

Undernourishment around the world

Reductions in undernourishment over the past decade

FAO's latest estimates indicate that, in 1997-99, there were 815 million undernourished people in the world: 777 million in the developing countries, 27 million in transition countries and 11 million in the industrialized countries.

For the developing countries, the latest figure represents a decrease of 39 million since 1990-92 (the benchmark period used at the World Food Summit), for which the revised figure is 816 million undernourished.¹ This means that the average annual decrease now stands at about 6 million people.

Clearly, there has been a slowdown in the reduction of undernourished in the world. As a consequence, to achieve the World Food Summit goal of halving the number of undernourished in developing countries by 2015, the average annual decrease required is no longer 20 million but 22 million – well above the current level of performance.

The overall decline in the number of undernourished in the developing regions hides contrasting trends in different countries: only 32 of the 99 developing countries studied recorded a decrease in their numbers of undernourished between 1990-92 and

1997-99. The total reduction achieved by this group amounted to 116 million people. This compares with a total increase of 77 million recorded for the countries in which the number of undernourished rose. Because the first group includes several large countries, such as China, Indonesia and Thailand in Asia and Nigeria in Africa, the total reduction achieved outweighed the total increase in the second, numerically larger group of countries. Hence the net reduction of 39 million [see Figure 3].

Thus, the number of undernourished has increased considerably in the majority of developing countries. (This analysis excludes Ethiopia and Eritrea, which were not separate countries in the early 1990s. It also excludes the nine developing countries in which less than 2.5 percent of the population was undernourished in 1990-92.)

When the number of undernourished is considered as a proportion of a country's total population, instead of in absolute terms, the picture is somewhat different. The proportion actually fell in the majority (58) of developing countries (see Figure 2). However, this finding should not be interpreted too

optimistically, since in 18 of these countries the fall coincided with a rise in absolute numbers. The decrease in the proportion of undernourished in these countries has not been sufficient to offset the effect of population growth. Continuing rapid rises in the number of mouths to feed imply further difficulties in meeting the World Food Summit target.

¹ FAO's estimates are revised annually as more information becomes available.

Figure 2. Proportion of population undernourished in developing countries, by prevalence category, 1990-92 and 1997-99

