Dimensions and Characteristics of Poverty and Malnutrition

- **What?**
- **How many?**
- **Where?**
- **When?**
- **Who?**
- **Why?**
- **How to overcome?**

I. Definitions and Measurement (What and How Many?)

A. Defining and Measuring Poverty and Malnutrition

B. Counting the Poor and Malnourished

I.A. Defining and Measuring Poverty and Malnutrition

I.A.1. Poverty

I.B.2. Malnutrition

I.A.i. Defining and Measuring Poverty

Or,

How did we get $1.00 a day?

and

What does that mean?

World Bank, World Development Report, 1990

- **Poverty: "the inability to attain a minimal standard of living" (p.26)**

- **This raises three questions:**
  - **How do you measure the standard of living?**
  - **What do you mean by minimal standard?**
  - **How do you express the overall severity of poverty in a single measure?**

Measuring the Standard of Living

- **"Household income and expenditures per capita are adequate yardsticks for the standard of living, as long as they include own production…" WB, WDR, 1990. P.26**

- **But they do not include such other dimensions of welfare as health, life expectancy, literacy, and access to public goods or common property resources (e.g., clean water, free public services), so complementary measures are needed.**

Defining the Minimal Standard of Living

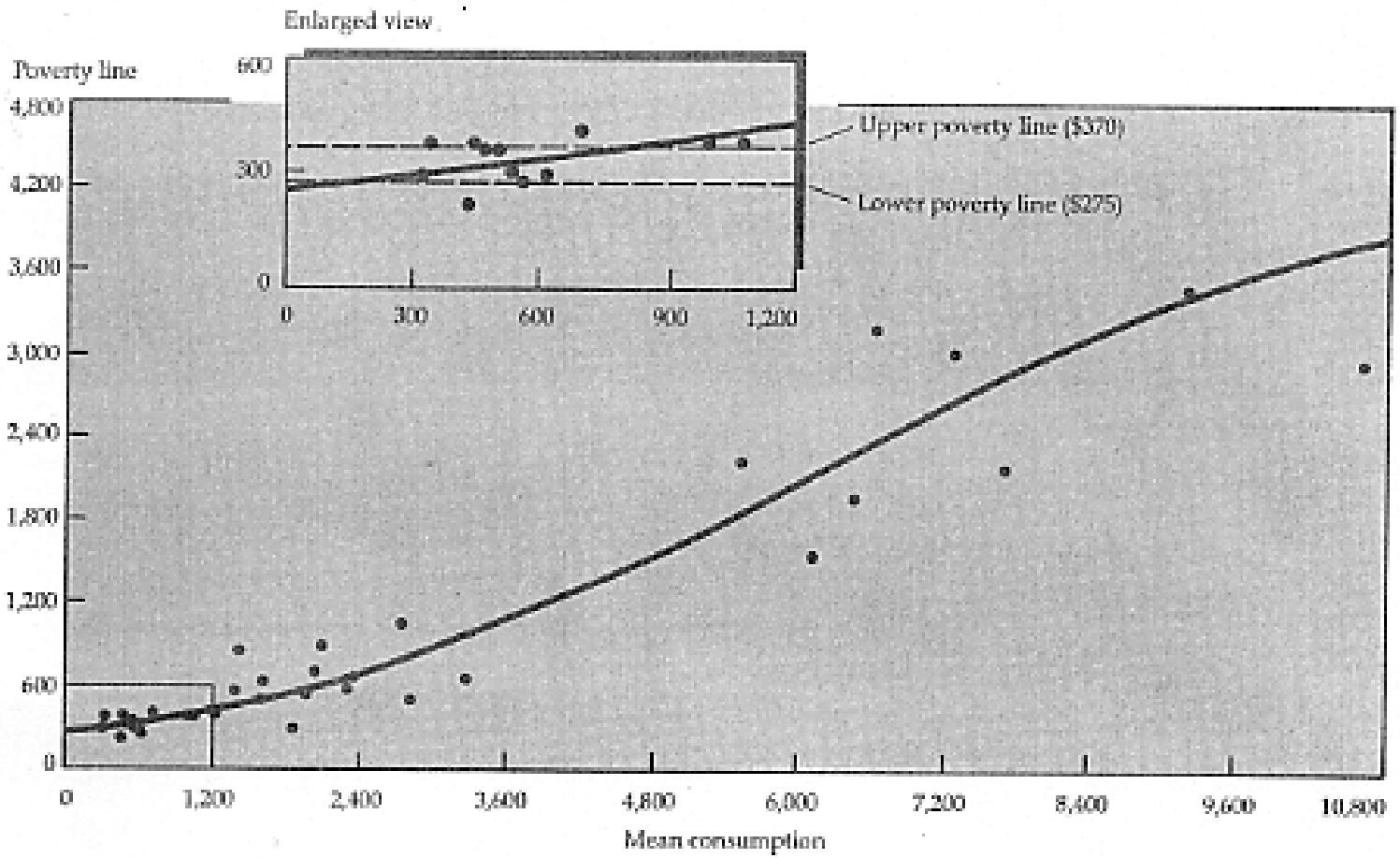
- **The minimal standard is expressed as a "poverty line" based on two elements:**
  1. **"the expenditure necessary to buy a minimum standard of nutrition and other basic necessities and**
  2. **a further amount that varies from country to country, reflecting the cost of participating in the everyday life of society." WB, WDR, 1990, p.26**

