THE PRACTITIONERS' GUIDE TO HEA

Chapter 4: Outcome Analysis

4 OUTCOME ANALYSIS

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This chapter is aimed at the practitioner who wants to become familiar with the steps and basic calculations involved in Outcome Analysis. It is not a comprehensive guide to Outcome Analysis, and does not take the practitioner through the details of the F.E.G. Single Zone Spreadsheet or the Integrated Spreadsheet. For more advanced practitioners and team leaders, this guidance can be found in the Team Leaders' Supplement. If you are reading this chapter, it is expected that you have already read through Chapters 1, 2, and 3 in the **Practitioners' Guide** and have participated in Baseline Assessment training. It is also assumed that you have been involved with the collection of baseline information in at least one livelihood zone.

After reading this chapter, practitioners should be able to describe both the theory behind and the basic calculations involved in the three steps associated with Outcome Analysis, including: the problem specification, coping strategies, predicted outcomes. They should be able to explain what is meant when practitioners say that HEA does not model behaviour; and provide an explanation for why certain coping strategies are not included in HEA Outcome Analysis. They should be able to fill out the Standard Calculation Format and complete the calculations therein. Practitioners should be able to detail which items go into the survival food, survival non-food and livelihoods protection basket. And it should be possible for the practitioner to enter into an informed discussion of the types of responses that might be reasonably associated with different types of deficits.

This chapter was co-authored by Mark Lawrence and Tanya Boudreau, with significant input from Penny Holzmann

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RELATED CD FILES

The CD that accompanies the **Practitioners' Guide** contains the following Annexes relevant to Chapter 4 found in the Team Leaders' Supplement Directory:

- **Annex A: Expandability – Calculations and Storage**
- **Annex C: The Integrated Spreadsheet**

RELATED TRAINING SESSIONS

The **HEA Training Guide** provides the following sessions relevant to Chapter 4:

MODULE 2: BASELINE ASSESSMENT

- *Session 6: The Reference Year*

MODULE 3: SEASONAL ASSESSMENT

MODULE 4: OUTCOME ANALYSIS

- *Session 1: Introduction to Outcome Analysis*
- *Session 2:Problem Specification and Coping Capacity*
- *Session 3: Introduction to the Single Zone Spreadsheet*
- *Session 4: Assessment of Non-food Needs*
- *Session 5: Linking Outcome Analysis to Response Analysis*
- *Session 6: Response Strategies – Switching Expenditure*
- *Session 7: Response Strategies – Expandability of Food and Cash Income*
- *Session 8: Problem Specification - Key Parameters*
- *Session 9: Problem Specification – Defining an Example Problem*
- *Session 10: The Single Zone Spreadsheet - Running the Example Problem*
- *Session 11: Planning the Response*
- *Session 12: The Integrated Spreadsheet*

INTRODUCTION

Outcome Analysis is the term used to describe the final three steps in HEA analysis. These steps are designed to produce a rational and defensible statement about the predicted effects of a hazard(s), or positive change (s) on household livelihood strategies (i.e. their ability to obtain food and cash income, and to acquire the non-food items they need to live).

Figure 1 and **Table 1**, below, serve as a reminder of the steps in HEA analysis, introduced in Chapter 1, and the reasons that each is required.

