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POPULATION, CONSUMPTION AND HUMAN DEVELOPMENT

BACKGROUND PAPER FOR THE 1998 HUMAN DEVELOPMENT REPORT

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INTRODUCTION

This paper is a 'think-piece' about the relationship between demographic changes and consumption - both levels and structure - and via this on human development. The motive for focusing on demographic changes is related to recent findings that the demographic transition towards older populations, by increasing savings/income ratios and worker/child ratios, (1) speeds up economic growth [Kelley and Schmidt 1994], explaining much of the 'growth advantage' of East Asia in 1960-90 and of the potential advantage of South Asia in 1995-2025 [Bloom and Williamson 1997]; and (2) improves the rate of poverty reduction, especially via reduced fertility [Eastwood and Lipton 1997]. Both economic growth and poverty reduction have clear implications for human development. The question we ask here is: are there similar effects from demographic changes, via consumption, on human development?

Why might this happen? Demographic changes are enormous. First, rates of population growth are unprecedented; for example, Asia's population increased from 1.5 billion in 1950 to 3.5 billion in 1995. Second, in the demographic transition, the balance between different age groups, and hence between workers and dependants, also changes dramatically, as does household and family formation, urbanization, and many other demographic aspects. Population increase raises the consumption of food, living space, energy and much else; will this lead to rising unit costs (diminishing marginal total-factor returns), or to economies of scale? To environmental degradation, or to inventions that economise on, or discover new, natural resources? growth as such, that has such significant impact on economic growth and poverty (unless population growth leads to 'diminishing returns'). Population restructuring - which usually starts with the better-off in a country and affects the poorest last - also influences growth and poverty, and hence consumption, in many ways, e.g. as the proportion of single-person households changes.

With hindsight, the importance of changing age-structure is not surprising. Between 1965 and 1990, in East Asia, the number of dependants grew nine times faster than the number of workers; in Africa dependants increased faster than workers.[1] It is unthinkable that such changes (and differences) should have no effect on levels and patterns of consumption, and hence on human development. Also, as these populations are going through 'demographic transitions', they are usually urbanising rapidly, as did the now industrialised

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[1] Calculated from [ADB 1997: 144]; figures reproduced in Table 5), by dividing the *growth rate* of the economically active population by that of the economically dependent population.

countries. This is usually a sign of prosperity rather than indigence, but changes in consumption patterns associated with these population redistributions have effect not always favourable for human development.

Unfortunately, existing data do not allow a systematic analysis of these effects (except perhaps on the last issue - much is known about different consumption patterns in rural and urban areas). A substantial body of research exists on the effects of demographic changes on *levels* of consumption (as proportion of GNP/GDP), but much less on *patterns* of consumption. To tease out these links through regression analysis involves deep problems of causality (complicated by the existence of a close association between demographic changes and GDP growth), especially in the virtual absence of long panel surveys, and is thus not feasible within the scope of this paper. Therefore, we rely on case-study evidence that describes patterns of consumption.

We proceed by describing consumption patterns in countries or regions at distinct *phases of the demographic transition*.[2] This will be described in more detail in Section 2. Basically, this follows standard demographic transition theory, in four phases: (1) the situation of high birth and death rates; (2) declining death rates while fertility remains high, and hence population growth increases; (3) declining birth rates and hence declining rates of population growth; (4) an ageing population, recently associated in some countries with below-replacement fertility. It should be noted, however, that these phases provide only very broad markers. One needs to emphasise the differences, for example, within a typical country at any given stage of the demographic transition; most significant is the fact that the poor usually lag behind, with significant effects on consumption patterns.

The rest of this paper is structured as follows. Section 1 reflects on the link between consumption and human development, for the moment abstracting from demographic change. We distinguish two stages: one in which many people in a country (region, group) are striving to reach the minimally necessary absolute level of absolute consumption; and a second stage, after almost everyone has reached that minimum, where inequalities - relative levels of consumption - become more important for human

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[2] This has the disadvantage that we are looking at cross-section data, where time series would be preferable (an example of this kind of comparison is the work by Deaton on Thailand and Côte d'Ivoire reported below). With respect to life-cycle approaches the problem [Lunt and Livingstone 1992: 106] is their assumption that young people now live under similar conditions to those of earlier generations. Particularly in societies with rapidly expanding purchasing power, such as western Europe during this century, this is unlikely to be right. Different attitudes to savings among the young may result from 'consumerism', easier credit, etc.

development. Section 2 focuses on population changes, reviewing patterns of population growth; the demographic transition in developing countries (and the lagging countries and groups); and population movements including urbanisation. We end section 2 with a discussion of secular trends in household formation: despite an observed decline of household size, it is false that a linear transition has taken place from 'traditional' extended to nuclear families. Section 3 then discusses the impact of these demographic changes on consumption levels and structure, both at a macro (country) and micro (household) level, focusing on what we term 'demographic extremes'. Section 4 reviews the impact of overlapping demographic development on the shift from 'absolute' to 'relative' consumption inadequacy as a central policy concern, and formulates some policy conclusions.

1. CONSUMPTION AND HUMAN DEVELOPMENT: BASIC NEEDS, 'CONSPICUOUS CONSUMPTION' AND 'MINIMUM ACCEPTABLE CONSUMPTION'

Consumption patterns have been and are changing rapidly in almost all parts of the world. Consumption is *essential* for human development at the level of a minimum necessary consumption basket (such as Rowntree [1899] devised for York, or the Indian poverty line, reflecting 'absolute needs'). Beyond that, human development could be seen to require imagine a constantly increasing level, and shifting pattern, of minimum acceptable consumption, changing in line with economic growth (reflected in relative poverty lines as used in Europe, i.e. 'relative needs'). This is not necessarily a matter of greed or even emulation. Human development has been described by Streeten [1958] in terms of an 'anabolism of wants' in which the satisfaction of acute needs opens steadily wider horizons for human growth and discovery. First, once absolute needs are met, education (and health) expenditure becomes increasingly important. Second, values regarding consumption, of what a minimum acceptable way of life is, change, also among the poor.[3] This corresponds closely to Adam Smith's celebrated remark that in Scotland in 1776 to lack linen was to incur shame and therefore unacceptable; when the basic minimum of consumption poverty has been passed, the basic consumption minimum remains, in Sen's words, 'absolute in capabilities' but becomes 'relative in commodities', including those needed to maintain self-esteem. This comes close to what has been described as 'conspicuous consumption', but we avoid the normative overtones, emphasising instead that, especially for the less well-off in any society, achieving 'minimum acceptable consumption' is part of human development.[4]

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[3] Is it possible to determine a cut-off point for the transfer from absolute to relative poverty? On the one hand, a poverty line defined on the basis of nutritional adequacy does allow this. But even here the question arises: which consumption goods are included in the measurement? Or does one simply accept 'revealed preference' and use the consumption level at which the expected satisfaction of energy requirements is 100 per cent, using the revealed-preference assumption that consumption resources are rationally allocated among uses [Lipton and Ravallion 1995]?

[4] Veblen defined conspicuous consumption broadly as consumption in excess of the subsistence minimum, and it represents symbolic status desires or aspirations to become a certain type of people. Yoon and Seok [1996] provide an interesting description of conspicuous consumption and social status in Korea. Their research provides support for Veblen's argument that conspicuous consumption is driven by status envy among status equals, and they argue that this is consistent with values in Korean society (a stress on form over practical utility, a lack of ethics guiding spending, and rank consciousness).

The argument presented here is in line with the expanded framework of consumption theory as presented by James [1993: Chapter 6]. Traditional consumption theory failed to take into account, according to James, (1) technical changes and the introduction of new products, and (2) changes in values, or 'non-wanton' preference changes. James extends Nurkse's theory on the 'international demonstration effect', to incorporate the 'powerful welfare implications of consumption based on status seeking', and more generally sociological as well as economic variables. In developing countries - as compared to, for example, the urbanisation process in the UK in the nineteenth century - these value changes are happening much more rapidly [James 1993: 128]; developing countries are not only leapfrogging technologically, but also in terms of consumption. This theory predicts a rapidly increasing need to spend. Very cautiously, it would suggest that 'The low Asian' shares of private consumption in private disposable income will tend in the long run to rise - and hence savings rates to fall - to 'European' levels.

Imitation, keeping up with the Joneses, sounds crassly materialistic in the bad sense; but reducing inequalities, and easing acquisition by the majority of the best aspects of consumption by the fortunate, does not. Nor does anabolism of wants, movement upscale in the quality of 'consumption' of housing, books, clothes, music. This process is central for human development, especially after the direst needs are satisfied. We do not, of course, argue that ever-increasing consumption is essential (we do not discuss the sustainability in terms of availability of natural resources either). Nor do we argue against using incentives, institutions and example to moderate the consumption of élites - though with globalization their influence as well as their capacity to select tax and institutional regimes is increasingly international. We point out only that the human development of non-élites, and the coherence of societies (especially multicultural ones), depends on the avoidance of huge and ever-widening consumption gaps between élites and the rest. Wilkinson [19xx] presents evidence that inequality (as distinct from absolute poverty alone) damages health, once a certain level of material welfare has been reached.[5] More unequal societies are less healthy, and are also likely to be characterised by a number of

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[5] The nutritional and health value of consumption patterns change over time, particularly when welfare improves (Section 3). The behaviour of élites seem to play an important role, e.g. leading the movement towards and later away from obesity, low levels of exercise and high animal fat consumption. In Brazil obesity among women peaked in the top quintile of the income distribution in 1974-5 (at 10%) but by 1989 the peak (at 13% had shifted to the third quintile [Coitinho et al. 1991].

other social problems.[6] In the UK, lower-rank civil servants are less healthy than the higher ranks. Even animal behaviour suggests that high status inequality, especially associated with absence of control over one's work and domestic circumstances and of security in one's tasks, damages health. This argument can be extended to consumption patterns: deprivation from (or severe inequality in) consumption goods deemed desirable, and consumed by the élite, is a serious hindrance to human development.

The negative effects of exclusion from accepted consumption patterns are stressed in the work on the UK by Dowler (in fact, she stresses both the financial difficulties of Britain's poor in obtaining a sufficient diet, and the subjective difficulties):

> "Those who cannot afford to eat in ways acceptable to society; who find food shopping a stressful or potentially humiliating experience because they might have insufficient money; whose children cannot have a packed lunch similar to their friends'; who do not call on others to avoid having to accommodate return calls - these are people excluded from the 'minimum acceptable way of life'. Food is an expression of who a person is and what they are worth, and of their ability to provide their family's basic needs; it is also a focus for social exchange. Food is, of course, a major contributor to health and well-being. But it is not just health that is compromised in food-poor households: social behaviour is also at risk."[7]

This sets out our framework for the analysis of consumption patterns, as they influence human development. The central point is that human development does not stop with the achievement of 'absolute needs' - although this forms a central concern in this paper - but that 'relative needs' become increasingly important. Relativity may be to a *past* attained pattern; hanging on to the 'acquis' becomes especially crucial to the self-esteem of the worse-off when (as in Britain and the USA in 1977-92) they are becoming, not absolutely poor, but absolutely poorer - less able

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[6] An interesting question is whether HDI or HPI indicators reflect this concern. Life expectancy and literacy rates are partly determined by a measure of inequality or social cohesion. GDI and HPI do reflect this to some extent.

[7] The 'minimum acceptable way of life', is, of course a relative definition of poverty like Townsend's. Despite worsening poverty in the UK as in other developed countries, there remains a clear difference between these poor and the poor in developing countries that are unable to obtain sufficient food.

to afford their traditional patterns of consumption - just as the best-off are radically improving on their own patterns. For instance, for widowed people in Britain [Howarth 1993], maintaining traditional patterns of preparing and consuming food - even in changed circumstances - is crucial for people's well-being.

Moreover, as we will discuss below, 'acceptable minimum consumption' is an issue even before absolute needs have been satisfied (if such a cut-off point can be identified). Although the poor spend their money in a rational way, they are not immune to the attraction of modern consumption;[8] this seems particularly relevant for the urban poor, but (as we will describe below) because of close rural-urban and international links, these influences are likely to be extended quickly to remote rural areas.

This latter observation begins to suggest the relevance of population change. In their preface to their Lyrical Ballads [1798?] Wordsworth and Coleridge speak of 'the encreasing accumulation of men in cities [where] the daily pressure of sensations has reduced them to an almost savage torpor' (***check***). One sees this among the near-desperate, half-employed, crime-racked slumdwellers of Johannesburg, who know but cannot approach the consumption of the (still almost wholly white) élite in its security-fenced houses. But even in less extreme cases[9] rapidly growing population density, and increasing travel, trade and commerce among population groups, increase the psychic pressures not to fall too far behind the still-growing consumption of the rich.

2. DEMOGRAPHIC REGIMES

We first briefly review global population data, as a background to the analysis on how demographic changes affect level, composition, distribution, sustainability and human development impact of consumption. Demographic data reviewed here includes scale (population growth, fertility, mortality) as well as structure (age, location, household types), focusing on the changes during the last 30-50 years and projections for the next 30 years. The geographical focus is on the developing countries - because most of the

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[8] According to Veblen, "[n]o class of society, not even the most abjectly poor, foregoes all customary conspicuous consumption. The last items of this category are not given up except under stress of the direst necessity" [in James 1993: 131].

[9] The ratio of income per person between top and bottom quintiles is higher in South Africa than in any other country with survey data.

world's population live there, because they face the fastest growth (and the fastest change in demographic structures), and because of the still-high incidence of absolute consumption poverty, and of rapid transition (e.g. in East Asia) to new problems of relative deprivation. But we also refer to the richer countries, and the implications of regional differences in population growth and structure on consumption patterns.

2.1 Population growth

Today's developed countries underwent a demographic transition during the 19th and early 20th century. The start of the transition was marked by a decline in mortality, and followed by a transition from high to low fertility; birth rates declined 75 to 100 years after birth rates began to fall. At present, in the developed countries, population grows hardly at all - the projected annual population growth for the developed countries between 1995 and 2020 is 0.2 per cent. For Europe annual *decline* of 0.1 per cent is expected [UN 1995: medium fertility assumed) - with very low fertility and rapid ageing.

Population grows much faster in the less-developed countries than in the industrialised world. Between 1950 and 1994, the population of the less developed regions increased by 161 per cent, compared with 43 percent for the more developed regions. Between 1990 and 1995, the population of the less developed regions grew at 1.9 per cent per annum, and the population of the more developed regions at 0.4 per cent per annum [UN 1995: 99]. Population growth in the developing world, well below 1 per cent per year before 1941, rose steadily to about 2.6 per cent in the 1960s - but then fell back to about 1.8 per cent today, as couples slowly reduced their family sizes [UNDP 1996: 149, 159, 179; World Bank 1990: 159, 231; Kandiah and Horiuchi 1995]. This demographic transition - much bigger and faster than its predecessor in Europe in 1750-1900 - is taking the developing world in 1940-2025 from:

- high birth-rates, death-rates and child/adult ratios and slow population growth;

- via high birth-rates, much lower under-five death-rates,[10] initially higher child/adult ratios but soon rising ratios of workers (and fecund women) to population, and fast population growth;
- to lower proportions of workers and fecundable women, reduced family size, and hence (despite further falls in death-rates) slower population growth.

Developing countries are in the midst of their demographic transition, although there are large differences among these countries (described below). In developing countries, broadly speaking, there was a transition from a high-mortality, high fertility regimes to a moderate-mortality, high fertility regime between the 1930s and the 1960s. Since the 1960s, this has tended to shift to a low-fertility, lowish-mortality regime. As a consequence, world population growth has been slowing down.

The projected average annual population growth rates of the different regions are shown in the following Table. This shows that among the 'developing' countries, East Asia has advanced furthest in the demographic transition, and sub-Saharan Africa least.

Table 1: Population and fertility projections for major world regions, 1995-2020

(UN World Population Prospects, 1994 and 1996 revisions)

Region	Aver. annual growth rate (%)	Average fertility rate (per woman)
World	1.2	2.76
Developed	0.2	1.77
Developing	1.4	2.97

[10] Infant mortality in today's developing countries fell from over 200 per thousand in 1941 to 150 in 1960 and about 67 today; many children aged 1-4 were also saved. This meant a big fall in the overall death-rate, typically from well over 45 per thousand around 1941 to 20 per thousand today. Although birth-rates fell in response, the process was slow - partly because, as the girls saved from death grew up, the proportion of women of childbearing age rose (from 46 per cent to 50 per cent in 1965-88 alone).

	(millions)		1995-2020	(p e r woman)
China	1,232	21.4	0.83	2.01
India	945	16.4	1.46	2.87
USA	269	4.7	0.80	2.09
Indonesia	200	3.5	??	??
Brazil	161	2.8	1.29	2.4
Russian Federation	148	2.6	??	??
Pakistan	140	2.4	2.55	4.6
Japan	125	2.2	0.01	1.56
Bangladesh	120	2.1	1.8	3.14
Nigeria	115	2.0	2.7	5.15

Trends in fertility rates are presented in the following table, which emphasises the divergent developments. In Africa and the least-developed countries in particular, fertility rates will fall below 5 only around the year 2000, and will remain above replacement level for many decades to come.

Table 3: Fertility per woman by region and over time
(UN World Population Prospects, 1994 revision)

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
World	4.94	4.91	4.19	3.48	3.04	2.78	2.52
Developed	2.77	2.52	2.01	1.84	1.71	1.75	1.86
Developing	6.05	5.97	5.01	3.99	3.38	3	2.64
Least developed	6.55	6.61	6.63	6.23	5.59	4.7	3.84
Africa	6.67	6.71	6.51	6.2	5.56	4.68	3.9
Asia	5.73	5.61	4.63	3.55	2.96	2.65	2.34
Latin America & Caribbean	5.89	5.74	4.68	3.62	2.96	2.53	2.26
Europe	2.58	2.46	2.1	1.85	1.59	1.62	1.76

North America	3.6	2.94	1.9	1.85	2.06	2.08	2.1
Replacement Fertility	2.1	2.1	2.1	2.1	2.1	2.1	2.1

Some countries and regions experience reverses in demographic transitions. The former communist transitional countries are a clear example, where mortality declines have been reversed. Even there, however, there are important differences - which cannot be explained by rises in absolute poverty [Harwin 1996]. Countries of the Caucasus have experienced the greatest poverty and GDP drops, but do not show the worst outcomes in mortality and life expectancy. Central Europe, with the best economic indicators, shows more worrying deteriorations in these indicators, perhaps due to declining social integration. The bleakest picture is in the Western CIS and Baltic regions. Even though the economic deterioration has not been as bad as in the Caucasian economies, welfare outcomes have been worse.

There is some global convergence of demographic trends, but it is very slow. In Africa and some Asian countries fertility rates will remain above replacement levels for decades. Moreover, within countries, there are also large differences; some regions and groups are seriously lagging behind in the demographic transition. This has consequences for consumption patterns and human development (Section 3).

2.2 Population structure

As countries pass through the demographic transition, population undergoes structural changes, with important implications for levels and structure of consumption. This section examines the changing structure of the population, in different stages of the demographic transition. It may be helpful to distinguish four broad demographic/ fertility regimes, linked to distinct patterns of consumption (and human development):
a) The '**high fertility, high mortality**' régimes, often characterised by absolute poverty levels of consumption and nutrition for a large part of the population.[11]

[11] For quite long periods on many societies, this has not been the case. An equilibrium can develop with reasonably adequate food for the large majority. But such an equilibrium is vulnerable to harvest failures, diseases, etc. (cf. R. Lee, Evenson).

b) The '**high fertility, low mortality**' régime: with or without rapid poverty decline (for different reasons), consumption growth puts increasing strain on natural resources.
c) A '**declining mortality, low fertility**' régime bears promise for human development, since workers increase relative to young dependants, increasing the affordability of education and investment and reducing sibsize pressures on child development; however this is linked to increasing consumerism, especially by the young (sec. 3).
d) In the '**lowest fertility**' régime the worker-dependant ratio rises again, because of an ageing population (i.e. an increasing proportions of 'dependent' elderly); this is likely to be associated with increasing political and consumer clout of the elderly, slower growth, and recently in many countries a large rise in the proportion of single-person households. All these things bring changing consumption patterns.

Table 4 presents an overview of the differences in population structures in richer and poorer countries. This clearly illustrates the large differences: in developed countries, the age group 0-14 forms 20 per cent of the population, and the age group 24-64 52 per cent; respective figures in the least developed countries are 43 and 34 per cent.[12]

Table 4: Age distributions by level of development, 1995
(UN World Population Prospects, 1994 revision)
Percentage of population in each age group:

Age Group	0-4	5-14	15-24	24-64	over 65
Developed	6.20	13.50	14.10	52.7	13.50
Developing	12.40	22.20	19.00	41.70	4.70
Least Developed	17.20	26.50	19.60	33.70	3.00

As will be discussed more extensively in Section 3.1, recent research on the changes in demographic structures has emphasised an unexpectedly high impact on economic growth and poverty reduction. These changes can be best illustrated with figures on the growth rates of two main demographic groups: the economically active population versus the economically dependent population (Table 5). This shows that, whereas in East Asia

[12] An interesting illustration of changing population structures of time is provided by Webb and Zia [1989] who show that Japan in 1985, Brazil in 2030, and Indonesia in 2055 will show similar structures. Table 11 of the Appendix shows changing demographic structures for a selected number of countries (expecting dramatic changes in age structures).

workforce grew nine times as fast as dependants, but in South Asia only 1.3 times faster, and in Africa at almost the same rate.

Table 5: Growth rates for different population groups and regions, 1965-90

Region	Total population	Economically active population	Economically dependent population
Asia	2.13	2.63	1.41
- East Asia	1.58	2.39	0.25
- Southeast Asia	2.36	2.90	1.66
- South Asia	2.27	2.51	1.95
Africa	2.81	2.78	2.85
Europe	0.49	0.68	0.15
Latin America	2.25	2.64	1.77
N. America	1.69	2.21	0.91

Source: Asian Development Bank 1997: 144 (based on World Bank data).

Much has been written recently about the ageing of the population. The proportion of over-65s in the European population is increasing from 8.7 per cent in 1950, 11.4 per cent in 1970 and 13.4 per cent in 1990, to a projected 16.1 per cent in 2010. In 1990, the percentages were much higher in North and West Europe than in East and South, though in the South the increase in the percentage of elderly during 1990-2010 will be most rapid. In Italy, for example, the percentage of elderly will increase from 14.2 per cent to 18.4 percent, in Greece from 13.7 per cent to 18.4 per cent. Within western Europe rates of increase are particularly marked in Germany, 15.4 to 20.7 per cent; and Switzerland, 15.3 to 20.3 per cent [Jones Finer 1996: 107-8].

For developing countries it will take longer before these levels of population ageing will be reached, but they seem to come earlier in their economic growth path. In Thailand, where the demographic transition is well advanced, the proportion of over 60s is expected to rise from 5.7 per cent in 1985 to 11.2 per cent in 2020 [Deaton 1989]. In China (see Table 11 of the Appendix) that proportion is rising very fast, from 5.6 per cent in 1990 to 13.9 per cent in 2030; this is creating considerable concern within and outside China about how to take care of the elderly. By contrast, in Africa, the proportion of over-65s will hardly change: 3.1% in 1980, 3.0% in 2000 and 3.9% in 2025.

2.3 Urbanisation and migration

Although rates of urbanisation are often over-stated and panic scenarios are common, the world is rapidly urbanising. This is partly due to rural-urban migration, and partly because of reclassification of rural into urban areas (although 60 per cent of urban growth is said to be caused by natural population growth, the lower fertility rates in urban areas tend to slow down the process of urbanisation). The urbanisation is almost all in developing countries. 90 per cent of 2 billion extra urban dwellers between 1970 and 2020 will be in LDCs (UN data). In Africa and Asia, within 30 years most people will live in urban areas. The following Table illustrates the expected urbanisation rates.