Estimating The International Poverty Line - World Bank 1990

- **Review official national poverty lines of 33 poor countries derived in mid-1980s**
- **Scale all to 1985 with consumer price indices**
- **Convert with "Purchasing Power Parity" conversion factor so, e.g., one dollar's worth of rupees buys the same "basket of goods" in India as one dollar's worth pesos in Mexico**
- **Choose international poverty line based on ["eyeballing"?] poverty lines of poorest eight**

Finding the International Poverty Line

Figure 2.1 Poverty and average standards of living, developed and developing countries
(1985 PPP dollars per capita a year)



International Poverty Lines
World Bank Estimates

- **1990 estimate: $1.02/day/person in 1985 prices converted with Purchasing Power Parity**
- **1999 estimate: $1.08 in 1993 prices converted with PPP (median of 10 poorest countries)**
- **Upper poverty line of $2.00**
- **The lower the line, the fewer people classified as poor**

Critiques of World Bank Estimates of International Poverty Line

- **Basket of goods for PPP does not reflect what the poor buy**
- **Poor pay higher prices**
- **Changes in PPP as global development proceeds tend to decrease poverty lines in poor countries**
- **Results: underestimate number of poor; and show an erroneously favorable trend in poverty reduction**

Source: Reddy and Pogge. 2003. "How *NOT* to Count the Poor."

www.socialanalysis.org

Human Development Index (HDI): U.N. Development Programme (UNDP)

- **"Measures the average achievement in a country in three basic dimensions of human development:**
- **A long and healthy life …**
- **Knowledge …**
- **A decent standard of living …"**

Source: UNDP. 2003. Human Development Report, Technical Notes, p. 141

Measuring The HDI: Indicators And Indices

- **A long and healthy life: life expectancy**
- **Knowledge: adult literacy (2/3 weight) and enrollment [all levels] ratio (1/3 weight)**
- **A decent standard of living: Gross Domestic Product per capita**
- **Convert each to an index (0 - 1) based on "goalpost" maxima and minima; sum and divide by 3. Max is 1.00.**

HDI: Albania Example

- **Life expectancy is 73.5 years. Goalposts are 25 and 85.**
- **(73.4-25) / (85-25) = .807**
- **Knowledge index = .798**
- **GDP Index = .602**
- **HDI = (.807+.798+.602) / 3 = .735 (95th)**

U.S. Poverty Threshold

- **Three times expenditure for low-cost, nutritionally adequate diet**
- **Created in 1963 by Mllie Orshansky of the Social Security Administration**
- **Based on:**
  - **(a) USDA "Economy Food Plan" designed for <u>emergency</u> use when funds are low; and**
  - **(b) USDA Household Food Consumption Survey showing that in 1955 families of 3 spent 1/3 of their <u>after-tax</u> income on food**

