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**Theme 1: Deepening the Analysis of the Factors  
Behind Progress Towards WFS Targets**

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**Technical Paper 1**

**Deepening the Analysis of the Factors Behind  
Progress Towards WFS Targets**

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September 2001

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Lawrence Haddad, July 2001.

## **Executive Summary**

This paper undertakes a systematic analysis of the factors behind the rate of progress towards World Food Summit targets. In summary, it:

- describes changes in numbers of 'undernourished' 1990-2 and 1996-8;
- presents a quantitative analysis analyse factors underlying progress towards WFS targets;
- triangulates FIVIMS aggregate data with detailed data on selected country case study contexts (Bangladesh, Ethiopia and Tanzania);
- offers suggestions for strengthening the 'undernourished' indicator; and
- offers suggestions for future monitoring of food security.

Section 1 introduces the topic, drawing the link with the WFS targets set in 1996. Section 2 of the paper describes the changes in the number of undernourished by region and by initial levels of undernourishment. Before analysing changes in the number of undernourished over the past decade, Section 3 discusses the construction of the FAO undernourishment indicator and what it does and does not represent. A number of strengths and weaknesses of this indicator are highlighted, and a number of suggestions are made within the paper to address the weaknesses - both in terms of currently available data and in terms of future data collection.

Sections 4 and 5 analyse the changes in the food situation over the 1990s. Section 4 uses a quantitative method to model why some countries have done better, or worse, in reducing food insecurity levels over time. This was done using regression analysis or correlates of change in the percentage of 'undernourished'. Four different regressions were conducted to show the type of complex analysis that FAO could usefully begin to invest in developing. The quantitative approach uses data published by FAO and by other international organisations within a multiple regression framework to identify factors associated with changes in the percentage of the population undernourished over the 1990s.

Section 5 employs a more qualitative approach. This uses 3 country level case studies from Bangladesh, Ethiopia and Tanzania to get behind the aggregate data from FAO and elsewhere to explore in more detail the story of food insecurity in the 1990s. These generally point to a more negative trend than data in the State of Food Insecurity in the world (SOFI) data. They highlight the importance of investment in agricultural research (Bangladesh), the devastating impact of shocks such as HIV/AIDS (Tanzania), the crucial importance of the intra-country distribution of food insecurity (all case-studies), the need to harmonise and analyse data collected (Ethiopia and Tanzania) and the need to monitor the capacity and institutional aspects of food security-related development aid (Tanzania). Anecdotal evidence gleaned from an email survey of food security focal points in a number of key countries is also analysed.

Section 6 reflects in more detail on some changes that could be made to enhance the future collection of food insecurity data at various levels and the analysis of that data. Section 7 concludes.

The paper highlights the conceptual distance between FAO's numbers of 'undernourished' and actual levels of food insecurity. It shows that the number of

'undernourished' indicator only really reflects physical access at national level (albeit with some partial adjustments to try and reflect local differences) but does not reflect the multi-dimensionality of food insecurity at the subnational level. The specific limitations in the "numbers of undernourished" indicator are detailed, outlining the assumptions associated with each component, key weaknesses and possible actions for strengthening them. It is noted that many of these aspects of food insecurity measurement could be integrated into FIVIMS as they all revolve around using existing household surveys and integrating the data with food balance sheets.

However, while the number of "undernourished" indicator is easy to criticise, the paper notes that there is as yet no clear substitute for it where national level data readily exists. The paper therefore identifies a number of ways to strengthen undernourishment data without requiring the investment of major additional resources. At the same time, it argues that professional resources need to be invested in developing a better indicator of food insecurity in the long term.

The paper provides three core sets of recommendations for FIVIMS.

The first set of recommendations relate to updating underlying assumptions behind data analysis and demonstrating the sensitivity of the estimates of undernourished to assumed values behind cut-offs and measures of distribution. A second set of suggestions relates to the collection of new data that are better able to predict shocks to food insecurity: these emphasise the need for collaboration between FAO and other centres of excellence in food consumption data collection, and the utility of developing a series of expert meetings and exploratory studies on options for food security data collection at different levels of capacity and resource availability. The final set of recommendations relates to the need for increased data analysis as a bridge between assessment and action.

The paper also notes that more quantitative analysis needs to be undertaken on the determinants of performance in meeting WFS targets. In addition, improved listening posts need to be developed in-country, drawing on FAO staff, WFP/VAM staff and FIVIMS focal points. Further, there should be increased recognition that the SOFI process is valuable in and of itself as it provides an opportunity to coordinate food security expertise across the many different FAO units and to forge a consensus on priorities for action to hasten the achievement of WFS targets.

More generally, the paper argues that FAO needs to develop a stronger culture of analysis, improve accessibility of the data it already possesses and improve thinking on shocks. Support to FIVIMS should focus on building on its strengths, improving its capacity to co-ordinate its various activities and strengthening its in-country listening posts.

## **1. Introduction**

At the World Food Summit (WFS) of 1996 the leaders of 186 countries pledged to reduce by half the number of hungry people in the world by 2015. In terms of the UN Food and Agriculture Organisation's (FAO) indicator of progress, the number of people "undernourished"<sup>1</sup>, this translates into a goal of 400 million people in 2015 from approximately 800 million in 2001. Using this indicator to compare the progress of different regions and different countries over the 1990s it emerges that certain of them have made better progress than others have in meeting these targets. For example, in East Asia there has been a decline in the number of undernourished by 59 million from the early 1990s to the late 1990s. In Malawi, the percentage of people that are undernourished has dropped from 47% to 32% over this period. Similarly for Thailand the percentage of undernourished has declined from 31% to 21%. On the other hand, in Central Africa, the numbers of undernourished have increased by 16 million. In Burundi the percentage of the population that is undernourished has increased from 44% to 68% and in Guatemala it has increased from 14% to 24%. Why have some regions and countries moved towards the targets and why have some moved further away?

This paper undertakes a systematic analysis of the factors behind the rate of progress towards the WFS target. Section 2 of the paper more fully describes the changes in the number of undernourished by region and by initial levels of undernourishment. Before analysing changes in the number of undernourished over the past decade, Section 3 discusses the construction of the undernourishment indicator and what it does and does not represent. A number of strengths and weaknesses of this indicator are highlighted, and a number of suggestions are made within the paper to address the weaknesses - both in terms of currently available data and in terms of future data collection. Sections 4 and 5 analyse the changes in the food situation over the 1990s. Section 4 uses a quantitative method and Section 5 employs a more qualitative approach. The quantitative approach uses data published by FAO and by other international organizations within a multiple regression framework to identify factors associated with changes in the percentage of the population undernourished over the 1990s. The qualitative approach uses 3 case studies (appended in full following this report) from Bangladesh, Ethiopia and Tanzania to get behind the aggregate data from FAO and elsewhere to explore in more detail the story of food insecurity in the 1990s. In addition, we draw on anecdotal evidence gleaned from an email survey of food security focal points in a number of key countries. Section 6 reflects in more detail on some changes that could be made to enhance the future collection of food insecurity data at various levels and the analysis of that data. Section 7 concludes.

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<sup>1</sup> As we shall see in Section 3, the term "undernourished" is used by FAO as a label for an indicator based on food production and then modified by distributional data. The term should not be confused with "undernutrition" or more generally with "malnutrition" which both relate to impaired growth, development and immunity due to an absence of some combination of food, care and health and sanitation services.

## **2. Changes in the numbers of “undernourished”: 1990-2 to 1996-8**

This section describes some of the changes in the numbers of undernourished over the 1990-2 to 1996-8 period.<sup>2</sup> The first part of the section describes changes in the *prevalence* of undernourishment, changes in the absolute numbers of undernourished and changes in the absolute numbers as a percentage of the numbers in 1990-92. Country rankings are compared using each of these measures of change. The second part attempts to move beyond calories by examining the supply of calories by source and by describing the dietary supply of proteins and fats in comparison to the dietary supply of calories. It does this only for the 1996-98 period because data on calories by source were not available for 1990-92. A final word of caution is warranted here. As the following chapter of this paper notes (chapter 3), there are significant limitations to the “undernourishment” indicator and the reader should bear this in mind when reading the descriptive data presented in the following sub-sections.

### **2.1 Changes in “undernourishment”**

At the country level and in terms of broad undernourishment categories, we can see from Table 1 that from 1990-92 12 countries have moved to a more secure category in 1996-8 (below the diagonal) while 9 have moved to a less secure category (above the diagonal). The remaining 78 countries have remained within their categories (on the shaded diagonal). But countries have a wide range of population sizes and Table 2 provides a picture of which 1990-2 undernourishment categories the changes in the numbers of undernourished have come from. The table shows that the net change in the numbers of undernourished is -47.2 million, comprising an increase of 70.6 million and a decrease of 117.9 million. The table also shows large net decreases coming from the 5-19% category and large net increases coming from the worst category, those countries with a level of undernourishment of over 35%. It is important to note however, that there are decreases (about 9 million) in the numbers of undernourished in countries that were classified as the worst off in 1990-92.

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<sup>2</sup> This period is chosen because this is the way the data are presented in the SOFI 2000. FAO bookends the period with three year averages. It does this to minimize the influence of measurement errors from any given year. This technique does, however, make the data less useful for measuring year on year changes in “undernourishment” and hence less useful for shorter-run policymaking.

**Table 1: A transition matrix for undernourishment categories: 1990-2 to 1996-8**

Number of countries in undernourishment categories in 1990-2	Number of countries in undernourishment categories in 1996-8					Total
	<2.5%	2.5-4%	5-19%	20-34%	>=35%	
<2.5%	9	0	0	0	0	9
2.5-4%	1	2	3	0	0	6
5-19%	0	2	25	1	1	29
20-34%	0	1	5	22	4	32
>=35%	0	0	1	3	19	23
<b>Total</b>	10	5	34	26	24	99

Data sources: SOFI 1999 and SOFI 2000

**Table 2: Changes in the numbers of undernourished, by undernourishment status in 1990-2**

Undernourishment category in 1990-2	Change in numbers of undernourished between 1990-2 and 1996-8 (millions)		
	Decrease	Increase	Net changes
<2.5%	-0.50	0.42	-0.08
2.5-4%	-0.07	1.97	1.90
5-19%	-76.83	15.53	-61.30
20-34%	-31.31	23.80	-7.51
>=35%	-9.16	28.92	19.76
<b>Total</b>	-117.87	70.64	-47.23

Data sources: SOFI 1999 and SOFI 2000

Table 3 reproduces the statistics in table 2, but by region. The largest net changes are from the countries of East Asia, primarily China. The largest net increases are from the countries of Central Africa, the Near East, and East Africa. Interestingly, South Asia shows a net decline in the numbers of undernourished. Figures 1 and 2 show the sources of increase and decrease for the countries that contribute most significantly to changes in these numbers. China contributes to nearly one half of the decrease in the numbers of undernourished, followed by India (12%), Indonesia, Nigeria and Thailand at 5%. In terms of contributions to the increase in numbers, The Democratic Republic of the Congo accounts for 21%, followed by the Democratic People's Republic of Korea (13%), Bangladesh (12%), Afghanistan (7%) and Tanzania (7%). These numbers are also highlighted in Figure 3.



**Table 3: Changes in the numbers of undernourished, by region**

Region (as in SOFI 2000)	Number of countries	Change in numbers of undernourished between 1990-2 and 1996-8 (millions)		
		Decrease	Increase	Net changes
South Asia	5	-17.87	10.30	-7.57
Southeast Asia	8	-14.40	0.35	-14.05
East Asia	5	-59.27	9.55	-49.72
Oceania	1	0	0.26	0.26
North America	1	0	0.68	0.68
Caribbean	5	-0.08	2.10	2.02
Central America	6	-0.10	1.74	1.64
South America	12	-10.59	1.58	-9.01
Near East	11	-0.41	9.17	8.76
North Africa	5	-0.07	0.35	0.28
Central Africa	6	-0.76	15.85	15.09
East Africa	9	-4.34	11.00	6.66
Southern Africa	11	-1.27	4.15	2.88
West Africa	14	-8.71	3.56	-5.15
Total	99	-117.8700	70.6400	-47.2300

Data sources: SOFI 1999 and SOFI 2000

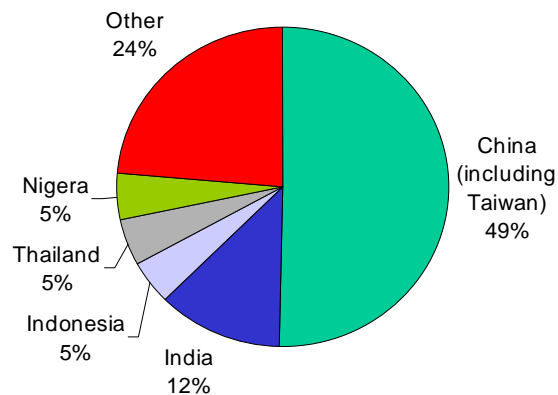
By focusing on absolute numbers the analysis so far has highlighted the most populous countries, ignoring the smaller countries that have nevertheless experienced large proportional changes in the numbers of undernourished. Table 4a lists the worst and best performing countries by changes in the numbers of undernourished. While China has the largest decrease in the numbers of undernourished, smaller countries such as Peru show a larger decline in the percentage of those undernourished and a larger decline in the numbers of undernourished as a percentage of those undernourished in 1990-92.

Tables 4b and 4c re-order the 99 countries along these lines and report the new ordering for the best and worst performers. In terms of reductions in the percentage of undernourishment, the top 5 performers are Peru (a 22.4 point reduction in the percentage of individuals undernourished), Chad (20.2), Ghana (18.9), Kuwait (18.2), and Malawi (15.2). At the other end of the table, the Democratic Republic of Korea (North Korea) (a 37.7 point increase in the percentage of individuals undernourished), the Democratic Republic of the Congo (24.3), Burundi (23.9), Cuba (14.5) and Mongolia (10.5) are the worst performers. The picture at the wrong end of the table is more invariant to the use of the 2 different indicators because of the rapid increase in undernourishment in two fairly populous countries (North Korea and the DR Congo).

A final indicator of progress or faltering is the decline in the number of undernourished as a percentage of the number undernourished in 1990-2. Table 4c shows that the countries with reductions in the numbers of undernourished that form the largest percentage of numbers in 1990-2, posted low percentages of undernourished in 1990-92. The exceptions to this are Kuwait, Ghana and Peru which showed large proportional declines in the numbers of undernourished, starting from a large base of undernourished in 1990-92. The Kuwait record undoubtedly is related to the receipt of aid, post Gulf war. Ghana and Peru were two of the stricter adherents to structural adjustment packages over the 1990s and it would be useful to understand the contribution that the liberalization of input and output markets made to their performance. North Korea and the Democratic Republic of Congo (DRC) are once again included in the worst

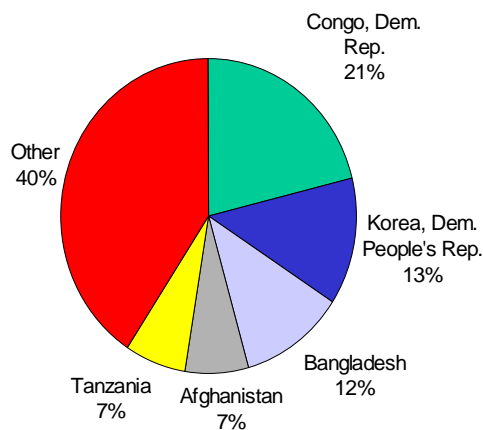
performers along this dimension. Cuba and Iraq are the two other worst performers, seeing the numbers of undernourished increase dramatically from already high levels (the percentage of their populations that were undernourished in 1990-92 being 19 and 17 respectively). For Cuba, the decline in aid from the former Soviet Union plus the continuing trade restrictions no doubt play a role, and for Iraq the numbers reflect, in part, the post-Gulf War sanctions.

**Figure 1: Source of decreases in numbers of undernourished between 1990-2 and 1996-8**



Note: Total decrease in number "undernourished" individuals is 117.5 millions

**Figure 2: Source of increases in numbers of undernourished between 1990-2 and 1996-8**



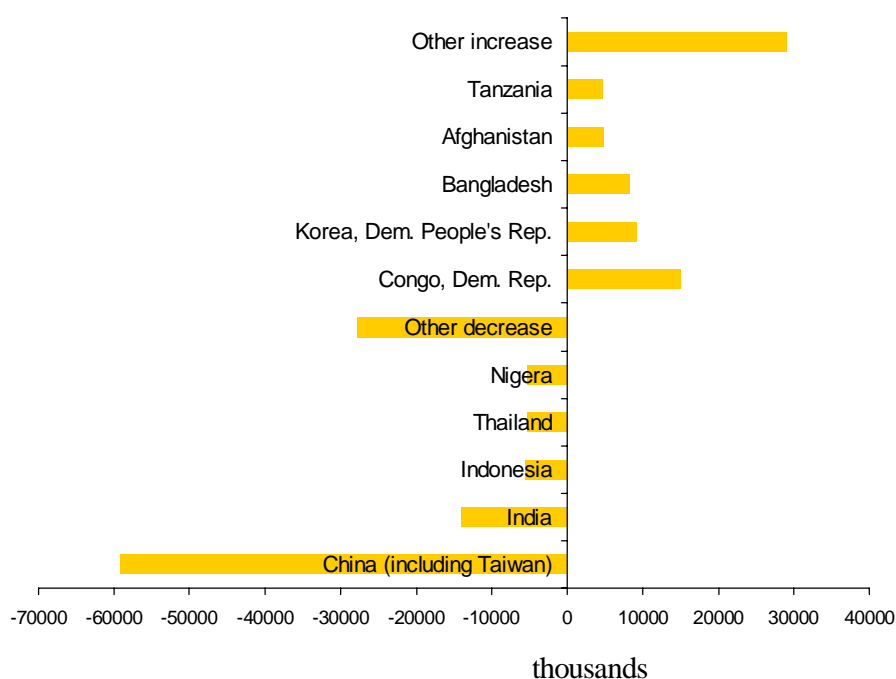
Note: Total increase in number "undernourished" individuals is 80.0 millions

**Table 4a: Selected countries sorted by changes in the numbers of people undernourished, 1990-2 to 1996-98**

	Country (best performer=1)	Difference between percent undernourished in 1996-8 and in 1990-92	Difference between numbers undernourished in 1996-8 and in 1990-92 (millions)	Change in number of undernourished, from 90-92 to 96-98 as a percentage of the numbers of undernourished in 1990-92	Percentage undernourished in 1996-98
1.	China	-6.00	-59.16	-29.69	11
2.	India	-4.60	-14.15	-6.38	21
3.	Thailand	-10.40	-5.48	-31.00	21
4.	Indonesia	-3.60	-5.46	-30.74	6
5.	Nigeria	-7.60	-5.37	-38.44	8
6.	Peru	-22.40	-4.48	-50.45	18
7.	Brazil	-3.10	-3.75	-19.08	10
8.	Pakistan	-6.30	-3.39	-10.50	20
9.	Ghana	-18.90	-2.62	-57.96	10
10.	Vietnam	-5.70	-2.36	-12.51	22
89.	Cuba	14.50	1.62	337.50	19
90.	Madagascar	6.70	1.79	44.64	40
91.	Iraq	7.90	1.82	108.33	17
92.	Burundi	23.90	1.83	74.09	68
93.	Uganda	6.90	2.10	53.85	30
94.	Nepal	6.70	2.10	51.22	28
95.	Tanzania	10.50	4.66	57.96	41
96.	Afghanistan	7.40	4.85	49.74	70
97.	Bangladesh	3.30	8.20	21.24	38
98.	D.R of Korea	37.70	9.18	228.36	57
99.	D.R of Congo	24.30	15.03	105.33	61

(SOFI 1999 and SOFI 2000)

**Figure 3: Changes in numbers of undernourished: 1990-2 to 1996-8**



**Table 4b: Selected countries sorted by changes in the percentage of people undernourished, 1990-2 to 1996-98**

	Country (best performer=1)	Difference between percentage undernourished in 1996-8 and in 1990-92	Difference between numbers undernourished in 1996-8 and in 1990-92 (millions)	Change in no. of undernourished, from 90-92 to 96-98 as a percentage of the no. of undernourished in 1990-92	Percentage undernourished in 1996-98
1.	Peru	-22.40	-4.48	-50.45	18
2.	Chad	-20.20	-0.75	-21.74	38
3.	Ghana	-18.90	-2.62	-57.96	10
4.	Kuwait	-18.20	-0.36	-78.26	4
5.	Malawi	-15.20	-1.27	-28.41	32
6.	Ethiopia	-12.40	-2.04	-6.70	49
7.	Sudan	-11.50	-2.16	-29.75	18
8.	Togo	-11.00	-0.25	-23.81	18
9.	Thailand	-10.40	-5.48	-31.00	21
10.	Mozambique	-8.80	0.86	8.74	58
89.	Afghanistan	7.40	4.85	49.74	70
90.	Iraq	7.90	1.82	108.33	17
91.	Mali	8.20	1.24	57.41	32
92.	Somalia	8.30	1.35	25.71	75
93.	Guatemala	10.00	1.24	98.41	24
94.	Tanzania	10.50	4.66	57.96	41
95.	Mongolia	10.50	0.32	41.03	45
96.	Cuba	14.50	1.62	337.50	19
97.	Burundi	23.90	1.83	74.09	68
98.	D.R of Congo	24.30	15.03	105.33	61
99.	D.R of Korea	37.70	9.18	228.36	57