Table 12: Urban and Rural Population in 1994 and 2025
(UN World Population Prospects, 1994 revision)
% of pop. living in urban areas:

	1994	2025
World	44.8	61.1
Developed Countries	74.7	84
Developing Countries	74.7	84
Least Developed Countries	21.9	43.5
Africa	33.8	53.8
Asia	34.1	54.8
Europe	73.3	83.2
Latin America & Caribbean	73.7	84.7
North America	76.1	84.8

Urbanisation has direct consequences for consumption. It exposes the rural population more immediately to modern patterns of consumption. But some significant aspects of the process of urbanisation need to be noted here - both influencing the way urbanisation affects consumption. In the first place, in contrast to what many modernisation and other theories assume, much migration remains circular, i.e. the migrants continue to maintain

close links with their villages of origin.[13] Second, migrants form a selective part of the rural population. Migrants are predominantly young healthy men - though there are regional differences in the gender ratio of migrants - which means that those left in the countryside are increasingly the old, children and women. This has implications for the structure of consumption, and for emulation, dependent on the nature of family bonds between urban and rural households.

For there is much more population mobility than indicated in figures on urbanisation. The late twentieth century is experiencing, probably not 'urbanization', but surely population movement, on an unprecedented scale (though much development thinking has been marked by a sedentary bias [McDowell and de Haan 1997]). At this moment, in addition to the hundreds of millions of economic migrants, it is estimated that there are some 18 million refugees in international transit, 35 million people internally displaced, 100 million people uprooted by planned development, and an estimated 25 million people in danger of displacement as a consequence of environmental change.

In studies of both rural-urban migrants and international migrants, it is now quite commonly accepted - after many studies that showed surprise in this respect - that migrants maintain close links with their areas of origin. Both remittances and return, therefore, also play a crucial role in processes of migration; this pattern of migration has significant consequences - to be discussed below - for the understanding of both family formation and levels and patterns of consumption.

2.4 Household formation

Research on migration has been helpful in focusing attention on the dynamics of family formation; as we will see below this is crucial for understanding especially levels of consumption, and may also be helpful in formulating policy suggestions regarding consumption. Of course, this paper does not allow for a full review of the research on family patterns and dynamics; nevertheless, it seems essential to make a few points that go against some of the established views in development theories (though less so in historical analyses).

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[13] This has been described in detail for India by de Haan [1994]; similar patterns have been described for China [Mallee 1995/96] and Wu and Zhou [1996], and elsewhere - de Haan forthcoming discusses this in some detail. Incidentally, this pattern of migration means that rates of urbanisation under-estimate rates of migration, or - relevant for the spread of urban consumption patterns - the contacts between rural and urban areas.

Many publications lament the decline of the extended family with modernisation, economic growth and urbanisation. There is little doubt that the size of households show a secular trend of decline. However, extended families have been less common than often suggested in NW Europe and N America [Laslett and Wall 1972] ??) as well as in India, where the size of the family probably did not change during the 100 years after 1850 [Shah 1973]. Conversely, though it is generally expected that urban households are less often extended than rural areas, in Shanghai most of the elderly population lives in stem families - grandparents, parents and children (Harper 1992: 169).

There is evidence that extended families are more common among the better-off households. An economic rationale for this is that only the better-off with inheritable possessions are able to keep their children at home. Also, with respect to the small pensions given to widows in Tamil Nadu, it has been suggested that the small amount of money - while being by no means sufficient for subsistence - may contribute to the widow being accepted in the family (Eswara Prasad 1995 ??).

The position of widows in India furthermore testifies that the extended family - where it exists - is very far from the idyll sometimes portrayed [Drèze 1992]. Many widows are not accepted in the households after the death of the husband, and when they are accepted their position by no means necessarily follows the ideology of respect for elderly.[14] This may apply to the old men as well, although to a lesser degree. The issue is of course not restricted to the elderly in India. Vincent and Mudrovcic (1993) note that in Bosnia (in 1991), obedience, respect and care due from children and daughters-in-law are widely acknowledged normative expectations; yet physical impairment leads to the loss of status and power.

Jones Finer [1996] notes that inter-generational family ties are far stronger in rural southern and eastern Europe than in more urbanised parts of Europe, but it is not clear that such continuing arrangements automatically favour the poor. In general, within extended families, respect is related to the contribution (perceived or real) of the old person. Gender studies have taught that households should not be seen as conflict-free units, and that relations are determined by partly culturally determined and often highly discriminatory

[14] Of course, a similar argument applies to the position of women in these households in general. In Northern India in any case, declining female-male ratios (as in China), female infanticide, and rising dowry prices are some of the most obvious warnings against imagining the extended family as an idyll.

ideologies (affecting consumption by girls, for example); similarly, studies of ageing point out that responses to the elderly cannot be taken for granted.[15]

Conversely, we disagree with a popular idea[16] about the way the West cares for the elderly. Given the deprived position of many elderly in (or out of) extended households in developing countries, one should not assume that they would be worse off or unhappier under European-style welfare arrangements - which of course are emerging in some developing areas (Kerala in India, Sri Lanka, Costa Rica, Cuba, urban China). Indian students researching welfare arrangements in the Netherlands (pers. comm.) were surprised by old people's high valuation of the group homes in which they lived. In Britain too, the old value these, seeing them as providing more autonomy than the family. An older woman, with a large and close family, stated: 'I don't think I would want to go and live with a child. I don't think I would want that. I think that then you become a nuisance and a burden and you are not loved so much because you are just these things' [Wilson 1993].

Moreover - centrally to consumption and savings (Section 3.1) and to policy options - State provision for the elderly is by no means simply a *reaction to* their alienation or deprivation when their children cannot or do not look after them. State actions have played an important and pro-active role in creating these provisions, for differing reasons, thereby probably *contributing to* dominant forms of family formation. There is evidence that housing policies in Europe have contributed to the formation of nuclear households, simply by providing insufficient space for larger families; conversely, Japanese housing policies achieve the reverse effect, by building two-level flats accommodating three-generation families. The first state pensions in Britain (in 1908) were provided for respectable old people of modest means - 'the sorts of people who ought *not* to have to face the humiliation of having to apply for discretionary Poor Law relief'. This was a clear example of 'statutory social policy to win

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[15] "[I]t would be tempting to see ageing, like death, as one of those basic human phenomena which cut across class lines ... But in modern society one of the main functions of social class has been to prepare a differential response to ageing' [Stearn 1977, in Wilson 1993: 46].

[16] This is partly an 'eastern' view on the 'western' world, one that holds that individualistic westerners do not respect and care for their elderly as in, for example, Confucian culture. See Jones Finer [1996] for a critique of this view, and a description of trends in ageing and responses to ageing over time, mainly in Europe.

votes'.[17] This is not the place to review the history of social policies in welfare states that are now in crisis; yet we must emphasise that household formations are determined by a variety of factors, do not follow simple logics, and are not immune to policy influences and incentives.

Deaton and Paxson [199x], reviewing patterns of ageing in Côte d'Ivoire and Thailand, suggest that household formation may be a mechanism to smooth consumption across generations. For example, members are allocated across households to maintain equal consumption levels. We would like to extend this argument: households and families are dynamic units (and hence difficult to research cross-sectionally), and patterns of family formation are context-dependent. For example, the importance of the socio-cultural context is described by Desai [1992] for West Africa (Ghana, Mali, Senegal) and Latin America (Brazil, Colombia, Dominican Republic). This research shows the importance of demographic factors for child nutrition (Section 3.3), but emphasises that cultural norms are important. In West Africa, providing food is largely the mother's responsibility. Numerous siblings usually increase the risk of child malnutrition, but the link is weaker in West Africa; in general in African countries the link is modified by access to extended family networks. Child fosterage spreads the cost of children across a wider group than simply the couple making the fertility decisions. Also, households change structure and numbers: men expand the productive group through marrying more than one wife, divorce, or through fostering other children [Lockwood 1997]. This is common in West Africa, but not rare elsewhere.

Thus, there is considerable evidence that household formation may be an adaptation to resource availability, including provisions provided by the state. This cautions against simplified models of household formation, especially the decline of a presumed 'traditional extended family'. As indicated at the start of this discussion, research on migration, both within and across national borders, has emphasised the importance of quite different family networks than that. Research by Epstein [1973] in Southern India in the 1960s/70s lead her to the concept of the 'share family', indicating the existence of household or family networks spread over different locations. Research in Calcutta in the 1990s confirms the

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[17] Jones Finer [1996]: 114. More in general, she argues that questions of population emerged as policy issues in the early twentieth century largely because of fears about manpower, economic and military. Harper [1992] provides an interesting discussion of Chinese policies with regard to the elderly: for example in 1958 the scheme of integrating elderly into the community was abruptly replaced by collective homes, and according to Harper this move was based on economic criteria rather than specific health and welfare policy considerations.

importance of continuing links between migrants in urban areas and their families back in the villages in Bihar [de Haan 1994]. Recent work on migration in China [Mallee 1995/96] provides similar pictures of continuing links. Finally, and perhaps most striking, most of the research on international migration now stresses the same phenomenon: international migrants do not break links with their home villages easily. The existence of 'transnational households' is a central element of international migration.

Two main conclusions follow. First, again, modernisation and in this case migration cannot be equated easily with the break up of extended families; on the contrary, it seems that 'share families' may be more stable than people actually living together (note the similarity with the quote above from the elderly woman in Britain). Second, in terms of consumption, because the migrants maintain such close links, patterns of consumption on both sides of the migration streams are likely to be strongly influenced.

3. DEMOGRAPHIC REGIMES AND CONSUMPTION

This section discusses the impact of demographic changes on consumption. Given the problems regarding availability of data as discussed in the introduction, this will describe in a 'think-piece fashion' how *major* demographic differences and conclusions influence consumption levels and patterns. The first section focuses on levels of consumption and savings, relying on macro-level cross-country data and a limited amount of micro-evidence. Second, we review some demographic impacts on food consumption (other aspects of which are discussed in the companion paper). Third, we discuss overall patterns of consumption during two demographic extremes: the 'high fertility, low mortality and the 'very low fertility, ageing population' régimes. Section 3.4 focuses on migration and urbanisation and the effects on consumption.

3.1 Demography and aggregate consumption relative to savings

The effect of demographic changes - particularly age structure - on *levels* of consumption, i.e. on savings behaviour, is more researched than the effect on consumption structures. Before discussing the evidence on this, it is useful to briefly discuss other, related, effects of demographic change.

First, cross-sectional regression analysis showed no apparent relationship between population growth *as such* and GDP growth [Asian Development Bank 1997, drawing on Bloom and Williamson 1997]. However, population growth in the developing world implies transition between demographic regimes; the same work showed that differential growth rates between persons aged 15-64 (workers) and the rest of the population (dependants) - leading to an increase, per head of population, in hours worked and possibly in savings rates - explain 15-40 per cent of growth, depending on country and demographic growth pattern. Thus from 0.5 per cent to (in East Asia) 1.3 per cent of annual extra per capita GDP is attributable to 'population growth plus implied change in age-structure' in 1960-92. This confirms the findings for the post-1975 period of Kelley and Schmidt [1994].

Eastwood and Lipton [1997] show the effects of fertility on poverty. They first confirm that, since the mid-1970s, higher birth-rates net of infant deaths (net birth rates, NBR) lead to slower economic growth. Using all 59 developing countries with reliable recent household surveys of poverty, they then show that, *given* real GDP per person, low-income groups receive smaller proportions of real private consumption in countries where the birth-rate is highest. They show that these correlations correspond to causal chains,

A cross-country relationship between changing age-structures and private *and public* capacity to save and invest seems to be well established, at least since the mid-1970s.[19] Such macro-evidence suggests a life-cycle savings effect, probably at household level. This could account for the slower growth-rates of countries that, 15 years previously, had recorded high population growth and fertility [Kelley and Schmidt 1994].[20]

However, micro-evidence suggests that the life-cycle savings model is not generally applicable. 'Our results make it difficult to believe that life-cycle saving is responsible for the cross-country correlation between growth and savings that exists in the data. Instead, the obvious alternative is that consumption tracks income over the life-cycle' [Deaton and Paxson 1990]. Yet this is hard to reconcile with the Kelley-Schmidt results, which do allow for the effect on savings of inter-country differences in GDP (and hence private income) per person.

Deaton and Paxson [1990] compare patterns of aging in Thailand and Côte d'Ivoire, and suggest that the mechanisms that determine PSRs may be qualitatively different. In Thailand the life-cycle model seems more applicable. In the poorer Côte d'Ivoire, there are larger households, and the elderly are likelier to live in extended families; this removes the pressure to save for retirement (there is no savings for old age [see also Deaton 1989]), and accordingly there is no correlation between age and poverty. The PSR would not change with demographic transition *unless that transition itself changed family support structures*. As noted in Section 2.4, household formation may be a variable, used to smooth consumption across generations; for example, members can be allocated across households to maintain equal consumption levels.[21]

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[19] See [Coale and Hoover 1958; Kelley and Schmidt 1994; Bloom and Williamson 1997; Higgins and Williams 1997;and Lipton's 1996 paper on population for the 1997 HDR].

[20] But (as reported in Lipton 1996 for HDR), few studies confirm the age-structure-savings relationship with micro-level developing-country data - see discussion below.

[21] This may explain Kelley's (1987: 40) finding that cross-sections have found it hard to identify clear effects of expanded family size, and hence age-structure, on household saving. Lipton (1996) suggested that this was unsurprising, since cross-sections - especially when they are of countries, not of households - also include small, young, low-savings households before their transition - and small, old, low-savings households after transition. Changes in household structure, we suggest below, is another possible explanation.

Spio and Groenewald [1996] discuss the life-cycle hypothesis with regard to South African black rural households. They argue that it 'may still apply to a large section of the population, but the big savers and the lowest earners may obey different criteria'. Average family income in their sample of 247 households showed a 'spiralling path over the earning span, rising to a peak at the 40-49 age range, declining moderately at the 50-59 age rage, and rising sharply thereafter', no doubt reflecting the unusually large dependence of Africa's poor on pension incomes. They conclude that the deviations of the life-cycle model are caused by two factors: strong family ties which make it unnecessary for younger households to save for future retirement; and the low and uncertain income of rural households, so that people save only when there is enough money, i.e. out of windfalls (the permanent income hypothesis).

We discuss in more detail below consumption in households with many children, and in ageing societies. Both for 'young' and 'old' populations, savings and consumption patterns are not very easily described.[22] With respect to families with large numbers of children, Kelley [1980] found in Kenyan households in the late 1960s that the number of children had a negligible effect on household savings. Neither is it generally accepted that the elderly dissave. In Asia in 1960-92 countries with a higher proportion of over-65s actually enjoyed *faster* subsequent economic growth (holding other relevant variables constant at their means) - an effect very hard to explain unless over-65s' PSR is positive, though of course the growth benefit is far less than from a higher proportion of prime-age persons (the effect of a higher proportion of under-fifteens is substantially negative) [Bloom and Williamson 1997]. In many richer countries, household savings seem not to decline with age, mainly because many of the goods the elderly consume (health care) are provided or paid for by the state. Cutler and Summers [19XX] suggest that the changing demographic structure in the US and other industrialised countries may actually boost savings and consumption. For Latin America, Taylor [19XX] argues that the elderly tend to save more than thought (and place less burden on the economy). With respect to the US, Wiseman and Clark [19XX] indicate that the elderly do not dissave at the high rates postulated by life-cycle models. In Germany, with its particularly generous pension and almost complete coverage of health expenses through mandatory health insurance, the

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[22] In most developed countries in spite of lower fertility, consumption levels continue to increase as a percentage of GDP/GNP. Between 1978 and 1990 the share of private consumption rose from 58.0% to 65.5% in the UK, from 64.6% to 66.8% in the US, and from 56.6% to 60.4% in France. In Germany and Japan there were small falls [Lansley 19xx: 105] - CHECK.

very old have the highest savings rates of all age groups [Supan-Borsch 1992]. All this indicates that the applicability of life-cycle and permanent-income explanations of savings ratios - and hence the impact of demoigraphic change on private consumption, and on the stability of human-development levels of people in old age or illness - is not an economic fixed fact but, at least in part, a policy variable. It depends on incentives and institutions that encourage or discourage provision of public, family and community savings and support.

Yet there may well be a gradual transition (of households and of countries) towards the life-cycle model of responses of the PSR to ageing. As a country becomes richer, households tend to move from a situation in which consumption tracks income, to one where there is savings to promote consumption smoothing. This is because institutional change, in savings and pensions and health care, tends itself to 'track' income growth and demographic transition. Collins [19xx], in a study of saving behaviour in ten developing countries (including Turkey), has aimed to separate out the main determinants of savings over time and across countries. The population share of children, the standard of living, and real growth rate significantly determine savings. Her results also suggest structural differences in saving behaviour between low- and middle-income countries: household saving seems to be less sensitive to age distribution and to changes in per capita income in the poorer countries. Yet the results discussed above also suggest that, in the richest countries, public provision may replace family provision and again remove some of the motivation for life-cycle savings against retirement, and some of the pressure to reduce savings in old age.

It is far beyond the scope of this paper to fully review the causes of changing ratios of savings to consumption. We stress, however, that savings behaviour is different in poorer countries at early stages of the demographic transition. There is evidence suggesting that consumption tracks income, and also that families adapt to resources by changing household structures. Later a life-cycle pattern emerges and may well account for higher PSRs in countries with falling fertility and growing proportions of people in their 40s and 50s. But by the time the population is substantially ageing, as many studies stress, the factors that once induced dissaving may well have weakened (as public safety-nets strengthened). We revert to these issues in Section 3.3; first we briefly discuss food consumption patterns as influenced by demographic changes.

3.2 Food consumption

The ratio of food expenditure to consumption varies with demographic structure, but in a way very hard to separate from the impact of higher incomes. This clearly lowers the food share [Lipton with de Haan and Darbellay 1997]. For example, within rural China

in 1990, the poorest decile spent 74 per cent of their income on food, and the richest decile 45 percent. In urban China, the respective figures were 50 per cent and 43 per cent. The average calorie consumption of the poorest decile was much lower - 1884 and 1794 in rural and urban areas respectively; the richest deciles in rural and urban areas consumed respectively 3139 and 2810 calories. (However, this discrepancy was far less than that of food expenditure per person.) For the 24 countries for which the HDRO had food consumption data, the proportion of private expenditure, in cash and kind, used for food declined systematically with increasing GDP (PPP). In Zambia, Sierra Leone, Kenya and Bangladesh, the percentage of expenditure on food was between 58 and 67 per cent; it was between 16 and 24 per cent for New Zealand, the UK, Italy, Sweden, and Japan.

But also, within food consumption, patterns change: as described in [Lipton with de Haan and Darbellay 1997] much extra income is spent on items of low nutritional priority, even if it reaches people who are not well fed. However, shifts in food consumption (e.g. towards animal products, and in cereals used from food to feed) in 1960-2000 have been smaller and more production-led than is widely believed.

While these changes are hard to disentangle from demographic effects, there are clear rural-urban differences in food consumption. Rural women, in some developing countries, have lower caloric and iron consumption relative to requirements, compounded by deprivations in health care, education, etc. In rural India, though using 82 per cent of all consumption for food, the poorest decile received only 1212 kcalories/person/day in 1972-73, as against 1316 in urban areas [FAO 1994]; in Asia absolute gains have not reduced gender or rural-urban divergences [Lipton et al. 1997; Bhargava and Osmani 1997]. Plainly demographic change will impinge on this.

Demographic change alongside consumption growth also affects food benefits if, even within better-off households, a sub-group of members is deprived of adequate nutrition. In the Philippines, 4 out of 10 under-fives in households consuming adequate calories are receiving below 80 per cent of recommended calories for their age [Bouis and Haddad 1990; Marek 1992; Lipton with de Haan and Darbellay1997]. Hence falling family size - in addition to reducing any harmful effect of large size on nutrition - will reduce the proportion of persons affected by food bias, which (on the cross-section evidence) will persist even if economic growth proceeds at the same time.

We have very little information about the effects of demographic change on food consumption pattern. FAO and UNFPA [Bender and Smith 1997: 13] have estimated the effects of demographic change on food *requirements*, for the period 1995-2050. They

have separated the population growth effect from other demographic issues. It is worth reproducing this Table. Everywhere most of the projected increase in food requirements is caused by population growth: in Africa 194 per cent, as against only 7 per cent from changing age-structure. But where the child/adult ratio falls rapidly over a shorter period, as for example in Bangladesh and India in 1990-2025 Appendix Table XX), the changing age-structure increases food needs much more dramatically .

Table 13 Effect of Demographic Change on Food Requirements, 1995-2050
(Percentage changes in food requirement)

Type of change	Africa	Asia	Europe	Latin America/ Caribbean	North America	Oceania
All demographic effects	+ 214	+ 69	- 9	+ 80	+ 31	+ 61
Population growth	+ 194	+ 66	- 7	+ 74	+ 33	+ 61
Combined effects	+ 7	+ 2	- 2	+ 3	- 1	0
- older age structure	+ 7	+ 2	- 1	+ 2	0	0
- increased height	+ 2	+ 2	0	+ 2	0	+ 1
- smaller % women pregnant	0	- 1	0	0	0	0
- greater % urban	-3	- 4	-1	- 2	-1	- 1

Source: Bender and Smith 1997: 13.

Changing demographics also affect food consumption culturally. In Section 1, while discussing Wilkinson [1997], we commented on some broad changes in consumption patterns. In particular, we noted that - as food is eaten not only for nutrition but also for status - the élites have played an important role in changing patterns of consumption and nutrition: first there is a move away from more nutritious goods, then the élite moves back to more healthy (e.g. less fattening) food - bread seems to be an example.

Further, people tend to maintain old ('outdated') patterns of consumption. Shetty (1997) notes the increasing prevalence of obesity in both developed and developing countries. This is caused by two factors - changes in dietary intake and levels of physical activity - both strongly associated with demographics, viz. ageing and urbanization. In some (but by no means all) developed countries, per capita energy and animal fat intakes have declined over the last three decades. But so have levels of physical activity with the move towards more sedentary lifestyles, increasing mechanisation of life, and declining occupational activity levels: energy expenditure levels have declined.

Prevalence of obesity is much lower in Africa and Asia, but here also obesity is increasing. For example, in Brazil between 1974 and 1989, the prevalence of overweight increased

from 3.1 to 5.9 per cent in males, and from 8.2 to 13.3 per cent in females [C.A. Monteiro et al., European Journal of Clinical Nutrition, 49, 1995]. Shetty [1997] cites national food consumption data for China for 1978-87 which indicate that per capita total cereal and vegetable consumption had increased and stabilised by 1984 while the consumption of meat, edible oils, sugar eggs and fish increased throughout the period - the amount of fat (animal and vegetable) increased year by year. (However, many more Chinese and other Asians are deficient in animal sources or iron, and even in fats, than are in excess [Lipton, with de Haan and Darbellay 1997]). Data form Delhi showed that higher income groups consumed a diet with 32 per cent energy from fat while in the lower income groups only 17 per cent of the energy was from fat; fat contents of urban diets, given income, are higher than rural [ibid.].

Food consumption is not just about nutrition; it also a social act. This has been often observed by anthropologist and others for developing countries, but is equally true for European societies. For example, Howarth [1993] describes patterns of food consumption of widowed people over 75 years old. According to her, the structure and content of meals and food preparation have symbolic significance. Studies have shown class differences in food preferences: for example, she quotes research from the 1980s demonstrating that both working- and middle-class groups value fresh fruit and vegetables, but only middle-class respondents stressed the importance of low fat and high fibre. Also, food consumption as well as preparation are expressions of gender identities. Many elderly women attempt to maintain continuity of food consumption - both women who persisted in preparing food as they had always done, and men who had to adapt more because of a lack of tradition of cooking. The importance of continuity, for example with respect to the traditional Sunday roast, was strikingly illustrated by one of the interviewed woman: 'We always had a roast on Sundays even when we was kiddies and we always laid the table up ... Even now, on my own, I do love to sit at the table in my kitchen and have my main meal. I do. It's how we was fetched up I suppose.' Changing demographic structures mean changing dietary role models.

3.3 Consumption patterns under 'demographic extremes'

This section discusses patterns of consumption, with a focus on two 'demographic extremes', marking important world-wide demographic differences (which are interlinked with differences in per capita income). The first is the situation of high dependency ratios where we focus on the consumption patterns of large poor households. We next describe what seems to happen to consumption as fertility declines. We then describe the other 'extreme', of an ageing population.

Extreme 1: high dependency ratios

The first 'extreme' is within (or related to) the 'high fertility, low mortality' régime described above: a macro-situation of high dependency ratios, and at a micro-level the situation of households with large number of children, and likely to be poorer. The main argument here is that, first and in line with many theories, the low levels of savings may contribute to poor households and/or regions being 'log-jammed' in a situation of multiple cumulative disadvantages; second, less familiarly, this problem may be compounded by patterns of consumption in which the poor also spend on (positional) goods that do not directly contribute to the (long-term) improvement of their situation.