U.S. Poverty Thresholds 2003

Source: U.S. Census Bureau at
http://www.census.gov/hhes/poverty/threshld/thresh03.html

Family Size*	48 Contiguous States
1	$ 8,825 - 9,573
2	11,122 - 12,682
3	14,393 - 14,824
4	18,660 - 19,979
8	30,619 - 33,876

***Exact threshold depends on family composition**

Mollie Orshansky (1971) created U.S. Poverty Threshold in 1963. She considered it a measure of income inadequacy.

I.A.2. Defining and Measuring Malnutrition

- The biology of malnutrition
- Food security
- Malnourished children

Food Security

“Access…at all times to enough food for an active healthy life.”

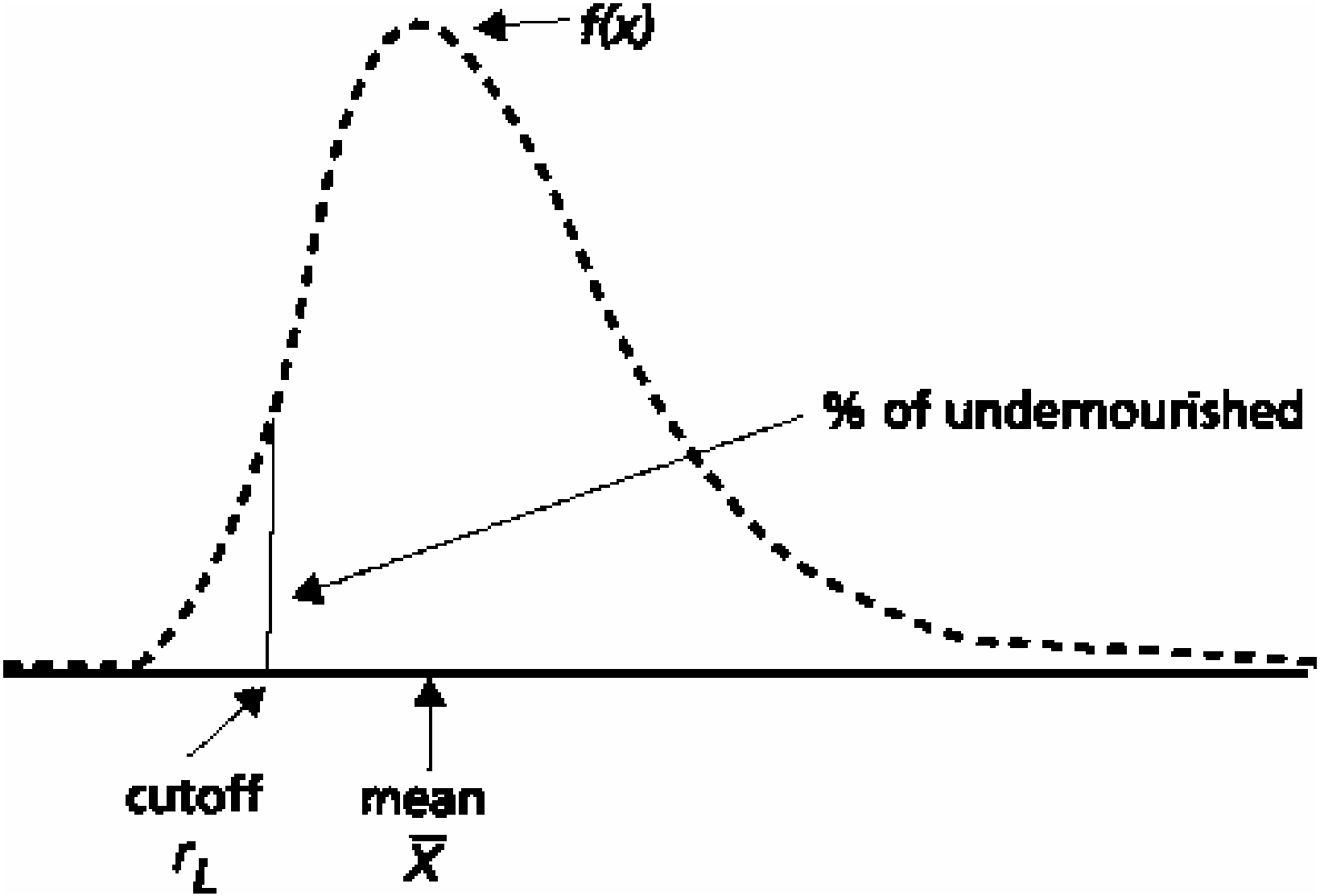
Source: Reutlinger in Foster, p. 95

How FAO Counts the Undernourished in a Country (1)

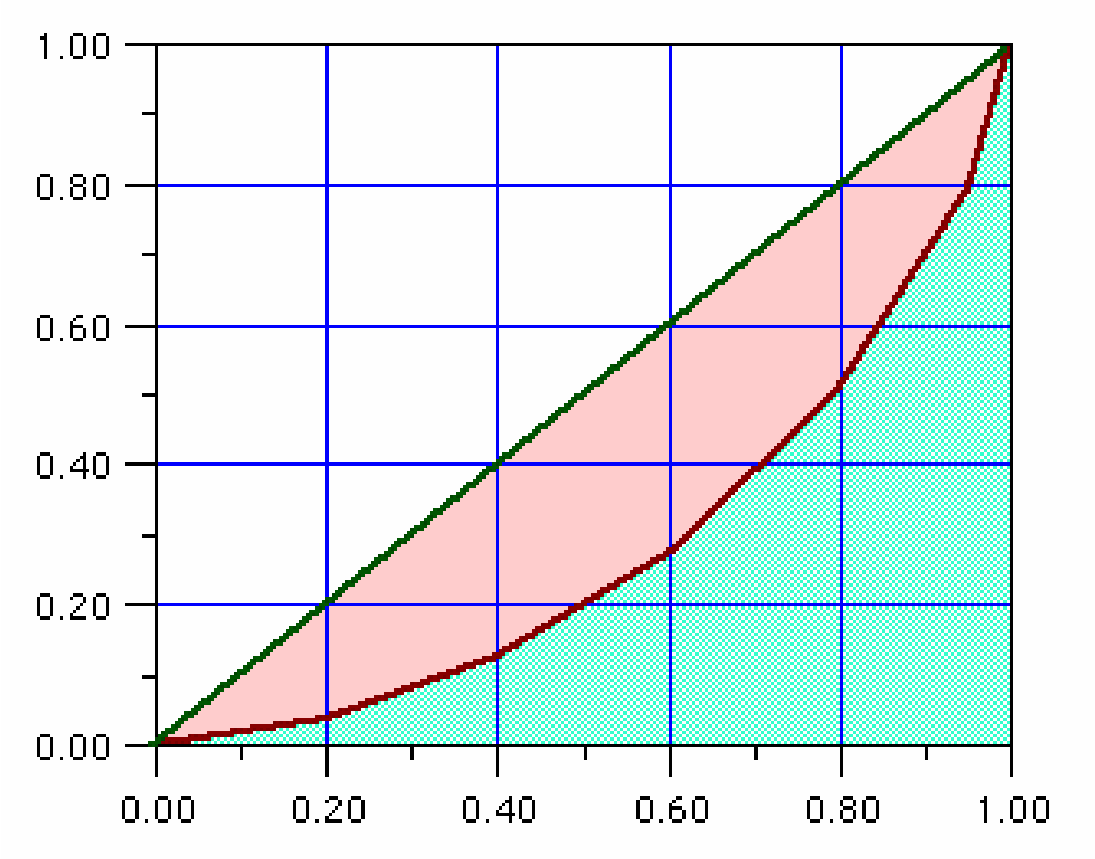
1. **Estimate total calories available in country from production, trade, and stocks**
2. **Divide by population to get average dietary energy supply (DES)**
3. **Estimate minimum energy requirements for good health for each age, sex, status group.**
4. **Aggregate into energy requirement for average individual based on percent of population in each group.**

