2	47.5	66.9	49.9	45.4
Santiago:	11.1	23.0	21.4	36.6	27.5	25.5
Quito:	31.4	46.2	59.6	79.4	70.9	56.4
Guayaquil:	41.1	51.5	61.1	69.3	60.9	52.5
Lima:	15.0	21.6	16.1	31.4	22.6	20.1
Caracas:	12.9	12.0	16.4	32.1	34.1	18.1
Maracaibo:	22.6	23.2	24.5	35.1	36.8	31.1

Source: Reproduced from Musgrove (1985), Table 11.

TABLE 3.2

INCIDENCE OF MALNUTRITION (%) IN BOGOTA AND CALI
BY FAMILY SIZE 1978 FOR TWO REQUIREMENT LEVELS

Household	Bogota			Cali		
Size	0.8R	1.0R	% Population in Category	0.8R	1.0R	% Population in Category
1	1.8	3.2	1.1	5.4	5.4	1.3
2	3.7	5.7	4.7	4.3	10.3	4.8
3,4	6.9	13.8	28.2	6.3	14.3	25.3
5,6	18.2	30.1	31.2	20.0	31.7	31.9
7-9	33.0	49.0	24.8	36.1	58.9	27.2
10+	50.9	73.4	10.0	41.6	63.0	9.6
TOTAL	21.1	33.1	100	22.1	36.4	100.0

Source: Reproduced from Garcia, Mohan and Wagner (1981).

A study by Garcia, Mohan and Wagner (1981) provides some further information on incidence of poverty and characteristics of the poor in Bogota and in Cali. While these results are not directly comparable to those of Musgrove since the methodology for identifying households suffering from malnutrition differ - in fact Garcia et. al. use two different methods - it is interesting to note that the conclusions on incidence of poverty and family size are unchanged. Table 3.2 presents the results and it is seen that for each of two poverty standards (labelled 0.8 R and 1.0 R) the incidence of malnutrition increases with family size, and dramatically so. Households with 10 members or more have a better than 60% chance of suffering from malnutrition, which has obvious implications for use of observable indicators in targeting expenditures and in policy design (subject of course to the incentive effects of such targeting).

Garcia et. al. (1981) have some further interesting characterizations of the malnourished in urban Colombia. The first concerns the incidence of malnourishment by age. They find that the peak incidence occurs in the age range 5-14 whether they look at Bogota or Cali, 1973 or 1978, using either one of their two methods for identifying malnourishment, or either one of their two standards for minimal requirements (Garcia et. al., 1981, Tables 9a and 9b). This is a very strong result. It matches up with the results on large families, and with the ENDEF results for Brazil (Table 2.2.1) and confirms the focus that policy must have on children, or at least on households with children.

Turning from the urban sector specifically to the more general national picture, a number of studies exist which give more information

TABLE 3.3

Percentage of children, less than 5 years of age, below standard height, by father's occupation, Guatemala, 1980

Father's occupation	Percentage of children less than 5 years of age below standard height
Farmer with less than 1 manzana[1]	57.1
Farmer with 1-1.9 manzanas	56.5
Agricultural wage worker (coffee and sugar)	54.0
Farmer with 2-4.9 manzanas	51.6
Agricultural wage worker (food crops)	51.6
Unpaid family worker	44.8
Unskilled urban wage worker	39.7
Farmer with 5 and more manzanas	37.7
Handicraft sales	35.8
Skilled urban worker	34.7
Professional or administrative worker	25.8

[1] 1 manzana = 0.7 ha.

Source: Reproduced from Hintermeister (1984), Table 3.3, compiled from INCAP (1980)

on incidence of malnutrition by socioeconomic groupings. Table 3.3 reports a disaggregation of incidence of malnutrition in children under 5 by father's occupation, for Guatemala in 1980. The figures in Table 3.3 present a natural ranking of target groups in Guatemala. Overall they reflect the higher incidence of poverty in the rural sector than in the urban sector that we have already commented upon - the agricultural occupations are mostly the high malnutrition incidence categories. Within agriculture, the role of size of land holding is seen very clearly. For children whose father is a farmer with less than one manzana the chance of having height below the standard norm is well in excess of a half, while the same chance for those whose fathers have 5 or more manzanas is below two fifths. Policy towards small holdings is clearly indicated, and here the picture is similar to that in Asia (we have deliberately excluded issues of <u>within</u> family distribution - see Harbert and Scandizzo, 1982).