Figure 1. Steps in HEA Analysis

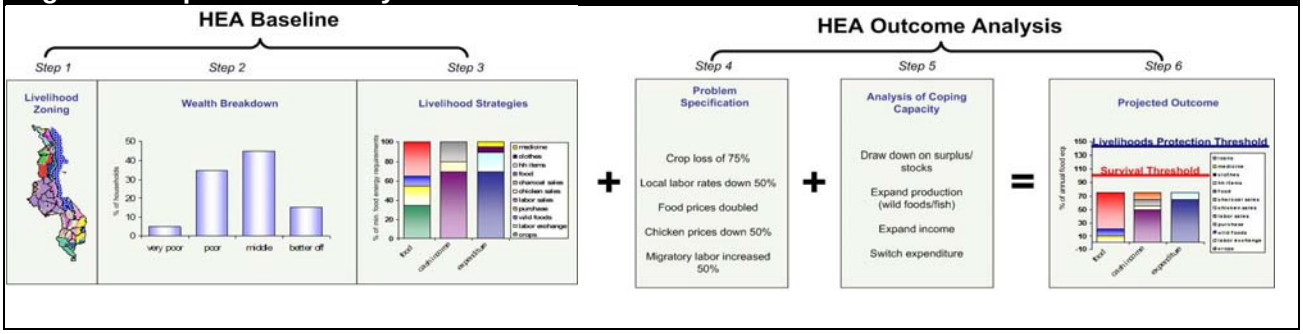


Table 1. Outcome Analysis steps with description and rationale

	Steps in HEA	What is it?	Why is it needed?
OUTCOME ANALYSIS	*Step 4. Problem Specification*	Translation of a hazard or other shocks into economic consequences at household level	It allows you to mathematically link the shock (or positive change) to each relevant livelihood strategy
	Step 5. Analysis of Coping Capacity	Analysis of the ability of households to respond to the hazard	It helps you to determine how to support people's own efforts, and to provide external assistance before households turn to damaging strategies; it highlights relevant indicators to monitor.
	Step 6. Projected Outcome	Prediction of the effects of the hazard in relation to a survival and livelihoods protection threshold.	It predicts whether and when assistance is needed to help people survive and/or protect their livelihoods. It also models the potential beneficial effects of proposed policies or programs.

The information that emerges from a baseline assessment is of use on its own for a wide range of applications, including poverty analyses and development planning (See Chapter 5 for more on this). However, in order to be of use in early warning work, scenario planning, emergency response planning, and other areas that require predictive estimates, baseline information needs to be combined with an analysis of hazards (Step 4 in **Table 1** and **Figure 1**), and households' coping capacity (Step 5 in **Table 1** and **Figure 1**). It is this process of combining baseline information with hazard and coping information in order to make predictive statements that forms the core of Outcome Analysis.

BACKGROUND

Food security assessment and analysis is most often conducted in order to provide decision makers with a basic set of information upon which to make choices about whether or not to provide assistance to a particular group of people in a particular location; what kinds of assistance to provide; when to start the program; when to end it; and how the assistance can be best targeted. One minimum requirement of this information is that it be provided early enough in a planning cycle to ensure appropriate actions can be taken. This means that to be of use for planning purposes, food security analysis needs to have a predictive capacity. Of course there are cases where a food security crisis is already occurring, with clear indications of stress on the population, and perhaps even signs of malnutrition emerging. But in these cases, the damage has been done, and aid will come too late if at all. The objective of HEA is to help prevent such crises, and the crucial steps in the analysis that allows for predictive work are those contained in the Outcome Analysis.

Being there in time

Outcome Analysis is the process by which information on a hazard (i.e. an event such as drought, insecurity or market dislocation) is combined with household economy baseline data to project likely future access to food and non-food goods and services at household level.

During the last dozen years, food security analysis has increasingly contained a strong livelihoods element. That is, the household has been taken as the point of reference, and analysis has been based on a systems approach that takes into account the economic operations of typical households.

Before this time, it was typical for food security analysis to be based on indicator approaches which typically used late, aggregate, or incomplete indicators. For instance, malnutrition indicators would be used to point to a food security crisis; but – as an example - malnutrition is both a late indicator, and an imprecise one. Malnutrition has multiple roots, and it is difficult to make a direct causal link between food insecurity and malnutrition without more context information. Another common food security conclusion that analysts would draw was that a drop in crop production necessarily meant that people would be food insecure in coming months. While crop production, as an indicator, has the advantage of being early enough to allow for preventive action, it does not always follow that a drop in production will lead to household food deficits. As discussed already in previous chapters, people rely on multiple options for obtaining food, and can increase reliance on alternative means if crop production is poor. Prices, as indicators of a food security outcome, are similarly inadequate: while a staple food price increase may indicate stress at the household level, it is difficult to interpret just how and whom it will affect without knowing who depends on purchase, to what extent and at what time of year.

Indicators vs Systems Approaches

A systems-approach to food security analysis aims to understand first the components that make up the local economy, so that the effects of a change in one part of the equation can be properly interpreted in another.

Indicator approaches are based on more generalised assumptions about causal relationships (e.g. production drop = food insecurity).

HEA allows us to appreciate elements which are crucial for a properly rounded view of food security but which are mostly invisible in official statistics. For instance, we are able to represent household cash income from casual employment or wood/charcoal selling or handicrafts; we can inquire into household capacity to adapt to economic stress, especially failed crop or livestock production; and we can appreciate household activities at different periods in the yearly cycle.