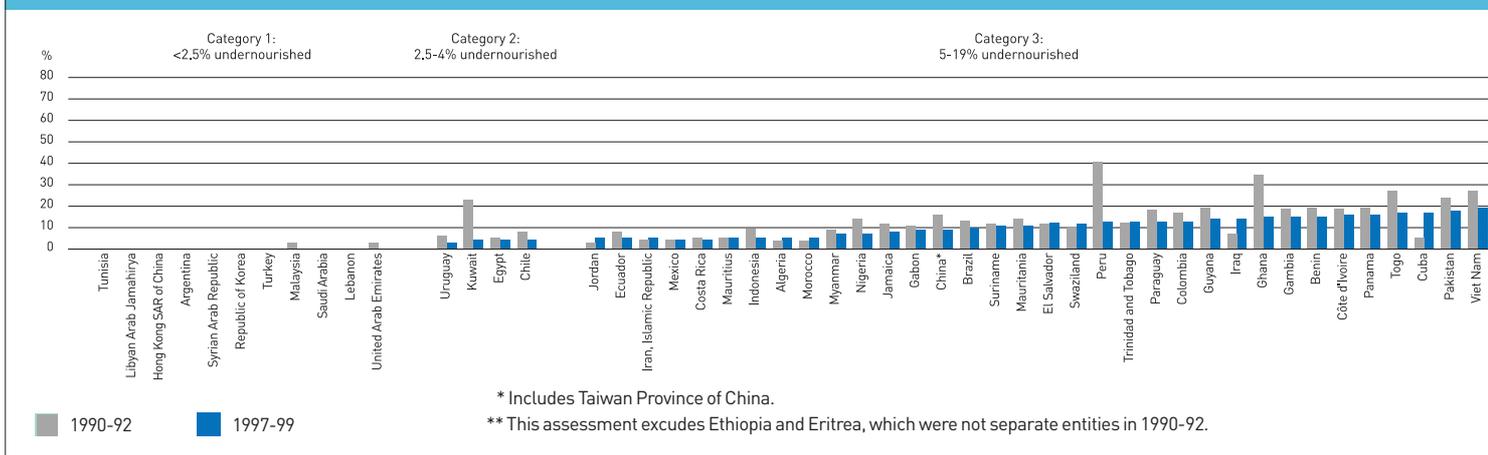
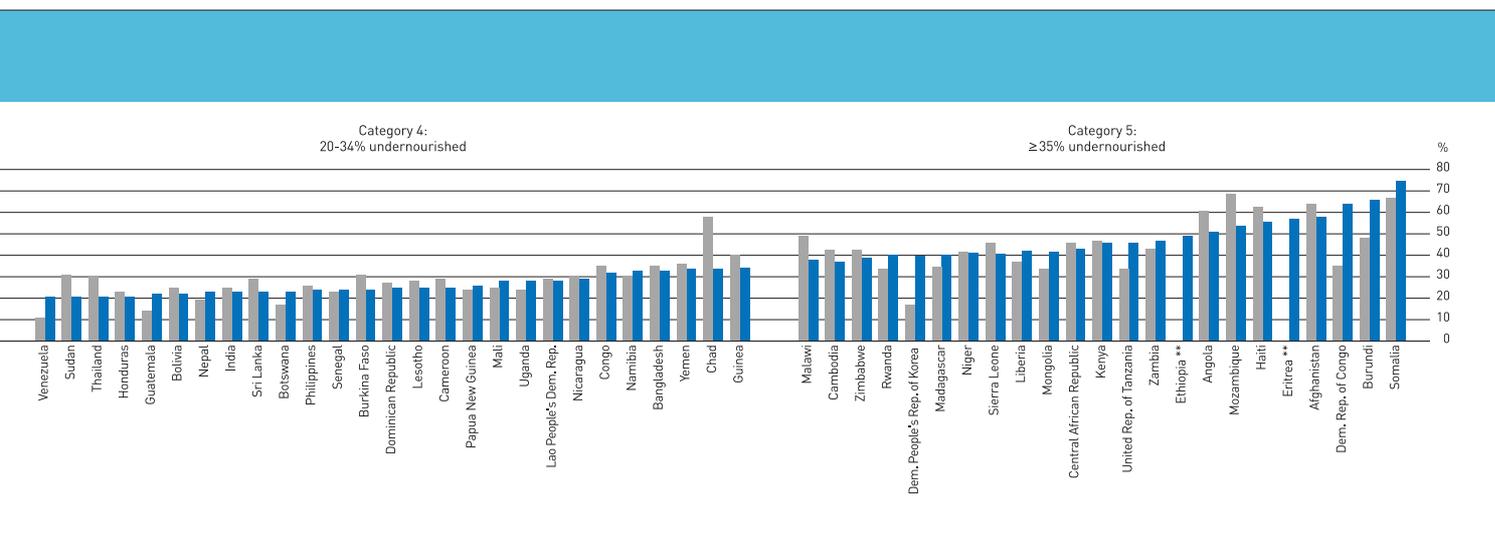