**Table 4c: Countries sorted by changes in the number of people undernourished from 1990-2 to 1996-8 as a percentage of the numbers undernourished in 1990-2**

	Country (best performer=1)	Difference between percentage undernourished in 1996-8 and in 1990-92	Difference between no. undernourished in 1996-8 and in 1990-92 (millions)	Change in no. of undernourished, from 90-92 to 96-98 as a percentage of the no. of undernourished in 1990-92	Percentage undernourished in 1990-92
1.	Libya	-0.80	-0.04	-100.00	0.8
2.	Suriname	-1.90	-0.05	-100.00	11.9
3.	United Arab Emirates	-1.80	-0.04	-100.00	1.8
4.	Kuwait	-18.20	-0.36	-78.26	22.2
5.	Ghana	-18.90	-2.62	-57.96	28.9
6.	Uruguay	-2.60	-0.11	-52.38	6.6
7.	Peru	-22.40	-4.48	-50.45	40.4
8.	Chile	-4.30	-0.51	-45.95	8.3
9.	Argentina	-0.98	-0.30	-42.86	2.1
10.	Ecuador	-3.20	-0.36	-41.86	8.2
89.	Tanzania	10.50	4.66	57.96	30.5
90.	Venezuela, RB	4.70	1.44	63.72	11.3
91.	Tunisia	0.39	0.04	66.67	0.7
92.	Burundi	23.90	1.83	74.09	44.1
93.	Guatemala	10.00	1.24	98.41	14
94.	Lebanon	1.42	0.05	100.00	0.9
95.	Hong Kong, China	0.64	0.05	100.00	1.8
96.	D.R of Congo	24.30	15.03	105.33	36.7
97.	Iraq	7.90	1.82	108.33	9.1
98.	D.R of Korea	37.70	9.18	228.36	19.3
99.	Cuba	14.50	1.62	337.50	4.5

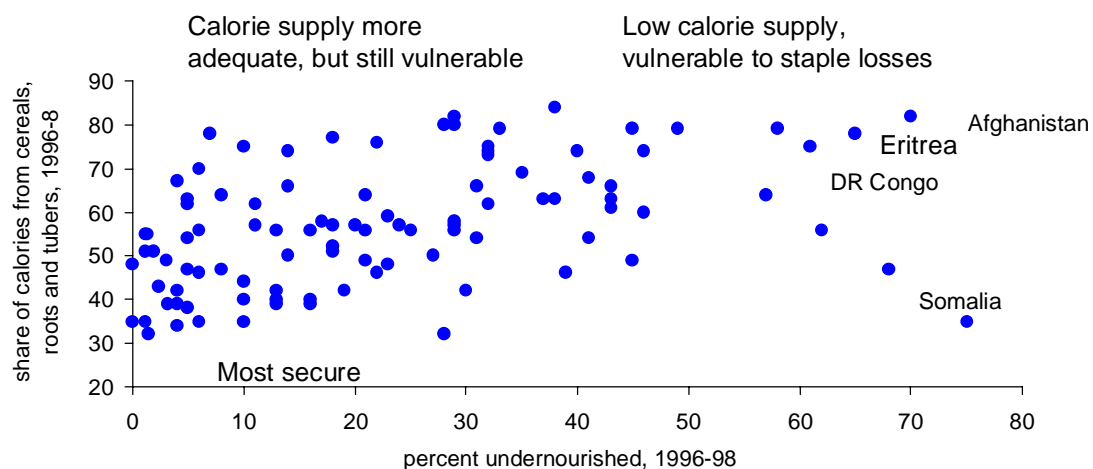
Data sources for both tables: SOFI 1999 and SOFI 2000

## 2.2 Beyond calories

As is widely known, calories are only one component of a healthy diet. Other components such as protein, fat, vitamins and minerals are also essential to any diet that successfully underpins food security. In the absence of data on other diet components, the source of calories is one indicator of the diversity of the diet. A heavy reliance on cereals, roots and tubers - sources of calories that are relatively poor sources of other diet components, at least on a gram by gram basis - is indicative of a diet vulnerable to malnutrition. SOFI 1999 and SOFI 2000 present data on the percentage of calories from cereals, roots and tubers, but do not use them in any global analyses. Cross-classification of countries by the prevalence of undernourishment and the reliance on cereals and roots and tubers for calories produces an interesting picture of deprivation and vulnerability.

Figure 4 plots these two variables against each other for the 99 countries in SOFI 2000. Countries with high prevalence of undernourishment tend to have a higher dependence on cereals, roots and tubers for their calorie supply, but there are several countries that have middle to low prevalences of undernourishment that are also heavily dependent on these staple foods. These countries may be more vulnerable to cereal infestations or other disruptions to the cereal production and distribution system. They may also be more vulnerable to micronutrient malnutrition and the morbidity and mortality that it results in. The countries that are worst off are Afghanistan, Eritrea, and the DR Congo.

**Figure 4: Percentage undernourished, by the share of calories from cereals, roots and tubers: 1996-98 (99 countries)**



But the share of calories from cereals, roots and tubers does not track other diet components particularly precisely. This is shown in Figure 5 and in Table 5. Table 5 presents the simple correlation coefficients between the share of calories from cereals and roots and tubers and per capita dietary energy, protein and fat supply in 1996. The correlation coefficients are all significant, but they are not close to the -0.9 values that would indicate a very close correspondence. Figure 5 shows the nature of the

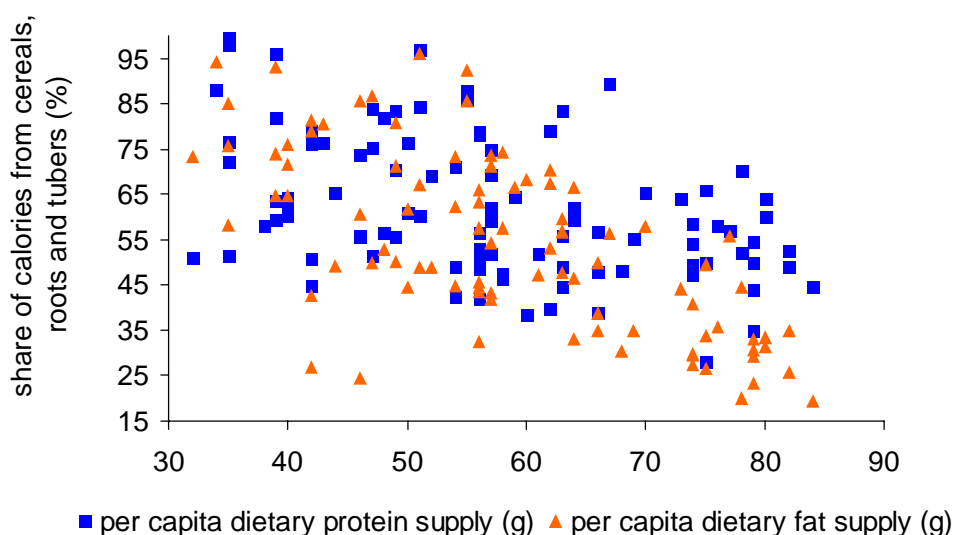
relationship - as the share of calories from cereals, roots and tubers declines, the per capita supply of proteins and fats increases - but it also shows its looseness.

**Table 5: Pearson correlation coefficients between the per capita daily supply of various dietary components**

	Share of calories from cereals, roots and tubers (%)	Per cap dietary energy supply (kilo cals)/day	Per cap protein supply (g)/day	Per cap fat supply (g)/day
Share of calories from cereals, roots and tubers (%)	1.0000			
Per cap dietary energy supply (kilo cals)/day	-0.4209	1.0000		
Per cap protein supply (g)/day	-0.4340	0.8548	1.0000	
Per cap fat supply (g)/day	-0.6709	0.7573	0.7171	1.0000

Note: all coefficients are significantly different from zero at 1%. Data sources: SOFI 1999 and SOFI 2000

**Figure 5: Share of calories from cereals, roots and tubers in 1996-98, by the 1996 dietary supply of protein and fats (99 countries)**



In future SOFI's it would be useful to *track*:

- the share of calories from cereals, roots and tubers. It would also be useful to present calories from other categories such as poultry, other meat, fruits and vegetables, and oils and fats;
- the producers of the food balance tables and the nutrition division at FAO could also revive the idea of converting the food supply data into vitamins and minerals, with the due acknowledgment of the limitations of macro food supply data to present profiles of micronutrients.

### **3. What does the number of “undernourished” measure?**

The previous section has described changes in the “undernourishment” data. This section reminds the reader that these data do not assess food insecurity either at the national or sub-national levels. The section first describes the construction of the undernourishment indicator and its conceptual distance from food insecurity. The second subsection explores the differences between the undernourishment indicator and simple means of the per capita calorie data it is based on. The third subsection explores the correlation of the per capita energy supply with child underweight data (from anthropometry data) and illustrates the extent to which the available calorie data are useful. Throughout Section 3 we highlight the strengths and weaknesses of the measures that are based on per capita calorie supply from food balance sheets. Some suggestions are made as to how the measures could be developed both in the near and medium term. These suggestions for development will be more fully outlined in Section 6 of the paper.

#### **3.1 Construction of the “undernourished” indicator**

In general terms, the number of “undernourished” is an attempt to inject a notion of distribution and access into what is essentially a food supply measure derived at the national level. Food balance sheet data (production and net imports and food aid) are converted into calorie, protein and fat units and divided by population size to obtain dietary energy, dietary protein and dietary fat supplies. The dietary energy supply (DES) data are then converted into numbers of “undernourished” by imposing a log-normal distribution, assuming a coefficient of variation to describe the dispersion of the distribution and applying a per capita calorie cut-off below which an individual is labelled as “undernourished”. The measure has been the subject of considerable debate and controversy. This is partly due to the application of the label “undernourished”. A more appropriate but obviously less user-friendly term would be “per capita national food supply deficit, partially adjusted by limited intra-country food distribution data”. The term “undernourishment” risks confusion with “undernutrition” (typically assessed at a population level with anthropometric measurements) and should be renamed.

The conceptual distance between this term and food insecurity at the individual level is enormous. Table 6 describes the basic differences between the “undernourishment” numbers and the concepts of food insecurity that we would ideally like to measure. With extant (i.e. currently available) household survey data it is possible to assess physical and economic access at the household level (and possibly food quality). Future data collection efforts at the household level (and more ambitiously at the individual level) will be necessary to develop more complete indicators of food insecurity.

**Table 6: The conceptual distance between FAO’s numbers of “undernourished” and food insecurity**

Numbers of ‘undernourished’	Food Insecurity	
<b>Physical access at national level</b>	<i>Physical access at national level</i>	Is there potentially enough food at the national level to feed all people?
<b>Some partial adjustments</b>	<i>Physical access at local level</i>	Is food in local markets or in local fields?
	<i>Economic access</i>	Can households afford to purchase what they do not consume from home production?
	<i>Social access</i>	Do all household members have equal access to food?
	<i>Food quality and safety</i>	Is food of sufficient diversity and safety to promote good health?
	<i>Physiological access</i>	Are the care and health/sanitation environments sufficiently good so that ingested nutritious food can be used for good growth and development?
	<i>Risk of loss of access</i>	How sensitive are any forms of access to shocks and cycles? (e.g. seasonality)
	<i>Access as a human right</i>	What is the capacity of the food system to deliver and what is the capacity of individuals to press their claims to food?

The “undernourishment” indicator does have the very real strength that there is no ready substitute for it.

The implementation of household food consumption surveys for 99 countries (the number of developing countries for which undernourishment data exist) in every year is not feasible. Anthropometric data assess malnutrition, not food insecurity (household food security, adequate care and health and sanitation are prerequisites for good nutrition). In any case, anthropometric datasets, while more numerous than food consumption datasets, are not collected in every developing country every year (more like once every 5 years - see WHO’s Global Database on Malnutrition and Child Growth).

However, the undernourishment indicator has many weaknesses. These are summarized in Table 7. As is clear from the table, many of the weaknesses can be addressed through a more concerted integration of food balance sheet data and household survey data. FAO and IFPRI are one year into a collaboration to begin to do just that, at least for Sub-Saharan Africa. Approximately 15-20 nationally representative household expenditure data sets are being accessed. They are now being cleaned and comparable food access indicators at the household level are being constructed.<sup>3</sup> But a number of new data collection efforts should also be initiated to complement the strengthened indicator of “undernourishment”. These will be discussed in Section 6.

<sup>3</sup> Countries that will definitely be included: 1. Ghana 2. Guinea 3. Madagascar 4. Malawi 5. Mauritania 6. Mozambique 7. South Africa 8. Tanzania 9. Zambia. Countries for which data sets are being reviewed for their quality: 1. Burundi 2. Central African Republic 3. Comoros 4. Djibouti 5. Senegal 6. Burkina Faso 7. Cote d'Ivoire 8. Ethiopia 9. Gambia 10. Guinea-Bissau 11. Niger 12. Uganda. Countries that cannot be included due to poor quality: 1. Mali 2. Cameroon. Countries with available data sets that have not been accessed yet: 1. Eritrea 2. Kenya 3. Lesotho 4. Namibia 5. Nigeria 6. Rwanda 7. Sierra Leone 8. Swaziland.



**Table 7: Limitations in the numbers of undernourished indicator and suggested actions to strengthen it**

<b>Component of undernourishment estimate</b>	<b>Assumptions made</b>	<b>Weakness</b>	<b>Further details</b>	<b>Action for Strengthening</b>
<b>Per capita dietary energy supply</b>	Based on food balance sheets; data collection methods and assumptions not clear	Heavy focus on calories; No focus on within-country household-level food availability		*Use data on fats and proteins in future descriptive work *Develop a Global Database on Household Food Security (which FAO and IFPRI are beginning to do)
<b>Coefficient of variation assumed for calorie intake distribution</b>	DES is more important determinant of numbers of undernourished than CV	CV range not based on nationally representative data sets CV is not allowed to vary sufficiently by country CV is assumed not to vary over time	Smith 1998	Use extant data from nationally representative datasets on household calorie availability to update CVs
<b>Log-normal distribution of calorie intakes</b>	Distribution is always log-normal	Distribution may not always be log-normal	Smith 1998	Use actual distributions to characterize regions, updating as new data become available
<b>Coefficient of variation assumed for calorie requirements</b>	Average physical activity levels over 24 hours are assumed constant by country	Variation across country is likely given different levels of mechanisation, urbanization, productivity etc.	Svedberg 2001	Use actual data on time allocation in a few countries and group countries accordingly
<b>Use of per capita denominator with dietary energy supply</b>	Households assumed to have same composition in terms of age and sex	Variation by country. Poorer countries tend to have younger populations. Some South Asian countries have fewer women.	Svedberg 2001	Use extant data from nationally representative datasets on average household composition
<b>Household composition affects energy requirement</b>	Households assumed to have same composition in terms of age and sex	Variation by country. Poorer countries tend to have younger populations. Some South Asian countries have fewer women.	Svedberg 2001	Use extant data from nationally representative datasets on average household composition
<b>Method of size of estimating tail of distribution</b>	Single integral method used. Correlation between intakes and requirements is not addressed.	Correlation between intake and requirements is positive due to long term physiological regulatory mechanisms	Svedberg 2001	Use a range of estimates on this correlation coefficient and estimate joint probability method of estimating tail of distribution in addition to existing method

### 3.2 Correlations of the percentage of the population “undernourished” with per capita dietary energy supply

How successful is the attempt to add a distributional dimension to the per capita dietary energy supply by converting it to percentage “undernourished”? The correlation between the prevalence of undernourishment and per capita dietary energy supply is high. Table 8 presents the coefficients for all 99 countries and for countries within region. For all countries the correlation coefficient is -0.908 in 1991 and -0.9069 in 1996. Perfect correlation would result in a coefficient of -1. The correlation is very strong in all sub-regions except North Africa. On the face of it, what do the extant efforts to add a distributional dimension to per capita dietary energy supply? One way to answer this is to examine if country rankings are sensitive to the choice of indicator: prevalence of undernourishment or per capita dietary energy supply? Table 9 lists the ten countries with the highest prevalence of undernourishment in 1996-98 and then lists the rank of these 10 countries in terms of per capita dietary energy supply in 1996 (data for 1997 and 1998 were not available at the time of writing).

**Table 8: Pearson Correlation coefficients between DES and the “percentage undernourished**

Region	Number of countries	Correlation coefficient between DES 91 and the proportion of undernourished, 1990-92	Correlation coefficient between DES 96 and the proportion of undernourished, 1996-98
All	99	-0.9080	-0.9069
South Asia	5	-0.9212	-0.9012
Southeast Asia	8	-0.9855	-0.9857
East Asia	5	-0.9786	-0.9611
Oceania	1	-	-
North America	1	-	-
Caribbean	5	-0.9582	-0.9538
Central America	6	-0.9455	-0.9741
South America	12	-0.8845	-0.8828
Near East	11	-0.8553	-0.8958
North Africa	5	-0.6765	-0.6904
Central Africa	6	-0.9885	-0.9315
East Africa	9	-0.9773	-0.9305
Southern Africa	11	-0.9564	-0.9340
West Africa	14	-0.8336	-0.9163

All correlation coefficients are significantly different from zero at 5% except for North Africa (significant at 20% level in 1996 and at 22% in 1991). Data sources: FAO/ESS

**Table 9: Rankings by the prevalence of undernourishment in 1996-98 and by per capita energy supply in 1996**

Rank on prevalence of undernourishment in 1996-8 (1 is worst out of 99)	Country	prevalence of undernourishment in 1996-8	Per cap dietary calorie supply, 1996	Rank on per capita dietary energy supply in 1996 (1 is worst out of 99)
1	Somalia	75	1577.8	1
2	Afghanistan	70	1645.5	3
3	Burundi	68	1688.8	4
4	Eritrea	65	1619	2
5	Haiti	62	1835.3	8
6	Congo, Dem. Rep.	61	1828.8	6
7	Mozambique	58	1829.9	7
8	Korea, Dem. Rep.	57	2056.8	22
9	Ethiopia	49	1865.9	10
10	Niger	46	1828.6	5

Data sources: FAO/ESS

From Table 9, we can see that the same set of 4 countries is identified as the most deprived by either indicator. Out of the 10 countries listed as having the highest prevalence of undernutrition, only one - the Democratic Republic of Korea - has a per capita dietary energy supply that is not among the ten worst out of the 99. When a country has a higher value for a dietary energy supply ranking than for a prevalence ranking, it indicates serious distribution problems. Conversely, Niger has the 10<sup>th</sup> worst prevalence ranking, but the 5<sup>th</sup> worst dietary energy supply - in this sense it is an “overachiever”.

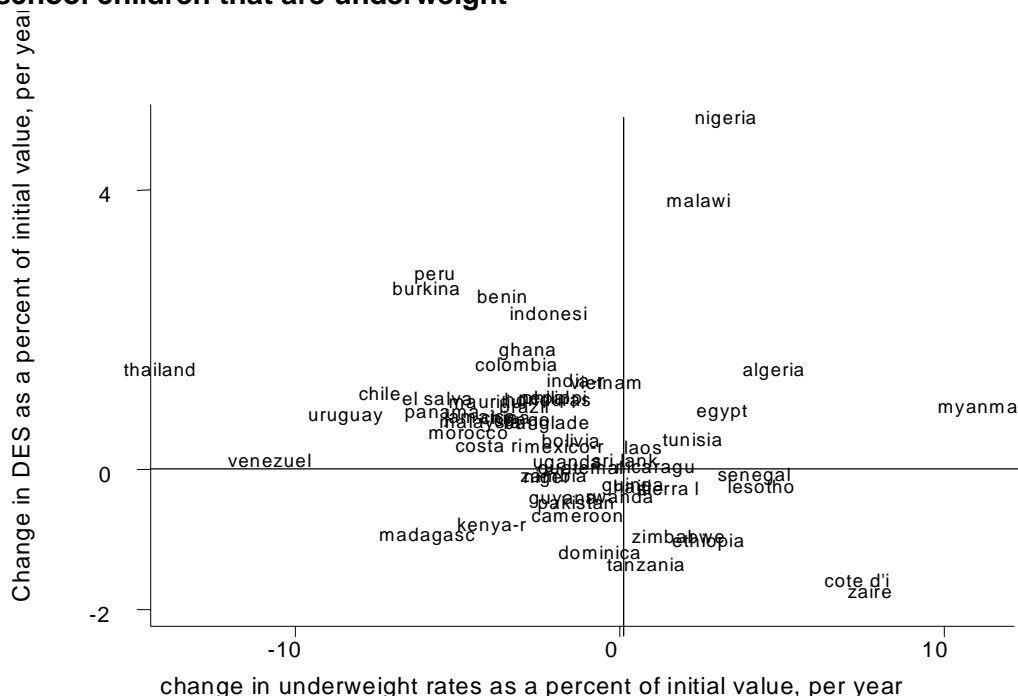
### **3.3 Correlations of per capita dietary energy supply with the percentage of underweight preschool children**

Another way of examining the usefulness of the food balance sheet data underlying the prevalence of undernourishment and the per capita dietary energy supply is to examine the correlation of these variables with other variables that they should theoretically affect. One such variable is the prevalence preschool child underweight. The food-care-health conceptual model of nutrition is now widely accepted. It characterises food security at the household level as one of the 3 key pillars of good nutrition. Without household food security, it is virtually impossible for children to grow properly. How strongly correlated is per capita dietary energy supply with a survey-based indicator of malnutrition such as a preschool child’s low weight for age?

