World Food Programme

Key Issues in Emergency Needs Assessment

Volume II: Background Technical Papers

Supplement to the
Report on the
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Rome, Italy

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Organized by:
Emergency Needs Assessment Unit
(OEN)

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Supplement to the Report of the Technical Meeting, 28–30 October, 2003, in Rome, Italy

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This volume collects the technical papers that act as a supplement to the Report on the three-day Technical Meeting on "Key Issues in Emergency Needs Assessment" held in October, 2003 in Rome Italy. They form an important technical backdrop to the good work done at the meeting. On behalf of the World Food Programme's Emergency Needs Assessment Unit (OEN), I wish to extend our sincere thanks to the authors of the technical papers and the organisations and offices they work for: Oxfam GB, Save the Cildren UK, Tango International, the World Bank, and the World Food Programme, Nairobi.

Wolfgang Herbinger

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Table of Contents

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Non-food aid response to food insecurity:
How do we identify the most appropriate types of intervention through emergency food security assessments?

By John Seaman (Save the Children-UK) and Chris Leather (Oxfam GB)

Introduction

This Background Paper has been written for discussion at the WFP-Partner Consultation on *Key Issues in Emergency Needs Assessments* in October 2003. During a previous meeting in March 2003, concern was raised that: -

> "food aid needs are sometimes over-estimated, while the potential for other (non-food aid) interventions to address food insecurity problems is not adequately addressed. Assessments should address food insecurity and not focus narrowly (solely) on food aid requirements"[1].

It is widely acknowledged that free food aid can have negative effects[2] including:-

- Encouraging population movements and concentrations
- Depressing food prices in local markets and affecting the livelihoods of local producers and traders (although evidence for this is anecdotal[3])
- Reduce the incentive to produce food and create dependency (again there is a lack of empirical research in this respect[4]).
- Creating tension between beneficiaries and non-beneficiaries
- Placing civilians at increased risk of violence by combatants
- Sustaining conflict

It is, therefore, not only important to have an understanding of the circumstances in which free food aid is and is not appropriate - it is also vital to have an understanding of when and how we can use different alternatives to free food aid.

Of course, some of these problems also apply to other types of assistance, not just food aid and some arise from the way in which assistance is distributed. It is necessary to evaluate the advantages and disadvantages of different types of assistance, as well as different modalities of delivery.

The key point is that food aid needs are often over-estimated. From what we know about food insecurity and famine, there must be a limited number of situations where there is an overall food deficit. This means that in many situations there must be other types of intervention, which would much better promote food security. Unfortunately, the over-estimation of food aid requirements

1 WFP (2003)

2 Young 1992, p 50

3 In some circumstances prices have remained stable due to surplus food being stored by traders.

4 In 2004, Oxfam GB aims to conduct research to determine the extent and ways in which food aid might create dependency.

frequently means that appeals for donor funding are dominated by food aid at the expense of other types of response[5].

The aim of this paper is to identify the key issues and outstanding issues in ensuring that needs assessments identify the most appropriate type of intervention for improving food security in emergencies. In particular, the paper focuses on ways of ensuring that the appropriateness of "non-food interventions" is taken into consideration during assessments.

The following questions are addressed: -

- How do we define "food aid" and "food aid alternatives"?
- In what circumstances are food aid and different food aid alternatives appropriate?
- What information is required to be able to decide on the most appropriate type of intervention?
- What are the key issues and critical areas of uncertainty?

At the request of WFP, this paper focuses on the assessment of the need for non-food aid responses. However, it should be highlighted that food security assessments should lead to conclusions on the appropriateness of different types of intervention, whether food or non-food, and should not assess households' food needs separate from their non-food needs. It is important to remember that responses are inter-changeable and that there might be a need for a combination of different types of response.

The paper also focuses on ways of helping people meet their immediate consumption requirements immediately after a shock. In food security assessments, Oxfam GB and SC-UK would normally also consider ways of improving the food and livelihood situation of the affected population in the longer-term.

A range of factors determine the relative appropriateness of different types of response, including the severity, phase, duration and scale of crisis, as well as the type of disaster, livelihoods affected and infrastructure available in country[6]. Due to the restrictions of time in the preparation of this paper, the focus is on determining the appropriate response according to the severity and nature of food insecurity rather than organisational capacity, funding or infrastructure.

SECTION 1: Defining and Comparing the Advantages of Food Aid Alternatives

A. The objective of food aid and non-food responses

An emergency assessment can be planned only with a clear understanding of the parameters of humanitarian operational response in mind.

The objectives of crisis responses are, except sometimes in the most general terms, rarely explicit, but there are broadly three in use:

[5] Development Initiatives (2003)

[6] Jaspars et al 2002

1. **To respond to established malnutrition i.e. to provide food to individuals or households who meet some objective criterion of malnutrition,**

At the individual level, food aid is provided, through supplementary or therapeutic feeding centres to children under 5 who fall below some anthropometric threshold. Pregnant and lactating women may also be considered in need of food aid.

At the household level, food aid might be provided to the whole family where it is assumed that a malnourished child may be an indicator of household need. Under special conditions, e.g. warfare, this objective may be unavoidable, although it has been imposed as a formal condition by a donor in at least two cases (e.g. in Darfur, where in 1998 a 20% child malnutrition level was set as a condition for considering the supply of any food, and more recently in Ethiopia: 15%). Regardless of the reason, the information needs under these conditions are relatively straightforward i.e. to establish the number, location and severity of the target group, using a representative anthropometric survey, a population estimate and a population map.

The use of food aid to treat established malnutrition at the individual level is of course appropriate when based upon anthropometric assessment. Household rations may also be relevant but need cannot be established merely on the basis of anthropometric status. It is necessary to gain an understanding of the underlying causes of malnutrition and determine the relative importance of food security, the care and health environment.

2. **To prevent malnutrition (and associated nutritional diseases) by providing for household food needs.**

This objective is more problematic. It is based on the assumption that it is possible to measure household food needs independent of their non-food needs, the household's own capacity to obtain food and to sustain their livelihoods. This is not logically possible:

- People can survive only if they satisfy some minimum level of 'non-food needs' (e.g. fuel, tax, water, and beans or other foods where only staples are available). It is often observed that people will reduce their food consumption, and sell food e.g. food aid, in order to get cash to meet these needs. The food needs of a poor household may be assessed e.g. at its biological need, but may have to sell some proportion of that food or their assets to obtain its non-food requirements, thereby threatening their nutritional status and/or livelihood sustainability.
- Some households will have assets that they can exchange for food. A wealthy household may have a shortfall on its current food production but sufficient reserves to satisfy both the shortfall and to meet its other expenses

An Emergency Food Security Assessment (EFSA) which attempts to estimate food needs, without considering non-food costs and household assets, runs into the difficulty that the assessed 'food need' may both under- and overstate food needs. The better off may be judged to need food they could provide for themselves and the reverse. In operational practice the success of non-food (and food aid) responses is judged chiefly in terms of the absence of visible distress. In fact emergency responses may be successful in preventing starvation but often only at the cost of the destitution of some proportion of the population. For example the 1992/1993 market intervention in Zimbabwe was broadly successful in stabilising maize prices, but an SC assessment in Binga District showed that many people could afford to purchase food only by reducing their food consumption and by selling off livestock and other major assets to get cash. People survived but at the cost of their future livelihood.

3. **To assist the affected population to meet their essential food and non-food requirements and to protect their livelihoods, health and dignity.**

We propose that emergency food security assessments are undertaken with this operational objective in mind, as it recognises (1) the importance of assessing and responding to people's non food needs and (2) the role that assistance can play in protecting livelihoods and longer-term welfare. Assistance might be provided that directly enables people to meet their immediate consumption requirements whilst preventing the use of damaging coping strategies (e.g. food aid, cash, hygienic items). Assistance might also be provided which enables people to protect their livelihoods whilst ensuring that existing household resources can be utilised to meet their immediate consumption requirements (e.g. livestock off-take, fodder, seeds and tools, other productive inputs).

B. Defining food aid and non-food aid responses.

Food aid, locally procured food, cash (and other material inputs) are (to a greater or lesser extent in different locations and for different purposes) interchangeable[7]. For example, food for work programmes may set food wages at a rate equivalent, at prevailing prices, to a defined cash wage; food aid can and has been used for market support, people receiving food aid may sell this to obtain cash to meet non food needs. Therefore a classification i.e. 'non-food aid responses' based on the material used for that response is somewhat arbitrary

Ideally, food, cash and other commodities would be freely available for relief use and food aid would be used only where it has a clear comparative advantage (see below). However, the operational reality is that food aid is often available where cash and other material are not. Therefore, the concept of "non-food responses" might be broadened to include the use of food aid in return for labour (food-for-work) and in other ways of facilitating access to food with less detrimental side-effects than with free food aid. Consequently, we have made a distinction between "free food aid" and "food aid alternatives" as follows:

> Responses other than the distribution of free food aid, whether the resources used are in food (whether as aid or not), cash or other material. By this definition non-food responses include a collection of approaches which attempt to improve people's ability to acquire or purchase food.

C. Classification of non-food responses

Reduce or stabilise food prices

Market support to reduce or stabilise food prices, by controlling the market supply of staple food to hold prices below some threshold. This is sometimes combined with administrative measures to prevent hoarding, bulk export of food from an area etc and is sometimes targeted to defined categories of recipient. Market support remains the policy mainstay of food security in many countries to iron out fluctuations between years and as a main plank of crisis management. Examples include the stabilisation of maize prices by the Government of Zimbabwe (largely using imported commercial grain subsidised by the World Bank) in 1992/3-price stabilisation in Tanzania in 1998, using national stocks and in numerous other cases. In the context of crisis management, the best known case is India where systems have been developed to support food prices and to create demand (through public works) in a highly targeted way. In the last decade, the International financial institutions and some donors have discouraged intervention in markets particularly in Africa (other countries such as Bangladesh having retained much greater control) as this is seen to interfere with market liberalisation.

[7] Food aid is distinguished from other e.g. locally procured, food that may be used for emergency prevention or relief only to the extent that: 1. Food aid commodities may be different to those obtained from local sources e.g. white/yellow maize. 2. Conditions may apply to its use e.g. a donor may specify that food may or may not be sold.

Increase household income by stabilising the prices of commodities sold by disaster-affected producers

An example of this is the purchase of livestock at a "fair" i.e. subsidised, price in situations where livestock markets have collapsed[8]. A potential additional benefit of this type of intervention is the increase in food acquired by food insecure families as a result of the free distribution of the meat from the purchased livestock (e.g. Oxfam GB, Wajir 2000, *Veterinaires sans Frontiere* north of the Niger loop in Mali in 1984[9][10][11]). Examples particularly on any large scale are comparatively rare, chiefly because of the obvious management difficulties.

Increase household income through the provision of cash, food, vouchers or other commodities (e.g. household items) either free of charge or in return for labour (e.g. cash-for-work or food-for-work)

Cash distribution has been run in many locations (e.g. by SC UK in Bangladesh for famine relief in 1995, by the Government of Bangladesh in some crises). The practical difficulties are well understood. In most locations security considerations preclude cash distribution except as a one-off event or on a local scale. Moreover, where the market supply of food is restricted, cash distribution may lead to sharp price rises. Oxfam GB has increasingly implemented CFW programmes, particularly in Asia in response to loss of labour and employment opportunities12. The impact and appropriateness of voucher systems has been viewed as variable. Some people have found them to have a good coverage, contribute to the local economy and to be more cost-effective than food aid13. Others have highlighted problems such as the lack of choice for the beneficiary, difficulty in providing change, loss of dignity, lack of price and quality control.

Increase household income through the provision of productive inputs (e.g. water supply for livestock, fodder, seeds, tools, fishing nets etc)

The provision of these types of assistance, enable households to utilise existing resources to meet their immediate consumption requirements whilst also helping to safeguard their livelihoods and future survival. Examples are relatively numerous. Following an assessment of the impact of the Orissa cyclone on the state's coastal population, Oxfam distributed seeds, potter's wheels, basket-making materials, saplings and fertiliser, fishing nets and goats, in addition to implementing cash- and food-for-work programmes[14].

D. Assist physical access to markets

This might be achieved by improving roads (combined with a food- or cash-for-work scheme[15]) or providing transportation for consumers or traders. It may also involve the provision of information on market functioning.

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[8] Akililiu & Wakesa 2001 July

[9] Jaspars et al 2002

[10] Birch & Shuria 2001

[11] Seaman, J. Personal observation

[12] Khogali 2001

[13] Hanley 1998

[14] Young et al (2001)

[15] WFP 1998 May

Reduce household expenditure and free-up money through policy interventions to reduce or suspend obligatory payments (e.g. taxation, school and health fees) so that households are better placed to purchase food.

The most recent case of which we are aware is the suspension of health fees in Ruengheri and Gisenyi Districts of Rwanda in 2000, although it has historically been a regular feature of policy response to famine in some countries e.g. in Imperial Ethiopia, the poll tax was sometimes suspended. Such approaches have the advantage of being administratively simple in organised states. The scope for such measures is clearly limited by the burden of charges and taxation in any particular location.

It is probably a fair generalisation that 'non-food aid' responses that are practical at a large scale and which can potentially be introduced at reasonably short notice are: 1. The price support of staple food. 2. Policy interventions where there is scope for these.

The appropriateness of different types of response depends upon a range of different factors. Factors within the social and economic environment include: national food availability, market functioning, household income and purchasing power, physical access to markets, security and gender relations. Factors which are inherent to different types of intervention include: desirability (by beneficiaries and non-beneficiaries), exchange value, logistical and managerial requirements, and associated costs.

These issues need to be taken into consideration during EFSAs and decision-making on appropriate interventions.

SECTION 2. Information needs for choosing non-food responses

The Objective of Emergency Food Security Assessments

The overall aim of EFSAs follows logically from the operational objective (see above) and could be stated as follows:-

> To assess the ability of disaster-affected households to meet their essential food and non-food requirements without damaging their livelihoods, health and dignity.

Overview of the information required in Emergency Food Security Assessments

It follows in turn that any EFSA must include information on the extent to which households are able to acquire food and non-food goods and the costs[16] to them (e.g. asset depletion, family separation)

[16] See Sphere (forthcoming) Food Security Standard 1: General Food Security, Guidance Note 4, "Understanding the risks associated with coping"

involved in doing this. The theoretical basis for such an assessment is 'exchange entitlement'[17] and an understanding of vulnerability and coping strategies[18].

A household's entitlement is a measure of the ability of that household to acquire food and non-food goods i.e:

> The sum of the household's current food holdings (current year production + stocks) and the value of their assets in terms of food. Assets may include cash (to include in some cases the potential for credit and gifts) livestock, labour, other tradable items and household access to wild plant and animal foods and 'gifts'.

In addition, to an understanding of shifts in entitlement resulting from a shock it is also necessary to understand the types and consequences of strategies that people use in response. As already indicated, it might be that households give priority to protecting their future livelihoods rather than meeting their immediate consumption requirements.

Assessing the severity of food insecurity at the household level

► **Changes in food and income sources[19]**

The information required to describe household entitlement is a household budget (sources and relative importance of food and non-food income), tradable assets and wild foods and 'gifts'. As household income fluctuates from year to year this information must relate to a defined reference year. The entitlement of a population (of households) may be estimated by obtaining information on a representative range households, defined according to their wealth or livelihoods. In order to set operational objectives information is also needed on patterns of household expenditure at different levels of household income[20].

► **Type and acceptability of coping strategies**

In addition, Oxfam GB uses the type and acceptability of coping strategies as a proxy indicator of food security status. It is assumed that the ways in which people acquire food and income and manage their livelihoods correlates with both their current and future exchange entitlement. For example, a household that is threatened by drought but still meeting their essential requirements may diversify their crop production in order to protect their future food security. Another household may also be meeting their immediate requirements but may be selling off their livestock at a higher than normal rate, thereby threatening their future food security. The latter household might be considered to be more food insecure and in greater need of assistance. The challenge in this approach is in determining the acceptability of different coping strategies (as to some extent this will be determined by cultural

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[17] Sen 1981

[18] Corbett (1988)

[19] Whereas the Household Economy Approach involves the quantification of food and cash income, other approaches only involve information on the changes in the *relative* importance of food and income sources.

[20] It is beyond the scope of this paper, but the current estimate of 2100 kcals/ person/ day which is applied in many EFSAs exceeds the actual consumption of the poor (themselves a large proportion of the population) in many locations. This raises the operational question as to whether the objective is to restore or maintain habitual levels of food consumption, or to exceed these. The effect on estimates of the gross tonnage of relief food required is potentially very large.

and moral norms) and with what level of food insecurity different strategies correspond. There is a need to conduct research in order to further assess the validity and reliability of this approach (see Key Issues and Critical Areas of Uncertainty below).

The analysis of shifts in entitlement is in terms of a model (itself a direct corollary of Sen's 1981 theory). The model is used to simulate the probable effect of some change in production, price or market access on households of different economy.

Entitlement information can be used to model

- The ability of a household, or population of households to meet its food and non- food needs and to compensate for any shortfall in current income (sometimes referred to as 'coping strategies') under defined condition of production, price and market access. In some cases coping strategies involve an intensification of usual economic activities i.e. expansion of efforts to obtain paid employment (e.g. more distant labour migration) or a greater reliance on wild foods, rather than some wholly new activity.
- The effect of a change resulting from a relief intervention. For example an estimate can be made of the effect of: a fall in price of staple foods from price stabilisation. To the extent that a household depends on food purchase to meet its staple needs a price fall will require the household to spend less money on food. This may reduce or eliminate the households need to reduce food consumption, to sell assets, or to forgo non-food consumption.
  A reduction in taxation or some other obligatory cost. More money will be available to be spent on food.

From population data sets it is possible to derive estimates of a variety of population statistics, including for example estimates of levels of the effective demand for food, the location and relative importance of markets for different traded commodities.

A great deal of experience has accumulated in the assessment of entitlement although there are several outstanding issues. This is discussed further under outstanding issues later in this paper.

Macro –level food availability

As suggested in the discussion on the comparative advantages of different types of response, when deciding on the need for and type of external intervention, it is necessary to have an understanding of:

- National / sub-national food availability / deficits
- The extent to which any deficit is likely to be filled by local actors, i.e. government and / or commercial traders
- The role humanitarian actors might be able to play in supporting governments and the private sector.

Free food distribution may not be appropriate when adequate supplies of food are available or when a localised food deficit can be addressed by local actors or by assisting food insecure households to access markets[21].

For example, it could be argued that although EFSAs in Malawi in 2001 correctly predicted a severe food crisis in early 2002, this did not sufficiently take into consideration a) the potential for the Government and the private sector to deal with food shortfalls and food price inflation and, b) did not

[21] See Sphere (forthcoming) Food Security Standard 1: General Food Security, Guidance Note 1, "Prioritising life-saving interventions"

sufficiently address seasonal issues. Consequently, the criticism has been made that estimates of food aid requirements were too high.

Information is, therefore, required on

- The population (aggregate) 'exchange entitlement'
- Government policies and intentions
- Regional food availability

Markets

- The capacity and motivations of the private sector
- Market location, accessibility, functioning and prices
- Terms of trade.

Additionally an EFSA will require information relevant to the practicality e.g. management, of the specific range of potential interventions at the location concerned

The decision as to the most appropriate type of intervention will depend upon

- Practical consideration e.g. the local availability of essential commodities
- As already noted the operational objective.

The information required for the identification and design of specific non-food aid responses

Staple food market support. To the best of our knowledge there is little experience of designing such interventions on the basis of EFSA information. In places where market intervention is used this is usually based on 1. a pre-existing or prearranged system for market intervention e.g. a system of fair price shops, 2. operational experience i.e. people who have prior experience of price support. Ideally the quantity of food available for intervention exceeds any possible level of demand i.e. sufficient food can be supplied to any market to ensure that the envisioned level of price can be maintained. The design of market intervention on the basis of an EFSA is therefore theoretical. The information required would be:

- An estimate of the amount of food which would have to be supplied to any market to maintain a predicted price.
- An estimate of the ability of households to meet their needs at that price, taking into account any operational objective i.e. to allow households to maintain their non-food needs and to retain assets.

SC UK has modelled the effect of price stabilisation on the ability of households to meet food/non-food needs, and derived estimates from this of the quantities of food required although these have not been used operationally.

Cash and food transfers to households by subsidising commodities; *by cash gift, cash for work or food for work; and policy interventions.* These all require a similar information set e.g. subsidised livestock purchase will require knowledge of livestock holdings, and other household entitlement, to estimate the effect of a given level of subsidy, how this will vary between households and the extent to which this would meet household food needs. Policy interventions e.g. suspending taxation, school and health fees, will require some ability to estimate the effect on household food access, how this will vary between households of different economy. Cash distribution will require knowledge of household needs, and appropriate information on markets (specifically their degree of integration with a wider market system) to determine whether the additional demand is likely to lead to price inflation.

Additionally:

1. A realistic (in the sense that people will not in general seek to sell food to obtain non-food items over this limit) estimate of minimum household non-food needs will be needed. This will require information on patterns of expenditure and costs. This is not always straightforward as some items of non-food expenditure e.g. primary education costs may be regarded as essential (i.e. people will go without food to get them) by some communities, a consideration which in our experience is not generally acceptable to donors.
2. A 'livelihood objective' must be declared by the intervening agency. Specifically this requires knowledge of household assets and an estimate of the extent to which it is considered acceptable for households to deplete these.
3. To plan cash/food-for-work programmes, information will also be required on household labour availability and existing employment opportunities and the returns.
4. The seasonality of the economy (crops, livestock and other cash sales, labour opportunities) allows calculation of the timing of expected demand (e.g. for staple foods).