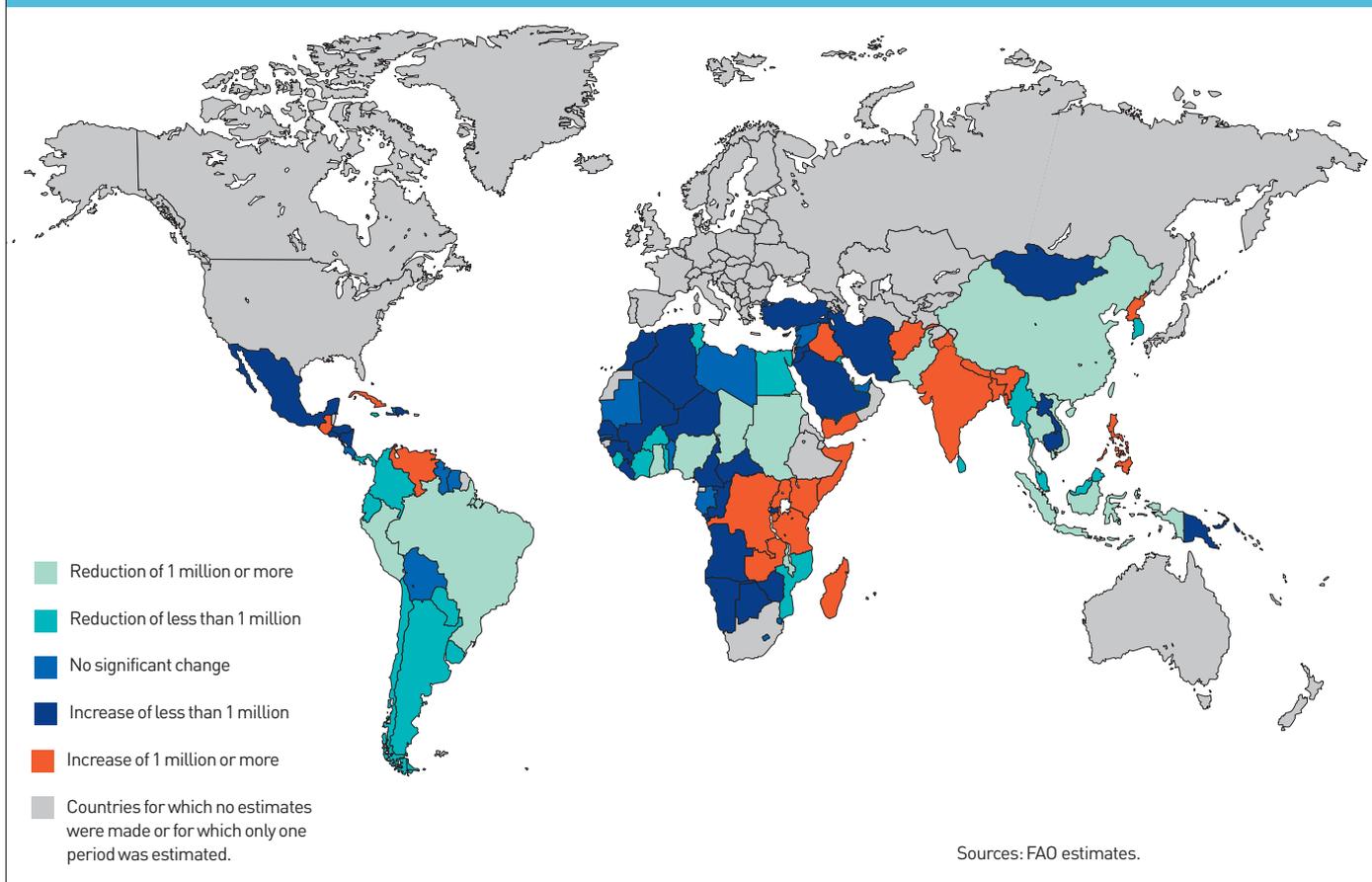