As described in Lipton [1996: population/poverty paper for UNDP], large family size damages the education, health, and growth of children. Economies of scale, for poor households in developing countries, do not significantly overcome their greater poverty exposure. A study of the Philippines found that an extra sibling, especially in a large family, significantly harmed the nutrition of under-fives, especially the youngest [Horton 1986]. This reduces their future income-earning capabilities. 'Transient life-cycle poverty' seems relatively innocent, but conceals something nastier: inter-generational transfer of poverty.

Lloyd [1995, Children in Large Families] describes the adverse consequences for children of large family size in terms of smaller shares of resources (including nutrition) among family members, limited access to public resources (health care and education), and unequal distribution of resources among family members and gender defined roles. Late-born and unwanted children (especially girls) are particularly vulnerable in large families. The disadvantage is 'only' a statistical probability, and can be negated by 'positive

deviance' [Zeitlin 1988]or modified by the social context of culture, class, social custom, and level of socio-economic development.[23]

Desai's [1992] comparative study of West Africa (Ghana, Mali, Senegal) and Latin America (Brazil, Colombia, Dominican Republic) concluded that children of teenage mothers are more likely to be malnourished than children whose mothers are older. Children whose mothers are living in consensual unions are most likely to be stunted while those with legally married mothers are less likely to be malnourished (although this is not true when controlling for overall household income, nor true in very poor areas). But cultural norms such as different parental responsibilities, as indicated above, showed to be important. The relationship between sibling number and malnutrition is weaker in West Africa (and inconsistent within African countries) which is related to the access to extended family networks. Child fosterage spreads the cost of children across a wider groups than simply the couple making the fertility decisions.

For an understanding of the changes in consumption in these societies it is important to keep in mind that most of these societies will also have a rich, internationally oriented elite, with distinct consumption patterns; the international and national demonstration effects will be important. As indicated in James [1993: Chapter 2 and 6], even some of the poor spend a lot on 'positional goods' or demonstrative consumption. (Heavy spending by men in workgroups on alcohol, tobacco and other drugs may typify this.) Consumption based on status-seeking may well also apply, even for the poor, internationally. James [1993: 34 ff], for example, mentions that research in Chile in the 1980s showed that, sliced wrapped bread produced on automatic lines was displacing traditional breads although its price per unit weight was considerably higher. In Kenya, newer refined methods of grinding maize found a large market, though the new product was less nutritious, and costs were substantially higher (and production was more capital-intensive) [Stewart 1977]. Also in Kenya, Kaplinsky [19xx] found in the 1970s a 90:1 price differential between the unit cost of the cheapest traditional staple and the most expensive

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[23] Lloyd [1996] describes the positive effects of mother's education on children's education; these are likely to be reinforced by reductions in unintended or excess fertility in the middle to latter phases of the fertility transition. Lloyd [1995b] reports regression analysis for determinants of children's participation and progress in school in seven SSA countries: education of head of household and living standard, progress in school (unrelated to survival of parents), female headed as opposed to male headed household; specific gender differences varied by country. See also Lloyd's [1993] study in Pakistan of maternal schooling.

imported cereal. Perhaps the demonstration effect arose from European expatriates consumption, imitated by the African élite, and then 'trickling down'.

However, such changes also often reflect the need of poor women for relief from chores and for more time to care for children or to earn money; or the need of poor workers to seize a hurried snack in a work break. One should be extremely wary of accusing the poor of irrational, status-conscious use of their terribly scarce resources. Anyway, the verdict is not clear; James argues (p.136) that status-seeking behaviour may also be *limited* by peer-groups. He quotes Douglas and Isherwood (p.136): 'The group imposes group values and so prevents deviant individual spending, defines what counts as too much conspicuous individual consumption, and proposes punishments.'

A few more tangible demographic impacts on consumption, in the successive stages of the fertility transition (rising, then falling, child/adult ratios), should be mentioned - remembering that lower income-groups in most of Africa and parts of Asia are still in the first stage, but that most of the developing world will be in the second stage for some decades from now. First, rising, then falling, child/adult ratios first raise, then cut, consumption of health, education and child care all with substantial direct and opportunity costs, reducing other household consumption. The impact varies (see above) with the extent to which these extra demands are met from family, community or State (free or subsidized) provision. Second, there is first extra, then reduced, demand on time of the mother, leading to rises, then falls, in physiological strain (maternal depletion) and in diversion from income-earning. Third, as the poor follow the rich in the middle-to-late demographic transition, differences in household size shrink, and so therefore does the apparent calorie elasticity (because the poor no longer have so much larger household size, so that this effect does less to amplify the effects of poverty in reducing per capita calorie consumption).

Finally and very significantly, demographic structural changes - urbanization; a fall in the number of households relative to population as family size falls; and a rising proportion of single-person households as divorce incidence increases and as ageing produces an increasing incidence of differentially surviving old women - means rising need per person, even at given income levels, for many 'fixed costs' of consumption. This raises the pressure on water, sanitation and 'sink services'. Also, rising population den-sity - within urban and rural sectors as well as due to urbanization - brings 'encreasing accumulation', more demonstration effects, and greater emulative consumption.

Declining fertility

In a 'declining/low fertility' regime, consumption is likely to change in various ways. In the first place, expenditure on education *per child* is likely to increase. Second, because this is linked to economic growth and poverty reduction following rising workers - non-workers ratio, this regime is likely to be marked by increasing 'non-essential' consumption, where, in our opinion, policy priorities would shift to addressing inequality. Other goods for which demand is likely to be increasing are transport and infrastucture (and jobs), and environmental problems may tend to become more serious (unless technological development. An illustration of all this, which emphasises gender differences, is the 'little emperor' phenomenon in China: one-child policy and practice apparently has led to big increases in expenditures for the only child, especially a boy.

It is also likely that with declining fertility the gender-distribution of (demand for) consumption goods is changing. Almost all developed countries have seen huge rises in the ratio of female to male participation rates, accompanying (as both cause and effect) lower age-specific and lifetime fertility. This plainly raises women's share in consumer demand, their reluctance to spend much time on child care, and their keenness for prolonged education - again reducing lifetime fertility, but (due to higher participation) raising lifetime incomes and control over consumption, relative to men.

A further, much less tangible change - accompanying declining fertility in the context of both globalization and economic growth - is the development of a youth consumer culture. In Britain during the past hundred years, the proportion of adolescents declined substantially; yet this relative demographic decline was made up for by increasing purchasing power of people in mid-to-late teenage years, in 1919-39 and again after 1945 [Benson 1994: 17]. Relevant to the development of this youth demand, lower fertility (alongside less deep slumps and more social security) permitted more *net* transfer of parental income *to each child*; for example, adolescents were probably able to retain a growing proportion of the growing income[24] they were receiving, handing over less to the parents. Similar processes are likely to occur in other countries, especially in countries where rates of fertility are low - such as in China with its 'little emperor syndrome'. Relatedly, Lunt and Livingstone [1992: 33] find that in Britain in the mass consumption age 'those with debts but no savings tended to be younger, whereas those who saved or had savings but no debts tended to be older'; class and other factors did not influence saving patterns. These differences are probably reflections of attitudes towards debt,

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[24] The index of real income per person in Britain increased from 100 in 1801 to 240 in 1901 and 702 in 1981 [Barker and Smith 1982, quoted in Benson 1994: 12].

rather than different economic demands as a function of one's stage in the life-cycle [ibid: 38]. Also, people in debt tended to have fewer children.

Extreme 2: Ageing of the population

Both richer and some of the poorer countries are increasingly confronted with the issue of an ageing population. The position of the elderly cannot be described in simple terms (sec.2.4). Consequently, we cannot expect simple pictures of their consumption patterns. First, household formation affects these greatly; the elderly in extended families, alone, and in homes have different expenditure patterns. Second, even more than in the case of children, state provisions play a crucial role.

We will not here review the debate regarding state provisions for the elderly, especially such as pension schemes and health care - both do of course present serious problems in many countries including poorer ones.[25] However, it may be useful to refer to the finding that the elderly dissave less than is often assumed. One possible reason is that, for example in Germany, state-provided pensions and health provisions or social insurance take over these costs. In Britain during the last century, as the proportion and longevity of elderly persons increased, so did their share in wealth, since most people during the course of their lives accumulate property, possessions, bequests (especially as grandparents survive for longer), pension rights (occupational pension schemes spread rapidly) and other assets (including perhaps the 'social capital' that gives access to resources, including work, after retirement). Redistribution of economic power in favour of the elderly has benefited women more than men: women's greater longevity meant they more often inherited property and other assets, and they special advantage from extension of statutory and private pension provision [Benson 1994: 19].

The consumption of the over-70s in Germany showed the following recent patterns [Supan-Borsch 19__]. The only items for which expenditure increased were health and housing (which reflects the immobility of the elderly). Food consumption (per capita) was constant or declining, in part reflecting falling energy needs with age. Other expenditures exhibited a clear decline with age, especially for travel and transport, and for consumers and other durables.

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[25] According to the ADB's Emerging Asia study, the health care costs per person for the elderly is roughly three times that of the non-elderly.

With respect to spending by elderly in Britain, Wilson (1993) emphasises that though the amount of money available influences quality of life (perhaps more for British pensioners than for Germans, with much more generous State pension and non-pension safety-nets for emergency support), powerful normative or cultural constraints - including strong gender-related ones, and a desire for autonomy - determine spending by the elderly. 'Women who have brought up families on a low income often have a life-long habit of saving and find it hard to stop. Rather than spending on themselves they may give money to their children and grandchildren.... particularly men may feel insecure if their savings begin to fall. They may fail to raise the housekeeping money they give to their wives to keep pace with growing needs.' The poorer in Wilson's sample were less likely to run down savings than the richer (which may be a manifestation of desired independence). As in the German case, in Britain pensioners are not likely to move, though this may carry large financial burdens; many pensioners are 'housing rich and income poor'. Car ownership, although also important for perceived independence, was strongly linked to current income. Ownership of consumer durables was more common but showed a similar pattern to cars.

We noted in the last section that British widowed people aim to maintain continuity in patterns of food consumption. This seems to suggest the possibility that elderly have a restraining effect on change in consumption patterns: they tend to retain older patterns of consumption, though that may include less as well as more healthy eating patterns. The extent of this moderating effect is not likely to be large though, for at least two reasons. First, the effect on younger generations is by no means clear; on the contrary, the elderly may form a negative reference group, from which the younger want to distinguish themselves. Second, consumption patterns of the elderly - as for others - are clearly related to income, and there is clear evidence of a new generation of elderly in welfare states that have significant purchasing power (as well as political clout that apparently was one of the main 'hindrances' for the US administration to reform the health sector), with new patterns of consumption; a new market is rapidly growing for secure group homes for the elderly, tour operators (such as 'Saga for the gaga'), and the like. An improving image of the elderly in television programmes in Britain during the 1980s was partly due to agitation from pressure groups but also because many older people had become significant consumers: purchasing power counts with television advertising [Gibson 1993]

3.4 Population mobility and consumption

The effects of urbanisation on consumption patterns are large, and can be easily identified. The 'absolute needs' change, notably for housing and sanitation. The decrease in family

size due to urbanisation also affects consumption patterns. 'Relative needs' change too; density increases demonstration effect, contact with élites is more intense, and advertising is more widespread. Kuznets's writings in the 1960s still seem relevant here: 'Urban life, with the anonymity of its dense population masses, with the detachment from earlier roots of the large immigrant component, and with the ease of observation and imitation of consumption patterns, may facilitate higher consumption levels by permitting greater play of the demonstration effect and by increasing sensitivity to new consumer goods.... the effects may be reflected in the trends in consumer expenditure relative to those of savings and capital formation, and in some components of total consumer expenditures more than others' [quoted in Maki 1996: 2].

In Britain during this century, geographical redistribution of purchasing power has been of great importance [Benson 1994: 14 ff]. Differential growth of population, wealth and income - in part due to changing national and foreign demand shifts, from 'rustbelt' to services consumption - concentrated and shifted consumption, and economic power. Income in urban areas was normally higher than in rural areas, as was home ownership. 'Thus the geographical distribution - and redistribution - of population, wealth and income have been mutually reinforcing. The result has been to concentrate consumer purchasing power increasingly - and disproprtionately - in urban and suburban areas, and especially in those to be found south of that imaginary, but influential, line which is drawn between the Humber and the Bristol Channel" [ibid. p.17]. Similar long-term trends can be seen in the USA and Germany.

It is unlikely that the experience in developing countries is different. Income in developing countries' cities are also higher than in their rural areas, poverty incidences lower, and - in sharp contrast to the nineteenth-century industrial revolution -mortality much lower [Lipton and Ravallion 1995; Lipton, Osmani and de Haan 1997]. Improved transport and communication implies that modern consumption patterns will spread faster, internationally as well as between urban and rural areas. However, air pollution and other signs of environmental crisis - in Shanghai, Delhi and Mexico City now, as in the English cities in 1815-48 - may yet reverse these patterns, rendering the towns prone to burgeoning health hazards that rural areas escape.

As was suggested by Austin in the 1970s [in James 1993: 133], 'even within their limited means, the poor buy highly preferred or fashionable foods at a premium in price. The urban poor may buy them for their status value, although they may be uneconomical from the nutritional standpoint'. Foods that have low prestige in rural areas, such as fruits and vegetables which are gathered and not cultivated, may not be eaten by newcomers to

urban areas because they cost money and are not thought of as 'valuable'. On the other hand, burgers may be eaten for status reasons.

Similar consumption changes occur with migration. Contact with other people and customs may change the consumption patterns of migrants and those who stay behind; as indicated above, circular patterns of migration have been predominant, intensifying 'demonstration effects'. Two apparently contradictory trends - one of continuity and one of discontinuity - should be explored. First, migrants, for example South Asians in the UK, do not change consumption as much as earlier migration theories predict (the same goes for rural-urban migrants); hence the development of markets for South Asian products (from vegetables via mangoes to Bombay videos) in the UK. Second, the consumption effect in the migrants' home villages are very striking. Virtually all studies on international migrants comment on the status symbols such as houses built by the migrants and their families.

4. CONCLUSIONS AND POLICY SUGGESTIONS

This paper has focused on the demographic changes that contribute to changes in consumption patterns, and via this to human development. Plainly, meeting minimum consumption needs is the prior condition for human development: to well-be one must first be. Yet the issue is not resolved once this minimum is reached. Many studies, from different parts of the world, emphasise that consumption is a social act: maintaining traditions on the one hand, conforming to as well as the consumption of reference groups on the other, affect people's well-being, for good or ill. Thus, we hypothesise that beyond the point where minimum needs are fulfilled, reducing consumption inequality becomes more relevant- to reduce both social distance (and incoherence, stress, and perhaps health damage) from big consumption disparities, and pressure to conform or emulate by adopting high-rolling strategies from multiple car ownership to cocaine consumption. The mass consumption society of the western world and increasingly of part of the developing countries, poses policy problems, not only of the sustainability of producing the increasing amount of consumer goods and of the inequality that these societies create, in terms of the actual distribution of these goods, but also of *perceived* inequality. Evidence suggests that this Veblenian argument applies not only to the western world, especially as desired consumption patterns become increasingly global.

Policy suggestions can be formulated, but we would not be optimistic about implementation. It seems crucial, first, that consumption patterns of the élite are steered - through incentives, institutions, even example - towards more sustainable consumption patterns. Second, policies should operate from the assumption that the poorer as a rule

will want to catch up with the richer; aiming to moderate the consumption of the poor without changes in élite patterns is not likely to be successful (or perhaps desirable). But - bearing in mind that it is the poor in the West, and middle income groups rather than the rich in Brazil, whose life-styles lead to obesity - incentives should be sought to accelerate 'good' emulation, e.g. by steering the poor's consumption towards healthier diets and life-styles, and education for the children. Examples such as nutritional education programmes in Indonesia, 'social marketing' to induce adoption of oral rehydration therapies in the Philippines, and marketing of coconut milk to replace imported soft drinks in Micronesia are worth further study [James 1993: 175 ff.].

Development of levels and patterns of consumption is bound up with demographic changes. We cannot here explore the statistical causation (or even correlation), but it is clear that demographic changes have been a central part of economic growth as well as poverty reduction, and therefore have contributed to differing consumption patterns. In Britain, for example, the unprecedented increase in purchasing power over the last century has occurred alongside changing demographic structure, especially a smaller proportion of children and young adults, and an increasing proportion of elderly - both groups with increasing purchasing power. Also, it has been accompanied with rapid urbanisation, with related changes towards 'modern' consumption patterns. None of these demographic changes is easily amenable to policy influences; but policies targeting consumer patterns should be sensitive to the demographic changes.

It seems that current population trends have four major implications:

- First, as others follow the changes in household size and age-structure led by the better-off, the demographic convergence contributes to more equal distribution of consumption, both at macro-level (countries with increasing worker-dependent ratios have a brighter economic future) and at micro-level (smaller families discriminate less in consumption between siblings - though gender discrimination may remain and even intensify).
- Second, however, there are countries and groups within countries that lag behind in the demographic transition; this may be compounded by the fact that the poor - even though spending their money rationally - do not always get the best nutritional value for money. Policy suggestions here include incentives to steer consumption in more sustainable directions.
- Third, when countries make the demographic transition to higher worker-dependent ratios, and family size declines beyond the level where it discriminates between siblings,

'consumerism' arises or intensifies. Inequality then becomes a main determinant of well-being, and policies that focus on this are likely to be more effective .

- Finally, many countries, at various levels of economic development, are rapidly ageing. This may have implications for consumption/savings ratios, but also for diverging consumption patterns between generations. Policy suggestions include incentives towards more sustainable patterns of consumption, such as housing for extended families. These policies, as earlier indicated, should be gender-sensitive; women both comprise most of the elderly, and in prime ages bear most of the burden of sustaining the elderly or sick in 'traditional' families.

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Appendix UNDP Demography and Consumption Paper

Table 1: Population and fertility projections for major world regions, 1995-2020
(UN World Population Prospects, 1994 and 1996 revisions)

Region	Aver. annual growth rate (%)	Average fertility rate (per woman)
World	1.2	2.76
Developed	0.2	1.77
Developing	1.4	2.97
Least developed	2.4	4.64
SSA	2.6	5.06
East Asia	0.6	1.98
Southeastern Asia	1.3	2.27
Southcentral Asia	1.5	3.16
Latin America & Carribean	1.3	2.54

Table 2: Population and projections for selected countries, 1995-2020
UN World Population Prospects, 1994 and 1996 revisions

Country	Population in 1996	% of world population	Avergage annual growth (%)	Average fertility rate
	(millions)		1995-2020	(per woman)
China	1,232	21.4	0.83	2.01
India	945	16.4	1.46	2.87
USA	269	4.7	0.80	2.09
Indonesia	200	3.5	??	??
Brazil	161	2.8	1.29	2.4
Russian Federation	148	2.6	??	??

Pakistan	140	2.4	2.55	4.6
Japan	125	2.2	0.01	1.56
Bangladesh	120	2.1	1.8	3.14
Nigeria	115	2.0	2.7	5.15

Table 3 - Most Populous Countries in 1950, 1996 and 2050
UN World Population Prospects, 1994 and 1996 revisions

	1950		1996		2050	
Rank	Country	Population (mn)	Country	Population (mn)	Country	Population (mn)
1	China	555	China	1,232	India	1533
2	India	358	India	945	China	1517
3	USA	158	USA	269	Pakistan	357
4	Russian Federation	102	Indonesia	200	USA	348
5	Japan	84	Brazil	161	Nigeria	339
6	Indonesia	80	Russian Federation	148	Indonesia	318
7	Germany	68	Pakistan	140	Brazil	243
8	Brazil	54	Japan	125	Bangladesh	218
9	United Kingdom	51	Bangladesh	120	Ethiopia	213
10	Italy	47	Nigeria	115	Iran	170

Table 4: Fertility per woman by region and over time
UN World Population Prospects, 1994 revision

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
World	4.94	4.91	4.19	3.48	3.04	2.78	2.52
Developed	2.77	2.52	2.01	1.84	1.71	1.75	1.86
Developing	6.05	5.97	5.01	3.99	3.38	3	2.64
Least developed	6.55	6.61	6.63	6.23	5.59	4.7	3.84

Africa	6.67	6.71	6.51	6.2	5.56	4.68	3.9
Asia	5.73	5.61	4.63	3.55	2.96	2.65	2.34
Latin America & Carribean	5.89	5.74	4.68	3.62	2.96	2.53	2.26
Europe	2.58	2.46	2.1	1.85	1.59	1.62	1.76
North America	3.6	2.94	1.9	1.85	2.06	2.08	2.1
Replacement Fertility	2.1	2.1	2.1	2.1	2.1	2.1	2.1

Table 5: Infant mortality per 1000 children by region and over time
UN World Population Prospects, 1994 revision

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
World	148	110	90	74.5	60.5	49	38
Developed	51	29.5	19.5	14	9.5	8	7
Developing	170	125	101	82.5	66.5	53	41
Least developed	186	161	143	125.5	105.5	87	68
Africa	179.5	152.5	125.5	106.5	89	73	57
Asia	171	120.5	96	78	61	47	35
Latin America & Carr.	118.5	95.5	74.5	55	43	35	48
Europe	61	33.5	23.5	16.5	12	10	8
North America	28	23.5	16	10.5	8	6	5

Table 6: Differential fertility within Asia
UN World Population Prospects, 1994 revision

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010
Asia	5.73	5.61	4.63	3.55	2.96	2.65
Southeast Asia	6.06	5.86	5.07	3.94	3.16	2.63
East Asia	5.32	5.23	3.75	2.38	1.92	1.95
West Asia	6.31	6.04	5.38	4.84	4.27	3.67
Southcentral Asia	6.07	5.96	5.48	4.73	3.95	3.22

Table 7: Fertility and Average Population Growth in Bangladesh and Pakistan
UN World Population Prospects, 1994 revision

Bangladesh							
	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
Fertility (B)	6.64	6.8	6.84	5.48	4.13	3.21	2.31
Aver. Pop. Growth (B)	2.1	2.6	2.8	2.04	2.18	1.9	1.31
Pakistan							
	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
Fertility (P)	6.65	7	7	6.88	5.88	4.69	3.53
Aver. Pop. Growth (P)	2.35	2.74	2.61	3.12	2.83	2.61	2.2

Table 8: Population, Fertility and Gender in China over time

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2010	2010-2020
Fertility (per woman)	5.78	5.78	4.01	2.45	1.95	1.99	2.1
Infant mortality / 1000 children	187	101	56.5	51	41	30	22
Population (thousands)	609,005	729,191	927,808	..	..	..	..
Avg. pop. growth rate	1.70	2.34	1.85	1.43	1.95	1.99	2
#men per 100 females	107.5	106	106.1	106.3	106.3	105.6	104.6

Table 9: Age distributions of countries by level of development in 1995

UN World Population Prospects, 1994 revision

Percentage of population in each age group:

Age Group	0-4	5-14	15-24	24-64	over 65
Developed	6.20	13.50	14.10	52.7	13.50
Developing	12.40	22.20	19.00	41.70	4.70
Least Developed	17.20	26.50	19.60	33.70	3.00

Table 10: Growth rates for different population groups and regions, 1965-90

Region	Total population	Economically active population	Economically dependent population
Asia	2.13	2.63	1.41
- East Asia	1.58	2.39	0.25
- Southeast Asia	2.36	2.90	1.66
- South Asia	2.27	2.51	1.95
Africa	2.81	2.78	2.85
Europe	0.49	0.68	0.15
Latin America	2.25	2.64	1.77
North America	1.69	2.21	0.91

Source: Asian Development Bank 1997: 144 (based on World Bank data)

Table 11: Countries which anticipate dramatic changes in age structures
UN World Population Prospects, 1994 revision
% of population in each age bracket

	1950			1990			2010			2030			2050		
	under 15	15-65	over 65	under 15	15-65	over 65	under 15	15-65	over 65	under 15	15-65	over 65	under 15	15-65	over 65
Bangladesh	37.6	58.8	3.6	41.8	55.1	3.1	33.1	63.2	3.7	22.8	70.2	7	19.7	66.5	13.8
Brazil	42	55.5	2.5	34.4	60.8	4.8	26.6	66.5	6.9	21.5	66	12.5	19.4	62.6	18
China	33.6	61.9	4.5	27.5	66.9	5.6	21.6	70.8	7.6	19.6	66.5	13.9	19.3	62.5	18.2
India	38.9	57.8	3.3	36.3	59.4	4.3	29.4	64.9	5.7	22	68.5	9.5	19.5	65.6	14.9
Kenya	39.8	56.3	3.9	49.2	47.8	3	44.2	53.4	2.4	33.2	63.2	3.6	24.3	67.8	7.9
Nigeria	45.7	51.9	2.4	45.4	51.9	2.7	36.3	60.6	3.1	34.6	61.1	4.3	24.4	68.7	6.9
Pakistan	37.9	56.8	5.3	44.1	53	2.9	38.5	58.2	3.3	27.5	66.5	6	22.5	67.6	9.9

Food security, food consumption patterns, and human development

Michael Lipton, with Arjan de Haan and Eliane Darbellay
Poverty Research Unit at Sussex University, Sep-Nov 1997
Background Paper for UN Human Development Report, 1998

Introduction and outline: closed loops and stylised facts about food consumption and human development

'Food security .. means a state of affairs where all people at all times have access to safe and nutritious food to maintain a healthy life'. Household food security (HFS) means 'physical and economic access to adequate food for all household members, without undue risk of losing such access' [FAO 1996: 5]. For all the people in a country to enjoy HFS requires three things.