Agricultural wage worker households fall somewhere in between small land holdings and larger land holdings in their propensity to contain malnourished children. But differences of 2 or 3 percentage points in incidence should not, perhaps, be significant in determining policy stance given the errors inherent in the data. For similar sorts of reasons the fact that incidence of child malnutrition is 2.4 percentage points higher in households where the father is an agricultural wage worker in coffee and sugar than in households where he works in food crops is perhaps not sufficient to dictate a major reorientation of policy towards wages in these two sectors unless further research confirms the differential as being significant and persistent. What <u>is</u> clear is that favourable policies towards agricultural wage workers in

general vis à vis towards their urban counterparts is indicated. Here the poverty incidences differ by 10 percentage points or more (this pattern is also documented for Mexico, see Bergman, 1980). Thus while within the urban sector policy should be directed towards raising the incomes of unskilled workers, as between urban and rural workers in general the latter should have priority. These implications for targeting are unlikely to be overturned by further careful research (see also Peek and Raabe, 1984).

A similar breakdown of incidence of malnutrition by occupational groups is given in Table 3.4 for Costa Rica. The Table is based on a Family and Community Questionnaire of the Ministry of Health, 1980, data from which is reported in UNICEF (1981). While not strictly comparable with Table 3.3 because of different criteria used for identifying malnutrition (Table 3.4 uses the Gomez classification, Grades 2 and 3), it should be clear that what we have is once again a hierarchy with implications for targeting. There are some interesting anomalies, such as the fact that farmers with less than 1 hectare show lower incidence of poverty than farmers with 1 to 3 hectares - but this is probably because the former group includes some rich urban households. Leaving this aside, a contrasting pattern to that in Guatemala emerges. In Costa Rica agricultural workers by and large have higher incidences of malnutrition than smallholders, although there is of course some overlap. But on the other hand there are similarities - urban workers are less likely to suffer from malnutrition than rural workers, and (after 1 hectare) big farmers are less likely to suffer from malnutrition than small farmers. This seems to be in keeping with the pattern in Asia.

Finally in this discussion of the occupational determinants of the

TABLE 3.4

Costa Rica: Malnutrition by Functional Groups

Functional groups	% with Malnutrition gr. 2 and 3
AW vegetables and fruits*	9.3
AW Unknown products	9.3
AW basic grains	9.1
AW coffee	9.0
Unskilled workers and artisans	8.9
AW beef cattle	8.5
F. from 1 to 3 ha*.	8.1
F. from 5 to 10 ha.	7.8
F. from 3 to 5 ha.	7.3
AW cattle not specified	6.7
Workers in the transitory informal economy sector	6.6
Pensioners	6.5
AW sugar cane	6.2
Qualified operators and artisans	6.2
All types of management	6.0
Office employees and salesmen	5.8
F. less than 1 ha.	5.5
F. from 25 to 50 ha.	5.0
AW banana and African palm	4.6
Service workers	4.4
F. 50 or more ha.	4.4
AW dairy cattle	3.5
F. from 10 to 25 ha.	3.4
Professionals and technicians	1.8
TOTAL	6.6

* AW = Agricultural workers; F = Farmers.

Source: Reproduced from Pacey and Payne (1985), Table 6.1.