Figure 3. Degree of food deprivation: changes in the number of undernourished between 1990-92 and 1997-99



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Individual country performances

The overall progress achieved in decreasing the number of undernourished in the developing world between 1990-92 and 1997-99 hides sharply contrasting trends in individual countries. Some countries have made outstanding progress, while some have moved forward more slowly or stood still. Still others, however, have suffered reverses, in most cases moderate but occasionally severe.

Countries that perform well may do so by following one or more routes. They may have devoted more resources to increasing agricultural production – the best option for the purposes of increasing economic growth and, if small farms and poor consumers are able to participate and benefit, for creating a more equitable society. Alternatively, they may have imported large amounts of food, either purchased on international commodity markets or received as food aid. Countries afflicted by long-standing civil wars or recent short-term shocks may achieve better than anticipated

performances by the latter route. In addition, a good performance may reflect a recovery from a previous period of poor performance – for example, a sharp reduction in the proportion of undernourished as agriculture recovers after the end of a civil war. The reverse is also true in the case of negative performances.

Best and worst performers

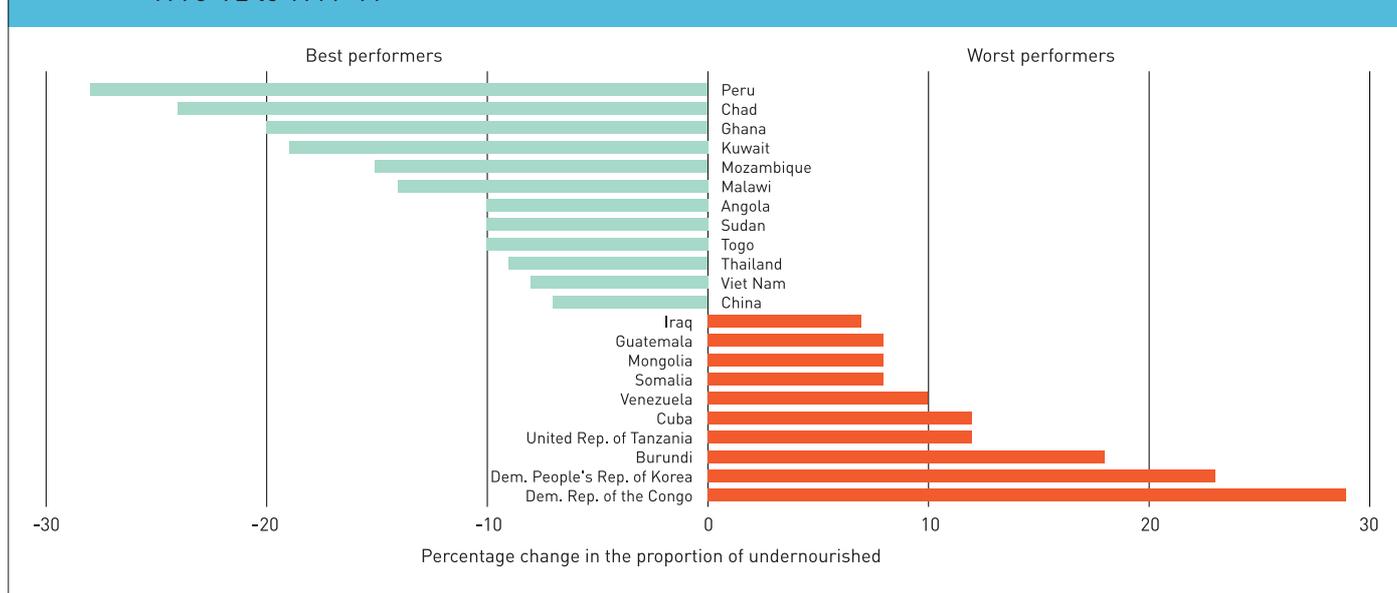
All other things being equal, changes in a country's number of undernourished will be proportional to the size of its population – the larger the population, the larger the increase or decrease that may be expected. But population also plays a confounding role in the statistics on undernourishment. While a rise in the proportion of undernourished implies a rise in their absolute number, a decline in the proportion does not necessarily imply a fall in number. A high population growth rate, for example, may result in absolute numbers increasing. Thus, changes in the proportion of undernourished provide a measure of performance that is

independent of the influence of population growth.

Analysed on this basis, 12 countries may be singled out as "best performers", i.e. they reduced their proportion of undernourished by more than one percentage point per year from 1990-92 to 1997-99. At the opposite extreme, there are ten countries that may be classified as "worst performers", since their proportion rose by more than one percentage point per year [see Figure 4]. The inclusion of some countries on this list at first seems counterintuitive. For example, today it might seem surprising that the Sudan is on the list of best performers. However, the data reflect changes between two periods, one centred on 1991 and another on 1998, so the current drought in the war-torn Sudan may not yet be manifested in the data.

The best- and worst-performing countries are found in all developing regions, including sub-Saharan Africa, where the proportion of undernourished in the total population is highest. In fact,

Figure 4. Countries with the largest reductions or increases in the proportion of undernourished, 1990-92 to 1997-99





seven of the best performers and four of the worst performers are in sub-Saharan Africa. This partly reflects the extreme diversity of production responses to different and rapidly changing agro-ecological conditions and policy environments in the region.

However, in the majority of these African countries, the proportion of undernourished was very high in 1990-92 and, even in the case of best performers such as Chad, Mozambique, Malawi and Angola, the proportion remained high in 1997-99. Because of their high population growth rates (3.2 percent per annum), Mozambique and Angola did not manage to reduce their number of undernourished significantly, despite their good performance. This underscores the role of high population growth in curbing reductions in the number of undernourished.

Although the results are influenced by the absolute size of national populations as well as their growth rates, the number of people added to or subtracted from the total number of undernourished does affect the overall rate of progress. The ten highest-ranking positive and negative contributors in terms of adding or subtracting millions of people to or from the world total are shown in Table 1. A number of comments are in order concerning the changes in numbers at the country level:

- Countries marked with an asterisk in Table 1 also appear on the list of best or worst performers in terms of percentage change over the seven-year period.
- The effect of a substantial population size is illustrated by India, where the percentage of undernourished is estimated to have declined from 25 to 23 percent but the number of undernourished rose by 11 million, owing to rapid population growth.
- The severe impacts of civil war and politico-economic crises are

Table 1. Countries contributing most significantly to changes in the number of undernourished, 1990-92 to 1997-99

DECREASES			INCREASES		
Country	Number (millions)	Percentage of total	Country	Number (millions)	Percentage of total
China	76	66	* Dem. Rep. of the Congo	17	22
* Peru	6	5	India	11	14
Indonesia	5	4	* United Rep. of Tanzania	6	8
Nigeria	4	3	* Dem. People's Rep. of Korea	5	6
* Thailand	4	3	Bangladesh	5	6
Viet Nam	4	3	Afghanistan	3	4
Brazil	3	3	* Venezuela	3	4
* Ghana	3	3	Uganda	2	3
Pakistan	2	2	Kenya	2	3
* Sudan	2	2	* Iraq	2	3
All others	7	6	All others	21	27
Total	116	100	Total	77	100