More recently, there has been a growing desire to broaden the analysis beyond food security to look at a wider range of possible interventions: for instance, cash as an alternative to food, and non-food assistance to complement responses that increase food availability and access.

A number of tools for carrying out HEA Outcome Analysis have emerged as a result of the need to take a more holistic view of livelihood patterns into account when making food security projections, and to craft the response to potential food security risks in non-food terms (such as cash, or in-kind alternatives such as salt, soap, or kerosene, etc.). The first and simplest tool is the Single Zone Spreadsheet, which allows the user to see the effects of one or more hazards on households' access to food and cash income, and the resulting impact on their ability to purchase a whole range of required goods. This analysis is done by livelihood zone, and enables the analyst to see effects on different wealth groups (i.e. poor, middle, and better off households) in the zone.

One of the challenges has been to incorporate this livelihoods-based perspective into large-scale sub-national or national analyses of food and livelihood security, particularly with respect to early warning and emergency needs assessment. The development of the HEA Integrated Spreadsheet, which allows for the concurrent analysis of a number of different hazards and a number of different livelihood zones (with multiple wealth groups therein) has greatly facilitated the process of using HEA for early warning and outcome analysis at the national level (e.g. Somalia and Malawi).

In the following chapter, general guidance is provided on the principles and some of the calculations that underlie the three steps that make up the Outcome Analysis process: problem specification; coping capacity analysis; and predicted outcome. Most practitioners who are not of team leader status are unlikely to be in a position to use the tools developed to run Outcome Analysis on their own: the Single Zone Spreadsheets and the Integrated Spreadsheets. This tends to be the responsibility of the team leaders. As such, detailed guidance on these tools is provided in the Team Leaders' Supplement rather than in this chapter.

A GENERAL OVERVIEW OF THE THREE STEPS IN OUTCOME ANALYSIS

The Problem Specification

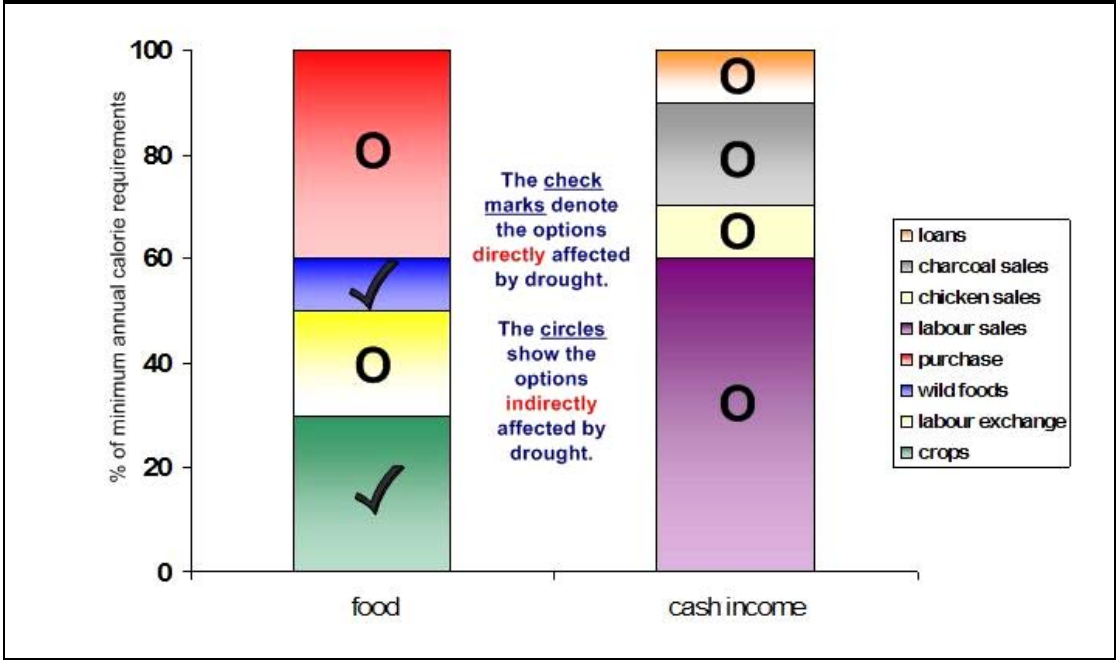
The first step in analysing how the baseline household economy will be affected by a particular hazard is to analyse the hazard itself. It is necessary to translate the hazard into quantified economic consequences that can be mathematically linked to household-level baseline information on food and income options or expenditure items. It is not enough, for instance, to say that a drought has occurred. Drought has many potential effects, and just how these play out in relation to household livelihoods depends in part on:

- which strategies specific to that livelihood zone will be affected by the drought (this is related to the baseline – see below); and
- the magnitude of the event (this is specific to the problem specification).