TABLE 3.5

Nutritional status of children between 6-59 months (Gomez classification) for four occupational groups, El Salvador, 1976

Regions	Number of cases	Percentage of children			
		First degree	Second degree	Third degree	Total
Smallholding, semi-proletariat farmers	1,447	53.8	21.0	1.7	100.0
Workers living on coffee Plantations	1,043	54.3	20.4	2.2	100.0
Workers living on coastal cotton and sugar plantations	1,489	48.8	12.5	1.5	100.0
Urban slums	1,369	51.1	14.0	1.3	100.0

Source: Reproduced from Deere and Diskin (1984), Table 5, based on Valverde et. al. (1980).

incidence of poverty, we consider the results of Valverde et. al. (1980). These are based on a broader definition of occupation, grouping together all urban slum households into one category, for example, but they provide a finer breakdown by extent of malnutrition. As can be seen in Table 3.5, so far as first degree malnutrition is concerned all four groupings are pretty similar in their incidences. The largest difference is one of five percentage points (on an average incidence of more than 50%), between workers living on coffee plantations and sugar plantations. The two features that emerge are, firstly, that urban slum dwellers have similar incidences of malnutrition as poor agricultural workers and, secondly, workers living on coffee plantations have the highest incidence out of the four groups for first degree malnutrition. The implication of the first feature is that if policies can be targeted towards urban sum dwellers then the choice between those and policies which transfer an equal amount of purchasing power to certain types of agricultural workers will not much affect the overall impact on poverty. However, within El Salvador the wages of coffee plantation workers are clearly a priority if the objective is to reduce poverty.

It has been argued by some that the regional divide is more important as a discriminator of poverty incidences than the rural/urban divide. Thomas (1982), recognizes the importance of the rural poor in Brazil, and yet argues for the importance of regional divisions:

"The more interesting outcome of the poverty measures undoubtedly points out that considerably more poverty exists in the nation's rural areas than in urban areas. For instance, a poverty index for the nation's rural areas is approximately 20% higher than the national average, while that of the metropolitan areas is roughly 50% below national aver-

TABLE 3.6

REGIONAL DISTRIBUTION OF POOR: BRAZIL (1984)

Regions	Poverty Line (Local Currency)	% Below	No. Below (1000)
Region I	2,585	16.35	1,419
Metropolitan Rio Janeiro	2,824	13.88	991
Other Urban	2,086	17.78	186
Rural	1,520	31.33	276
Region II	2,663	20.79	4,333
Metropolitan Sao Paulo	3,374	13.82	1,148
Other Urban	2,199	13.28	939
Rural	1,753	20.59	697
Region III	1,885	18.96	3,364
Porto Alegre	2,893	14.93	237
Curitiba	2,245	10.54	85
Other Urban	2,068	16.73	972
Rural	1,526	18.00	1,607
Region IV	1,631	29.39	3,809
Belo Horizonte	2,282	18.57	340
Other Urban	1,775	21.14	1,093
Rural	1,541	40.83	2,431
Region V	1,620	48.01	13,903
Salvador	2,603	27.55	340
Recife	2,152	31.55	612
Fortaleza	1,879	36.24	388
Other Urban	1,795	38.13	3,189
Rural	1,377	54.78	8,967
Region VI	2,896	16.00	108
Region VII	1,730	14.35	526
Belem	2,144	20.75	154
Other Urban	1,843	27.63	306
Other Urban	1,794	12.22	259
Areas			
Metropolitan	2,831	17.38	4,403
Other Urban	1,942	22.63	6,944
Rural	1,562	39.36	13,978
National Average	1,953	29.36	27,462

Source: Thomas (1982), Table 19.

TABLE 3.7

Incidence of Malnutrition among Children Below the Age of 18 in Brazil, by Severity and Region

Region	Severity of Malnutrition (Gomez Classification)		
	I	II	III
Northeast	38.2	28.0	2.2
Southeast	36.2	15.4	0.2
Frontier	39.0	23.3	0.7
Brazil	37.2	20.2	0.9

Source: World Bank (1983)