* Also included in the ten best and worst performers in terms of percentage change.

illustrated by the listing of the Democratic Republic of the Congo, the Democratic People's Republic of Korea, Afghanistan and Iraq among the worst performers. In these countries (three of which are classified as worst performers in terms of proportional change) there has been a considerable increase in the number of people suffering from undernutrition and other forms of deprivation. The explanations across these four cases of human tragedy vary, but all involve civil war or extreme problems in the functioning of the political economy.

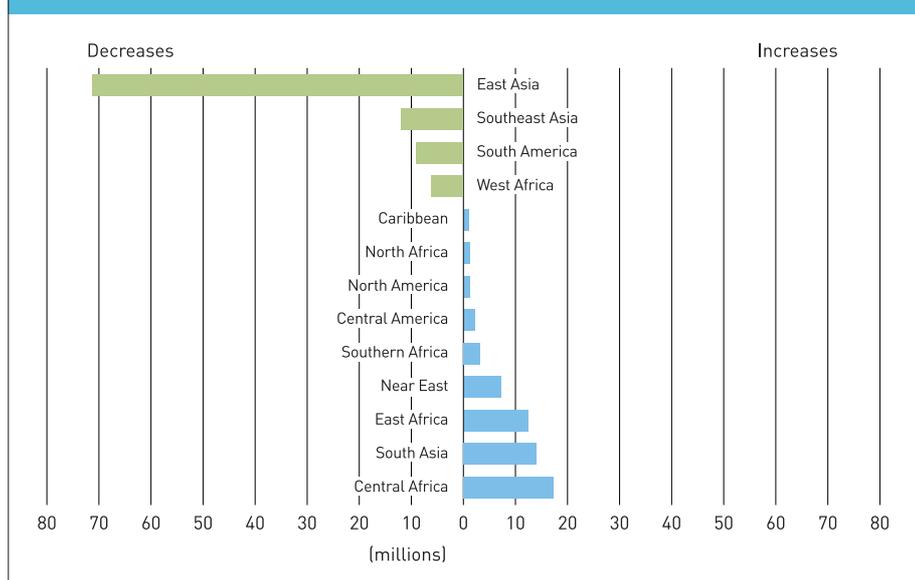
- Among the 98 countries analysed, the two extremes of performance are represented by China, a country that achieved stunning aggregate

economic growth in the 1990s and a socio-economic transformation rivaling that of Southeast Asia in the 1970s and 1980s; and the conflict-stricken Democratic Republic of the Congo, a potentially very rich country which has seen its proportion of undernourished grow from 35 percent in 1990-92 to 64 in 1997-99. It should be noted that, despite China's good performance, the country is still home to the world's second largest number of undernourished people after India.

- The effect of the larger countries is very noticeable when the additions and subtractions are aggregated (in millions) across the 12 subregions, as shown in Figure 5.

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Figure 5. Changes in numbers of undernourished by region, 1990-92 to 1997-99



Role of population growth and agricultural development

As already indicated, the majority of developing countries suffered significant increases in their absolute number of undernourished. This is a worrying trend, masked by the much better performances of a few.

Given population growth, reversing the

trend requires either faster growth in per capita food availability or more equitable access to food – or a combination of both. The relative importance of these two avenues to reducing undernourishment, however, varies with the specific situation of a country and various prevailing factors at a particular point in time. Where there is severe undernutrition among the very

poor, however, governments and their partners in the international community need to intervene directly through a variety of safety net programmes.

Table 2 presents the population, food availability and production growth rates for two groups of countries – those in which the number of undernourished increased significantly and those in which it declined from 1990-92 to 1997-99.

As expected, the first group had a far higher population growth rate and a much lower growth rate in per capita food availability than the group with a decline in numbers of undernourished.

Furthermore, in the first group, per capita food and agricultural production growth rates were both much lower than those of the second group, which highlights the vital role of agricultural development in promoting faster growth in food availability.