Using a dataset that matches child underweight data collected in a given year with the corresponding year’s DES figures (see Smith and Haddad 2000), the correlation coefficient for 63 developing countries ranges between -0.46 and -0.55 (both significant at the 1% level). Figure 6 presents this data graphically for these 63 countries. It plots changes in per capita dietary energy supply against changes in the percentage of preschool children that are underweight. In general the points are in the two quadrants that we would expect: when DES increases over time we would expect child undernutrition rates to fall and when DES falls we would expect child underweight rates to increase. There are several examples of where the two variables move in counter-

intuitive directions. For example, for Nigeria the underweight rates are increasing despite increases in per capita energy supplies. Alternatively, for Madagascar preschooler underweight rates are declining at the same time that the per capita dietary energy supply is decreasing.

**Figure 6: Changes in per capita energy supply and changes in the percentage of preschool children that are underweight**



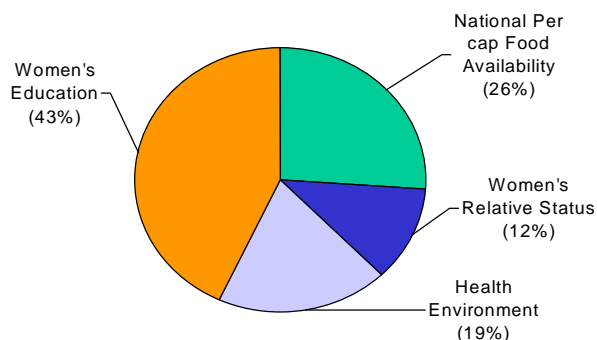
There may well be legitimate reasons for these off-diagonal cases. In Nigeria for example there could be a decline in child care quality or a decline in safe water. Both of these trends would increase child malnutrition rates, despite the increase in food supply per capita, even if the undernourishment indicator were a true measure of household and individual food security.<sup>4</sup>

The best way to test the relevance of per capita dietary energy supply and hence its credibility as a food insecurity indicator is within a multivariate framework. Just such an exercise was undertaken in Smith and Haddad (2000). The results of that exercise are presented in Figures 7 and 8. Figure 7 shows the contributions of 4 factors to the reductions in child underweight rates observed over the 1970-1995 period. It

<sup>4</sup> Comparisons of changes in undernourishment rates and poverty rates in comparable time periods are harder to obtain. Where we do have \$1/day poverty trend data - Brazil (down), China (down), Indonesia (down) and Nepal (up) - the direction is the same as the “undernourished” data. Unlike FAO’s “undernourishment” data the poverty data are based on surveys and the measure goes beyond physical access to economic access. However it does not extend to social access and physiological access. A food security indicator that gets close to the true food security situation can say much about the gap between food security and poverty - a gap fuelled by a lack of information, a lack of power and a lack of complementary inputs such as clean water and good sanitation.

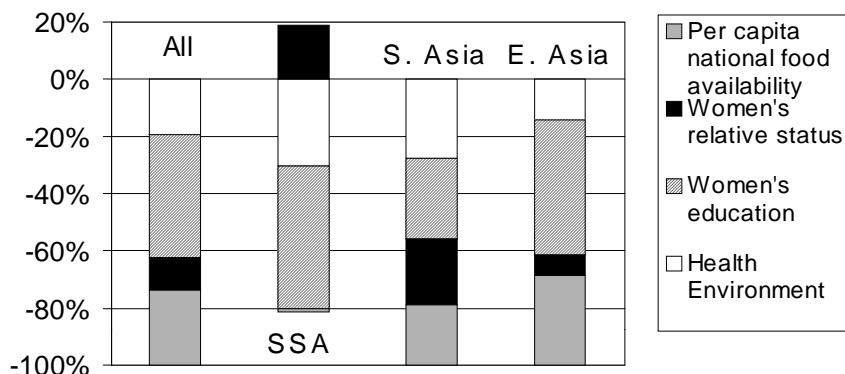
demonstrates that increases in per capita dietary energy supply were responsible for 26% of the declines in child underweight. Figure 8 disaggregates this analysis by region over the 1970-95 period for the poorest regions of the world. The large contribution that per capita dietary energy supply has made to South and South East Asia is clear. However, dietary energy supplies have not played a large role in reducing child underweight in sub-Saharan Africa - due to a combination of lower per capita increase than in other regions and a weaker relationship with child malnutrition - probably due to the frequency and severity of the multiple shocks suffered by the region over the past 25 years.

**Figure 7: Contributions of underlying determinants to reductions in children underweight, 63 developing countries: 1970-95<sup>5</sup>**



Smith and Haddad 2000

**Figure 8: Relative contributions to reductions in child malnutrition, 1970-95: selected regions**



Smith and Haddad 2000

<sup>5</sup> Women's secondary school enrollment and women's relative status (the ratio of female to male life expectancy) are positively and significantly correlated. They too highly correlated only if they destabilize the regression coefficients, which they do not.

Undernourishment data that incorporated some of the methodological suggestions in Table 6 would probably show an even stronger contribution to the decline in child undernutrition.

#### **4. Multivariate Analysis of changes in the percentage of undernourished: 1990-2 to 1996-8**

Mindful of the limitations of the percentage of undernourished indicator, this section undertakes a multivariate regression analysis to identify factors that are correlated with increases or decreases in the percentage undernourished between the period 1990-2 and 1996-8 as observed in Section 2. A potentially large number of variables are available (although not for every country in every year) for this exercise in correlation. This means that a conceptual framework is necessary to guide the inclusion or exclusion of candidate correlates. This framework is described in Table 10.

Bearing in mind that the proportion of “undernourished” is not equivalent to what is meant by “undernutrition” and it is more akin to food supply (recall the high correlation with per capita dietary energy supply), most of the explanatory variables focus on food supply. Variables such as agricultural productivity, the percentage of land to irrigation, and public investment in agriculture relate to the ability to produce food. Others variables focus on distribution of access to food within the country (such as the Gini coefficient of income distribution and the ratio of female to male literacy - an indicator of women’s status). Other variables describe shocks - both weather and non-weather - that either disrupt some aspect of the food system or more generally destroy intergenerational knowledge transmission (such as HIV/AIDS). Finally there are some conditioning variables that characterise the country in terms of location and urbanization. The general approach employed is to include the levels of the variables in 1991 and the changes in the variables over the period 1991-97. In this way we can separate out importance of the initial conditions and the changes in those conditions during the 1990s.

Given the limited time available for this analysis, it should be considered as illustrative of how a more detailed and considered data collection and empirical analysis for SOFI 2002 could be conducted. Appendix Table 1 describes in more detail the variables that are available and lists their sources. Table 11 describes the means and ranges of the different variables.

**Table 10: The conceptual framework behind the multivariate analysis of changes in the percentage of undernourished**

Explanatory Variable	The Proportion of "Undernourished"				
	Per capita calorie supply (Dietary Energy Supply)				Distributional concerns
	Food Production		Ability to import food	Food aid receipt	
	Level of Input use	Productivity of input use			
GDP/ capita (PPP)	X	X	X		
Literacy rate	X	X	X		
Democracy level	X	X	X		X
Gini coefficient					X
Ratio female to male literacy	X	X			X
Public sector investment in agriculture	X	X			
Agricultural productivity		X			
Percent of arable land under irrigation	X	X			
Productivity in non-agricultural sectors			X		X
Weather shocks	X		X	(+/-)	X
Other shocks (e.g. conflict, HIV/AIDS)	X	X	X	(+/-)	X
<b>Conditioning Variables</b>					
Population	X	X	X	X	X
Percentage of population in urban areas	X	X	X	X	X
Region	X	X	X	X	X

**Table 11: Description of variables available for regression analysis**

Variable label	Variable Description	Number of countries for which observations exist	Mean	Min	Max
diffp7p1	Change in percent of undernourished between 1996-8 and 1990-2	98	-.74	-22.4	37.7
gdppcg	Percent change in GDP/capita (PPP), 1991-1997	86	.22	-.34	1.01
gdppc91	GDP/capita in 1991 (PPP)	86	2882	443.05	18784
yieldg	Change in value added per unit of agricultural land between 1994 and 1991	80	.0315	-.57	.71
flmlna	Ratio of female to male literacy in 1991	91	.737	.24	1.36
read91	Percent of adults literate in 1991	91	63.2	11.6	97.3
rup91	Percent of population rural in 1991	98	57	3.96	94.62
irld91	Percent of cropland that is irrigated, 1991	92	17.2	.13	100
irld97	Percent of cropland that is irrigated, 1997	94	18.0	.13	100
inflat91	Inflation rate, 1991	81	94.8	-11.69	2945.1
inflat97	Inflation rate, 1997	83	14.0	-3.7	175.51
lifexp92	Life expectancy at birth in 1992	98	59.2	34.12	75.9

Variable label	Variable Description	Number of countries for which observations exist	Mean	Min	Max
lifexp97	Life expectancy at birth in 1997	98	60.2	37.22	76.54
day91	Percent of population below \$1/day in 1991	45	33.8	1.16	88.2
day97	Percent of population below \$1/day in 1997	4	27.0	11.8	50.3
gini91	Gini coefficient of income distribution in 1991	45	44.4	28.85	63.42
gini97	Gini coefficient of income distribution in 1997	4	40.5	30.06	63.42
expagag1	1991: Govt. Expenditure on Agriculture as % of Agriculture GDP	39	9.2	.9	75.98
expagag7	1997: Govt. Expenditure on Agriculture as % of Agriculture GDP	22	12.35	1.84	64.17
expagt1	1991: Expenditure on Agriculture as a Share of Total Expenditure	41	5.7	.02	22.97
expagt7	1997: Expenditure on Agriculture as a Share of Total Expenditure	24	5.3	.48	13.38
shk_exe m	Number of shortfalls in food supplies in current marketing year requiring exceptional and/or emergency assistance, 1996-98	98	3.1	0	15
polit_91	Political Liberties in 1991, Freedom House Index (1 is most free)	95	4.6	1	7
civil_91	Civil Liberties in 1991, Freedom House Index (1 is most free) <sup>6</sup>	95	4.4	1	7
polit_97	Political Liberties in 1997, Freedom House Index (1 is most free)	96	4.4	1	7
civil_97	Civil Liberties in 1997, Freedom House Index (1 is most free)	96	4.5	2	7
nat_dist	Number of natural disaster, 1991-1997, Relief web	98	2.2	0	11

The results from the regression analysis are presented in Table 12. Four different regressions are presented. The first regression indicates that only two variables are significantly associated with changes in the percent of undernourished: (a) the emergency shortfall variable (an increase in shortfalls is associated with an increase in the percentage of undernourished) and (b) the change in a country's willingness to uphold civil rights (a decline in that ability is associated with an increase in the percentage of undernourished). Note that neither capita GDP growth over the 1991-97 period nor agricultural productivity growth over the same period has a significant association with the change in percent of undernourished. Once we drop one or the other of these variables as in columns 2-4 of Table 12, it becomes clear that they are substituting for each other and thereby cancelling each other out. In column 2 we drop the change in agricultural productivity variable and we can see that growth in GDP per capita becomes significantly associated with declines in the percentage of undernourished. In column 3 we drop per capita GDP growth and reinstate growth in

<sup>6</sup> The methodology used by Freedom House to develop these indicators is provided at the following address: <http://www.freedomhouse.org/research/freeworld/2001/methodology.htm>



agricultural productivity. The latter becomes more significant but still does not cross the 95% confidence rule. This is due to its strong correlation with the emergency shocks variable (which is, after all, derived by FAO and may be correlated with percentage of undernourishment by construction). Once this emergency shocks variable is dropped in column 4 and replaced with a natural disaster shocks variable compiled by another organization, agricultural productivity growth becomes significant. Also worth noting is the association between increases in the percent undernourished and declines in life expectancy. Countries affected by declines in life expectancy tend to be those most heavily afflicted by HIV/AIDS. As described elsewhere, HIV/AIDS has disastrous impacts on agricultural productivity and on the level of input use in agriculture (Haddad and Gillespie 2001).

A number of variables were not significant in any combination of regressions undertaken: literacy in 1991, the ratio of female to male literacy in 1991, population in 1991, GDP/capita in 1991 and regional location. This suggests that it is changes in the above variables that are more important than initial levels. This is encouraging from a policy perspective as it indicates that changes in the medium term can have important impacts on the drive to World Food Summit targets. Other variables relating to the arable land per person and the percentage of cultivated land under irrigation were not significantly associated with changes in the percentage of undernourished, perhaps being eclipsed by the shock variables.

A number of variables could not be used in the analysis due to missing values. Note that we have data for changes in the percentage of undernourished on 98 countries in LAC, Asia, NENA and Sub-Saharan Africa. In the 4 regressions reported in Table 12, the number of countries for which we also have explanatory variables declines to 70-74. If we include variables such as poverty rates, Gini coefficients and public investment in agriculture the sample size drops to around 40 and it becomes very difficult to obtain significant variables with so few observations. More work needs to be done by FAO and others to fill these gaps. Table 11 indicates the extent to which the variables have missing values.

Despite all these limitations in the data and the time constraints on the analysis and data collection, it is clear that shocks are a crucial factor in knocking countries off the path towards the WFS targets. Shocks are picked up in the frequency with which emergency shortfalls need to be filled, the declines in the adherence to civil rights, and declines in life expectancy. In addition, agricultural productivity growth is positively associated with declines in the percentage of undernourished.

**Table 12: Regression results: correlates of the change in the percentage of undernourished over the 1990-2 to 1996-98 period**

Explanatory variables	Dependent variable: change in prevalence of undernourishment: 1990-92 to 1996-98			
	(1)	(2)	(3)	(4)
Percent change in GDP/capita (PPP), 1991-1997	-4.5726	-10.1725		
	(0.89)	(2.26)*		
Change in value added per unit of agricultural land between 1994 and 1991	-7.9646		-9.0043	-12.0679
	(1.16)		(1.57)	(2.02)*
Percent of adults literate in 1991	-0.0183	-0.0027	-0.0370	-0.0455
	(0.38)	(0.06)	(0.82)	(0.96)
Inflation rate, 1991	0.0030	0.0017	0.0036	0.0058
	(1.31)	(0.84)	(1.64)	(2.70)**
Number of shortfalls in food supplies in current marketing year requiring exceptional and/or emergency assistance, 1996-98	0.6754	0.5978	0.6476	
	(2.87)**	(2.71)**	(2.88)**	
Change in life expectancy at birth, 1997-1992	-0.9022	-1.1381	-1.0096	-0.7236
	(1.73)	(2.34)*	(2.18)*	(1.51)
Change in civil liberties 1997-1991	1.9626	1.8609	2.0654	2.1784
	(2.60)*	(2.47)*	(2.78)**	(2.74)**
Number of natural disasters, 1991-1997, Relief web				-0.3049
				(0.78)
Country in Asia	1.5409	2.7308	0.4653	1.8595
	(0.56)	(1.01)	(0.19)	(0.65)
Country in NENA	0.8131	1.6035	0.4895	-1.0979
	(0.26)	(0.54)	(0.16)	(0.33)
Country in sub-Saharan Africa	-2.1815	-2.9356	-2.4833	-1.1878
	(0.77)	(1.05)	(0.91)	(0.41)
Constant	0.6730	0.7879	1.3134	3.1937
	(0.15)	(0.18)	(0.31)	(0.70)
Observations	70	74	71	71
R-squared	0.35	0.32	0.34	0.25

Note: absolute value of t-statistics in parentheses.

\* significant at 5% level; \*\* significant at 1% level

## 5. Qualitative approaches to understanding the changes in food security in the 1990s

Quantitative approaches are useful for establishing broad patterns and for quantifying their magnitude and statistical significance. But by design, they involve data reduction - a "boiling down" of complex data into a few variables that have a limited range of values. The construction of the shocks variables in Section 5 is an example of this. An essential complement to an expansive quantitative approach is a more intensive qualitative one. The latter helps us to understand exactly what is happening in a given context and

allows a greater understanding of the role that history, culture and power play in determining the evolution of development outcomes.

There are many qualitative approaches that could be employed to help understand changes in food security over time. Some approaches may be participatory in the process of question setting and investigation, others not. The purpose of this section of the paper is to bring in some insights from more qualitative work that could be undertaken in a short space of time for SOFI 2001, and more importantly to highlight some more systematic qualitative approaches that SOFI's in 2002 and beyond could take.

Three short country case-studies - Bangladesh, Ethiopia and Tanzania - were commissioned to bring in some qualitative insights (full case studies are appended to this report). While they do draw heavily on data from quantitative sources, they also draw on more qualitative sources. Moreover the quantitative data tend to be disaggregated. Specifically it was hoped that the case studies would reveal the extent to which the aggregate picture painted by the SOFI data reconciles itself with the case-study leader's long-term understanding of the situation in his/her country. In addition, the inability of the SOFI data to develop a sub-national picture of trends in food security highlighted the importance of identifying groups experiencing food insecurity and understanding the reasons for that insecurity.

In addition to the short case-study approach, several national food security focal points were consulted. The purpose of the contact was to ask the focal points to give their perspectives on the food security situation from the field and to give their opinions on the accuracy with which the SOFI data represented broad food security trends. We used the 18 FIVIMS focal points that had email addresses. In addition we emailed the World Food Program who kindly agreed to send our request for the above information to their food insecurity vulnerability and mapping (VAM) coordinators in country.

## **5.1 Results from the case studies<sup>7</sup>**

The case-studies for Bangladesh, Ethiopia and Tanzania are attached in to this paper. All three countries are classified by FAO as category 5: that is they have prevalences of undernourishment that are greater than or above 35%. As table 13 indicates, the trends in prevalence of undernourishment over the 1990-92 to 1996-98 period are, however, very different. Bangladesh has seen an increase in prevalence from around 34% to 38%, while Tanzania has seen a much bigger rise from 30% to 41%. Ethiopia has seen a large decline in prevalence from 61% to 49%. Data on child malnutrition rates trend in the same direction as the food supply data, increasing from 28.9% in 1991 to 30.6% in 1997. In Bangladesh, the trend for child malnutrition is in the opposite direction (down) to the trend in percentage undernourished (up). No trend data are in child malnutrition are available for Ethiopia during this time period.

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<sup>7</sup> The Bangladesh Case-Study was prepared by Gerry Gill. The Ethiopia case-study was prepared by Alemayehu Kassa. The Tanzania case-study was prepared by Alison Tierney. They are presented in full after the main body of this report.

**Table 13: Selected indicators for the three case study countries**

Variable	Bangladesh	Ethiopia	Tanzania
Percent of population undernourished in 1996-8	38%	49%	41%
Change in percent of population undernourished between 1990-2 and 1996-8	+3.30 points	-12.4 points	+10.5 points
Change in number of people undernourished between 1990-2 and 1996-8	8.20 million	-2.04 million	4.66 million
Percent of preschool children with low weight for age, 1991	65.8	47.7	28.9
Percent of preschool children with low weight for age, 1997	56.3	-	30.6

### **Bangladesh**

The Bangladesh case-study highlights several issues:

- ◆ *The need to go beyond calories when assessing food security.* The case-study describes the increase in prices of pulses relative to the price of cereals. This has negative implications for the nutritional quality of the calories that are available to the population. This supports the argument in Section 2, that future SOFI's need to make a bigger effort to look at the supply of other components in the diet. It also suggests that future investment decisions in agricultural research and development - which are so essential to agricultural productivity - need to be made through a nutrition lens.
- ◆ *The increasing levels of income inequality.* This trend is obviously discouraging from the food access perspective and it supports the arguments in Section 3, for updating the distributional assumptions upon which per capita calorie availability are converted into the numbers of undernourished.
- ◆ *The importance of shocks to the food security situation and the need to reduce the vulnerability of certain types of households.* This echoes the multivariate results found in Section 4. Progress has been made through the improved targeting of food assistance programs during the 1990s, often with a specific objective of targeting women. However, the case-study also suggests that certain groups - households with no adults capable of participating in a public works scheme and households without school age children (and hence are not eligible for school-based food schemes) - are being left behind. Specifically, the South Asian phenomenon of male bias in the intra-household discrimination of food allocation and the need for improved recognition of this problem in SOFI data is stressed. All this argues for agencies like FAO giving greater visibility to sub-national data. It also argues for extant sub-national data to be made much more readily available.
- ◆ *Understatement of cereal production.* The case study aimed to assess how far SOFI 2000 figures represent reality. It notes that with respect to cereal production, the official figure of 0.38% growth in production over the period 1990/91 to 1996/97 may be considerably understated. Other assessments suggest that the figure should in fact be closer to 3.4%. This figure appears to be supported by trends in the use of

inputs and product prices. Caution is therefore recommended in the use of these figures as the basis for the allocation of food aid.