- National food consumption, averaged over persons and times, must meet the average person's needs for calories and other nutrients,[1] plus allowances for (i) distribution of both food and needs around that average unequally among times (e.g. between seasons, and years, of plenty and of dearth), and among and within households (e.g. between women and men, children and adults, cities and villages, large and small people, rich and poor), and (ii) reserves against losses, wastes and mistakes.
- Command over food, and capacity of markets and safety-nets to meet it (allowing for error, waste, loss, etc.), must *in fact* be distributed among times, among and within households, etc., in a way permitting everyone - having satisfied other basic needs - to meet nutrient needs, provided the able-bodied work for 'reasonable' periods and rewards.
- Decision-makers must be sufficiently 'food secure' - confident - in the persistence of the above conditions that their production, consumption and health behaviours are not 'unreasonably' distorted by the need to avoid nutrient deprivation or serious hunger.

Hundreds of millions of people in developing countries lack HFS. Many suffer damage to human development through illness or premature death. Many more fail to realise their capabilities because their education or production are curtailed by shortage of calories, iron, or (less often) iodine or vitamin A., or by the need to avoid risks to food consumption. In developed and transitional countries, lack of HFS is rarer, but low-income groups - like middle-income groups in developing countries - increasingly suffer

[1] This is a minimal requirement. At a higher level, HFS would require national food availability sufficient to provide variety, taste, texture, and food style that kept people contented with food.

from diseases of affluence linked to excessive or malstructured food consumption.

Most countries experience rival claims from globalization and national food security. Globalization, often seen as a path to efficient growth, requires that countries and localities *grow* food only if their international comparative advantage lies there, and *eat* whatever foods are competitively supplied by free international trade and investment, and preferred by customers. National food security (NFS), often seen as a path to HFS, appears to require self-reliance, even autarky for main food staples - to ensure HFS, avoid 'food blackmail', express national views of food health hazards, or safeguard diverse and lively national or local patterns of food consumption or production.

This paper is about current levels, past trends, prospects, and policy options for food consumption, seen as a way of enabling people, especially at-risk or poor people in poor countries, to fulfil their capabilities for human development sustainably. The adequacy of food consumption for this purpose depends on whether food *availability* meets *requirements*. Availability depends on production, trade, stock change, and their composition (especially between crops and animal products) - and on entitlements: claims on available food, distributed among persons and times. Biological requirements for calories, proteins and micronutrients depend on numbers of people, their age-structure, and their health, work, adult weight, and metabolism. Psychic requirements - whose satisfaction, and refinement, are part of human development - include food taste, texture and variety.

Food consumption is part of a **closed loop**. The loop runs from food production and distribution, via food consumption, to food outcomes (human capabilities and their sustainability), to functionings, back to food production and distribution. Capabilities include health, skills and strength, which depend partly on nutrition; that depends partly on food consumption. Functionings include food production, processing and enjoyment.

Food consumption, and the resulting nutrition-based human capabilities, have improved more, for a larger proportion of the world's people, in the past 30-50 years than in the previous 3-5000. Yet the huge improvements - mainly in adequacy and security of calories for the poor - have exposed other problems: micronutrient deficiencies; regions (most of Africa) and groups (girls in South Asia) that lag behind even in calorie intake; other groups characterised by excessive or ill-balanced food intakes, leading to

illness or premature death; and a shift to monocultures and intensive animal products that may threaten the supply and price of cheap staples for the poor, the health of the rich, and the sustainability of the environment.

What policy options might solve these problems, and extend the improvements of 1950-2000 in food consumption as a source of better human capabilities? This depends on *why* human nutrition has improved, and why gaps in this achievement - and new problems - have appeared.

The improvement is explained by overall economic growth and poverty reduction, but not entirely. Much extra income is spent on items of low nutritional priority, even if it reaches people who are not well fed. Also, higher and better-distributed food production and consumption are causes of growth and the reduction of poverty, at least as much as effects.

A closed loop (food production/distribution--food consumption--food outcomes (human capabilities)--functionings--food production/distribution) can be changed by a supply push or a demand pull on any component of the loop. Economists tend to argue that changes in food production, distribution and outcomes are caused by consumption-pull: by changes in effective demand, as determined by consumers' preferences and incomes. On this view 'consumer sovereignty' determines price incentives to food producers and traders, and thus what they do: the scale, structure, and methods of food production.

But the opposite sequence, in which food supply-push causes the changes in consumption and capabilities around the closed loop, has been at least as important. Really, it is 'capabilities-push'. Human capabilities create techniques - and policies - that transform food production or distribution. New ways of producing food and selling it globally, and policies to affect those who produce, process and distribute it, have transformed food producers' incentives and possibilities, and thereby the volume, distribution, location, types and prices of foods - and the employment of poor food producers. All this, in turn, has transformed food consumption, and hence nutrition-based capabilities, usually for the better, sometimes for the worse. Borlaug or Khush, helping to make 'green revolutions' in wheat and rice across Asia and Latin America; Monsanto, developing and marketing new maize hybrids (or that rural myth, the square tomato); Monnet, sowing the seeds of the European Union and its agricultural policies; Chinese reformers, distributing tens of millions of hectares from inefficient collectives to small family

farmers in 1978-84: such people, with production-linked capabilities, alongside food buyers, are sovereigns over food consumption.

Production-linked capabilities and consumer choices jointly affect the role of food in human development not only via food *consumption*, but also by altering food *requirements*. These are determined mainly by demography, work, life-styles and health environment. Health researchers and policy-makers have hugely altered these. Better health care - by raising the prospects of survival, and hence the ratio of adults to children, and of old people to younger workers - greatly changes food requirements.[2] Health innovation also alters these directly. The effectiveness of a given food intake in preventing caloric and iron deficiency is greatly reduced by malaria. Its decline in the 1960s due to insecticide and drug campaigns, followed by its widespread revival after 1980 as resistant parasites and mosquitoes developed (partly due to slackening campaigns), reflect the impact of scientific and political capabilities on health production, and thereby on nutritional gains from a *given* amount and distribution of food consumption.[3]

In generating food outcomes, technology and policy for production and distribution are 'sovereign', alongside consumers, in increasing, reducing or altering choices. That applies not only to food consumption, but also to life-styles and health spending, which affect the extent to which any particular food intake enhances nutrition-based capabilities.

Better incomes, information and mobility greatly affect consumers' power over these capabilities. But so does production and distribution technology and policy. In the past fifty years, changes in production and distribution - from the 'green revolution' to food aid - have led to unprecedented falls in undernutrition and in risk of famine, and such falls are set to continue. But some key undernourished regions and groups are likely to remain unaffected by the supply-push changes. Meanwhile, they have exposed (rather than created) micronutrient problems, and in better-off countries contributing to new problems of excessive and unbalanced consumption.

The **stylised facts** about food consumption trends, as sources of human development, in the last thirty years, support a crude but broadly correct argument, with strong policy implications. The argument is as follows.

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[2]See the companion paper [de Haan and Lipton 1997].

[3]Another important example is successful actions to reduce schistosomiasis. These improve the nutritional impact of a fixed food intake in four important and distinct ways [Stephenson (ed.) 1987].

(1) The proportion of undernourished people - i.e. those getting too few calories to fulfil desirable capabilities - has fallen greatly, but remains large in some regions, and is the main global problem of food consumption.
(2) Differences, among places and over time, in levels and trends in undernutrition are linked to (and often caused by) differences in calories consumed per person (*average* dietary energy supplies, DES).[4] This is not because the *distribution* of DES is unimportant. It is because only those who are, or feel, undernourished use large parts of income - and in particular growth in income - to get extra calories. So countries with larger average DES tend to have higher calorie intakes *among the potentially undernourished*. Remaining differences reflect mainly different needs, including adult body size and the health and child-care environment.
(3) Where undernutrition is a problem, its levels and trends, and those in average DES, are linked to (and often caused by) levels and trends in national production of staple foods. This is partly because some people eat what they grow, but mainly because most undernourished people live where unskilled employment and food availability depend substantially on domestic agriculture. When this is productive (or fast-growing), so are (i) demand for unskilled labour, especially if farms are fairly small and equal; (ii) nearby affordability of basic, readily available food staples.[5]
(4) It is often claimed that malnutrition other than undernutrition has worsened due to a shift to undesirable, homogeneous or foreign/multinational food sources. Deficient consumption of most micronutrients, and inappropriate consumption of animal fats, salt and sugar - while more important than was thought thirty years ago - are *less* prevalent, and related to poverty or transition at least as much as to affluence or 'lifestyles'. Shifts in food consumption (e.g. towards animal products, and in cereals from food to feed) in 1960-2000, contrary to widespread belief, have usually been (i) rather small, (ii) due to changes in productive efficiency, and/or (iii) focused on groups and places where the shifts improved and diversified nutrition. Restructuring consumption of animal foods may require health policy that challenges 'producer power', but the main problems are production sustainability and effects on staples prices for the poor.

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[4]Subject to one proviso: some places or times - with larger adults, higher ratios of adults to small children, more illness, or intenser work requirements - need more calories to avoid undernutrition.
[5]The last two points do not prove that, to avoid undernutrition, countries should maximise locally grown food *availability* via self-sufficiency. If they can enrich their poor better by employing them in non-food, or non-farm, production, in which the country has comparative advantage and which is traded for food, that is the preferred strategy. Weak food production, in largely agricultural countries, is associated with weak overall agriculture; undernutrition arises mainly because this reduces poor people's *entitlement* [Sen 1981] to food consumption, by denying them adequate land, work and nearby cheap food.

(5) Projected gains to 2010-20 in food consumption, nutrition, and hence human development leave big problems, especially massive undernutrition [Rosegrant et al. 1995]. Gains depend on policy for population, trade, distribution, and to raise faltering or sluggish staples yields in poor countries.

This review of food consumption therefore proceeds as follows:
First, we look at levels and trends in caloric and anthropometric indicators of undernutrition for some main regions, nations and groups.
Second, we examine their average DESs and the link to undernutrition.
Third, we explore their per-person production and net import levels and trends, for food and main staples, and link them to trends and differences in DES and undernutrition. For countries with mainly poor and rural populations, rising food self-sufficiency and per-person staples production are usually signs of success. They cause rising income (from land and labour) for the poor, and hence better nutrition. Sluggish staples production usually indicates failure. But in fast-growing middle-income countries, *falling* food self-sufficiency and per-person staples production are often signs of successful development and trade. They cause improved incomes for the poor, and hence more diversified and nutritious food consumption.
Fourth, we assess levels and trends in food consumption and production as cures, and perhaps causes, of for non-caloric malnutrition; this involves looking at the structure of consumption, production, and their links.
Finally, we examine issues arising from globalization, liberalization and commercialization food consumption, for undernourished and 'overnourished' populations. The global context of population and sustainability are touched upon, but reviewed mainly in a companion paper [de Haan and Lipton 1997].

Each part, as appropriate, considers food requirements, security, stability, within-household and gender distribution, and human development impact.

1. Food consumption, calories, anthropometry, human development

A. Levels of undernutrition: Table 1 shows that in 1990-92 *inadequate levels of food consumption* were widespread. 840 million people, one-fifth of the developing world, consumed so little food, relative to requirements, that they suffered *caloric undernourishment.*[6] This often leads to *anthropo-*

[6]Dietary energy intake less than 1.55 times the basal metabolic rate, BMR, for men, and 1.56BMR for women. BMR is the rate of energy breakdown by a warm, fasted (18 hour) person in complete rest). The caloric intake required to meet 1.55-1.56BMR varies by country, because 'minimum calorie requirements .. take into account .. age/sex composition of the population' [FAO March 1995: 27]; for example, 1.55BMR in Asia averages 1790 kcals/man/day in Asia but 2000 in Latin America.

metric deficiency; for instance, about 1 in 3 under-fives in developing countries were significantly underweight for their age. These probably included most of the 1 in 10 who would die before the age of five [UN 1997: 175]; severe anthropometric deficiency is associated[7] with increased risk of suffering *damaged human development* via reduced longevity, physical work capacity, mental functioning, or immune response.

Yet in 1990-2 global food consumption provided 2720 dietary calories per person [FAO 1996: Table 1], which would have been sufficient if distributed in proportion to requirements. Food consumption is so unequal that *caloric* undernourishment is serious. Yet caloric inequality explains only part of *anthropometric* deficiency, and both together explain only part of differences in human-development outcomes, such as child mortality.

For instance, Table 1 shows that in 1990-92 sub-Saharan Africa was the region with the highest proportion of persons suffering caloric undernutrition (43 per cent); next, far behind, was South Asia (24 per cent). Yet height and weight shortfalls are far commoner in South Asia. For example, almost 60 per cent of under-fives are at least two standard deviations below US mean weight-for-age - twice the proportion in sub-Saharan Africa. Puzzlingly, the proportion of children dying before age 5 is higher in sub-Saharan Africa (13.7%) than in South Asia (11.8%), and life expectancy is barely 50 in SSA yet over 60 in South Asia [UN 1997: 165, 175].

Part of the explanation of the very different human-development outcomes of Asian and African food consumption is that - while most Africans, having until 1920-70 been able to expand into new farmland, have only recently faced pressure to adapt to land and food scarcity - most Asians (in China, South Asia and Java) have had much longer to adapt. Asians responded by two millenia of massive irrigation; by radical improvements in rice breeding, from the Sung dynasty in China in the tenth century [Bray 1986] to the green revolution of 1965-90; and, after the big falls in child mortality of the 1950s, by reducing fertility. Asians were forced, much earlier than most Africans, to 'build in' behavioural adaptations that reduced caloric undernutrition - since 1960, dramatically so (Tables 1-2).

[7]The association between *mild to moderate* anthropometric deficiency (especially stunting) and bad subsequent outcomes is, however, (i) weak, (ii) probably not causal. Mild to moderate stunting is (a) a 'marker' of an economic and physical environment leading to troubles later, rather than a direct cause of such troubles; (b) often a sign of biological adaptation to an environment that imposes severe strain: a population that cannot acquire much food is under genetic pressure to adapt by selecting genes for low energy requirements (smallness). See Payne and Lipton [1994]; Lipton [1983].

However, Asians - at least the poorer 50-75 per cent - have also been forced, by millenia of pressure on land and food, into biological adaptations that raise *apparent* anthropometric shortfalls. Big people, with high energy requirements, have more strength to break in new land - but, when land expansion slows down, are less likely to survive and reproduce despite prolonged or repeated periods of hunger, especially if too poor to carry reserves. Poorer Asians have therefore apparently selected genes for smaller size and lower metabolic rates than were needed in most of Africa, which until 50-100 years ago had expansible land frontiers.

Hence Asians, though less liable than most Africans to caloric undernutrition, score worse on standard, conventional indicators of stunting, wasting, and underweight. However, because these lower scores partly reflect adaptation, they have less than expected effect on human development. That is shown by much higher life expectancy, and lower child mortality, in South Asia than in Africa, even in countries with similar living standards, infection régimes, sanitation and health care (Table 2 and [UN 1997: 161]).

The anthropometric shortfalls of historically poor families are not permanent. As more and safer food consumption removes the genetic pressure towards low calorie requirements, so 'Asian' or 'Amerindian' inherited height, body mass, and probably metabolism increase towards US or Southern Sudanese levels, though usually not all the way. That has been the experience of upper-class Indians,[8] and of Japanese in the USA. [Tanner 1964; Eveleth and Tanner 1976; Davies 1988; Payne and Lipton 1994]. Conversely, Africans will probably get smaller, unless - as suggested by the IFPRI projections reported in Table 1 - Africa's post-1970 experiences of rising undernutrition, and falling food availability and entitlements per person, are due to be reversed. If not, genetic pressures will select, as they have done in Asia, for smaller people, better able to cope with harsher caloric conditions.

The higher anthropometric shortfalls in much of Asia than in most of sub-Saharan Africa, even with comparable food-health-poverty environments, reflect not only biological adaptation, but also greater inequality by gender and landholding, especially in South Asia. There, the victims of these severe inequalities - landless labourers and females - are the most prone to smallness, even extreme smallness, and low metabolism. These reduce their

[8]Intermarriage within each castes and/or class throughout India, together with land inheritance, means that a labouring (large landed) family, in most cases, for many generations inherits - alongside selected genes for body size - needs and opportunities for adaptation to small (large) access to food.

working and perhaps learning capacity, even if biological adaptation helps them to outlive their African counterparts [UN 1997: 161].

Table 2 confirms these patterns at country level. In India and Bangladesh over 6 in 10 under-fives are significantly stunted, and similar proportions underweight for age, by conventional standards. However, pediatricians would agree that this overstates the inadequacy of food consumption. It is more serious, and less explained by adaptation, that 15-20 per cent of under-fives are significantly 'wasted' (low weight for a given height) in India and Bangladesh - figures matched only in Mauritania, Niger and Mauritius.[9] Respective child mortality rates are 115, 115, 195, in Niger a horrifying 320, but in Mauritius only 23. Gender discrimination almost certainly explains much of the inter-generational transmission of smallness in South Asia [Bhargava and Osmani 1997]; respective rankings in the gender-related development index (out of 138 ranked countries) are 118, 128, 127, 145 and 54 [UN 1997: 149-51, 174-5]. This suggests that in Mauritius even wasting, affecting 16.2 per cent of under-fives in 1985, may overstate dangerous child undernutrition.

International patterns of undernutrition are partly explained by females' serious relative deprivation of food consumption and health care in some regions. This causes more severe stunting and wasting, which threaten life as well as physical and perhaps mental development, among girls than boys in Northern India, Bangladesh and Pakistan, though seldom elsewhere [Harriss 1986; Svedberg 1989]. The human-development result is reduction of female life expectancy to male levels - it is 3-6 years higher elsewhere in the world - and difficult pregnancies due to small womb size, with consequences ranging from high rates of maternal mortality and of stillbirths, to low birthweight that imperils infant life and development [Bhargava and Osmani 1997].

Rural women suffer the most disadvantage. Compared to urban women, their lower food consumption is compounded by less chance of trained attendance in childbirth, deeper poverty, less health care, and less education (and a smaller share of it for girls).[10] In rural India, though using 82 per cent of all consumption (cash and kind) for food, the poorest decile received

[9]FAO [1996], app. 2, table 8, for good surveys from developing countries - 46 from the 1990s, 19 from 1987-9 and 8 from 1981-6. Nowhere in the Americas except Guyana (8.5 per cent in 1981) did wasting in the most recent survey exceed 5 per cent.

[10]This compounds the damage; at any level of poverty, women who have completed primary education are likelier to show 'positive deviance' in child feeding and care [Bhargava and Osmani 1997; Lipton and de Haan 1997; Zeitlin and Bajrai 1987].

only 1212 kcalories/person/day in 1972-3, as against a still shocking 1316 (79 per cent) in urban areas [FAO 1993]. The figures have improved since, but rural disadvantage in food consumption, with its special harm to poor women, remains.

Remoteness is another log in the *interlocking log-jam of disadvantage* that worsens the human-development effects of inadequate food consumption. In China, as in much of Asia [Lipton, Osmani and de Haan 1997], and in Latin America [Psacharopoulos and Patrinos 1994], remote regions and minority groups are the most liable both to caloric undernutrition, and to the other disadvantages that sharpen its impact on death-rates and on the development of those who survive. Each of the following is more prevalent *with* than *without* each of the others: low calorie intake per person, remoteness, rurality, discrimination against females, scanty schools, bad sanitation, absent or distant health care, poverty, heavy and seasonally peaked work even in pregnancy, and low calorie consumption per person.[11] In most developing countries, those in the 'worst' quintile on all these characteristics are likely to have 50-65 per cent of the national average life expectancy and years of education, and double the age-specific death-rate and time ill.

The better-off are not exempt from caloric undernutrition, partly due to the distribution of food consumption inside the household. In the Philippines, 4 out of 10 under-fives *in households consuming more than 100 per cent of the calories they need* are receiving below 80 per cent of recommended calories for their age, while adults average 108 per cent of requirements [Bouis and Haddad 1990; Marek 1992]. All agree that calorie consumption per adult equivalent rises, and caloric work requirement falls, as people move out of poverty. The 'calorie-income elasticity' or CIE (the percentage rise in calorie intake due to a 1 per cent rise in income) is usually negligible, even negative, among the richest. Even among the poor, it is far below 1, partly because even calorie-deprived families use extra income to meet acute, unmet consumption wants and needs other than calories: micronutrients, food variety, shelter [Bouis and Haddad 1990 for the Philippines]. CIE is estimated at 0.4-0.6 for groups with fairly low calorie consumption (1750-2000 kcals/person/day) in Kenya and Nigeria [von Braun and Kennedy 1986], but these estimates may be too high [Behrman and Deolalikar 1989]. The balance of evidence is that the CIE among the poorest 20 per cent of persons in South Asia, China, and sub-Saharan Africa is 0.2-0.4.

[11]Admittedly, a household tends to have higher child/adult ratios, and hence reduced caloric *requirements*, if (other things equal) it is: in the poorest decile; rural; remote; little-educated. However, many indicators, e.g. differential mortality, show that requirements are reduced less than consumption.

Table 6 shows big differences between the highest and the lowest income groups, in a range of developing countries, in caloric *consumption per person*. Exacerbating the effects on *caloric adequacy per individual*, poorer households have higher needs - among adults for work (and job search), among children to fight a hostile disease environment - and face more seasonal variation; but this is more than offset by the poorest deciles' higher child/adult ratios and smaller adult body size, both of which reduce food needs per person. In Bangladesh in 1988-9 the richest quintile enjoyed 60 per cent[12] more calories per person than the poorest (Table 6); the above effects might together have reduced the gap in calories per 'unit of requirement' to some 35-40 per cent, but this is huge given the caloric deprivation of the poor.

B. Trends in undernutrition, famine and HFS: *Poverty* - lack of entitlements to food - is probably the main proximate cause of *undernutrition*. If poverty were eliminated, calorie acquisition would be distributed much more closely to caloric needs; as persons get less poor, they not only raise calorie intakes, but also reduce requirements due to heavy physical work, ill-health, and calories for under-fives doomed to 'die from poverty'.

World Bank [1990, 1997] shows big reductions in poverty since 1969-71 in most of Asia, North Africa, and Latin America. There, caloric and anthropometric undernutrition are now much lower. In sub-Saharan Africa neither undernutrition nor poverty is significantly lower than in 1969-71. The proportion of persons in developing countries with daily calorie consumption below 1.55BMR fell from 35 per cent in 1970 to 20 per cent in 1990 (Table 1). Gains were absent only in sub-Saharan Africa.