Finally, Table 2 also provides information on changes in the domestic and external resources allocated to agriculture, again corresponding to these two country groupings. Domestic resources directed to agriculture are represented by the total net value of capital stock in agriculture, i.e. livestock, tractors, irrigation works, land improvements, permanent crops and so

Table 2. Growth in food supply, production and resources directed to agriculture compared with changes in the number of undernourished

Country grouping	Average annual growth rate from 1990-92 to 1997-99				Change from 1990-92 to 1997-99	
	Total population	Per capita dietary energy supply	Per capita food production	Per capita agricultural production	Net capital stock in agriculture per worker	External assistance to agriculture per worker
	(%)	(%)	(%)	(%)	(US\$)	(US\$)
1. Countries where the number of undernourished increased significantly	2.1	0.1	0.4	0.4	-65	-14
2. Countries where the number of undernourished decreased significantly	1.4	1.4	3.8	3.4	118	-1



on. The annual change in this value reflects national investment in agriculture. External resources (external assistance) directed to agriculture are the commitments made by the multilateral and bilateral donor agencies that support agricultural development. In countries where the number of undernourished has increased and the growth of per capita food and agricultural production has been very low, capital stock as a ratio of the number of workers in agriculture has in fact decreased, while it has risen in the group where the number of undernourished has decreased. On the other hand, the level of external assistance to agriculture, expressed as a ratio of the number of workers in agriculture, has decreased in both groups – but the decline was larger in the first group. This suggests that this group’s poor performance can be attributed to inadequate resources devoted to agricultural development.

The contrast regarding the change in resources directed to agriculture emerges more sharply when the group of best performers are compared with the worst performers (as shown in Table 3).

Clusters of variables

In preliminary analyses, two clusters of variables have been identified as being very significantly related to changes in the prevalence of undernourishment:

- i) variables that reflect extreme national shocks (as measured by the frequency of food emergencies, loss of civil rights and declines in life expectancy);
- ii) variables that reflect growth in agricultural productivity.

In other words, there is a strong inverse relationship between the occurrence of shocks (whether caused by natural or by human-induced disasters) and progress in reducing the number of undernourished, and there is a strong correlation between increased

Table 3. Changes in resources directed to agriculture in the best- and worst-performing country groupings, 1990-92 to 1997-99

Country grouping	Net capital stock in agriculture per worker (US\$)	External assistance to agriculture per worker (US\$)
Best performers	88	5.3
Worst performers	-158	-31.0

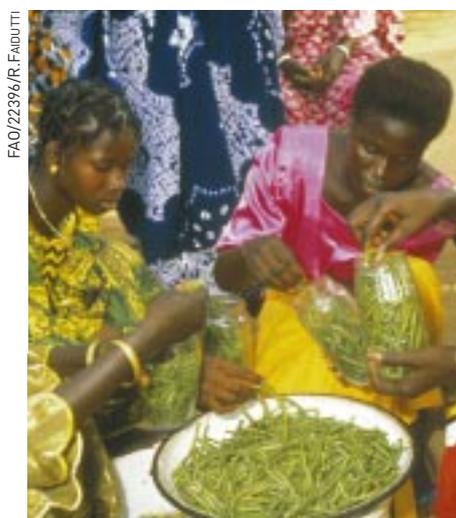
agricultural productivity and reductions in the number of undernourished.

Further reinforcing this balanced view of how undernourishment can be reduced is a recent study by the International Food Policy Research Institute (IFPRI), which examines the relationship between a variety of factors and reductions in the number of underweight children in 63 developing countries between 1970 and 1995. The study indicates that the statistical explanation of lower numbers of underweight children centres on the following proportional determinants:

- level of women’s education (43 percent);
- national per capita food availability (26 percent);

- health and environmental factors (19 percent);
- women’s status in society (12 percent).

In conclusion, attempts to seek one simple cause for either good or bad performances are not very useful. The power of just a few variables to explain change in highly diverse, and indeed unique, national situations is limited. FAO’s analyses show that food production and access to food are important, but they are not the only factors at work. Civil wars and other extreme shocks help to explain the situation in a subset of countries, but the findings here may reflect the presence or absence of food aid as well as the resilience of agriculture sectors under stress. It is possible to speculate that women’s education and levels of basic health may be more important in countries with more stable circumstances. It is vital for such analyses to be conducted not merely internationally but within individual countries, using reliable baseline data and deploying the resources necessary to monitor and evaluate changes in key indicators over time.



Women bottling beans

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Towards more equal access to food

A lack of means to gain access to food is a major source of deprivation for poor people, especially in urban centres but also in land-scarce rural areas. Has the world made progress in improving access and reducing the gap between the abundant and varied diets of the rich and the meagre fare of the poor?

Over the past three decades, world food production has grown faster than population. Between 1969-71 and 1997-99, the amount of food available per capita per day rose from 2 410 to 2 800 kcal in the world as a whole, and from 2 110 to 2 680 kcal in the developing countries.

