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Identification of factors that trigger emergency needs assessments in slow-onset crises

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Table of contents

Executive Summary

The purpose of an emergency needs assessment is to provide a comprehensive picture of the severity and magnitude of a humanitarian crisis by estimating the amount and types of resources needed to avert a famine and to recommend modalities of implementation for a relief operation. An emergency needs assessment, which normally lasts for several weeks, requires investment of resources and is often carried out jointly by several organizations. There are no objective criteria for when it should be triggered or by which factors: the decisions whether or not to carry out assessments are usually taken on an ad hoc basis.

It is a paradox of the contemporary world that food crises and famines still occur. Assuming that all national and international relief actors are interested in averting such crises and that sufficient resources would be provided following the recommendations of a needs assessment, the errors that allow a crisis to develop can be made at two stages: first, when the decision is made whether and when to carry out an in-depth assessment of a situation; second, during the assessment itself. A comprehensive assessment must be reliable, so that the decision is fully and accurately informed.

The first question, therefore, is always: "Is the situation bad enough to trigger an emergency needs assessment?" Experience in recent crises shows that this first step is often missing, because assessments are often not carried out in good time. The second question – "Are the recommendations of the assessment reliable?" – is a secondary concern: emergency needs assessments typically operate within margins of error, but the likelihood of seriously misinterpreting the situation is less than that of failing to identify the need to carry out an assessment. The crucial question in famine prevention is to identify factors that should trigger emergency needs assessments.

The purpose of this paper is to facilitate improved decision-making as to when to carry out emergency needs assessments. First, factors that describe the food-security situation in a country are identified; second, a threshold is provided for each factor; third, the factors and their thresholds are combined into a composite index that summarizes the food-security situation in a way that can be linked to interventions. Four criteria have been followed – the methodology should:

(i) be practical and easy for non-experts to apply;

(ii) be applicable in all slow-onset emergencies;

(iii) rely on readily available data, often macro-level; and

(iv) not require substantial investment of resources and in-depth micro-level analysis.

The proposed model combines a range of early-warning systems and uses two types of data: production figures are considered static, one-off data, that establish the baseline food-security situation for the coming year; prices and social indices are dynamic, changing continuously over the period and requiring regular data collection and continuous analysis. To demonstrate the practical applicability of the model, the paper applies the methodology to the 2001–2002 famine in Malawi and demonstrates how that crisis could have been prevented if the various sources of information had been combined during assessment of the food-security situation.

The result is the table below, which combines three types of food-security indicators: production, access and social stress. Grouping each index into a five-level scale based on the relative percentage change of the parameter, the table calculates an aggregate index between zero and 15 that indicates the level of food insecurity. A value of 5 is considered sufficient to

trigger an emergency needs assessment. Given the dynamics of prices and social stress indicators, the calculations should be carried out periodically, for example monthly.

Proposed methodology for triggering emergency needs assessments

INDICES			LEVELS				
			1	2	3	4	5
Production decline			<10%	>=10% but <20%	>=20% but <30%	>=30% but <40%	Over 40%
Price	**Absolute increase**		<10%	>=10% but <20%	>=20% but <30%	>=30% but <40%	Over 40%
	Terms of trade: staple food price and…	Assets	<10%	>=10% but <20%	>=20% but <30%	>=30% but <40%	Over 40%
		Livestock					
		Labour wage					
Social	**Outcome indicators**	Malnutrition	>= 2.3 but <10	>= 10 but <20	>= 20 but <40	>40	
		CMR*	>= 0.2 but <0.5	>=0.5 but <1	>=1 but <5	>=5 but <15	>=15
	Behavioural changes	Coping strategies	Subjective judgement is needed to verify evidence of increasing food stress in affected communities				
		Migration**					

Note: * Crude mortality rate: the rate of death in the population – both sexes and all ages – measured as number of deaths/10,000 people/day. Wasting: proportion of children between six months and 5 years old below 80 percent of the median weight-for-height or below –2 Z-score weight-for-height.

It is difficult to identify the most relevant assets, the prices of which should be monitored. To detect terms of trade decline accurately, the focus should be on assets that are "important" in the local culture, such as those that people strive to acquire as soon as they can afford them. In rapid rural appraisals, these assets should soon be identifiable.

With regard to monitoring wages for labour, it is advisable to focus on the activities of the poorest, most vulnerable and most food-insecure people. It may be difficult to express these wages in monetary terms, because they are often paid in kind. To calculate terms of trade, it is better to use local labour wage rates rather than the national minimum wage, which is often expressed as an average across regions.

** Migration could be replaced by other social indicators that are relevant in the country concerned.

The proposed model relies on several assumptions and involves some arbitrary selection of thresholds; the calculation of sub-indices and the general recommendations can therefore be subject to debate. Alternatively, the proposals could be field tested and adapted to local contexts. This methodology is not an attempt to replace existing early-warning systems; it is an innovative effort to organize various sources of information into a simple model that relies on objective criteria and enables non-experts to assess food security. The recommendations could support the launch of a comprehensive emergency needs assessment that should provide a reliable picture of evolving food security and trigger an appropriate and proportionate response.

Introduction

1. The effectiveness of the international humanitarian system in detecting food crises and responding to them in a timely and efficient manner is a moral and practical issue that requires careful scrutiny. Tens or even hundreds of thousands of lives may depend on the efficiency of early warning, but it is equally important to make sure that the emergency response is implemented efficiently in terms of timing, magnitude and modality with a view to protecting or restoring livelihoods. Contemporary famines and food crises have shown that gaps in early-warning systems persist because "the international humanitarian system does not operate according to agreed thresholds for response, and as a result its interventions are ad hoc and inconsistent" (Darcy and Hofmann, 2003).

2. This paper proposes a simple methodology for early warning that could be used to trigger emergency needs assessments (ENAs). In the first part, the methodology is described in detail, identifying indicators of food security and thresholds for each factor, and combining the information into a comprehensive assessment of the food-security situation. The second part of the paper applies the methodology to the case of Malawi as an example.

3. The paper is not an attempt to combine existing early-warning systems: the proposed methodology aims to provide a more rigorous basis for triggering ENAs and is considered a more in-depth analysis of food security. The methodology proposes an initial layer for detecting impending food crises, but it should be followed by more comprehensive assessments.

Triggering ENAs in slow-onset crises

Defining emergencies

4. Traditional definitions of emergencies usually distinguish between sudden natural disasters, slow-onset crises and political crises that may involve population displacement. Most definitions recognize that many emergencies evolve from a series of events rather than from a single event, so the time frame of the emergency is fluid. The various definitions agree that in an emergency the "normal coping capacities" of the affected people are overwhelmed.

5. There is, however, no consensus with regard to when a situation becomes "critical" and when it has "normalized". Such a distinction would be necessary in situations where the crisis represents a point on a deteriorating development curve, as for example in Malawi in recent years, requiring identification of trigger indicators for humanitarian response and objective thresholds to identify when intervention becomes necessary.

"Measuring" emergencies

6. Over the past decades, several different methodologies have been developed to analyse food-security conditions in a country or a region and to provide early warning; they can be categorized by the level of analysis – micro or macro – and the issue to be investigated – production-based or access-based models. Methodologies are often a combination of these possibilities, and frequently add information to the model. All these models have been

designed with the same aim, but none of them uses universally agreed thresholds to distinguish between a slow-onset crisis and an emergency.

7. The most widely used approach is the active food balance sheet (FBS), which attempts to assess the food situation in a country for the subsequent year; it can thus be categorized as a macro-level, production-based model. FBS combines figures that are often unreliable on population, crop production, imports and exports and informal cross-border trade, with the result that data problems accumulate in the final balance so that the model is prone to large standard errors. The major drawback, however, is that it ignores the important aspect of access to food. The household food economy approach (HFEA), on the other hand, is a micro-level, access-based model that analyses the "sum of the ways in which the household gets its income, its savings and asset holdings, and its consumption of food and non-food items" (Save the Children Fund [SCF]/UK, 2000, p. 7); with HFEA, the greatest challenge is to find representative households and to collect reliable information about the relevant variables.

8. There are several alternative early-warning systems that combine in various ways macro-level and micro-level information about food access, production and utilization. These include Famine Early-Warning System Network (FEWS-NET) vulnerability assessments, the vulnerability analysis and mapping (VAM) framework and, among the regional initiatives, the Indian famine codes and the Turkana district early-warning system in Kenya.[1] Whereas FEWS-NET and VAM are concerned more with access, the famine codes and the Kenyan initiative are more availability-oriented. The common characteristic of existing approaches is that they do not provide universal thresholds for deciding when a crisis develops into an emergency. Different methodologies often produce different results, and sometimes even contradictory information.

9. The "famine intensity scales" developed by Howe and Devereux (2004) are the first attempt to provide objective universal thresholds for characterizing food crises. The scales distinguish five levels of severity based on crude mortality rates (CMRs) and malnutrition indices (wasting); either is considered sufficient to trigger an emergency. The idea that emergencies develop in stages is not new, but the innovative attempt to identify objective thresholds based on these indices is the conceptual basis for the methodology proposed in this paper.

10. The occasional failures of early-warning systems to predict food crises occur largely because they do not use objective criteria to separate an emergency from a slow-onset crisis. To understand how these systems function, their basic components can be examined and possible problems identified.

11. Three steps need investigation. First, factors and indices must be identified that provide information about food security in the population, providing input for a comprehensive early-warning system. This involves (i) analysing the relationship between micro-level and macro-level indicators, (ii) checking the relevance and reliability of the information and (iii) assessing the impact of political factors that may be influencing the availability, quality or utilization of data. Second, thresholds must be identified to distinguish between states of food-insecurity such as chronic and acute, or mild, moderate and severe; an

[1] The Turkana early warning system provides an interesting example of translating data into decision-making. The system monitors 18 indicators about the environment, rural economy and human welfare and uses four levels from "normal" to "emergency".

important methodological question is whether these thresholds should be contextualized by country or region, or universally applicable. Third, agreement must be reached as to which of the indicators should be used to distinguish between situations that require an emergency response and those that do not. Alternatively, the indices and information may be combined, but this raises additional methodological problems. The three questions could simply become "What triggers an ENA, when and how?" The following sections review the three steps.