SECTION 3. Critical areas of uncertainty

The main outstanding technical issues in the estimation of entitlement relate to:

1. The level of detail in, and geographical disaggregation of, the data set.
2. Sampling
3. The use of household techniques with additional e.g. macro level information to design non-food responses.
4. There are also outstanding issues relating to operational objectives.
5. Consensus on what might be considered to be *essential* non-food requirements and hence how to determine when to intervene
6. Determining what are acceptable livelihood strategies and hence what sources of food and income might and might not be taken into account when determining the need for assistance

1. The level of detail/ disaggregation of the data set.

Techniques used to collect livelihood data sets were originally designed to enable the rapid collection of data at low cost with the primary aim of crisis prediction. To achieve this for large areas involves a simplifying step, the characterisation of an economy in terms of a distribution of 'typical' households in a series of (locally defined) wealth or livelihood groups. Within group variation is sometimes estimated (as ranges of observed or reported values). The use of markets (by people in defined populations) also involves an approximation. The relative importance of markets for different traded commodities is ranked (1, 2 etc) and in large geographical areas it may be supposed that distance would imply a different rank for different households using the same market.

This simplification means that derived quantitative estimates e.g. the total demand for food at a particular market, are approximations, but the data does not allow a statistically conventional approach to estimating of the size of the error i.e. a confidence interval.

2. Sampling

To date most household economy data collected has been at deliberately (rather than randomly) selected sample sites, the aim being ideally to select sites with the widest economic variation within

the defined population. This approach allows the use of the method in insecure areas where formal sampling is impractical and for modelling/ prediction has no obvious disadvantage. However as noted above it is not possible to derive quantitative estimates except as approximations.

Recently for specific studies we have used representative samples of individual households (to estimate the impact of change in coffee prices on household economy, and as part of an investigation into the economic impact of HIV). This would appear to overcome the problem although there remains some work to do on: 1.The statistics of estimates of particular derived quantities. 2. The statistics of sampling populations in large geographical areas.

3. The use of household techniques with additional e.g. macro level information to design non-food responses.

In recent years many situations have arisen which arguably (i.e. modelling suggests) could have been managed at much lower cost with much lesser loss of life using non-food rather than food approaches. Specifically, the evidence is that the market plays a major role in most recent food crises. This is either as a cause e.g. in southern Malawi in 2001/2002 where famine/food crisis resulted from a large rise in the price of maize, for the most part due to extraneous (to household production) reasons, or a consequence of food crisis e.g. production shocks leading to staple price rises and to collapse of asset prices as assets flood the market. Livestock markets are particularly unstable and prone to collapse.

However donors have in general been reluctant to entertain non-food interventions for political (e.g. Northern Sudan), ideological, (the reluctance to use food aid for market support in Malawi despite the 4-5 fold increase in price) practical (the large current availability of food aid) reasons and because of the difficulty of getting donors to respond before crisis is evident. Our (SC UK) experience of relating a formal EFSA to a subsequent market intervention is limited to a single example, the drought in Tanzania in 1998, where the anticipated (from a need assessment) result of market support was largely borne out by subsequently monitored events (Ref).

4. Operational objectives

As noted above, it is rare for operational objectives to be set. This issue needs to be addressed. Although many food interventions are successful in preventing starvation they are less successful in preventing **'**negative coping strategies' such as the sale of productive assets, child labour, prostitution and theft[22] and leave affected people poorly equipped to resume their normal livelihood after the crisis has ended.

5. Consensus on what might be considered to be essential non-food requirements and hence how to determine when to intervene

As mentioned above, if we are to take household ability to meet essential non-food needs into account, we must be able to define what is essential. Non-food needs might include, hygienic items, clothes, fuel, transport, education, health costs. In any EFSA, it will be necessary to determine to what extent these needs are being covered through other humanitarian responses outside of the "food security" sector. Furthermore, there is a need to reach greater consensus both globally and within specific operational environments, as what type of non-food needs we are prepared to support.

[22] See Sphere (forthcoming) Food Security Standard 1: General Food Security, Guidance Note 4, "Understanding the risks associated with coping"

6. Determining what are acceptable coping strategies

Many approaches to EFSA, look at the type and acceptability of coping strategies to determine either or both (1) the severity of food insecurity or (2) the amount of assistance that is required (i.e. "negative coping strategies" are not taken into account when calculating the extent to which households are meeting essential requirements). How do we decide on what is "acceptable" or "negative" given that this is determined by cultural and moral norms?

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Chronic and Transitory Food Insecurity

By Tim Frankenberger

I. Introduction

Vulnerability, poverty and food insecurity are not the same. The latter two concepts describe livelihood states at particular points in time. Vulnerability looks forward and seeks to describe the extent to which individuals and families are prone to being unable to cope with adverse events. Poverty and food security are essentially static concepts whereas vulnerability is dynamic and describes how people move in and out of poverty and food insecurity (Moser 1998). A food needs assessment is often a snap-shot in a point in time that will not be able to capture the dynamics of this vulnerability dimension.

WFP and other organizations involved in emergency assessments recognizes that it is important to distinguish between vulnerable groups to enable social support to be spatially and temporally targeted so that these groups do not get more food insecure as a result of shocks. Some groups will be chronically vulnerable to food insecurity and require routine support while others may experience transitory vulnerability. A key question to be asked is whether the differences between the chronic and transitory food insecure populations are significant enough to have implications for assessment methodologies and programming strategies.

This paper will discuss why it is important to take this issue into account in emergency assessments, what are the distinguishing characteristics of chronic and transitory food insecure populations, what are the information needs to identify these types of groups in various contexts and emergency settings and for developing appropriate responses, and what are the limitations and constraints that face field workers in making distinctions between these groups (e.g. time and access issues).

II. Definitions and Characteristics: Distinguishing Chronic and Transitory Food Insecurity

Vulnerability is classically defined[23] as exposure to risks and stress and the lack of the ability to cope with the consequences of risk (Chambers 1989; Webb and Harinarayan 1999). Thus, vulnerability has two dimensions: exposure and susceptibility. Exposure is the likelihood that an individual or household will be affected by a shock or threat. Susceptibility is the individual's or household's ability to cope with such threats (Devereux 2002).

There is no single way of analyzing vulnerability. Vulnerability can be described in relationship to economic dimensions, biological dimensions, political dimensions, and social dimensions. In addition, the way that vulnerability is defined will also differ depending on whether the objective of the intervention is to reduce malnutrition or increase agricultural output (Darcy and Hoffman 2003). Oftentimes, the focus of vulnerability is largely driven by the mandates and objectives of organizations.

[23] According to VAM, vulnerability can be defined as the probability of an acute decline in food access, or consumption, often in reference to some critical value that defines levels of human well-being.

WFP is focused on vulnerability to hunger and food insecurity among the populations with which it works. The concept of vulnerability directly relates to food security when factors place people at risk of becoming food insecure or malnourished, including those factors that affect their ability to cope (WFP Memorandum 2001). Adopting the definition of the World Food Summit, WFP defines food security as follows:

Food security exists when all people, at all times have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary requirements and food preferences for an active and healthy life.

Food insecurity exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. It may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level.

From this perspective, vulnerability to food insecurity is determined by the frequency and severity of exposure to natural and human-made hazards, as well as the socioeconomic and geographical scope of those hazards (VAM guidelines 2002). A household's ability to cope will be determined by their access to tangible and intangible assets, levels of household production, levels of income and consumption, and the ability to diversify their sources of income and consumption to effectively mitigate the effects of risk that they face at any given moment.

Determining how households cope is an important aspect of vulnerability analysis. Understanding how well households cope and the resilience of their livelihoods is more important (VAM Guidelines 2002). An effective vulnerability analysis must also look at the meso level environment to determine if the local economy can absorb the sale of assets and labor that accompany responses to shocks. The stability of wages and prices in the market will play a critical role in understanding vulnerability to food insecurity.

Conceptually there are important distinctions between chronic vulnerability to food insecurity and transitory vulnerability, however these distinctions are not always straight forward. Chronic vulnerability to food insecurity denotes persistence over time in the state of being vulnerable to food shortages (Ellis 2002). Households that are persistently unable to meet their food intake needs over time (e.g., for several months every year or most years – 3 out of 5) are said to be chronically vulnerable to food insecurity. Chronic vulnerability to food insecurity is strongly associated with structural disadvantages that are difficult to reverse quickly and chronic poverty, typified by lack of assets (human, physical, other), high dependency ratios, residence in remote locations, working in low-return occupational categories and chronic sickness and/or social barriers (McKay and Lawson 2002).

Typically the landless, female-headed households, elderly, sick and disabled and other disadvantaged groups with low levels of asset holdings, limited household labor, insufficient means of support from family members are the most food insecure and vulnerable (VAM Guidelines 2002). Households can also be chronically vulnerable to food insecurity if they live in areas that are susceptible to natural or human caused disasters. In addition, households in areas of conflict are also susceptible to chronic food insecurity.

Transitory vulnerability to food insecurity involves a temporary inability to meet food needs or smooth consumption levels. This is primarily due to seasonal income fluctuations, adverse price movements or temporary shocks. In other words, transitory food insecurity is associated with an inability of households to maintain their consumption levels in the face of fluctuations or shocks affecting their incomes or circumstance (McKay and Lawson 2002). Displaced people who have not achieved self-reliance, are considered, for example, transitorily food insecure so long as there is an

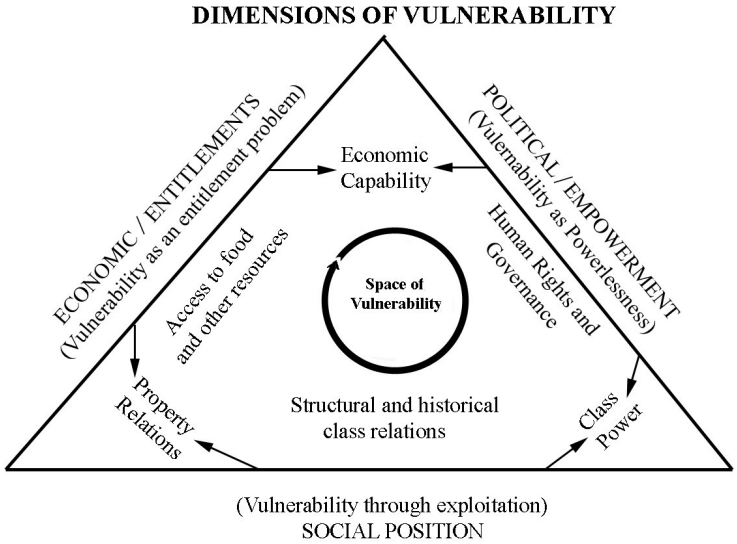
expectation that they will be able to return to their homes and former means of livelihood, integrate in their present location, or resettle elsewhere.

In order to analyze vulnerable food-insecure populations, it is important to look at the factors causing assets and coping capabilities to deteriorate, rather than assets and coping strategies themselves. The general reasons behind increased vulnerability to food insecurity, particularly in Africa, can be macro-level forces (e.g., growth failure tied to rising poverty), declines in migration options, market failures in the context of market liberalization, governance factors at regional, national and local levels, and the HIV/AIDS pandemic (Ellis 2002). All of these factors influence the ability of people to manage risk and cope with shocks that determine their access to food.

Chronic vulnerability to food insecurity can be increased through economic entitlement failure, political powerlessness or social exploitation and discrimination. Many poor people are affected by a combination of these factors. Response planning should be based on the manifestation of vulnerability affecting communities in a particular context (McLean 2001). Economic and social vulnerability leading to food insecurity are more important aspects in drought situations, whereas political and social vulnerability take precedence in conflicts. The shock of HIV/AIDS can cut across all three dimensions. The important point is the compounding nature of vulnerability. For example, the economic/entitlement problems leading to food insecurity can be exacerbated by being politically powerless and socially excluded. It is the interaction between these different types of vulnerability that will determine poor people's capacities, access to resources and the ability to meet their food needs.

Because vulnerability to food insecurity is multi-faceted, each of these dimensions needs to be taken into account in determining the vulnerability status of a community, household or individual to food access. Figure 1 identifies three sources of vulnerability that affect a given population.

Figure 1



(Adapted from Watts and Bohle, 1993)

To summarize, the chronically food insecure are structurally vulnerable, lacking access to natural and human resources, particularly productive assets such as land. Social barriers including the lack of access to social capital, institutional participation, and informal discrimination inhibit social or economic mobility for the chronically food insecure households. The chronically food insecure may constitute anywhere between 5-25% of the population, depending on the context and location. In

addition the chronically food insecure are heterogeneous and may have very different demographic characteristics and causal factors that have led to their destitution.

The transitory food insecure often represent a larger proportion of the rural or urban population who experience food insecurity either cyclically during lean periods of the year, or suddenly as a result of a shock or emergency. Transitory vulnerable households are often able to rely on their social capital as well as their access to assets to cope with shortfalls in the near term. The major problem these types of households face is consumption smoothing.[24]

Links between Chronic and Transitory Food Insecurity

Chronic and transitory food insecurity are linked. Chronic food insecure households may depend upon the transitory food insecure for wage labor, loans, and informal safety nets on a regular basis. When the transitory food insecure households are experiencing major consumption shortfalls it is difficult for them to provide this support. In addition, if the conditions that are creating the consumption shortfalls for the transitory food insecure persist over a long period of time, then they too dispose of assets, break social ties and become part of the chronically vulnerable. In such transitions, it is very difficult to distinguish the two groups.

When a shock affects an area or population group, some transitory food insecure households may become chronically food insecure, if they have lost their productive assets. These same households may be able to recover from a shock with assistance that enables them to retain or recover sufficient productive assets, preventing the downward spiral to chronic vulnerability.

Vulnerability to Food Insecurity in Urban Settings

Chronic food insecurity is also growing in urban areas. For example, the number of people living in slums and informal settlements in Africa increased by 17% between 1999 and 2003, and by 18% in Latin America and the Caribbean (Stevens 2003). In urban settings, chronic food insecurity may first result from the transition costs associated with migrating from rural to urban areas (Mitlin 2003). Chronic food insecurity may also be influenced by access to services in a given area. Poor access to infrastructure, such as shelter, potable water, sanitation, fuel, and transport may lead to serious health problems. Poor health, high health care costs, high interest debt, and patron-client extraction fees can intensify food insecurity. In addition, insecure tenure and frequent movement to alternative neighborhoods may reduce a household's ability to develop social networks. Women living in urban areas are particularly disadvantaged by the labor market and are overrepresented among the chronically food insecure (Stevens 2003).

Transitory food insecurity in urban areas can often be disguised. This is primarily because the transitory food insecure sell off household assets to maintain consumption levels to compensate for the loss of employment due to retrenchment or economic downturns. For example, the transitory food insecure populations in Jakarta and other urban centers in Indonesia were not identified as vulnerable in the early stages of the EMOP precisely because asset sales were allowing them to meet their consumption needs in the early phases of the emergency. It was only after most of the assets had been sold that nutritional problems began to show up within this population. After selling off assets, the transitory food insecure also began competing with chronically food insecure households for limited employment opportunities in the informal sector making it more difficult for the chronically poor to be food secure (TANGO International 2000).

[24] Consumption smoothing involves the ability to make consumption shortfalls that occur seasonally or inter-annually less severe. It can also involve maintaining stable prices for food across seasons or inter-annually.

Vulnerability in Conflict Situations

Conflict or complex political emergencies are a pervasive threat to life and livelihood in many countries. Unlike natural disasters, complex emergencies are also characterized by the deliberate destruction of political, economic, social and environmental systems, rendering complex emergencies fundamentally more devastating than other disasters (Lautze 1997). Conflict factors thus explain the rapid increase in refugees and internally displaced persons (IDPs). But conflict also has more broad reaching impacts: it hampers economic growth and investment; it has led to fragmented national politics and the rise of a set of economic actions based on plunder rather than production; and it directly destroys people's livelihoods, assets and institutions—sometimes deliberately, sometimes as by-product. Conflict has serious food security impacts because competition for scarce resources underpins many of the local conflicts—particularly in pastoral areas; and competition for other resources (oil, mineral wealth) underpins larger scale conflict (CARE 2003).

Complex emergencies are marked by the extreme impoverishment of vulnerable groups ("losers") and massive accumulation by those in power ("winners") (Lautze 1997). "Losers" sell livestock, pledge farms, incur debt and borrow grain at high interest rates. "Winners" gain by forcing increased reliance on market transactions with prices depressed/inflated to their advantage. War can also lead to radical shifts in the division of labor, with considerable changes in the roles of women, men, children and the elderly.

Conflict also disrupts public goods and services, as well as kinship networks, and informal reciprocal agreements. The breakdown of social institutions can fragment communities. This can lead to fluid shifts in political power and manipulation of relief (Lautze 1997). The coping mechanisms employed by surviving populations can destroy the productive capacity of the land.

Thus political dimensions need to be taken into account in determining vulnerability to food insecurity in complex emergencies (Jaspars and Shoham 1999). Often times, members of specific ethnic, political or religious groups are singled out for violence. For example, in Somalia in 1992, traditional minorities and displaced persons from the wrong clan were the main victims of the famine. Social and political marginalization can be the most important determinants of vulnerability to food insecurity in complex emergencies and have to taken into account in emergency needs assessments.

HIV/AIDS and Vulnerability to Food Insecurity

HIV/AIDS is currently one of the greatest threats to global development and stability. It is a long-term, long-wave humanitarian crisis that will last for decades. Since the emergence of the epidemic, more than 60 million people worldwide have been infected with the virus. Over 20 million have died. Of the 42 million people currently living with the virus, 28.5 million (71%) live in Sub-Saharan Africa with infection rates rising.

The crisis in Southern Africa highlights the complex interactions between HIV/AIDS, food insecurity and humanitarian action. An understanding of the complex and diverse ways that the epidemic affects micro, meso, and macro level conditions is necessary to understand how the pandemic is increasing underlying vulnerability to food insecurity and creating present and future emergencies.

To understand the relationship between HIV/AIDS and vulnerability to food insecurity, it is important to take into account how livelihoods situations can increase susceptibility to HIV exposure and transmission as well as other factors that increase vulnerability to post-AIDS infection impacts. Policies and programs need to be designed to strengthen household and community resistance to HIV/AIDS infection, and resilience to the impacts of the disease.

The effects of HIV/AIDS on rural livelihoods are immense. The impact is experienced both in terms of the deterioration of household economies and the unraveling of the social fabric of the lives of

those affected or afflicted by AIDS. The most immediate impact of chronic illness is the loss of labor, which, depending on the timing and duration of sickness, results in delayed agricultural production, land being left fallow, changes in crop mixes, a change in livelihood sources, an increase in agricultural wage employment, and ultimately decreased agricultural production and livelihood status, and increased food insecurity. Farming systems are changing with more intensive cropping systems being replaced by less intensive, less productive, and less nutritionally diverse systems. For example, diverse, complex systems consisting of banana, legume, maize, and vegetable cultivation are being replaced by cassava and sweet potatoes in Uganda because of lower labor requirements. The magnitude of the impact on food insecurity depends on the extent of HIV infection within a community, who becomes infected and the economic roles they fill.

III. Implications for Policy and Interventions

In terms of policy, strategies to address chronic and transitory food insecurity would be different and distinct. Policies aimed at consumption smoothing would reduce transitory food insecurity significantly but would have little impact on chronic food insecurity. Such strategies would include social protection interventions such as targeted food safety nets as well as market interventions that have an effect on prices and community based insurance mechanisms (e.g., food banks, savings groups) (Barientos and Shepherd 2003). In order to bring about the largest decrease of food insecurity in the short-term, appropriately timed consumption smoothing interventions would be a proper investment. Many food aid interventions can be designed to meet this objective.

Strategies for improving the situation for the chronically food insecure would essentially focus on improvements on human and physical capital. For example, providing child benefits, educational subsidies and educational opportunities could drastically reduce chronic poverty. Many development interventions could help meet these objectives, including typical WFP interventions focused on school feeding and supplementary feeding. When a shock affects an area or population group that includes people who are chronically food insecure, the initial, life-saving consumption smoothing response should seek to protect livelihoods when possible. This initial response would then be complemented by (self-targeting) capital/asset protection and safety-net measures designed on a thorough understanding of the diverse livelihoods and food security status of the different groups within the affected population.

IV. Implications for Assessments

Emergency needs assessments are the foundation on which interventions and responses are built. Assessment should be an ongoing, transparent process that focuses on measuring change. According to recent emergency needs assessment expert consultations, a good emergency needs assessment should go beyond identifying just needs and provide an understanding of the context and dynamics that led to the crisis (WFP 2002). If there is pre-crisis data distinguishing the chronically food insecure and other populations, those data can be used together with current assessment data to distinguish those among the total population in need of assistance who were already chronically food insecure and those who are transitorily food insecure.

At a minimum, to determine what proportion of the population is chronically food insecure, information should be collected on structurally vulnerable households that lack access to natural, economic and human resources, particularly productive assets (land), are socially isolated and minimally participate in community activities, are discriminated against, have high dependency ratios, reside in remote isolated locations, and work in low-return occupational categories. Typically these households are landless, female-headed, elderly, sick and disabled.

Transitory food insecure households can be distinguished from the chronically food insecure by their access to assets and social connections that enable them to manage the shock in the short term. These populations are implementing coping strategies to preserve productive assets and prevent destitution.

Understanding coping strategies is crucial to emergency needs assessments because the types of strategies that people use and the number of people carrying out such activities can tell the assessment team how severe the situation currently is (Young et al. 1998).

Assessing the Multiple Dimensions of Food Security Status

Because of the various dimensions of food insecurity, there is no single measure of food security status that is adequate to inform an effective program response (Riely 2001). Measures of availability (e.g., production and market supply), access (income and in kind contributions) and utilization (health and nutritional status) are all required for the design of effective food security programming. Assessment of the level of food insecurity according to each of these measures, and their trends and variability over time should be part of any food security analysis (Riely 2001).

The previous discussion has already highlighted some of the important distinctions between chronic and transitory food insecurity. It is also important to take into consideration the distinction between moderate and acute food insecurity. In recent work carried out in Ethiopia, Riely has highlighted some of the differences that are important to take into account in the range of possible food security responses that should take place. See Diagram 1 below (Riely 2001).