The remarkable growth in food availability achieved in the developing countries more than halved the proportion of undernourished in the total population from 37 percent in 1969-71 to 17 percent in 1997-99. This decrease was not sufficient, however, to halve the absolute number of undernourished in the developing world, estimated to be 956 million in 1969-71

and still as high as 777 million in 1997-99, FAO's latest three-year average estimate.

Clearly, world food production must continue to grow if the 1996 World Food Summit target of halving the number of undernourished by the year 2015 is to be met. In theory, a smaller increase in production would suffice if its growth were accompanied by more equitable access to food. This could be achieved through redistribution – of food itself, of the means of producing it or of the purchasing power needed to buy it – to those currently on the lower rungs of the food access ladder.

Inequality of access to food can be measured among, as well as within, countries and among households as well as among household members:

- Measuring access among countries provides an indicator that is useful in the international political arena, since it enables countries to position themselves for negotiations in such areas as debt reduction, capital

transfers and trade status. It also helps countries assess their relative performance in terms of national agricultural and economic development.

- Measuring equity among households within countries is useful for assessing progress made in overcoming inequities among different population groups, and in identifying regions or social strata that are particularly at risk from undernutrition.
- Regarding equity of food access among household members, there can be enormous variations within countries, influenced by a variety of socio-economic and cultural practices and traditions. In some cases, intrahousehold access is very equitable. When it is not, clear patterns of malnutrition for certain age and gender groups may emerge. This form of inequality can be dealt with by specific resource transfer and/or nutrition education programmes, which must be carefully organized to be consistent



Vendors at a fish market display their produce

FAO/16216/L-SPAIN/NTA



Table 4. Changes in distribution of dietary energy supply and resulting Gini coefficients between 1969-71 and 1997-99

DES categories (kcal/capita/day)	1969-71		1979-81		1990-92		1997-99	
	Number of countries	Population (%)						
Less than 1900	16	6.9	11	2.2	13	3.0	7	2.7
1900-2100	26	41.8	12	20.4	13	4.3	17	3.5
2100-2300	35	11.0	42	13.6	23	7.0	21	5.2
2300-2500	27	5.9	15	24.8	23	21.2	18	23.1
2500-2700	12	5.3	16	3.8	21	7.0	21	3.4
2700-2900	8	3.2	19	7.3	15	28.5	18	11.7
2900-3100	10	8.2	16	4.1	14	5.0	16	31.5
3100-3300	16	7.1	11	9.6	18	11.4	19	5.6
3300-3500	8	10.4	12	11.3	7	3.0	12	5.7
3500 or more	1	0.2	5	2.8	12	9.5	10	7.5
TOTAL	159	100.0	159	100.0	159	100.0	159	100.0
Gini coefficient		0.116		0.105		0.091		0.089

with international behavioural and national cultural norms.

The assessment of changes in the inequality of access to food among and within countries – the focus of this section – is undertaken using the Gini coefficient, commonly adopted in distributional analysis. The Gini coefficient theoretically ranges from zero, implying an equal distribution among the units under consideration (countries or households in our case), to 1, implying absolute inequality – in other words, concentration in a single unit. The more the coefficient departs from zero, the more unequal the distribution.

Unequal access among countries

For this report, the Gini coefficient has been derived for inequality of access to

food among selected countries classified according to ten per capita DES categories. Calculation of the coefficient was based on the proportion of the world's population in the different categories between 1969-71 and 1997-99 (see Table 4).

The Table shows that access to food among countries is not very unequal: the Gini coefficient is around 0.10. It also shows that there has been a continuous decline in this form of inequality over the last three decades. At these levels of inequality, the declines over 27 years are significant, although they appear to be slight. This reflects the fact that more countries have shifted from lower to middle DES categories than from middle to higher DES categories. For example, between 1969-71 and 1997-99, the number of countries shifting out of the three lowest categories was 32, whereas

only 16 shifted into the three highest categories. From this bunching effect, it may be concluded that the growth in world food availability since 1969-71 has indeed been accompanied by a redistribution in favour of countries that previously had a low per capita food availability.