To a large degree the falls in both poverty and undernutrition can be traced to increased employment of low-income people in food production - either via self-employment on fairly equal landholdings, or via labour-intensive growth in staples production. Where food output has grown, the poor have increased the level and stability of their entitlements to calories, both via income from employment and self-employment, and due to greater local availability, cheapness and reliability of food supply. The price effect is crucial; the poor raise their consumption of calories much more than others, in response to lower staple-food prices, for two reasons. First, the propor-

[12]The gaps in China are similar. Gaps of over 3:1 between richest and poorest deciles in India (Table 6) are known to be due to survey method. Meals taken by very poor labourers at the farms or households of their relatively rich employers, are 'budgeted' to the diets of the latter, not the former.

tionate increase in their real income is more; second, because they need the extra calories, they are likelier to substitute them for non-food even at a given income [Alderman 1984]. Falls in relative prices of food (especially staples) and growth of farm output are good predictors of declining poverty incidence in India [Mellor and Desai (eds.) 1986]. Probably both effects work by raising food consumption.

The human-development outcomes of these trends appear from comparable micro-surveys of children under 5 for 1976-95 [FAO 1996: 72-3]. In successive nationwide surveys in sub-Saharan Africa, the proportion underweight (more than two standard deviations below US median weight-for-age) rose in 10 countries and fell in 3 (and substantially only in Zimbabwe[13]). In the Near East and North Africa 3 countries recorded improvements, and 2 (very small) deteriorations. In Latin America and the Caribbean the favourable balance was 14 to 3. In Asia only Laos showed deterioration; ten countries showed improvements, which were especially big and steady in India [Sachdev 1997] and Pakistan, though underweight appears still pervasive (but see above). In China too, huge improvements would be shown if long-run survey data were available, but in huge countries such as India and China there are big regions (Tibet in China, the 'Bimaru States' in India) that have remained little touched by the improvements [Drèze and Sen 1997; Bhargava and Osmani 1997].

Also, improvement in anthropometric outcomes of food consumption was seldom smooth. It was largely confined to the post-1980 period in South Asia, and to the 1970s in Latin America. Nationwide surveys mostly support these trends. The regular surveys in ten of India's 18 bigger States by the National Institute of Nutrition show slow, steady falls in underweight among under-fives from 1975 to 1994 (though levels are still alarmingly high).[14] This parallels the falls in poverty incidence (and the growth in real average consumption) over that period, after the absence of change in 1960-75 [Ravallion and Ozler 1996; Penn World Tables 5.6].

[13]From 20.7 per cent (1984) top 15.5 per cent (1994). There may also have been worsening in several transitional economies; significant stunting affected 21 per cent of Russian children aged under 2 by 1992/3, though the proportion underweight was only 3.6 per cent [Mroz and Popkin 1995].

[14]The proportion of under-fives at least 2 standard deviations below NCHS median weight-for-age fell from 77 per cent in 1975-9 to 64 per cent in 1994. On the even more stringent 3SD cut-off, the proportion fell from 38% to 25%. For stunting the falls were: <2SD, 79% to 63%; <3SD, 53% to 36% [Sachdev 1997]. Comparison with other countries and with mortality rates suggests that part of the prevalence of very small size in Indian children is adaptive, probably genetic.

Surveys give an incomplete picture of how groups or regions differ in trends in adequacy of food consumption. For the 60 per cent of the world's people who live in Asia - who have seen big falls in caloric undernutrition, as in mortality and poverty risk - such variables show regional divergence within nations, not convergence [Lipton, Osmani and de Haan 1997]. However, among the Chinese poor, rural and urban calorie consumption converged in the 1980s (Table 6), probably because many hungry rural migrants moved to cities, where they seldom obtain either urban or rural social-security benefits.

Anyway, two in three of the world's people live in countries that, in the past 30-50 years, have seen unprecedented, rapid and sustained improvements in human capabilities due to falling incidence of calorically inadequate or insecure food consumption. This greater adequacy of food consumption - and its greater stability, despite some evidence of reduced stability in world food *production* [Hazell 1987] - is due to better direct access to own food, food employment, and larger public and private stocks, often including food aid.

Improved HFS is most strikingly reflected in the virtual absence - in sharp contrast to the historical record - of widespread famines in Asia since the disastrous loss of life (15-30 million persons) in China in 1959-61. Even the worst experience, Bangladesh in 1974-5, cost under half a million lives In sub-Saharan Africa, only in Ethiopia (1984-5) did deaths approach a million, and famines have been rare except during or just after war or State breakdown [Ravallion 1997: 1205-6].

HFS is not linked to national self-sufficiency in food; many very well-fed nations have big food deficits. Many people consume enough food only by selling, or working on, labour-intensive cash crops such as tea; such extremes as uprooting Sri Lanka's tea bushes to raise food *production* would not, as intended, increase HFS but greatly reduce it, by cutting food *entitlements*. Most serious studies show that commercialization improves the food consumption of the poor [von Braun and Kennedy 1986; Maxwell and Fernando 1989]. Yet governments in largely rural countries with highly variable food availability often feel they must insure against famine, not simply by grain trade (including forward or options operations) markets for staples, but by underpinning domestic food farming or carrying stocks. It is indeed sensible to redress the large institutional, price and other biases that still damage rural production, and some food stocks are wise. But huge

public-sector stocks and public distribution schemes have, in most of India (though not Kerala), proved inefficient and inequitable paths to HFS.

The importance of some local control of food sources is revealed by absence of famine during terribly difficult conditions in the 1990s in several transitional economies [see Popkin 1993 on Russia]. The food security of the poor (urban as well as rural) was protected during prolonged hyperinflation in the Ukraine by consumption of food grown in 'household plots', distributed from otherwise largely unreformed collectives. During civil violence in Albania in 1996, food security was similarly helped by the earlier, egalitarian distribution of State and collective land to family holdings.

Returning to the trends: the sharp - though neither steady nor universal - falls in caloric deprivation, and in their anthropometric and health consequences, are - from the viewpoint of human development - undoubtedly the most important ongoing change in food consumption globally. In Section 4 we explore the links between caloric change and other aspects of food consumption and nutrition (including obesity and animal fat and micronutrient intake), the outcomes for human development, and the prospects and policy options. First, however, we need to explore the extent to which the improvement in nutrition is traceable to improved availability of dietary energy (sec. 2), or to changes in the capacity to produce it, locally or globally (sec. 3).

2. Dietary energy supplies and nutrition: the links

A. Levels: Human nutrition reflects the use of claims (entitlements) to food.. Claims may be underused or misused due to cultural factors, or wrong or missing information. However, it is the adequacy of a person's claims - more than their underuse or misuse - that mainly determines whether her nutrition fulfils the needs of human development, especially for the main human-devel-opment problem of global food consumption. People are calorically undernourished almost entirely because their claims on calories are insufficient.

Each person's annual claims on calories, in any country, depends on three things: available calories or 'dietary energy supplies', DES, per person;[15]

[15]These are estimated from FAO Food Balance Sheets by adding, for each foodstuff, (calories per ton) *times* (the year's tons production, plus net imports and stock depletion, minus feed, minus an allowance for

calorie requirements per person (affected by age-structure, height, weight, work and metabolic rate [FAO 1996: Appendix 3]); and the interpersonal distribution of DES and requirements. This section first examines levels and trends in DES. We then show that - with some striking exceptions - these closely parallel, and may largely explain, differences and trends in the incidence of caloric and anthropometric undernutrition. Finally, we explore the 'outliers' - places and times where far more, or far fewer, people attain caloric adequacy than would be predicted from average DES.

Levels and trends in DES in tables 3-4 roughly reflect those of caloric and anthropometric adequacy, tracked in tables 1-2. As for *levels*, calorie supply per person in 1990 averaged 2520 in developing countries, 3230 in transitional economies and 3410 in industrialized countries. In the developing world South Asia and sub-Saharan Africa (2040-2290) lagged far behind other developing regions (2550-2960). This reflects the relative incidence of caloric undernutrition (Table 1) and premature death. At this broad level the only anomaly - that anthropometric undernutrition appears more in South Asia than in sub-Saharan Africa - was explained above.

To see how a nation's DES per person reflected undernutrition, we estimated the links for 35 developing countries with relevant data for stunting, underweight and wasting, as defined in Table 1.[16] DES averaged over 1990-92 did little to explain wasting (low weight-for-height) among under-fives at the survey date, since wasting reflects manly recent illness or food shortage. Key results[17] for proportions of under-fives underweight (U) and stunted (S) are

$$(1)\ \ln U = 19.46 - 2.14 \ln DES \qquad (\text{adj } r^2 = 0.195)$$
$$(3.47^*) \qquad (-3.04)^*$$

$$(2)\ \ln S = 15.09 - 1.51 \ln DES \qquad (\text{adj } r^2 = 0.199)$$

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seed and waste), all averaged (divided by population) in the same year. Such averages, of course, tell us nothing about interpersonal distribution of calories.

[16]We required (a) average DES in 1990-92, (b) nationwide undernutrition survey data (invariably for a single year) between 1989 and 1993, for children aged 0-59 months. Data [FAO 1996: Tables 1 and 8] used definitions of stunting, underweight and wasting as given below Table 1 of this paper.

[17](i) These equations pass the standard diagnostic tests for absence of heteroskedasticity, normality, and functional form. (ii) Alternative functional forms were tried and in most cases also passed these tests, though linear and semilog regressions showed somewhat smaller adjusted r^2 (details available on request). A log-log regression is natural, preventing meaningless predictions of negative S or U, and introducing 'diminishing returns' to extra DES - one expects extra (average) calories to do more to improve nutritional status when caloric intake is smaller. (iii) Reciprocal causation is unlikely to be a concern, unless there is both extreme undernutrition of the farm workforce, plus labour shortage. The first is not necessarily - and the second most improbably - correlated with overall low DES.

(3.95)* (-3.07)*

*: significant at 1 per cent

Given the weak DES data for several countries, these are strong results - and would be stronger if we could estimate DES per 'equivalent adult' (allowing for the high proportion of under-fives, with lower energy needs, in some countries). Low average national DES accounts for about a fifth of international variance in stunting and underweight among under-fives.

Of the remaining 80 per cent, some is associated with lower dietary energy requirements. These, even among children, could arise because of warmer conditions, or genetic 'programming' for lower height, body-mass index or metabolic rate per kg [Payne and Lipton 1994; Lipton 1983; and see above). People with lower requirements (or countries comprising them) normally choose lower caloric intakes. One would therefore expect 'outliers', with much higher incidence of *apparent* undernutrition than predicted by the above equations, among countries known to meet these conditions. Indeed, India has a positive residual more than twice the standard error on equation 1.

Some of the remaining variance in stunting and underweight among countries is associated with the interpersonal distribution of calories. They are far less unequal than income, but maldistribution might raise the incidence of anthropometric undernutrition, above what is predicted from DES, in countries with exceptionally unequal income, such as some Latin American countries, Kenya and South Africa [Deininger and Squire 1996]. Also, unequal intra-household distribution of food might lead to more undernutrition than is predicted from DES, in countries with biases against girls in food provision - or in health care (so that ill-health reduced efficiency of girls' calorie utilisation). This effect contributes to the outlier status of India, and probably that of Mauritania, which also shows stunting and underweight more than two standard deviations above the predicted level in both these equations. Conversely Peru, Jamaica and Paraguay are favourable outliers, with less stunting and wasting than would be expected from average DES. This may reflect relatively low discrimination against girls, and in Jamaica successful nutrition interventions.

B. Trends: In parallel to the improved nutritional outcomes already discussed, average calorie supplies per person in the developing world rose by 18 per cent between 1969-71 and 1990-92. This was only slightly offset by

the rising ratio of adults to children (though this will become an important factor increasing energy requirements in South Asia in 1995-2025), and by the rising body mass and hence calorie needs of adults. Average DES, even per equivalent adult, in Asia and Latin America appear to have been rising by about 1 per cent per year for at least twenty years.

The regional pattern of increases in calorie intake per person (Table 3-4) closely reflects that of falling incidence of undernutrition (Table 1-2). Both are fastest in E/SE Asia (including China); respectable in the Middle East and North Africa, in Latin America in the 1970s, and in South Asia in the 1980s; and nil or negative in sub-Saharan Africa. There have been dramatic improvements for some large populations: in China calories per person per day rose by 37 per cent from 1969-71 to 1992-4.

Of course, not only averages matter. Yet rising average DES in a country normally means that the poor are among the gainers. This is because only if poor people are enjoying rises in purchasing power, access to land, or productive technology will there be much extra demand for calories. The rich have very low elasticity of calorie intake to income growth.

Apart from big gains in dietary energy supplies per person in normal years, there have been improvements in year-to-year stability of food supplies to the poor, and hence in household security from famine. This is true even of systems of nationally subsidised food distribution from stocks. Even schemes such as those in Egypt and India, known to be very weakly targeted on the poor, in years of dearth undertake large systematic releases of staples. This helps the poor by suppressing the rise in prices, but may fail to reach the neediest remote regions (such as Western Sudan) where transport or retail food markets function badly.

Nevertheless, growing stability in DES - despite possible *falls* in the stability of world grain production [Hazell 1987] - has implied a sharp improvement in the adequacy of food intakes. Many people still eat too little to permit fulfilment of their capabilities, but past improvements are expected to continue. For example, the proportion of persons in South Asia eating unduly few kilocalories per day[18] has fallen from 35 per cent in 19769-71 to

[18]Less than 1.54 times their basal metabolic rate [Alexandratos 1995]; see Table 1. These proportions are almost certainly much higher than the proportions of persons at significant health risk from consuming too few calories [Lipton 1983; Payne and Lipton 1994], but do indicate those who may be impeded from risk-taking, or from prolonged heavy work, by caloric insecurity.

24 per cent in 1990-92, and this is expected to decline to about 12 per cent by 2010.

Although improvements in physical status of children have been slower and patchier - the proportion of under-fives significantly underweight in South Asia fell only from 64 per cent in 1970 to 54 per cent in 1990 and is projected to be 49 per cent even in 2010[19] - better health conditions have transformed such relatively small improvements into greatly reduced risks to life and health. The infant mortality rate in countries with low human development almost halved in 1960-94, from 167 to 85; the fall was fastest where nutritional improvement was fastest (e.g. in China) and both were slowest in the less-developed countries of Africa [UN 1997: 166-7].

About one in three infant deaths is associated with some form of caloric undernutrition - too few calories relative to requirements. This means both low food consumption (DES) for children and pregnant or lactating women, and waste of calories due to parasites and infections. The huge fall in infant and child mortality in poor countries has been due mainly to the interaction or 'synergism' between more, and more stable, food consumption and improved sanitation, immunisation and health care. A classic study [Taylor et al. 1978] proved this synergism in then-poor villages of the Indian Punjab. A much larger fall in mortality and undernutrition was achieved when a fixed cash sum was divided between health care and nutrition supplementation, than when it was concentrated on one or the other.

Section 4 below covers qualitative aspects of food consumption in developed and developing countries. However, one point about the relationship between qualitative and quantitative improvement must be made here. It is sometimes argued that, although calorie consumption of the needy in poor countries may have increased, this has not prevented - indeed may have caused, or been due to factors that also caused - qualitative worsening in food consumption or its consequences for human development, among the poor of developing countries or otherwise. This claim is incorrect.

The claimed quality problems might lie in four areas: proteins, micronutrients; excess (especially of animal fats); and dietary variety.
(1) As regards proteins, Gopalan and others refuted the once-prevalent claim that many people suffered deficiency of protein, or of critical amino

[19]'Underweight' means that weight-for-age is at least 2 standard deviations below the median value of the US (NCHS) reference population. This estimate of 'underweightness' makes no allowance for genetic and other adaptation and is thus probably too high, but probably a useful indicator of trends.

acids, even when they obtained sufficient calories [Lipton 1983: 8]. Recent analysis has revealed exceptions, but the upsurge in calorie consumption, where it has happened, has led to a decline in protein deprivation. The protein intake data in tables 3-4 confirm this, as does juxtaposition of country estimates of trends in protein and calorie intakes [FAO 1996: Tables 1-2].

(2) For main micronutrients subject to deficiencies - Vitamin A, iodine and iron - increased intakes of most main staples, and maintenance of consumption of cheap pulses, may not suffice (as they do for proteins) to bring about major improvements. However, as income and caloric intake improve, even the poor amend diets to improve taste, texture and variety [Bouis and Haddad 1990]. This normally increases intake of micronutrients - except perhaps iron. Without meat consumption, which in many developing areas (notably South Asia) remains low except for the well-off, it is possible, but in many agro-ecological zones hard, to eat a *readily accessible* diet that avoids risks of anemia. The pervasiveness of anemia and Vitamin A deficiency in the developing world is a very serious problem, only partly alleviated by uptrends in DES. Micronutrient trends are reviewed in Section 4.

(3) The average person consumes far less fat, especially animal fat, in almost all developing countries and regions than in most developed countries - even relative to total calorie intake [our Tables 3-4; FAO 1996, Appendix 2]. Access to 'energy-dense' foods, including animal fats, remains inadequate, not excessive, for most poor populations, but is starting to rise as more people meet basic calorie needs. Diseases of affluence (and obesity among the non-affluent), related to animal fat consumption, are emerging in some developing countries, especially parts of S America and SE Asia where consumption distribution is or becomes especially unequal. But in most developing countries cheaper and more widespread dairy consumption - if food-to-feed diversion is sustainable without raising staples prices - is of major net benefit to diets. Section 4 discusses these issues.

(4) Poor people have shown themselves eager, and able, to enhance dietary variety as food consumption rises. The share of main food groups in total food intake has been steadily falling, from very high levels of homogeneity and tedium, precisely in the developing areas where calorie consumption has been rising. Whether globalization is 'homogenizing' is of negligible concern compared to its effects on the nutrition of the underfed; links between the two issues (sec. 4) exist, but are in general exaggerated.

3. Better DES, nutrition and food consumption: the role of production

To understand the problems and prospects for food consumption as a source of human development, and the appropriate policies, we need to be clear that three propositions, apparently contradictory, are all true:

- Advances in food production (and to some extent distribution) explain much of the huge improvement in food consumption in Asia and Latin America in the past thirty years; absence of such breakthroughs explains much of the dismal record of food consumption in Africa.
- As A. K. Sen has shown, most famine and chronic hunger are caused, not by low food availability (let alone production), but by failures in the victims' entitlement to food (from income or support systems).
- Production transformations and 'producer power', while reducing undernutrition in the South, are associated with serious health problems in the North, in transitional economies (most seriously), and in some 'successful' developing countries in E/SE Asia and Latin America.

We now establish the first proposition, and explain its link to the others.

For 35 developing countries, we showed that higher dietary energy supplies per person in 1990-92 (DES) were linked to lower incidence of serious stunting and underweight in childhood (p. 15). Higher DES, in turn, is linked to higher cereals production per person:

(3) ln DES = 7.65 + 0.669 (cereals production per head 1990-92)
(194.4)* (2.99)* adjusted $r^2 = 0.190$

As in all the equations, standard requirements are met (see fn. 17), but detailed interpretation - and achievement of fuller explanations (higher r^2, etc.) - requires multiple regressions, allowing, for example, for food distribution. All that is intended here is to show that in developing countries, with their largely rural and/or agricultural populations, food production per person is *one* important determinant of DES. In other words, in low- and middle-income countries, net imports of staples are not fully substituting, as sources of DES, for low production. This suggests that domestic staples production is contributing to DES by strengthening demand for it, rather than simply by supplying calories: higher DES in developing countries is associated with higher demand for food caused by higher incomes from its domestic production, by smallholders and farm employees.

This is confirmed by the fact that production on appears to affect nutrition only indirectly, via DES. There is no significant *direct* bivariate link, in this 35-country data set, between cereals production per person (1990-92) and surveyed incidence of stunting or underweight among under-fives (1989-

93). Conversely, when these incidences are regressed against domestic cereals production and net cereals imports, only the latter affects them:

(4a) ln (stunting) = 2.96 - 0.14 (ln cereal imp/pop) + 0.04 (ln crl prod/pop)
(9.2)* (-2.51)* (0.52, n.s.) adj r^2 = .169
(4b) ln (stunting) = 2.83 - 0.16 (ln cereal imp/pop)
(14.6)* (-2.97)* adj r^2 = .187

The results are similar for underweight. Standard statistical requirements are met (fn. 17), elasticities are high enough to show the effects are important, and coefficients are significant at 1 per cent.

Net import demand by the population *reflects* capacity to claim food entitlements, either through the market or through food aid. Hence net cereals imports are linked to lower stunting and underweight. Domestic cereals production *creates* capacity to claim food entitlements, either by direct production or by exchanging wage income for food, raising demand for - and hence linked to - higher dietary energy supplies. These, in turn, are linked to lower stunting and underweight. Food production reduces undernutrition - but by improving entitlements to, and hence effective demand for, calories (via employment and price restraint), rather than by increasing food availability.

There have been two main mechanisms through which widely spread producer power improves food consumption: the green revolution and land reform. Countries, and regions of the same country, have done much better in reducing poverty and undernutrition where the rate of growth of food yields has been higher. This has almost certainly worked mainly via food price restraint and wider access to employment [Ravallion and Chen 1996; Mellor and Desai (eds.) 1986; Lipton with Longhurst 1989]. Individually redistributive land reforms have been associated with sharp improvements in undernutrition and poverty in China, internationally, and among Indian States [Drèze and Sen (eds.) 1997; Tyler and el-Ghonemy 1993; Lipton, Osmani and de Haan 1997]. It follows that, if yield growth in main food crops slows down or becomes less labour-intensive (as has happened since the mid-1980s), and if land reform is on the back burner, then rises in food production will lead to smaller gains in food entitlements for the poor in 1995-2015 than in 1965-85.

Nevertheless, those regions that have substantially improved food consumption levels (by reducing poverty and undernutrition) *without* raising

food production - such as Kerala in India - are likely to find such improvements hard to sustain if food output continues to stagnate, with upward pressure on local food prices and few gains in employment incomes [Ramachandran 1997]. Conversely, large parts of sub-Saharan Africa and semi-arid South Asia will continue to make slow progress in food consumption until yields of staple foods grow much faster. Fortunately such improvements are consistent with developmental emphasis on small farms, with their higher labour-intensity and hence greater propensity to turn yield increases into expanded entitlements to food consumption. Also, they are consistent with outward-orientated agricultural policies; nothing in the above argument justifies price biases against cash crops or farm exports.

The real problems are twofold. First, it is not easy to generate agricultural research for labour-intensive, small-farm growth in regions long bypassed by it. Second, the 'producer power', inevitably and rightly generated by appropriate farm policies during development, can readily turn to power over policies on public health, including food consumption and water, that prioritises food producers' interests - by no means only or mainly those of farmers or farmworkers - over health and environmental concerns. We revert to these issues in section 5. But we must bear in mind that increased staples production, and more equal distribution of farm assets, enhance food entitlements and so help solve the world's main food problem: caloric underconsumption.

4. Food consumption structure and human capabilities

A. Outline: We first look at consumption structure by main staples and food groups. We highlight international differences, secular changes and production effects. Next, we review two main consequences of these structures: for animal fats and the linked problem of obesity; and for micronutrient deficiency. Finally we set the issues into the context of the global food system.

Rising food consumption is often associated with a structure of dietary calories that shifts towards meat and dairy products providing proteins, fats and iron, and away from staples providing complex carbohydrates. These changes are, especially if accompanied by consumption of more fruit and vegetables, up to a point beneficial for the poor. Yet the same changes - with other aspects of changing life-styles: ageing, urbanization, less exercise at work and play, more smoking and drinking - are associated with so-called 'diseases of affluence'. Here, the aspects of food consumption that may harm human capabilities are associated with low-income groups in

developed countries and high-income urban groups in developing countries. But there are signs of improvement in these diets. The biggest threats from consumption of animal products may well be, not to the health of the non-poor, but to the price of staples eaten by the poor, and perhaps to ecological sustainability.[20]

An unvarying consumption structure, if unduly dependent on one or two food staples and especially if calorie intake is inadequate, can lead to micronutrient deficiencies. These affect mainly (though by no means only) children in developing countries, especially those from poor households in remote areas with soils (and hence foods) also deficient in key nutrients.

Increasingly, global systems affect the structure of consumption. We have attributed improving *levels* of food consumption, as a source of human capabilities, partly to 'producer power'. Yet producer power, combined with lack of consumer information, is in large part responsible for the failings in the *structure* of food consumption. These two faces of producer power correspond to two faces of globalization, both of trade and of cultures. This has huge potential - in many respects realized - to increase household food security and diversity. In this respect globalization is merely a broader form of free exchange, and as such beneficial. However, exchange and globalization can be turned into the enemies of consumer capabilities by producer power. This can distort the terms of international food trade. It can persuade governments to under-regulate distribution of possibly dangerous foods. It can permit powerful producers to impose on others the costs of overfishing or of environmentally careless farming. In other contexts producer power has killed Chinese consumers in millions, by forcing open markets for 'global' suppliers of addictive poisons: opium a century ago, cigarettes today.