Determining the relevant factors to monitor: "key parameters"

The first step in compiling the hazard information is to determine the relevant factors for analysis, using the baseline information as a guide. These factors are referred to in HEA as "key parameters"; that is, for each wealth group and livelihood zone, the sources of food or cash that contribute significantly to total food or cash income so that a reduction in access to that one source may have a significant effect on total access. For example, a drought in southern Africa may cause a production failure but it will almost certainly have a number of consequences in relation to agricultural livelihoods beyond the obvious loss of crop and livestock production. These include the loss of income from local agricultural employment, from cash crop sales and from livestock sales (through reduced prices), and the reduced availability of wild foods. **Figure 2** shows how a drought directly affects crop and wild food production, and indirectly affects all of the other options for obtaining food and cash income.

Figure 2. Illustrative effects of drought on food and income



For example, even something like charcoal sales, which is not immediately undermined by drought, will be influenced indirectly. As more people turn to this option to increase their income, the resulting increase in supply is likely to lower prices, potentially cancelling out the benefits of increased sales.

Taking the illustrative case in **Figure 2**, the three most important sources of food in this livelihood system are 1. crop production, 2. labour exchange and 3. food purchases. Therefore, these are the "key parameters" and the most important indicators to monitor related to each of these, respectively, would be:

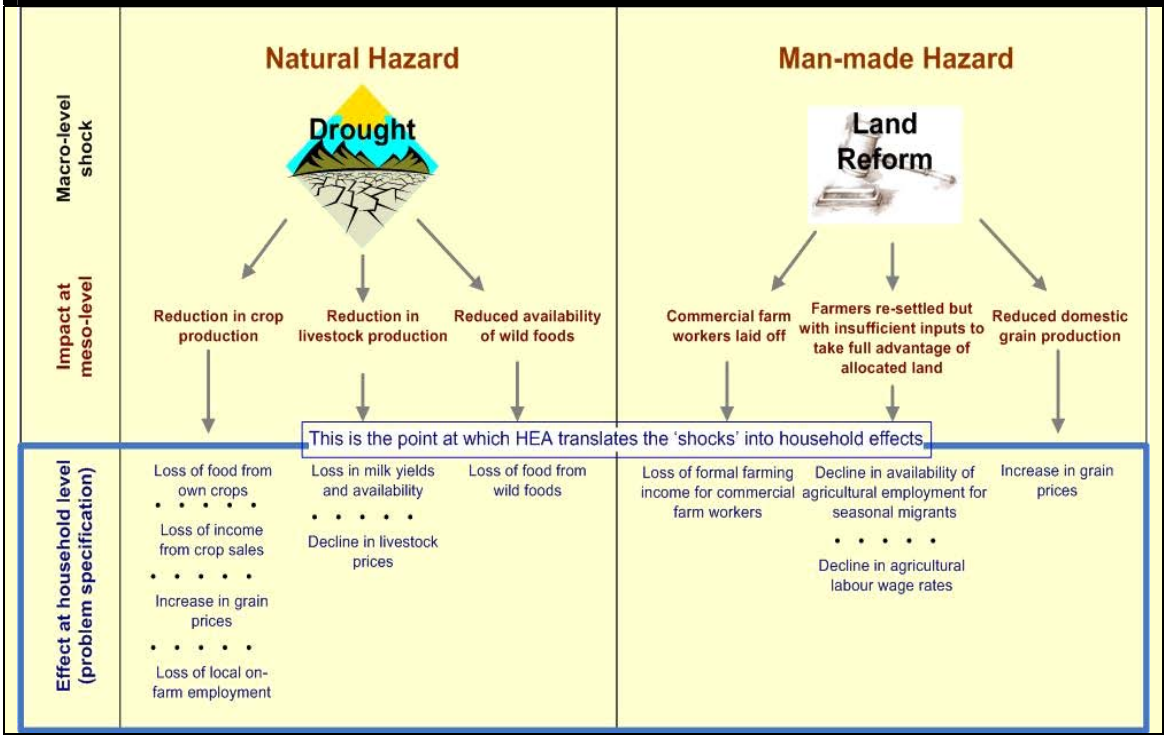
- yields and area planted;
- wage rates and labour demand;
- and staple prices.