How FAO Counts the Undernourished (2)

5. **Estimate distribution of energy consumption based on (a) mean DES; (b) Gini coefficient of income inequality and; (c) log normal model distribution**
6. **Calculate percent of population below minimum**
7. **Multiply by population to get number undernourished.**


f(x)
% of undernourished
cutoff
z_L
mean
$\bar{x}$

The Gini Coefficient and the Lorenz Curve

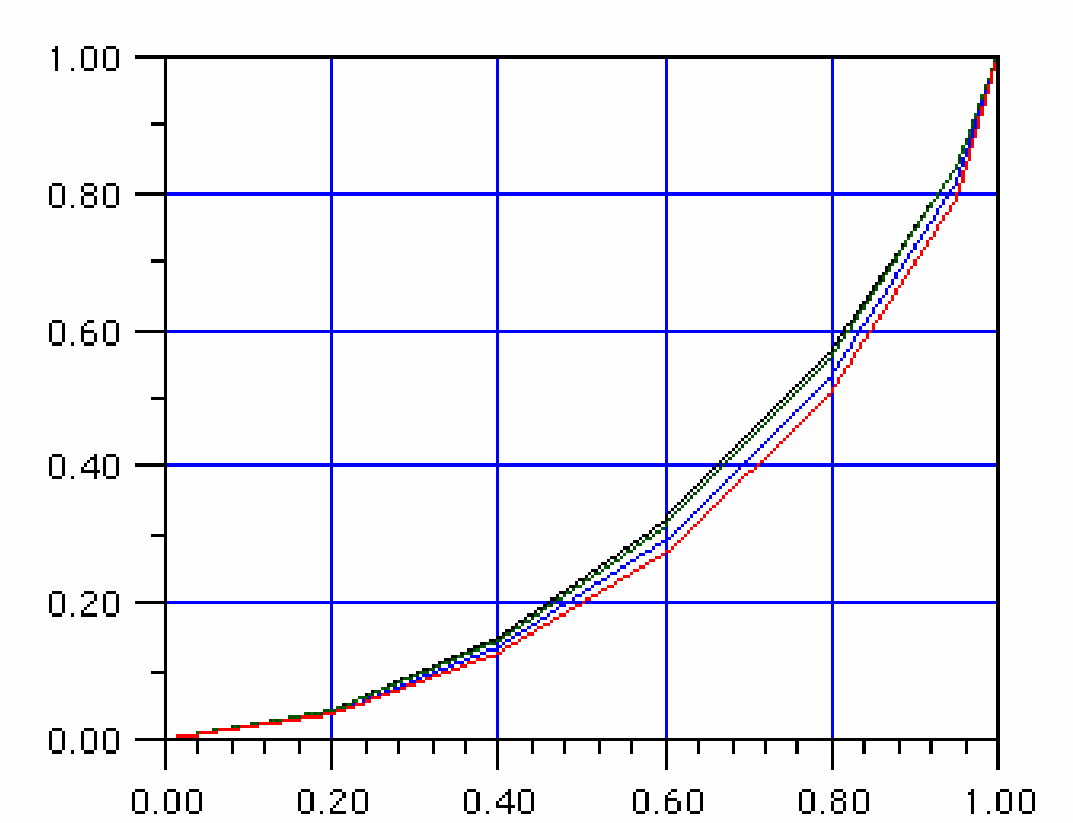


Lorenz Curves for U.S. Show Increasing Income Inequality

1970 - 1994

years 1970, 1980, 1990, 1994 colors:black green blue red

Coefficients: .39; .40; .43; .46



FAO: Energy Requirement

- (FAO/WHO/UNU, 1985), has defined energy requirements as follows:

  The energy requirement of an individual is the level of energy intake from food that will balance energy expenditure when an individual has a body size and composition and level of physical activity, consistent with long-term good health; and that will allow for the maintenance of economically necessary and socially desirable physical activity. In children and pregnant or lactating women the energy requirement includes the energy needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health.