Factors reflecting food-security conditions

12. It is reasonable to assume that the decision to carry out an ENA should be driven by the trigger factors rather than by underlying vulnerability factors in slow-onset crises, such as HIV/AIDS.[2] Two levels of information exist for assessing the severity of food insecurity in a country: (i) the micro-level – the household or individual; and (ii) the macro-level. A comprehensive early-warning system should combine all possible sources of information at both levels, including factors triggering food crises and "social indicators" of food scarcity.

13. Unless regular micro-level surveys provide reliable information over time about changes in food-insecurity conditions, the starting point in judging whether to carry out a comprehensive ENA should be readily available macro-level data.[4] Debate in the famine literature over the past 25 years has revolved round the food availability decline (FAD) and the food entitlement decline (FED) theories; in line with these, the various macro-level indices could be grouped into "production" and "prices", with a third category incorporating impact indicators of food insecurity.[5]

14. Production figures are available shortly after harvest, normally providing an early indication of the magnitude of food insecurity for the next twelve months, unless a significant amount of food is likely to be harvested before the next main harvest; this is usually negligible in the rain-fed agriculture dominant in sub-Saharan Africa. The several food crops produced in a country, which all contribute to national food availability, can be combined into food balance sheets to estimate the "food gap", which is the amount of food that will have to be imported during the subsequent months to cover the deficit. There are several ways of calculating food-import requirements: they can be interpreted as (i) a "staple gap", referring to the deficit in the main staple crop, (ii) a "cereal gap", indicating the difference between cereal availability and needs, and (iii) a "food gap", which includes alternative food crops. Clearly, the three interpretations can result in significant differences; the magnitude of error involved in the calculations needs to be taken seriously.

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[2] This assumption is necessary to ease the tension between the broader concept of "emergency", as discussed above, and the requirement of any early-warning system to distinguish clearly between non-emergency and emergency situations. For example, it is difficult to incorporate into this framework the fact that Malawi in 2003–2004 declared an emergency on the basis of HIV/AIDS – a long-term chronic vulnerability factor rather than an **immediate** trigger factor justifying an urgent **emergency** response.

[4] The establishment of vulnerability assessment committees (VACs) in Southern African countries is an example of baseline micro-level information.

[5] One of the major conceptual problems with Sen's entitlement approach (Sen 1981), as argued by Fine (1997), is that it starts the analysis from the micro (individual) level and compares it with macro-level indices. The levels of aggregation introduce methodological problems in the concept and make it difficult to apply in practice.

15. In most countries in sub-Saharan Africa, the staple cereal crop can be easily identified: its significance in the national diet is indicated in consumption surveys as the percentage of diet in terms of calories covered by the staple crop.[6] The main problem with balance sheets is that once the focus on the staple crop is abandoned and the analysis is extended to other cereals, and later to a range of food crops, the magnitude and impact of methodological problems increase simultaneously. Food balance sheets may be less reliable as early warnings, because including a range of crops increases unreliability with regard to availability and utilization.[7] As more crops are included in the balance, practical problems arise such as questions of which crops to include and how to adjust the utilization side to reflect the proportion of the national diet covered by each crop.[8] Contentious population figures and per capita requirements may further increase the variability of the food balance sheet in response to different assumptions, thereby reducing reliability.[9] In spite of these widely acknowledged problems, food balance sheets remain one of the most important pillars of early-warning systems.

16. Following identification of the staple, cereal or food gap, two questions arise: "Is the gap sufficiently large to trigger the emergency alarm?" and "How is the gap to be filled during the agricultural year?" Deciding whether the production gap should be considered "large enough" is often a sensitive issue subject to qualitative judgement. There is no objective threshold to resolve the problem, and different assumptions may produce different results. It is frequently argued, for example, that even if a cereal gap seems significant, commercial imports will cover the gap and so there is no need to declare an emergency or trigger a needs assessment on the basis of reduced production. Consequently, however large the gap, the question of how it can be filled should receive more attention. The simple answer is food imports, but these need to be disaggregated. There are three main sources of food imports: commercial imports, formal and informal, and concessional imports, or food aid; each can have serious limitations.

17. Formal, recorded commercial imports can be carried out by the public or the private sector. Before agricultural marketing was liberalized in developing countries, states had overall responsibility for ordering imports in a timely and predictable manner. Government parastatals dominated food markets in African countries: centrally managed agricultural marketing systems set prices in all regions of a country; national food reserves provided buffer stocks to allow immediate market intervention if prices increased above affordable levels. These two pillars of the previous system have now disappeared as a consequence of agricultural liberalization; the importance of government imports in

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[6] Food preferences can be deeply embedded in the local culture: a good example is white maize in Malawi, which can justify a focus on the "staple gap" in food needs assessments.

[7] It is notoriously difficult to measure the production of non-cereal crops such as horticultural crops or roots and tubers.

[8] The Southern African Development Community (SADC) technical handbook recommends: "…in an ideal situation it is desirable to include all food commodities in the food balance sheet" (Rook, 1994, p. 7). The general advice is to include all main cereal and non-cereal staple food crops; a good "rule of thumb" is to try to capture 75 percent of calorific intake.

[9] There are two approaches to assessing per capita food requirements: (i) the "status quo approach" applies a trend-projection method to historical domestic utilization figures, for which SADC recommends using at least six years (Rook, 1994); it extrapolates typical historical levels of domestic utilization and food consumption requirements to the current year; and (ii) the "nutritional approach", which calculates an adequate or desirable level of food consumption determined by the amount of food necessary to ensure a healthy active life; this method uses a per capita energy requirement level, which is expressed in terms of calories and calculates the contribution of each commodity to the national diet.

overall imports has declined, allowing more space to the private sector, and consequently price variability has increased substantially as markets have shifted from central regulation to demand and supply. This paper does not discuss the literature on the impact of agricultural liberalization, but it is important to conclude that ENAs should acknowledge that private trade imports, formal and informal, are difficult to predict and that variability in prices may become an important indicator of food security.

18. Unrecorded informal cross-border trade is a further factor that reduces the reliability of production-based food-security assessments; it may be extensive in countries with porous borders. There is no universal agreement in assessment missions, whether in different countries or in the same country in different years, as to whether the magnitude of informal trade should be factored into assessments. Even with such agreement, the unreliability of various estimates and the unpredictability of unrecorded cross-border imports for the following twelve months would still make the result of assessments very uncertain.

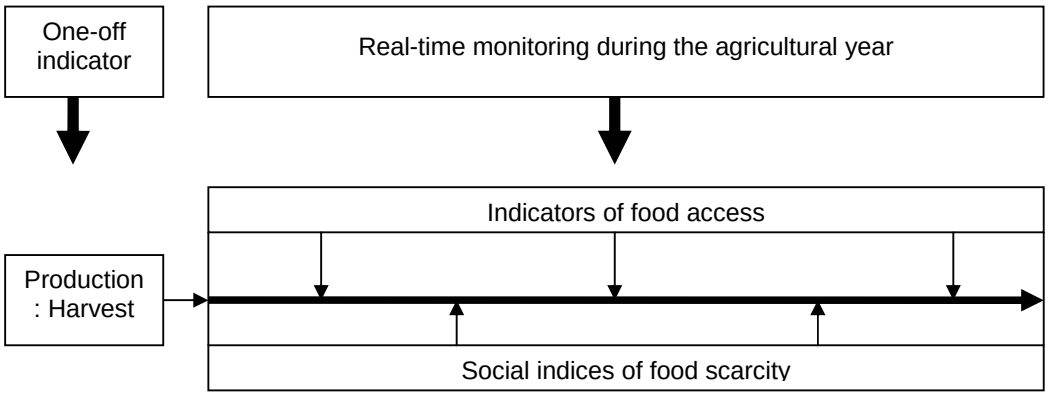
19. There is no universal methodology to decide on the proportion of the food gap to be covered by food aid. Crop and food security assessment mission (CFSAM) reports are published jointly by the Food and Agriculture Organization of the United Nations (FAO), which assesses the crops, and WFP, which estimates food aid needs. Food aid needs may be higher than an actual food gap, resulting in inconsistencies between the two estimates.[10]

20. It may be concluded that both sources of imports to fill the food gap suffer from unpredictability or methodological problems. The food-production situation may signal an emergency, but it is difficult to predict imports for the following twelve months; real-time monitoring and reporting are needed, but accurate monitoring of informal cross-border trade is difficult and food available in-country may not be the same as food available in markets. Food-crop prices are the one indicator that is a function of demand and supply available on the market and that reflects changes in the food-security situation in the country; this indicator can thus be used as a proxy for market availability.

21. It should be noted that whereas production figures are one-off, available at a certain time and constant for the rest of the agricultural year, access indicators – prices – and social-vulnerability indices change continuously. Production figures may therefore be useful to raise attention at the beginning of an agricultural year; but they may be subject to various interpretations in terms of staple, cereal and food gaps and contaminated with data problems, and so will not show events that happen during the crisis. Figure 1 demonstrates the conceptual difference between production as a static indicator and the rest of the indices, which are dynamic indicators.

[10] It may be argued that it is normal to obtain food aid needs above aggregate import requirements if the former is a function of household vulnerability and the latter relate to macro-level trends. But there is still a conceptual inconsistency: if according to the assessment there is enough food in-country, then food aid may not be the most effective way to give large sections of the population access to food, unless it is locally purchased.