### **Ethiopia**

The Ethiopia case study highlights the following issues:

- ◆ *The existence of much within-country variation in food security status.* The case-study identifies rural households with low asset bundles, displaced and destitute individuals, and pastoralists with limited livestock holdings as the key vulnerable groups. Again, this finding is no surprise and is not anything that FAO's undernourishment data pretend to be able to describe. But it is essential for data collection methods to be developed that allow the tracking of food insecurity at a disaggregated level. Such a system would result in improved resource allocation from a technical viewpoint but if it were developed and implemented in a transparent manner it would also ensure greater accountability on the part of those tasked to deliver resources to the areas that need it most.
- ◆ *There are many sources of difficult-to-reconcile data on food security.* Several data sources - quantitative and qualitative - are cited in the case study. Many of the sources tell apparently contradicting stories about food security trends. The FAO data indicate strong declines in the numbers of undernourished during the 1990s. There has not been a nationally representative anthropometric survey since the early 1990s in Ethiopia so no trend can be established for this variable during the 1990s. However, anthropometric data from 4 sub-regions show a worsening during the corresponding period. In 2 of these 4 regions, a participatory assessment found that participants in the lower and middle income groups felt that their food situation had become less secure during the 1990s. The disparities in these trends may be due to many reasons: the selection of indicators, the selection of different trend start and end points, regions selected, samples selected. Their lack of harmonization, and the lack of recent key benchmark surveys in anthropometry or household food security mean that there is a real potential for these data sources to amount to less than the sum of their parts. As a consequence, there is no real in-country, cross-actor consensus as to what are the priority actions for reducing food insecurity.

### **Tanzania**

The Tanzania case-study highlights the following points:

- ◆ *The centrality of the threat of HIV/AIDS to food security.* For those with the infection, it is the difference between life and death. For those left behind it has "shattered the fragile existence and caused members of the household to find themselves in extreme poverty rather than simply facing routine hardship". The example given is of *mama ntilie*, women food sellers who maintain a livelihood by selling cooked food at street stall. The case-study cites HIV/AIDS as the most significant cause of increases in food insecurity - more important than weather, financial crisis and political changes. It is clear that any food security strategy must operate with an HIV/AIDS lens.
- ◆ *Monitoring the performance of institutions that are supposed to improve the welfare of the poor and food insecure.* The case-study provides an example of how an NGO

programme found it easier to help those who were poor, but not the poorest. The poorest tend to be the most difficult to reach in terms of practical and institutional factors – a point that also emerged in the Bangladesh case study regarding NGO micro-credit schemes which failed to reach the ultra-poor. Also the funds were channeled in such a way that the community was unable to use them in a holistic manner. A loan was designed that could only be used for fishermen who formed themselves into a group - and this reflected the financier’s perceptions of community priorities rather than the communities own perceptions of their needs. As a result the loan was underutilised and the fisherman group soon disbanded. Somehow the performance of institutions that are involved in the promotion of food security needs to be monitored.

- ◆ *A reminder that the monitoring of food security is a means and not an end in itself.* The case-study reminds us that the kinds of data collected under FIVIMS are only useful if they are used to inform policy, strategy and interventions. This underlines the importance of combining the food security data with other data from other sources so that *analysis forms the bridge from assessment to action*. Moreover, the concept of food security should not be seen in isolation from other concepts such as poverty and livelihoods.

## 5.2 Results from email surveys

Approximately 15-20 WFP VAM focal points and 15 FAO FIVIMS focal points were emailed and given a 2 week response time. The email presented the undernourished data for a range of countries and asked the focal points whether the FIVIMS data painted a picture that was in line with their in-field experiences for their own country. The focal points were also asked about sub-national variations in food security trends, the major causes on food insecurity and the constraints to making more rapid progress in meeting WFS targets. Responses were received from 3 VAM and one FIVIMS focal points. Given the tight timelines this level of response is not too surprising.

Nevertheless, there were some commonalities in the responses. All 4 responses (Cuba, Tanzania, Viet Nam and Zimbabwe) indicated that the trends observed by the undernourished data *were* in accordance with trends they perceived in country. Issues raised by the focal points resonated with the issues raised in the case-studies. Table 14 summarizes the issues.

**Table 14: Summary of four responses received to email survey**

Country	Source	Key points
Cuba	VAM/German Valvida	*Impacts of repeated droughts *Low intake of fats, leading to low absorption of micronutrients
Tanzania	VAM/Juvenal Kisanga	*Impacts of repeated shocks *Need for diversity in food availability
Viet Nam	FIVIMS/Dr. Ha Hai Ly	*Income poverty declining more rapidly than food poverty *Women’s status not improving, despite improvements in male nutrition status
Zimbabwe	VAM/Gary Eilerts	*Decline in 1996-8 food availability relative to 1990-2, despite the fact that the situation in 1990-2 was dire due to drought—reflects other shocks experienced in late 90s (El Nino/LaNina, disruption of commercial farming sector, currency weakening etc).

Box 1 presents the response from the Tanzania VAM focal point which highlights the sequence of shocks that have befallen the country in the 1990s and their importance for the failure to improve food security indicators. The report also highlights the importance of accounting for the composition of calories and other components of the food basket.

**Box 1: The Tanzania food security situation: a VAM focal point perspective**

In normal season years, Tanzania is self-sufficient in its staple crop, white maize. However, during the period 1990 – 2000, four major crop failures occurred in the country, as harvests were badly affected by a combination of floods and drought that significantly disrupted food production, further decreasing the already limited purchasing power of the rural poor. In 1991/92 and 1996/7, severe drought hit the country. In the 1997/98 season, a recovery from the previous drought was expected but abnormally high rainfall (El Nino) greatly reduced crop production in many districts. 1997/98 was officially declared a year of famine by the Government. The following year 1998/99, drought again caused food insecurity to over a million people.

Food insecurity is closely related to poverty in this country, as Tanzania is classified as a Low Income and Food Deficit (LIFD) country with a per capita GNP of US\$ 240 (1999). Recent poverty and vulnerability assessments indicate that over half of Tanzania's population of 31 million is classified as poor. Out of this, almost 61 per cent live in rural areas. The rural poor are largely dependent on subsistence agriculture. Especially in the arid and semi-arid areas of the country yield are low. This is due to a number of factors, including limited access to credit and extension services as well as crop damage by pests. The agricultural system is rain dependent and remains highly susceptible to climatic shocks.

The trends indicated by the FAO might be in resonance with the state of food insecurity experienced in the last decade. However, nutritional studies in this country always depict a very contradictory picture in a sense that even in some regions or districts considered to be food self sufficient, cases of malnutrition are sometimes very high, particularly for under-fives. Feeding habits and food basket composition are among the factors contributing to this paradoxical situation.

Other factors, which generally contribute to food insecurity in this country, include: (a) poor infrastructure – it is costly to move grains from surplus to food deficit areas due to poor state of rural roads, and (b) high levels of post harvest losses, which result in rapid decline of household stocks.

Source: Dr. Juvenal Kisanga, VAM focal point.

Three suggestions arise from this analysis:

- it seems that increased levels of support to FIVIMS focal points would have high payoffs in ground-truthing “undernourishment” data trends and in building a demand for food security data.
- an ever closer collaboration between FIVIMS and VAM focal points is also recommended, given the mandate of the VAM focal points and the resources that they have at their disposal.
- in addition, it would be desirable for FAO country-level experts to be drawn into the SOFI process more.

## **6. Recommendations to strengthen the analysis of progress towards World Food Summit targets**

The recommendations outlined in this section concern:

- a) strengthening of the current methodology for estimating the number of undernourished;
- b) new data collection initiatives to be developed, and
- c) a deepening of the analysis of FIVIMS data.

### **6.1 Strengthening the current methods for estimating the number of undernourished**

There are several things that can be done to strengthen the current method for estimating the numbers and prevalence of undernourished. Many of them call for the increased use of extant survey data, greater transparency in the methods used to generate the numbers, and a greater ability and willingness to self-critique assumptions made.

- ◆ Rename the ‘undernourishment’ indicator
- ◆ Use extant data from nationally representative datasets on household calorie availability to update the coefficient of variation estimates that are used to convert mean per capita calorie availability into numbers of undernourished via a log-normal distribution
- ◆ Examine the validity of assuming a log-normal distribution of calories by comparing with the shape of actual distributions of household calorie availability observed from household survey data.
- ◆ Revisit the pros and cons of publishing the “undernourished” data in a year-by-year format. The current policy of publishing the data in 3 year moving averages reduces the impact of measurement error, but also dampens the ability of the indicator to measure valid year on year fluctuations.
- ◆ Expand the exploration of calories by food source and use data on the availability of fats and proteins. Consider the conversion of food supply data into micronutrient availability.
- ◆ In a few select countries, compare estimates of the number of undernourished, the per capita food availability and the sources of calories from food balance sheet data with estimates of these dimensions of food availability obtained from household surveys.
- ◆ ***Develop a global database on household food insecurity*** that presents summary data on food consumption from the most recent household surveys in low-income countries. Summary data should be presented using methodology that is as close to uniform as possible and where not possible, the methodology should be clearly spelled out. Standard tables should show the percent of individuals or households with calorie availability below some cut-off, broken down by region, gender of head of household, income group, and primary activity pattern.



- ◆ Develop state of the art food insecurity maps using similar methods to poverty maps that combine household survey data and census data. Related expertise exists within many organizations to do this and Japanese-funded work on this type of map is being undertaken gradually by FIVIMS in Asia. Perhaps an expert consultation should be undertaken in partnership with the World Bank, WFP and key PVOs.
- ◆ Some exploratory attempts to use household consumption data to classify households into livelihood categories should be attempted. In this way the relationships between food security, poverty and livelihoods could be developed.
- ◆ Consider the use of extant panel household survey data to construct estimates of the proportion of households that are chronic and transitory. The chronically food insecure (i.e. those below some cut-off at all times) will require a different policy response to those falling below the cut-off at certain times (i.e. the transitorily food insecure).
- ◆ Use actual time allocation data when available to assess the robustness of assumptions made about activity patterns when determining calorie cut-offs.
- ◆ Use a joint probability method of estimating the tail of the calorie availability distribution in addition to the existing method. The former method allows for a correlation between intakes and requirements.
- ◆ Be more transparent in the methods used, the assumptions made and the rationale for the assumptions. Undertake sensitivity analyses on the assumptions, perhaps publishing optimistic, pessimistic and middle level estimates. Publish standard errors and confidence intervals whenever possible.

## **6.2 New initiatives for food security data collection.**

Many of the suggestions made here are not intended to compete with the recommendations made in the previous sub-section. They should be seen as complementary and more exploratory. All of these efforts should be undertaken in partnership with key actors in food insecure countries so as to maximise capacity development within country and within FAO.

- ◆ Develop standard protocols for collection of food insecurity data at different levels of cost, accuracy and reliability. A standardization of methods in best practice type papers or manuals would promote the collection of new consumption data, especially if it can be done in a manner that is sensitive to the timeliness of data needs and the availability of resources.
- ◆ Be opportunistic in identifying new opportunities for the collection of food consumption/food security data. Many new data collection activities (such as LSMS surveys, DHS surveys, Labor force surveys, UNICEF/MICS surveys and PVO surveys ) may be both suitable and amenable to the addition of some type of household food availability module.

- ◆ Form a series of partnerships with universities and research institutions to enhance the collective capacity to analyse food security data.
- ◆ Liaise with others agents such as SCF, HKI and CARE to harmonise rapid methods for the collection of food security data.
- ◆ Use the SOFI process to bring different FAO units together. There are many centres of excellence within FAO related to issues of food availability assessment and analysis. The SOFI document is the result of a SOFI process that has considerable potential in terms of bringing these centres of excellence together. In this way the SOFI process can serve to coordinate FAO activities in this area, identifying complementary activities, and the potential for new joint action.

### **6.3 Deepening the analysis of food insecurity data**

In general, there needs to be a greater emphasis on the analysis of FAO data on undernourishment. The multivariate analysis presented in this report is indicative of what can be achieved in the short run. A more considered approach, with the build-up of an open access dataset would lead to a stronger analysis culture.

- ◆ More multivariate analysis of undernourishment data and the types of data described in Tables 10 and 11. Particular emphasis should be given to the quality of shocks data (both in terms of frequency and severity) as it is clear that many of the worst-performing countries in Section 2 have suffered from shocks, whether they are related to conflict, governance, HIV/AIDS, or weather extremes. It should be noted that analysis in sections 2, 4, and 5 are comparisons of only two points in time. Obviously, the more data points that can be included and analyzed within a time-series context, the better. As one of the email questionnaire responses pointed out, the use of only two data points per country makes the direction of the shift in indicator between the two periods more sensitive to the actual periods selected. The multi-year datasets constructed should be made available for others to use. In this way FAO can lead the debate on the reasons behind the progress (or lack thereof) of countries towards WFS targets.
- ◆ Develop better in-country listening posts about what is happening to food insecurity in a particular country. The listening posts would highlight the types of groups within country that are vulnerable to food insecurity, the constraints to progress, and the changes that are needed for accelerated progress. The picture that emerges from these listening posts should be reconciled with FAO/FIVIMS undernourishment data and the aforementioned multivariate analysis.

## **7. Summary and conclusions**

According to FAO/FIVIMS data, over the 1990-92 to 1996-98 period, the number of individuals that are undernourished has fallen by 47 million. Countries that were the most undernourished in 1990-92 were responsible for a net increase of 20 million during the 1990-92 to 1996-98 period, while countries in the middle undernourishment category in 1990-92 showed a decline of 61 million people. Regionally, most of the decreases came from Asia and most of the increases from Africa. South Asia (-7 million), South East Asia

(-14million) and East Asia (-49 million) led the way in terms of reductions, while Central Africa (+15 million), East Africa (+7 million), Near East and North Africa (+9 million) and Southern Africa (+3 million) comprised the bulk of the increases. China and India demonstrated the largest single country declines in the numbers of undernourished, while the Congo Democratic Republic, the Korean People's Democratic Republic and Bangladesh demonstrated the largest increases in the numbers of undernourished.

Ordering the countries by the changes in the percentage of undernourished (as opposed to numbers of undernourished) produces similar rankings, but highlights the increases in undernourishment in less populous countries such as Burundi, Cuba and Mongolia. Ranking countries in a third way - by the increase in the numbers of undernourished as a percent of the numbers in 1990-92 - highlights the large increase in undernourishment in Iraq from a relatively low initial level. Cross-classifying the percentage of undernourished figures by the percentage of calories from cereals and roots and tubers (a higher figure indicates a less varied and therefore a less nutritious food supply) highlights the extreme vulnerability of countries such as Afghanistan and Eritrea that have high values for both these dimensions of food security.

The conceptual distance between analyses of 'undernourishment' and analyses of what we think of as 'food insecurity' is large. Concepts of economic, social and physiological access, vulnerability and safety are not captured by it. Attempts to make the food supply data more sensitive to distributional concerns result in country rankings of the undernourished that are closely related to per capita calorie supply because the two measures have a correlation coefficient of approximately -0.9. Quite frequently the correlation of changes in undernourishment runs against trends in child undernutrition. This is most clearly seen in Malawi, Nigeria, Algeria and Egypt where the percentage of undernourished are falling, but for the same years, the percent of undernourished children is increasing. Some of this disconnect is due to the fact that the two indicators assess different phenomena. However, the incorporation of some of the methodological improvements listed in Table 6 for the estimation of the undernourishment figures should increase the correspondence between these two variables. The true contribution of increased food security to reductions in child undernutrition would probably increase as a result of this methodological strengthening.

The correlates of poor performance in terms of reducing undernourishment are related to shocks (HIV/AIDS, governance, and conflict) and to agricultural productivity growth. Many data points are missing for certain countries in certain years. This result would probably be even stronger if the undernourishment data were published in a year on year manner rather than as a three-year moving average. The data need to be made more complete and a fuller analysis undertaken for SOFI 2002. The data should also be made available on the FAO web site to allow the wider community of analysts to contribute to FAO's mission. Analysis of variation in food security performance at the country level - both over time and within country - is a crucial complement to the multivariate approach which explores variations across countries. In the limited time available three case studies were analysed (Bangladesh, Ethiopia, and Tanzania) and two sets of email inquiries were conducted (with WFP VAMS focal points and with national FIVIMS focal points).

The case-studies highlighted many of the themes that emerged from the more quantitative analysis. The importance of investment in agricultural research (Bangladesh), the devastating impact of shocks such as HIV/AIDS (Tanzania), the

crucial importance of the intra-country distribution of food insecurity (all case-studies), the need to harmonise and analyse data collected (Ethiopia and Tanzania) and the need to monitor the capacity and institutional aspects of food security-related development aid (Tanzania). The handful of responses received from the email surveys tended to corroborate the country-specific picture painted by the trends in the undernourished data, but obviously shed a lot more light on the subnational trends in food security, the causes of food insecurity and the constraints to further progress.

A number of recommendations were made with the aim of strengthening data collection and analysis to act as a spur and guide to action. Several suggestions were made for strengthening the FAO methodology for estimating the numbers of undernourished. The suggestions are not resource intensive and should be feasible in the short-run. Many suggestions relate to the updating of data underlying assumptions and the demonstration of the sensitivity of the estimates of undernourished to assumed values behind cut-offs and measures of distribution. A second set of assumptions relates to new data collection that are better able to predict shocks to food insecurity, and urges a collaboration between FAO and other centres of excellence in food consumption data collection to develop a series of expert meetings and exploratory studies on options for food security data collection at different levels of capacity and resource availability.

The final set of recommendations relates to the need for increased data analysis as a bridge between assessment and action. More quantitative analysis needs to be undertaken on the determinants of performance in meeting WFS targets. In addition, improved listening posts need to be developed in-country, drawing on FAO staff, WFP/VAM staff and FIVIMS focal points.

Finally, there should be increased recognition that the SOFI process is valuable in and of itself. It provides an opportunity to coordinate food security expertise across the many different FAO units and to forge a consensus on priorities for action to hasten the achievement of WFS targets.