Unequal access among households

Intracountry inequality of access to food is due mainly to differences in income or purchasing power among households. The best and most direct way of assessing this kind of inequality is to look at data on food consumption for households in different income classes. However, few such data sets exist, and those that do are mostly one-off snapshots rather than data series showing changes over time. However,

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Prevalence of undernourishment *vis-à-vis* poverty

FAO's measure of the prevalence of undernourishment is based on the distribution of household food consumption and availability, whereas the measure used by the World Bank to estimate the prevalence of extreme poverty is based on the distribution of household expenditure on consumables. There is a positive and close relationship between food consumption and expenditure on consumables in low-income households. Furthermore, calculations of the inequality in the distribution of household food consumption and availability have in many cases been derived from data on inequality in the distribution of household income and expenditure, so the two separate exercises may be expected to produce similar results. To ascertain whether or not this is so, FAO country estimates of the prevalence of undernourishment have been aggregated to correspond to the World Bank's regional estimates of the prevalence of extreme poverty. The results are in the Table below.

In all but one case, the estimates for extreme poverty are higher than those for undernourishment. The exception is the Near East and North Africa, where the prevalence of extreme poverty is estimated to be only 2 percent compared with 7.7 percent for undernourishment. This anomaly reflects the weaknesses in both of the organizations' approaches when they are applied at low levels of prevalence.

In FAO's estimates, food consumption is expressed in terms of dietary energy, and people in households consuming less than a certain minimum energy requirement are considered to be undernourished.

The minimum daily requirement, which takes into account the calories needed to maintain body weight while performing light activity, varies from country to country but is approximately 1 900 kcal per capita, depending on age, sex and average height.

In the World Bank's estimates, expenditure on food and non-food consumables is expressed in terms of the International dollar, adjusted for purchasing power parity (PPP). People living in households with a per capita expenditure of less than PPP \$1.08 per day are considered to be living in extreme poverty. The PPP \$1.08 poverty line is obtained as the median of the ten lowest national poverty lines of the 33 calculated by the World Bank. National poverty lines take into account the value of the basic food basket, which also involves estimates of energy requirements. These refer to the average requirements, which are approximately 2 200 kcal per capita per day.

Therefore, the international poverty line used by the World Bank for defining extreme poverty relies on a higher food consumption level than that used in the FAO definition of undernourishment. This explains the general tendency for the World Bank's estimates of extreme poverty to be higher than FAO's estimates of undernourishment. It also reinforces the already widely shared belief that the undernourished are found largely among the poorest of the extreme poor. Hence combating undernourishment implies combating the most extreme conditions of poverty.

Prevalence of undernourishment compared with extreme poverty in selected regions

Region	Prevalence of undernourishment [1997-99] (Percentage of population)	Prevalence of extreme poverty [1998] ¹
East Asia	9.7	15.3
South Asia	23.6	40.0
Sub-Saharan Africa	27.8	46.3
Eastern Europe and Central Asia	4.2	5.1
Near East and North Africa	7.7	2.0
Latin America and the Caribbean	10.6	15.6
TOTAL	15.0	24.0

¹Source: S. Chen and M. Ravallion. 2000. *How did the world's poorest fare in the 1990s?* World Bank Policy Research Working Paper No. 2409. Washington, DC.



A variety of fruit and vegetables for sale in a covered market

FAO/21032/R, FAO/111

there are data on the distribution of household income and expenditure for a significant number of developing countries. Furthermore, time series of Gini coefficients relating to these data are also available. As unequal access to food among households is determined largely by income inequalities, changes in the latter can serve as a proxy for changes in household access to food.

Comparable data on income distribution were examined for 23 countries in Latin America, Africa and Asia, covering the period 1970-1993.¹ Based on this study, the following observations may be made:

- Intracountry income inequality is much greater (Gini values ranging from 0.25 to more than 0.55) than intercountry inequality in food distribution (approximately 0.09 to 0.12 as in Table 4).
- Across countries, the period-to-period changes in the coefficient are rather small, with no indication of either an increasing or a decreasing

trend across all or even a significant minority of countries. In countries that have experienced rapid growth, all income classes tend to move up together, with little change in the distributional pattern.

The share of food in household expenditure declines with rising income. In addition, there are upper and lower limits to food consumption (expressed in kcal), whereas this is not true in the case of incomes. This means that actual changes in access to food, as opposed to income, will tend to be smaller than those that can be detected from the analysis.

It can therefore be deduced that, over time, real changes in the equality of interhousehold food consumption have tended to be very small, if at all perceptible. This is why countries need to organize special programmes to help raise the level of disposable income of people in the lowest income classes, which have the highest rates of undernutrition.

In conclusion, although there has been a consistent decline in the inequality of access to food among countries in the world (see Table 4), no similar trend is discernible among households within the developing countries.

¹ The data were obtained from the World Income Inequality Database (WIID), maintained by the United Nations University of the World Institute for Development Economics Research in Helsinki.