Figure 1. Distinguishing between static and dynamic indicators of food security



22. The importance of price data as a proxy for food security and for food availability on the market is underlined by the fact that in chronically food-insecure countries, the poorest people spend on average 60–80 percent of their income on food and purchase a significant part of their food needs in markets. This proportion is increasing as populations grow and as the size of landholdings and of per capita food production decline, with a consequent increase in reliance on imports. It is easier and cheaper to collect market price information than to estimate food production.

23. Prices are determined by the relationship between effective demand and available supply on the market. Changes in prices should be analysed with reference to at least three elements: (i) which commodity price is being monitored – prices of what?; (ii) what are price changes compared with – changes with reference to what?; and (iii) what is the spatial distribution of prices in the country – prices in which regions?.

24. The first question is relatively easy to answer: the price of the staple crop is usually a good proxy for other food prices, given that people will first try to buy the staple food on the market; if they cannot, they will resort to alternative foods. It may, however, be equally consistent to calculate an aggregate food price index as part of the consumer price index, in which the most important and nutritious food crops could be included.

25. With regard to the second question, there are basically two options for finding a basis of reference for analysing price changes: (i) it is possible to calculate the percentage increase in prices compared to a reference period – either the previous month or months, or the moving average for a period; or (ii) it is possible to calculate the terms of trade between certain items or durable goods and food prices. It is worth considering both options, because they usually complement each other: in his analysis of the 1970s Ethiopia famine, for example, Sen (1981) found that food entitlement collapsed not because of price increases but because of the declining real income of the affected population; in this case, price increases would not trigger an ENA, but the collapsing terms of trade between wages and food crops and between livestock or assets and food crops would do so.[11]

[11] It could be argued that most contemporary famines are characterized by significant increases in food prices. Even in the 1970s Ethiopia famine, there was evidence that food prices rose in remote rural communities, and that Sen underestimated this by analysing price data only from large urban markets.

26. The third question, the spatial distribution of prices across regions, remains a major question with regard to price analysis. Market integration may become a serious issue because remote regions may be weakly connected to large markets as a result of lack of effective demand and high transaction costs in transporting food; even relatively high food prices may not attract additional imports into remote regions if transaction costs are too high. It is also more difficult to collect and monitor price data in remote areas. Even if price data were available in all regions, Sen's entitlement approach shows that the most food-insecure areas may not experience higher prices because of lack of effective demand. It should be noted that the double interpretation of changes in prices compared with trends or analysed as terms of trade contextualizes price information, and it becomes a technical problem of data collection in remote areas rather than a problem of comparison or interpretation. If prices are not increasing in absolute terms, terms of trade will decline when analysed in the local context and thus provide reliable early warning. The importance of price information in providing early warning is clear.

27. The third set of indicators can be referred to as "social indicators" of food insecurity. They detect the impact or existence of abnormal conditions in a region or country, but do not provide information about the reasons for social tension. Social indicators can be divided into outcome indicators and behavioural changes. Quantitative outcome indicators of food insecurity include child malnutrition rates (wasting) and CMR. Although they are often dismissed as a late or "trailing" indicator, rising rates of malnutrition can reflect deteriorating food security while a crisis is developing (see the Malawi case study), because consumption rationing is an early behavioural response to food shortage.

28. This insight is captured in the "coping strategies index" developed by the Cooperative for Assistance and Relief Everywhere (CARE), which enables rapid assessment of food stress at the household level: a short questionnaire elicits information on dietary change, consumption rationing, borrowing food or money to buy food and asking relatives or friends for assistance (ennonline, 2001). Another rapid appraisal method for capturing food rationing behaviour is the "dietary diversity score" (Hoddinott and Yohannes, 2002): households with low dietary diversity are more likely to face food deficits; monitoring dietary diversity could provide a sensitive indicator of rising numbers of households facing food stress. Other behavioural changes that could be monitored would be country-specific but might include abnormal rates of migration, which was observed to be a robust indicator of livelihood stress in Niger during 2005, or high levels of livestock sales, which should always be monitored in pastoralist societies.

29. Table 1 summarizes the three main sources of information to be combined in comprehensive early-warning system.

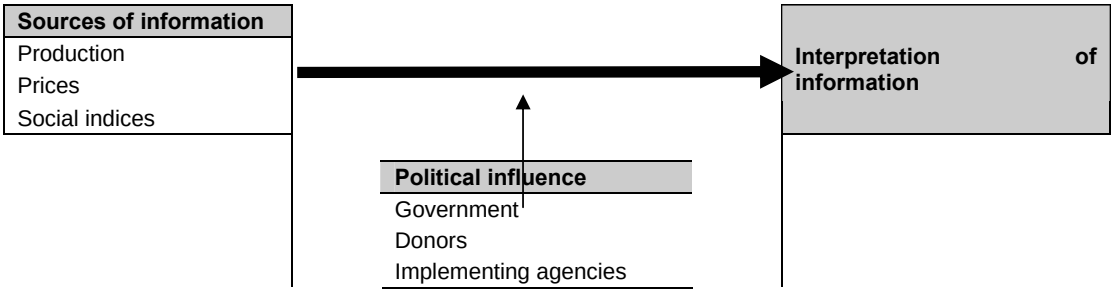
Table 1. Factors to be included in early-warning systems

Availability-based	Production	Staple
		Cereals
	Gap approaches	Staple gap
		Cereal gap
		Food gap
Access-based	Prices	Staple
		Other food crops
	Terms of trade between staple food and…	Assets
		Livestock
		Wages

Social indicators	Behavioural changes	Coping strategies
		Migration
	Outcome indicators	Malnutrition
		Crude Mortality Rate

Examples from contemporary food crises show that most of the data discussed above are normally available during food crises; indeed, most early-warning data are collected in the most food-insecure countries. The most frequent problems are utilization and interpretation of data, not availability. It should be understood that decisions to launch ENAs and intervene during food crises will be influenced by political factors and interests; the main actors are governments, donors and implementing agencies. Figure 2 shows where political factors may influence data interpretation.

Figure 2. Utilization of early-warning information influenced by political factors



30. These factors cannot be generalized. An early-warning system will function most efficiently if, and only if, the influence of political factors can be reduced to minimum or eliminated. This requires the establishment of objective criteria for each index to facilitate the decisions whether or not to launch an ENA and intervene during the crisis. Every effort must be made to verify the reliability of data used to justify action or inaction and to filter out political influences from the assessment and response.

Identifying thresholds and combining indices

31. To identify the threshold for each index, the categorization of indicators as one-off (production) or continuous (prices and social indicators) should be maintained. The level of production at harvest will determine the global situation for the rest of the year; information will have to be updated more regularly and at the local level as continuous indices change.

32. Production can be measured in various ways, but in terms of practical applicability the easiest and most reliable approach is to compare staple food production with the five-year average; comparison with cereal production may equally be justified, depending on food consumption habits in the country. The main problem with the staple-, cereal- or food-gap approach rather than analysis of production levels is that an early-warning system should compare the food situation with trends in previous years to distinguish the current situation from the norm. Cereal and food-gap analyses are carried out in CFSAMs or by FEWS-NET, but they are rarely available for consecutive years. In calculating gaps, the usual problems with estimating food utilization – population figures and per capita consumption – make the analysis less reliable and more subject to political interference. In

emergency assessments it should be more practical to compare the level of staple or cereal production with the level in the previous five years.[12]

33. The objective thresholds set for different magnitudes of production decline should be sensitive to different levels of shock; some degree of arbitrariness is unavoidable. Five levels of production decline should be distinguished to make the indices sensitive enough to different levels of decline in production and compatible with other methodologies such as famine-intensity scales. For practical reasons, the levels should be 0–10 percent, 10–20 percent, 20–30 percent, 30–40 percent and over 40 percent. A 10 percent decline compared with the previous five-year average may not be serious, but a 40 percent decline should raise serious concerns about food security unless remedial action is taken. Ranges are better than absolute numbers because they give the analyst flexibility during the decision-making process. The continuous indices should enter the framework in the second step.

34. Once the level of production decline has been determined it will remain constant; the analyst should now include dynamic indices that need to be updated and monitored regularly. For the early-warning system to capture absolute increases in prices, a similar five-level scale should be used with the same 10 percent thresholds. The monthly price of a commodity should be compared with its price in the same month the previous year. The main advantage of this method is that seasonal price fluctuations are observed because only the relevant months are compared.[13] The method is useful if the previous year's price can be considered "normal" or "baseline"; but if the country experienced a major food crisis or irregular price increases in the previous year, long-term averages should be taken. Price data need to be adjusted by the consumer price index, because comparison of nominal prices may lead to inconsistent results.

35. As with the production level thresholds, the 10 percent intervals could be replaced by intervals of 5 percent, 15 percent or 20 percent. As a general rule, the higher the proportion of income spent on food by the poorest people, the more sensitive the price sub-index needs to be to changes. A 10 percent scale is a sound basis and is consistent with established methodologies: the Indian famine Codes, developed by the colonial British in the 1800s, used a 40 percent rise in food prices above the baseline as a threshold for declaring famine conditions.[14]

36. The thresholds for terms-of-trade indicators are less easy to set. It may be argued that asset, livestock and labour ratios could all be relevant and that they could substitute for each other. These ratios are likely to co-vary closely because they are calculated in relation to the same food commodity, but in view of the aim of the assessment – to detect worsening food security – it is advisable to accept the most significant decline in the different ratios. If local indicators identify other terms-of-trade ratios, they should also be included in the analysis. For consistency, the same five-level scale is proposed as for production and price indices.

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[12] There is no reason why a five-year trend should be preferred to a six-year or ten-year trend. Given the high population growth rates in most food-insecure countries, five years should be long enough to incorporate a trend and short enough not to be severely distorted by population growth.

[13] There is nothing conceptually wrong with comparing monthly food prices with the average annual price of the same commodity. However, the problems of aggregation may blur the result of the analysis.