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**Appendix Table 1: Description of Data Used and Data Sources**

Variable label	Variable Description	Source and Comments	Number of countries for which observations exist
diffp7p1	Change in percent of undernourished between 1996-8 and 1990-2	FAO data. Source: SOFI 2000.	98
gdppcg	Percent change in GDP/capita (PPP), 1991-1997	Source: World Development Indicators 2000. World Bank.	86
gdppc91	GDP/capita in 1991 (PPP)	Source: World Development Indicators 2000. World Bank.	86
yieldg	Change in value added per unit of agricultural land between 1994 and 1991	Source: World Development Indicators 2000. World Bank.	80
flmlna	Ratio of female to male literacy in 1991	Source: World Development Indicators 2000. World Bank.	91
read91	Percent of adults literate in 1991	Source: World Development Indicators 2000. World Bank.	91
rup91	Percent of population rural in 1991	Source: World Development Indicators 2000. World Bank.	98
irld91	Percent of cropland that is irrigated, 1991	Source: World Development Indicators 2000. World Bank.	92
irld97	Percent of cropland that is irrigated, 1997	Source: World Development Indicators 2000. World Bank.	94
inflat91	Inflation rate, 1991	Source: World Development Indicators 2000. World Bank.	81
inflat97	Inflation rate, 1997	Source: World Development Indicators 2000. World Bank.	83
lifexp92	Life expectancy at birth in 1992	Source: World Development Indicators 2000. World Bank.	98
lifexp97	Life expectancy at birth in 1997	Source: World Development Indicators 2000. World Bank.	98
day91	Percent of population below \$1/day in 1991	Source: World Development Indicators 2000. World Bank.	45
day97	Percent of population below \$1/day in 1997	Source: World Development Indicators 2000. World Bank.	4
gini91	Gini coefficient of income distribution in 1991	World Development Report 2000/1. World Bank. Oxford University Press.	45
gini97	Gini coefficient of income distribution in 1997	World Development Report 2000/1. World Bank. Oxford University Press.	4
expagag1	1991: Govt. Expenditure on Agriculture as % of Agriculture GDP	Annex Table 5, Mobilising Resources to Fight Hunger, FAO web site	39
expagag7	1997: Govt. Expenditure on Agriculture as % of Agriculture GDP	Annex Table 5, Mobilising Resources to Fight Hunger, FAO web site	22
expagt1	1991: Expenditure on Agriculture as a Share of Total Expenditure	Annex Table 7, Mobilising Resources to Fight Hunger, FAO web site	41
expagt7	1997: Expenditure on Agriculture as a Share of Total Expenditure	Annex Table 7, Mobilising Resources to Fight Hunger, FAO web site	24
shk_exem	Number of shortfalls in food supplies in current marketing year requiring exceptional and/or emergency assistance, 1996-98.  From <i>Foodcrops and Shortages</i> . GIEWS. FAO web site.	"Refer to an exceptional shortfall in aggregate supplies or a localized deficit as a result of crop failures, natural disasters, interruption of imports, disruption of distribution, excessive post-harvest losses, other supply bottlenecks and/or an increased demand for food arising from population movements within the country or an influx of refugees. In the case of an exceptional shortfall in aggregate food supplies, exceptional and/or emergency food aid may be required to cover all or part of the deficit."	98
polit_91	Political Liberties in 1991, Freedom House Index (1 is most free)	Freedom House, Freedom in the World. New York/ Washington D.C. ( <a href="http://www.freedomhouse.org/research">www.freedomhouse.org/research</a> )	95
civil_91	Civil Liberties in 1991, Freedom House Index (1 is most free)	Freedom House, Freedom in the World. New York/ Washington D.C. ( <a href="http://www.freedomhouse.org/research">www.freedomhouse.org/research</a> )	95
polit_97	Political Liberties in 1997, Freedom House Index (1 is most free)	Freedom House, Freedom in the World. New York/ Washington D.C. ( <a href="http://www.freedomhouse.org/research">www.freedomhouse.org/research</a> )	96
civil_97	Civil Liberties in 1997, Freedom House Index (1 is most free)	Freedom House, Freedom in the World. New York/ Washington D.C. ( <a href="http://www.freedomhouse.org/research">www.freedomhouse.org/research</a> )	96
nat_dist	Number of natural disasters, 1991-1997, Relief web	UN Office for the Coordination of Humanitarian Affairs (OCHA). Financial Tracking Database for Complex Emergencies. Contributions for Natural Disasters. Found at Relief Web. ( <a href="http://www.reliefweb.int">www.reliefweb.int</a> )	98



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**DFID-Funded  
Technical Support Facility to FAO's FIVIMS**

***Managed by the*  
Overseas Development Institute**

**Theme 1: Deepening the Analysis of the Factors  
Behind Progress Towards WFS Targets**

**Case Study 1: Bangladesh**

Gerry Gill

(ODI Research Associate)

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*Edited by Karim Hussein & Tom Slaymaker (ODI)*

## **Bangladesh Case Study**

### **Executive Summary**

Despite considerable progress in reducing human poverty, during the first half of the 1990s Bangladesh failed to maintain previous momentum in reducing income poverty, and is now placed in the worst of FAO's five categories in terms of prevalence of malnutrition. Chronic food insecurity is compounded by frequent livelihood shocks caused by extremely adverse weather events. Nevertheless, per capita cereal production trends are positive, and may well have been significantly underestimated in Government figures. Thus the FAO estimation that prevalence of malnutrition rose from 34% to 38% during 1990/92 to 1996/98 may be unduly pessimistic, at least in terms of calories. However, production of more nutritious foodstuffs (particularly pulses and fish) is in long-term decline, and quantitative improvement in a context of qualitative deterioration still indicates that malnutrition is on the increase. Although there is potential for further increasing agricultural productivity, exceptionally high population density implies that in the longer term a growing portion of the country's food supply will have to be imported. Past and present improvements in human capital lay the foundations for this.

Three groups are particularly vulnerable to food insecurity: the poor, women and girls and those living in disaster-prone areas. The government defines both upper and lower poverty lines in terms of calorie consumption, and the figures indicate the position of the poorest (the 'ultra-poor') is still improving in absolute terms. However the official definition of poverty does not take into account the deterioration in quality of diets. Moreover, income inequality is growing, so that, even using a caloric measure of poverty, the relative position of the poor has been declining. Intra-household discrimination against women and girls in terms of access to food is widespread in Bangladesh, and should receive greater recognition. Those living in coastal and riverine areas are particularly vulnerable to weather-related livelihood shocks, including loss of physical and natural capital and erosion of savings. Nevertheless, improved disaster management has enhanced the provision of safety nets for those struck by natural calamity. In addition, policy reforms in the early 1990s have led to better targeting of food interventions, thereby improving provision for the chronically food-insecure, even if the amount of food available remains small in relation to need. However some of the very poorest households, which cannot rely on the safety nets normally provided by social capital, are also being bypassed by both government and NGO anti-poverty interventions.

### **1. Introduction**

Table 1 provides some basic food and nutritional indicators for Bangladesh. These attest an extremely adverse position in both absolute and relative terms: every indicator is among the worst for the Asia-Pacific region. According to FIVIMS, the prevalence of malnutrition actually increased from 34% in 1990-92 to 38% 1996-98. This is more than double the Asian average, and it places the country in the lowest of FAO's five categories (i.e. prevalence of malnutrition  $\geq 35\%$ ). The average food deficit of the under-nourished is in fact 13% higher than the equivalent figure for sub-Saharan Africa. Moreover excessive reliance on the starchy staple for daily energy supply indicates serious dietary imbalance.

**Table 1. Food Availability and Undernourishment**

<b>Food Availability and Undernourishment Indicators and Overview</b>	
Dietary energy supply	2060 Kcal/person/day
Dietary energy supply of the undernourished	1460 Kcal/person/day
Food deficit of the undernourished	340 Kcal/person/day
Share of main food group (rice) in DES	81 %
Proportion of population undernourished	38 %
Nutritional status of under five year-olds:	
- Underweight (%)	56 %
- Stunted (%)	55 %
- Wasted (%)	18 %
- Mortality rate (‰)	115 ‰

Sources: SOFI 1999, 2000

Chronic undernutrition arises mainly from the fact that Bangladesh is the world's most densely-populated agrarian country. Agriculture is the largest sector of the economy, contributing around 30% of GDP. Population is currently around 134 million and, although as much as 55% of the land is farmed, there is only 0.07 ha of agricultural land per capita, so that food production potential is severely restricted. More than 80% of the population is rural and nearly 50% of the rural population is functionally landless, with the bottom 40% of households owning less than 2% of the land (GoB 1999a, IFAD 1999 and World Bank 1999a). Compounding this, the country is prone to extreme weather conditions in the form of floods, droughts, cyclones and tornadoes, which leave much of the population vulnerable to both temporary setbacks and catastrophic loss of assets. In such a situation poverty is both endemic and closely linked to food insecurity.

The picture painted in Table 1 is bleak – perhaps misleadingly so, for in fact considerable progress has been made by Bangladesh in reducing poverty during the thirty years since Independence. The box overleaf provides some important indicators. However the statistics indicate that progress in reducing human poverty has not been matched by corresponding reductions in income poverty, largely because economic growth has been sluggish, particularly in the dominant agricultural sector. In the 1990s GDP grew at 5-6% in most years, although there was a downturn to 3.3% in 1998/99 due to severe flooding (ADB 1998). In per capita terms these figures translate into 3-4% growth in most years, which is not very impressive, given the economy's low starting point, the pressing need for improvement and the much better performance levels of some other Asian countries.

## **2. Trends in food production and availability**

Table 2 provides some comparative agricultural growth figures for selected Asian countries. Bangladesh's relatively poor performance here is due partly to the continued conversion of agricultural land to other uses, which has masked impressive progress in increasing cropping intensities. Between 1973/74 and 1996/97, despite loss of 13% of agricultural land, total cropped area grew by 16%.<sup>8</sup> The main constraint on growth has apparently been poor performance in increasing crop yields – as demonstrated by the country's low position in the league table of cereal yields (Table 3 – but see Box 1).

<sup>8</sup> Figures calculated from GoB 1999a and 2000b.



**Table 2: Agricultural growth rates of selected Asian countries: 1970-1997 (% p.a)**

Country	1970-80	1980-90	1990-97
Bangladesh*	1.86*	2.7	1.7
China	3.2	5.9	4.4
India	1.8	3.1	3.0
Indonesia	4.1	3.4	2.8
South Korea	2.7	2.8	2.1
Malaysia	5.0	3.8	1.9
Pakistan	2.3	4.3	3.8
Thailand	4.4	4.0	3.6

\*1973-1980. Source: World Bank 1999a Table II.1

**Table 3: Cereal yields in selected Asian countries\* (MT/ha)**

Country	Rice	Maize
Bangladesh	2.78	1.03
China	6.19	4.94
India	2.87	1.64
Indonesia	4.34	2.58
South Korea	6.93	4.12
Malaysia	2.98	1.79
Pakistan	2.84	1.43
Thailand	2.36	3.50
Asia	3.87	3.71

\*Three-year averages, 1996-98. Source: calculated from FAO 1999

**Box 1: Indicators of Success in Reducing Poverty in Bangladesh**

- Population growth rates fell from 3% in 1970s to 1.8% in by the end of the 1990s
- From the 1970s to the 1990s population grew by about 70%, but foodgrain production doubled
- The yearly foodgrain gap narrowed from 40 kg/person in the early 1970s to 17 kg/person in the early 1990s
- Per capita GNP has increased from US\$280 in FY1990 to US\$350 in 1998
- Impressive progress in reducing human poverty: incidence fell from 61.3% in 1981/82 to 47.2% in 1993/94
- Key social indicators such as life expectancy at birth, and infant and under-five mortality rates improved at rates above the LDC average during 1970 to 1997, while total fertility rate fell at the fastest rate in South Asia
- The country's Human Development Index was 0.166 in 1960, 0.309 in 1992 and 0.433 in 1997

Sources: World Bank 1999b and various issues of the Human Development Report

Figure 1 (appendix) shows that cereal production fell during the first half of the 1990s, but recovered in the second half.<sup>9</sup> Since 1994/95 it has been increasing faster than population, thereby significantly reducing the 'cereal gap'. In fact, the true situation may

<sup>9</sup> *Boro, aus* and *amon* are the country's three rice seasons and the figures indicate rice production in each season.

be much more favourable than these statistics indicate, for quite a number of analysts believe, on the basis of input use and product prices, that there has been considerable underestimation here (World Bank 1999a). One source estimates that cereal output grew by 3.4% per annum over the 1990/91 to 1996/97 period, not at the 0.38% indicated by official figures (Mitchell and Islam 1998). The already high figures for cropping intensity and the relatively low yield estimates, suggest that if there has been underestimation, it has probably been in yields.

Fluctuations in domestic cereal production are smoothed out by a combination of commercial and concessional imports and off-take from stocks. However, there is little import of other foodstuffs and no stocks are held, so that their availability is much more variable. Per capita availability figures are published for a limited number of foodstuffs, and the statistics for four of these are shown in Figure 2<sup>10</sup> (appendix). Clearly, availability of eggs has increased most, but animal produce in general does not figure significantly in the diets of the poor, and not at all in those of the ultra poor. The same is true to a lesser extent of edible oils. Although these are nutritionally essential, they are expensive, and the volume consumed by the poor is very small. On the other hand, cereals and pulses have traditionally figured very prominently in the diets of the very poor, and it is very important to maintain a balance here, because of the protein-efficiency of such a mix.

Figure 2 indicates that in fact per capita availability of pulses fell by 25% over the period. This is consistent with the finding of the Household Expenditure Survey that per capita consumption in the rural areas fell by 27% between the 1991/92 and 1995/96 rounds (GoB 1998). The most likely explanation is crop substitution. Pulses are primarily a dry-season crop, and with the spread of irrigation, *boro* rice (which is much less risk-prone) can be substituted. *Boro* production has been rising steadily (see Figure 1), while area under pulses fell by 12% between 1983/84 and 1990/91, and by 5% between 1991/92 and 1997/98.<sup>11</sup> Per capita acreage therefore fell by 24% and 15% in these two successive periods. During the 1990s the price of pulses increased by around 70%, while rice prices remained stable.<sup>12</sup> In Bangladesh the poorest households spend an estimated 70% of their incomes on food (GoB 1999a, Table 14.25), and it can be assumed that as the pulses: cereals price ratio rises, such households will substitute cereals for pulses. No studies are presently available to indicate the extent to which this has actually taken place, but availability, price and acreage statistics, macro-level consumption estimates and information from key informants in the agricultural sector are all consistent in indicating that substitution has indeed been taking place. Paradoxically this situation is worsened by government policy in targeted food assistance programmes, which at least until recently, provided assistance only in the form of wheat and rice (see Section 4).<sup>13</sup> Given the already extreme dependence on cereals for nutrients, any increase in this reliance must be viewed with grave concern.

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<sup>10</sup> In addition to the foodstuffs shown in Figure 2, statistics are published on the availability of tea, onion, chillies, sugar, molasses, salt, meat and milk & milk products,

<sup>11</sup> Calculated from GoB 1999a, various tables. The two series are reported separately because a definitional change in 1991 renders comparison invalid.

<sup>12</sup> This assessment is based on price trends calculated from raw price data published in GoB 1999. The trend of pulse prices is significantly positive at  $p < 0.005$ , while that of rice prices is not statistically significant.

<sup>13</sup> More recently, cash payments have begun to be substituted for cereals in a small way, and this could have an impact in terms of nutrition, although the growing price differential between cereals

The problem of deterioration in the quality of diet despite long term increases in quantity, is heightened by the fact that capture fisheries, another traditionally important contributor to the quality of poor people's diets, is also in decline. In this case the cause is over-fishing, declining stocks and resulting social conflict. Eight percent of the population of Bangladesh relies solely on capture fisheries for their incomes, whilst 73% – including some of the poorest elements in society – engage in part-time subsistence fishing from open access water bodies. Since 1970 there has been a steady and consistent decline in the annual per capita consumption of fish from 11kg to 7.5kg (DFID 1998: 3.4.1).

### **3. Vulnerability to food insecurity**

Although Bangladesh does suffer from such problems as HIV/AIDS, conflict and political instability, they are not sufficiently severe to impinge on food security in the way that they do in sub-Saharan Africa. In Bangladesh vulnerability to food insecurity is mainly a function of poverty, position within the household and geographical location.

#### **3.1 Poverty**

The Bangladeshi government implicitly defines poverty in terms of food security, defining the 'poor' as those consuming less than 2,122 kcal/day and the 'hardcore poor' as those consuming less than 1,805 kcal/day (FAO 2000). Based on these upper and lower poverty lines, around 55 million people (47.5% of population) were categorised as poor, and 30 million (25.1%) as 'hardcore poor' in 1995/96 (GoB 1999a). As in other developing countries, participatory poverty assessments in Bangladesh have uncovered a much more complex view of the structure of poverty among rural people, but food security (in terms of how long a household's own food supply lasts) figures high on the list of indicators (Sharp 2001, CARE 2000 Table 1).

**Table 4: Incidence of 'poverty' and 'hardcore poverty'**

Year	Poor*		Hardcore Poor*	
	millions	%	millions	%
1983/4	58.4	62.6	34.3	36.8
1985/6	55.3	55.7	26.7	26.9
1988/9	49.7	47.8	29.5	28.4
1991/2	51.6	47.5	30.4	28.0
1995/6	55.3	47.5	29.1	25.1

\* The definition of Poverty Line I was reduced from 2200 to 2122 kcal/day in the 1988/89 survey, while that of Poverty Line II was increased from 1800 to 1805 kcal/day. These definitional changes may well account for the size and direction of the movement in both sets of figures between 1985/86 and 1988/89. Source: GoB 1999a Table 14.28

Table 4 indicates considerable progress in reducing poverty in the 1980s, and these figures are consistent with the FIVMS assessment that the proportion of undernourished people fell from 42% in 1979/81 to 34% in 1990/92. However the two sets of figures for the 1990s are inconsistent. The Government statistics indicate that over the period 1991/92 to 1995/96 the proportion in 'poverty' remained the same, while those in 'hardcore poverty' fell by three percentage points. This indicates continued, if slower,

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and pulses may severely limit the degree of 'reverse substitution', especially in the case of the most vulnerable groups at whom such programmes are mainly targeted.

progress in poverty reduction, since the figures imply that some of the ‘hardcore poor’ were becoming merely ‘poor’, replacing people in the ‘poor’ group, who had moved above the upper poverty line.<sup>14</sup> Given that the Government defines both poverty lines in terms of caloric intake, it is difficult to reconcile this with the SOFI assessment that over roughly the same period (1990/92 to 1996/98) the prevalence of malnutrition rose from 34% to 38%. In fact if it is true, as reported earlier, that cereal production has in fact been increasing much more rapidly than the Government statistics suggest, both of the above estimates are unduly pessimistic, and Bangladesh should perhaps be reclassified as a Category 4 country. A more important issue, however, is how useful such a reclassification would be in a situation where quantitative improvement had been achieved in a context of qualitative deterioration.

Trends in income equality are important determinants of trends in the prevalence of malnutrition, and the findings here are disturbing. Table 5 shows that the Gini coefficients have been rising, indicating that the poor are gaining more slowly than the not-so-poor as the economy grows (albeit sluggishly). Taking the lowest two deciles as approximately representative of the ‘hardcore’ poor, during the first half of the 1990s, their position declined in relative terms. In 1991/92 the poorest 20% received 6.5% of all income, but by 1995/96 this figure had fallen to 5.7%, a drop of 12.3%. Taking the 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> deciles roughly to represent the next vulnerable group, i.e. those who are ‘poor’ but not ‘hardcore poor’, the position also worsened over the period, with their share of income falling from 18% to 16.2%, a fall of 10%. However during this same period the country’s per capita GDP grew by 34% at constant market prices, suggesting a slight improvement for both the poor and the hardcore poor in absolute, if not relative, terms.<sup>15</sup>

**Table 5: Gini coefficients of income distribution**

	<b>Rural</b>	<b>Urban</b>	<b>National</b>
<b>1983/4</b>	0.350	0.370	0.360
<b>1985/6</b>	0.360	0.370	0.379
<b>1988/9</b>	0.368	0.381	0.379
<b>1991/2</b>	0.364	0.398	0.388
<b>1995/6</b>	0.384	0.444	0.432

Source: GoB 1999a Table 14.27, based on data from GoB 1998b

Gini coefficients are not available for the period since 1995/96, but data on wage rates suggest that there has been something of an upturn since about then. Figure 3 shows how real wage rates in agriculture and construction (proxies for wages in rural and urban areas) changed during the 1990s. Both series fell until 1993/94, but then improved by 25% over the next five years. Both series are so volatile it would be difficult to draw any very firm conclusions about long-term trends from so few observations, but what can be said is that the very volatility of these two series indicates that labourers’ incomes are vulnerable to severe shocks. For example, the dip in the mid 1990s was due to prolonged drought. Drought is a period not only of food scarcity and high prices, but also of low labour demand, so the shock of wage cuts for the few who could find work would be mirrored by the even greater shock of unemployment for the many who could not.

<sup>14</sup> This view is supported to a certain, but inconclusive, extent by longitudinal village studies indicating reduction in the severity of poverty in four study villages between 1980 and 1995 (Greeley 1999).

<sup>15</sup> These figures are calculated from statistics in GoB 1999a Tables 11.06 (GDP) and 14.27 (income distribution).

### 3.2 Intra-household discrimination

Within poor households children and pregnant women are particularly vulnerable to the switch to a more restricted diet that was described earlier, because of relatively high protein needs. Women are often subjected to more intentional forms of bias, because tradition dictates that men eat first and most. The evidence for this is considered in a recent review, which, although it did find some evidence of discrimination aversion, also found many households in which men did indeed consume more food than women, and boys consumed more than girls (Haddad *et al* 1996).<sup>16</sup> The current SOFI report seriously underplays this issue by misquoting the review in question: “Evidence of pro-male bias in food consumption is scarce” (SOFI 2000 box p. 11). In fact the original paper prefaced this conclusion with the words “Outside South Asia ...” going on to add that “Within the South Asia region, the few studies that have examined this issue found strong evidence of pro-male bias” (*ibid* p. 24). The Bangladesh government itself accepts that there is pro-male discrimination in food distribution, as in the current five year plan, which notes that “Excessive mortality among women due to discrimination has resulted in a sex ratio whereby there are 105 men for every 100 women. Nutritional status of women and girls is marked by sharp differences with that of men and boys” (GoB 1998a p.167). This is illustrated by the latest estimates, showing that 45% of adult men and more than half of adult women do not have access to minimum caloric requirements, and that “infants, pre-school children and pregnant and lactating women are at greater nutritional risk than others” (FAO 2000:5).

### 3.3 Disaster - prone areas

Within a pattern of regional variation in the incidence of poverty, there are localised pockets of extreme vulnerability to weather events that destroy livelihood assets. The problem is growing as population pressure drives increasing numbers to settle in disaster-prone areas. Table 6 lists the major disasters that have struck the country since Independence.

**Table 6: Major natural disasters since 1971**

Year	Event	Nature of Calamity
1998	Floods	Submerged 60% of land; 1,100 deaths; widespread damage to infrastructure
1995 and 1997	Floods	Killed 6,000; widespread damage to livestock and fisheries
1991	Cyclone	140,000 killed; 15m others affected in coastal areas
1990	Floods	Widespread and devastating
1989	Tornado	1,000 deaths; local devastation to livelihoods
1987 and 1988	Floods	Series of floods killed 5,000 and caused widespread devastation
1985	Cyclone	Localised, but killed 8,000 and caused considerable damage

<sup>16</sup> The complexity of the situation is illustrated by a recent study showing that discrimination in intra-household food distribution is influenced by, among other things, the current individual assets of each parent and the share of assets each parent brought to the marriage (Hallman 2000).