TABLE 3.8

MALNUTRITION INCIDENCE IN MEXICO BY REGION

	1st Degree	2nd Degree	3rd Degree
NORTH			
Sonora			
Agna Prieta	31.2%	5.5%	0.0%
Sinaloa			
Concordia	46.8	12.5	0.0
Coahuila			
Finisterre	52.8	20.8	0.0
Nuevo Leon			
San José de Raices	56.0	24.0	0.0
CENTRAL WEST			
Hidalgo			
Almoloya	41.1	12.8	3.1
Xochiocoatlan	51.5	23.9	1.3
El Nith	30.5	43.9	10.4
Puebla			
San Juan Epatlan	70.5	17.6	5.9
Tlaxcala			
Santa Cruz Aquiahuac	48.4	14.0	1.7
GULF ZONE			
Veracruz			
Paso del Toro	50.0	16.7	0.8
METROPOLITAN MEXICO			
Xochinilco			
Santa Cruz Xochitepec	49.8	9.6	0.4
Tlalpan			
San Muguel Xicalco	63.4	8.7	1.3
AVERAGE	49.3%	17.5%	1.1%

Source: Austin (1979), Table 5.

ages. Compared to such urban-rural differences, however, some regional differences, particularly between the Northeast and the Southeast, are more striking. The sharpest contrast is provided by a comparison of the state of Sao Paulo with the Northeast region. While a poverty index for Sao Paulo state is roughly 2-1/2 times below the national average, that for the Northeast is 1-2/3 as high as this average."

The figures on which Thomas bases his argument are reproduced in Table 3.6. While using the same ENDEF survey that we have been relying on for information on Brazil in this paper, they are based on poverty lines which are food poverty lines augmented to take account of non-food needs and are hence not directly comparable to our discussions on malnutrition. However, it is interesting to note that if we take the figures for incidence of malnutrition in children given in Table 3.7, then for the case of grade III, the national incidence is 4.5 times the incidence in the Southeast, while the incidence in the Northeast is almost 2.5 times the national incidence. Of course, this happens with much smaller percentages, but Thomas's general point is well taken. Regional variations in the incidence of malnutrition in Mexico are detailed in Table 3.8, and similarly large differences are clear (see also Ferrari, 1980, for Peru and Herrick and Hudson, 1981, for Costa Rica).

What, then, do we know about the characteristics of the poor and the malnourished in Latin America? While it is dangerous to generalise from individual country studies, and we have ourselves raised objections to some of the methodologies pursued, some tentative suggestions might perhaps be entertained. Firstly, the incidence of poverty is significantly higher in rural areas than in urban areas. Secondly, while such differences in incidence indicate policy targeting, the differences in

incidence between regions can be much larger. Thirdly, the incidence of malnutrition and poverty among large families is very high and, relatedly, children between 5 and 14 are particularly at risk. Fourthly, among rural farmers we have the expected relationship between size of holding and incidence of malnutrition and poverty. Fifthly, agricultural workers show higher incidences of poverty than their urban counterparts. These features of poverty and malnourishment in Latin America have implications for policy, and we have already touched on some of these. The next section continues the analysis in greater detail.

4. Aspects of Policy: Growth and Redistribution

The magnitude of absolute poverty is a function both of the mean level of income, as well as its distribution. If malnutirtion is the specific focus, then its magnitude is a function of mean nutritional intake as well as the distribution of intake. Policies to alleviate poverty and malnutrition can therefore be thought of either as growth oriented or redistribution oriented. Of course in principle there need be no inherent conflict between the two - for example, at low levels of nutritional intake an improvement in nutrition improves individual productivity and hence the productive capacity of the economy (see Dasgupta and Ray, 1986). But in the literature, growth and redistribution are pitted as opposites, with difficult choices having to be made between the two. In what follows, therefore, we will divide our discussion of policy into the impact of growth and the impact of redistribution. In the latter category we will discuss targeting priorities in the Latin American context.