[14] Note that the famine scales used the reference of the previous year's average for the price increase.

37. The question whether price data should be compared with trends or analysed as terms-of-trade ratios – or both – requires further discussion, because the two cases may not occur simultaneously. If prices of food commodities start to increase, there are three possibilities for the prices of assets:[15] (i) asset prices may increase at the same pace as food prices, leaving the terms-of-trade ratio constant; (ii) asset prices may increase at a slower pace than food prices, indicating declining terms of trade; and (iii) asset prices may not increase at all, or start to decline, leading to a rapidly declining or collapsing terms-of-trade ratio. In (i), trend data and terms-of-trade figures would give contradicting results: the former situation would indicate a crisis; a constant terms-of-trade ratio would imply stable food-access conditions.[16] In (ii) and (iii), the trend data and terms-of-trade ratios would indicate deteriorating food security.

38. Increasing food prices do not necessarily imply declining food access: labour wages, for example, may increase simultaneously at the same pace, leaving food entitlement constant. On the other hand, declining terms of trade in most cases indicate declining access to food; collapsing terms of trade of livestock and other assets indicate distress sales, a widely documented behaviour during food crises. Collapsing terms of trade between wages and food prices reflect diminishing access to food. Subject to data availability, terms-of-trade ratios would be preferred to food price trends for the calculation of the aggregate index, because they usually provide more insight into the status of food access.

39. The third group of indices reflects social stress in communities affected by a food crisis; they can be grouped into behavioural changes and outcome indicators. The outcome indicators can be taken from the famine-intensity scales developed by Howe and Devereux (2004), which also use five levels for different severities of food crisis. Their index combines malnutrition and CMR according to defined thresholds. The two components of the famine scale are not really continuous data, because these nutritional surveys are not carried out monthly. It is therefore advisable to use official national figures as long as no other survey is carried out in the country during the period – preferably a nationally representative survey; otherwise sentinel site monitoring. This is consistent with the implicit recommendation of the famine scales that countries should be considered as experiencing ongoing or chronic famines where "normal" levels reach "food insecure" or even "famine" conditions. Niger and Somalia may be cases in point.

40. There are conceptual and methodological problems in relation to interpreting changes in malnutrition figures. Such movements can be contrasted either with previous trends or with absolute thresholds, but there is no reason to favour one option over the other. Given that malnutrition figures are specific to time and locality, baseline information should have been collected in the same region and the same period of the year if the result of a one-off survey is to be compared with a trend.[17] National demographic and health surveys and integrated household surveys with nutritional modules, which are normally carried out

[15] In this case assets include labour wages as well.

[16] This is, however, theoretical: an unexceptional increase in food prices is rarely followed by the same kind of increase in asset prices, unless there are hyperinflationary trends; this is primarily an economic problem that would presumably be captured by the media or other sources.

[17] For example, the reason why the Helen Keller International (HKI) survey in Niger in January 2005 did not show higher levels of malnutrition than other surveys is probably that the baseline information from 1992 and 2000 had been collected in different months – May and June – and not necessarily in the same area, as discussed in Box 1.

every five or ten years, may not be sufficient for this purpose: a routine monitoring system is needed that collects information continuously and regularly and that could identify fluctuations in trends and, as with price data, identify extreme variations and rapid increases in malnutrition if food security deteriorates. In the absence of such a system, which should be established across all food-insecure areas, it is difficult to compare malnutrition figures derived from surveys with trends from other sources of baseline information.

41. Using absolute thresholds also raises conceptual and methodological problems. First, identifying thresholds remains arbitrary, because different agencies and studies identify and "qualify" thresholds differently (see Table in Box 1). Second, baseline levels of malnutrition can vary significantly across regions and countries, so the recommendations of the model can be different according to circumstances: in a more food-secure region characterized by low malnutrition, the threshold may not be low enough to signal an emergency when food security deteriorates; in a region characterized by higher baseline malnutrition, the threshold may indicate ongoing but moderate famine and so recommend immediate intervention in spite of the fact that the situation could be considered "normal". It is theoretically possible that in an area of long-term crisis, the model would not indicate a sudden-onset emergency or a slowly deteriorating situation, but would simply highlight the fact that the area is chronically and severely food-insecure.[18]

42. With regard to indicators of behavioural change, subjective judgement and local knowledge will probably be needed to decide whether a situation has deteriorated to the point where a needs assessment is justified. However, some of the rapid-appraisal techniques – the coping strategies index, dietary diversity and Cuny's pre-famine indicators – allow behavioural changes to be quantified and indexed, so it might be possible to establish thresholds for different levels of food stress; further work would be needed to harmonize these with the other indices being monitored.

Combining sources of information

43. Table 2 summarizes the three types of information required – production, prices and social indices – and their thresholds. After the release of production statistics, the level of crisis will remain constant, according to production of the staple crop; only the two dynamic indices will change over time.

44. The various sources of data can trigger ENAs in two ways. The first option is to select one index that could justify the decision to carry out an ENA; for example, an ENA could be triggered by a 45 percent decline in production of the staple crop, a similar relative increase in staple prices or a decline at the same rate of terms of trade. The second option is to combine the indices into a single index, with the advantage that contradictory information derived from different sources could be harmonized; even if one index showed no problem, the combined index would detect worsening food security. And the two options can be combined in an index that could provide a picture of the aggregate impact of all indices; even if the aggregate score would not trigger an ENA, if any of the four quantifiable indicators reached a maximum value, an ENA would become necessary.

[18] A useful way forward could be to combine the two options: changes in prices can be compared with previous trends and with prices of other items (terms of trade), so malnutrition figures could be compared with trend data and with thresholds. The methodology for each context could be selected on the basis of availability of data.

Table 2. Methodology for triggering ENAs

INDICES			LEVELS				
			1	2	3	4	5
Production decline			<10%	>=10% but <20%	>=20% but <30%	>=30% but <40%	Over 40%
Price	**Absolute increase**		<10%	>=10% but <20%	>=20% but <30%	>=30% but <40%	Over 40%
	Terms of trade: staple food price and…	Assets	<10%	>=10% but <20%	>=20% but <30%	>=30% but <40%	Over 40%
		Livestock					
		Labour wage					
Social	**Outcome indicators**	Malnutrition	>= 2.3 but <10	>= 10 but <20	>= 20 but <40	>40	
		CMR*	>= 0.2 but <0.5	>=0.5 but <1	>=1 but <5	>=5 but <15	>=15
	Behavioural changes	Coping strategies	Subjective judgement is needed to verify evidence of increasing food stress in affected communities				
		Migration**					

* Crude mortality rate: the rate of death in a population, including both sexes and all ages, measured as number of deaths/10,000 people/day. Wasting: proportion of children aged 6 months to 5 years who are below 80 percent of the median weight-for-height or below –2 Z-score weight-for-height.

It is difficult to identify the most relevant assets, the prices of which should be monitored. To detect terms of trade decline, the focus should be on assets that are "important" in the local culture – those that people strive to acquire as soon as they can afford them. In simple rapid rural appraisals, these assets should become clear very quickly.

In terms of monitoring labour wages, it is advisable to focus on activities that are mainly done by the poorest, most vulnerable and most food-insecure people. It may be difficult to express these wages in monetary terms, because they are often paid in kind. For the calculation of terms of trade, it is more reasonable to collect local labour wage rates rather than the national minimum wage, which is often expressed as an average across regions.

** Migration could be replaced by other social indicators that are most relevant in the country concerned.

45. The various indices can be combined very simply, given that all factors are measured on a consistent five-level scale. The index would range from 0 to 15, taking its minimum value of zero if all sub-indices indicate an improvement in the trend, which occurs (i) if production during the crisis year is higher than during the reference year, (ii) if food prices are lower than the past average and (iii) if none of the social-stress indicators shows a crisis.[19] The maximum value of 15 is reached if each of the production, prices and social indices takes the maximum value of 5.[20] The question remains: "At what value of the overall index should an ENA be triggered?" Considering that the aim of an ENA is to draw attention to worsening food insecurity – it is just the first step towards planning a possible intervention – it is reasonable that the initial requirement should be set at a low level to prevent a humanitarian catastrophe and avoidable delays in food imports. A third of the maximum value of 15 could be considered sufficient for requesting an ENA.[21]

[19] In other words if malnutrition is lower than 2.3 and CMR is lower than 0.2.

[20] As discussed earlier, it is theoretically possible to include both trends and terms of trade for prices, in which case the maximum value taken by the index would be 20 – but prices would then be taken into account twice, giving double weight to price data in the aggregate index. This may raise problems, given that the ultimate aim of the model is to provide a balanced summary across a set of indices that includes production and social variables. Social outcome indicators – malnutrition and CMR – remain in the final index as a single combined variable, because they are adapted from the famine scales, which considers them as "and/or" changes (see Table 8 in the Annex).

[21] A similar approach was adopted in Ethiopia, where WFP applied Cuny's pre-famine indicators by ranking drought-affected regions by the number of indicators observed. The 14 indicators fell into the following

46. The quantitative figures do not take into account qualitative information that may be available from various sources. It should become possible to trigger ENAs at lower values if the importance and reliability of qualitative information justifies it: in other words, a low quantitative index value together with credible qualitative evidence of behavioural change indicating food stress, for example reports of abnormal levels of migration or livestock deaths, would be a sufficient basis for a needs assessment.

47. Accepting a level above one third of the maximum value may not trigger an ENA early enough, leading to loss of time during impending food crises. A central concept when selecting a lower value is that an ENA does not necessarily imply a food-aid intervention: its purpose is to provide in-depth information about the causes and consequences of worsening food insecurity and to consider possible interventions in good time.

48. Table 3 illustrates a "needs assessment calendar" that calculates a value between 0 and 15 for each month. When the aggregate value moves above one third of the maximum value, an ENA is commissioned. The table gives only a rough indication of the need for ENAs. The importance of qualitative information should be taken into account during the assessment process; personal judgement is unavoidable.