Paradoxically, 'producer power' improves the adequacy and structure of consumption in early development - enabling poor farmers and farmworkers to overcome urban bias, to obtain land and infrastructure, and to diversify and improve diets. Still in China, we may note the contrast between the lethal powerlessness of rural producers during the famine of 1960-63, and the life-enhancing producer power of peasant households to achieve huge rises in food production and consumption during and after the reforms of

[20]See Sec. 5. Measures to avoid these threats can involve acute trade-offs. Thus stall-feeding of cattle reduces their demand for grainlands, but may increase health risks (**evidence needed here, Richard; Philip James enquiry in press**?) Conversely the shift from meat to fish consumption is good for human health, but appears unsustainable for stocks of increasingly many fish species and regions.

1978-84. Yet this same producer power often becomes the enemy of proper food consumption in late development, enabling powerful lobbies to distort and damage the global patterns of consumption and trade.

Our closing remarks, on the policy implications of consumption structures actual and desired, return to these issues. The key point is that consumer sovereignty - seen by many economists as a description of the world as it is - is really a policy goal for the world as it could be made. To attain that goal, policymakers need to do three things. They need to improve and globalize swift, honest food overview and information. They need to restructure global research (in many cases an international public good) so as to produce more staples labour-intensively in developing countries, and to improve the structure and healthiness of foods. Hardest of all, policymakers need to restrain and counter what Adam Smith saw as the normal tendency of powerful producers to collude, for their own interests, against the consumer.

B. Animal, vegetable, miserable: global or diverse food consumption?: Dietary energy comes from animal and vegetable sources. In 1990-92 the latter gave 70 per cent of calories consumed in industrialised countries (staples, i.e. cereals, roots and tubers, were 39 per cent); 72 per cent (44 per cent) in transitional economies; 83 per cent in Latin America and the Caribbean; and over 90 per cent in other developing areas. Staples provided 42 per cent of calories in Latin America, 66 per cent in sub-Saharan Africa and South Asia, and 72 per cent in E/SE Asia [FAO 1996: 23-5].[21]

There are differences among and within countries (Tables 4-5 of this paper), reflecting different levels of income, structures of domestic food production, price policies and tastes. In 1990-92 Denmark derived 44 per cent of calories (and a worrying 80 per cent of fats) from animal sources, mostly meat, and Bangladesh only 3 per cent (20 percent) [FAO 1996: 93-4, 105-6]. Compared to their share of calorie intake, animal products loom much larger in fat consumption (often damagingly so, at high intakes[22]), but also

[21]Roots and tubers loom much larger relative to cereals in SSA (respectively 21 per cent and 45 per cent of dietary energy supplies in 1990-2) than in any other developing region (in South Asia the respective percentages are 65 and 2) [FAO 1996: Table 7]). This has big effects on human development. Fibre deficiency is much less likely in SSA, but protein deficiency somewhat more likely. Above all, yield improvement has been much slower in most roots and tubers than in most main staples, increasing Africa's difficulties in raising dietary energy supplies.

[22]The importance of this remains controversial. Risks of heart attack and probably stroke are increased by high levels of 'bad' cholesterol (low and very low density lipoproteins) in the blood. Such levels are somewhat increased by intake of unsaturated fats (which are dominant in palm and coconut oil as well as butter and red meat), but are much more affected by genes, and can be reduced by vigorous exercise and moderate consumption of red wine, preferably not simultaneously.

in protein consumption (probably beneficially so, at low intakes). Hence it is important to *reduce* the role of animal products in the diets of industrial countries and better-off persons (with few protein problems but frequent excess of dietary and bodily fat), but - if sustainable, and consistent with adequate calorie acquisition - to *increase* that role among poor persons in poor countries,[23] for three reasons. Dietary diversity is desirable in itself. Body mass index and fat reserves are dangerously low in some of these groups, especially among childbearing women. And iron anemia, pervasive in many poor countries, is hard to prevent from inexpensive, accessible vegetable sources alone.

What were the main changes in food consumption structure in recent decades, and with what effect on human development? The answers are surprising. First, dietary diversity *rose* between 1969-71 and 1990-92 in all regions and all types of economies, as indicated by a falling proportion of calories derived from a country's main food group.[24] This is a crude way to categorise food types, but other indicators also show diversifying consumption, for poor as well as rich, even in some slow-growing economies (cf. the Philippines data in our Tables 4-6). Even the composition of most countries' staples consumption has become more diverse (Table 5). Increasing trade, travel and urbanization have diversified food baskets in a large majority of countries, reducing risk from crop failure or from price rises for a single source of energy or micronutrients. Pressures towards diversity - except in the remotest areas, and for some of the many still too poor to eat enough calories - have more than offset 'homogenization'; even Macburgers and chicken tikka pizzas are, for many, a diversifying experience and a first step to wider horizons.

Second, 'globalizing' shifts in local staples *consumption* have not generally damaged, but have rather been led by or conducive to, local staples *production*. The growing salience of wheat as an alternative to rice for consumers in South and East Asia, for example, even if its origins were partly in food aid, has been paralleled by an upsurge in wheat areas and yields: for example, as traditionally rice-eating cities like Calcutta and Dhaka shifted towards wheat, producers in North Bengal responded by planting high-yielding wheat varieties. In South and East Asia food production has grown much less for rice, coarse grains and starchy roots than for wheat, fruits,

[23]India's poorest rural quintile 25 years ago needed higher fat intake (Table 6 of this paper) and still does, while as in China the richest urban quintile consumes too much fat, especially animal fat.

[24]Food groups are cereals, pulses and nuts, vegetables and fruits, roots and tubers, other vegetable products, meat and offal, fish, eggs, and animal oils and fats [FAO 1996: 27-9].

nuts and oilseeds, 'consonant with the growth of consumption' [Cho 1996: 45]. Similarly, in sub-Saharan Africa, wheat and rice have increased their share in DES from 8.4 per cent in 1969-71 to 13.2 per cent in 1990-2, but have advanced fastest in the African countries able to grow them. The share in DES of the main 'African' cereal with significant yield advances at world level, maize, also rose (from 13.5 per cent to 14.7 per cent), and cassava's share was stable. Rising rice and wheat shares in African staples consumption, while initially related to food aid and imports, mainly reflect displacement of sorghum and millet [FAO 1996: 31, 107], largely due to sluggish yields [Lipton 1994].[25] Domestic production led diversification (by being sluggish) or responded to it where potentially dynamic, as with wheat in Bengal or Zimbabwe.

C. Overconsumption, animal fats and obesity: All this suggests two facts contrary to the 'conventional wisdom' for most countries and groups:

- Rising diversity of diets;
- Beneficial interaction between globalization of food markets and food consumption, on the one hand, and local food production, on the other.

Two further counter-intuitive facts are:

- The generally improving dietary role of animal fats, and perhaps sugar;
- Usually favourable medium-term impact on the 'diseases of affluent lifestyle' from poverty reduction, development and globalization.

There are worrying trends in consumption of animal products by some countries and groups, but mainly it is rising where on balance desirable, and falling elsewhere. In most low-income countries, far more people would benefit from higher than from lower fat intake,[26] animal products, and meat (to reduce ane-mia). The risk is deficient, rather than excess, consumption of animal foods. In most such countries it would be bad policy to prioritise reduced consumption of fats, even animal fats. After all, most obese people have a (hard) option to cut fat intakes; the poor need, but lack, the option to *raise* them.

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[25]These crops also have demand that declines with urbanization, with rising opportunity-cost of women's time spent in processing, and with growth (even if modest) of real income per person.

[26]The recommended range is 48-113 g/day for active men aged 18-60, 37-86 for women (but 40-105 in pregnancy and lactation) and 23-108 for under-eighteens; for details see [FAO 1997a (Human Nutrition in the Developing World),Annex I, table A1. In 1990-92 total fat in Bangladesh averaged only 17 g/person/day, one-tenth of the figure for Denmark! This is an extreme case, but given maldistribution there is a real risk of inadequate fat intake among pregnant women and poor households even at levels in countries such as India (41), the Philippines (38), or Zaire or Peru (34) [FAO 1996: 95-7].

After substantial urbanization and economic growth, it makes sense to change these priorities, as the risk of animal-fat overnutrition and obesity spread down the income scale. However, in middle-income countries, there is a caveat. The 'telescoped health transition' carries the risk that growing emphasis on 'lifestyle diseases' and overnutrition - as against diseases, still much more damaging, of undernutrition and poverty - will further skew the distribution of health resources towards the articulate urban middle-aged rich, away from the young rural poor [Bhargava and Osmani 1997].

In the USA since the mid-1950s, the trend towards rising animal fat consumption has been reversed, and rises in sugar consumption have slowed greatly. Especially among the better educated, consumption of whole milk and high-fat red meats has been falling at least since 1978. Similar shifts began somewhat later in other 'Northern' countries [Slattery and Randall 1988; Stephen and Wald 1990; Popkin et al. 1989; Milio 1991]. The share of animal products in *total DES* fell marginally in industrialized economies, but rose (usually marginally) elsewhere, between 1969-71 and 1990-92. More important from a health viewpoint, the share of animal products in *fat supply* fell in most of the 'danger areas': from 62 per cent to 55 per cent in industrialized economies, from 52 to 44 per cent in Latin America and the Caribbean (in both cases with a faster fall in the 'risky' part due to meat, offal, and animal oils and fats), and even, marginally, from 68 to 67 per cent, in transitional economies. Of danger spots, only E/SE Asia saw a rise, from 40 to 48 per cent [FAO 1996: Tables 4, 9]. By 1990-92, industrialised countries averaged 76g/person/ day of animal fat, transitional economies 67g, Latin American countries 34g, and other developing regions only 10-24g (Table 5 below).

Animal fat consumption remains worryingly high in some countries and groups. In general, non-European countries with high average intakes of animal fats reduced them between 1969-71 and 1990-92: Australia from 100 to 85 g/person/day, the USA from 81 to 79, Uruguay from 94 to 75. In the developing world, the Asian tigers have been raising per-person consumption of other animals, but only Hong Kong/China appeared to be moving into dangerous average levels, rising from 48 to 68 g/person/day of fat from animal sources. The worrying trends are in Europe: from 91 to 95 g/person/day in Germany, from 89 to 100 in Austria, and from 113 to an alarming 144 in Denmark. The transitional economies show less alarming recent levels, and fewer rises: Romania from 39 to 58 g/person/day, the former Soviet Union from 59 to 69, Czechoslovakia from 80 to 84, but Yugoslavia from 52 to 44, in 1969/71-1990/92; subsequent falls in average

calorie intakes (in Eastern Europe from excessive levels), while dangerous for some poor groups, probably mean further improvement for most people's animal fat intakes. Mediterranean countries again defy conventional wisdom: though popularly acclaimed for using vegetable fats, they mostly showed sharp rises in average animal fat intake, Greece from 45 to 69 g/person/day, Spain from 46 to 93 and Yugoslavia from 52 to 94. Some countries with active health policies show improvement, Canada from 91 to 73 g/person/day, Norway from 90 to 84 [FAO 1996: 95-7].[27]

Such averages conceal worryingly high intakes for some groups. The best-off decile of urban households in China in 1990, and in India in 1972/3 (and probably today), showed average fat consumption well above 100 g/person /day (our Table 6), and though animal-fat shares are not available they were substantial. Animal-fat intakes in developed countries - like heart disease and obesity - are associated with lower-middle incomes, especially in countries with much inequality of income and status [Wilkinson 1996].

High levels of saturated fat intake - mainly from animal fats, but also from palm and coconut oils - are implicated in high blood levels of 'bad' cholesterol (low-density and very-low-density lipoproteins). This accelerates the formation of arterial plaque and hence raises the risk of death from coronary heart disease and probably stroke. While this effect is genuine, its importance is controversial: blood fat level and composition are largely genetic, and may be more effectively improved by exercise (and even by moderate consumption of red wine) than by diet. To the extent that diet causes heart disease, high salt intake may be more to blame than animal fats. These may well, however, complement low-fibre diets as a cause of colon, prostate and breast and other cancers, especially as fats tend to displace complex carbohydrates, which are often associated with fibre sources [FAO/WHO 1992].

Fats of all kinds provide energy-dense 'quick fixes' for hunger. Such fixes, and the capacity to store and release body fat [Payne and Dugdale 1987], helped hunters, at risk of infrequent meals, to survive through reproductive age. Hence, since most of human history has involved hunting, fat-seeking and fat-using are likely to conform to felt needs programmed into human genes. With development, meals become regular; hunting, and in later development other forms of work-related physical exercise, become less so;

[27]Data constraints compel these crude comparisons. Animal DES appears increasingly to come from poultry, and in some countries pork, which have less fat content than red meats. Moreover some animal fats (especially from many fish) are 'healthier' than some vegetable fats. See above, fn. 22.

yet the fat-related genes are under little evolutionary pressure to adjust, because obesity - while harmful to health - tends to cause death *after* the age of reproduction. Obesity is both related to fat intake and - in association with physical inactivity, stress and high blood-pressure - a cause of many life-style diseases, including non-insulin-dependent diabetes as well as heart disease.

In the USA severe obesity (body mass index above 27.8 for men, 27.3 for women), affects about one-third of adults of both sexes. It is highest among blacks, Hispanics, and the poor. European incidence is less but rising sharply (e.g. from 7 per cent in 1980 to 14 per cent in 1991 in England). Obesity is spreading in developing countries also; in Brazil, Cuba and Peru 9 per cent of adults have body mass index above 30. Proportions in India and China are still well below 3 per cent, but - as in the Caribbean and South-east Asia - the 'spread' among the newly affluent is substantial [Shetty 1997]. Data for Brazilian women show how the development process 'moves' obesity (and its associated threats to life) from the rich to the poor: between 1974-5 and 1989 the peak incidence of obesity shifted from the highest to the middle income quintile [Coitinho et al. 1991].

D. Capacity and signals, micronutrient deficiency, and other food evils: Humans are a successfully evolved species. This implies that any substantial human group selects for genes that align food intakes and requirements to maximum success in surviving through reproductive age and in producing similarly successful offspring - if that group has the capacity and faces appropriate signals. What does this imply for the likely time-paths of, and for appropriate policies against, the three forms of malnutrition that reduce human capabilities: calorie inadequacy,[28] overconsumption, and micronutrient deficiency? In particular, how will poverty reduction, development, and market globalization affect the capacity of, and the signals to, people to select amounts and structures of food consumption that reduce these three evils?

(1) *Calorie inadequacy* is likely to be reduced substantially by poverty reduction (see above, especially [Subramanian and Deaton 1996]). Poverty re-duction implies increased capacity: to afford energy (calories) by self-provisioning, barter or purchase, the main methods of food acquisition in

[28]The balance of evidence is that few people suffer 'pure' deficiency of protein (or, even more, of specific amino acids) - 'pure' in the sense that it would remain even if all their calorie sources were proportionately raised until energy intake met requirements. An articulate but small minority of nutritionists argues that there has been serious underestimation of 'pure' protein or amino acid deficiency, especially among children and in areas with root and tuber staples. See fn. 21 above.

organised societies; to reduce energy expenditure in work and disease; and (because child mortality falls) to curb fertility, thus reducing the calories tragically 'wasted' on under-fives who fail to survive.[29] Also, calorie deficiency provides signals that induce people to correct it as they become less poor (i.e. acquire the capacity): extreme inadequacy directly and obviously harms ability to survive or reproduce; even moderate inadequacy signals itself, in reasonably healthy people, as hunger and appetite. So poverty reduction normally means that calorie deficiency is corrected by food acquisition.

General socio-economic development probably increases people's capacity to avoid calorie inadequacy, and not only by reducing poverty. During development, work comes to require less physical energy; the health environment improves, reducing energy requirements to fight disease; and often nutritional education and information improve. On the other hand, development is accompanied by substantial rises in height, body mass index, and adult/child ratio, all raising energy requirements; but these increases do not stop calorie adequacy from improving, because they normally come after, and respond to signals from, widespread increases in entitlements to food.

Some aspects of globalization can worsen caloric inadequacy, mainly by giving premature signals. Globalized marketing of inappropriate prestige foods can reduce calorie intake for infants, e.g. if formula foods are marketed to the poor (though they can be a boon for the better-off). In general, however, this seldom outweighs gains in calorie adequacy as globalization brings capacity for of more, longer-distance exchanges of labour and products.

(2) *Overnutrition* characterises the poor in rich countries, and the rich in poor countries. It responds to poverty reduction and development jointly. In low-income countries the rich, perhaps in part under the influence of globalized production and distribution of processed foods, switch towards animal fats, away from fibres and complex carbohydrates, and therefore suffer more from obesity and some 'diseases of affluence'. In rich countries the poorest, unable to afford healthier foods and life-styles, are at much greater risk than the well-off. The process of change can be seen in middle-income countries; In between, in Brazil, the peak incidence of obesity - and doubtless of associated diseases - moves up the income scale as development proceeds.

[29]This outweighs the (important) fact that poverty reduction reduces or reverses the genetic pressure towards selecting small body sizes - taller, broader people have higher energy requirements.

Poverty reduction in its early stages creates the 'capacity' to be overnourished, but later - alongside general development - also other capacities: to acquire and use information on healthy food consumption, and to select foods, and other behaviours such as non-smoking and exercise, that allow diversity of food textures, tastes and sheer pleasure, without adding to disease risks. However, genetic signals to avoid overnutrition are less benign than for undernutrition. Most of human history has rewarded hunter-gatherers able to 'feast and fast'; survival and reproduction prospects depended on periodic overeating and rapid fat formation and release [Dugdale and Payne 1987]. Even urbanizing, increasingly sedentary populations (e.g. in the Caribbean) may well inherit have fat-cell endowments that 'signal' against appropriately rapid reductions of food and fat intakes, explaining the fast growth of obesity; the proportion of under-fives who were obese in the late 1980s was higher in Jamaica and Chile (10-11 per cent) than in Canada (6 per cent) or Italy (4 per cent) [WHO/FAO 1992: 22]. However, as the Brazilian data suggest, the reduction of 'broader' poverty through education and emulation - and, yes, through the 'globalization' of healthier body images instead of fatty hamburgers - allows the human species to develop (and inherit) responses to food-consumption signals via learning, not just genes.

(3) *Micronutrient deficiencies* also do not respond simply to development and poverty reduction. Unlike calorie-protein deficiency, they usually neither give early signals that clearly indicate remedial action (and are not sufficiently widespread or intense to impair large groups' survival through reproductive age), nor - without expert advice - generate capacity for remedy even by the wealthy, because neither the deficiency nor the foods to remedy it are apparent. For example, scurvy remained a common cause of death among long-distance sailors, until it was found to be readily corrected by consuming foods rich in Vitamin C.[30] Similarly, today's main micronutrient deficiencies (iron, Vitamin A, iodine) usually signal themselves only when they become severe, and the signals are not readily interpretable, nor are the corrective actions self-evident. This does not imply that poverty reduction is useless. As people get richer, they usually diversify their diets and raise consumption of animal products, fruit and vegetables. This reduces the risk of iron deficiency substantially, of Vitamin A to some extent, and of iodine deficiency slightly (see below). General development also creates the social conditions for attacking micronutrient deficiency more

[30]Exceptions such as salt deficiency do rapidly trigger corrective behaviour, suggesting that selection pressure to correct such deficiencies was strong in the past and has left genetic traces today.

effectively, e.g. via iodine fortification of salt (see p. 32) - though vitamin A is less readily remedied by fortification alone, and iron deficiency even less so, due to problems of bioabsorbability.

As for globalization, longer-distance and more varied exchanges of food and other products are accompanied by the spread of 'mass-produced', often franchised, processed foods, and market integration. The net effect on food consumption is almost certainly to reduce micronutrient deficiencies, though also to increase overconsumption (see above).

E. Micronutrients: Iron deficiency affects about one-third of the world's people, impairing physical and mental work, and increasing risks in pregnancy. Iodine deficiency affects some 1.1-1.5 billion, of whom over 600 million are goitrous. Vitamin A deficiency is a risk for over 200 million, and is especially serious for children; over 14 million have consequent eye damage [Graham and Welch 1996: 1]. Table 8 indicates levels and trends of major deficiencies by region, and for China and the former USSR.[31]

Iron deficiency appears to be worsening globally.[32] Of its 2.1 billion victims in 1991, about half had clinical anemia, including over 44 per cent of women in the developing world and 13 per cent in the developed world.[33] Population prevalence varies from 64 per cent in South Asia to 23 per cent in South America. Severe anemia worldwide causes 1 in 5 maternal deaths[34] and is transmissible to children, causing stunting and vulnerability to infection. Even modest pre-school iron deficiency permanently reduces learning capacity and manual dexterity. A 10 per cent rise in hemoglobin in a moderately anemic person raises work capacity by 20 per cent.

Iron can be obtained from cereals, some vegetables and pulses, dairy products and meat - in sharply rising order of both iron content and bioavailability.[35] As income rises, people turn from cereals to pulses and vegetables, and later to meat. Thus consumer sovereignty plus income growth

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[31] Further details and data in this discussion are from [World Bank 1994] and FAO [1997].

[32] In contrast to the sharp improvement in Vitamin A (except for Africa), average iron availability appears to be declining since about 1970 in most of the developing world [World Bank 1994: 11].

[33]The highest levels are in Eastern Europe. Even in the USA almost 1 in 5 pregnant women are affected. The rate is 8 per cent even in the best performer, Denmark (relevantly the 'worst' country on excess consumption of animal fats) [WHO 1992: Prevalence of Anemia in Women].

[34]Proportions are higher in many countries. For every 100,000 live births, severe iron deficiency is responsible for 192 of the 342 maternal deaths in Pakistan (65 per cent of pregnant women in Karachi in 1988 suffered from anemia), and for 82 (out of 550) in Kenya [UN 1997: 175; WHO 1992].

[35]Haem iron (from meat) is absorbed at 20-30%; non-haem iron (from cereals, pulses, fruits and vegetables) at 1-8%. Milk is intermediate.

should have reduced iron deficiency in Asia, where it is most serious. However, producer power has been more important: 'green revolution' cereals showed much more buoyant yields than pulses (or cattle) and displaced them, making pulse sources of iron scarce before most people could afford much meat [World Bank 1994; ACC/SCN 1992; Behrman and Deolalikar 1987; Meesook and Chernichovsky 1984]. The incidence of iron deficiency, as signalled by anemia among non-pregnant women, between 1970-80 and 1980-90 rose in South Asia (from 58 per cent to 64 per cent), E/SE Asia (40 to 47 per cent) and middle America and the Caribbean (20 to 27 per cent), and slightly (38 to 40 per cent) in sub-Saharan Africa. Matters are made worse by the distribution of iron, not only among income groups, but within the household; gender bias, despite the requirements of pregnancy, has been shown in the Philippines [Bouis 1991] and bias against under-fives in India [NNMB 1980].

Policy to reduce iron deficiency involves reconciling three goals:

- To improve iron balance among the iron-deficient: to enhance their iron consumption from food, to redistribute it towards women and children, and to reduce the need for iron as fewer pregnancies are chosen (in response to lower child mortality, more female education and modern employment, and readily available contraception).
- To avoid stimulating meat consumption - and hence excess animal fat intake and obesity - among those with ample iron intake.
- To achieve these tasks in a way that is agriculturally sustainable without threatening the caloric sources of the poor: compared with production of cereals for direct consumption, production of meat (and to a lesser extent of milk, vegetables and even pulses) is extremely costly in terms of calories per hectare and per litre of water.

The example of iron shows the dilemmas of food consumption policy in face of micronutrient deficiencies. Their challenge cannot be met either by markets alone, or by a policy that fails to recognize and use incentives. In particular, 'breeding varieties of food staple plants that load high amounts of iron and zinc in their seeds holds great promise for making a significant, low-cost and sustainable contribution to reducing .. deficiencies in humans in developing countries [and] may well increase yields on deficient soils in an environmentally beneficial way' [Graham and Welch 1996: 55]. Agricultural research - both private plant breeding (led by profit incentives) and public research - has grossly underinvested in these possibilities.