CALORIES REQUIRED

A. FOSTER : 2350 calories

B. UN Food and Agriculture Organization (FAO)

Years	Males
0-1	800
10-12	2170
16-18	2820
18-60 (active)	2944
>60	2060

Years	Females
0-1	800
10-12	1925
16-18	2150 (+200 pregnant)
18-60 (Childbearing age)	2140
Pregnant	2240
Lactating	2640
>60	1830

Source: From King and Burgess. 1993. APP. 2

Table A2.1: Daily requirement for energy, protein, fat, iron, iodine, and vitamins for different sex and age groups

Age†	Weight (kg)	Energy (kcal)	Protein (g) Diet**		Fat (g)	Iron (mg) Diet **			Iodine (µg)	Vitamin A (RE)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Folate (µg)	Vitamin C (mg)
			A	B		H	M	L							
Children-both sexes															
0-6 months	5.4	585	10	---	---	--	--	--	---	350	---	---	---	19	20
6-12 months	8.8	960	14	---	---	7	11	21	50	350	0.3	0.5	5.4	32	20
0-1 years	7.3	800	12	---	---	7	11	21	50	350	0.3	0.5	5.4	26	20
1-3 years	11.9	1250	14	23	35	5	7	13	70	400	0.5	0.8	9.0	40	20
3-5 years	15.9	1510	18	26	42	5	7	14	90	400	0.7	1.0	10.5	53	20
5-7 years	19.6	1710	20	30	48	7	10	19	90	400	0.8	1.1	12.1	65	20
7-10 years	25.9	1880	26	38	52	8	12	23	120	400	0.9	1.3	14.5	85	20
Boys															
10-12 years	34.0	2170	34	50	60	8	12	23	150	500	1.0	1.6	17.8	110	20
12-14 years	43.2	2360	43	64	66	12	18	36	150	600	1.2	1.7	19.1	140	30
14-16 years	54.5	2620	52	75	79	12	18	36	150	600	1.2	1.8	19.7	180	30
16-18 years	63.6	2820	27	4	78	8	11	23	150	600	1.2	1.8	20.3	200	30
Girls															
10-12 years	35.4	1925	35	52	53	8	11	23	150	500	0.9	1.4	15.5	120	20
12-14 years	44.2	2040	42	62	57	13	20	40	150	600	1.0	1.5	16.4	150	30
14-16 years	51.5	2135	46	69	59	13	20	40	150	550	1.0	1.5	15.8	170	30
16-18 years	54.6	2150	45	66	60	16	24	48	150	500	0.9	1.4	5.2	170	30
If pregnant		+200	+6	+7		26	38*	76*		600	1.0	1.6	17.5	400	50
Men-active															
18-60 years	65.0	2944	49	57	83	8	11	23	150	600	1.2	1.8	19.8	200	30
>60 years	65.0	2060	49	57	56	8	11	23	150	600	1.2	1.8	19.8	200	30
Women-active															
Childbearing age	55.0	2140	41	48	59	16	24	48	150	500	0.9	1.3	14.5	170	30
Pregnant	55.0	2240	47	55	65	26	38*	76*	175	600	1.0	1.5	16.8	400	50
Lactating	55.0	2640	59	68	73	9	13	26	200	850	1.1	1.7	18.2	270	50
>60 Years	55.5	1830	41	48	51	6	9	19	450	500	0.9	1.3	14.5	170	30

* Supplements are usually needed to provide enough iron.
† Example to explain how are range is expressed: 1-3 years means 1 year 0 months to 2 years 11 months.
-- No value available. Assumption made that breastmilk covers needs.

Source: King and Burgess. 1993. Nutrition for Developing Countries. Oxford.