Table 3. ENA calendar

Month	Production	Food Price		Social indices	Total value
		Absolute	Terms of trade		
1. (Harvest)	One value relevant for entire period				
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					

49. To test the proposed index in practice, the case study in Malawi during the 2001–2002 food crisis was selected. The next section applies the methodology at the national level, but it is important to consider whether the index could be applied at the regional level and even the district level. There is in theory no problem with compiling the table of indicators for a region where food security may be declining rapidly; the model could be calculated for all regions of the country, thereby providing a basis for comparison across regions. The main remaining problem, however, is the availability of data disaggregated by region and district: it is unlikely, for example, that asset prices would be available in remote areas, or that price trends could be identified at a highly disaggregated level.

50. The methodology, therefore, remains valid at the national level. Even so, it raises questions as to whether data from different regions should or could be inserted into the model. Production figures are normally available at the regional and national levels, but online monitoring of terms-of-trade ratios is unlikely to be in place. Reports of such information may be localized and occasional, provided by local non-governmental

categories: rising grain-to-wage ratio, increased livestock sales, falling livestock prices and consumption of famine foods.

organizations (NGOs) or church organizations. The same applies to social indicators, especially nutritional surveys or crude mortality rates. Whether such data should be included in calculation of the "national" index depends on the coverage, credibility and reliability of the figures, which may be available at different times and in a variety of districts. Given that this model aims to raise attention and trigger an ENA, it is advisable to include most of the available indicators. However, much depends at this stage on the experience and judgement of the people building the model in analysing the situation critically and realistically.

51. The Malawi case study is an example of an application of the methodology. Further field testing will be required to validate the proposed approach.

Case study: Malawi

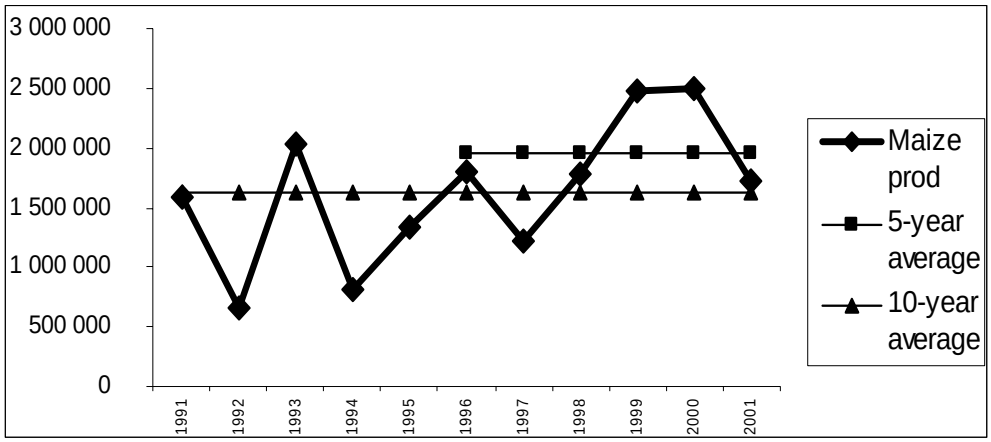
52. An efficient but tragic way of learning is from past failures: analysing the failings of emergency assessments and humanitarian interventions will contribute to avoiding similar failures in the future. The Malawi food crisis of 2001–2002 is instructive for several reasons:
    i) The 2001/02 famine, which was measured by several indices, was the worst crisis in the history of Malawi and even more devastating than the 1949 Nyasaland famine.
    ii) Several early-warning systems were in place, including FEWS-NET and VAM, but they failed to assess the food-security situation accurately. Long before extreme conditions developed, ample evidence of an impending food crisis was available from various sources, but it did not trigger an ENA in 2001 or even a declaration of a crisis until the emergency was almost over in late February 2002.
    iii) Most of the indicators provided contradictory information, which is useful in testing against a more complex system of early warning.

Available information for an ENA

53. The information that should have triggered an ENA in Malawi during 2001 can be categorized into the three main groups discussed in the previous section: (i) analysis of the level of agricultural production, (ii) investigation of price data and (iii) assessment of the relevance of indicators of social tension. The reliability of each source must be scrutinized.

54. The staple food in Malawi is maize; food preferences are strongly biased towards maize. Figure 3 shows maize production during the 1990s, including five-year and ten-year averages. The relative fall in maize production in 2001 was 32 percent from the previous year; but if this harvest is compared with the five-year average, the decline is only 12 percent. The figure also reflects the interesting finding that maize production during the food crisis was actually 6 percent higher than the ten-year average.

Figure 3. Maize production in Malawi, with five-year and ten-year averages, 1990–2001



Source: Tiba (2005).

55. It is by no means clear whether there was a real production failure and thus a need to launch an ENA; this is even more difficult to determine if a food-gap approach is taken. There was no CFSAM in Malawi in 2001; FEWS-NET calculated several types of food gaps and published them in monthly bulletins. The maize deficit was calculated at 275,000 mt, 19 percent of national production of 1,456,000 mt (FEWS-NET, July 2001). When other crops were included in the analysis, several other estimates appeared: in June, FEWS NET concluded that "Malawi will experience a 438,000 mt food **surplus** this year due to high root crop production" (FEWS-NET, June 2001, p. 1, emphasis added). At the same time, this report noted that "excluding these root crops leaves the country with a food **deficit** of 323,000 mt"; one month later, the 438,000 mt food surplus was halved to 263,000 mt (FEWS-NET, July 2001). The margin of error of various calculations, methodologies and interpretations must be borne in mind: the debate is not about the size of a projected food deficit, which may trigger an ENA, but simply about whether the country will experience a "bad year" or a "good year" with a large food surplus. An initial look at the data suggests huge inconsistencies ranging from a serious maize deficit to a large food surplus. Under these circumstances, the analyst may ask: "Which data should I believe: is there going to be a food crisis or not?"

56. Whereas the production figures seem to be inconsistent, price data provide a clearer picture. The importance of food prices in determining food access is well known in Malawi: according to the 1988 Integrated Household Survey (IHS), an average household spends about 70 percent of its income on food.22 The prices of maize and other food crops are collected by the Market Information System of the Ministry of Agriculture. Figure 4 shows a rapid increase in maize and cassava prices during 2001.23 It is remarkable that maize prices started to increase shortly after the harvest in May, which could indicate a reduced maize harvest, a possible high maize deficit and an initial shortage of maize on the market as early as July. Compared with the average for both the previous years and with the price of maize during the same month a year before, maize prices increased exponentially from August onwards. In September 2001, the parastatal

[22] Broken down by levels of poverty, the ultra-poor, the poor and the non-poor spend 78 percent, 76 percent and 55 percent of their income on food, respectively (Government of Malawi, 1998, p. 81).

[23] Both the maize and cassava prices are national and show very similar increases across all regions of Malawi. This is underlined by the coefficient of variation, which quantifies differences between prices across regions, and is constant for the entire period.

Agricultural Development and Marketing Corporation (ADMARC) raised the price of maize from MWK245 to MWK17 per kg, which is unusual in Malawi, where most farmers normally start buying maize in October.

57. If the early-warning system cannot draw conclusions from production figures, alternative sources of food-security data should be consulted that provide more consistent results. In this case, price data provide substantial evidence of extreme food insecurity. Terms-of-trade ratios could not be calculated because of lack of data at the national level. Prices of assets, livestock or labour wages could be collected relatively easily in rural areas, but at this stage only sources of information that were readily available to the analyst are taken into account. Terms-of-trade data are not available from macro datasets, but a price increase compared with previous months should be a clear indicator of crisis.

58. Other quantitative and qualitative indicators of food insecurity were also available. An FAO memorandum of September 2001 warned: "…there does seem to be an acute shortage of food – indicated by queues of the public to buy maize husks…" (FAO 2001, p. 3); the evaluation report in the same month of the Targeted Inputs Programme funded by the Department for International Development (DFID) warned that the rapid increase in prices "spells a serious food-security problem. By January–February 2002, it may well reach crisis proportions" (Levy and Barahona 2001, p. 28). During August and September, a validation by SCF/UK of their risk mapping for three food-economy zones noted maize price rises of 180 percent in Salima and Kasungu districts. In October 2001, SCF published a report on a "…household economy assessment…" in Mchinji district that revealed alarming indicators of stress: the document argued for an "…urgent need to plan and prepare for a potential food aid intervention…" and warned that "…without the support of a food or livelihood intervention, the poor and a proportion of the middle have very few options in accessing their minimum food requirements…" (SCF 2001, p. 15).

59. In December 2001, SCF/UK conducted two nutritional surveys in collaboration with the Ministry of Health that showed very high levels of undernutrition:[25] global acute malnutrition (GAM) was 9.3 percent in Salima, with 3.9 percent nutritional oedema, and 11.8 percent in Mchinji district, with 1.9 percent nutritional oedema. In comparison, baseline rates of malnutrition reported in the October 1995 multi-indicator cluster survey (MICS) by the United Nations Children's Fund (UNICEF) showed that 7 percent of children nationally were acutely malnourished (Taifour, 2002, p. 3). A survey conducted in March 2002 – after the declaration of a state of disaster on 27 February 2002 – found GAM of 19.0 percent in Salima and 12.5 percent in Mchinji (ibid.) and collected CMR.[26] At the same time, anecdotal evidence from church groups and civil society organizations operating in rural areas also warned about worsening food security; but the usefulness and objectivity of malnutrition figures in assessing the severity of a food crisis and triggering an emergency response are debatable. Box 1 compares the relevance of the same indicators in Niger in 2005, which also did not trigger an ENA.

[24] Malawi *kwacha*; US$1 = approximately MWK130 (February 2006).

[25] The surveys enumerated 2,144 children in Mchinji and Salima districts.