Iodine deficiency affected over a billion people in 1991, about half in China or India (Table 8; [FAO/WHO 1992; ACC/SCN 1992]). Unlike iron deficiency, iodine deficiency is less linked to poverty (and resulting dietary

uniformity) than to region. In hilly areas and flood plains, iodine is leached from topsoil by rain, or removed in runoff by flooding, ice or snow.

Iodine deficiency is almost absent in developed countries, yet present even among otherwise well-off people in mountainous regions of developing countries. This tells us two things about food consumption policy. First, State capacity matters. Developed countries 'easily' tackle iodine deficiency by compelling iodization of salt. Yet most developing countries cannot enforce such legislation; salt suppliers are many and dispersed, and evade the legislation successfully, because mass poverty renders salt consumption responsive even to tiny price rises induced by iodization. Second, markets matter. It is because mountainous regions are remote, and diets often localized, that so many of their people are confined to foods from their local agro-ecologies, with inadequate iodine content.

Vitamin A deficiency appears to affect many fewer people than the other two main conditions, but is rightly prioritized for two reasons. First, it can have severe and irreversible effects on children; Vitamin A deficiency blinds some 0.3-0.5 million children annually, of whom about two-thirds die [FAO 1997]. Second, though this is still controversial in the scientific literature, many experts argue that full physical and mental functioning require much higher Vitamin A levels than current requirements; if so, many more people are deficient than is suggested by current estimates.

Vitamin A is obtained largely from animal sources in higher-income countries (including Latin America), but elsewhere from selected plant sources: carrots, green leafy vegetables, sweet potatoes and (especially important in Malaysia and West Africa) palm oil. Income increases and resulting dietary diversification have substantially reduced incidence of Vitamin A deficiency in Latin America and most of Asia, but it has worsened in Africa. Biotechnology (gene transfer) offers prospects of breeding 'yellow rice' with high Vitamin A, but here - as with yellow maize, which already exists - there is a problem of consumer resistance to unfamiliar foods. This is less important with calorie deficiency, where 'hunger signals', ill-effects, and cures are more obviously linked - hungry Calcutta residents in the 1960s proved very ready, though traditional rice-eaters, to shift when cheap wheat enabled them to assuage both calorie deficiency and hunger. To obtain similar changes in food habits to tackle micronutrient deficiencies - where the urgency of change is less self-evident - the resources of modern global marketing may be a valuable tool.

Calcium deficiency becomes more important to avoid osteoporosis in developed countries, because work involves less physical activity and because populations are older. In Britain, Dowler and Calvert [1995] show that the poorest of the three groups studied - long-term unemployed council tenants with no annual holidays and rent or fuel bills automatically deducted from benefit - received only 80 per cent of the reference calcium intake, very significantly less than other groups (and barely half the reference intake of iron) [Dowler and Calvert 1995].

5. Food consumption in a world system: globalization and environment

A. Cash crops, commercialization and food security: Food consumption and production in different regions and countries have always been linked. Aspects of globalization are enormously increasing the importance of these links, and hence of commercialization and cash-cropping:

- Production costs and hence prices of food have fallen secularly, but transport and delivery costs have fallen faster - due to continuing technical improvement in transport, containerization and preservation, and to developing countries' rising capacity to process foods. Such trends will continue to increase internationally traded food as a proportion of food consumption.[36]

- The Uruguay Round and related events will also increase this proportion.

- So will rises in per-person output (invariably linked to greater specialization and exchange) and income (leading to rises in the quality and cost of food consumption per unit of weight, and hence in 'tradeability').

- Liberalization of capital flows, unless restrained, will continue to expand investments in franchised, standardised food production and distribution.

- Food consumption and production, population growth, and environmental change are linked through global interactions.

In principle agricultural commercialization and globalization can either improve or damage household food security. HFS improves because trade and exchange permit specialization and use of comparative advantage; tea workers and smallholders in Sri Lanka eat more food staples than would be possible if they grew them on their land instead of high-value tea. HFS suffers to the extent that commercialization - via changing technology or

[36] Periodic rises in fossil-fuel prices, as in 1973-4 and 1978-82, have not proved durable, and are offset by steady fuel-saving in transport, partly through more processing at the point of production.

crop-mix, or greater farm inequality - reduces employment, so that at-risk groups lose income and hence food entitlements; or if food availability is more unstable in the broader marketplace than was the case under local self-sufficiency. When famine threatens, local or global markets allow food *into* a region, or at-risk groups out of it; however, trade (and trade routes) also allow food to move *out* of places where the starving are also penniless, as may have happened in the Irish famine of 1847 and the Bengal famine of 1943 [Sen 1981].

It is an empirical issue: when do cash-cropping, market liberalization, and globalization of agricultural trade improve, and when worsen, the adequacy and stability of nutrition for groups at risk? A review of fourteen studies [de Walt 1993] found seven cases of positive impact on both income and nutrition of the poor; seven of positive impact on their income, not as yet clearly translated into nutritional improvements; and three cases of apparent damage to nutrition, the clearest in an irrigated rice system in Kenya where there was little diversity and where the farmers had almost no control over their cropping patterns. The nutritional advantages of diversity are confirmed by Schofield [1979], a large comparative study of *villages*, showing that those combining cash crops and food crops showed less undernutrition than those concentrating almost entirely on one or other group. Another study showed that in six *countries* commercialization and cash crops were strongly associated with improved income and child nutrition, even among very poor groups [von Braun and Kennedy 1986]. However, most cases involved smallholders with genuine choice to commercialize.

Binswanger and von Braun [1991] stress that much rural commercialization is driven by urbanization at least as much as by globalization. They confirm general gains to income, job security and nutrition from commercialization, but stress three areas of caution: evictions (Kenya and the Philippines), coerced commercialization by plantation owners or governments (parts of Francophone Africa), and replacement of crops traditionally providing prestige and independent incomes for women (Gambia, Rwanda).

In general, the more equal is control over land and assets, the likelier is a wide spread of gains in food consumption and nutrition from marketization. An important example is the frequent recommendation in structural adjustment programmes for devaluation and removal of export taxes. This is marketizing and globalizing, tends to increase specialization on labour-intensive products in developing countries, and helps the poor if they are in net surplus of tradeables - food and especially export crops. But the process may well reduce food entitlements among poor net food buyers if - apart

from facing dearer food - they cannot compensate by growing more cash crops, e.g. for lack of land or water. The risk is greater if the poor also cannot get much extra employment, to compensate for the dearer food; while large farms are not much more likely to respond to incentives for cash-crop expansion than small farms, they are much less likely to do so labour-intensively. Hence - as the Chinese experience of 1977-84 illustrated - land reform is highly complementary to market-orientated structural adjustment as a route to improving HFS among at-risk groups, especially where research and technology for small-scale farms is available.

The basic principle - that HFS gains, in the wake of liberalization and globalization of food consumption and production, are far less likely in very unequal societies - is expressed in different ways. For those whose food insecurity is a rural phenomenon, now (and still probably in 2020) a large majority of those at nutritional risk, the principle points to small-scale land-water develop-ment, redistribution and labour-intensive technical progress. This applies mainly to countries where the workforce is large relative to available land and capital, rapidly growing, and 'underemployed'. In countries with higher levels of capital, land or skills per worker, at-risk groups are mainly urban, and methods of preventing poverty and other causes of exposure to food insecurity are more complex. As in poor and largely rural societies, globalization and commercialization are likelier to advance HFS if production is small-scale and labour-intensive, but - in contrast to those societies - efficiency usually indicates larger-scale firms and labour-saving paths of progress. Also, 'globalization' and market liberalization - while usually raising average income in rich countries (as in poor ones) - tend to increase inequality, by raising the relative rewards to skills and capital. The threats to HFS also become more complex and subtle, concentrating still on the poorer groups, but with much less protein-energy malnutrition relative to micronutrient defic-iencies, overconsumption (e.g. of animal fats and salt), and fibre shortages.

It is tempting to conclude that the new malnutrition, of poorer people in rich societies, will be reduced by globalization if, and only if, such people improve their nutritional education and awareness. However, most of the malnourished (like most smokers and under-exercisers) know what they should do, but are impeded from doing it by the circumstances of relative poverty: distance from appropriate food markets, lack of time or equipment for proper food preparation [Dowler 1997], and income-driven lack of access to the communities of leisure and culture that permit a more long-sighted, diversified approach to eating. Globalized marketing brings an unprecedented range of foods, many health-enhancing, to those who can

reach them and pay for them. Large numbers of those who cannot, even if aware of the effects of bad diets, need a 'quick fix'. To such demand, global marketers of less healthy food, like those of cigarettes, cater. In rich countries, welfare and health interventions may 'pick up the pieces' from inequality-driven malnutrition, if societies choose to afford welfare states and to live with possibly undesired side-effects on incentives. But probably some redistribution is needed to turn the opportunities of globalization into a reliable source of enhanced food consumption and health for poor people in rich but unequal societies [Wilkinson 1996].

How will food consumption, in its impact on human capabilities, be affected by agricultural trade liberalization - EU reforms of the Common AgriculturalPolicy, regional integration, the Uruguay Round? 'Among the most robust results [of many] multicountry models is that increased trade in both manufactures and agriculture occasioned by the new multilateral trade agreements significantly increases .. world economic welfare .. many low-income, food-deficit countries benefit, especially if they .. liberalize their own trade regimes' [Robinson and deRosa 1995]. In brief, access to voluntary trade tends to accelerate growth, and growth tends to reduce poverty. But the tide does not lift all boats; some may be swamped. Immobile people, 'stuck' in areas or products unattractive to those whose income is growing, lose. Artificial overproduction of staples, stimulated by price regimes in developed countries (especially but not only the EU and Japan), will decline as protection and subsidy are reduced, raising world staples prices; this will stimulate production in low-income countries with comparative advantage in staples, but will lead to losses for countries (mainly in Africa) that remain big net food importers. Such losses - in NFS and welfare - should eventually be exceeded by gains from new lines of specialization, but only perhaps after a long and hard transition. As for HFS, poor net food buyers lose from dearer food; only as trade expansion brings extra work are the poor likely to experience net gains. The crucial importance of land and other distribution, in translating extra potential welfare into household food security for those at risk, is clear.

The general concern that trade liberalization will destabilize poor people's household income and hence food consumption, however, appears to be misplaced. Cereals price fluctuation harms the poor most, because staple food looms largest in their budget, and because they suffer most if their food intakes fall. But there is reason to believe that agricultural trade liberalization *increases* food price stability; past protection and subsidies have meant that European producers, in particular, felt little incentive to cut output when world prices rose (or to raise it when they fell).

A more serious concern is the continuing fall in world food stocks as a proportion of consumption, but this may not be related to agricultural liberalization. The Uruguay Round specifically allows floor procurement prices, and limited domestic subsidies, for developing countries' food-security stocks [Islam 1996]. If donors' readiness to supply emergency food aid declines (as, with liberalization, its real cost to donors increases), the need for, and cost of, public grain stocks may rise even further. Already large - India's have sometimes exceeded 30 million tons - they are hugely costly in terms of foregone investment, and in some countries (India, Egypt) have proved an ineffective route to HFS. Yet some public stocks remains a necessary safeguard against bad years in poor countries, unless developing countries take a much cheaper and less distortionary path to year-to-year HFS: forward or options contracts in international cereals markets. So far, however, international institutions, while advocating such contracts, have not guaranteed developing countries against the risk that they might be broken in periods of world food shortage. Pending such guarantees, developing-country governments, concerned for HFS, rightly reject complete reliance on world food markets for HFS, inter alia recalling the food crisis of 1972-4, when harvests were bad in several major food producers at once and staples prices rocketed. As liberalization raises food prices and perhaps cuts food aid, stocks and NFS may increasingly required, though never sufficient, for HFS.

B. Some global system links: meat, population, environment: Many argue that there is a moral and pragmatic 'global food consumption system', i.e. (1) that poor people in developing countries would gain massively, others would lose little or gain, and global environment would improve, if food consumption used fewer resources: specifically, if a smaller proportion of cereals and land were used for meat, agriculture were less dependent on fossil fuel, and calories-per-head shifted from developed to developing countries;
(2) that growth of food consumption, due to growth of population or of income per person, will soon face natural-resource limits [Meadows 1972]. The two claims are linked: the less growth is feasible, the stronger is the case for shifting inputs, claimed to constrain growth, towards countries (or rather people) with currently low, health-threatening calorie intakes.

The second claim is given force by the clear slow-down in, and area limits to, global food *production* growth. Population projections and their impact on food consumption [de Haan and Lipton 1997] underlie IFPRI's baseline

projection for cereals *consumption* growth in 1990-2020 of 56 per cent.[37] Yet cereals production growth slowed from 3 per cent per year in the 1970s to 1.3 per cent in 1983-93 and is projected to grow at 1.5 per cent per year to 2020 'if investments in agricultural research and infrastructure do not fall below the already reduced levels of the 1980s' [Pinstrup-Andersen and Pandya-Lorch 1996: 228]. Absent major breakthroughs in technology, this assumption may be optimistic because of diminishing returns to such investments. These have already saturated many irrigated regions (i.e. brought most farmers' technology close to the sustainable economic yield potential);[38] other arable areas have proved much less susceptible to 'green revolution' yield rises; and arable area expansion is almost over in Asia, and elsewhere is at decreasing yields but increasing cost and environmental hazard. Sen [1981] stresses that food consumption is normally constrained by entitlements, not availability; but Malthus showed how, if growth of grain production was slow relative to population growth, agricultural (and rural non-farm) employment and wages would suffer, threatening the purchasing power of most of the food-poor. This will be worsened because slower cereals output growth would threaten the pro-poor food price trends of the past fifty years - a steady fall of about 0.5 per cent in cereals prices relative to those of manufactures; such food price pressure will be reinforced by reduction of agricultural subsidies (Sec. 5A).

It thus becomes appealing to seek ways to avoid production-environment crunches, yet permit growth in food consumption by the hungry, by *restructuring* food demand or supply. In particular, reducing meat and dairy consumption is attractive. To provide the same amount of calories, it requires 3-7 times as much land as does direct consumption of tortillas, chapatis or bread; so huge gains in calorie availability seem possible by appropriate land use changes. Also, these high land requirements (and food conservation costs) greatly raise price-per-calorie for animal products, from which the food-poor therefore usually derive only small proportions of consumption, relying mainly on cereals, roots and tubers. So the food-poor would gain if land use switched from animal products. So might the rich, whose health problems *may* derive significantly from overconsumption of such products. The case against them is reinforced by many claims of serious health hazards, from antibiotic-resistant bacteria to BSE. Even if each

[37] This would cut the number of malnourished under-fives only from 184 mn to 155 mn.

[38] 'Green revolution' lead areas, such as the Indian Punjab, are facing yield slowdowns or even declines for reasons reflecting classic environmental concerns: lowering of the water-table through groundwater extraction; limits to agrochemicals due to water pollution; micronutrient extraction and depletion as macronutrient fertilisers bring ever-higher yields; build-up of many low-level pest populations tolerant of chemical, and increasingly biological, counter-weaponry [Conway 1997].

case is well handled, which the producer lobby renders unlikely, hazards will recur, because related to intensive production technologies - themselves dictated by the economics of increasingly scarce land and other natural resources, and hence by the resource-intensive requirements of animal production and consumption.

While attractive, the argument is full of holes!
(1) It is hopelessly vague about methods and sequences. As people get richer, most of them *choose* to replace food staples by animal products - even though this choice steadily bids up the excess price-per-calorie of animal products, partly through demand-pull, partly through pushing their production onto less suitable land, or requiring greater intensification, in either case with diminishing returns and environmental stresses. Hence, even if the above changes are desirable, it is necessary to specify how to induce them via changes in incentives, or in policies to affect tastes.
(2) Over two billion people, most poor or near-poor, are at serious risk of anemia. Extra intake of meat almost certainly *raises* their capabilities (fn. 38). Meat intake in 1990-2020 is scheduled to grow by 158 per cent in developing countries, and in developed countries only by 18 per cent [Pinstrup and Pandya-Lorch 1996: 228] - far above the differential in population increase. Making meat scarcer and dearer could well do more harm than good, especially since the poor (who need the extra iron), are most sensitive to price disincentives [Alderman 1984] than the rich (who may be overconsuming animal fats). The argument applies even more forcibly to dairy products.
(3) Although 'filtering' grains through animals is a costly way to use land to feed humans, a growing proportion of farm animals is stall-fed - often on vegetable by-products (including cereal stalks) rather than grain. Many of the remainder are grazed on non-arable or marginal land; converting the latter to cereal uses, as has happened in many parts of Africa, raises employment but threatens, and has sometimes destroyed, soil sustainability.
(4) Though few poor people consume mainly animal foods, many produce them - often symbiotically with cereals (mixed farming systems). Exogenous pressures against animal products would threaten these systems by reducing natural manuring, reducing the value of grain stalks and catch crops, compelling costly and labour-displacing tractorization, or reducing the 'store of val-ue' against bad times that serves so many of the poor as a coping mechanism.
(5) Time [26 Jan 1998: 12; our italics] reports medical research that 'just one serving of fish a week *seems* to cut in half the risk of sudden cardiac death'; that 'fat from fish *may* increase the risk of breast cancer by 69%';

that 'monounsaturated fat [as found in canola] *appears* to cut in half the risk of breast cancer'; and that (e. g. to offset excess animal fat intakes) 'cholesterol-lowering drugs [are] great at correcting bad cholesterol [but] *may* not [stop] heart disease in [the 15 % of] men who have an unusual cholesterol gene'. Artificial, intensive farming - not only of animals - carries new risks; the non-undernourished rightly demand information allowing them to be cautious, as the BSE saga richly proves. But food policy, e. g. towards meat and dairy products, has unintended effects on undernourished consumers and producers; it should not be based on daily-shifting health scares and debates, but on open, participatory, consumer-controlled, science-based decisions at international, national and local level. Given growing globalization, alignment of ref-erees - EU, the USA, the WHO/FAO Codex Alimentarius, WTO - is urgent.

The consumption of animal products has been considered in a little detail. This is not so as to reach firm conclusions. These will vary with time, place, group and value-judgements. The point is to illustrate the complex effects, on human capabilities and their sustainability, of food consumption structures and policies to change them. The central argument remains attractive: it would be splendid if somebody could think of ways to drastically reduce consumption of meat and dairy products among the 'overfed' and to use the freed-up land resources to increase cereals, pulse and legume consumption among the 'underfed'. But the modalities of such proposals are obscure, and where clear often damaging. 'The devil is in the details'.

Similar considerations apply to most of the national and global policy issues raised by the shared wish to achieve levels, compositions and distributions of food consumption that sustainably optimise human capabilities. Yet there is no reason why complexity should induce paralysis; some desirable policy changes are clear. Projections of food consumption and adequacy, undernutrition, and overnutrition, on alternative assumptions, appear in [Rosegrant et al. 1995; Pinstrup-Andersen and Pandya-Lorch 1996; Bhargava and Osmani 1997]. These projections make clear that reduced population growth in most developing countries, renewal of growth rates (much depleted in the 1980s) in agricultural research and investment, and (to a smaller extent) agricultural trade liberalization, are all likely to improve nutritional outcomes as regards undernutrition, overnutrition and sustainability. The mechanism of improvement is much more via food entitlements than via food availability: for instance, faster declines in human fertility improve the nutrition of the undernourished, not mainly by winning some alleged race between population and food consumption, but

by cheapening food staples relative to wage-rates and by reducing mortality associated with very large families.

TABLE 1: UNDERNUTRITION BY REGION

Regions	**Years**	**Undernourished population**			
		1) Caloric[1]		**2) Anthropometri**	
		Population below 1.54 BMR		Wasted [2]	
		nbr (mn)	%	nbr (mn)	%
All developing countries	1969-71	941 (918)	36 (35)		
	1979-81	843 (906)	26 (28)		
	1990-92	781 (841)	20 (20)	47.9	
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
	2010	637	11		
	2020 (baseline scenario)				
East and South-East Asia	1969-71	506 (476)	44 (41)		
(South-East Asia only for column	1979-81	366 (379)	26 (27)		
"underweight", as separate data	1990-92	258 (269)	16 (16)	9.4	
are given for China)	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
	2010	77	4		
China	1980				
	1990				
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
	2020 (baseline scenario)				
South Asia	1969-71	245 (238)	35 (33)		
	1979-81	278 (303)	31 (34)		
	1990-92	265 (255)	24 (22)	26.6	
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
	2010	195	12		

	2020 (baseline scenario)				
Sub-Saharan Africa	1969-71	94 (103)	35 (38)		
	1979-81	129 (148)	35 (41)		
	1990-92	175 (215)	37 (43)	6.1	7
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
	2010	296	32		
	2020 (baseline scenario)				
Middle East and North Africa	1969-71	42 (48)	24 (27)		
	1979-81	23 (27)	10 (12)		
	1990-92	24 (37)	8 (12)	4.4	8.
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
	2010	29	6		
	2020 (baseline scenario)				
Latin America and Caribbean	1969-71	54 (53)	19 (19)		
	1979-81	47 (48)	13 (14)		
	1990-92	59 (64)	13 (15)	1.5	2.
	2010	40	6		
	2020 (baseline scenario)				
Middle America/Caribbean	1980				
	1990				
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				
South America	1980				
	1990				
	2000 (pessimistic scenario)				
	2000 (optimistic scenario)				

Sources: [1] Alexandratos (1995), *The Outlook for World Food and Agriculture to Year 2010*, in Islam, N., Population and food in the early twenty-first century, IFPRI 2020 Vision, Washington D.C., p.33.

Data in brackets from FAO (1996), *The Sixth World Food Survey*, Rome.

[2] FAO (1996), *The Sixth World Food Survey*, Rome

[3] UN ACC/SCN (1992), *Second Report on the World Nutrition Situation*, Washington D.C., vol. 1, p.67; 2020 projections from [Rosegrant et al.1995].

Definitions:- *BMR:* Basal Metabolic rate. *Wasted, Stunted, Underweight:* see notes below Table 2.

- The *pessimistic* scenario applies the worst five-year rate of change over a five year period during 1975-90 to the regional grouping of countries.

- The *optimistic* scenario applies the best five-year rate of change over a five-year period during 1975-90 to the regional grouping of countries (UN ACC/SCN, 1992).

Notes: [1] The threshold level of 1.54 BMR differs across regions; it ranges (Alexandros 1995:.33) from 1,780 calories per day in Asia to 1,985 calories per day in Latin America. Figures in brackets are FAO (1996), and take into account the sex-age structure of the population; the cut-off points used are 1.55 BMR for males and 1.56 BMR for females; the caloric value of the BMR differs from country to country depending on age-structure and adult height and weight.

TABLE 2: UNDERNUTRITION IN SELECTED DEVELOPING COUNTRIES

Countries	**Survey Years**	**Anthropometric status of under 5 children** [1]			
		Wasted	Stunted	Underweight	O
		%	%	%	
East and South East Asia					
China	1987	3.7	32.1	21.3	
	1992	3.4	31.4	17.4	
Philippines	1971/5	8.4	55.1	49.2	
	1982	4.7	42.0	32.6	
	1992	7.3	34.7	33.4	
South Asia					
Bangladesh	1975	n.a.	n.a.	84.4	
	1985/86	15.3	67.5	70.9	
	1990	15.5	64.6	65.8	
India	1977	n.a.	78.6	77.5	
	1989	n.a.	65.1	68.6	
	1992	18.9	61.2	61.0	
Sub-Saharan Africa					
Kenya	1978	5.3	35.4	n.a.	
	1987	4.5	32.2	14.3	
	1993	5.9	32.7	22.3	
Nigeria	1990	9.1	43.1	35.7	

Middle East and North Africa				
Egypt [2]	1978	1.0 (1)	38.8 (39)	16.6 (17)
	1990	3.5 (1)	30.0 (31)	10.4 (11)
	1995	9.7 (4)	21.6 (30)	16.8 (10)
Tunisia [2]	1974	1.3 (1)	39.5 (40)	20.2 (20)
	1988	3.1 (2)	18.2 (21)	10.4 (10)
Latin America and Caribbean				
Brazil	1975	5.0	32.0	18.4
	1989	2.0	15.5	7.0
Mexico	1988	6.3	22.3	13.9
	1989	5.5	35.1	19.0

Sources: [1] FAO [1996: 72, 112]; UNICEF [1993].