Wild foods, while a component of overall food income, could be considered a lesser source, and therefore not absolutely essential to monitor, especially if resources for monitoring were limited, as they tend to be.

In almost all cases, crop production and prices are going to be critical factors to monitor. However, there may be isolated cases where a purely pastoralist or fishing livelihood may preclude the need to monitor crops, or cases where the relative balance of one food source over another makes a clear case for adding additional parameters to a government's standard monitoring system. HEA baselines allow for the development of customised indicator sets, helping target scarce monitoring resources effectively, and justify a clear allocation of labour resources in the field.

The information related to these indicators (i.e. yields, area planted, wage rates, labour availability, staple prices) is obtained from existing monitoring systems (e.g. crop

Figure 3. Translating macro-level shocks into household effects



assessment data or market price monitoring information) and occasionally from dedicated data collection efforts in the field, where time and resources permit.
The task of obtaining all of the information necessary to create a 'problem specification' is clearly critical, but one which HEA is not designed to undertake. HEA relies on meteorological and agricultural monitoring systems to provide predictions of crop production or pasture availability. Similarly, it relies on others to do the political and economic analysis required to predict future trends: how prices will change, what markets will do, or which state entitlements will be lost. HEA typically takes up the reigns at the point where these analyses leave off, translating these macro-level changes into specific food and cash income effects at the household level. Although in many cases, if the analysis on these macro-level changes has not been done, HEA practitioners must do the best they can to fill in this information gap. An example of just where this translation point lies is given in **Figure 3**.

Determining the magnitude of the shock

The next step in the problem specification, after identifying which "key parameters" to obtain monitoring information for, is to analyse just how big the problem will be for each of these components of the livelihood system. Whether information exists on these parameters, and whether the information is reliable, depends on how complete and accurate the established monitoring systems in a country are. However, the main objective for each factor is to quantify the change – in percentage terms – from the reference year. **Table 2** gives examples of the types of problems that are specified in relation to the hazards presented.

Table 2. Illustrative problem specifications related to two hazards: drought and war

Hazard	Household effect	Problem specification for HEA
Drought	Reduced crop production	Crop production 30% of reference year
	Reduced livestock production	Milk yields 80% of reference year
	Reduced wild food production	Wild food production 75% of reference year
	Loss of income from agricultural labour sales	Agricultural labour sales are 48% of reference year. *(This is because the number of jobs available has declined to 60% of the reference year and wage rates are 80% of the reference value)*
War	Market closure	Staple food prices increase 200% above reference year
		Livestock prices fall to 75% of reference year
	Crop inputs looted/destroyed	Crop production 30% of reference year
	Reduced access to grazing lands	Milk yields 50% of reference year

Assuming the existing monitoring systems are effective, then the process of defining a problem specification is quite simply one of calculating this year's production or price as a percentage of the reference year's. So, for instance, in the example below, the production data for the districts falling into a livelihood zone has been organised for ten years. The baseline/reference year – 2002 – has been shaded in grey.

Agricultural Production (MT)		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	Current year
Livelihood Zone	Dist. 1	2000	1000	2300	4000	2000	3800	2200	3000	1300	1900	1000
	Dist. 3	2500	1200	2200	3500	2100	3300	2400	2000	1700	2000	900
	Dist. 6	1800	1300	2000	3000	2200	3500	2100	2500	1555	2200	1200
	AVERAGE	***2100***	***1166***	***2166***	***3500***	***2100***	***3533***	***2233***	***2500***	***1518***	***2033***	***1033***

The livelihood zone's average production for the reference year is **2,233 MT**. The livelihood zone's average production for the current year is **1033 MT**. Thus, the production problem specification would be:

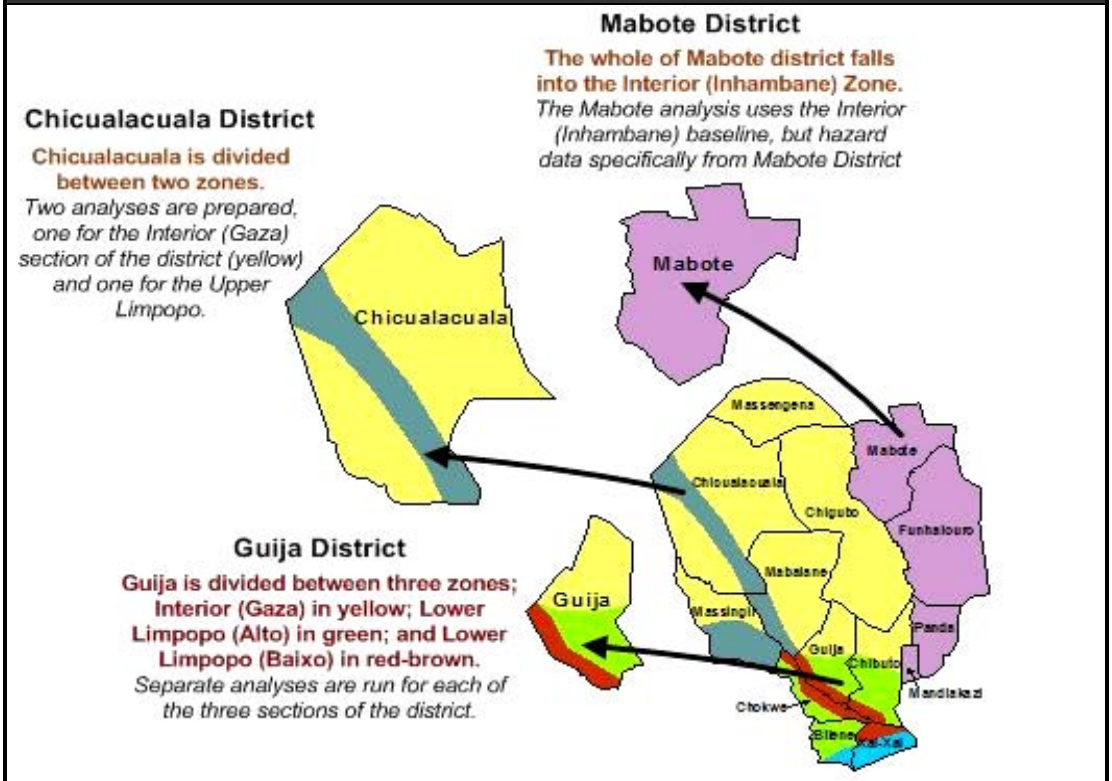
'Current year' (1033) divided by 'reference year' (2233) X 100 = 46% (rounded).

The same basic process would apply to any of the production problems. The income problems are slightly more complicated because they require the analyst to consider both the availability of the commodity sold, and the price at which it is sold in the current year compared to the reference year. (See **page 16**.)

Analysis by administrative unit

It is worth noting here that the problem specification is typically not applicable to an entire livelihood zone as given in the example above. In practical terms, the average for a livelihood zone may be meaningless because of the variability of hazards from year to year. So it is currently standard practice to define the problem at the sub-livelihood zone level, depending on available data sets.

Box 1. Analysis by administrative unit



Even though only one household economy baseline is developed per livelihood zone, the outcome analysis can still be run district by district.

Official production and price data are usually available at the district level (i.e. at administrative level 3). It is not typical to find such data at a lower level, and it is almost

never available by livelihood zone[1]. In addition, decision-makers usually require output by administrative area (since this is the level at which interventions are implemented). HEA has therefore developed an approach that utilises district level input, allowing baseline information to be used in conjunction with existing government data systems, making it complementary to these systems rather than competitive with them.

Although only one baseline is developed per livelihood zone, this does not mean that the Outcome Analysis can only be run for the livelihood zone as a whole. If a zone is divided between several districts (e.g. the Interior Gaza zone in the Limpopo Basin), it is possible to run separate analyses for each district within the zone. Equally, when a single district is divided between two or more zones (e.g. Chicualacuala and Guija districts in the Limpopo Basin) separate analyses can be undertaken for each livelihood zone within the district. **Box 1** shows how this is done.

Where a large zone covers more than one district this approach has the added advantage of a more detailed geographical analysis of hazard impacts than if data are aggregated for the livelihood zone as a whole. For example, the level of crop failure during a drought tends to be greater in the north than the south of the Limpopo Basin in Mozambique. In this case it makes much more sense to analyse the situation for the different districts within a large zone, such as the Interior (Gaza) zone, rather than averaging the level of crop failure across the zone as a whole.