[26] This assessment was carried out after the emergency had been declared in late February, and should be considered too late for triggering an ENA. CMR in Salima district was 1.23, which would classify as "famine conditions" according to the famine scales (Howe and Devereux, 2004).

Box 1. The role of malnutrition in triggering an ENA

There are no internationally agreed thresholds for wasting to trigger an ENA. A level of wasting of up to 10 percent is within the acceptable range according to the World Health Organization (WHO), classified as "low or medium" or "usual in African populations in non-drought periods", and to the famine scales, which classify the situation as "food insecurity". The figures diverge after the 10 percent threshold: according to one interpretation, wasting of 10–15 percent is "high" and over 15 percent is "very high"; others consider 20–40 percent as "undoubtedly high and indicating a serious situation" and over 40 percent as "a severe crisis". In the terminology of the famine scales, wasting of 20–40 percent is considered "famine conditions" and over 40 percent is "severe famine"; the "extreme famine" category does not use a threshold for wasting, but refers to CMR (see Table 4 and Tables 8 and 9 in the annex).

Table 4. WHO thresholds for classifying the prevalence rates for wasting among children under 5

Low	<5%	**5-10%** "usual in African populations in non-drought periods"
Medium	5-9%	
High	10-14%	**>20%** "undoubtedly high and indicating a serious situation"
Very high	>=15%	**>40%** "a severe crisis"

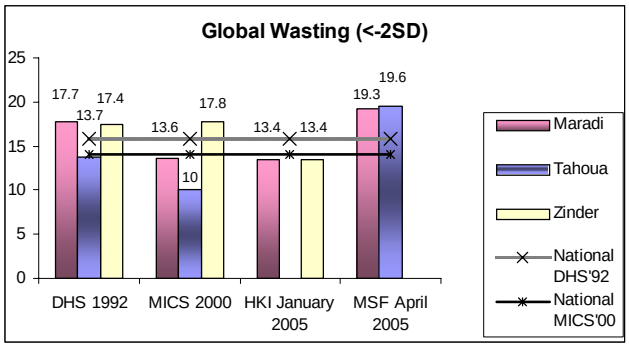
Wasting = weight for height (<-2SD).
Source: *WFP Food and Nutrition Handbook*, Interpretation of Nutrition Surveys, Table 1.
The last column under "wasting" is taken from p. 39, Box 5.2.

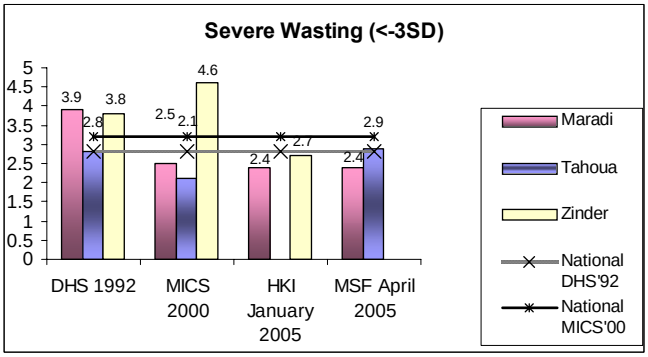
A reason for the different interpretations is that different regions have different "normal/ acceptable" levels. In the UNICEF survey in Malawi, the 7 percent baseline level is considered acceptable. The 9.3 percent in Salima and the 11.8 percent in Mchinji found by SCF in December were clearly higher, but these levels would be considered "medium/high" or "usual" according to WHO scales or "food insecurity/food crisis" famine scales. It is not obvious whether they should have triggered an immediate response.

It is worth comparing the Malawi case with Niger. The NGO Helen Keller International conducted a nutritional survey in Niger in January 2005 and found global wasting levels of 13.4 percent in Maradi and Zinder regions. The figures were significantly higher than the malnutrition figures in Malawi found by SCF in December 2001, but they still did not raise attention or indicate an emergency. The reason is simple: the national "baseline" level in Niger is 15.8 percent (Demographic and Health Survey [DHS], 1992) or 14.1 percent (Multiple Indicator Cluster Survey [MICS], 2000), and even in the same regions normal levels were 17.7 percent (DHS) and 13.6 percent (MICS) in Maradi and 17.4 percent and 17.8 percent in Zinder; in both regions, severe wasting scores (<-3SD) were lower in January than any of the national or regional averages.

A different picture emerges if the findings of the April 2005 *Médecins sans frontières* (MSF) nutritional survey in Niger and the baseline levels are compared. The MSF survey in Maradi and Tahoua found much higher levels of global wasting in April compared with regional benchmarks and with national averages. In terms of severe wasting, however, even the MSF survey showed **lower** levels than national and the regional averages – 2.4 percent in Maradi and 2.9 percent in Tahoua.

Global and severe wasting in Niger, 1992-2005





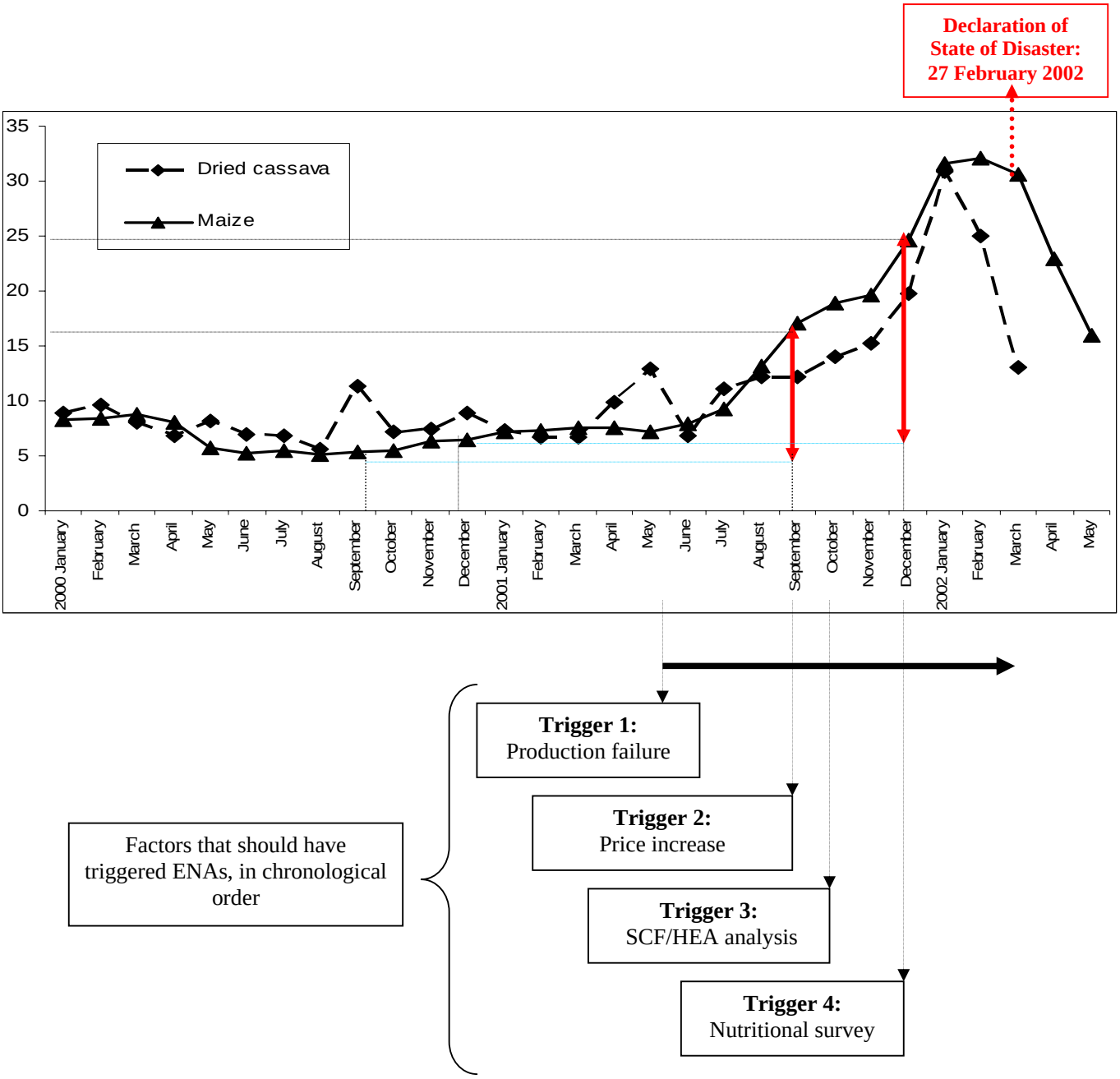
The main source of the inconsistencies may be methodological: the timing of the national surveys in Niger did not correspond to the HKI or MSF surveys, so the "baseline" is uncertain. The DHS and MICS surveys were carried out between April and July, but none of the NGO surveys during the crisis are theoretically comparable with the national findings. The lack of accurate online monitoring indicates a serious problem in monitoring food security: if important, accurate and readily available information on malnutrition is to be used to trigger an ENA, online monitoring is needed to provide an accurate picture of changing situations.

Sources: Government of Niger, 1992; Government of Niger and UNICEF, 2000; Helen Keller International, 2005; MSF, 2005.

60. It may be concluded that information and evidence were available in time from various independent sources about rapidly worsening food security in Malawi. There were data from at least four independent sources between June and December that should have triggered at least an ENA:
    i) June: the apparent failure of production and inconsistency among various estimates of the food deficit or surplus;
    ii) September: the rapid increase in maize prices, including the major increase in the ADMARC price;
    iii) October–November: reports by FAO, the Targeted Inputs Programme (TIP) and SCF, and anecdotal evidence of worsening food security; and
    iv) December: the SCF nutritional survey showing above-average levels of malnutrition in two rural districts.