Year	Event	Nature of Calamity
1974	Floods	Widespread flooding killed over 20,000 and damaged wide areas of farmland
1970	Cyclone	Worst in a century; 224,000 killed 600,000 homeless; widespread damage to farmland and destruction of two-thirds of fishing activity

Source: World Bank 1999a, Table I.2

Cyclones figure prominently here. These storms do not travel far inland, so that only those living in the coastal belt are vulnerable, but the effects can be locally devastating, with direct storm damage followed by tidal waves and flooding which together destroy infrastructure, buildings, livestock, fisheries and food stocks. Salinisation of the fields implies long-term devastation of soil fertility. Flooding also features strongly in Table 6. Inland about 10 million people live in close proximity to the major rivers in very erosion- and flood-prone conditions. At least half of the land surface is subject to inundation and even in a normal year thousands of people lose their homes and lands to flooding. Bank erosion is a major problem: about 2,400 km<sup>2</sup> are affected annually, and between 1982 and 1992 there was an estimated net loss to river erosion of 87,000 ha of mainly agricultural lands (GoB 1998a). It is estimated that over half of the rural landless in Bangladesh lost their land to riverbank erosion (Baqee 1999). Figure 4 reproduces a map from the 1999 SOFI report showing famine-prone areas of Bangladesh. This clearly displays the relationship between vulnerability to famine and proximity to the main river systems. Other major pockets of famine vulnerability can be seen in the north-west, where additional contributory factors include scarcity of non-farm employment opportunities and unusually unequal land distribution (Expert Group 2000:20).

#### **4. Safety nets**

Government efforts to improve the food security situation were systematised in a series of policy reforms in the 1990s. Early in the decade the system of large-scale interventions in rice and wheat trade was dropped in favour of a more market-oriented and private sector-based approach. In addition, the previous system of untargeted 'statutory' rationing was abandoned in favour of more targeted interventions aimed at the nutritionally vulnerable. This led to the share of public food distribution going to poor households rising rapidly from under 40% to over 80% (Expert Group 2000:3). The 1997 National Policy Statement on Food and Nutrition and the related Nutrition Plan of Action (GoB 1997) contain specific targets, together with a general statement of aims with respect to increasing food production. These emphasise desiderata such as: meeting the nutritional needs of vulnerable groups (women, children and the elderly), minimising post-harvest losses, ensuring safe drinking water, improving nutrition education and developing income-generation activities. Several vehicles are mentioned for achieving this – such as increasing food production, promoting agricultural diversification and discouraging tobacco production – but, other than the above targeted interventions, few concrete measures are proposed for linking increased production to improved nutrition.

Another important policy statement is the 1999 National Agricultural Policy. Traditionally agricultural policy has had one overriding aim, the attainment of cereal self-sufficiency, but the new policy's objectives include that of increasing production and supplies of "More nutritious food crops and thereby ensuring food security and improving nutritional status" (GoB 1999:4). Given the population's excessive reliance on cereals for nutrition, this is a welcome development, but again the necessary linkages between aggregate

production and consumption by the food insecure are not clearly spelt out. The most recent policy statement in the area of food and nutrition is the Comprehensive Food Security Policy, which was approved last year (Expert Group 2000). This does make a clear linkage between food security and food entitlements, suggesting means of improving existing policies on short-term access (direct food transfers or the cash proceeds from food aid monetisation) and longer-term access (action to reduce food prices, employment-generating economic growth through public infrastructure investment, skill development and growth-promoting macroeconomic policies). The new urgency with which the Government has come to regard food security issues is in tune with the SOFI scenario in which “A country with higher prevalence of undernourishment and a daily dietary energy deficit of over 300 kilocalories per person would strive to reduce the depth of hunger as a top priority” (SOFI 2000 p.5).

The Government’s direct response to the problems of the vulnerable falls into two categories: emergency disaster relief following events such as those shown in Table 6, and the creation of ‘development safety nets’ in the shape of targeted food assistance programmes for the chronically vulnerable. Experience of the 1998 floods, the worst in the country’s recorded history, indicates that the government has attained impressive capacity to deal effectively with emergencies by co-ordinating a harmonised response by government agencies, donors, the private sector and NGOs. This primarily addresses immediate humanitarian concerns, including the provision of emergency food supplies (World Bank 1999b Box 1.1).

**Table 7: Targeted food assistance programmes in Bangladesh**

<b>Programme</b>	<b>Main objective</b>	<b>1999-2000 allocation (metric tons)</b>
<b>Food for Work (FFW)</b>	Employment generation for poor (mainly dry season); development and maintenance of rural infrastructure	752,000
<b>Food for Education (FFE)</b>	Promote primary school attendance and improve nutritional status of poor children	350,000
<b>Vulnerable Group Devt. (VGD)</b>	Assistance to disadvantaged women in rural areas, mainly in the lean months of Oct-Dec and Feb-Apr.	184,000
<b>Test Relief (TR)</b>	Employment generation for poor, mainly in the rainy season (similar to FFW, but lower labour requirements)	130,000
<b>Gratuitous Relief (GR)</b>	Disaster relief; grain distribution according to perceived needs	40,000
<b>Other</b>		50,000
<b>TOTAL</b>		1,679,000

Source: BDF 2000 Table 1

Longer-term safety nets are provided in the shape of targeted food assistance. The details for 1999/2000 are given in Table 7, from which several important points arise. First, the aggregate amount allocated, 1.679 million metric tons, is about 7% of the total volume of cereals available for consumption in-country. This is quite modest in a situation where half the population live below the upper poverty line and a quarter are below the lower poverty line. On the other hand, the Table indicates a good cross-spectrum spread of activities that accounts for the major vulnerable groups and links longer-term human development goals with medium-term food security (through the FFE programme). The transitory food insecurity of households during the lean season is also addressed, although the amount allocated to these two programmes is less than that

allocated for dry (post-harvest) season FFW. Some programmes are targeted towards the poorest districts, such as those of the north-west.

New approaches are beginning to address the nutritional problems deriving from the fact that payments under targeted food assistance have traditionally been paid in cereals. Some programmes now provide cash, instead of food, for work. Others supply micro-nutrients to women of reproductive age, and there is an initiative to control iodine deficiency disorders. Evaluations of targeted food assistance programmes suggest that, although there is some leakage and some 'padding' of the work done, in general they do tend to be pro-poor and reasonably effective (Sida 1999; BDF 2000). Unfortunately the actual impact of such measures on the 'depth of hunger' is difficult to assess within the confines of the present study. Although a Nutrition Surveillance Project, co-ordinated by Helen Keller International and other NGOs, has been established, it has not proved possible to obtain any information from them as to the impact of these and other measures on the food security position of the undernourished.

There appear to be significant numbers among the poorest people who fall outside of government safety nets, for example households with no able-bodied members capable of participating in FFW schemes and no school-age children to participate in FFE. The poorest households often also lack the food security implicit in traditional safety nets provided by kinship or neighbourhood groups, because of lack of social capital. They even lack access to the more modern safety nets that are provided by NGOs. For example, Bangladesh has become well-known for the microfinance approach to addressing poverty, but these institutions have failed to reach the very poor for a number of reasons, including emphasis on financial viability and stringent rules that screen out those who may not be able to pay on time. However the basic problem is that the ultra poor lack the social capital needed to obtain (group-guaranteed) loans (World Bank 1999a:51). Again the actual extent of this problem insofar as it relates to food security of the ultra poor is not presently known.

## **5. Key lessons**

1. If reducing the number of hungry people is defined in terms of caloric intake, Bangladesh has made great progress – probably significantly more progress than the official figures show. However this has been achieved at the expense of quality of nutrition. The World Food Summit emphasised the need to halve the number of hungry people in the world, and the FIVIMS has continued this terminology by speaking of "depth of hunger" and by using kilocalories in the diet as the principal indicator of under-nourishment. This may have encouraged some policy makers in countries like Bangladesh to continue to overemphasise self-sufficiency in starchy staples as the most rapid way of reducing undernutrition.
2. In terms of attacking the prevalence of undernutrition, the present Bangladeshi policy of targeting food interventions at women and children is a significant improvement on the past policy of statutory rationing. The statement in SOFI 2000 that there is little evidence of intra-household bias against women and children does not hold true for Bangladesh, and if taken seriously could lead to significant and damaging policy reversals.



3. Bangladesh is one of the world's most disadvantaged countries in terms of quality of nutrition. However if the present trend of growing income disparity in a context of only modest economic growth continues, there is little prospect of ending this problem at least in the short term.
4. Balancing this, Bangladesh has had considerable success in reducing human poverty. Frustration with lack of progress in terms of reducing food insecurity in the short term should not be allowed to obscure the fact that investment in human capital will pay long-term economic dividends and therefore holds out the prospect of rapid improvement in later years.
5. Extremely low per capita availability of cultivable land in Bangladesh indicates that the potential for domestic agriculture to serve as a basis for a serious long-term assault on the country's nutritional problems has a limited time horizon. While there may be significant scope for increasing agricultural productivity in the more immediate future, in the longer term food imports will inevitably have to increase. Economic policy presently emphasises economic diversification and export-led growth. Past and present day investment in human capital will assist this drive, and provide the means to increase food imports as part of an overall strategy of meeting the nutritional needs of a growing population at improving standards.
6. There are indications that efforts at improvement have so far by-passed those in extreme poverty (e.g. the elderly, female-headed households). Efforts to provide safety nets for the vulnerable need to be refocused to cater for the needs of such households.

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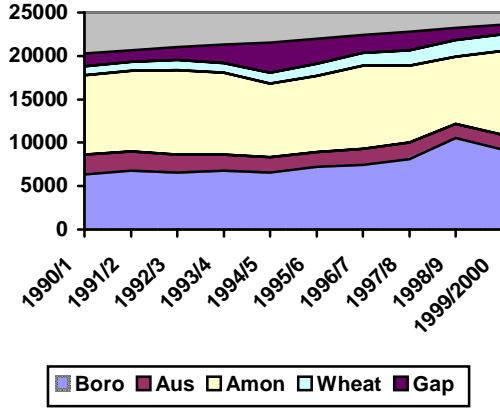
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Appendix

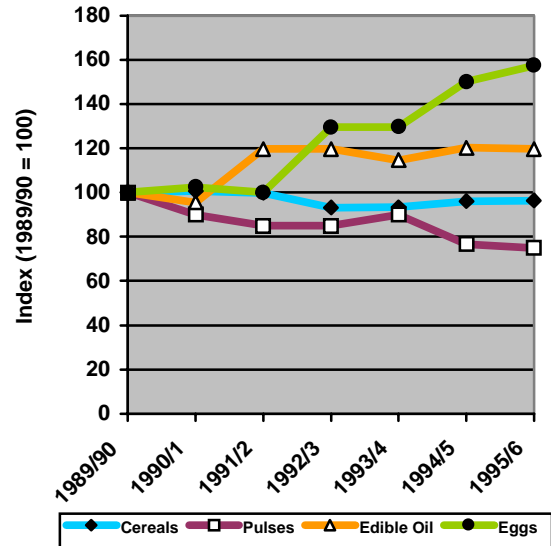
**Figure 1. Cereal Production and the Cereals Gap ('000 MT)**

(Source: Based on GoB 2000a Table 2.1)



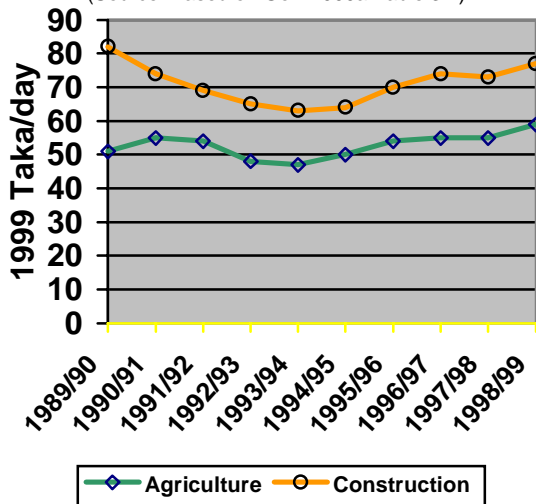
**Figure 2. Indices of per capita Availability of Foodstuffs**

(Source: Based on GoB 1999a Table 14.01)

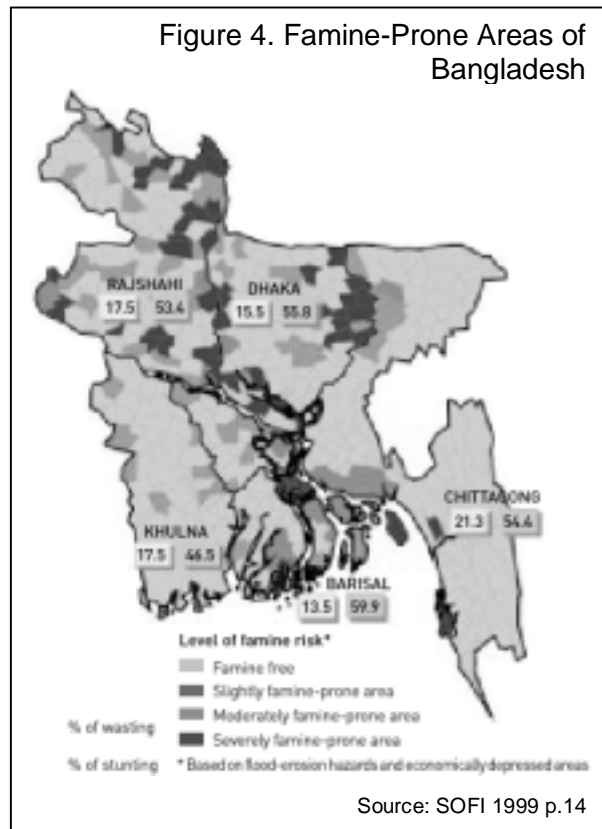


**Figure 3. Real Wage Rates in Agriculture and Construction**

(Source: Based on GoB 2000a Table 3.2)



**Figure 4. Famine-Prone Areas of Bangladesh**





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**Theme 1: Deepening the Analysis of the Factors  
Behind Progress Towards WFS Targets**

**Case Study 2: Ethiopia**

Alemayehu Kassa

(ODI Research Associate)

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*Edited by Karim Hussein & Tom Slaymaker (ODI)*

## **Using SOFI Data to Deepen the Analysis of Factors Affecting the Meeting of World Food Summit Targets**

### **ETHIOPIA CASE STUDY**

#### ***Executive Summary***

*This study looks at national and sub-national indicators of food insecurity in Ethiopia, focusing on the 1990s. It argues that evidence from national level indicators about trends is somewhat conflicting, but that such highly aggregated indicators disguise the high variability of poverty and food security, particularly at district and household levels. A number of studies at a district level point to the presence of high variability in vulnerability between urban and rural areas, as well as within rural areas and between different groups. There is increasing evidence of a deepening of rural poverty and food insecurity in the most vulnerable parts of the country through the 1990s - despite policy efforts to tackle food insecurity.*

*This case study focuses on examples of food insecurity amongst the rural poor in the northern highlands of Ethiopia. Other vulnerable groups are identified, but not dealt with in depth, due to the constraints of time and data. Immediate and underlying causes are highlighted, and put in the wider context of policies of government and international development agencies. Some of the immediate causes include drought, land shortages, deforestation, erosion and pests. Critical pressures on land and shrinking farm plots, very low yield, as well as the declining asset base of farmers due to persistent drought are exacerbating the situation. Policies targeted at reducing vulnerability in the 1990s have failed to stem the increase in numbers of vulnerable.*

#### **Long term national food security trends and indicators**

Ethiopia's economy is dominated by smallholder agriculture. In most parts of rural Ethiopia, livelihoods are based on a form of agriculture which increasingly appears to be less sustainable from year to year. The land constraint in the deficit producing areas means poor peasant farmers seldom produce enough to meet their food needs. With high rainfall variability, both in time and space, compounded by other structural constraints, both sources of food and income are undependable and rural people suffer both chronic and transitory food insecurity. Consequently, the overlap and interconnectedness between poverty and food insecurity are closer than in many other countries.

There is abundant data available for Ethiopia, but drawing conclusions is often precarious, because of potential bias and different methods of analysis and interpretation. Some sources indicate an improvement in poverty or food security for Ethiopians over the last decade or more, but these findings are challenged by a number of national level datasets.

*FAO SOFI reports do not give the changes in the aggregate figures of proportion of undernourished from 1991 to 1997 for Ethiopia. Various other gaps in the data also exist (Annex 2). The only available figure is for that of 1995/97, which shows 51% of the total population was undernourished and that the average food deficit of the*

undernourished is more than 340/kcal/person/day (FAO 2000). Ethiopia has some of the highest rates of child malnutrition in the world, with prevalence of undernourishment that is greater than or above 35%.

Conclusions based on data for the 1990s only may not reflect the underlying trends in Ethiopia due to various factors. 1991/92 was a period of transition, while 1996/7 was a year of unusually good agricultural production due to good rains in large parts of the country. This will have had an influence on figures for this period. In spite of the good production, many households still had a food deficit, indicating that the problems are more of food access than production. 1997/98 saw the beginning of one of the major droughts of recent years, while in 1998 the Ethiopian Eritrean war started, further affecting rural livelihoods in several areas.

Amongst the sources that indicate an improvement in wellbeing amongst Ethiopians over the last few decades is a recent study that concludes "poverty declined between 1989 and 1994" (Dercon and Krishnan, 1998). Based on analysis of national accounts data, consumption surveys and food price trends, the World Bank also concluded that "the poor in Ethiopia have improved their wellbeing over the course of the nineties, especially in rural areas" (WB 1999:24, quoted in Devereux and Sharp, 2001:6).

Indicators that reflect a deterioration in food security include:

- **Child malnutrition** appears to be worsening from an already high prevalence. Whilst wasting prevalence for children between 1983 - 1992 did not change significantly, the proportion of stunted children rose from 59.8% to 64.2% (WB figures quoted in Bevan 2000:9). Long-term anthropometric data collected by Save the Children in four areas of Amhara and Oromyia Regions shows a steady deterioration since November 1993 (Annex 1).

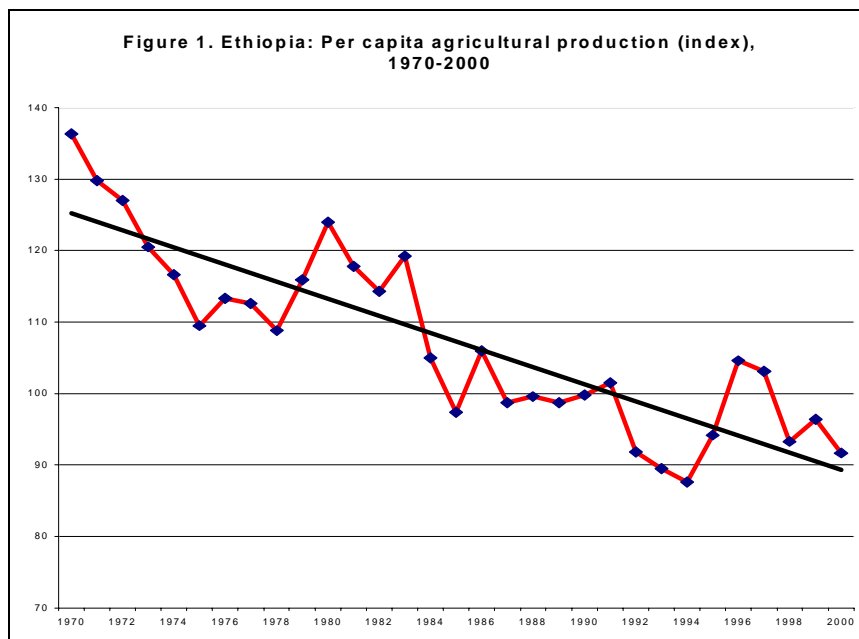


Figure 1. ETHIOPIA: Per Capita Agricultural Production (Index)

Source: FAO/WFP 2001

- **Per capita agricultural production** has steadily declined over the last three decades (Figure 1). The average growth between 1971 and 2000 was -1.15 percent (FAO/WFP 2001)<sup>17</sup>.
- **Food import requirements** mainly food aid, (Annex 2), has grown in volume during the 1990s (despite a drop in 1996/7). In 2000, the food aid shipments to Ethiopia were the highest since 1984/5 - due mainly to the impact of drought in pastoral areas, compounded by the impact of war and the additional 350 000 IDPs, but possibly reflecting an increase in underlying poverty and destitution.
- **Changes in wealth profiles** have been documented. In their 'Consultations with the Poor' for the World Bank (WDR 2001/1), Dessalegn Rahmato and Akililu Kidanu state that respondents to a survey in both rural and urban areas reported "an increase in the number in the lowest category of well-being and a decline in the numbers in the highest category" and testify to starvation and increased destitution in food-deficit areas, particularly those hit by continuously failing rains (Bevan, 2000). A recent study by Save the Children in rural food insecure areas concur with this trend (Mathys 2000).