Diagram 1—Dimensions of Food Insecurity: Possible Programme Responses

		Severity	
		Moderate	**Acute**
Duration	**Transitory**	Mitigation-Oriented Development	Mitigation-Oriented Development plus Short-Term Relief
	Chronic	Development	Development plus Long-Term Health and Feeding

Understanding the severity of food insecurity is essential to determine the best type of response (Young et al. 1998). The severity of food insecurity can be gauged by its impact on people's ability to feed themselves in the short-term (risks to lives) and its impact on livelihoods in the longer term (risks to livelihoods) (Jaspars and Fielding 2002). **Risks to lives can be assessed through significant shifts in people's major sources of food which cannot be compensated adequately by other sources, by a significant reduction in the quality of the diet, or by nutritional status**.[25]

Risk to livelihoods requires an analysis of vulnerability and risk. **When people are using coping strategies that damage their livelihoods in the longer term, or incur some other unacceptable cost such as acting illegally or immorally, then they are highly vulnerable to food insecurity**. How much information an assessment should gather on livelihood vulnerability is a key unresolved question.

According to a recent review carried out by ODI (Darcy and Hofmann 2003), the primary focus of humanitarian needs assessments should be at the end of the causal chain that leads to actual suffering. While context and causality are important to assessments, the focus should be on the symptoms and

[25] One issue that needs to be resolved is determining the planning figure in emergency rations. See the Summary of this paper.

proximate causes of suffering. While the link between short-term and long-term welfare is important, humanitarian action demands an approach focused on relatively short time horizons. For this reason, most assessments focus on the severity of food insecurity currently rather than the duration of food insecurity in the long term.

Given the enormous demands on field assessment staff during an assessment, it may be inappropriate to expect them to successfully implement an expanded methodology to attempt to capture the full dimensions of the duration (chronic vs. transitory) and severity (acute vs. moderate) of food insecurity for the purposes of broader development planning (Riely 2001). While assessments have the potential to inform development policy issues in the long-term, in the short-term, the food needs assessment may be the *wrong* mechanism to generate an improved understanding of the overlap between chronic versus transitory and moderate versus acute food insecurity (Riely 2001). However, data gathered during assessments can be compared with pre-crisis information or follow on studies to identify trends and the status of different livelihood and/or wealth groups.

Separating Vulnerability Analysis from Emergency Needs Assessments

Standard models of vulnerability analysis are often based on a very broad range of indicators and lengthy assessment methods (mapping, wealth ranking, semi-structured interviews, household surveys and participatory methods). Such techniques are resource-intensive to collect and are rarely feasible or appropriate in rapid onset disaster situations (Darcy and Hofmann 2003).

Many WFP field staff report that the use of food security and livelihood frameworks assisted them in defining vulnerability. The VAM conceptual framework (See Annex 1) was cited as a good framework to use to identify the various dimensions to take into account. In particular, field staff indicated that using a Chronic Vulnerability index was a useful tool for ranking vulnerability at the district level.

Vulnerability mapping is generally used prior to a crisis as a tool for disaster preparedness or in post-disaster rehabilitation. For WFP, much of this work is currently carried out by the VAM unit. In places where food security and vulnerability analysis have become a routine on-going activity at the Country Office level[26], this information provides a ready and periodically updated baseline and reference for emergency needs assessments. As a result, emergency needs assessments carried out in these countries can be done in a more rapid and easier fashion and are usually of higher quality because of this baseline information. Where VAM studies have been carried out, there tends to be an adequate understanding of the normal food security situation. This information can be used as a benchmark to measure the extent to which the situation has changed as a result of a shock (WFP 2002).

Recent experience from West Africa indicates that spatial techniques for mapping vulnerability need to take other factors into account other than agro-meteorological indicators. Non-agricultural income related factors were also key determinant to food insecurity, implying that structural vulnerability analysis will need to be done to track changing vulnerability status (WFP 2002).

Not all countries where emergencies occur have VAM units or similar 'pre-crisis' vulnerability analyses conducted by other organizations and therefore do not have good baseline information upon which to base emergency needs assessments. In the absence of vulnerability information prior to the crisis, or in countries without WFP/International NGO presence, baseline information usually is created from available secondary data. In addition, there may be information that can be derived from

[26] VAM has outlined a Standard Analytical Framework (SAF) which represents a structured step-by-step analytical process tailored explicitly to meet critical information needs in the WFP Emergency and Development program cycle. Each product is based on a specific conceptual framework for understanding food insecurity and vulnerability.

FEWSNET or from country vulnerability information systems already established (e.g., government, regional bodies, LNGOs, etc.)

In many cases, secondary data is not organized or analyzed in a way that can establish a good baseline. Poor demographic data, especially in conflict situations, constitutes one of the main barriers to accurate needs assessments. If there is significant variance in estimations of population size, compounded by the fact that different groups will have different levels of vulnerability, possibilities for over or underestimating the problem are significant (Darcy and Hofmann 2003).

If baseline information is not available or of poor quality, this may require that additional vulnerability information be collected during the emergency needs assessment exercise. In the absence of pre-crisis information, primary data collection should endeavour to determine what has changed as well as the current situation. The extent to which this can be done will depend a lot upon the nature of the emergency. There is recognition that different types of emergencies require different types of needs assessments along an "urgency" continuum (WFP 2002).

WFP assessment missions can range from rapid, initial assessments typically deployed at the early stage of a sudden crisis to in-depth household-based risk and food security assessments that are carried out in slow-onset emergencies (e.g., Kenya). Within this range, the nature of the emergency will also influence types of data that can be collected or should be collected (e.g., conflict or natural disaster). The most critical aspect in emergency needs assessment from a programming standpoint is the trade-off between assessment quality/depth and timeliness.

Lives versus Livelihoods: Distinguishing between Current and Chronic Needs

Relief interventions are currently designed to maximize survival of the greater number of disaster affected people in only one time period: the present (Lautze 1997). By focusing solely on saving lives in both quick onset as well as complex emergencies in the short-term, insufficient attention is given to how disaster affected populations optimize the trade-offs between saving lives and livelihoods over the long-term. This reality should be taken into consideration in the types of information that is collected as well as the types of interventions that are supported. Some limited amount of resources should be used to foster self-sufficiency and productivity and not only be used for short-term survival of the most vulnerable.

In the initial stages of an emergency, assessments should consider actual or imminent threats to life, health, subsistence (food, water, shelter, and clothing) and physical security (Darcy and Hofmann 2003). This information is essentially the current status of the well-being of the population impacted by a shock. The focus is on the immediate threats not the longer-term potential vulnerability trends. **After the initial stages of an emergency, the focus should progressively shift to protecting livelihoods, particularly in situations in which individuals are depleting a large number of their assets to meet acute needs** (WFP 2003). The extent to which this is possible is contingent on mobilizing appropriate resources.

Assessment Issues Related to Chronic Vulnerability to Food Insecurity

Chronic food insecure conditions are essentially development problems and should be addressed with development resources. However, as resources currently available to address long-term structural problems are inadequate in relation to the scale of the problem, acute food insecurity situations develop requiring emergency funds (WFP 2003). It is in these situations that the distinctions between transitory and chronic vulnerability to food insecurity become blurred.

Similarly, in situations of chronic food insecurity or chronic instability, an ongoing program of humanitarian action may be a viable mode of international engagement but cannot be expected to achieve longer-term development goals (Darcy and Hofmann 2002).

In certain situations, chronic vulnerability to food insecurity is created by poor governance at national, regional and local levels (e.g., Zimbabwe). Donors and implementing agencies face particular dilemmas in this situation, because they do not wish to support the regime that has created this vulnerability. However they also do not want to stand by while people suffer (WFP 2003).

Another issue facing WFP, NGOs, governments, and their partners regarding the determinants of vulnerability to food insecurity are related to macro-economic shocks. Current capacity within many of these organizations accustomed to dealing with drought or rapid on-set emergencies is limited in addressing macro-economic issues. These organizations have difficultly in analyzing and devising interventions that will be appropriate responses to these macro-economic shocks. It is also difficult to know when to exit from these vulnerable conditions when these macro-economic shocks are on-going (WFP 2003).

In conflict related situations, an assessment of threats to the security of civilians should be considered an essential component of any vulnerability analysis. Links between violent threats to life, health, subsistence and security will be critical to such analyses (Darcy and Hofmann 2003).

In some situations where emergencies do occur, previously identified food insecure households are often targeted first for food assistance programming. These households may be chronically food insecure, such as the landless, or those headed by disabled people, have chronically ill members or are headed by the elderly. In the initial stages, the transitory food insecure households may be given a lower priority in targeting and food assistance. Many of these households may be forced to dispose of many of their productive assets to cope with the emergency (e.g., Indonesia). As a result, they become more vulnerable through time. Thus not addressing the needs of transitory food insecure households creates and ever increasing pool of chronically vulnerable households. Transitory food insecure households would benefit significantly from consumption smoothing interventions, such as targeted safety nets. Therefore emergency needs assessments need to ensure that the transitory food insecure are targeted in food assistance programs.

In contexts of chronic high risk, effective systems of surveillance that can reveal trends and hot spots are likely to be more appropriate than repeated emergency assessments (Darcy and Hofmann 2003). WFP in Southern Africa is currently seriously considering moving to a food security surveillance system as a replacement for rolling assessments.

Assumptions about Vulnerability

In most assessment processes, there are assumptions made as to which groups in the targeted population are most vulnerable. Biases in the notion of vulnerability may introduce artificial distinctions which do not reflect the real needs of a population or the heterogeneity of the chronically vulnerable. Agencies and donors in their search for the most vulnerable may concentrate resources heavily upon a particular group while neglecting others (Darcy and Hofmann 2003). Assumptions about risk and need faced by particular groups should be made explicit and tested before large dispersements of resources are targeted to such groups.

To summarize, in the absence of good vulnerability baseline information and the requirements to address overall food insecurity in emergency operations, many assessments have difficulty distinguishing chronic vulnerability to food insecurity from transitory vulnerability. This has implications for the design of appropriate interventions to address the food insecurity experienced by the affected communities.

V. Problems of Linking Emergency Assessments to On-going Vulnerability Analysis

Although it is recognized that a good baseline vulnerability analysis is critical to making the emergency needs assessment more efficient and of higher quality, these linkages are not always easy to maintain.[27] One problem is that the functions of these two activities may be separated institutionally. For example, in some countries early warning and baseline information is collected by an independent unit such as FEWSNET or a disaster unit in the government. In many other countries, WFP baseline data are often collected by the VAM unit and can be linked to assessments. In addition, assessments may not be linked effectively with vulnerability monitoring. Even in countries where there is a desire to link VAM baseline vulnerability information to assessments, donors may be reluctant to fund permanent staff for the VAM units. In such situations, baseline data are not available to contextualize the information for the assessment (WFP 2003). As a result, emergency needs assessments attempt to capture vulnerability information in the assessment, making them long and cumbersome to implement. This also creates analysis problems.

It is important to separate the vulnerability analysis and monitoring function from the needs assessment function. In this way, the two functions can play complementary roles. In most emergency settings the most critical problem in the gathering of data is analyzing what is collected and translating this information into understanding the underlying processes behind the symptoms (Lautze 2003). By separating these functions, separate efforts can focus on the underlying factors that could potentially lead to vulnerability while the emergency assessment could focus on the acute risks associated with current manifestations of vulnerability.

VI. Similarities among Approaches Used by Agencies to Assess Food Insecurity and Vulnerability

Many of the agencies that currently carry out micro-level assessments of food and livelihood insecurity collect similar kinds of information. Using the household as the unit of analysis, agencies collect information on food access, income and expenditure patterns, asset holdings, food production, cereal prices and coping mechanisms. The key difference between these approaches is in the conceptual models used and the methods that are implemented in data collection. These differences make it difficult to promote standardization across methods. However, there is great potential for identifying the minimum data sets that should be included in emergency assessments (e.g., access to food, capacity to cope and recover). Such a data set will allow for effective comparisons within and across contexts.

VII. Summary

Distinguishing between Chronic and Transitory Food Insecurity

There is widespread recognition that it is important to identify the most vulnerable groups within a population that have been affected by a shock. Vulnerability to food insecurity can be long-term and chronic or it can be transitory and temporary in nature. Differences between the chronic and transitory food insecure are important to take into account in program design. Interventions that allow for consumption smoothing will benefit the transitory food insecure but may not have much-long term effect on the chronically food insecure. Chronically food insecure populations will require significantly longer term investments in human and physical capital.

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[27] WFP Country Offices with Regional Bureau backstopping are responsible for carrying out emergency needs assessments. The Emergency Needs Assessment Unit (OEN) in WFP Rome is responsible for providing normative guidance.

Methodological considerations

A **food access analysis**, not food supply/balance calculations, should be used as basis planning food security interventions. Macro analyses of supply deficits and micro-level level analyses of access deficits usually lead to very different estimates of the food 'gap' and consequent food needs. Both should be reported. Interventions in favor of food insecure people should be designed on the basis of assessed access deficits. A **livelihood model** is essential, and the model should be explicit in the assessment and analysis process. Different models can be used provided that they incorporate the range of factors that influence food access and utilization (income, expenditure, assets, debts, transfers, etc.). A **combination of data collection methods** is needed in any situation. This includes, as appropriate, the use of available secondary data, qualitative (rapid appraisal) methods, and household surveys, depending on the phase of the assessment and local conditions, especially security:

- During phase 1 of assessment: Qualitative methods, using non-probability sampling, will be used primarily. The purpose is to get an in-depth understanding of livelihoods and to be able to make ball-park estimates of the numbers of people affected and needing specific types and levels of food and/or non-food assistance.
- During phase 2 of assessment: more representative (probability) sampling should be used to verify assumptions, refine targeting, and adjust programme interventions.

The Coping Strategies Index (CSI) can provide a valuable tool for monitoring the dependence of households on exceptional coping strategies and risks to their future food security. It should be noted that there may be issues relating to the weight assigned to various coping strategies in the index.

A number of key issues need to be taken into account when factoring vulnerability into needs assessment planning:

- The nature of vulnerability will vary by context. Vulnerability to food insecurity can be increased through economic entitlement failure, political powerlessness, social exploitation and discrimination, and conflict. Therefore, it is important to take these differences in context into account in any needs assessment that is carried out. Models and assumptions need to be adapted to different livelihood systems found in different regions.
- Assessments must distinguish between who are not food insecure and cannot cope and are in need of assistance, whether they were chronically food insecure before or not, and those who can cope without assistance. Similarly, assessments need to differentiate between those who are expected to recover with appropriate assistance and those who are now likely to remain food insecure in the foreseeable future without assistance.
- In the initial stages of an emergency, assessments should consider actual threats to life, health, subsistence and physical security of both the transitorily and chronically food insecure. The focus should progressively shift to protecting livelihoods in later stages of the emergency.
- Chronic poverty conditions can lead to acute emergency food insecurity situations when structural problems are not adequately addressed through development resources. This blurs the distinction between chronic and transitory food insecure populations.
- In conflict situations, assessment of threats to civilians should be considered an essential component of any vulnerability analysis.
- Emergency needs assessments will be more effective if they are coupled with vulnerability analyses. Baseline vulnerability analyses should be carried out separately, if possible, from emergency needs assessments. However, explicit efforts to conceptually and institutionally link the two in order to ensure complementarities are of critical importance and should not be left to implicit assumption.
- Assessments need to consider the status and needs of people in the area directly affected by a shock, as well as those in nearby areas that may be indirectly affected.

Unresolved Issues

Food energy benchmark: One issue that needs to be resolved is determining the planning figure in emergency rations. Some argue that food gaps should be estimated on the basis of either 2100 kcal (adjusted as needed for demographic composition, activity level, temperature and health status), as prescribed in WHO/UNHCR?WFP/UNICEF and Sphere guidelines or normal consumption levels for the country/population concerned, as in FAO food balance sheet calculations. Exit criteria and strategy may be difficult to determine in an area where normal consumption is below this prescribed level.

Exit from livelihood support: Exit strategies for livelihood support interventions need to be determined. While 'emergency' operations phase out once immediate life-saving relief needs have been met, protecting livelihoods requires longer-term development assistance. Continuing to support livelihoods would depend on the availability of development resources.

Targeting food insecure households: Targeting and providing assistance to meet different levels of need within a community remains a challenge. This requires either an existing, well-established social safety net based on relevant food security criteria (which is rare) or the collaboration of an entire community in implementing a community-based targeting and distribution. The latter is time and resource intensive Community-based targeting is most appropriate for slow-onset (e.g., drought) settings, or in well-structured communities characterized by longstanding interaction with implementing partners. The success of community-based approaches in other situations, including protracted crises, is unclear.

Trigger-level for intervention to protect productive assets: Currently, there are no practical methods or criteria to determine the point at which external assistance should be initiated to prevent the loss of productive household assets, putting future livelihoods at risk.

Resource availability: Protecting livelihoods as well as saving lives requires mobilization of sufficient resources. It is uncertain whether or not donors will make such resources available.

Risk of raising false expectations: The undertaking of an emergency food security assessment in a situation of chronic food insecurity may (perhaps will) raise expectations of assistance among the population and local officials, but few donors are able/willing to commit additional resources for 'preventive' measures in response to early warnings. How to avoid raising false expectations remains a problem.

Trigger for emergency response in a chronic situation: For a slow-onset emergency in a country with high chronic food insecurity, what should be the trigger for an emergency response? When do we decide that the chronic situation is becoming acute? What are the indicators?

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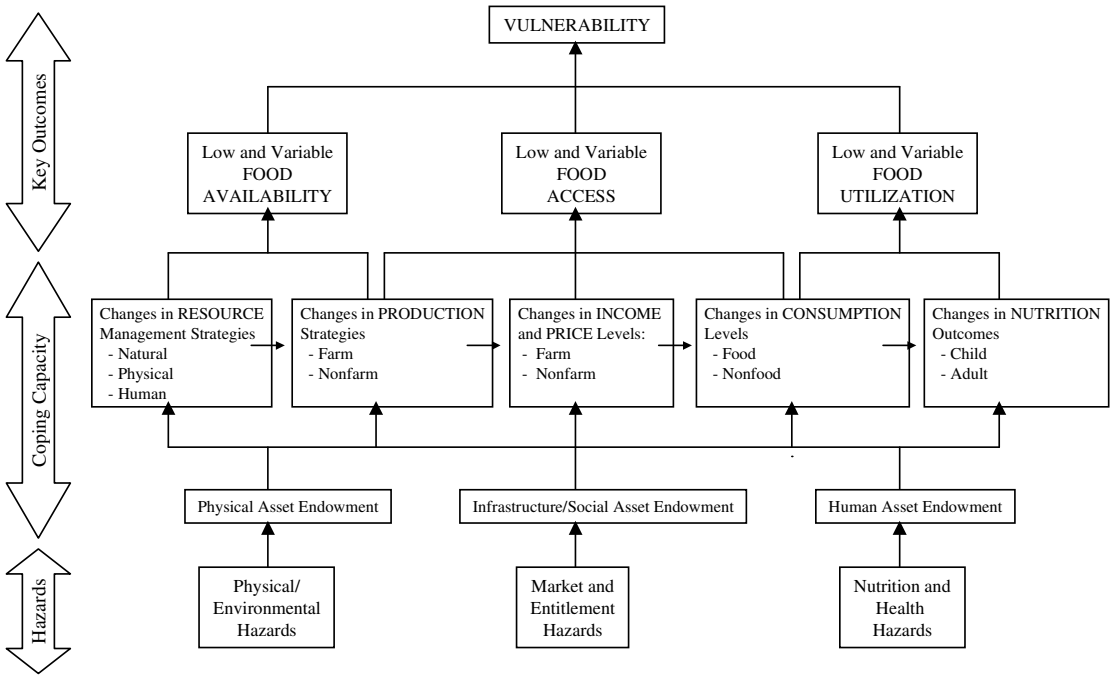
Annex: VAM Vulnerability and Food Security Framework

In this framework, exposure to risk is determined by the frequency and the severity of natural and man-made hazards, as well as the socioeconomic and geographic scope of those hazards. The determinants of coping capacity include household levels of natural, physical/economic, and human assets, levels of household production, levels of income and consumption, and, importantly, the ability of households to diversify their sources of income and consumption to effectively mitigate the effects of the risks that they face at any given moment (Diagram1).

Vulnerability and Food Security Framework



From WFP (2000), derived fromWebb, et al (1993)

Market Analysis and Emergency Needs Assessment: A Review of the Issues

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Abstract

This paper reviews the role and methods of market analysis in the Emergency Needs Assessment (ENA) process. If emergency interventions pursue efficiency objectives -with an eye to minimising costs and collateral economic damage - then market analysis must be an integral part of the process. The analytical methods for all areas of market analysis are well documented, and can be borrowed from a large corpus of literature. But methods are often developed around large panel datasets that are not available in emergency situations. Nor are advanced economic modelling and econometric skills readily available in the humanitarian community. The challenge is to develop methods in a practical middle ground between 'seat-of-the-pants' calculations and academic research. But robust methods of market analysis take us part of the way to ensuring that operations are cost-efficient. The information must be used to inform flexible programme and resource-allocation decisions.

Introduction

The relationships between emergency food intervention and markets are complex and a short paper cannot hope to provide detailed practical guidance. Rather, my intentions are to paint a picture of the main issues and approaches, with broad brush-strokes, to indicate some of the areas where there is a need for further development of techniques and, finally, to advocate for enhanced dialogue and information sharing between the main players in this area. Market analysis as part of Emergency Needs Assessment (ENA) helps elucidate the implications of markets for operation design and implementation. It helps both in assessing needs but also in designing suitable intervention modalities such as distribution mechanisms, procurement strategies, design of M&E and MIS, etc.

As long as cost-efficiency is an objective of the intervention, accurate market analysis will be a fundamental part of Emergency Needs Assessment (ENA). Of course, issues of cost-efficiency may take a backseat when there are more pressing objectives of reducing mortality or malnutrition, or preserving livelihoods. Besides, intervention options may be so limited (by insecurity, time, or resource constraints) that the finer issues of cost-efficiency become irrelevant. Moreover, market analysis generally requires time-series data for comparison[28]. To develop time-series data resources, market information systems require institutional stability and continuity, and thus the MIS may collapse in a complex emergency and with it the options for sound price analysis. Feasibility and data constraints in the early stages of chaotic and rapid-onset emergencies do limit options for market- or any other type of analysis. The options are much greater for predictable or slow onset emergencies, which still account for a substantial proportion of global emergency food aid resources – whether in Iraq from May 2003, in southern Africa in 2002, or in the Horn of Africa (every year since 1978).