61. Figure 4 shows the four main sources of evidence of an impending food crisis in Malawi.

Figure 4. Average prices of maize and dried cassava in 27 districts in Malawi, 2000–2002



Source: Tiba (2005, p. 92).
Note: Retail prices in local markets in MWK/kg.

62. The figure shows a sequence of events that should have triggered an ENA or the declaration of a state of disaster much earlier than late February, by which time the crisis was effectively over. Wrong interpretation of data and political factors influencing data utilization are the causes.

Verifying data reliability

63. The previous section revealed serious inconsistencies of production data from large food surplus to devastating maize deficit. Clearly, it would be problematic to select just one among such contradicting sources of information and justify inaction on the basis of that interpretation. The FEWS-NET monthly food-security reports noted that the reason for the inconsistency was very high production of root and tuber crops, mainly cassava. It follows that the reliability of cassava figures needs further investigation.

64. Several studies since the late 1990s have argued that official cassava production figures were gross overestimates (Freeman, 1999, 2000; APRU, 2000, 2001). Estimated production of root crops in Malawi increased so rapidly during the 1990s that "…fresh root crop production in the 1997/98 season was sufficient to provide every man, woman and child in the country with 376 kg per year or almost 1.9 tonnes for every family…" (Carr, 1998, p. 3). This figure, clearly well beyond the consumption capacity of the population, raises a paradox: how could Malawi have such high levels of undernutrition while large food surpluses were being produced?

65. Official production figures released in June showed that maize production had declined compared with the two previous years and the five-year average – even FEWS-NET reported a large maize deficit – but the national food balance sheet concluded that no intervention was necessary. The prediction was that the deficit would be offset by (i) cassava production, (ii) maize available from the Strategic Grain Reserve, (iii) commercial maize imports and (iv) informal imports. The unreliability of the cassava-production figures is evident; the three anticipated sources of maize during the crisis should also be examined.

66. During 2000, 167,000 mt of maize was sold from the Strategic Grain Reserve, which was almost fully stocked. The sales were not transparent, which raised questions about who purchased the maize and whether it was exported or left in the silos.[27] Scarce and contradictory information on both issues introduced a political dimension into the crisis. Donors were reluctant to act unless information were provided as to where the maize had gone. During the months when the ENA should have been commissioned, there was still a general belief that the maize that had been sold or had disappeared from the reserve would be released on to the market; but it seems that this did not happen.

67. It was also believed that the maize deficit would be at least partially offset by private-sector imports. In a liberalized agricultural marketing system, the private sector would gradually take over from the public sector the main responsibility for importing maize. In August 2001, the Government ordered 150,000 mt of maize from South Africa, of which only 16,700 mt had arrived by April 2002 because of customs delays and transport bottlenecks. It is not known why the private sector did not respond by increasing maize imports in line with rapidly increasing maize prices. No studies have been carried out in Malawi of the organization, workings and incentives of the private sector, so it is difficult even today to draw conclusions about what should have driven private-sector maize imports.

[27] A report by the Anti-Corruption Bureau in 2002 revealed that senior government officials benefited from the grain reserve sales.

68. It is also optimistic to justify non-intervention on the basis of expectations of future informal cross-border trade. It is difficult to estimate how much maize flows into and out of a country, even in retrospect. Few studies have considered this issue in Malawi, but the range of estimates illustrates the large margins of error. The November 2002 FEWS-NET report noted that cross-border trade "…could be in excess of 60,000 mt per year…"; the 2004 FAO/WFP CFSAM estimated a net inflow of maize of approximately 200,000 mt in the southern and central regions alone (FAO/WFP, 2004, p. 3).

69. The four sources that were expected to offset the maize gap logically justified inaction, but they were highly controversial and unpredictable. Even after the event, it is difficult to analyse the situation because of the lack of reliable information. On the other hand, substantial evidence indicated that the maize gap was not being adequately filled from any source. Rapidly increasing maize prices, reports warning of deteriorating food security in rural areas, anecdotal evidence and the SCF nutritional survey in December should have been sufficient to launch an ENA in Malawi during late 2001.

70. There was no official recognition of the crisis until the Government declared a state of disaster on 27 February 2002, too late to prevent hunger-related deaths. Political debate, mainly on the corrupt sales from the National Grain Reserve, may have prevented recognition of the crisis and blocked timely intervention. On the other hand, clear thresholds distinguishing between chronic and acute food insecurity would have forced the Government to declare an emergency much earlier. The following section suggests what these thresholds might be.

Compiling the table

71. Before the information is synthesized into a framework, the sources of data must be ranked according to probable reliability. In crisis-prone situations, the analyst will find political debate to be misleading. A reliability check in Malawi could have been carried out during the period when the ENA should have been triggered; poor data quality should not be blamed for the fact that no ENA was carried out in time. Data problems and constraints may be dealt with by ranking the sources of information according to reliability, selecting those assessed as "high reliability" and ignoring "low reliability" sources (see Table 5).

Table 5. Food crisis information in Malawi ranked according to reliability

Information	Reliability	Accepted / Ignored
Maize and cassava prices	High	Ignored
Nutrition surveys	Medium/High	
Anecdotal evidence	Medium/High	
Production statistics and food balance sheet	Low	Accepted
Maize import figures		

72. The most reliable, easily collected and important indicator for food security was the exceptionally high price of maize in all markets in the country, which proved to be insufficient to trigger an ENA; another important and reliable indicator was the high price of cassava. Yet cassava prices were not merely ignored: they were not even reported by the authorities responsible for monitoring food security. The most contentious and

unreliable information – food production figures and maize import figures from various sources – were used to justify inaction.

73. Nutrition surveys, which are important and reliable early indicators of food crisis, were not enough to trigger an official assessment of the situation either, possibly because they were commissioned by SCF/UK and were not integrated into the official early-warning system. Credible stories of hunger-related deaths and social breakdown such as theft of food crops and violent action by vigilantes against people caught stealing were reported by priests and NGOs in affected villages, but were dismissed as scaremongering until the BBC and CNN broadcast the evidence of famine to the world.

74. Table 6 synthesises the available information and shows the sources of confusion that affected the assessment of food security in Malawi during 2001. Availability-based indicators are either missing – cereal production compared to previous year and cereal gap – or confusing – maize production decline interpreted in three different ways, or food gap ranging between surplus and deficit as a result of different interpretations. Table 6 clearly cannot contain dynamic indices, which change monthly; these are reported by month in Table 7. In Malawi, "evidence of social breakdown" replaces "migration" as a major social indicator to be monitored.

Table 6. Summary of early warning information in Malawi, 2001

Indicators			**Information**
Availability-based	Production decline	Staple: maize	-32% compared to previous year, OR -12% compared to 5-yr average, OR +6% compared to 10-yr average
		Cereals	Not available
	Gap approaches	Staple gap	275 000 mt *deficit* (19% of national production)
		Cereal gap	Not available
		Food gap	+438 000 mt *surplus*, OR +263 000 mt *surplus*, OR -323 000 mt *deficit*
Access-based	Prices	Staple	See calendar table
		Other food crops	
	Terms of trade	Assets	Not available
		Livestock	
		Wages	
Social indicators	Behavioural change	Coping strategies	See calendar table
		Social breakdown	
	Outcome indicators	Malnutrition	
		Crude Mortality Rate	

75. Interpretations and data sources based on the availability-based approaches produce very different results, so different scenarios can be calculated. According to the thresholds (see Table 2), maize production compared with the previous year's production gives an index value of 4, representing a 32 percent decline and severe crisis; compared with the five-year average, the index value would be 2, representing a 12 percent decline; and compared with the ten-year average or with any of the food gaps showing food surplus, the index value would be zero, no crisis at all. These figures – and the confusion they create – should be available after harvest, when there is still time to consider intervention or to monitor the situation. It should be clear to the analyst that little attention should be paid to

the various interpretations of production when assessing the food situation, even without assessing the credibility and relevance of the data.

76. Of the dynamic indicators used to assess changes in food security over time, the first and clearest is the rapid increase in maize prices compared with the average in the previous two years and with the price of maize during the same month one year before. From at least August onwards, all price data show extreme food insecurity, which calls for an index value of 5, the highest in the measuring system. As proposed earlier, any index showing extreme conditions should automatically trigger an ENA. Ironically, there is no point in considering price data any longer, because a two-and-a-half to three-fold increase from September onwards should have been clear indication of severely declining food access in a country where most of the population spend most of their income on food. The analysis does not take cassava prices into account, investigation of which would have shown that the justification for inaction – the belief that production figures showed that sufficient cassava was available – was invalid.

77. The third set of indicators, the outcome indicators of social stress represented by malnutrition and crude mortality rates, cannot easily be incorporated into the table because the trends are not monitored continuously. It is highly probable that the figures would have shown a deteriorating and alarming trend and triggered an ENA, but they had to be excluded from the final table until the month of December, when the first nutrition survey by SCF was released. It should be noted, however, that in this case the maximum value of the final index was 10 instead of 15. Malnutrition and CMR figures entered the table in December and March, and get a value of 2 and 3, respectively to malnutrition and CMR.[28] In this context, a subjective assessment by priests, NGOs and the media in the affected communities, which was based on unofficial reports of social breakdown, should have been sufficient to signal a crisis and elicit a timely response from the Government and donors even before the value of the quantifiable indices rose to high levels.

78. Regardless of the way in which the sources of information were combined, price data should have triggered a timely emergency response in August or September. As a result of price increases, the value of the final index as early as June and July was between 6 and 7 – 60 percent to 70 percent distress – indicating the need for an immediate ENA. As the findings of nutrition surveys entered the table in December, the value of the index increased to 9.29. The index reached 10 – 67 percent of the maximum 15 – when the updated nutrition surveys were released in March.