Consider first the effects of growth on poverty. In doing so we

TABLE 4.1

LATIN AMERICA: CALCULATIONS OF CROSSOVER TIMES

Country	(A) $\bar{y}_p/z$	(B) 100g (% per annum)	(C) T (years)
Argentina	0.745	0.3	98
Brazil	0.538	4.6	14
Colombia	0.512	3.0	23
Costa Rica	0.564	1.6	36
Chile	0.567	-0.1	∞
Honduras	0.491	0.5	143
Mexico	0.608	2.9	17
Peru	0.448	-0.1	∞
Venezuela	0.625	0.9	52

Source: (A) Calcualted from Altimir (1982), Table 14
(B) Average Annual Growth Rates of GNP per capita, 1965-1984, Taken from World Bank (1986), Annex Table 1.
(C) Calculated from (A) and (B) using formula in the text.

assume that growth is distribution neutral. It leaves relative inequality unchanged ie all incomes grow at the same rate. What would be the impact on absolute poverty? If the poverty line is z and the mean income of the poor is $\bar{y}_p$, then with an annual growth rate of g it will take:

$$T = \frac{\ln(z/\bar{y}_p)}{\ln(1+g)}$$

years for the average poor person to cross the poverty line. This "crossover time" (see Kanbur, 1987) gives an indication of the efficacy of growth in alleviating absolute poverty. Using Altimir's (1982) data, Table 4.1 shows the crossover time for a selection of Latin American countries on the basis of their past growth rates in per capita GNP.

Now Altimir's figures for the ratio mean income of the poor to the poverty line are for the overall poverty line and not the food poverty line. If we can assume that this ratio is unchanged when using the food poverty line then the calculations in Table 4.1 are applicable to food poverty alleviation by means of growth as well. Crude as they are, the figures in Table 4.1 do give an indication of the magnitude of the problem in Latin America. For Peru and Chile, which recorded a negative average annual rate of growth over the past 20 years, the crossover time is of course infinite. Obviously these negative growth rates are influenced by the impact of the current recession. But even if this were taken out and a low positive growth rate were substituted, very long crossover times would still result. This is seen for the case of Honduras, where the average annual growth rate of income per head has been only 0.5%. Combining this with the depth of poverty in the country, we get an incredible 143 years for the average poor person to cross the

poverty line. Obviously the structure of the data are bound to change over such a long time - the calculation is merely intended to convey the small role that growth at historical rates can play in alleviating poverty. In fact, suppose that the Honduran growth rate of income per head doubled to 1% per annum as a result of growth oriented policies. The crossover time would then come down to around 70 years - still a very long time horizon for alleviating the poverty of only the average poor person.

However, there are some Latin American countries where, because of a combination of low poverty and/or high growth rates, crossover times are around 15 years. Mexico and Brazil are interesting cases in point. The latter has higher poverty and a higher growth rate, with the result that they have similar crossover times.

There are three major problems with the crossover time calculations. First, the crossover time focuses only on the income of the average poor person and says nothing about the numbers of the poor. There have been some attempt to project these numbers in the future, notably the projections by Ahluwalia, Carter and Chenery (1979) to the year 2,000. These rely on the absolute poverty line discussed in Section 2, and make an adjustment to the distribution of income based on the Kuznets curve estimates of Ahlawalia (1976). By and large these estimates show significant declines in the incidence of poverty in Latin American countries although (i) they are based on growth projections of the last decade and (ii) the methodology underlying them has been criticized by Anand and Kanbur (1986). Secondly, the poverty calculations are not directly nutritionally focussed. Thirdly, no account is taken of possible changes in the pattern of consumption as income grows. Of course in order to

TABLE 4.2

BRAZIL: DEFICITS EXCEEDING 400 CALORIES BY REGION, 1975

	Total Population (Thousands)	No. in deficit (Thousands)	Incidence (%)	Average deficit (Calories per person per day)	Total deficit (Million calories per day)	Total of all Deficits (Million calories per day)
Northeast						
Rural	17,739.8	2,428.9	13.7	540	1,310.4	3,268.8
Urban	14,291.7	6,952.6	48.7	529	3,678.4	5,151.3
Total	32,031.5	9,381.5	29.3	532	4,988.8	8,420.0
Southeast						
Rural	20,046.2	321.7	1.6	476	153.3	1,096.3
Urban	44,524.8	5,471.1	12.3	527	2,882.6	7,592.5
Total	64,571.0	5,792.8	9.0	524	3,035.9	8,688.8
Frontier						
Rural	5,268.7	1,763.4	33.5	593	1,087.2	1,717.3
Urban	5,274.0	1,633.4	31.0	617	968.2	1,624.2
Total	10,542.7	3,396.8	32.2	605	2,055.4	3,341.4
Brazil						
Rural	43,054.7	4,514.0	10.5	565	2,550.8	6,082.3
Urban	64,090.5	14,057.1	21.9	536	7,529.1	14,367.6
Total	107,145.2	18,571.1	17.3	543	10,079.8	20,450.0