Definitions: - *Wasted*: Wasting is a measure of a child's weight-for-height in relation to the median value of the US (NCHS) reference population. The cut-off point used here is -2 S.D. from the median. The figures in the table indicate the prevalence of *total* wasting (moderate and severe).

- *Stunted*: Stunting is a measure of a child's height-for-age in relation to the madian value of a standard reference population. Same cut-off point as above.

- *Underweight*: Underweight is a measure of a child's weight-for-age in relation to the median value of a standard reference population. Same cut-off point as above [UNICEF 1993].

Notes: [2] For most countries, the surveys give anthropometric estimates for children aged 0 to 59 months; in India, the figures relate to the population aged 12-71 months and in Bangladesh 6-59 months. In Egypt and Tunisia, as the surveys refer to different age groups across the years.Age-adjusted trend data (for 0-59 months) are given in brackets, so figures are comparable through time.

TABLE 3: FOOD AVAILABILITY BY REGION

Regions	**Years**	**Dietary ener supply (DES) 2**		**Fat supply 3**	
		Per caput daily calorie supply *(Kcal. per day)*	Average annual ra of growth *(%) (1970 to 1990)*	Total fats *(grams/capita/ day)*	Animal fats *(grams/capita/ day)*
All developing countries	1969-71	2140	0.8	33	12
	1979-81	2330		40	15
	1990-92	2520		51	19
	2020 Baseline	2814			
	2020 Low Pop	2966			
	2020 Low Inv	2656			
	2020 High Inv	2972			
	2020 Trade Lib	2822			
East and South-East Asia	1969-71	2060	1.3	25	10
	1979-81	2370		33	14
	1990-92	2680		51	24
South-East Asia	1990	2555			
	2020 Baseline	2823			
	2020 Low Pop	2976			
	2020 Low Inv	2701			
	2020 High Inv	2932			
	2020 Trade Lib	2832			
China	1990	2667			
	2020 Baseline	3373			
	2020 Low Pop	3470			
	2020 Low Inv	3244			

	2020 High Inv	3575			
	2020 Trade Lib	3379			
South Asia	1969-71	2060	0.5	29	8
	1979-81	2070		32	8
	1990-92	2290		41	11
	2020 Baseline	2600			
	2020 Low Pop	2796			
	2020 Low Inv	2396			
	2020 High Inv	2782			
	2020 Trade Lib	2623			
Sub-Saharan Africa	1969-71	2140	-0.2	41	9
	1979-81	2080		42	10
	1990-92	2040		41	9
	2020 Baseline	2136			
	2020 Low Pop	2301			
	2020 Low Inv	2018			
	2020 High Inv	2229			
	2020 Trade Lib	2120			
Middle East and North Africa	1969-71	2380	1.0	50	18
	1979-81	2850		65	22
	1990-92	2960		70	20
	2020 Baseline	3301			
	2020 Low Pop	3485			
	2020 Low Inv	3079			
	2020 High Inv	3474			
	2020 Trade Lib	3293			
Latin America and Caribbean	1969-71	2510	0.4	57	30
	1979-81	2720		71	34
	1990-92	2740		78	34
	2020 Baseline	3054			
	2020 Low Pop	3166			
	2020 Low Inv	2900			
	2020 High Inv	3216			
	2020 Trade Lib	3038			
All developed countries	1969-71	3190	0.2	108	68
	1979-81	3280		118	73
	1990-92	3350		125	73
	2020 Baseline	3537			
	2020 Low Pop	3630			
	2020 Low Inv	3497			
	2020 High Inv	3604			
	2020 Trade Lib	3519			
Industrialized countries	1969-71	3120	0.4	117	72
	1979-81	3220		127	75
	1990-92	3410		138	76
Transitional economies	1969-71	3330	-0.1	89	61
	1979-81	3400		100	69
	1990-92	3230		98	67

Sources: [1] Data for 1970-1990 from FAO [1996: 11].

[2] Projections for 2020 from Rosegrant et al. [1995].

[3] FAO [1996: 17].

[4] FAO [1996: 16].

[5] FAO [1996: 25].

Notes: [2] The scenarios are described as follows[Rosegrant et al., 1995]:

Low pop.: low-variant growth rate projections of the United Nations

Low Inv.: Low investment, slow growth simulates the combined effect of a 25% reduction in non-agricultural income growth rates and cuts in investment in public agricultural research and social services.

High Inv.: High investment, rapid growth simulates a 25% increase in non-agricultural income growth and higher investment in agricultural research and social services.

Trade lib.: Trade liberalization simulates a full removal of agricultural protection.

[3] and [4] Supply = production + imports + decrease in stocks

TABLE 4: FOOD AVAILABILITY IN SELECTED DEVELOPING COUNTRIES

Countries	**Years**	**Age structure[1]**	**Dietary energy supply (DES)[2]**		**Fat supply[3]**	
		Percentage of 14 years old o total populatio *(%)*	Per caput daily calo supply *(Kcal. per d*	Change over time	Total fats *(grams/capita/d*	Animal fats *(grams/capita/ day)*
East and South-East Asia						
China	1969-71	0.40	1993 (2010)	↗	22.4	9.7
	1979-81	0.36	2324 (2350)		30.8	14.5
	1992-94	0.28[a]	2757 (2710)		58.1	34.2
Philippines	1969-71	0.45	1765 (1770)	↗	33.2	17.7
	1979-81	0.42	2220 (2200)		35.5	16.4
	1992-94	0.37[b]	2371 (2290)		44.2	23.2
South Asia						
Bangladesh	1969-71	0.45	2118 (2120)	↘↗	15.3	4.0
	1979-81	0.46	1914 (1910)		14.1	3.5
	1992-94	0.44[a]	2022 (1990)		20.6	3.6
India	1969-71	0.40	2038 (2040)	↗	29.8	7.1
	1979-81	0.39	2081 (2080)		32.7	8.1
	1992-94	0.35[c]	2397 (2330)		41.8	11.0

Sub-Saharan Africa						
Kenya	1969-71	0.48	2198 (2200)	↘	34.5	13.8
	1979-81	0.50	2151 (2150)		40.7	13.9
	1992-94	0.49[a]	1916 (1970)		43.4	14.5
Nigeria	1969-71	0.45	2267 (2380)	↘↗	51.6	3.6
	1979-81	0.44	2032 (1960)		52.0	5.7
	1992-94	0.45[a]	2588 (2100)		57.6	5.5
Middle East and North Africa						
Egypt	1969-71	0.41	2351 (2510)	↗	47.1	12.7
	1979-81	0.40	2918 (3130)		65.7	17.7
	1992-94	0.39[b]	3228 (3340)		58.5	16.2
Tunisia	1969-71	0.46	2279 (2280)	↗	56.8	11.4
	1979-81	0.42	2818 (2810)		69.4	15.6
	1992-94	0.35[d]	3167 (3260)		91.7	17.4
Latin America a Caribbean						
Brazil	1969-71	0.42	2433 (2460)	↗	46.9	22.0
	1979-81	0.38	2677 (2680)		65.8	27.1
	1992-94	0.33[d]	2797 (2790)		81.0	32.5
Mexico	1969-71	0.46	2706 (2740)	↗↘	57.8	23.1
	1979-81	0.44	3149 (3180)		80.9	37.6
	1992-94	0.36[b]	3053 (3190)		83.6	36
Transitional economies						
Poland	1969-71	0.27	3430 (3470)	↗↘	104.1	84.5
	1979-81	0.24	3521 (3580)		116.8	92.3
	1992-94	0.23[d]	3347 (3340)		112.1	78.1
USSR/Russian Federation	1969-71	0.27	3333 (3320)	↗↘	85.6	59.5
	1979-81	0.22	3370 (3360)		94.3	64.4
	1992-94	0.22[d]	2927 (3190)		81.9	58.8
Industrialized countries						
Germany	1969-71		3137 (3210)	↗	125.1	85.4
	1979-81		3304 (3370)		133.2	91.5
	1992-94		3382 (3410)		143.4	88.3
United States	1969-71		3105 (3230)	↗	122.2	73.1

1979-81	3239 (3360)	131.3	74.7
1992-94	3610 (3700)	142.3	78.9

Sources: [1] UN [1994, 1997a].

[2] and [3]: FAO [1996b]. Data in brackets: FAO [1996].

Notes: [1] a 1990 b 1995 c 1993 d 1994

[2] and [3]: In the Food Balance Sheets, availability of calories, fat and protein are *per inhabitant*; total supply is divided by in-area population within the boundaries of the country.

[2] For each country, figures in brackets are for 1969-71, 1979-81 and 1990-92 (not 1992-94)

TABLE 5: FOOD CONSUMPTION IN SELECTED DEVELOPING COUNTRIES

Countries	**Years and *survey years***	**Total population 1** *(in thousand)*	**Volume of food consum 2** *(kg./capita/year)*			**Composition of food bun** **1) Share of main cereals in tot**		
			Cereals	Meat	Milk	Rice	Wheat	Maize
East and South-East Asia								
China	1961-63	671,434	130.9	4.8	2.4			
	1969-71	816,143	165.9	9.3	2.0	38.2	12.2	8.0
	1992-94	1,175,449	224.2	34.8	5.9	35.4	22.4	7.7
	1985							
	rural							
	urban							
	1990							
	rural							
	urban							
Philippines	1961-63	29,240	122.5	14.1	12.4			
	1969-71	37,537	124.5	16.7	17.2	42.8	6.5	5.8
	1992-94	64,805	156.7	24.5	18.3	39.5	8.4	7.5
	1978		*134.0*	*11.3*	*12.0*			
	1987		*125.9*	*16.8*	*15.7*			
South Asia								
Bangladesh	1961-63	54,065	204.2	3.9	12.2			
	1969-71	66,688	199.6	4.2	11.7	73.9	5.9	0.0
	1992-94	115,233	195.8	3.4	14.1	75.2	8.4	0.0
	1973-74		*169.2*	*2.5*	*10.6*			
	1988-89		*186.1*	*2.3*	*8.1*			
India	1961-63	462,849	156.1	4.3	37.4			
	1969-71	555,009	158.1	4.2	33.6	33.2	15.0	3.4
	1992-94	901,485	178.5	4.9	57.7	32.5	19.2	2.8
	1972-73							
	rural		*182.4*					
	urban		*134.4*					

	1986-87							
	rural		*171.6*					
	urban		*132*					
Sub-Saharan Africa								
Kenya	1961-63	8868	139.2	19.9	68.7			
	1969-71	11,504	145.1	18.6	67.2	0.7	3.9	45.4
	1992-94	26,388	115.7	16.1	80.3	2.1	5.8	40.4
Nigeria	1961-63	44,794	125.0	7.2	3.7			
	1969-71	55,093	111.1	7.9	8.1	1.5	1.6	6.8
	1992-94	105,287	132.9	9.5	4.5	8.8	1.7	5.2
Middle East and North Africa								
Egypt	1961-63	29,291	168.5	11.7	30.4			
	1969-71	35,277	178.6	11.9	33.4	12.4	29.9	19.9
	1992-94	60,314	251.5	19.2	37.6	9.6	36.4	17.3
Tunisia	1961-63	4,376	163.6	13.3	38.7			
	1969-71	5,125	170.4	12.6	49.2	0.1	53.9	0.0
	1992-94	8,570	206.4	19.3	72.7	0.3	52.0	0.0
	1975		*168.5*	*14.9*	*37.7*			
	1985		*157.2*	*17.8*	*40.8*			
Latin America and Caribbean								
Brazil	1961-63	77,179	102.4	28.4	63.6			
	1969-71	95,857	104.7	31.5	66.6	16.0	10.4	8.0
	1992-94	156,483	116.5	54.5	95.6	14.8	11.3	8.1
Mexico	1961-63	39,258	159.7	29.1	59.7			
	1969-71	50,475	169.1	27.4	78.8	1.8	9.8	41.6
	1992-94	90,024	170.9	47.6	105.3	1.3	9.5	35.0
Transitional economies								
Poland	1961-63	30,327	199.8	48.6	214.0			
	1969-71	32,629	193.0	56.0	255.0	0.6	21.1	0.0
	1992-94	38,396	154.6	74.6	204.3	0.3	24.4	0.0
USSR/Russian Federation	1961-63	221,976	208.8	45.2	162.5			
	1969-71	242,923	190.1	52.4	191.5	1.2	32.9	0.1
	1992-94	147,731	159.2	54.3	137.3	1.7	34.6	0.1
Industrialized countries								
Germany	1961-63	74,038	95.5	68.9	175.7			
	1969-71	77,709	97.7	83.0	179.6	0.5	14.6	0.7
	1992-94	80,833	94.0	90.5	227.9	0.7	14.4	1.4

United States	1961-63	186,490	88.0	96.3	263.0			
	1969-71	205,130	83.2	111.8	235.7	1.0	15.1	1.6
	1992-94	261,853	115.0	121.6	254.7	2.0	16.3	2.6

Sources: [1], [2] and [4] FAO [1996b].

[2] and [4] (in italic): FAO [1994].

[3] FAO [1996].

Definitions: [2] and [4] Cereals: wheat, rice, barley, maize, rye, oats, millet, sorghum and others. Meat includes offal; fish includes all seafood.

[3] DES: Dietary Energy Supply

Notes: [1] Population figures are mid-year estimates by the United Nations Population Division.

[2] For this column, figures from the FAO Food Balance Sheets are given, showing 'per caput food *supply'* (and not consumption); indeed, due to a lack of household survey data on consumption over time, we use per caput food supply as approximation to per caput consumption. Nevertheless, for a few countries, data from household surveys have been published; when these data were available, we give them (not theFood Balance Sheet figures) in italic.

[4] For this column, figures from the FAO Food balance sheets are given, showing the share of animal products in total DES (and not in the *actual* calories consumed per capita). Again, when data from household surveys were available, I completed the FAO figures with shares of animal products in the actual average daily calories consumed per capita. The results from the surveys are in italic.

TABLE 6: FOOD EXPENDITURE AND FOOD CONSUMPTION BY EXPENDITURE GROUPS IN SELECTED DEVELOPING COUNTRIES

Countries	Survey years	Area	Deciles / Quintiles of households [1]	Average household size	Share of food expenditure [2]	A co (K
East and South-East A						
China	1985	Rural	Decile 1	5.45	70.6	16
			Decile 10	4.51	43.0	29
		Urban	Decile 1	3.85	59.7	17
			Decile 10	3.14	39.2	25
	1990	Rural	Decile 1	5.5	74.4	18
			Decile 10	4.2	44.7	31
		Urban	Decile 1	4.2	58.4	17
			Decile 10	2.7	42.8	28
Philippines	1985	National	Quintile 1		70.2	
			Quintile 5		48.5	
	1988	National	Quintile 1		68.2	
			Quintile 5		47.0	
	1982	National	Quintile 1	6.6		16
			Quintile 5	5.9		20
	1987	National	Quintile 1	6.3		15
			Quintile 5	5.6		19
South Asia						
Bangladesh	1981/82	National	Quintile 1	3.5	70.1	13
			Quintile 5	8.3	60.8	23
	1988/89	National	Quintile 1	3.6	69.9	16
			Quintile 5	7.8	59.6	25
India	1972/73	Urban	Decile 1	6.4	79.2	13
			Decile 10	2.8	45.8	38
		Rural	Decile 1	6.1	82.4	12
			Decile 10	3.9	61.4	39
	1986/87	Urban	Decile 1		73.5	n.a
			Decile 10		42.3	n.a
		Rural	Decile 1		76.0	n.a
			Decile 10		49.2	n.a
Middle East and North Africa						
Tunisia	1975	National	Quintile 1	6.7	61.3	21
			Quintile 5	4.4	36.8	29
	1985	National	Quintile 1		56.9	20
			Quintile 5		36.0	25
Latin America and Caribbean						
Mexico	1977	National	Decile 1	4.0	94.7	n.a
			Decile 10	6.0	26.3	n.a

1984	National	Decile 1	51.9	n.a
(last quarter)		Decile 10	31.1	n.a

Source: FAO [1993-4].

Notes: [1] In all surveys but China and Mexico, the figures are given by income or expenditure *groups* and not by *deciles/quintiles*; we reclassified the households by deciles/quintiles.

The households in the first decile/quintile are the poorest, the households in the tenth decile or fifth quintile are the richest, in terms of per capita consumption expenditure (China, India), total expenditure (Bangladesh, Tunisia), or total income (Philippines).

[2] Food expenditure as a percentage of household consumption expenditure.

3 The figures are given *per person* (and not per consumer unit or adult equivalent).

TABLE 7: FOOD PRODUCTION BY REGION: *ALL CEREALS*

Regions	**Years**	**Demand for all cereals (total)**			**Annual growth rate of total demand** *(1961-1990) and (1990-2010)*	**Productio all cereals** *tons)*
		Food *(mn. tons)*	Feed *(mn. tons)*	Total use [1] *(mn. tons)*		
All developing countries	1969-71	375	n.a.	492		480
	1988-90	670	160	930		845
	2010	996	n.a.	1,462		1,314
East and South-East Asia	1969-71	173	21	220	4.1 and	216
	1988-90	320	74	435	2.0	419
	2010	424	176	657		635
South Asia	1969-71	106	1	119	2.8 and	116
	1988-90	172	2	196	2.1	200
	2010	271	4	302		292
Sub-Saharan Africa	1969-71	31	1.4	37	2.6 and	36
	1988-90	54	n.a.	63	3.4	54
	2010	110	n.a.	128		109
Middle East and North Africa	1969-71	33	10	54	4.0 and	46
	1988-90	63	32	112	2.6	73
	2010	103	64	190		119
Latin America and Caribbean	1969-71	33	22	63	3.6 and	66
	1988-90	56	45	113	2.4	99
	2010	87	79	134		159
Developed countries	1960-70				2.1	
	1980-90				1.0	
	1990-2000				0.8	
	2000-2010				0.5	
Transitional economies	1960-70				3.7	
	1980-90				0.8	
	1990-2000				-1.2	
	2000-2010				0.4	

Sources: - Figures for *developing* countries from Alexandratos [1995]. Figures for developed countries from Mitchell and Ingco [1995].

Notes: [1] In addition to direct food and feed consumption, 'total use' comprises cereals for seed, industrial nonfood uses and waste.

[2] All figures for developing countries in table 7 are the results of estimations covering 93 developing countries, accounting for 98.5 % of total population in the develping countries; the numbers in brackets are the net imports of *all* developing countries, including those not in the group of 93, some of which are sizeable importers, though minor producers (Taiwan).

[3] The self-sufficincy ratio is production / total use

Regions	Years	Growth rat in foodgrai production *(average annual)*	Growth rat in producti of meat *(average annual)*	Growth rate in productio of milk *(average annual)*	Growth r irrigated *(average annual)*
All developing countries	1961-71				1.52
	1971-81				1.5
	1982-90				0.87
Asia	1966-74	3.21	4.01	2.85	
	1974-82	2.61	4.57	4.38	
	1982-90	0.87	6.17	5.21	
Far East	1961-71				1.08
	1971-81				1.62
	1982-90				1.43
China	1961-71				2.95
	1971-81				2.03
	1982-90				0.94
Sub-Saharan Africa	1966-74 (1961-71 for area)	2.6	1.57	0.98	0.88
	1974-82 (1971-81 for area)	1.49	2.88	3.1	3.24
	1982-90	1.86	3.32	2.75	1.71
Middle East and North Africa	1966-74 (1961-71 for area)	1.99	3.47	1.84	0.80
	1974-82 (1971-81 for area)	2.26	4.58	3.32	0.24
	1982-90	3.64	3.06	0.88	1.13
Latin America and Caribbean	1966-74 (1961-71 for area)	2.11	2.87	3.7	0.81
	1974-82 (1971-81 for area)	2.02	4.01	2.33	1.38
	1982-90	0.65	2.41	1.82	0.46
All developed countries	1966-74 (1961-71 for area)	2.03	3.18	1.1	1.79
	1974-82 (1971-81 for area)	1.29	1.96	1.06	3.05
	1982-90	0.19	1.69	0.55	0.81
Former Soviet Union	1961-71				1.97
	1971-81				5.05
	1982-90				1.89

Sources: - Agcaioli et al. [1995]; columns 6 and 7 from Oram and Hojjati [1995].

TABLE 8: MICRONUTRIENT DEFICIENCIES BY REGION

Regions[4] (WHO and UN regions)	**Years**	**Population at risk and affected by micronutrient malnutrition**					
		Iodine[1] deficiency disorder *(millions)*		**Vitamin A[1]** deficiency *(millions pre-scool children*		Vitamin A supply [2] (RE/caput/ day)	**Iron[1]** defici anae *(milli*
		At risk	Affected (goitre)	At risk	Affected (xe-rophtalmia)		
World	1988						
	1991	1005	225	190	13.8		2150
	latest	1572	655	228	3.1		
All developing countries	1988						
	1985-90						
Africa[a]	1988						
	1991	150	39	18	1.3		206
	latest	181	86	31	1.0		
Sub-Saharan Africa[b]	1970					1043	
	1980					970	
	1975-85						
	1985-90						
	1990					922	
Middle East and North Africa[a, b]	1970					527	
	1980					704	
	1975-85						
	1985-90						
	1990					851	
	1991	33	12	13	1.0		149
	latest	173	93	18	0.2		
South East Asia[a]	1991	280	100	138	10.0		616
	latest	486	176	123	1.7		
Asia (other countries, including China)[a]	1991	405	30	19	1.4		1058
	latest	423	141	42	0.1		
South Asia[b]	1970					411	
	1980					472	
	1975-80						
	1985-90						
	1988						
	1990					542	
South-East Asia[b]	1970					283	
	1970-80						
	1980					470	

	1985-90						
	1988						
	1990					700	
China[b]	1970					820	
	1980					845	
	1985-90						
	1990					966	
Latin America[a]	1988						
	1991	55	30	2	0.1		94
	latest	168	63	14	0.1		
Middle America /	1970					567	
Caribbean[b]	1980					661	
	1970-80						
	1985-90						
	1990					731	
South America[b]	1970					645	
	1980					686	
	1970-80						
	1985-90						
	1990					714	
All industrialized countries	1988						
North America	1988						
Europe	1988						
	1991	82	14	-	-		27
	latest	141	97	-	-		
USSR	1988						

Sources: [1] Figures for "latest" from FAO [1997]
Figures for 1991 from FAO/WHO [1992]

[2] Data from ACC/SCN [1992, vol. 2: 105]

[3] Data for 1985-90 and 1975-80/85, ACC/SCN [1992, vol. 1: 43]; for 1988, WHO [1992].

Notes: [1] Xerophtalmia (drying of the eye) is a general term for all eye signs of severe vitamin A deficiency, including blindness [World Bank 1994]

[3] [a] Proportion and number with haemoglobin below 11 g/dl.

[b] Proportion and number with haemoglobin below 12 g/dl.

[4] [a] Follows WHO classification of developing countries,into 5 regions: (sub-Saharan) Africa; Middle East and North Africa; South East Asia (Bangladesh, Korea, India, Indonesia, Mongolia, Myanmar, Nepal, Sri Lanka, Viet Nam and Thailand); Asia (other countries) (comprises Cambodia, China, Laos, Malaysia, Philippines and Singapore); Latin America.

[b] Follows UN classification of developing countries. UN regions are: sub-Saharan Africa; Middle East and North Africa; South Asia; South East Asia (not identical with the WHO region of South East Asia); China; Middle East; Central America/Caribbean; South America.

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Population at risk and affected by micronutrient malnutrition

Iodine[1] deficiency disor *(millions)*		**Vitamin A**[1] deficiency *(milli pre-school children)*		Vitamin A supply [2] (RE/caput/ day)	**Iron**[1] deficiency or anaemia *(millions)*	Prevalence of anaemia in women (15-49 years old) *(% and millions*		Iron supply[2] (Mg/caput/da				
At risk	Affected (goit	At risk	Affected (xerophtal-mia)					Pregnant[a]		Non-pregnant[b]		
								%	mn	%	mn	
1005	225	190	13.8				2150	51	58	35	399	3
1572	655	228	3.1									
								56	56	43	364	4
								51	50	41	320	4
150	39	18	1.3				206	52	11	42	48	4
181	86	31	1.0									
						1043						
						970						
										37		
								50	6	40	35	4
						922						