## **What do the National Averages Mask?**

The national level averages present variable findings, although growing evidence of worsening food insecurity is emerging. However, these national level figures mask stark contrasts within the country, both geographically and in terms of trends over time for particularly vulnerable groups. In Ethiopia food insecurity has a strong spatial element; there are considerable differences between rural and urban areas and between different agro-ecological zones.

### **Rural-urban differences**

Past studies have indicated deeper poverty in rural areas than urban. For instance, the proportion of people living in extreme poverty is higher in rural areas than in urban (25% compared with 18%) (GoE, 1991). However, some exceptions are noted: "while generally urban calorie intake is around or larger than rural calorie intake, this is not the case for urban Tigray, which in fact has the lowest average intake (1902 Kcal/day/adult) of all regions" (Bevan, 2000). This is an area requiring more in-depth study, as one of the consequences of rural poverty is in-migration of an economic underclass into urban areas to seek income opportunities.

### **Intra-rural differences**

There are clear regional differences in terms of poverty and food insecurity. At a regional level, Tigray, Amhara and Southern People's region stand out by all four measurements of poverty, namely per capita income/expenditure in 1995/96, headcount under poverty line, depth of poverty beneath the line, and severity of poverty beneath the

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<sup>17</sup> The fluctuation in cereal production per capita in Annex 2 does not contradict the findings presented in Figure 1, but illustrates the dangers of looking at short term trend data in order to draw conclusions about long terms trends.

line (Government of Ethiopia,1999:11). This data illustrates considerable intra-regional differences in poverty between zones and districts (Bevan, 2000).

Some of the most food insecure rural poor are found in the north-eastern highlands of Amhara Region. In North Wello and Wag Hemra, studies have shown that most farmers are far from self sufficient in food. Based on a very crude look at food production per capita, the population cannot feed itself, even in a favourable year (Holt and Rahmato, 1999:14; Chapman et al., 2001 a and b). More over, while food aid has been complementing food needs in the most food insecure households, it has been insufficient in quantity as well as nutritional balance (only cereals are normally distributed). Table 1 below shows how even middle income groups in North Wello had an annual food deficit in 1999, after significant food aid distributions were taken into account.

Area	Wealth Group	% of total households in 1999	Deficit in 1999 (after food aid receipt)	% food needs provided by food aid
South Wello (mid-land)	Very poor	1-10%	30-40%	30-40%
	Poor	40-50%	25-35%	30-40%
	Less poor	15-25%	10-20%	25-35%
	Middle	15-25%	Beneficiaries: 0%	Beneficiaries: 30-40%
	Better off	5-15%	Non-beneficiaries:5-15% 0%	Non-beneficiaries:0% 0%
North Wello (high land)	Very poor	5-15%	40-50%	25-35%
	Poor	45-55%	20-30%	25-35%
	Middle	20-30%	5-15%	15-25%
	Better Off	10-20%	0%	20-30%

**Table I. Impact of food aid on household food deficits** (taken from Mathys, 2000)

### **Pastoral areas**

The situation in the pastoral areas is generally less studied, but these areas remain highly vulnerable to periodic droughts and shocks, as indicated by the severe food crisis in Somali Region in 2000. Various factors are emerging as the causes for the chronic food insecurity in these vast sub-regions of the country. Population pressure, especially the growth of the animal population beyond the land carrying capacity, insecurity due to political unrest in neighbouring countries that forces migration of people and their herds across borders, the incursion of large scale private farms as well as enclosures of traditional grazing areas are all significant. Shocks to markets – such as the rift valley fever outbreak in parts of Ethiopia and Somalia in late 2000 has led to serious interruption again to livestock trading with Saudi Arabia which is affecting pastoralists in the Ogaden.

### **Vulnerable Groups**

There is considerable documentation of who constitutes the rural food insecure (Chapman et al., 2001; Holt and Desselegn 2000), particularly in the north-eastern



highlands and their profiles (Box 1). What is less clear is how these groups have been affected over time.

**Box 1: Who are the Vulnerable Groups?**

The main groups within Ethiopia who are vulnerable to food insecurity are:

- Poor rural households with limited land holdings, productive assets (especially oxen), and labour resources (especially elderly and / or disabled households).
- The urban poor and destitute
- Displaced people
- Pastoralists with limited livestock holdings

The most vulnerable rural households are found in the chronically food insecure northern highlands of Amhara and Tigray regions, as well as Hararghe, Welayita and parts of Southern People's region. Typically, such households lack oxen or cattle, are labour and land poor, and experience a structural food deficit even in an average year of production. They often constitute as much as 50% of the rural population (Chapman et al., 2001 a and b).

## **Increasing evidence of deepening food insecurity**

This study focuses primarily on the first category - poor rural households, who are numerically the most significant of these vulnerable populations. There is increasing evidence that, despite some improving national level trends, the situation has been deteriorating through the 1990s for these groups.

A time series of nutritional data and accompanying analysis highlights the progressive asset deterioration of poor households in Amhara Region (SC 1998, 2000). The graphs in Annex 1 illustrate deteriorating trends in children's weight for length in different zones of three particularly food insecure regions in Ethiopia. In addition, SC reports consistently show a sizeable category of poor and very poor households who are unable to move up the wealth spectrum (Chapman et al., 2001a and b).

A SC (UK) study on food aid impact in Wello and East Hararghe similarly provides evidence of deepening food insecurity - albeit only over a short time period of the 1990s (Table I; Box 2). This showed that "all wealth groups in all 3 study areas have experienced a general impoverishment over the last 3 - 5 years as a result of drought combined with long term determinants of poverty (Mathys 2000:73). 12 months of nutrition monitoring in the areas worst affected by drought in Amhara region in 1999/2000 showed that "household assets....have drastically eroded in recent years. Thus even in the event of the return of favourable rains, households in worst-affected areas will remain highly vulnerable to shocks for some time" (SC UK with Region 3 DPPC 2000).

**Box 2: Sliding down the wealth scale: food insecurity in South Wello from 1998 - 1999**

A recent evaluation of the impact of food aid showed a downward shift of rural people in terms of wealth in Legambo, South Wello, as a result of poor crop years. The 'better-off' and 'middle' wealth groups, that comprised 20-25% and 30-40% respectively of households during 1998, accounted for only 5-15% and 15-25% respectively of those groups by 1999. The balance of households had moved down to the 'less poor' and 'poor' wealth groups. The 'less poor' grew in number, whilst the 'poor' group swelled from 15-25% to 40-50% in 1999.

The results of repeated poor or failed crop seasons were:

- Elevated sale of animals over the past 3-5 years to earn income to buy grain and non-food necessities, and,
- Limited income-generation options due to poor agricultural performance.

Underlying determinants include:

- Fragmentation of land holdings due to land inheritance practices,
- Poor market access due to low purchasing power (effective demand) and poor infrastructure,
- Limited off-farm working opportunities,
- Limited access to flexible credit to invest in improved agricultural practices/inputs and animal holdings for coping with shocks (Mathys 2000).

## Key Factors Affecting Household Food Security

The key factors underlying food insecurity in Ethiopia are multiple and complex in their interrelationships, and include both physical factors (drought, environmental degradation etc), as well as the policy environment (land and agricultural policies etc). There is however no dispute that the great majority of the population are dependent on highly precarious rain-fed agriculture.

- ***Landholdings and land tenure***

Land holdings are too small to allow most farming households to achieve food self-sufficiency (Holt and Dessalegn, 1999; CSA 1996/7). Fragmentation of land holdings is exacerbated by land inheritance practices. For example, 59 % of the rural households in South Tigray, 40% in West Gojam (despite being a surplus producing area) and 67% in North Wello had land holdings of less than 1 hectare in 1994. Less than 1% of the households in both South Tigray and West Gojam had more than 5 hectares, whilst no household had more than 5 hectares in North Wello. (CSA 1996/97). In the best of years, these households produced less than half their cereal requirements<sup>18</sup>.

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<sup>18</sup> Area allocated for different land uses proportioned on bases of zone level figures from CSA Land Use report and production calculated on basis of CSA yield figures for each season for each zone in their 1996/97 Crop Yield Report for Rural Peasant Agriculture.

An inflexible land tenure system in much of the country prevents the sale and investment in land required. Uncertainty about continued right to cultivate the same plot of land means peasants have no incentive to address the long-term impact of land degradation. In a country where over eighty percent of people's livelihoods are based on an unviable form of subsistence agriculture, the unresolved land tenure question is a major factor contributing to food insecurity - despite World Bank assertions to the contrary (World Bank, 1999).

- ***Population growth:***

Population growth, estimated at between 2.2 - 3% p.a., reduces per capital landholdings, increases the pressures on natural resources and contributes to landlessness in rural areas.

- ***Recurrent droughts contributing to asset loss***

Poor weather conditions and droughts have led to profound shocks to rural livelihoods, exacerbating already low yields and leading to further loss of productive assets, particularly oxen for ploughing. Mathys (2000) concludes that one of the major reasons for the reduced access to food for the majority of households is a continual impoverishment of the wealthier households who normally make a living based largely on their crops and animals, through attempting to cope with the drought.

- ***Limited opportunities for off-farm employment***

Livelihood options including migration and income diversification are restricted by limited availability of off farm employment. The reduction of land cultivated by the State Farms and cessation of seasonal migration to the sugar, coffee, tea, cotton etc plantations due to fear of loss of agricultural plots<sup>19</sup> have brought to an end an important income source from off-farm labour. Furthermore, there has been a loss of opportunities for labour with better off households, due to a general downward slide in assets and production for all households (regardless of wealth group) (Mathys, 2000)

- ***Agricultural policies***

Regionalisation led to a weakening of agricultural extension systems in many parts of the country. The ethnic element of regionalisation led to many households abandoning their land and large numbers of internally displaced, particularly in the initial phase of regionalisation. Rural investors have been restrained by bureaucratic red tape. Agricultural policies are not designed at the grassroots level, and do not take into account local differences and the concerns of the local people directly affected. For instance agricultural intensification under the Sasakawa Global 2000 extension and

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<sup>19</sup> In 1997/98 the author investigated opportunities for off-farm labour income in the large agro-industrial estates. At the time a serious shortage of agricultural labour was being experienced by all the major farms along the Awash River, leading to crops left to rot in the fields. The reasons for the reduction in migration to the coffee and tea plantations were partly ethnic and partly due to a dispute in working conditions. In the case of the sugar and cotton estates, the fear of loss of membership in farmers' associations, and thus access to farm plots was a primary cause. Many households from different regions were seriously affected by the loss of this important income source.

credit programme is ill-adapted to highly risky rain-fed agriculture in the highlands. This top-down yield enhancement project, endorsed and promoted by the government does not reach the poorest farmers, is often coercive and poorly adapted to the most marginal areas.

Agricultural intensification remains the key policy drive in Ethiopia, despite the marginal nature of rain-fed agriculture in most parts of the country. In such an environment, more attention needs to be paid to policy initiatives which support alternative livelihoods options to agriculture, both rural and urban. Such an approach would serve to strengthen existing coping strategies of rural people, who already supplement their limited returns from crop and livestock agriculture with a range of options which include daily labour, petty trading and food aid.

- ***Food Security and Development interventions***

The Government of Ethiopia has been tackling the problems of chronic and acute food insecurity through its National Policy on Disaster Prevention and Preparedness Management (NDPPM). This includes an effort to bridge the gap between relief and development, and the channelling of food aid resources where possible into food for work schemes or Employment Generation Schemes designed to tackle some of the constraints to food insecurity. In practice, these schemes have failed to make a significant difference to the underlying problems of food insecurity, and have often been poorly designed with little local participation. A more flexible approach is required, which allows for local input into policy design, and is accompanied by measures to address the underlying constraints of land tenure, migration, diversification and asset building.

At a broader macro economic level, policy directions imposed by international agencies such as IMF, have discouraged funding of social services. The consequences of ever diminishing resources allocated by the government for health, education etc is an important and direct contributor to under nourishment.

- ***Social relations***

Food insecurity at a household and individual level also depends on ethnicity, caste, age, sex, wealth, religious activity, disability etc. Bevan (2000), for example cites vulnerabilities of children, women, old people and people with disabilities.

Vulnerability is compounded by the growing impact of HIV/AIDS. The impact of the absence of social security systems and policies for older people, combined with the general weakening of traditional support systems in which old people were supported by kin, very low pensions etc are all factors that are attributing for the increased food insecurity of older people. People with disabilities, whose number is increased by war and for most of whom there is neither kin support or social security systems, are increasingly forced into beggary, the most food insecure under class.

## **Key lessons on monitoring food security trends**

The clear picture that emerges from current literature is that the FAO global figures on undernourishment and other national level food security indicators do not reflect the high

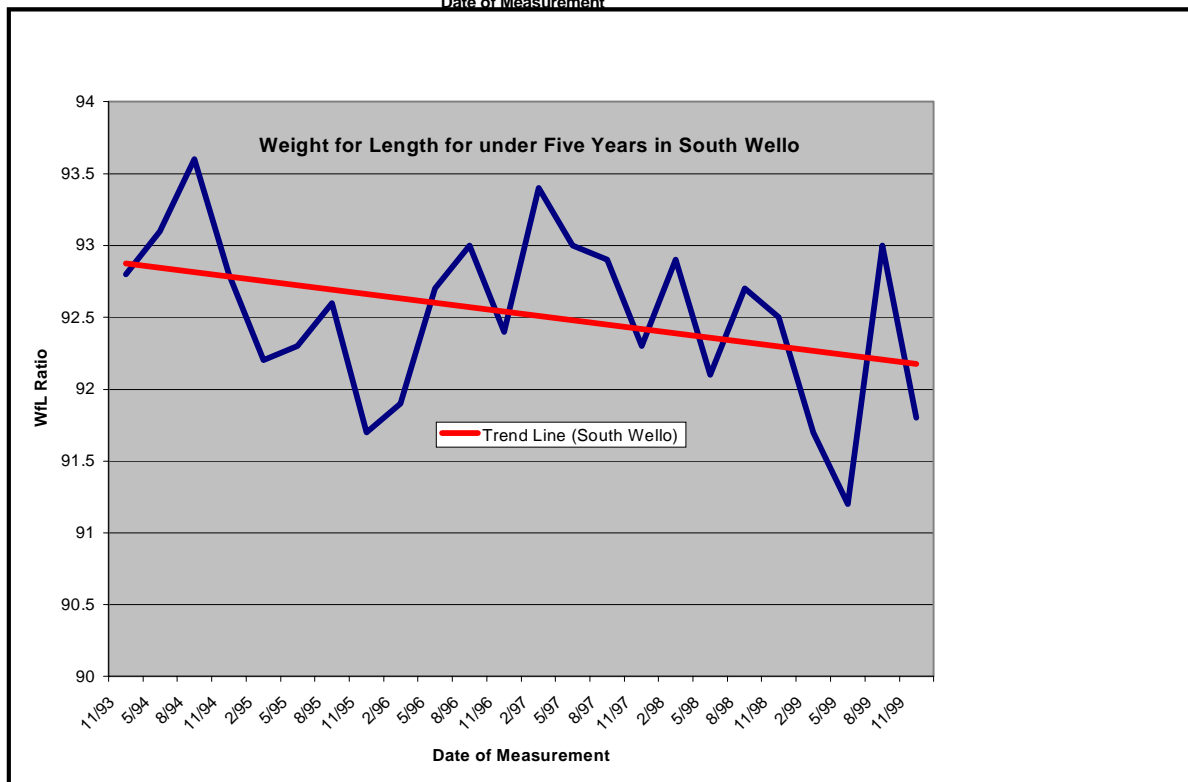
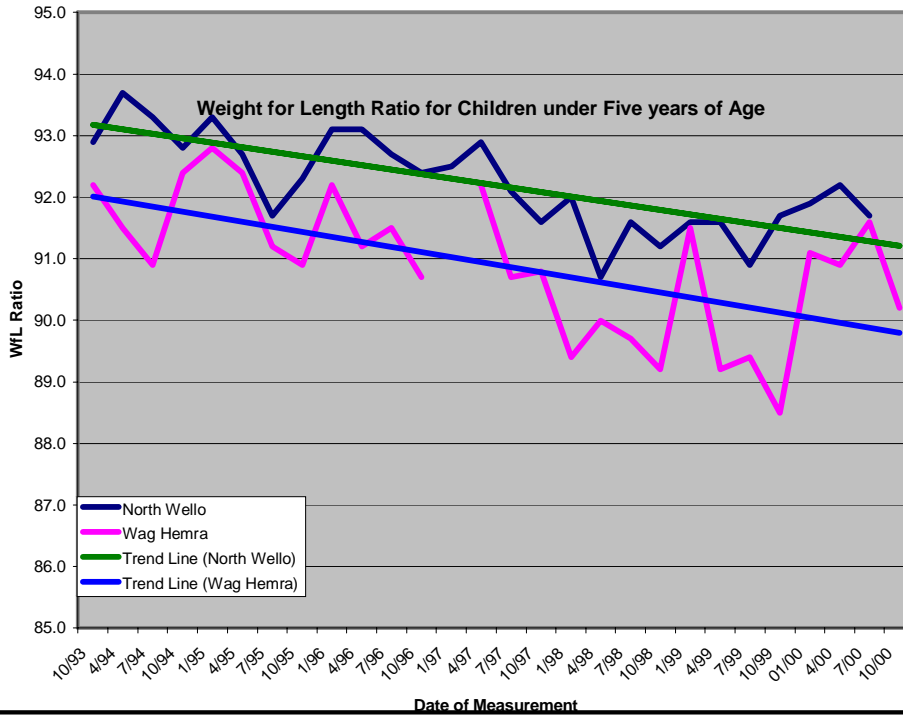
variations in food insecurity within areas and groups within Ethiopia. Indeed, whilst the evidence is not yet entirely conclusive, there is a strong case that can be made for a deterioration in food security for some of the poorest groups in Ethiopia over the last few years. The example used in this case study is from South Wello. However, this is believed to be typical of many of the traditionally food insecure areas elsewhere in the country.

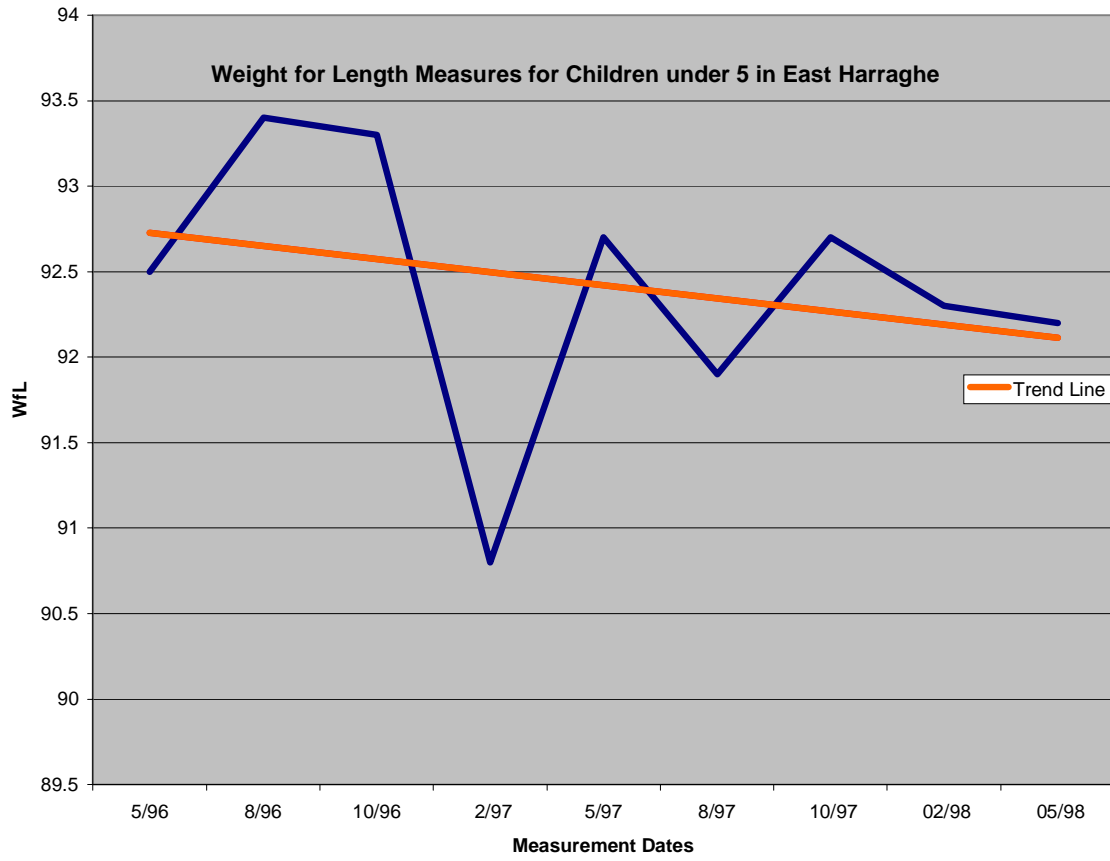
From this case study, four key lessons can be drawn for future tracking of food security trends:

- I. Methods need to be developed to monitor household level trends in food insecurity and poverty over time. These need to be over a timeframe that can take into account climatic variations and other factors. This can best be done by using a standardised data collection method. To this end, strengthening the national data collection programmes such as the Central Statistics Office and the Ministry of Agriculture needs to be explored.
- II. Carrying out an inventory of existing food security methodologies would help understand and narrow down the differences in the various approaches, thus helping reduce the potential for conflicting information produced by different agencies.
- III. Monitoring tools must be able to disaggregate data by vulnerable groups and areas in order to be useful for decision-makers. These methods need to be able to incorporate micro level studies into macro level monitoring tools.
- IV. FAO Ethiopian food availability calculations are based predominantly on annual crop production, and fail to account sufficiently for *belg* (short rain) production, non-cereal foods and other income sources. A more comprehensive accounting of other food and income sources for the food availability calculation is required. In large areas of Ethiopia, the high numbers of food insecure are a result of both the failure of current forms of agriculture to provide even for basic subsistence needs, and also the extremely constrained alternative income options available. In such a context, food security monitoring needs to monitor a broader range of indicators than just production and consumption.