Source: reproduced from World Bank (1983), Table 15.

take into account these criticisms we would have to have detailed survey data and conduct careful simulations for particular countries. One such exercise is that conducted by the World Bank (1983) for Brazil (see also Knight and Moran, 1981) and we now turn to those results.

Table 4.2 presents the situation as it was in 1975. We have focussed attention on those whose calorie deficits exceed 400 calories (based on standards at the low end of the FAO/WHO guidelines). On the basis of ENDEF data, the Table shows that in 1975, 17.3% of Brazilians had a deficit in excess of 400 calories. In contrast to our earlier findings on the incidence of food poverty, we see that the incidence of large deficits is greater in urban areas than in rural areas. However, while the incidence is lower in rural areas, the average deficit of those below the chosen cut off is greater in the rural areas. Thus although fewer rural people suffer from the extreme of calorie deficit (both in terms of absolute numbers and in relation to the total rural population), those who are poor are, on average, more severely malnourished. Comparing across regions, we see that as before the Southeast has the lowest incidence of malnutrition. However, while the Northeast and Frontier regions are about equal in their incidences, Frontier's incidence is marginally higher, and so is its mean deficit.

From this baseline, the World Bank simulated a pessimistic scenario of 4% per year total income growth and an optimistic scenario of 7% per year total income growth over 1980-2000. The growth is assumed to be distribution neutral and population projections are used to convert total growth into per capita income increases. Estimates of the elasticity of per capita calorie consumption with respect to family per capita expendi-

ture are used to convert income growth into calorie consumption increases. The resulting configurations of extreme malnourishment are shown in

TABLE 4.3

BRAZIL: PROJECTED DEFICITS EXCEEDING 400 CALORIES BY REGION IN THE YEAR 2000

	Total Population (Thousands)	Pessimistic		Optimistic	
		Thousands	% of Total	Thousands	% of Totals
Northeast					
Rural	24,891.8	-	-	-	-
Urban	31,634.8	4,720.0	14.9	156.0	0.5
Total	56,526.6	4,720.0	8.4	156.0	0.3
Southeast					
Rural	25,165.9	-	-	-	-
Urban	96,365.9	664.5	0.7	-	-
Total	121,531.8	664.5	0.5	-	-
Frontier					
Rural	10,061.4	1,522.8	15.1	453.4	4.5
Urban	15,100.5	1,761.3	11.7	416.9	2.8
Total	25,161.9	3,284.1	13.1	870.3	3.4
Brazil					
Rural	60,119.1	1,522.8	2.5	453.4	0.8
Urban	143,101.2	7,145.8	5.0	572.9	0.4
Total	203,220.3	8,668.6	4.3	1,026.3	0.5

Source: Reproduced from World Bank (1983), Table 32.

Table 4.3. As can be seen, there is a dramatic decline in the incidence of extreme malnourishment for the whole of Brazil. Taking the pessimistic scenario the incidence drops from 17.3 percent to 4.3 percent, a factor of 4. However, because of population growth the absolute numbers of extremely malnourished only drops from 18.6 million in 1975 to 8.7 million in 2000. Extreme malnourishment is eliminated entirely in the Southeast under the optimistic scenario, and an incidence of only 0.5 percent persists over the whole of Brazil.