This paper is organised as follows. Section 2 considers the direct link between market analysis and concepts of need of assistance. Price analysis plays a central role in measuring

[28] Price indices are meaningless without time-series comparison, whereas other indices relevant to ENA (kilocalorie deficits, poverty headcounts, or Global Acute Malnutrition rates etc.) have an absolute significance, regardless of past trends – and can be collected during once off samples. Snapshot market assessments (without time-series) can, however, shed much light

need both at the preliminary stages of the ENA process (when rough estimates are generated for the purposes of resource mobilisation) and during an intervention, when needs estimates, and targeting and response strategies are or should be refined. Section 3 considers the links between targeted food aid interventions and national food security and macroeconomic conditions and policies. In particular, we consider the relationship between national balance sheets and estimates of targeted need. Effective food aid interventions rely on getting the right balance between commercial and humanitarian actions. Section 4 reviews the issues surrounding the role of the private sector in ENA and design of response modalities. The clear links between market conditions and the appropriate and cost-efficient form of transfer are discussed in Section 5.

Market Analysis and Food Security Assessment

Prices as Indicators of Welfare and Food Security

Most early warning systems (EWS) include a price monitoring, usually covering some basic producer, factor, and consumer (food) prices, and less frequently, wage rate data. EWS data tend to be analysed in an unsystematic fashion, which pays little attention to modern demand and welfare measurement theory. The few operational models that are applied (such as the household food economy approach) focus on food consumption quantities, and do not seem to take account of the large corpus of relevant studies on price indices. There are close similarities between the indices that are needed for ENA, and conventional poverty measures (such as the food poverty gap and headcount ratios – see Annex 1), which are essentially price indices. Although there are some examples (e.g., Ward and Rimmer, 1995), the application of formal poverty indices to the ENA questions is relatively rare. Thus valuable price data (from EW or MIS) may not be fully utilised. This is surely an issue that merits more examination.

The second challenge relating to the use of price data for ENA is that the rough initial estimates, used for indicative resource planning and mobilisation at the early stages of an emergency, must reflect some expectations of future price developments. A WFP EMOP may have a planning cycle of 6 months to a year. In highly volatile rural food markets, how can we project prices into the future? There are essentially two (not mutually exclusive) approaches. One relies on time-series price modelling, including the use of autoregressive and seasonal adjustment models. The second uses partial equilibrium models, which attempt to capture the main supply and demand parameters of one or more commodity markets. Whatever approach is used, prediction of future outcomes is a data-hungry and error-prone business. Although reasonably robust and testable models exist (in abundance): the only practical limitation is data. Of course, various types of errors[29] are common to all predictive models, not just explicit market models. Perhaps ENA techniques should focus on probabilistic (and scenario-based) modelling of the future, where errors are explicitly reflected in the model outputs.

[29] These include under-specification (missing critical variables), misspecification (incorrectly constructing the model), sampling errors, and white noise.

Market Failure and Food Insecurity

In a world of competitive markets for labour, consumer goods, factors of production, and outputs, the risk of famine should be negligible. If markets are perfectly integrated, surely intense yet prolonged local famines are impossible? Workers should seek more remunerative labour opportunities and local food price hikes will be quickly dampened as the trade spots a profit opportunity. Famines and prolonged local price hikes exist because markets fail or weak and poorly integrated. Ravallion (1987) pioneered the use of price co-integration models in famine analysis, and the field has developed rapidly since then. Once again, the techniques for spotting market failure exist, but these require considerable econometric expertise and long/clean price data series.

Experienced field assessment teams, however, can easily identify markets that don't work. It is enough to speak to a few traders and consumers, ask about flows from and to neighbouring markets, and examine the marketing policies and structures. We can even establish a few basic 'rules of thumb' for assessing food markets. Let's say that the price of commodity x in a deficit market (A) is more than 25 percent higher than that it is in the nearest surplus market (B), after allowing for transport costs from B to A. This is an indication that the market is poorly integrated.

Bootstrap methods may serve the primary information need. Problems arise when we need to justify and intervention on the basis of quantifiable and testable facts. Can a large-scale intervention to subsidize trucking of food from B to A, or to replace the market entirely, be justified on these grounds? Compare this with an estimated coefficient of market co-integration with a known error distribution and accepted tests of statistical efficiency. A critical question for ENA is: How reliable and transparent does your policy information need to be? There is always a trade-off between reliability and cost. Before deciding between the quick-and-dirty or the state-of-the-art, we must answer these questions. What are the additional costs of introducing a more reliable and transparent method? And what are we willing to pay?

Market Monitoring During an Intervention

We have discussed some of the challenges facing decision-making prior to an intervention. This is the most challenging type of analysis. Analysis is simpler when field officers have been deployed (who can collect plenty of data), financial resources have been allocated, security arrangements are in place, and (presumably) data management tools, structures, and staff are established. Adjustments to ENA and other key programme parameters during an intervention are essential, given the fluidity of food security and food market conditions in an emergency and the probable projection errors in initial estimates of need.

A MIS can provide critical information for ENA adjustments during an intervention. For welfare and food security measurement, price indices can indicate whether recovery has taken place, and some kind of normality has been achieved. Second, food markets can give important indications of whether the food aid response is working. In particular, depressed market prices and large outflows of food aid commodities can be indicative of faulty targeting or commodity choice, while persistent price hikes for staple commodities in a target area are likely indications of an inadequate response. The problem once again is that simple rules of thumb may be misleading. There are numerous reasons for resale of food aid commodities, including pressing demand for non-food commodities. Ideally, analysis of the market impact of food aid would be based on a long time-series, stretching back to before programme intervention. Moreover, price information needs to be supplemented with other data on food consumption and utilisation patterns, typically collected in the context of Post-Distribution Monitoring exercises.

Macro-micro linkages

National Balance Sheets and ENA

There seems to be some confusion relating to the link between national food market analysis and the results of ENA. ENA and national food security analysis tend to be combined in the Crop and Food Supply Assessment Missions. The standard Cereal/Food Balance Sheets provide an ostensible import deficit (or exportable surplus), with some projection of commercial imports, the remainder being a 'food aid requirement'. The method has become something of an anachronism in liberalised food markets, where grain parastatal and state subsidies no longer 'fill the gap' and where donors are unwilling to use food aid for national market stabilisation. Further, the method fails to integrate domestic and border price information. The ostensible 'food import requirement' is only a rough indication of national food market prospects, because commercial trade responses cannot be predicted with any accuracy. The FBS is a good example of a scanty-data rule-of-thumb model, with all the limitations that entails.

There is probably a need to explore the use of more realistic partial equilibrium models, with explicit modelling of prices and demand, import, and supply elasticities for national food security analysis, but our more pressing question is: What does FBS analysis mean for ENA? There is no reason why the balance sheet deficit should correspond to the need for targeted emergency food aid, and the two estimation processes should be regarded as separate. Cases of emergency needs arising in countries with tradable grain surpluses are relatively common. Of course, there is a relationship between national market conditions and targeted needs, insofar as a tight national market pushes food prices up across the board. This, however, depends on the degree of market integration. An exportable maize surplus in Ethiopia may have little or no bearing on the remote and highly food insecure areas of North Wollo or eastern Tigray. With weak domestic trade/low levels of integration, establishing national-local linkages is technically demanding, and may be less effective than just monitoring local prices.

If national food market monitoring has a role in ENA (and this issue needs greater exploration) then it is probably more on the supply-side. Tight national supplies and large ostensible deficits are likely to imply that emergency food aid procurement strategies will have to focus on imports, rather than on local purchases. However, even with large national shortfalls and a weak domestic market, local surpluses may still be available at depressed prices. Procurement strategies will typically depend on numerous other factors, including transport costs, local commodity preferences, quality issues, and regulatory structures.

Macro and Sectoral Policy and ENA

A more important set of issues relates to the relationship between sector and macro policy and ENA. Heavy government intervention can increase prices for consumers or undermine production incentives. Government rationing and attempts to defend fiscally unsustainable subsidies can lead to poor market integration, market failure, or just heavy implicit taxes, and all the associated welfare losses. If some shock (domestic crop failure, exchange rate devaluation, or fiscal squeeze) leads to the collapse of a state subsidy system, should emergency food assistance be provided? This question poses a moral dilemma, not least because the timely provision of substantial food aid can 'prop up' unsustainable or downright unfair policies and the governments that support them. Programme food aid, aimed at national price stabilisation, is no longer popular with donors (and WFP does not handle 'monetised' assistance). Interventions in the FX market, such as FX rationing, and import substitution policies can also have deleterious national and local food security impacts. Whatever the efficiency or other moral arguments against blurring the distinction, we are still

left with cases such as Zimbabwe and DPKR, where clear humanitarian needs arise from misguided food policy.

Sound analysis of sector and macroeconomic policies sheds light on the causes of food insecurity and intense need. We certainly need to know the policy determinants of need, even if there are no technical answers to the questions posed above. It is not within WFP's mandate or comparative advantage to advocate for more efficient sector or macro policies, nor can emergency food aid imports be conditional on macroeconomic reform. However, there is clearly a need for WFP to form effective partnerships with Government, the World Bank and IMF to ensure that macro and market legislation is conducive to food security, and that emergency food aid is not used as a substitute for reform.

ENA and the Commercial Trade

Disincentives and Crowding Out

During an intervention, market analysis serves to measure the desired and unintended consequences of food aid interventions. The potential economic disincentives of food aid are well known[30]. Rightly or wrongly, food aid has been associated with four broad types of disincentive:

Trade disincentives: The commercial sector does not have an incentive to import if the domestic wholesale price is below the cost price for imports. Generous food aid distributions can 'crowd out' the local trade in the food aid commodities

Production disincentives: Farmers face lower prices, particularly if food aid is distributed at harvest time, as commercial food demand can be depressed/replaced, particularly when programmes fail to target the poor (Yamano et al., 2000 who find that FFW programmes can also reduce domestic marketing of crops)

Labour disincentives: providing free or subsidized commodities reduces people's willingness to work at the prevailing wage rate (Sahn and Alderman, 1996). If not associated with public work programmes, food aid may actually increase unemployment (Osakwa, 1998)

Policy disincentives (discussed briefly above)

If economic efficiency is on the ENA agenda, we must evaluate the likely impact of food aid on markets. The same market information systems that collect data to assess food aid utilisation patterns can be modified to assess impact. Depressed prices, particularly in areas where the food aid commodity is produced, must be a warning sign. Similarly, it is always necessary to monitor private trade volumes.

However, market information is useless if it not used to inform decisions. Emergency food aid operations need not crowd out the domestic trade, nor depress producer prices. Well-timed distributions with careful targeting increase demand, without necessarily replacing commercial purchases. Moreover, getting the right balance of local purchase, triangular transactions, and international imports can help to ensure that producers are not discouraged. Finally, sub-contracting transport, storage, and handling to the private trade can actually strengthen the trade. Of course, WFP does not have complete control over its

[30] See for example, Stewart (1988), Maxwell (1986), Shultz (1960), Clay and Stokke (1991). The arguments and models are familiar so are not repeated here.

procurement strategy (in-kind donations are usually more forthcoming than cash for LP) or the timing of deliveries in-kind donations, but more can be done to increase the market-sensitivity of our interventions.

Market Information and Trust

We usually consider the audiences of ENA information to be donors, recipients, and humanitarian partners. Information of initial requirements estimates, pipelines, and resource strategies are less frequently shared with the commercial trade. Lack of information and trust increase risk, and decrease traded volumes with possible negative impact on consumer prices. Large food aid imports will have more of a distorting effect on the market if the trade is uncertain when, where, and how much will arrive.

Traders must know what WFP is doing and intends to do, especially for advance planning and financing of imports. ENA results must be shared very quickly with trade (as well as updates on the import and LP pipeline). The paper thus far has considered the ENA process as a user of market information systems. We tend to forget to provide ENA information. Building dialogue and information flows with the trade must be considered a priority.

Market Conditions and Efficient Transfers

Assuming that some critical deficit/need is identified, whether in monetary or kilocalorie terms, how should it be filled? The answer depends entirely on how programme objectives are perceived. If the food aid ration is regarded as a simple nutrient transfer, we just match the food basket to the nutrient requirement, perhaps attempting to ensure that the commodity choice reflects local preferences. If cost-efficiency is an issue, then market information becomes highly relevant.

There is always a possibility that a cash transfer is preferable to in-kind from an efficiency perspective. Basu (1996) and Famminow (1995) provide relatively non-technical reviews. More technical studies have been conducted in relation to the US Food Stamps Program. To arrive at an accurate estimate of the relative efficiency of the alternatives requires a detailed modelling of the supply and demand effects. Again, less data-intensive (and less instructive) methods have been applied, which give a rough answer to the question, such as the alpha ratio (Reutlinger, 1985, and Reutlinger and Katona-Abte, 1984). The alpha ratio compares the value of the food aid basket to the recipient, with the full costs (to the donor and WFP) of distributing the basket. This may be compared with the costs of, say, distributing one dollar of cash. It does not consider either the market effects of cash versus food, nor the fact that a highly targeted transfer will have a different market impact from a blanket one. A more complete decision tool would at least consider market integration (food transfers will generally be less cost efficient in a well-integrated efficient market).

There are other considerations too: the marginal propensity to consume from a food transfer may be higher than from a cash transfer, thus a food transfer may address nutritional objectives more effectively. Drèze and Sen (1989) make the case for cash provision, based on the logistics costs and difficulties of food aid procurement and distribution. Although the authors concede that food transfers bring marginally higher food consumption than cash, they argue that famine victims will spend the bulk of cash on food in any case. They conclude (p97) that: "*The choice between providing food and providing cash may still matter to some extent, but it is hardly likely to have momentous implications for the survival chances of famine victims*". However, food transfers can have momentous impacts on markets, so the question is highly relevant.

The same basic approaches (for deciding between cash and in-kind) can also be used to determine the appropriate commodity composition of the ration basket, if in-kind donations are selected. However, a practical method for ration basket analysis – one that goes beyond the simplistic alpha ratio to incorporate market considerations - is lacking. It becomes rather complicated to integrate nutritional concerns (e.g., ensuring a diet with the right nutrient balance) with cost-efficiency and dietary/preference concerns in a single index. This is another area where academics and practitioners must come together to develop approaches that are both practical and robust.

Conclusions

Market analysis serves the ENA process in numerous ways. A large number of analytical tools exists, most of which have been successfully applied in developing countries, which could fulfil the basic analytical requirements of market and price analysis for ENA. These tools have been developed in data-abundant research environments with the benefit of large panel datasets. The challenge for developing robust and testable ENA tools is not the lack of methods, but the lack of data, especially in chaotic circumstances that often surround emergency operations. What is needed is a set of tools that fall somewhere between the current reality (somewhat unfairly characterised as 'seat-of-the-pants' and 'rule-of-thumb') and sophisticated, data-hungry models. Developing such solutions requires more effective collaboration between academic economists and practitioners in the field.

A second recurrent theme is that whatever tools and data are available some element of prediction is always needed for the initial ENA. These tools will always churn out large errors and it is probably not worth investing too much in the initial estimates. Rather there is a need to find ways of making errors more explicit in the first estimates, not to give a false sense of accuracy. Over time, the ENA must be refined continuously, based on evolutions in the market and as new household food security, market and utilisation data become available. From a first rough estimate of need, we can refine the spatial and temporal accuracy of the ENA, and identify intervention modalities that are sensitive to market conditions. As the informational basis improves, it is important to ensure that resource modalities are flexible enough to allow adjustment in all the main programme parameters (numbers of people, timing of distributions, ration scale, commodity bundle, and supply/procurement source). Without this flexibility, food aid programmes will fail to achieve their economic and financial efficiency objectives – however much is invested in market analysis.

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Annex: Price Indices and Consumption Deficits

If the need for emergency food assistance is related to some concept of an individual or household food deficit, this may be expressed either in quantitative terms, perhaps using kilocalories as the basic unit of measurement, or as a price index. In practice, these indices are identical. The food poverty line (Foster, Greer and Throbecke 1984, Greer and Thorbecke, 1986), see also Ravallion, 1998 for a review of the literature) is essentially a price index that compares household expenditure with the minimum cost of achieving a nutritionally adequate diet.

Poverty headcount and gap measures are statistically almost identical to measures that compare food consumption and requirements in caloric terms, provided that the definition of full expenditure is sufficiently broad to embrace a monetary evaluation of food consumption from own-farm produce, in-kind gifts and loans, and hunting and gathering. This suggests that there are opportunities for a more systematic use of price data in the ENA process.

The beginnings of such an approach are indices of 'terms of trade', which are ratios of producer prices for the key product, to consumer prices for a main staple. TOT indices (used regularly in Kenya and Ethiopia, for example) are not easy to interpret. Assessing the effectiveness of price information in predicting famines, de Waal (1991) finds that these indicators often provide false predictions. The main reasons for suspecting TOT and partial price indices is that they do not capture quantitative variables, are highly influenced by exogenous factors (that may or may not be indicative of famine), and exclude relevant information in complex and mixed livelihoods.

Moving from a mathematically simple TOT, to indices that incorporate quantities (household production and consumption) requires a great deal more data on prices and quantities, but also on parameters in the demand model. In a highly stylised pastoral economy, where only one animal is reared and only one cereal is consumed, the TOT might be an effective welfare indicator (and we could indeed compare the TOT directly with a food poverty line). The reality of mixed livelihoods is that even incomplete estimates of total household or expenditure rely on a large number of quantities, prices, and parameters.

To move from a simple but highly partial and error-prone TOT to a comprehensive price index like the food poverty gap ratio, requires expenditure surveys. The analytical tools are highly developed: the problem is only one of data availability. What is needed, perhaps, is some practical if imperfect compromise between a very partial TOT and full expenditure index based on a detailed household survey.

Market Considerations in Emergency Needs Assessment:

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Background paper for the WFP Technical Meeting: Key Issues in Emergency Needs Assessment, Rome, 28-30 October, 2003.

Markets and Emergency Food Aid: Key Issues

Given the urgent needs of food-insecure populations in emergency relief situations, decisions related to program design and the volume of food aid required must be made quickly, without the benefit of time-consuming and data-intensive detailed analysis. As a result, assessments of the volume of food aid required to meet emergency needs are often done on the basis of calculations of a projected gap between available domestic supply and a target consumption level that takes little account of prices and markets. The target consumption level is usually based on consumption patterns in normal years and/or caloric requirements. Available domestic supply is derived from production estimates and available public stocks. Neglecting the roles of prices and markets in influencing food demand, imports and producer incentives, however, can result in excessive financial costs of operations and adverse effects on food security and farmer incomes in the medium-term.

Markets and prices play a critical role in determining food consumption, private trade flows and producer incentives. Except in emergency relief situations involving refugee camps where food aid accounts for total supply of food, consumers usually acquire some of their food through market purchases. Changes in market prices thus influence the levels of food consumption. Likewise, market price incentives can induce private trade flows (imports) that enhance local market supplies and help stabilize prices.

In the medium term, however, excessive flows of food aid can depress market prices to the detriment of local producers, lowering levels of production and farmer incomes. Program food aid, in particular, has often been driven more by supply considerations (surplus disposal) in donor countries, rather than food security needs and incentives for domestic production in recipient countries. As a result, program food aid flows have actually reduced food security in the medium term for some recipient countries.[32]

Nonetheless, targeted interventions to food insecure households will in most cases be necessary in emergency relief situations. Access to food for these households may be threatened both by a decline in their incomes and increases in the prices of major staple foods. Well-functioning private markets can enhance food security at the national level by rapidly adding to market supplies and partially offsetting production shortfalls. These increases in market supplies can also dampen price increases, making food more affordable

[31] The opinions expressed here are the author's and do not necessarily reflect those of the World Bank, its Executive Directors, or the countries they represent. Lynne Brown, Carlo del Ninno and John Nash provided helpful comments. As usual, any errors and omissions are solely the responsibility of the author.

[32] A number of mechanisms can be employed to avoid these negative effects, including local purchases of food commodities for distribution programs, targeting of food distribution, and use of cash instead of food. A full discussion of the effects of program food aid flows and these options is beyond the scope of this paper, however. See Clay and Stokke, eds. (1991) and Faminow (1995).

and thus helping to minimize reductions in household access to food. However, unlike targeted food or cash transfers or employment schemes, increases in private market supplies do not directly add to household incomes. For households that have suffered severe losses in incomes as a consequence of the emergency situation, interventions to increase household incomes are needed to maintain access to food at pre-emergency levels.

This paper explores the interactions between food aid flows and markets, highlighting the implications for emergency needs assessments and food security. Section 2 presents a micro-economic analytical framework to examine the potential role of private imports to add to food supplies and stabilize prices following production shortfalls, and the magnitude of disincentive effects of food aid on domestic production. Empirical analysis of food markets in Bangladesh following major domestic production shortfalls is used to illustrate the approach. Section 3 discusses how market and price considerations can be made operational in emergency needs assessments. Conclusions are presented in section 4.

Analytical Framework: Supply and Demand in Closed and Open Economies

One major reason why markets and prices receive relatively little attention in food aid emergency needs assessment is that the focus of relief efforts is on short-term (immediate) food security needs of consumers. These food security needs are often based on estimated nutritional requirements (often calorie intake) that are independent of market prices or consumer incomes. But except in situations where all of an individual's consumption is provided through rations (as in a refugee camp without even an internal barter market for food), consumption of food will be determined by income from all sources (including own production and transfers) and market prices,[33] (which together determine access to food), and consumer preferences (one of the determinants of utilization of food). Thus, although the nutritional requirements of an individual do not depend on market prices, her actual consumption of food will be influenced by prices.

Moreover, market conditions and prices will determine private sector trade flows and will affect producer incentives for food production in the medium-term. In some emergency situations, lack of security or destruction of transport infrastructure may prohibit private trade from other regions in the short-term. Where trade is possible in the short- or medium-term, however, these additional supplies can stabilize local markets and ease constraints on food availability. Similarly, domestic production in the short-term may be zero for many months until the next harvest season. Medium term food security is jeopardized if late arrivals of food depress food prices at harvest time, seriously reduce farmer incomes, and slow the growth of the rural economy through reductions in demand for rural goods and services.