**ANNEX 1**

**ANTHROPOMETRIC DATA FROM SAVE THE CHILDREN  
VARIOUS AREAS, 1993 - 2000**





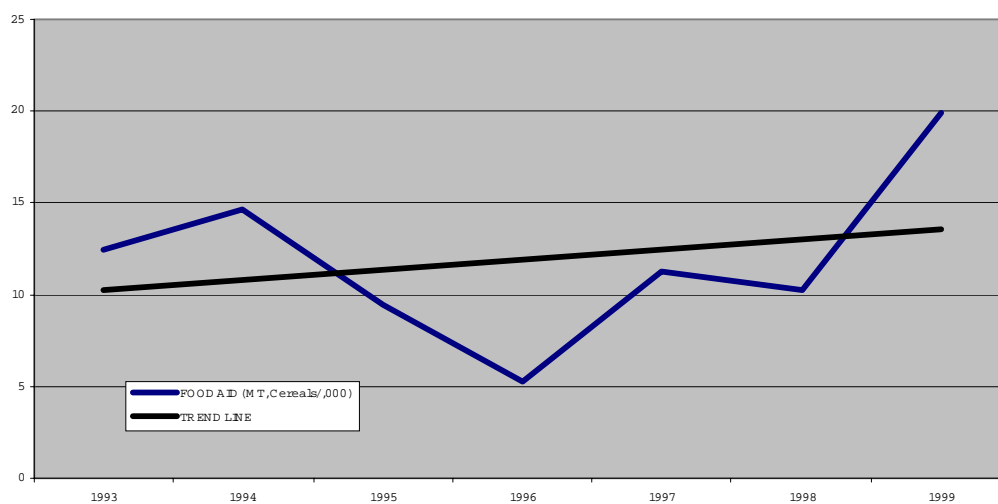
## ANNEX 2.

### SELECTED NATIONAL LEVEL INDICATORS

	1993	1994	1995	1996	1997	1998	1999
POPULATION (,000) <sup>@</sup>	52,463	53,911	55,354	56,789	58,218	59,645	61,095
CEREALS PRODUCTION (MT/,000 PEOPLE) <sup>@</sup>	100.92	97.29	121.77	165.16	162.71	120.66	137.60
FOOD AID (MT, Cereals/,000)	12	15	9	5	11	10	20
Kcal/Cap/Day (All Sources) <sup>@</sup>	1,648	1,698	1,727	1,866	n.a.	n.a.	n.a.
GNI Per Capita (Current US\$) Atlas method (current US\$)*	n.a.	n.a.	110.00	n.a.	n.a.	100.00	100.00

Source:- <sup>@</sup> FAO Website, \* World Bank Website.

#### TREND IN FOOD AID





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**Theme 1: Deepening the Analysis of the Factors  
Behind Progress Towards WFS Targets**

**Case Study 3: Tanzania**

Alison Tierney

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*Edited by Karim Hussein & Tom Slaymaker (ODI)*

## **Tanzania Case Study**

### **Executive Summary**

The case study of Tanzania uses ethnographic accounts of livelihood strategies to examine the relevance of national and global initiatives for monitoring food security. Two specific examples are used to illustrate more general themes. The ethnographic examples are of urban poverty (women market vendors) and of a rural development programme (NGO support to artisanal fishermen).

Four themes arise from the discussion of this material:

- The critical impact of HIV/Aids on food security
- The performance of development agencies in achieving food security
- The purpose of FIVIMS is to enhance food security, not just to measure it
- The importance of both positive and negative aspects of livelihood strategies

An effective integration of qualitative and quantitative approaches can be achieved by maintaining and developing different forms of representation in future issues of SOFI. The profiling of individuals and social groups in SOFI 2000 allows the value of a qualitative approach to be maintained, by conveying a holistic account of people's lives in specific social and cultural contexts. This approach can be further developed in future SOFI reports so as to include information about the skills and strengths evident in local efforts to achieve food security.

### **1. Introduction: food security in Tanzania**

The total population of Tanzania in 1997 was 31.4 million, of which 41% (12.7 million people) are undernourished. Those who are undernourished make up a larger proportion of the population than in 1991, when the percentage was 31%. A decade earlier, in 1981, the figure was 23% (SOFI 2000 p.28 Table 1). These figures illustrate a dramatic rise in food insecurity during the last decade, and this is the continuation of a trend which started in the eighties. Tanzania is one of the worst affected countries for undernourishment, according to the prevalence categories of SOFI 2000 which identify five levels (the worst being countries with 35% or more undernourished).

**Table 1: Tanzania's state of food security**

GDP per capita	US\$ 230
Growth rate	4%
Trends in agricultural production	5%
% of population undernourished	41%
FAO deficit of undernourishment (kcal per person per day)	300
Nutritional status of under five year olds:	
underweight	31%
stunted	43%
wasted	7%
Under five mortality rate (per 1000)	160

Sources: Kapunda 1998; SOFI 1999, 2000

Kapunda argues that 'although Tanzania is food secure at the national level there is food insecurity at the household level', mainly due to lack of purchasing power (Kapunda 1998:85). Although Kapunda takes an integrated approach to understanding food

insecurity, including population policy, environmental policy, agricultural development and natural resources management, he does not examine the micro level context to consider ways in which lack of purchasing power manifests in practice. Without sufficient analysis of the local context, measurements of food security remain detached from the social reality they aim to represent.

This case study provides two examples of how people face up to and cope with food insecurity, and draws conclusions for the FIVIMS conceptual framework. In section 3 the key questions of the terms of reference are answered, in the light of the material presented here.

## **2. Examples of how people achieve food security in Tanzania**

### **2.1 Market vendors: income generation, AIDS and food security**

Throughout Tanzania, *mama ntilie* are a feature of the markets in towns and cities<sup>20</sup>. This is the local term for women food sellers who are some of the poorest members of the urban population. They maintain a livelihood by selling cooked food at street stalls. These are the equivalent of cafes or fast food retail outlets, as they provide quick, cheap meals at lunchtime for office workers and others who require food when away from their own homes. The *mama ntilie* usually combine their market activities with subsistence farming on patches of land within the urban or peri-urban area, many of them are single parents and heads of households, and in most cases the main breadwinner of the family.

These women food sellers maintain a precarious existence, earning very small amounts of money from their market activities, which makes it possible for them to eke out a living for themselves and their dependents. They are highly vulnerable to financial shocks, such as currency devaluations and increases in the price of staples, as they use their earnings to buy produce (mainly rice and meat) in order to prepare the cooked meals which they sell. Their subsistence farming provides some of the necessary supplies, but is primarily for domestic consumption. There is almost no margin for error in their commercial operation, as they experience a hand to mouth existence. In many cases, the households which they run are composed of a high proportion of non-earning dependents, though for some there are financial contributions from older children who have left school and are working, or from other adults who are members of the household.

The HIV/AIDS epidemic has had a profound effect on the households headed by these women food sellers. In many cases it has shattered the fragile existence and caused members of the household to find themselves in extreme poverty rather than simply facing routine hardship. Where adult women have died of AIDS teenagers have had no choice but to take on the role of adult, supporting younger children, and in some cases children who are orphans end up living on the street. In other cases, the women household heads take in the orphans of relatives who have died of AIDS, thus increasing the number of dependents which they have to support. There is a strong social pressure and moral obligation to take in these children, because there is no alternative for them,

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<sup>20</sup> Tierney 2000 provides a detailed account of the *mama ntilie* of Tabora town's central market.

but the increase in household members can put an enormous strain on the women who do so.

### **Relevance for FIVIMS**

Before the threat of AIDS, many female-headed households were managing to keep going, but are on the brink of destitution. The impact of AIDS is to push them over the edge, as they have no resources in reserve to buffer them against extra shocks. The effect of HIV/AIDS in Tanzania has been well documented, see for example Ainsworth & Semali 2000; Appleton 2000; Mukoyogo & Williams 1991; Pohjonen 1998; UNICEF 1999. There is evidence to suggest that the incidence of female AIDS cases is rising more rapidly than that of males (TGNP 1999:27) so there is more likelihood of a female-headed household being deprived of its main breadwinner. However, the data on HIV/AIDS prevalence in Tanzania is limited, and therefore it is difficult to discern trends at the present time. Whilst infant and child mortality rates have been decreasing in recent decades (according to data for the period 1967-1996) it seems likely that the effect of the AIDS epidemic will negate any expected gains in mortality rates resulting from technological progress. The same applies to maternal mortality rates (Eele *et al* 1999:14-16). The following table shows the estimates for HIV prevalence in pregnant women in Tanzania.

**Table 2: Estimated HIV prevalence in pregnant women**

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<b>Major urban areas</b>	4%		8%	9%	9%	10%	11%	13%	14%	10%	14%
<b>Other Areas</b>		6%	6%	9%	10%	9%	10%	12%	15%	10%	

Source: Eele *et al* 1999:16 (based on data from UNAIDS/WHO)

The International Development Target (IDT) for maternal mortality aims to reduce the 1990 level by three quarters by 2015 and, at present, the available data suggests that this target is unlikely to be met in Tanzania. Maternal mortality rates impact on food security by removing productive adults from households, and by increasing the ratio of non-earning dependents per household when orphans are taken in by relatives. Those households which manage to continue to maintain a livelihood under these conditions are displaying qualities of extraordinary resilience and strength. These personal qualities are key resources which enable people to cope when faced with extreme hardship, and it is important to take account of these aspects when analysing food security at the macro level.

## **2.2 Fishing: development institutions' contribution to food security**

In the rural areas of Tabora Region, western Tanzania, fishermen and their families are relatively well-off by local standards. This is because they have access to a valuable food supply - fish - when others are experiencing food shortages, or lack of diversity in their diet. Fishermen are also able to sell fish, and therefore raise cash, which can assist them in securing adequate food, as they can buy staples (maize and rice) when other

villagers have already used up all their own produce and have no cash to buy from the local market<sup>21</sup>.

Fishermen in Tabora were the beneficiaries of an international NGO programme operating in the early nineties. This NGO aimed to focus on poverty alleviation but, in this case, was not working with the poorest sections of society. There were good reasons for this. Difficulties of access, both in practical terms (transport and the condition of local roads) and in terms of institutional structures and local power relations, meant that it was not easy for the staff of development agencies to 'reach' the poorest sections of society.

The fishermen were encouraged, by local government officials, to form a co-operative group which would be eligible for funding from the international NGO. The more senior fishermen, who were also village leaders, mobilised the younger fishermen to form the kind of group which fitted the expectations of the NGO programme and a loan was provided to the group.

As it turned out, the loan was not used effectively in the long run. The individual fishermen all had the fishing equipment which they needed to carry out their trade, at the technological level they are accustomed to: artisanal fishing, from dug-out canoes, using nets and selling to traders at the lake shore.

The group leaders, who were also village leaders and locally well-respected and responsible men, considered the best way to use the loan for the benefit of the whole community. One of the main problems for villagers was that there was no maize mill in the village. This was a particular problem for women, who are responsible for grinding of maize and preparation of meals using the maize flour. Women have to walk 5km to the next village, carrying the bag of maize on their heads, to the mill at the local mission school, and pay the commercial rate to have it ground. The leaders of the fishermen's group suggested that the best use of the remainder of the loan would be to buy a mill for the village, and run it on a non-profit basis for the benefit of all villagers, both women and men, by charging the cost price only for grinding.

This idea was turned down by the local government official who was responsible for implementing the NGO programme at the local level. Had the loan been used to purchase a maize mill, the benefits of the programme could have been more gender equal than when the resources were used only by fishermen.

Over the course of several months, the fishermen's co-operative group disbanded, and the rest of the loan remained unaccounted for. The programme objectives were too rigid, and did not allow for a responsive approach taking account of local circumstances and ideas expressed by the primary stakeholders. The relevance of the programme to local people was fleeting and marginal.

### ***Relevance for FIVIMS***

The example of the loan to the fishermen's co-operative raises the question of the longer term purpose of compiling an information and mapping system such as FIVIMS.

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<sup>21</sup> See Tierney 1997 for the full account of this anthropological study of a fishermen's co-operative group in Tabora Region.

Acquiring the information, and assembling the map, is not an end in itself, even though it is a major task and not easily achieved. Presumably, the purpose is to provide a tool to facilitate greater food security, a tool which can be used to inform development practice in such a way that implementing agencies can achieve more effective distribution of resources to the poorest. The FIVIMS tool has the potential to be used by development agencies (including international NGOs and local government institutions) to improve their performance. The fishermen's loan illustrates that it is not just availability of resources which matters, but also the process by which they are distributed, and the extent to which institutional styles of working are responsive to local conditions. The national and global understanding of food security needs to take account of the role which the aid industry plays in the process of enhancing or hindering people's efforts to acquire sufficient food.

In this example, the lack of responsiveness of the programme resulted in the community being cut off from potential benefits, so that the development institutions (both government and donor) became marginal or irrelevant to local efforts to achieve food security. People did what they had done before, which is to get on with struggling to survive without official assistance. The overall effect was that donor support was neutral in this case, having neither a negative nor positive impact.

This data is relevant when compiling the information and mapping system, and when thinking about how the system will be used. Gathering data for FIVIMS must include data on the impact - both positive and negative - of those institutions which are supposed to provide assistance to the poorest. Artisanal fishermen are operating in an environment which is affected by national and international political and economic forces, which includes the activities of development agencies. Between 1991 and 1997 a substantial amount of donor funds were supposedly directed towards alleviating poverty, including food insecurity, and yet food insecurity has increased dramatically. Does this mean it would have increased more without those donor funds? Or has the effect of donor funding been neutral, as in the case of the loan to the fishermen's group? If the effect is neutral, what kind of climate is FIVIMS operating in, and how useful will the information and mapping system be in the long run?

### **3. Key issues/lessons learned**

There are four key lessons emerging from this account of food security in Tanzania, which are examined in detail below:

1. The critical impact of HIV/Aids on food security
2. The performance of development agencies in achieving food security
3. The purpose of FIVIMS is to enhance food security, not just to measure it
4. The importance of both positive and negative aspects of livelihood strategies

The changes in the aggregate figures of the proportion undernourished from 1991 to 1997 do represent the actual conditions in Tanzania. These findings serve as a reminder that a significant proportion of the population are worse off than the average figures. Of those facing the most severe food insecurity the available data suggests that women



experience greater hardship than men, whether this be in relation to lack of access to donor resources or through the impact of the AIDS epidemic.

The factors affecting food security in Tanzania include unreliable climate, financial crises and political change, but the most significant issue is HIV/AIDS. This is seriously hampering efforts to reach the IDTs, which were otherwise making some positive progress.

Another key issue to take into account is the performance of organisations which specialise in poverty reduction. The data which shows that food security is declining suggests that these organisations, whether international donor agencies or national government institutions, have not been performing well. In some situations, such as that of the loan to the fishermen's co-operative described in this paper, development organisations have had at best a transient and neutral effect, and add little to people's own efforts to achieve food security.

In terms of the major lessons arising from this case study, a key issue is to not lose sight of the longer term purpose of a global tracking system for food security trends. Ultimately, the aim is not to simply follow what is happening and document it, but to tie in with the larger system of the aid industry, and provide assistance which will reverse negative trends and support positive ones.

Ethnographic accounts of development practice provide insights into the relationship between development organisations and the intended beneficiaries, and from this perspective the relevance of FIVIMS is not self-evident. The question arises as to whether this measurement system will make any difference to the lives of the poor in developing countries.

Studies in the anthropology of development portray a situation in which development institutions are peripheral, though not insignificant, at the local level (eg. Crewe 1998; Ferguson 1990; Gatter 1990; Harrison 1995; Pigg 1992; Querejazu 1987; Tierney 1997). These ethnographies provide accounts of local social reality, including the activities of development institutions, and illustrate the ways in which people maintain a livelihood. This includes information about positive aspects of people's lives and the normal running of life in local communities. In other words, the emphasis is not on the fact of poverty and the role of institutions in alleviating poverty, but on everyday life and the way people get by in circumstances which are sometimes difficult.

Ethnographies of development have implications for the FIVIMS conceptual framework and the approaches adopted for tracking food security. This rich body of literature is a valuable source of qualitative data on development practice, and challenges the notion of measurement. The rationale behind FIVIMS is that we can measure food insecurity in, say, the year 2000, measure it again in 2015 and see whether the IDTs have been met. Along the way we can track what is taking place and feed the key findings back to implementing agencies so that they can improve their performance. Tracking food security is not just about following trends to see what is happening, but also about influencing trends so that they take a more positive turn. For this we need to know about positive as well as negative issues - how people manage to keep going when faced with poverty and hardship.

If development agencies continue to perform poorly in terms of reaching the poor, then any improvements in food security will continue to be the result of the efforts by the poor to help themselves. People get by in the face of poverty through their own ingenuity, resilience and determination, and meanwhile international agencies measure what is going on. The challenge is how to establish a more effective link between monitoring poverty and alleviating it, rather than simply watching what is going on.

To integrate useful lessons from qualitative data it is necessary to work with the principles of a qualitative approach. The key principles are, firstly, that the account is holistic, including a mix of different issues which make up the everyday lives of local communities, and, secondly, that both positive and negative issues are given equal coverage. Both of these principles can be integrated into the FIVIMS conceptual framework, so as to make it more relevant and useful in bringing about greater food security for the poor.

The 'measurement model', which is the main characteristic of the FIVIMS approach, is inclined to chop up qualitative data so as to slot it into the compartments of an essentially quantitative approach. Another characteristic, evident in SOFI 1999 and 2000, is for an emphasis on negative aspects of people's lives - undernourishment, vulnerability, fear of starvation, etc. One exception is the profiling of artisanal fishers in Benin (SOFI 2000:17-18), which includes information about 'potentially positive' features of people's lives. This inclusion of positive features results in a more balanced account, showing how people cope with their circumstances, even though they are 'among the most food insecure' sections of the Benin population. A realistic strategy for development institutions concerned with poverty alleviation is to support the positive features and make it more feasible for people to help themselves.

Future SOFI reports should build on this approach, so that the tracking of food security includes monitoring of what people are already doing to maintain a livelihood, and recognises that these achievements are key features of an effective poverty alleviation strategy. A balanced account is needed, which draws on what people do to cope with hardship as well as what they lack. The broader implications of this are that development planning can be reoriented to start from what people have and how they make the most of it.

It is important to synchronise FIVIMS with other global and national initiatives concerned with poverty. There is a danger that, with the proliferation of current initiatives such as PRSPs, SLAs, food security, etc each one can become a specialist area in itself. Food insecurity is an aspect of poverty, and not a separate issue, and it is important to maintain good co-ordination between these different schemes.

All these macro level approaches to poverty depend on the quality of primary data, whether qualitative or quantitative. Statistical data conveys an idea of certainty, which can be invalidated if the primary data is shown to be unreliable. One of the roles of a qualitative approach is to cross check, through specific examples, the assumptions of a quantitative approach. However, it is also important to integrate the general principles of a qualitative approach, so as to gain from all that it has to offer. A case study approach is appropriate for capturing the mix of positive and negative aspects which need to be included to understand how people face food insecurity.

A significant feature evident in micro-level accounts of local efforts to achieve food security is the impressive personal qualities of people who manage to keep going under conditions of extreme hardship. These qualities must be recognised as a key resource in the overall understanding of food security issues. When people are faced with deprivation they have no choice but to develop qualities such as ingenuity, perseverance and stamina - qualities which are intangible but essential to survival.

If these personal qualities are a significant factor in the achievement of food security, then they should be represented in the FIVIMS process and in SOFI 2001. The question is how to account for this factor, given that personal qualities are not conducive to measurement in the conventional sense. One way this can be done is in the overall approach of FIVIMS, by adopting a perspective which recognises the strengths of people who cope with food insecurity, not portraying them as weak and dependent but as proactive and resourceful individuals who make the most of what they have. When considering how to document these features of food security the most appropriate method is the case study describing individuals within their particular social and cultural context. Such a case study can convey a flavour of how things are, and the lived experience of coping with food insecurity, to complement more general information available in national statistics. There are examples of this in SOFI 2000, where three individuals are profiled to illustrate nutritional status and vulnerability (p.13-14), and this approach should be developed further for future issues of SOFI.

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