Table A2.2: BMRs of men and women of different weights

		BMR	
Age (years)	Weight (kg)	Men	Women
18-29+	40	1291	1084
	45	1368	1158
	50	1444	12331
	55	1521	1305
	60	1597	1387
	65	1674	1452
	70	1750	1525
30-59+	40	1343	1177
	45	1401	1221
	50	1459	1264
	55	1517	1308
	60	1575	1351
	65	1633	1395
	70	1691	1439
>60	40	1027	1016
	45	1095	1067
	50	1162	1121
	55	1230	1174
	60	1297	1226
	65	1365	1279
	70	1432	1331

Table A2.3: FORMULAE AND FACTORS FOR CALCULATING DAILY ENERGY AND PROTEIN NEEDS

Formulae used to calculate average individual energy requirements (James and Schôfield 1990)

- For ages over 10 years, the average individual energy requirement is Basal metabolic rate (BMR) x Physical activity levels (PALS)
- For ages 0-10 years, the average individual energy requirement is Body weight x Energy allowance

  The energy allowance factor allows for the energy need of frequent infection and desirable levels of activity.

Formulae used to calculate basal metabolic rate (BMR)

	Males	**Females**
10-17+ years	17.5 x W + 651	12.2 x W +746
18-29+ years	15.3 x W + 679	14.7 x W + 496
30-59 years	11.6 x W + 879	8.7 x W +829
> 60 years	13.5 x W +487	10.5 +W + 596

Where W is the body weight in kilograms.

Table A2.2 gives the BMRs of men and women of different ages and weights.
Table A2.3 lists factors for calculating energy and protein needs.

Source: King and Burgess. 1993. Nutrition for Developing Countries. Oxford.

Table A2.2: Factors for calculating daily energy and protein needs

Age (years)	Energy allowance (kcal/kg)		Physical activity level (PAL) factor		Protein (g per kg body weight)			
	Boys	Girls	Male	Female	Male		Female	
					Diet*		Diet*	
					A	B	A	B
0+	109	109						
1+	108	108			1.2	2.0	1.2	2.0
2+	104	102			1.15	1.93	1.15	1.93
3+	99	95			1.1	1.85	1.1	1.85
4+	95	92			1.1	1.85	1.1	1.85
5+	92	88			1.0	1.47	1.0	1.47
6+	88	83			1.0	1.47	1.0	1.47
7+	83	76			1.0	1.47	1.0	1.47
8+	77	69			1.0	1.47	1.0	1.47
9+	72	62			1.0	1.47	1.0	1.47
10+			1.76	1.65	1.0	1.47	1.0	1.47
11+			1.72	1.62	1.0	1.47	1.0	1.47
12+			1.69	1.60	1.0	1.47	0.95	1.4
13+			1.67	1.58	1.0	1.47	0.95	1.4
14+			1.65	1.57	0.95	1.4	0.9	1.32
15+			1.62	1.54	0.95	1.4	0.9	1.32
16+			1.60	1.52	0.9	1.32	0.8	1.18
17+			1.60	1.52	0.9	1.32	0.8	1.18
18-59+ light activity			1.55	1.56	0.75	0.88	0.75	0.88
moderate activity			1.78	1.64				
>60 light activity			1.51	1.56				

	Energy (kcal/day)	Protein (g/kg body weight/day)	
		Diet A*	Diet B*
Extra needs for pregnancy			
Light – Moderate activity	100	6	7
Heavy activity	200		
Undernourished women	200-285		
Extra needs for lactation	500	17.5	20.5

*See explanation of diets on p. 427

Source: King and Burgess. 1993. Nutrition for Developing Countries. Oxford

MALNOURISHED CHILDREN

- **Children age 0-5 years whose weight for their age is below minus 2 standard deviations from the median of the reference population.**

Source: World Bank. World Development Report. 2000-2001. P. 318

Stunted Children as an Indicator

- **In children under 5, height is determined mainly by nutrition, not genetics**
- **Stunting highlights major outcome problem - diminished physical and mental capacity**
- **Reflects long-term poverty**
- **Reflects care and health as well as food availability**
- **Care may be a function of culture as well as poverty**
- **Misses short-term changes**