Markets in the Short Term: Demand Effects and Price Stabilization through Trade

Figure 1 illustrates how openness to import trade adds to price stability in the case of a production shortfall. With a normal harvest, short-run supply in the months just after the harvest is fixed, as indicated by the vertical supply curve S0. With this level of production, the market price is P0, determined by the intersection of the supply and demand curves. A production shortfall shifts the short-run supply curve back to S1. In the absence of international trade, the market price would rise to P1. However, with free trade and an import parity price (the unit cost of imports including tariffs, transport and marketing margins)

[33] Consumption of food by farm households that are net sellers of food is also influenced by market prices, since these affect the household's income and the implicit price of food consumed.

of Pm below P1, domestic demand is Q2 and the difference between Q2 and Q1 is the sum of private imports, changes in private stocks and net market injections (distribution less domestic procurement) by the government. Note that in this case, if there is no change in private stocks,[34] net market injections less than or equal to M1 have no effect on the price, but only reduce the quantity of imports.

Note also that where market prices are determined by the cost of imports, targeted transfers of cash or food stamps/coupons can also be used to increase household food security without raising domestic prices. Any increase in demand for food (that shifts the demand curve outward) results in an increase in private imports rather than an increase in price.

In Bangladesh, private sector imports, made possible by trade liberalization in the early 1990s, did effectively stabilize rice prices in 1997/98 and 1998/99 following major rice production shortfalls (Figure 2). Following a poor monsoon season (*aman*) rice harvest in November 1997, domestic prices rose rapidly to import parity of coarse rice from India. Prices did not rise further because a competitive private sector import trade was able to bring in all the grains required to meet excess demand at that price. Similarly, following the massive floods of 1998, private sector imports again increased significantly and kept prices from rising above import parity (Dorosh, 2000).

These private sector imports played a critical role in enhancing food security for poor flood-affected households in Bangladesh. Had rice imports from India not been available, the next lowest cost source for private importers would have been Thailand, for which the import parity price of 15 percent broken rice in Dhaka in the same period was 16.1 Taka/kg. Given the 20.9 percent increase in import parity price, estimated rice demand would fall by between 4.2 and 6.3 percent, assuming an own-price elasticity of rice demand of –0.2 to –0.3. In this case, rice imports would decline by approximately 700 thousand to 1 million tons.[35]

Such an increase in rice prices would have had a major impact on rice consumption of poor households. Average daily per capita calorie consumption of a sample of poor flood-exposed households in rural Bangladesh in December 1998 was only 1638 calories/day. Based on econometric estimates of calorie demand equations, with rice prices 21 percent higher, per capita consumption of the rural poor in 1998/99 could have been 44 to 109 calories/day less than this very low consumption level (del Ninno, Dorosh and Smith, 2003).

The large surge in private sector imports of rice (and wheat) totaling over 2 million tons, and a large increase in the winter season (boro) rice crop in 1999 (harvested in April/May) more than offset the rice production loss in the first half of the fiscal year (July-December 1998). Estimates of the food aid needs based on a food gap approach that ignored private imports thus proved to be excessive: per capita availability of rice and wheat in the July 1998 – June 1989 fiscal year actually increased in 1998/99. Food aid inflows totaling, did, however, enable an increase in distribution through targeted channels and a build-up of stocks. Ultimately, over 200 thousand tons of food aid originally scheduled for flood rehabilitation and relief were deferred to the 1999/2000 fiscal year since government storage facilities were nearly full.

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[34] A decrease (increase) in private stocks will reduce (increase) the amount of imports, holding net government sales constant.

[35] This calculation assumes no problems with supply of imports from Thailand and a competitive import market involving fewer importers and larger shipments. See Dorosh (2001) for a discussion of implications of importing rice from Thailand.

Markets in the Medium Term: Avoiding Price Disincentive Effects on Domestic Production

Although in the short-term flood aid inflows enhance food security by increasing food availability and often supplying direct distribution programs to food-insecure households, food aid can also harm food security in the medium run if it leads to a reduction in producer prices (relative to the normal levels).

Figure 3 illustrates the impact of food aid on domestic prices and producer price incentives. In this analysis with a medium-term time frame that includes a food crop harvest, the supply curve S0 has a positive slope indicating that production (supply) is affected by output price incentives. Food aid adds to domestic supply, shifting the supply curve from S0 to S'. In the absence of private sector trade, total supply equals total demand at a price of P1. However, if the world price PM (import parity) is below P1, then there will be private imports equal to M1, in addition to food aid (F1).

As long as food aid is less than or equal to the level of private sector imports that would be imported in the absence of food aid (M1 plus F1), then food aid has no disincentive effects on domestic production, since domestic market prices will be equal to import parity (PM). However, in comparison to a higher, long-term import parity price of PM', food aid may cause disincentive effects even when there are private sector imports. At the import parity price of PM', domestic production would be S2 in the absence of food aid, compared with only S3, with food aid.

The import parity price in any given year could be higher than the long-term average import parity price, as well. In this case, even though food aid reduces domestic producer prices below import parity and has a disincentive effect on domestic production, domestic prices would still be high in comparison with other years.[36]

The basic analytical framework described above focuses on the import parity price of a food aid commodity (e.g. wheat) and the short-run response of consumers and producers to changes in that commodity's price, holding other factors constant. But other factors, which influence the shape and location of the domestic supply and demand curves for the food aid commodity, must also be taken into account. Domestic supply is determined not only by farmers'expected price during the growing season, but also by the expected prices of alternative crops, expected yields, available production technologies, weather and prices and availability of inputs. Domestic demand is determined by the responsiveness of consumers to changes in the food aid commodity price (reflected in the shape of the demand curve), as well as the prices of other goods (most importantly, other major staples) and the level and distribution of household incomes (both of which shift the demand curve to the right or left). Other factors also influence total demand including demand for the commodity as animal feed and the amount distributed through programs targeted to poor women and children.

Analysis using a small model of Bangladesh wheat markets based on supply and demand parameters illustrates the potential disincentive effects of continued food aid in that country.[37] Bangladesh received about 600 thousand tons of food aid wheat for targeted distribution programs in years of normal harvests in the late 1990s. During these years, the

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[36] An alternative to using the current import parity price is to compare domestic prices with a reference price calculated on the basis of medium-term average of world prices or projected medium term world prices.

[37] The following discussion draws heavily from Dorosh et. al. (2002).

private sector also imported wheat, including both high gluten content *milling wheat* for commercial baking purposes and wheat with lower levels of gluten content similar to the wheat produced domestically. Increased rice and wheat harvests have reduced the gap between wheat demand and domestic wheat supply, not only by increasing wheat production, but also by reducing demand for wheat. Because rice and wheat are substitutes for one another, wheat demand falls when good rice harvests lower the price of rice.[38]

As shown in Tables 1 and 2, wheat price disincentive effects from food aid flows are a legitimate concern in years of good rice harvests in Bangladesh. A reduction in the average wholesale price of rice from 12.24 taka per kilogram (the average price in 1999/2000) to 11.2 taka per kilogram (the approximate price level in late 2000), brought about by good rice harvests, reduces the gap between domestic demand and supply of domestically produced wheat from 1.132 million tons (Scenario 1) to 916 thousand tons (Scenario 3).[39] At the higher, five-year average world price level of $152/ton,[40] total excess demand for wheat is only 838 thousand tons, approximately equal to the 813 thousand tons of net wheat public distribution in 1999/2000.[41] Injections of wheat above 838 thousand tons would depress prices below import parity levels and eliminate incentives for private imports.

Table 3 shows the size of the potential price disincentive effect of 600,000 and 900,000 tons of net public wheat distribution under alternative assumptions for rice prices and model parameters. The prices shown in the table are the prices that result from the specified level of net public foodgrain distribution if private sector imports of non-milling wheat are zero. In other words, these prices show the market clearing prices in the absence of private sector imports of non-milling wheat.

With net Public Food Distribution System (PFDS) wheat distribution of 900,000 tons and medium-level rice prices, wheat prices in Bangladesh would be 10.44 taka per kilogram in the absence of non-milling wheat imports by the private sector. This price is 10.6 percent below long-term import parity of 11.67 taka per kilogram (calculated using the average dollar price of U.S. Hard Red Winter #2 wheat over the 1995/96–1999/2000 period, adjusted for quality, transport, and marketing costs). If net PFDS wheat distribution were only 600,000 tons, the market-clearing price would be 12.32 taka per kilogram, which would be above the long-term import parity price.

With low rice prices, even 600,000 tons of net PFDS wheat distribution is sufficient to bring down market-clearing prices to 11.0 taka per kilogram, 5.8 percent below long-term import parity. Nine hundred thousand tons of net PFDS wheat distribution with low rice prices drops wheat prices to 9.31 taka per kilogram, 20.3 percent below long-term import parity. Using more elastic demand parameters, the potential price disincentive effects are even larger, ranging from 12.1 to 27.3 percent under the various scenarios.

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[38] Rice is generally preferred to wheat by consumers in Bangladesh and rice consumption is 7-8 times that of wheat.

[39] These two scenarios assume the 1999/2000 average world wheat price of $120/ton, U.S. Hard Red Winter wheat #2, f.o.b. (free on board), U.S. Gulf.

[40] The figures for imports do not include 360 thousand tons of higher gluten content "milling wheat" needed for commercial baking purposes, which are assumed to not be responsive to changes in prices of milling wheat.

[41] Note that more elastic supply and demand parameters imply that changes in the import parity price have a larger effect on the total quantity of wheat import demand. Thus, with a more elastic demand and supply, raising the import parity price from 9.2 to 12.2 taka per kilogram reduces the "safe level" of food aid from 999 to only 4 thousand tons (Table 2).

Thus, net PFDS wheat distribution of 900,000 tons has small price disincentive effects on wheat production even with medium-level rice prices, and the disincentive effects are quite large (-20.3 percent) when domestic rice prices are low, as in 2000. Reducing net PFDS wheat distribution to 600,000 tons completely eliminates the price disincentive effect with medium-level rice prices (and inelastic parameters). If the more elastic parameters are a better indication of medium-term supply and demand behavior, however, there are still significant price disincentives, even with medium-level rice prices and only 600,000 tons of net wheat distribution.

Incorporating Market Considerations into Emergency Needs Assessments: Suggested Operational Guidelines

Incorporating market trade flows and prices into emergency assessments of food aid needs and programs is critical for accurate estimates of food aid needs and avoiding price disincentive effects on local production. Monitoring of market behavior is also needed both in emergency assessments and to provide data for mid-stream adjustments in program implementation. This section offers suggested operational guidelines for market analysis, and is not meant to provide a theory of marketing nor a complete check list for marketing analysis.[42]

Assessing the potential role of markets to stabilize food supplies

Whether markets can play a major role in augmenting food supplies in an emergency situation will depend on the potential for traders to make a profit from the transactions and the degree of competition amongst traders. Government policy can play a major role in influencing both of these factors.

The potential for traders to make a profit from trade flows in an emergency situation depends on price differentials between the source of supply and the market in the emergency-affected area, a normal marketing margin reflecting costs of storage, transport and other marketing costs, size of the potential supplying market, and the risks involved in trade. Detailed information may not be available, but even limited information on key market aspects can significantly aid market assessments.

Current price differentials between markets can be calculated using wholesale prices for the major staples, (adjusted, if necessary for differences in quality). Marketing margins can be assessed through small surveys of traders. This information on marketing costs can be checked with actual price differentials between major wholesale markets where substantial trade flows have occurred in the past. Increased costs due to damaged physical infrastructure as a result of the emergency may have increased these costs should be taken into account. Ideally, comparisons of prices across markets can be made over time using weekly or monthly price data.

Trade flows may not occur even where there appear to be adequate price incentives if traders' risks are very high. Informal tolls and danger of theft from bandits, uncertainty over possible changes in government policy (imposition of tariffs, movement restrictions, stock limits), changes in exchange rates (for international trade), and the potential of sudden large inflows of food aid to saturate markets all add increase the risks of trade, increasing costs and diminishing trade volumes. Informal interviews with traders concerning risks and

[42] See Timmer, Falcon and Pearson (1983) *Food Policy Analysis* for a concise presentation of the theory of markets and the basics of market analysis.

barriers to trade to uncertainty are a good source of information for identifying the major risks.

Assessing the size of a potential supplying markets in neighboring regions is important, because if this market is small relative to the size of the emergency food needs, trade flows to the emergency-affected region will have price effects in the supply market. As a result, the total volume of trade flows may be small, either as a result of market forces or because the government in the supplying region imposes trade restrictions to prevent a price rise. Note, however, that a moderate price rise in supplying regions can benefit producers in these regions, with minimal costs to net consumers, and at the same time limit the price increase in the deficit regions. For example, in Kenya in the early 1980s, Dreze and Sen (1991) provides evidence that inter-regional trade flows from regions not affected by drought could have dampened the price increases in drought-affected regions of the country.

Assessing the degree of competition in markets is more difficult. One evidence is market price behavior itself: marketing margins reflect actual marketing costs and relatively small profit margins. If risks for traders is high, however, assessing traders' full costs can be problematic. Where available, statistical analysis of the extent of market integration in recent years provide evidence of correlations of price movements that are consistent with competitive markets. Unless this analysis has been done prior to the emergency situation, this analysis is likely to be too time-consuming to conduct at the time of an emergency. Moreover, studies of past market price movements may not shed much light on current market conditions if market infrastructure has been disrupted or government policy has changed.

Special attention should be given to remote areas where transactions are likely to be high, markets may be thin, and price fluctuations may be particularly large. In these regions, unless market transactions costs can be reduced (e.g. through reduction in transport costs), price increases in the absence of direct public interventions could severely reduce household access to food.

Another indicator of the competitiveness of markets is the number of traders involved in various levels of trade (e.g. importers, wholesales, retailers). Rapid assessments using key informant interviews of traders and government officials can provide qualitative information. For international trade, letters of credit data compiled by the Central Bank can provide information on the number of traders and the volume of trade per trader, (as well as give an indication of likely trade flows in the coming weeks).

Estimation of food aid needs

Information of the incentives for trade and the extent of competitiveness in markets, can be supplemented with estimates of supply and demand responsiveness to prices to give an indication of potential flows of private imports, and thus help in determining food aid needs. A basic methodology for these estimates, which estimates private import demand on the basis of changes in total per capita supply and demand relative to a base period is outlined below. This analysis is explicitly short-run, e.g. the time period for analysis is between the onset of the emergency situation and next expected major harvest. Domestic production for this period is thus assumed to be fixed. (Potential effects of food aid flows on price incentives for future harvests are discussed in the next section.) Expected private import flows are estimated using changes in real (e.g. inflation-adjusted) prices and per capita demand.

The starting point for the analysis is calculating availability/capita of the major staple in the base year: production less losses plus net public and private imports. This figure will

be used as an estimate of total food consumption. Where a government agency maintains stocks, availability should be adjusted for changes in public stocks. The base year chosen should ideally be a recent year with normal harvest and reliable data. (Note that although private import numbers may be subject a great deal of uncertainty, these may be only a small percentage of available supply.)

The second step involves calculations of real (inflation-adjusted) prices of food in domestic and appropriate international markets in the base year and in the current year. For domestic markets, the wholesale market price generally differs less across individual markets than does the retail price, and is likely to be a better indicator of overall market conditions. A non-food consumer price index (for which the price of the major staple is not a component) or the overall GDP deflator can be used to adjust prices for overall inflation. The import parity price of (actual or potential) private food imports is calculated as the wholesale market price in exporting market plus tariffs, transport and marketing costs.

Third, the volume of private sector imports is estimated as total demand (a function of the import parity price, either for the whole year or until food aid arrives) less net availability apart from private imports (net domestic production, food aid and government imports). Using alternative estimates of price elasticities of demand from existing literature, if necessary from countries with similar socio-economic conditions and consumption patterns), the percentage change in per capita demand with private imports is then estimated from the percentage change in real prices (import parity price , Pm_t, relative to the wholesale price in the base year, Pd_0) and the own-price elasticity of demand (e):

$$(D_t-D_0)/D_0 = e * (Pm_t-Pd_0)/Pd_0,$$

where D_t and D_0 are per capita demand in the current and base periods, respectively. The calculations of changes in demand can be refined to include adjustments for income effects if per capita incomes have changed substantially, (using the percentage change in per capita incomes and an estimated income elasticity of demand).[43]

Given the uncertainty regarding data and production, trade, prices, demand parameters, and market behavior, sensitivity analysis is essential. Estimated private import flows are especially sensitive to changes in the estimates of production, (generally the largest component of total availability). Note also that these calculations have implicitly assumed no changes in (per capita) private stocks (end stocks are assumed to equal beginning stocks). This assumption is most likely to be valid if beginning and end stocks are low, as in the case where the analysis covers the period from just before the major harvests in two successive years.[44]

[43] Note that in the Bangladesh examples discussed in the previous section, income effects were small since households borrowed heavily to finance food purchases (del Ninno, Dorosh and Smith, 2003).

[44] See Dorosh (2001) for a discussion of the implications of private stock changes in these calculations.

Estimation of producer price disincentive effects

The above analysis covered only the short-run in which production was fixed. In order to incorporate the effects of food aid on producer incentives for subsequent harvests, the analysis can be extended to include an equation for domestic supply as a function of the wholesale price. Here, the simplest assumption is to use the estimated market price as the farmer's expected price, and to explicitly model only a single period (generally one year).[45] A more complex approach is to explicitly model various seasons and stock changes (Dorosh and Haggblade, 1997). This approach is more appropriate for analysis of program food aid flows in the medium run, however, where there is sufficient time and data for the analysis. Other refinements can be made to the analysis as well, including possible high marginal propensities to consume food aid out of food aid transfers (del Ninno and Dorosh, 2003).[46]

Conclusions

In emergency food situations, market flows from outside the directly affected region (from both within the country as well as imports) can play an important role in augmenting food supplies and increasing food security. Neglecting these market flows in emergency needs assessments risks overstating food aid needs and causing price falls that discourage domestic production (if excess food aid flows are disbursed). Overestimating the potential market inflows risks excessive price rises that result in reduced availability and access to food. Careful assessments of market conditions (potential sources of supply and competitiveness of markets) and the potential volume of private imports are needed, therefore, as part of emergency needs assessments.

This paper has outlined the basic features of a market analysis for emergency food situations and potential disincentive effects of food aid on domestic production. An approach of this type may aid in emergency food assessments by enabling rapid quantitative estimates of private market inflows of food. Crucial to this analysis is an understanding of market structure and behavior in the affected regions, which can be facilitated by establishment of effective information systems that include regular monitoring of markets (prices and private international trade flows). Simple quantitative models like the ones outlined in this paper could also be made part of the standard toolkit for analysis, with basic data and parameters already collected for countries highly susceptible to food emergencies.

Most important is that a better understanding of the potential for markets to enhance food security in emergency food situations will lead to policies that encourage market flows. National and local governments can enhance food security by taking measures to promote competitive markets and private trade, both during the time of an emergency, as well as the medium term. As illustrated by the case of Bangladesh following the massive floods in 1998, private trade can rapidly add to national food supplies, stabilizing prices and thereby enhancing availability and access to food by the poor. Trade flows do not obviate the need for targeted programs to enhance access to food and address nutritional and health needs of vulnerable individuals (particularly women and children). Nor does the possibility of private trade flows and food aid in times of emergency reduce the importance of investments in technology development and maintaining farmer incentives for promoting efficient domestic production and rural incomes. Private trade flows can make a major contribution to preventing an emergency from becoming a disaster, however, through both increases in availability and access to food.

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[45] Alternatively, the expected price can be specified as a function of lagged prices.

[46] del Ninno and Dorosh (2003) show that a direct distribution of wheat through targeted programs in Bangladesh results in an increase in wheat demand of about 0.3 kgs for each 1 kg distributed. Thus, the effect of food aid transfers on market prices if reduced, though there remains the effect of a net increase in supply of about 0.7 kgs for every 1 kg distribution.