The above figures do indicate that growth at historically observed rates can make an appreciable dent in extreme malnutrition. But this is just a reflection of the very low standard chosen. If we look at the consequences for the population with any degree of deficit at all, then the World Bank (1983) calculations show that under the pessimistic scenario the incidence of calorie deficit drops from 67.2% in 1975 to 46.5% in 2000, but because of population growth the absolute numbers increase from 72 million to 94 million. Thus the problem of malnutrition, not of the extreme variety but malnutrition nevertheless, will persist if growth takes place at the assumed rate. Even with the optimistic scenario in the year 2000 there will be over 46 million malnourished Brazilians (22.7% of the total population).

It is with this consideration in mind that the World Bank (1983) analysed the costs of direct distribution of diet supplements to eliminate all calorie deficits, the assumption being of course that the distribution would be targeted 100% efficiently - each individual would get just enough to eliminate his or her own deficit, no more and no less. The cost estimates are thus a lower bound. The range of estimates got, under different assumptions about growth rate, sequencing of implementa-

tion and type of dietary supplements, range between 1 and 2% of GDP in each of the years 1980-2000.

The calculations above indicate once again the importance of targeting. With 100% targeting the burden of eliminating malnutrition is less than 2% of GDP. With untargeted income increases, in the form of distribution neutral growth, dietary inadequacy would be the norm for almost 50 million Brazilians by the end of the century. Of course, 100% targeting is very rarely available to policy makers, and we turn now to a discussion of the type of redistributive strategies open to them in a Latin American context.

While 100% targeting is a policy maker's pipe dream, information on the poverty characteristics of socio-economic and regional groupings can be used to sharpen the extent to which the benefits of expenditure reach the poor and malnourished (see Mateus, 1983). The theory underlying such targeting is discussed in Kanbur (1986, 1987). If y is income, $f(y)$ is the frequency density of income and z is the poverty line in income space, then Foster, Greer and Thorbecke (1984) have suggested the following poverty index:

$$P_\alpha = \int_0^z \left(\frac{z-y}{z}\right)^\alpha f(y)dy; \ \alpha \geq 0$$

where the parameter α reflects the degree of aversion to the depth of poverty. The poverty measured can be the inability to afford the cost of a minimally nutritious diet (as calculated by Altimir, 1982, for example). Or, as Kakwani (1986) has suggested, if y is calorie intake then P_α could be a direct measure of the extent of malnourishment. Two special cases of P_α are worth noting. When $\alpha=0$,

$$P_\alpha = P_o = \int_0^z f(y)dy$$

which is simply the incidence of poverty. When $\alpha = 1$,

$$P_\alpha = P_1 = \int_o^z \left(\frac{z-y}{z}\right) f(y)dy = P_o[1-\frac{\bar{y}_p}{z}]$$

which is simply the incidence of poverty times the average poverty gap as a ratio of the poverty line.

From our point of view the interesting feature of the P_α class of measures is that they are additively decomposable across population subgroups. Thus if x_1 is the fraction of population in group 1 and x_2 is the fraction in group 2 ($x_1 + x_2 = 1$), then:

$$P_\alpha = x_1 P_{1,\alpha} + x_2 P_{2,\alpha}$$

where $P_{1,\alpha}$ is the group 1 specific measure and $P_{2,\alpha}$ is the group 2 specific measure (the extension to many mutually exclusive and exhaustive groups is obvious). Consider now a redistribution which takes an amount Δ_2 from every member of group 2 (whether rich or poor) and gives Δ_1 to every member of group 1 (whether rich or poor). Budgetary balance requires:

$$\Delta_1 x_1 = \Delta_2 x_2$$

Should such a redistribution be undertaken? It is shown in Kanbur (1986) that:

$$\frac{dP_\alpha}{d\Delta_1} = - \frac{\alpha x_1}{z} [P_{1,\alpha-1} - P_{2,\alpha-1}]$$

which is negative if:

$$P_{1,\alpha-1} > P_{2,\alpha-1}$$

In other words, if the objective is to minimise P_α budgetary expenditure should be targeted towards groups with high $P_{\alpha-1}$.