[28] The survey in March 2002 found malnutrition rates of 19.0 percent in Salima district and 12.5 percent in Mchinji – "food crisis conditions" according to the famine scales, with a value of 2 – and a CMR of 1.23 – "famine conditions", with a value of 3. The overall value of **3** is therefore appropriate.

[29] At this point the maximum value of the index becomes **15** instead of **10** and the overall index will represent 60 percent (9/15), which is actually lower than the previous figure of 70 percent (7/10); but as the threshold for triggering an ENA had already been passed, it is of less importance.

Table 7. ENA calendar in Malawi, 2001–2002

Month	1. Production	2. Price, compared with			3. Social indices	Total value
		past year average (%)	same month 1 year earlier (%)	terms of trade		
1. Harvest	Maize production decline compared with 5-year average = 12% = value of **2** according to scale.	**First**		Not available	**Trigger for ENA = Production**	
		125	151		0	2 + 4 + 0 = 6
2. July		146	169			2 + 5 + 0 = 7
3. August		**Second**			**Trigger for ENA = Prices**	
		207	255		0	7
4. September		269	319			
5. October		**Third**			**Trigger for ENA = SCF/HEA**	
		297	343		0	7
6. November		309	311			
7. December		**Fourth**			**Trigger for ENA = Malnutrition**	
		387	382		2	2+5+2 = 9
8. January		497	438			
9. February		505	436			
	"Too late": needs assessment missed.	**27 February 2002**			**Declaration of state of disaster**	
10. March		482	407		3	2+5+3 = 10
11. April		361	305			
12. May		252	224			

79. It is clear that the final index and its sub-components could be calculated and interpreted in different ways. The advantage of the table is that it combines the different sources of available quantitative data in such a way that if one source of information – production – fails to provide accurate information about an approaching crisis, the other two sources – prices and social distress indices – signal a crisis. It is hence irrelevant to prioritize one source over another: if one source indicates distress, immediate response is required. The table excludes qualitative information and the warnings of several reports that would have supported the need for an ENA well before the declaration of a state of disaster in February 2002.

Conclusion and recommendations

80. Food security results from a combination of factors; no single index accurately captures it. A decision as to whether and when to trigger an ENA should therefore be based on a combination of indicators rather than a single source of data. This paper considers a range of indices and proposes a simple methodology to analyse them simultaneously. Given that the aim was to identify factors that should trigger ENAs, the methodology relied on macro-level data that are available in most food-insecure countries: food production, prices and social indices. If reliable micro-level figures are available over a longer period of time, as for example in the VAC surveys in southern Africa, the analysis should incorporate them.

81. An early-warning system functions according to the quality of the data input. Whereas food access is determined by production and prices and is represented by indices of food insecurity, early-warning systems are unlikely to function effectively without accurate real-time monitoring of the figures. Given that production estimates are difficult to monitor, substantial improvement in the quality of the figures in the short term is unlikely; for the immediate future, therefore, more attention should be devoted to market prices and social indicators of food insecurity. In particular, the following recommendations are made:

(1) Market-information systems should be supported to collect an appropriate range of price data from a variety of regional, district and village markets. Price figures indicate distress because they are (i) compared with previous trends and (ii) expressed as terms-of-trade indices compared with labour wages and prices of assets and livestock. Price data are relatively easy to collect: highly trained enumerators are not needed, so substantial initial investment is not required. There are two keywords: (i) **frequent**: data should be collected preferably weekly and at least fortnightly; and (ii) **grassroots**: data should be collected from remote areas where the marketing system is least developed. Accurate and reliable price data will help to target food aid programmes to the most food-insecure areas and will have much wider applications in terms of designing long-term food-security policies. Such data combined with terms-of-trade ratios make it possible to detect worsening food security in remote areas, because they constitute a universal indicator of food distress.

(2) Further resources should be invested in identifying and monitoring social indicators of food stress, including outcome indicators such as malnutrition and CMR, and qualitative indicators of behavioural change, especially coping strategies. These data may be more difficult and costly to collect than prices, but they are of the utmost importance. The comparison between Niger and Malawi (see Box 1) shows that changes in malnutrition rates over time matter as much as the absolute level. In Niger, global wasting of 14 percent to 16 percent is considered normal; in Malawi, a wasting rate of 9 percent to 11 percent was used by SCF to draw attention to an emerging food crisis. To detect changes over time, real-time monitoring is needed. Substantial additional investment may not be needed because many health centres in rural areas collect malnutrition data. It should in any case be possible to establish suitable monitoring systems or scale up ongoing efforts within existing institutional frameworks. The information collected would be equally helpful in detecting food crises and in targeting food aid or other social protection.

82. With regard to indicators of behavioural change, further consideration should be given to investing in rapid appraisal methods such as dietary diversity or the coping strategies index and monitoring them as part of a regular food-security information system. These need to be supplemented with locally specific indicators such as livestock sales or migration to reflect outcomes of food stress in each country, region or livelihood system. Common sense and local operational and professional experience are needed to judge the relevance of this information objectively.

83. Unless such investments are made in the most food-insecure and crisis-prone countries, ENAs are unlikely to become more reliable and provide accurate early warning. If these proposals are adopted, the credibility of early warning will improve and actors such as governments and donors will be less likely to politicize or ignore the indications of the early-warning system.

84. The methodology developed in this paper, particularly locally specific indicators and their thresholds, require field testing and local contextualization. The indicators and thresholds must not be seen as definitive or as able in all cases to predict a developing food crisis accurately. The main advantages of this proposal are its relative simplicity and the fact that it attempts to combine, verify and analyse various sources and types of information in a single monitoring system that is relatively simple to operate.

85. To make this methodology applicable in specific contexts, a baseline must be established and information gaps identified at the country and sub-national levels on the basis of the following questions:
    i) What kinds of food-security data are regularly reported and routinely monitored?
    ii) How credible, timely and relevant is each of these data sources and indicators?
    iii) How can the various sources of data be integrated into a simple but coherent early-warning system?
    iv) What critical information gaps exist that needs to be filled through additional data collection and monitoring?

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Annex

Table 8. Famine intensity scale

Level	Phrase designation	Lives: malnutrition and mortality indicators	Livelihoods: food-security descriptors**
0	Food security conditions	CMR < 0.2 and Wasting* < 2.3%	Social system is cohesive; prices stable; negligible adoption of coping strategies.
1	Food insecurity conditions	CMR >= 0.2 but < 0.5/10,000/day and/or Wasting >=2.3 but < 10%	Social system remains cohesive; price instability, seasonal shortage of key items; reversible 'adaptive strategies' are adopted.
2	Food crisis conditions	CMR >=0.5 but <1/10,000/day and/or Wasting >=10 but < 20% and/or prevalence of Oedema	Social system significantly stressed but remains largely cohesive; dramatic rise in price of food and other basic items; adaptive mechanisms start to fail; increase in irreversible coping strategies.
3	Famine conditions	CMR >=1 but <5/10,000/day and/or Wasting >=20% but <40% and/or prevalence of Oedema	Clear signs of social breakdown appear; markets begin to close or collapse; coping strategies are exhausted and survival strategies are adopted.
4	Severe famine conditions	CMR >5= but < 15/10,000/day and/or Wasting >= 40% and/or prevalence of Oedema	Widespread social breakdown; markets are closed or inaccessible to affected population; survival strategies are widespread.
5	Extreme famine conditions	CMR >=15/10,000/day	Complete social breakdown; widespread mortality.

Source: Howe and Devereux (2004) p. 362.

* Wasting: Proportion of child population from 6 months to 5 years old who are below 80 percent of the median weight-for-height or below –2 Z-score weight-for-height.

** These food-security descriptors are examples of the types of experiences that may be associated with each intensity level; not all of them have to be present in every situation that is given that intensity designation.

Table 9. Global baseline mortality rates, by region

Baseline Reference Mortality Data by Region				
Region	CMR (deaths/ 10 000/day)	CMR emergency threshold	U5MR (deaths/ 10 000 U5s/day)	U5MR emergency threshold
Sub-Saharan Africa	0.44	0.9	1.14	2.3
Middle East and North Africa	0.16	0.3	0.36	0.7
South Asia	0.25	0.5	0.59	1.2
East Asia and Pacific	0.19	0.4	0.24	0.5
Latin America and Caribbean	0.16	0.3	0.19	0.4
Central and Eastern European Region/CIS and Baltic States	0.30	0.6	0.20	0.4
Industrialized countries	0.25	0.5	0.04	0.1
Developing countries	0.25	0.5	0.53	1.1
Least developed countries	0.38	0.8	1.03	2.1
World	0.25	0.5	0.48	1.0

Source: UNICEF, *State of the World's Children 2003* (data from 2001).

Acronyms

ADMARC	Agricultural Development and Marketing Corporation
APRU	Agricultural Policy and Research Unit/Bunda College of Agriculture, Malawi
CARE	Cooperative for Assistance and Relief Everywhere
CFSAM	crop and food supply assessment mission
CMR	crude mortality rate
DFID	Department for International Development
DHS	Demographic and Health Survey
ENA	emergency needs assessment
FAD	food availability decline
FAO	Food and Agriculture Organization of the United Nations
FBS	food balance sheet
FCND	Food Consumption and Nutrition Division of the International Food Policy Research Institute
FED	food entitlement decline
FEWS-NET	Famine Early-Warning System Network
GAM	global acute malnutrition
HEA	Household Economy Analysis (SCF/UK)
HFEA	household food economy approach
HIV/AIDS	human immuno-deficiency virus/acute immune deficiency syndrome
HKI	Helen Keller International
MICS	multiple indicator cluster survey
MSF	*Médecins sans frontières*
NGO	non-governmental organization
SADC	Southern African Development Community
SCF/UK	Save the Children Fund/United Kingdom
TIP	Targeted Inputs Programme
UNICEF	United Nations Children's Fund
VAC	vulnerability assessment committee
VAM	vulnerability analysis and mapping
WHO	World Health Organization