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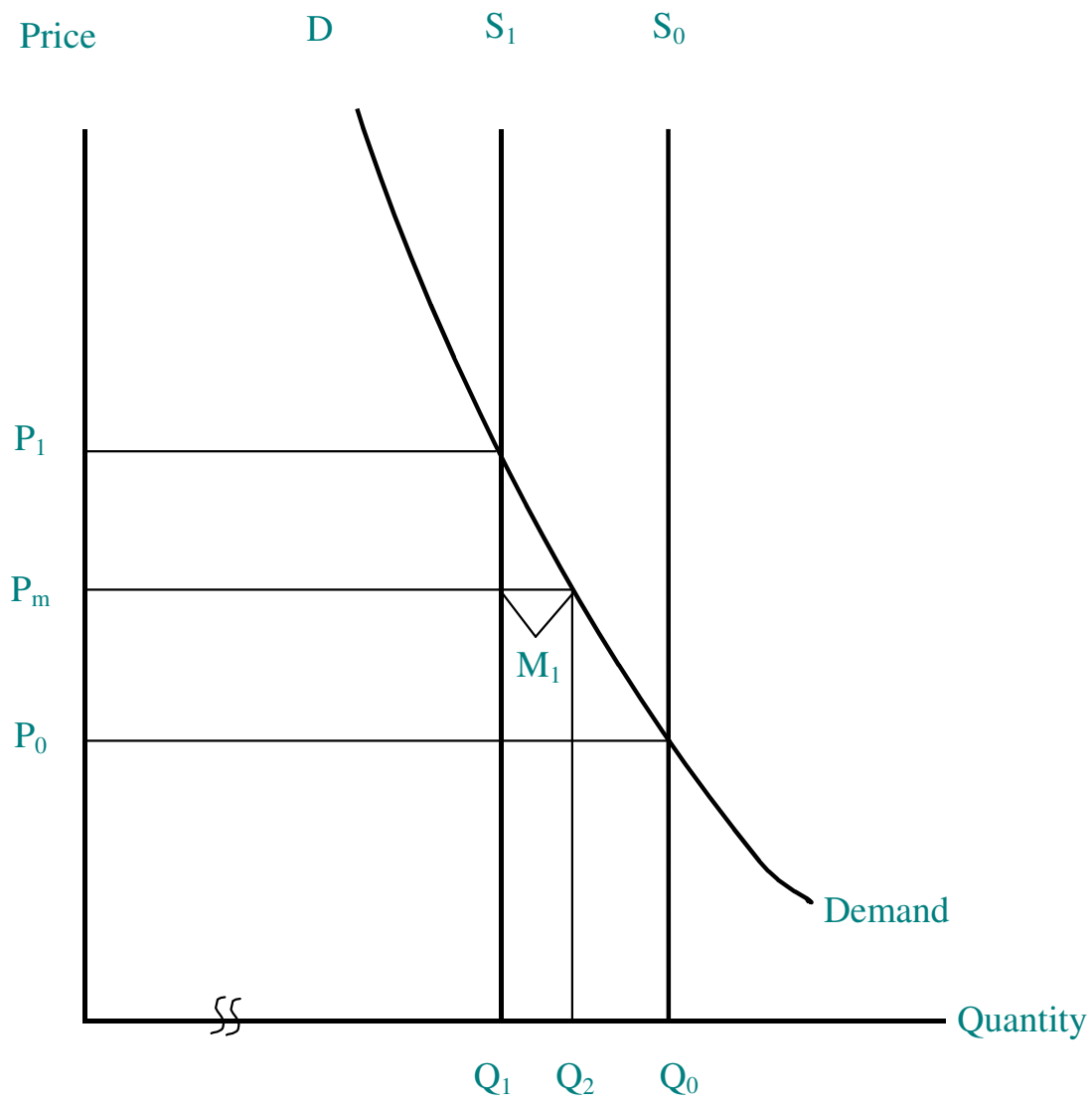
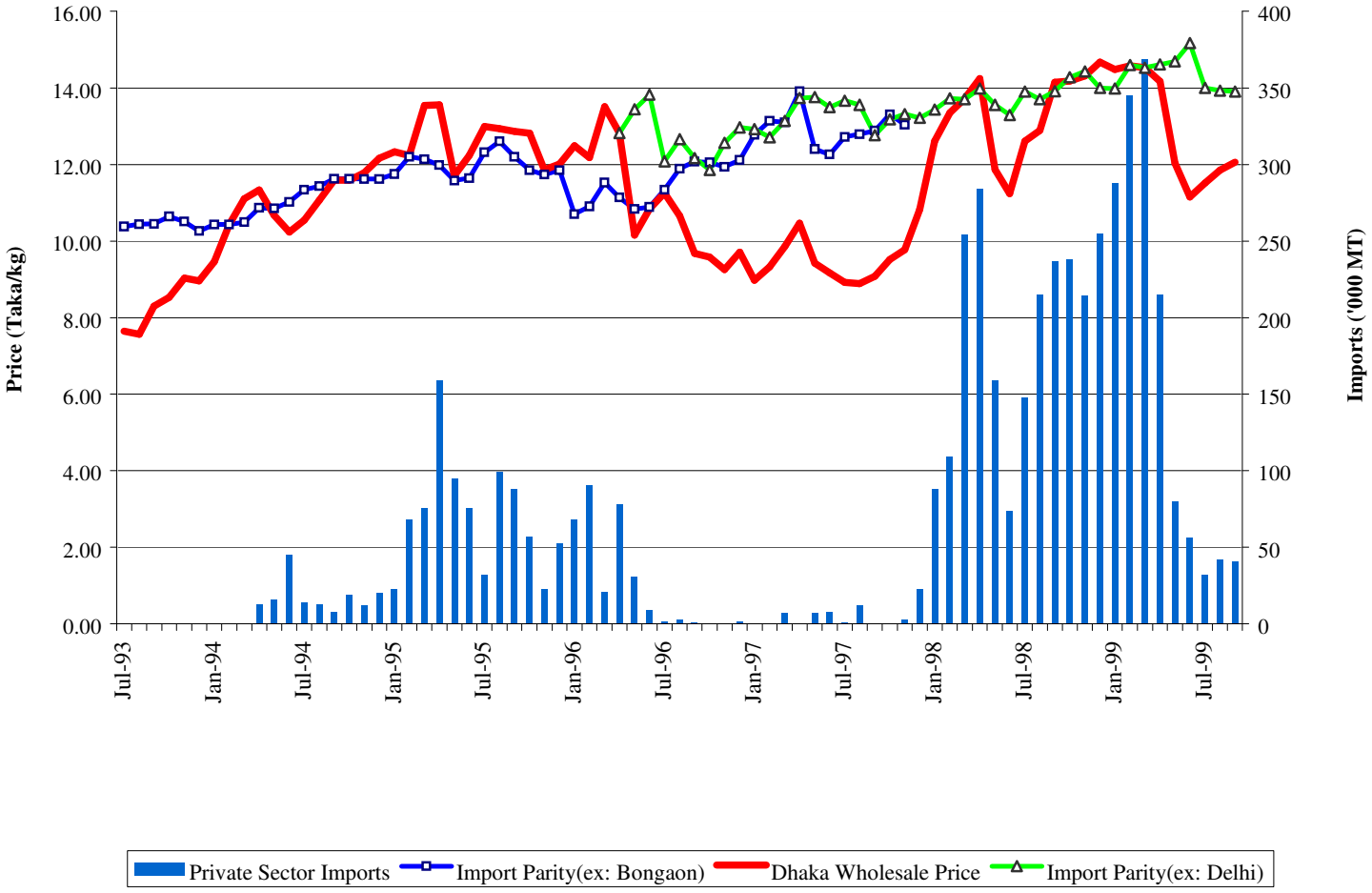
Figure 1 — Effects of a Production Shortfall



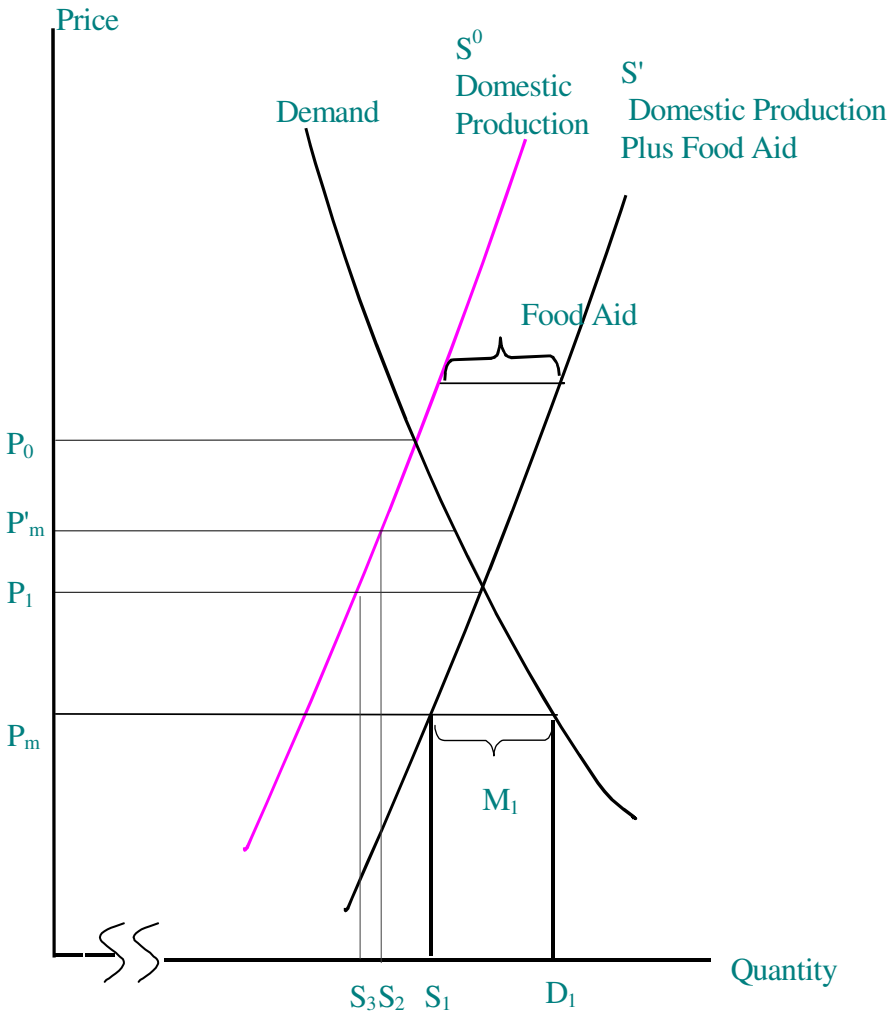
Source : Dorosh (1999).

Figure 2 — Rice Prices and Quantity of Private Imports in Bangladesh, 1993-99



Source: Dorosh (1999, 2001).

Figure 3 — Disincentive Effects of Food Aid



Source: Dorosh et.al., (2002).

Table 1 - Wheat Imports and Domestic Prices in Bangladesh Under Alternative Scenarios

	Base 1999/2000	Scenario 1	Scenario 2	Scenario 3	Scenario 4
International Wheat Price ($/ton)[a]	120	120	152[b]	120	152[b]
Domestic Rice Price (Tk/kg)	12.24	12.24	12.24	11.20	11.20
(1) Production (mn tons)	1.840	1.877	1.967	1.927	2.020
(2) Public Net Distribution (mn tons)	0.813	0.917	0.917	0.917	0.917
(3) Private Imports (mn tons)	0.806	0.575	0.281	0.359	0.076
(4) Total Supply[c] (mn tons)	3.275	3.181	2.969	3.011	2.811
(5) Total Net Imports (2)+(3), (mn tons)	1.619	1.492	1.198	1.276	0.993
(6) of which non-milling wheat[d] (mn tons)	**1.259**	**1.132**	**0.838**	**0.916**	**0.633**
(7) Domestic Wheat Price (Tk/kg)	8.64	9.23	10.79	9.23	10.79
Domestic Rice Price (Tk/kg)	12.24	12.24	12.24	11.20	11.20
(8) Percent Change Wheat Price	0.0	6.8	24.9	6.8	24.9
(9) Percent Change Production	0.0	2.0	6.9	4.7	9.8
(10) Percent Change Demand	0.0	-2.9	-9.4	-8.1	-14.2

Table 2: Maximum Level of Net Wheat PFDS without Causing Wheat Producer Price Disincentives

	International Wheat Price		
	162 $/MT (9.2 Tk/kg)*	**194 $/MT (10.8 Tk/kg)***	**222 $/MT (12.2 Tk/kg)***
Medium Rice Prices - 12.24 Tk/kg (2000)			
Inelastic Parameters	1.132	0.838	0.623
Elastic Parameters	0.999	0.417	0.004
Low Rice Prices - 11.2 Tk/kg (2000)			
Inelastic Parameters	0.916	0.633	0.425
Elastic Parameters	0.589	0.045	-0.345

* The international wheat price shown is the cost, insurance and freight price, Chittagong ($/MT), U.S. HRW#2.
Import parity prices include shipping and handling costs to wholesale Dhaka, adjusted with 0.905 quality factor.
Note: These simulations assume inelastic demand for milling wheat imports of 360,000 MTs per year.

Figure 1— Source: Dorosh, Shahabuddin, Aziz and Farid (2003).

Table 3: Impact of Food Aid on Domestic Wheat Prices (Disincentive Effects)

	Net PFDS Wheat Distribution (thousand tons) 600	900
Medium Rice Prices - 12.24 Tk/kg (2000)		
Inelastic Parameters	12.32 Tk/kg ***	10.44 Tk/kg -10.6%
Elastic Parameters	10.26 Tk/kg -12.1%	9.47 Tk/kg -18.9%
Low Rice Prices - 11.2 Tk/kg (2000)		
Inelastic Parameters	11.00 Tk/kg -5.8%	9.31 Tk/kg -20.3%
Elastic Parameters	9.20 Tk/kg -21.2%	8.48 Tk/kg -27.3%

Notes: Wheat prices shown in the table are the prices which result from the specified level of net public foodgrain distribution if private sector imports of non-milling wheat are zero.
Percentages shown indicate the percentage below a long-term import parity price of 11.67 Tk/kg.
These simulations assume inelastic demand for milling wheat imports of 360,000 tons per year.

Source: Dorosh, Shahabuddin, Aziz and Farid (2003).

Sampling Approaches and Options for Emergency Needs Assessments

By Tim Frankenberger and Richard Caldwell

I. Introduction

WFP carries out or participates in more than one hundred needs assessments each year (WFP 2003). These emergency needs assessments will differ, since emergencies are of a wide variety, differing in their nature, scope, duration and impact. Each type of emergency requires different approaches[47], skills, and capacities to assess potential effects of the shocks and to design appropriate responses. Given the large number of emergency needs assessments and the wide variety of people from within WFP, as well as implementing partners and consultants that conduct them, it is important to ensure that high standards are used regarding the appropriate data collection techniques.

One of the most important issues identified in a recent survey of emergency needs assessments specialists in WFP was centered around sampling methods and approaches. Typical disagreements arise around methodology, timelines, population figures and designation of the most vulnerable. These staff recognize that there is a lack of consensus on sampling and the dangers of using incorrect sampling in estimating need and targeting interventions.

Country Office staff and consultants are currently familiar with a wide variety of sampling techniques, such as random stratified sampling, two-stage sampling, cluster sampling, sampling required for nutritional assessments, stratification by food economy or livelihood zone, and purposive sampling used in rapid assessments. Staff recognize that sampling can be compromised due to the lack of time in rapid onset emergencies and can be a major challenge in complex emergencies when population figures are unreliable.

A number of WFP Implementing Partners assist in carrying out emergency needs assessments. These include rapid, in-depth and formal detailed assessments in all the main emergency setting types (slow onset, sudden onset, refugee and complex/conflict emergencies). Many of these agencies undertake more than 30 assessments per year.

Because different approaches and sampling procedures are used in different emergencies by these implementing partners, the comparability between the assessed needs of different groups and countries is difficult to achieve. For example, qualitative data and vulnerability indicators are particularly difficult to compare among livelihood groups and countries for which the risks, assets, and coping strategies are different. Quantitative indicators are easier to compare, but often agencies don't adhere to the same methods, sampling approaches or recommended indicators. Comparability should be facilitated by clear statements of the objective of the assessment, the conceptual model/framework and assumptions, the methodology and potential biases, and the context. Criteria should be established for choosing and defining the best methodology to use in a particular situation.

[47] See Annexes 4, 5 and 6 for more information.

To conduct a good emergency needs assessment, it is necessary to have an adequate understanding of the context and dynamics that lead to the crisis as well as the current acute risk that vulnerable populations are facing. Thus, we need to have information on the key factors that are leading to vulnerability (e.g. range of shocks and the ability to cope with these shocks) and the prevalence of food insecurity distributed across the target population.

Much debate has centered on which methods (qualitative versus quantitative) are suited for collecting these types of information. Certain sampling approaches may be better suited for capturing in-depth information on context, while other sampling approaches may be better suited to capture information on prevalence. In many cases, the approaches used to capture contextual information feed into the design of sampling approaches used to collect data on the number of individuals in need.

Measurement objectives aimed at determining the prevalence of food insecure or malnourished and indicate the need for quantification of results. Probability sampling methods has an advantage in these instances in that the error, precision, and confidence around the estimates are also quantifiable and differences between subgroups can be statistically compared. Measurement objectives aimed at understanding the causes and degree of food insecurity from the point of the actors suggest that qualitative methods employing non-probability sampling may be better suited.

In reality, our measurement objectives are usually a combination of the two suggesting that in an ideal situation a combination of sampling approaches would be used. In these best case scenarios complementarities can often be enhanced by using qualitative, non-probability approaches to help shape quantitative, probability surveys. However, given the inherent constraints found during emergencies, assessments may have to compromise from this ideal approach.

The key issue is how to capture both of these types of information in the various settings in which emergencies take place (slow onset, sudden onset, refugee and complex/conflict settings). Some of the most common constraints in carrying out these needs assessments that influence sampling design include time, cost, resource availability and skilled labor. All of these issues are intensified in a rapid onset emergency context where the need to have access to information quickly is paramount.

The ideal sampling strategy is one that matches measurement objectives with a suitable level of precision and a high degree of confidence. This type of sampling strategy may be impossible to implement in a field situation given particular logistical constraints (such as time or geographical expanse). In many situations, secondary data which are needed to help define the sampling universe for the assessment are not available or are of such poor quality they are of no use. Finding the universe for which to draw a sample may be nearly impossible in cases where the population is moving, dispersed, or in some other way difficult to access. In addition, coordinating information collection across several agencies that use a number of different data collection approaches make it difficult to generate comparable data. In situations where improper sampling approaches are used, resources may be wasted.

The objectives of this paper are fourfold: (1) to identify current sampling methods used in conducting assessments in emergency situations, (2) to provide detailed information about sampling methods and process, including how to calculate an acceptable minimum sample size and basic information about both probability and non-probability sampling techniques, (3) to explore some possible alternative strategies that would address some of the common sampling problems in emergency assessment today, and (4) to offer a list of critical problem areas that need immediate attention regarding sampling issues in ENAs.

II. An Overview of the Sampling Process[48]

Sampling is a process that includes establishing measurement objectives, determining how to draw the sample from a well-defined population, determining who is eligible to be sampled (sampling frame) and how precise the results should be. The first step in sampling is to define the *population(s)* of interest clearly and accurately. The population defined depends solely on the purpose of the study. Inclusion and exclusion criteria must be identified to define characteristics that include certain people or households and rule out certain others.[49] Schofield defines population as "the total collection of elements actually available for sampling."[50] For practical reasons, the surveyor should bear in mind precisely which elements are available in the intended population and which are not, and use this information to limit the extent of the claims one makes about generalizing the results. The degree of generalization may be critical to the purpose of the study, hence, defining a reasonable population and type of sample method are important factors in determining meaning beyond the original setting of the research.

A. Sampling Units

For the purposes of drawing a sample, a population consists of sampling units. A *sampling unit* is a collection of elements that do not overlap and which exhaust the entire population. For example, if the elements were females over 60 who had visited a health clinic in the last two weeks, and the population was all such households in Zimbabwe, then the sampling unit could be geographical regions, or clinics, but it could not be cities because this would not exhaust the population of interest. Sampling cities in this case would exclude people living in rural areas.[51] What is important here is that the definition of the sampling unit should be unambiguous and conform to local understanding and acceptance. The most common sampling unit in multipurpose socioeconomic studies is the household, even when individual-specific estimates are sought.[52]

B. Defining the Universe

The *universe* is the location or population or group that the study seeks to describe.[53] The universe is determined by the objectives of the study. However, it is not always practical to survey the entire universe, hence a sample is usually drawn. The various types of sampling discussed below illustrate possible available solutions when this problem occurs.

C. Sampling Frame

Sampling units are organized into a sampling frame. A *sampling frame* is "a list of units in the population (or universe) from which the units that will be enumerated in the sample area are selected."[54] The frame is most typically the generated list of households or individuals

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[48] Many of the elements described in this section are normally associated with probability sampling, but that in fact these research design issues must be addressed regardless of the sampling approach being used.

[49] TANGO International. 2002. Guidelines to CARE Malawi for the Design of Future Baseline and Evaluation Studies. Tucson, AZ: TANGO International.

[50] Schofield, William. "Survey Sampling." *In* Design Issues.

[51] Ibid.

[52] Carletto, Calogero, 1999.

[53] Ibid.

[54] Ibid.

that has a chance to be selected, but it could also be administrative areas, census materials, ordinance survey maps, tax listings, land registries, or a village map showing individual households. A sample can only be representative of the population included in the sampling frame, hence, a critical point is how well the sampling frame corresponds to the population the study wants to describe.[55] The concept of the coverage of a sampling frame is important to the investigator because of the requirement that each and every unit have a non-zero probability of being selected in the sample. Alternatively, complete coverage requires that the sampling frame include all elements of the target population.[56]

Where sampling frames exists for the ultimate sampling unit (e.g. most often households or individuals) cases selected for inclusion in the sample can be selected randomly or systematically from the sampling frame. Where this information is non-existent or inaccurate, multi-stage sampling may be required in which the first stage sampling units are selected at the level of aggregation for which a reasonably complete sampling frame exists and a subsequent stage is used to select ultimate sampling units from within these aggregations selected in the first stage.

The following characteristics ensure an accurate sampling frame: (1) comprehensiveness (a sample can only be representative of the sampling frame, that is, the population that actually had a chance to be selected); (2) probability is known but not necessarily equal; and (3) efficiency or accuracy, that is, the issue of whether the sampling frame includes units that are not among those that the study wants to sample.[57]

D. Sample Size[58]

The calculation of sample size is one of the most technically challenging aspects of survey design. Decisions about sample size are strongly linked to the required level of precision in the variables the investigator is measuring. Precision, or sampling error, is defined in terms of a margin of error and a confidence level. Sampling error is the difference between the characteristics of the sample and the characteristics of the population from which the sample is selected.[59] In general, the larger the sample size the smaller the sampling error, but it is critical to understand that the sampling error depends on the actual size of the sample rather than on the sampling fraction. The sample size needed to estimate the birth rate in Mali (at a given level of precision) would be the same as that needed to estimate the birth rate in India.[60] Said in another way, sample size is independent of the size of the study population (until the study population is relatively small, in which case it is often better not to draw a sample but use the entire population).

Two parameters must be established by the surveyor in order to calculate the sample size: (1) the desired statistical significance level, also known as the false-positive rate or chance of a Type I error, and (2) the desired statistical power level, or the false-negative rate or 1 minus the chance of a type II error. Statistical significance measures the probability of falsely

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[55] Ibid.

[56] Johnson, Aaron C. and John S. Rowe. 1987. Agricultural Statistics for Developing Countries. Madison: University of Wisconsin, June.

[57] Ibid.