This targeting rule has a particularly simple interpretation when $\alpha=1$. Because then $P_\alpha = P_1$ and $P_{\alpha-1} = P_o$. Thus if the objective is to minimise P_1, groups with high P_os ie high incidences of poverty should be the beneficiaries of redistribution. This is natural: if we are concerned to minimise the poverty gap, then we want to maximise the probability that a given (marginal) income transfer will reach a poor person - the extent of his or her own poverty gap is irrelevant. It should now be clear where our characterisation of malnutrition and poverty in the previous section comes in. The incidences of poverty in different socio-economic groupings provide a natural ranking for targeting (the identification of "high risk" groups is recommended as a research strategy by Pinstrup-Andersen, 1981). In Latin America, as in Asia, the incidence of poverty in the rural sector is higher than in the urban sector. Redistributive measures which operate at this level of aggregation should therefore be used to raise rural incomes. With more fine tuned instruments, the details of poverty within the rural sector and the urban sector can be used to guide redistributive policy. Within the rural sector, helping smallholders and agricultural workers will be a well targeted policy. Within the urban sector, manual workers' incomes

should be a prime focus of policy. The counterpart to this is the severe effect that recession is bound to have, via manual workers earnings, on poverty (see Ffrench-Davis and Raczynski, 1986, and Lustig, 1986). In both rural and urban sectors, raising large families' incomes is an extremely well targeted policy for reducing poverty.

Apart from these general conclusions about regional and occupational groupings at the broadest level, once we get into finer classifications differences do begin to emerge between Latin American countries (c.f. the contrasting patterns in Costa Rica and Guatemala in comparing incidences of poverty between smallholders and agricultural workers). But this is not surprising. At a certain level of detail the analysis has to become country specific, and moves beyond the scope of this region - wide survey (for a similar view, see Peek, 1984). It is to be hoped, however, that the method of identifying target groups will prove useful in the country analysis as well.

5. Further Research

To end, we would like to pick out two topics which seem to be high on the research agenda for the analysis and alleviation of malnutrition and poverty in Latin America. Firstly, there is the task of reconciling the many different estimates of the magnitude of the problem. All estimates agree that the problem is severe, and, furthermore, the patterns of malnourishment and poverty revealed are fairly consistent. But there are discrepancies in numbers of malnourished and poor as estimated by different authors. The discrepancies can sometimes be attributed to differences in the poverty line chosen, but in many cases the underlying methodologies differ and a systematic attempt at evaluating these

methodologies is needed (for a start in this direction see Anand and Kanbur, 1986).

However, even more important than resolving the discrepancies in estimates of numbers in poverty at the all Latin America level, is the analysis of the patterns of poverty and malnutrition at the detailed, country specific level. Given the minor role that growth can play in eradicating malnutrition within a generation, there may well be a role for redistribution. But redistribution with 100% targeting towards the poor is not feasible. Rather, we will have to rely on policy instruments which are much coarser, instruments which affect the incomes of broad groups of individuals in the same way. But which of several broadly defined groups should be favoured in a targeted strategy of poverty alleviation? The answer depends on how we measure poverty and what instruments we have at our disposal. Following the arguments in Kanbur (1986), we showed in section 4 that if our object was to reduce the national poverty gap (or nutrition gap) then, under a particular model of the effects of policy on income (nutrition), socio-economic groups with a high incidence of poverty (malnutrition) should be high on the list for targeting. If the object of policy is a different index of poverty and malnutrition, or if the effects of policy are modeled in a different way, then of course the targeting rule will be different. Some of these alternative targeting rules are derived in Kanbur (1986), but what is important is to apply them to particular countries.

What is required for such an application is a detailed profile of poverty by policy relevant socio-economic groupings. It is probably true that the level of disaggregation necessary for policy analysis in each country will mean that no continent wide inferences can be drawn on the

patterns of poverty. But the division of labour we are suggesting is a natural one - the use of broad regional and occupational categories to comment on the pattern in Latin America as a whole, and the use of much more finely disaggregated categories for national policy prescriptions. In our view it is the latter course of research and analysis that will yield the highest payoff.

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