[58] The default level of confidence is normally set at 95%, though there may be situations that require that the level of confidence be relaxed to 90%

[59] Salkind,

[60] Casley, Dennis J. and Krishna Kumar. 1988. The Collection, Analysis, and Use of Monitoring and Evaluation Data. Baltimore: John Hopkins Press.

rejecting a hypothesis about an indicator when the hypothesis is in fact true (e.g. rejecting that the proportion of stunted children in a population is less than 15 percent, when the true proportion is less than 15 percent). Statistical power measures the probability of rejecting the maintained hypothesis when it is false (e.g. rejecting the hypothesis that the proportion of stunted children is less than 15 percent when the actual proportion of the population is less than 15 percent.). In most instances, decreasing the significance level (decreasing the chances of a type I error), also decreases the power of the test (increasing the chances of a type II error). The level of statistical significance measures the probability of falsely rejecting the maintained hypothesis when the hypothesis is true, and is usually denoted as □. A commonly accepted value for □ is 0.05, or a 5 percent chance of a type I error. The widely accepted rate for the probability of a type II error, or *, is 0.2 or 20% which corresponds to a power level 0.8 or 80% (power = 1-*).[61] The power parameter is probably more important to program evaluators since it ensures that a program is not judged a failure when in fact it has had a positive result. Insufficient power may lead to a false conclusion that there are no significant changes in indicators over time, or differences between project and control groups, when in fact there were real changes that were not detectable given an insufficient sample size.[62] To ensure sufficient power, a minimum value of 0.8 should be used and 0.9 if resources permit. Power and confidence levels (statistical significance) represent a tradeoff where at the same sample size and sample attributes an increase in one corresponds with a decrease in the other. The only way to increase both is by increasing sample size.

The minimum sample size is influenced by the particular sampling design chosen (e.g., cluster designs require larger samples than single stage designs in order to achieve the same degree of precision), the number of variables measured (the more variables the higher the sample size),[63] the estimated variance or standard deviation of the main variable(s) studied, the required precision, and the resources and time available to conduct the study. When examining more than one indicator (e.g. a survey that includes several health and nutrition indicators), one must calculate the sample size needed to achieve the desired precision level for each important indicator estimate. The indicator with the largest sample size dictates the sample size for the entire survey.

E. Non-Sampling Error

In any data collection process, some important sources of error are separate from the sampling error. Non-sampling errors include a wide variety of anomalies: listing error and omissions, interview non-responses, response or measurement errors, interview recording errors, errors of coding and data entry, and programming or data processing errors. In the context of needs assessments, response errors occur mostly through memory failure, uncertainties about units or dates, and misunderstanding or miscommunication of a question. Measurement errors arise from the ambiguities inherent in the measurement task, the complexity of the data collection process, and the level of skill of the enumerators. Practically speaking, response and measurement errors can be considerably greater than most people imagine. For example, studies of bias in farm yield measurements have shown errors of 10-20 percent to be typical.[64] The point here is that one gains little by reducing

[61] Medical Statistics: Sample Size and Power for Clinical Trials. 2003

[62] Magnani, Robert. 1997. Sampling Guide. Washington D.C.: USAID, Food and Nutrition Technical Assistance.

[63] Carletto, Calogero, 1999.

[64] Casley and Kumar. 1988.

sampling error if non-sampling error is high and persistent throughout the data set. Total error is calculated by summing the squares of the sampling and non-sampling errors.[65]

If one is studying a relatively homogeneous population, the sample size can be smaller and still have a high degree of confidence. Larger samples sizes are required for heterogeneous and/or more dispersed populations. Annex 2 provides an example calculation for determining sample size when using simple random sampling for a 95% confidence level as well as a set of guidelines to follow when calculating sampling error. Annex 3 provides the standard calculation for sample size when using a multi-stage probability sampling design.

F. Selecting a Sample

There are two general types of sampling strategies – probability sampling and non-probability sampling. *Probability sampling* is where the likelihood of any one unit of the population being selected has a known, non-zero probability of being included in the sample. Probability samples use randomly selected mechanisms in at least one stage. *Non-probability sampling* is where the likelihood of selection is unknown; these strategies usually involve approaches where subjective judgments play a role in the selection of the sample. Non-probability samples are not representative of the study population, but this deficiency can be appropriate in many situations. One can learn a lot from non-representative samples, but information collected by this means must not be elevated to a status that cannot be substantiated.[66]

Non-probability samples are especially useful in exploratory research, pilot studies, studies involving highly specific populations, or studies involving transient or otherwise difficult to locate groups. A general rule of thumb is that measurement objectives related to quantification of conditions and associations more appropriately fit the probability sampling approaches, and measurement objectives aimed at in-depth inquiry into how people perceive their own or others' experiences, vulnerability, causes, etc., more appropriately fit the non-probable strategies. It is worthwhile to note that there is significant gray area here, both in terms of measurement objectives and in terms of appropriate sampling strategies. For example, purposive sampling approaches are used with methods aimed at quantification of conditions and with certain measurement objectives such as getting commodity prices in a market setting, both of which one might initially think would be gathered using a probability sampling technique.

Depending on the emergency context, assessments could undertake one or more of the following sampling strategies.

III. Emergency Scenarios and Sampling Frameworks

A. Slow Onset Emergencies

Emergency assessments in slow onset emergencies have taken on a variety of forms, depending upon the amount of data already available, the nature of the emergency, the resources available and the time constraints for generating information. When considerable information is being collected by the government or other agencies, most needs assessments are tailored to verify whether designated areas are vulnerable or not. When

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[65] See Casley and Kumar, 1988, pp.84-85, for a sample calculation of total error.

[66] Bernard, Russell. 2002. Research Methods in Anthropology.

little information is available, needs assessments become more comprehensive and more extensive.

All needs assessments in slow onset situations try to develop a representative sampling scheme in the field work. These sampling schemes often involve several steps. The first step is the national prioritization of districts or administrative units to be sampled. The use of secondary data either generated by government ministries or National Early Warning Systems can be used to select vulnerable areas (e.g. Uganda, Kenya). In the absence of this data, national samples are drawn on the basis of agro-ecological zones, food economy zones or livelihood zones (e.g. Eritrea). Cost and available resources may be the determining factor as to how large these first stage sampling units will be. The second stage usually involves the selection of sub-administrative units within the zone. Within these sub-zones village/communities are selected in a representative fashion. Finally, data is collected within the village or community, either using a random sample of households, a stratified sample of households based on wealth rank, or focus groups and key informants based on particular criteria. The development of the sampling scheme is directly related to the question of which unit of analysis is appropriate for reporting the results and exiting data that are available.

Emergency assessments during slow onset emergencies often have enough time[67] to collect information using probability sampling procedures. Time is also usually available to conduct good secondary data reviews as well as vulnerability analyses. Despite this luxury of time, relatively speaking, proper sampling procedures are often not followed to capture accurate food security needs and information necessary for proper targeting and programming. The following discussion outlines a number of sampling approaches that can be used in slow onset emergencies.

a. Simple Random Sampling

Random sampling provides the best chance of drawing a representative sample from the sampling frame, and at a minimum of cost. A simple random sample is the most straightforward method of random sampling and is often used in refugee camp settings. Here, each individual has an equal and independent chance of being selected as part of the sample – equal since there is no bias that one person will be chosen rather than another, and independent because the choice of one person does not bias the researcher for or against the choice of another.[68] A simple random sample can be done in two ways – with and without replacement. The most common method is without replacement.

As desirable as it is to always draw a simple, random sample it is rarely practicable in development settings due to the disbursed nature of households, especially in rural areas. One would have to accept the probability of sampling any household in the population, despite its location (imagine this in Nepal!).

b. Stratified Random Sampling

A stratified random sample is a particularly useful sampling approach when needing to sample individuals from a variety of predetermined subgroups. Stratification may be used where separate estimates are desired for the sub-populations. However, it should be noted

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[67] Although slow onset emergencies are not under the same time constraints as quick onset emergencies, Staff available to do the assessments may still not have much time to devote to the assessment.

[68] Salkind, Neil J. 2000. Exploring Research. Upper Saddle River, New Jersey: Prentice Hall.

that if estimates at the same level of confidence and precision are desired for each sub-group, the sample size must be applied to each strata.

To draw a stratified random sample, individuals (or the sampling unit) are divided into non-overlapping sub-groups or strata. Simple random samples are then drawn from each of these forming a larger sample.[69] If a sample can be selected that is as close to being representative of the target population, then any observations one makes regarding that sample should also hold true for the population.

One obvious shortcoming of the stratified sample is that the investigator must have detailed and accurate information about key variables in the population and the justification for stratification must be known in advance.[70] Oftentimes this information is unavailable and it may be impractical to expect to accurately characterize the relevant features of a specific population.[71]

c. Cluster Sampling

Cluster sampling improves on stratified random sampling in terms of cost, but with a risk of increasing sampling error. A cluster sample is where the elements are all of the members of randomly selected sampling units, each of which is a cluster or collection of elements from the population sampled. Cluster sampling is most often used when a sampling frame that lists elements is not available, or when the list is likely to be highly inaccurate. Cluster sampling is also used when the resources for conducting the survey prohibit the application of simple random sampling because the units are highly dispersed, usually in the geographical sense, but this degree of dispersion could also be in reference to time.[72] The best approach to use when a cluster is impossible to reach is to replace the cluster in question with another cluster in the same general area and with similar characteristics. By limiting the scope of the sample frame construction and fieldwork to a subset of population to be covered, the cluster thus provides a way to effectively control field costs.[73]

Cluster sampling can be useful when assessing emergency vulnerability impacts on various groups in a complex emergency. Cluster sampling is most suitable for small populations from geographically dispersed areas when the surveyor wants or needs to reduce costs.[74] Each geographically dispersed group, or cluster, represents a subset of the population. While cluster sampling is time effective, one must make sure that the units are homogeneous enough such that any differences in the unit itself might not contribute to a sampling bias.[75]

d. Multi-stage Designs

Often it is necessary to have a multi-stage sampling design that incorporates stratification, clustering, and random selection of households. The overall design effect is reduced for

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[69] Ibid.

[70] Carletto, Calogero. 1999.

[71] Nation, Jack R. 1997. Research Methods. Upper Saddle River, N.J.: Prentice Hall.

[72] Schofield, William. "Survey Sampling." *In* Design Issues.

[73] Magnani, Robert. 1997.

[74] Watts and Halliwell,eds., 1996.

[75] Salkind, Neil. 2000.

stratification but increased for clustering. In these cases the overall design effect is greater than one but less than two.

B. Other Sampling Approaches Used in a Variety of Emergency Contexts

In situations where it is difficult to draw a proper sampling frame due to time constraints or because of access constraints, or when measurement objectives dictate, non-probability sampling techniques are often used (these are discussed below). When monitoring impacts in a complex emergency setting, it is difficult to draw a representative random sample since there is rarely a pre-existing sampling frame. In addition, population size may not be known and there may be few easily identifiable clusters within the population, with sizes that are not known.[76] In essence, it will be very difficult to design a sampling scheme that would achieve true statistical validity.

a. Purposive Sampling

Purposive sampling is used in a variety of emergency contexts. It involves selecting communities, households or individuals that have specific characteristics that are deemed critical to capture in an emergency needs assessment. For example, communities consisting of specific ethnic groups or with different access to services; households from different wealth ranks and/or individuals with different characteristics such as gender, age, or educational levels might be deemed important in an emergency needs assessment. Purposive samples emerge from experience in understanding the context. Purposive sampling approaches are often used by NGOs in food needs assessments (e.g. food economy approach).

In conducting livelihood assessments, many NGOs use a combination of random and purposive sampling, the latter being used to ensure that the diversity of conditions present in the livelihood zone are captured in the sample. Some examples of criteria used in their purposive sampling include nearness to roads, access to markets, ethnic differences, livelihood strategy differences, and agro-ecological differences. After these criteria have been developed, they then place a number of communities found in the region into categories that represent the criteria. By stratifying the communities along the criteria, it ensures that certain characteristics are found in the sample.[77]

> An example of combining purposive sampling with random sampling is being implemented in Rapid Food Security Assessments carried out by WFP in Kenya. Teams visit designated livelihood zones believed to be food insecure based on secondary data and early warning information. To get a representative view of conditions within the livelihood zones, a list of locations is obtained and random communities are selected from this list. The teams aim to conduct a minimum of four community interviews per livelihood zone per day. With two teams working in each district, working six days a week, approximately 36 community interviews can be conducted. More interviews are conducted in livelihood zones where the largest proportion of the population resides. Thus the

[76] Maxwell, San, Ben Watkins, Robin Wheeler, and Dekha Sheikh. 2002. The Coping Strategy Index: Field Methods Manual. CARE and World Food Programme.

[77] TANGO International. 2002. Household Livelihood Security Assessments: A Toolkit for Practitioners. Atlanta: CARE PHLS Unit.

sampling of the livelihood zones should be based on designated livelihood differences within a district, the proportion of the population living in each livelihood zone and the current knowledge of food security conditions.[78]

b. Quota Sampling

Quota sampling is useful in subdividing groups in a complex emergency context. Quota sampling involves dividing a target population into subgroups, then choosing individuals from each subgroup until the designated quotas have been filled. Selection of the subgroup samples may or may not be based on the proportion that each subgroup occupies in the whole target population, as in systematic random sampling.[79]

One reason quota sampling is used frequently is to reduce costs, but also the method has intuitive appeal to certain survey situations.[80] Quota sampling has the advantage of making the non-random sample more representative of the target population. It some situations it may be difficult to locate full subgroup quotas because some people may be inaccessible for the survey resulting in a biased sample.

c. Snowball and Dendritic Sampling

Snowball sampling is especially useful as a cascading key informant interviewing technique in a rapid onset emergency context. If the surveyor is unable to contact potential respondents because they are transient or their activities curtail their availability, the snowball sampling method can provide a starting point from which to get information. Snowballing involves contacting one or two informants to start. These initial contacts then supply names and contact information of other key informants. When surveyed, this second group may lead, in turn, to other contacts. In this way, one can build up a reasonably large, non-random sample.[81]

Dendritic sampling is a type of snowballing approach that can be used in rapid onset emergencies that takes advantage of social networks to gather information quickly. The key informants are chosen based upon their networks of contacts with other individuals dispersed across the region in which information needs to be gathered. The regional key informant aggregates the information up from key informants living in other areas, making it possible to obtain information pertinent to the needs assessment in a rapid manner. For example, a regionally based key informant who has good contacts with tribal leaders or district officers can develop a vulnerability picture in a very timely manner. This information needs to be checked and verified in follow-up assessments.

Annex 1 summarizes the different types of probability and non-probability sampling strategies that have been discussed, when they should be used, and some of the advantages and disadvantages of each in conducting emergency needs assessments under an entire range of conditions.

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[78] WFP/VAM-Kenya. 2003. Field Assessment Handbook: Rapid Food Security Assessment Missions in Kenya. Nairobi. June.

[79] Watts and Halliwell, eds., 1996.

[80] Schofield, William. "Survey Sampling." *In* Design Issues.

[81] Ibid.

C. The Lot Quality Assurance Sampling (LQAS) Method: An Alternative Sampling Approach in Emergencies

Originally developed in the 1920s to monitor the quality of industrial production output, Lot Quality Assurance Sampling (LQAS) involves a random sampling method that could be applied in emergency needs assessments. LQAS could be useful in a rapid onset emergency context given its low sample size requirements, its potential to generate specific conclusions and relatively high quality information, the low cost of application, and the low level of skills necessary to use the method.[82] Within a rapid onset emergency, LQAS assessment sampling has the potential to generate data quickly that can then be used to make timely decisions about targeting. Within a slow onset emergency, the information generated from an initial LQAS assessment could also serve to focus and target follow-up qualitative surveys in vulnerable or food-insecure localities.

One possibility for how the LQAS method could be adapted to the emergency needs assessment context would involve identifying a core set of proxy indicators, converted into dichotomous variables that would comprise an initial survey to be conducted quickly. Possible indicators for this survey might include level of food availability in markets (adequate, inadequate), diet diversity (below 4 food items, above 4), and incidence of wasting (below 10%, above 10%). Each of these variables would be dichotomously scored. All of these data would then be compiled and analyzed to indicate whether a particular area is vulnerable or not. WFP's Pilot Study conducted in Kenya in 2001 for improving vulnerability analysis used a similar method in the use of secondary data.[83] The process involved choosing 18 variables that represented the dynamics of access and availability to food in addition to three outcome indicators. The overall goal of the secondary data analysis was to analyze these variables as a set to determine what they collectively say about chronic food insecurity.

While the original LQAS method requires a small sample size, applying this method to an emergency situation would still be a challenge. One possible sampling strategy might be to map out market networks and their catchment areas and to randomly sample within these areas.

IV. The Coping Strategy Index: An Alternative Method for Capturing Vulnerability

The Coping Strategy Index (CSI) is an inexpensive, easy-to-administer tool useful as an early warning indicator of impending food crisis or as an assessment of vulnerability during an emergency needs assessment. CSI measures coping strategies as a behavior response to transitory food insecurity. During food aid needs assessments the tool serves to identify areas and population groups where the needs are greatest.

The CSI is applied as a two-step process. A participatory rapid appraisal process is used to tailor the CSI concept to the local situation, inquiring about the relative severity of different consumption coping strategies within that context and the nature of relationship between strategies in order to weight them (e.g., linearly more severe, exponentially, etc.). This method employs purposive sampling methods in qualitative data collection to inform the survey instrument to be used in the probability sampled household survey.

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[82] Valadez, Joseph J. and Gilles Bergeron. 2002. Recommended Sampling Plan for Food Monitors of USAID/Haiti Food for Peace Activities. Prepared for the Food and Nutrition Technical Assistance (FANTA) project.

[83] Haan, Nicholas, Farmer Graham and Robin Wheeler. 2001. Chronic Vulnerability to Food Insecurity in Kenya. Rome: WFP.

Following the qualitative data collection, a typical household survey using 2-stage probability sampling is used to quantify the degree to which households are employing various strategies. As a rule of thumb, several sample size options exist for the second exercise, offering cheaper alternatives by compromising the predicted precision of the CSI score estimates.[84] Thus this approach combines sampling methods to meet dual measurement objectives a) an understanding of how people interpret the severity of various coping strategies they employ and b) a prevalence of relative food insecurity for comparison between groups within a shared coping strategies area or within a group overtime.

One problem with the cross-sectional use of CSI is that it is a relative score and there is not a particular value that corresponds with a threshold for food secure/food insecure. Since it is tailored to each context, defining a universal threshold score is problematic. Similarly, it is difficult to make comparisons between places given the local tailoring of the tool. It can, however, provide a cross-sectional comparison between groups within a particular place and provides a tool for time-series comparisons.[85]

V. Conclusion

Depending on its complexity, an emergency situation necessitates some significant re-thinking about how needs assessments are conducted. The most basic of considerations – the measurement of objectives, the target population, and the overall study design – require adjustments from conventional methods used in an emergency context. Sampling approaches and implications for their use in emergencies are critical elements in the design of an assessment and can have great impact in terms of identifying appropriate interventions and in targeting issues.

The following list of problem areas identifies critical issues that must be addressed as they serve as the foundation from which any sampling method in an ENA is devised:

- Defining *measurement objectives* lays the foundation for the assessment process and is therefore paramount to the process of identifying specific research questions as well as indicators, which in turn, dictate allowable sampling error, minimum acceptable level of confidence, and minimum required sample size. If the measurement objectives are not clearly delineated, designing an appropriate sampling strategy will be difficult.
- In the emergency context, be it rapid or slow onset, having *quality secondary data* available in formats that are fairly easy to use and understand, is critical to the process of determining one's research population and universe, and degree of vulnerability. In some cases, good data are available but they have been collected in ways that make them difficult to interpret. If secondary data are not available, gathering information through key informants is the norm but this process involves time, resources and labor.
- Data collection efforts are not always coordinated between and within agencies and NGOs. This dilemma ends up wasting valuable resources but also restricts the level of data analysis one can ultimately perform. In some cases today, assessments are conducted using at least several different instruments. There may be anthropometric surveys conducted on children, food security assessments on households and field visits to address environmental health concerns. Multi-sector assessments, for example, where different types of information are available but have typically been gathered on different populations, or using different units of analysis, make it difficult to analyze

[84] It should be noted that for purposes of statistical rigor, and the ability to draw inferences, the 20X20 cluster design is the minimum acceptable sample size. Other forms of sampling may yield more indicative information but not statistical significance.

[85] Collins, Greg. 2003. Personal communication. WFP.

above a descriptive level. Different sampling strategies by population or unit complicate the matter further. Exploring possible mechanisms for *coordinating efforts between agencies in reference to data collection* would significantly improve inferences that could ultimately be drawn.

- Defining the population and the universe are critical to the process of achieving a representative sample that can then be extrapolated beyond the sample, but there may be severe practical or logistical constraints in using the universe or population that is desired. Exploring means for better accessing *the desired universe and frames*, or exploring alternative frames for some of the more common types of emergency contexts, could provide significant value added to current sampling methods.
- There does not yet exist much *consensus on methods for sampling* in the emergency context. Designing an adequate sampling strategy for a particular emergency setting can be a complicated process and many field staff do not have the technical skills to devise the initial design, and in some cases, to execute the design in the field situation. Working toward consensus on some basic sampling issues (e.g., acceptable sampling error and level of confidence, acceptable level of representativeness) and providing this information efficiently to those staff that need it would also strengthen the assessments, particularly in reference to targeting, data reliability and validity.
- It is impossible to recommend a blanket sampling approach, but rather measurement objectives dictate the ideal sampling approach (that is probability sampling for some, non-probability for others) and that other constraints dictate the degree to which we must deviate from the ideal.

Annex A: Sampling Strategies: Advantages and Disadvantages

Sampling Type	Description	When to Use it	Emergency Setting	Advantages	Disadvantages
Probability Strategies					
Simple Random Sampling	Each member of the study population has an equal probability of being selected.	When the population members are similar to one another on important variables	Slow onset	• Ensures a high degree of representativeness • Simple, self-weighting • Sample size requirement is often small (e.g. design effect is 1)	• Time consuming • Resource intensive • Sampling frames may not be readily available or incomplete • Sample households may be very dispersed • Members of a sub-group of interest may be under-represented
Stratified random sampling	Each member of the study population is assigned to a group or stratum according to relevant criteria, next a simple random sample is selected in each group.	When the population is heterogeneous and contains several different groups, some of which are related to the topic of study.	Slow onset	• Ensures a high degree of representatives of all the strata or layers in the population. • Allows sub-population analysis • Sampling is more likely to reflect the population, improves efficiency	• Time consuming • Resource intensive • Sampling frames may not be readily available or incomplete • Must guard against recurring patterns within the sampling frame (e.g., lists arranged by age, sex) • Samples may be very dispersed
Cluster sampling	Each member of the study population is assigned to a cluster, then clusters are selected randomly and all members of the selected cluster are included in the sample.	When the population consists of units rather than individuals.	Slow onset Nutrition Surveys Assessing emergency vulnerability impact	• More time efficient • Does not require listing of full population • Less geographical spread of sampling units and therefore saves and convenient	• Possibly, members of units are different from one another, decreasing the technique's effectiveness • Increases sampling error • Clusters may not be representative

Non-probability Strategies					
Quota sampling	Sample selected that yields the same proportions as the population proportions on easily identified variables.	When strata are present and stratified sampling is not possible	Complex and rapid onset	• Ensures some degree of representativeness of all of the strata in the population	• Degree of generalization is questionable
Snowballing or Dendritic Sampling	Respondents identify additional members to be included in the sample.	When time and resources are limited and inaccessible research population	Rapid onset	• Effective means for identifying sources for qualitative information	• Degree of generalization is questionable
Purposive Sampling	Sampling unit is purposively chosen based upon a desired characteristic	Qualitative surveys used to capture in-depth understanding of food insecurity and vulnerability	Can be used in all types of emergencies	• Captures variability of vulnerable groups within the targeted area.	• The degree of generalization is questionable

Adapted from: Watts, Simon and Lyndsay Halliwell 1996 and TANGO International 2002.

Annex B: Calculating Sample Size and Sampling Error

for a Simple Random Sample when Estimating Proportions

I. The following equation shows the *sample size calculation* for simple random sampling for a 95% confidence level (binomial distributions).[86]

$n = (z/\text{standard error})^2 (p) (1-p)$	
n	= sample size
z	= standard score corresponding to a given confidence level (z =1.96 for the 95% confidence level)
p	= expected proportion with the characteristic
(1-p)	= expected proportion without the characteristic

Example: The CARE Malawi team planning a health survey in Dedza does not have any estimate on the contraceptive use in Dedza, which they want to study. They therefore assume a 50% - 50% distribution or the "worst case scenario' (p=+0.5). They want the results to have a maximum of $\pm$7 standard error at the 95% confidence level. The calculation is:

$n = (1.96/0.07)^2 (0.5) (1-0.5)$

$n = 196$

The sample size required is 196 women of reproductive age.

In the Dar es Salaam Urban Livelihood Assessment conducted in 1997 by CARE, the general rule of thumb that 200 children is an absolute minimum sample size for a nutritional assessment was amended given the prevalence rate of stunting. The prevalence of stunting in Dar es Salaam at the time was 30%, and given that the assessment was targeting only low-income areas, the inter-group differences may not be very large. Given an average prevalence of 30%, and an inter-group difference of 10%, this would require group sizes of roughly 300 children per group.[87] In essence, the sample size for the nutrition survey was increased to the maximum possible permitted by budgetary constraints in order to permit the greatest possible number of inter-group comparisons within the sample. These were based both on geographic area differences and on livelihood group differences.

Sample size and standard errors for simple random sampling for the 95% confidence level.

[86] Source: TANGO International. 2002. Guidelines to CARE Malawi for the Design of Future Baseline and Evaluation Studies. Tucson, AZ: TANGO International.

[87] TANGO International. 2003. Guidelines for WFP Assistance in Urban Areas. Tucson, AZ: TANGO International.

Sample size	Binominal percentage distribution				
	50/50	60/40	70/30	80/20	90/10
	Standard error				
100	10.0	9.8	9.2	8.0	6.0
200	7.1	6.9	6.5	5.7	4.2
300	5.8	5.7	5.3	4.6	3.5
400	5.0	4.9	4.6	4.0	3.0
500	4.5	4.4	4.1	3.6	2.7
600	4.1	4.0	3.7	3.3	2.4
700	3.8	3.7	3.5	3.0	2.3
800	3.5	3.5	3.3	2.8	2.1
900	3.3	3.3	3.1	2.7	2.0
1,000	3.2	3.1	3.0	2.5	1.9
1,100	3.0	3.0	2.8	2.4	1.8
1,200	2.9	2.8	2.6	2.3	1.7
1,300	2.8	2.7	2.5	2.2	1.7
1,400	2.7	2.6	2.4	2.1	1.6
1,500	2.6	2.5	2.4	2.1	1.5
1,600	2.5	2.4	2.3	2.0	1.5
1,700	2.4	2.4	2.2	1.9	1.4
1,800	2.4	2.3	2.2	1.9	1.4
1,900	2.3	2.2	2.1	1.8	1.3
2,000	2.2	2.2	2.0	1.8	1.3

Adjustments for design effects*

Sample size is easy to calculate for a simple random sample (using the formula above), but it gets more complex when the study design has multiple stages (as most do). You can reasonably estimate the required decrease or increase in sample size by using the following table. If you do this while planning your sampling strategy it will help you to make decisions.

Sampling method	***Adjustment range***
Stratified sampling	0.50 to 0.95
Cluster sampling	1.50 to 3.00
Multistage sampling	1.25 to 1.50

* Based on world-wide survey experience

As can be observed in the above table, the design effects for cluster sampling vary from 1.5 to 3, which of course has an important implication for sample size, cost and time needed to complete the fieldwork. For cluster sampling the exact design effect depends on the number, size and homogeneity of clusters. As a general rule, it is better to have a larger number of small-sized clusters than a small number of large-sized clusters.

Example: Adjustment for design effect

CARE Malawi decided to use a stratified cluster sampling design and the sample size of 196 has to be adjusted, following the advice of an expert, by 1.3.

n = 196 x 1.3

n = 255

Adjustments for non-response

Most common reasons for non-response:

- Inability to contact the respondent (e.g. respondent not at home at the time of the survey)
- Inability of respondent to complete the interview (e.g. respondent is ill, interviewer does not speak respondent's language)
- Refusal of respondents to answer the survey questionnaire

There are certain techniques to minimize non-response. Non-response has implications for the sample size calculation. If, for example, a response rate of 90% is expected, than the sample size will have to be adjusted by 1.10.

Example: Adjustment for non-response

CARE Malawi adjusted the sample for non-response, expecting that about 10% of the selected sample of the target population would not be found at the time of the survey.

n = 255 x 1.10

n = 281

Sampling error

Standard error for 95% confidence level.

$$SE = 2 \times \sqrt{(p \times (1-p) / n}$$

SE	=	standard error of the mean
p	=	proportion with the characteristic
(1-p)	=	proportion without the characteristic
n	=	sample size

II. The following factors should be taken into consideration when calculating *sampling error*:

- Roughly speaking, to calculate sampling error one uses the square root law – to halve the sampling error one must quadruple the sample size.
- Sampling error depends not only on the sample size but also on the sampling design. A cluster design increases the sampling error; a random stratified design reduces it.
- Sampling error also depends on the estimator used. By including external information into the estimate, one can generally reduce the sampling variance. The assumption is made here that the estimator for any mean, percentage, or rate in the universe is simply the sample mean, percentage, or rate found in the sample, whereas if one wants to use the sample to estimate a total, one scales up the sample total in proportion to the sampling fraction. For such estimators, the sampling bias is zero, and therefore the only sampling error is the random error component.
- Finally, sampling error depends not only on the sample but also on the universe sampled. Specifically, if there is wide variation in the universe, sampling error will be high for a given sample size and design; if all units in the universe were equal, there would be zero sampling error and a sample of a single unit would suffice to give perfect precision.[88]

[88] Source: Casley, Dennis J. and Krishna Kumar. 1988. The Collection, Analysis, and Use of Monitoring and Evaluation Data. Baltimore: John Hopkins Press.

Example: Standard error calculation

CARE Malawi found in their study that the contraceptive prevalence rate in Dedza was of 17%. The actual number of respondents to the survey questionnaire was of 248.

$$SE = 2 \times \sqrt{0.17\ (1-0.17)\ /248}$$

$$SE = 2 \times \sqrt{0.1411/248}$$

$$SE = 2 \times \sqrt{0.0005689}$$

$$SE = 4.7$$

The survey had initially calculated a sample size and error based on the "worst case scenario". Now that the results are known, the error estimation for current contraceptive use is $\pm$ 4.7. This means that CARE Malawi can be 95% sure that the current contraceptive use in Dedza lies between 12.3 and 21.7.

Non-sampling errors

- Imprecision in the definition of the study population
- Errors in survey design
- Non-response
- Measurement errors (e.g. poorly worded questions and response choices, inadequately trained interviewers)
- Errors in data processing

Annex C: Calculating Sample Size for a Multi-Stage

Area Probability Design Comparing Means

The Rural Livelihood Assessment conducted recently in Eritrea by CARE, WFP and ERREC used a multi-stage area probability sampling design. The sample size was calculated using standard methods based on variance estimates of key continuous variables of asset and income, from previous household surveys in Nepal, Madagascar and Indonesia.[89]

The formula used for calculating sample size for a multi-stage probability sample was:

$$N = D[Z_\alpha + Z_\beta)^2 * (sd_1^2 + sd_2^2)/X_2 - X_1)^2]$$

N = required minimum sample size per strata

D = design effect for multi-stage sampling

Z_α = the z-score corresponding to the selected level of confidence desired to be able to detect that an observed change of magnitude ($X_2 - X_1$) would not have occurred by chance (statistical significance)

Z_β = the z-score corresponding to the selected level of confidence desired to be able to detect an observed change of magnitude ($X_2 - X_1$) if it indeed exists (power)

sd_x = estimated standard deviations for current and future survey rounds of a key variable

X_1 = the estimated level of an indicator at the time of the baseline survey

X_2 = the expected standard deviation of the same indicator at the time of the future survey

Stage 1 of the sampling involved the stratification of geographic areas based on sampling zones. Each sampling zone was chosen based on 3 available indicators.

Stage 2 involved the selection of Kebabis with probability proportional to size (PPS). Ten Kebabis were selected using PPS per zone.

Stage 3 involved a random selection of villages, or clusters, within each selected Kebab. Two villages were selected within each Kebab.

Stage 4 involved a random selection of households within each selected village

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[89] TANGO International.2003, Eritrea Rural Livelihood Security Assessment: report of the Findings. CARE, WFP and ERREC.

Annex D: Nutritional Surveys and Surveillance Systems

A technical consultation addressing nutritional surveys and surveillance brought together key players from the humanitarian community and technical expertise in nutrition and monitoring. Given the critical need for close monitoring of the immediate impact of the HIV/AIDS crisis on malnutrition, the group concluded that nutritional surveillance is necessary to better inform programming decisions, to monitor the condition of the population, to reduce the high level of resources required to undertake district level surveys and to build local capacity for monitoring nutritional status as an integral part of broader initiatives to monitor vulnerability.[90]

The consultation team recommends a household-based nutritional surveillance system comprised of repeated representative surveys based on cluster sampling with clusters selected with probability proportional to size (PPS). A sample sufficiently large to provide estimates at the local as well as national level for each country is most ideal. Although the conventional standard for nutritional assessments is the 30 x 30 survey (30 children in each of 30 clusters), the cost, time and effort required to undertake these surveys is considerable[91].

The technical team agreed that the surveillance needs to be able to detect small changes in nutritional status, to analyze relatively small areas, to have a relatively short time frame between data collection, and to maintain a standard level of confidence of 95%. Based on sample size calculations, they recommend a minimum sample of 200 children from each local area and no fewer than 20 clusters should be used in each local area.[92] (See Section III and Annexes 2 & 3 for detailed discussions of sample size).

The Badghis Nutritional Survey

This nutritional survey was conducted recently in Afghanistan and used a cluster sampling method with the PPS method. This strategy offers a more representative sample than the EPI methods commonly recommended which biases household selection toward the center of the village, and in so doing, introduces serious bias into measures of health and nutrition.[93]

Although the Badghis Study used the traditional 30 x 30 nutritional cluster survey (30 children in each of 30 clusters), it is sometimes not necessary and probably wastes resources and time if extreme precision is not needed. The Badghis Study chose 30 clusters because with fewer clusters the design effect tends to rise rapidly. While more clusters is generally better, adding clusters may not provide enough additional precision to make the extra logistic efforts worthwhile. When there are great distances between clusters as there was with the study in Afghanistan, the resources and time spent to collect data were costs not outweighed by the

[90] WFP. 2003. Technical consultation on nutrition surveys and surveillance in southern Africa, Johannesburg, April 8-9, p.1

[91] Standard practice is to use 30x30 for nutrition surveys carried out for WFP. Divergence from the 30x30 sample should only be done where a statistician with good knowledge of sampling design (and ramifications of sample size reduction) is involved.

[92] Ibid, p.5

[93] USAID. 2002. Standardized Monitoring and Assessment of Relief and Transitions (SMART). Washington D.C.: USAID.

benefit of the larger sample size. If one wants to further decrease design effect, choosing more numerous and smaller clusters increases precision as well.[94]

The sampling unit was the household but an important objective was to collect data on children under five years of age. In this case, the assumption was made that each household had an average of 1.3 children < five and enough households were then selected to obtain data on the target number of 534 children (an average of 18 children/cluster).[95]

Annex E: Rapid Rural Assessments

A variety of NGOs are using and developing a number of different approaches to evaluate the food security situation in emergency contexts. One persistent issue concerns the trade-off between collecting information quickly, that can also be analyzed efficiently, and having data that are representative of a population larger than the sample. In a RRA, one tends to rely on previous experience, common sense and judgment of a particular case rather than clearly defined statistical principles. It is also rarely possible to define the sample frame and sample size based on theoretical questions alone, rather, the more practical questions of time, manpower, access, logistics and cost tend to be dominant and it is often these that determine which areas can be visited and how large the sample size will be.[96]

Several NGOs including Save the Children-UK are using the Household Food Economy Analysis (HFEA) to estimate how a specified event (a hazard or shock) such as crop failure or insecurity or displacement affects access to baseline sources of food and income.

The key issue of representativeness must be considered here as well. In a RRA this is assured through purposive sampling – the selection of community representatives for interview based on known or pre-determined characteristics. These representatives are defined through a combination of secondary data analysis and information from key informants. The primary unit for sampling in the HFEA is the Food Economy Zone (FEZ). Practical experience indicates that for a baseline assessment, 8-12 interviews should be completed for each socio-economic group per FEZ. This sample size normally entails visiting between 8-12 villages per FEZ.[97]

The defined population varies with the use to which the analysis is put. Interview locations are usually chosen to include as much variation as possible. Wealth groups are usually self-defined by the community. Interviews are rarely random, but rather, extremes are chosen. Interviews

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[94] The Badghis Report makes an important comment about sampling children under five. If one has to choose to select only one child per household then the child still needs to be selected randomly. This can be done easily by recording all eligible children in the household and then perform a statistically weighted analysis. In this situation, the child selected represents all the eligible children in that household and therefore must be given more statistical weight during the data analysis. Their recommendation is that it is much easier to actually sample all children under five in selected households and this strategy should be used if at all possible. The data analysis is easier, the sample is no longer biased toward single children, and it does not substantially increase the clustering which increases the design effect.

[95] Ibid.

[96] Lawrence, Mark. 2002. Food Security Analysis Field Kit. World Food Programme in sierra Leone Tchnical Support Unit.

[97] Ibid.

are conducted with representatives from the various wealth groups and then the interview refers to a "typical" household in that group.[98]

Because their food security programming requires focusing on the community, Catholic Relief Services uses the food security pyramid which depends on a group-oriented participatory approach. Oxfam's approach to food security in emergencies is concerned with longer term issues of supporting livelihoods and self-sufficiency, as well as the short term issues of immediate food needs. Their analysis uses data gathered from both secondary and primary sources, including key informant interviews, food and crop assessments, field visits, household visits, direct observations, and anthropometric surveillance based on sentinel sites.[99]

CARE's Livelihood Security approach is similar to Oxfam's and the HFEA method. In a quick onset emergency, CARE recognizes there are constraints on time and resources and uses the rapid assessment depending more on secondary data. Once CARE decides in which sector to intervene, they conduct a more detailed assessment on that particular sector.[100]

While drawing on various existing approaches to food security and livelihoods analyses, the Action Against Hunger (AAH) approach is a framework UNICEF uses for their nutrition assessments; these assessments are done in two stages – a nutrition causal analysis (ideally conducted in conjunction with an anthropometric survey) followed by a more in-depth technical assessment of a particular sector in need. They specifically include spatial, temporal and household analyses in their food security analyses.[101]

In Kenya, WFP used three layers of sampling to conduct their study addressing vulnerability to food insecurity – (1) secondary data analysis (SDA) techniques were used to identify and characterize the more vulnerable districts from which Community Food Security Profiles (CFSP) were constructed, (2) livelihood zones were identified within each district, and (3) within each community, focus group interviews were conducted including a "typical group" which was aimed at mixed representation.[102]

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[98] WFP. Core Components of Emergency Food Needs Assessment, Part Two: Needs-based Approaches to Food and Nutrition Assessments. World Food Programme: Office of Humanitarian Affairs.

[99] Young, Helen. A Livelihoods Approach to Food Security in Emergencies. Oxfam.

[100] Frankenberger, Timothy. CARE International's Livelihood Security Approach. Atlanta: CARE.

[101] Mason, Francis. AAH: Approach to Food Security Assessments. Action Against Hunger-UK.

[102] Haan, N., G. Farmer and R. Wheeler. 2001. Chronic Vulnerability to Food Insecurity in Kenya-2001: A WFP Pilot Study for Improving Vulnerability Analysis. Rome: WFP.

Annex F: Urban Assessments

Tailoring assessment and analysis to an urban population poses a challenge to the traditional approaches of many development agencies. The skills that enable the urban poor to survive are not necessarily conducive to a static concentration of assistance in a fixed location. Complicating sampling for urban emergency needs assessments are the following issues:

- There is no single definition for what is urban. Many definitions are unclear because many countries define "urban" by local government status, and in some cases, municipal boundaries include only the central city areas. Population size may be used to allocate state funding, and the size of city populations may be a political as well as a demographic issue.[103]
- Distinct poor areas are often difficult to locate because the poor are mixed in with better-off households in the same neighborhood. This distinction must be understood as a continuum rather than a precise distinction, and one cannot assume that densities throughout the periphery will necessarily be lower than in inner-city areas.
- Livelihood opportunities are not necessarily neighborhood-based and may exist in other parts of the city making it difficult to select parts of the city for data collection based on livelihood strategies.[104]
- The significance of transition should also be noted and the difficulties of rural to urban transition may be equally found here. Some settlements that were on the periphery of the city become "inner city" areas as the city expands and partial infrastructure becomes overloaded with densification.[105]
- Migration from war can result in large urban centers with a particular set of needs, and arguably, highly vulnerable populations. Many displaced people choose to locate (sometimes illegally) in existing human settlements but settle in a dispersed fashion making them particularly difficult to find.[106]

The size and diversity of the urban environment complicates the ability of traditional rapid assessment methods to generate a reliable, representative picture of the urban poor in a short amount of time.[107] The most critical sampling challenges faced by CARE in their urban assessments in Bangladesh and Tanzania concerned the overlay and diversity of communities and external validity. City dwellers oftentimes belong to many different "communities" which frequently extend beyond the geographical. These communities may be based on gender, religion, ethnicity or occupational groups. In urban areas, households can link with many different sorts of communities fairly easily and in doing so, access many connections and resources outside geographical, often arbitrary, administrative boundaries.[108]

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[103]Mitlin, D. 2003. *The Economic and Social Processes Influencing the Level and Nature of Chronic Poverty in Urban Areas*. Presented at the 'Staying Poor: Chronic Poverty and Development Policy'. University of Manchester 7-9 April.

[104] TANGO International. 2002. Household Livelihood Security Assessments: A Toolkit for Practitioners. Atlanta: CARE USA.

[105] Mitlin, D. 2003.

[106] Ibid.

[107] Garrett, James L. and Jeanne Downen. 2001. Rapid Assessments in Urban Areas: Lessons from Bangladesh and Tanzania. Washington D.C.: IFPRI.

[108] Garrett, J. and J. Downen. 2001.

Additionally, the mobility of households and the rapidity with which economic development or decline may affect a region, a city or a neighborhood, can make it difficult to generalize findings. In a dynamic urban environment, even statistically representative quantitative surveys may not be generalized to other neighborhoods, other cities or across time.[109] In Bangladesh and Tanzania, CARE used administrative limits of the cities as the boundaries of the study area and then purposively chose sites for quantitative and qualitative surveys.

Ruel et al discuss the methodology used in their study of childcare as an input into child nutrition in Accra. The research was carried out in three stages, the first two of which used traditional methodologies. The third stage involved an observational study of a small sub-sample of households to gain a more in-depth understanding of childcare that could not be explored through recall techniques. Each method provided unique information but also enriched and informed interpretation of other study components.[110]

In preparing to conduct a rapid urban assessment, WFP recommends the following in reference to site selection and sampling:
Site selection should be based on secondary information, the knowledge of staff and partners about the area, and the objectives of the study. A matrix of desired characteristics and potential sites should be developed to help ensure a reasonably representative sample. The aim in this case is to work to ensure the highest degree possible of representativeness in reference to variation in livelihood systems, constraints and sources of vulnerability.

- Respondents for the qualitative component of the assessment should be deliberately selected for the key informant interviews and focus groups.
- The local guide who assists in the sampling process for the quantitative survey will also help identify informants and group participants.
- The sampling process for the quantitative survey begins by having local officials assist in a geographic mapping process to identify administrative units and divide them into clusters weighted for poor households and selecting two sites within each ward.
- Within these sites, a systematic random sample is drawn. WFP recommends a sample of 50 households within each site.[111]

[109] Garrett, J. and J. Downen. 2001.

[110] Ruel, Marie T., Margaret Armar-Klemesu and Mary Arimond. 2001. A Multiple-Method Approach to Studying Childcare in an Urban Environment: the Case of Accra, Ghana. Discussion Paper BRIEFS, Washington D.C.: IFPRI.

[111] TANGO International. 2003. Guidelines for WFP Assistance in Urban Areas. Tucson, AZ: TANGO International.

See also:

Key Issues in Emergency Needs Assessment
Volume I: Report of the Technical Meeting on ENA

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