Household Coping Capacity

The next step, after defining the problem and calculating its magnitude for each of the relevant aspects of the baseline picture, is to take account of the coping strategies that different types of households will employ to try and deal with the problems they face. The key questions here are:

- Which of the existing food and income options can be expanded under current circumstances?
- What additional options can be pursued?
- To what extent will these responses be able to increase access to food and/or cash (i.e. *how much* extra food/cash can be obtained from these different sources)?

In other words, this is a quantified analysis of households' ability to diversify and expand access to various sources of food and income, and thus to cope with a specified hazard. This area of analysis is commonly referred to in HEA as 'expandability'. Information on expandability is collected during the baseline study, usually by referring back to previous years and investigating the extent to which particular sources of food or cash could be expanded in bad years. To this extent, a determination of what is possible in terms of people's coping capacity is derived from actual field work.

However, 'expandability' in HEA is not just a reflection of what is *possible*. It is also, in part, a judgment of what is *acceptable*. **Box 2** lists the types of coping strategies typically used by households[2]. The strategies are organized according to three categories from low to high

[1] The exception here is with satellite imagery, such as NDVI and WRSI, which can present results in any defined polygon, including livelihood zones.

2 Note that some strategies usually included in lists of coping strategies are not included here, e.g. strategies that maintain primary production in the face of a hazard (e.g. re-planting of crops, replacement of long-cycle by short-cycle crops, long distance grazing of livestock). This is because in household economy analysis these aspects of coping are captured in the 'hazard'. Replanting of crops and replacement of long- by short-cycle crops

cost. Note that cost is not just a function of the type of activity, but the extent to which it is utilised (as in the livestock sale and labour migration examples described below). Typical low cost strategies include consumption of stocks (rather than selling them), or reduction of expenditure on non-essential items and buying food instead. These options do not put the households longer term survival at risk nor do they undermine the health of its members.

Examples of high cost strategies, on the other hand, would include decreased calorie intake (below the minimum required level), the sale of all livestock or reduced spending on water. These coping strategies undermine the viability of the household in the long term and they put its members at risk in health terms. As such, they are not considered acceptable and would not be employed in the Outcome Analysis to reduce a potential deficit. If all the potential coping strategies were included in the analysis, this would have the effect of minimising and almost certainly under-estimating the need for assistance as measured by deficit from a household economy deficit[3].

In other words, because Outcome Analysis aims ultimately to provide decision makers with information that allows for enough lead time to implement interventions to protect both lives and livelihoods, the **intervention trigger point** in the analysis is set before people have to resort to coping strategies that would undermine livelihoods or put at risk lives.

Thus, only those strategies that are appropriate responses to local stress are included. In this context, appropriate means both 'considered a normal response by the local population' and 'unlikely to damage local livelihoods in the medium to longer term'. In many agricultural areas, for example, it may be usual for one or more household members to migrate for labour when times are hard. Provided the response is not pushed too far (i.e. too many people migrating for too long a period of time), this can be considered an appropriate response to stress. Similarly, in a

Box 2. Types of coping strategy

Low Cost *(included in outcome analysis)*

- Reduced expenditure on non-essential items (beer, cigarettes, ceremonies, festivals, expensive clothing, meat, sugar, more expensive staples, etc.)
- Harvesting of reserve crops (e.g. cassava, enset)
- Consumption rather than sale of any crop surplus

Medium Cost *(included in outcome analysis)*

- Increased sale/slaughter of livestock (sustainable)
- Intensification of local labour activities
- Short-term/seasonal labour migration
- Intensification of self-employment activities (firewood, charcoal, building poles, etc.)
- Increased remittance income
- Increased social support/gifts
- Borrowing of food/cash
- Sale of non-productive assets (jewellery, clothing, etc.)
- Collection of wild foods

High Cost *(excluded from outcome analysis)*

- Unsustainable sale/slaughter of livestock
- Long-term/permanent migration (including distress migration of whole households)
- Excessive sale of firewood/charcoal (e.g. because of its effect on the environment)
- Sale/mortgaging of productive assets (land, tools, seeds, etc.)
- Prostitution
- Child labour
- Reduced expenditure on productive inputs (fertilizer, livestock drugs etc.)
- Reduced expenditure on health and education
- Reduced expenditure on water
- Decreased food intake

are captured through the crop production 'problem' and the effects of long-distance grazing are captured through the livestock production 'problem'.

[3] This is because the inclusion of a strategy in the outcome analysis has the effect of reducing the deficit, effectively delaying any intervention until that strategy has been fully utilised. It would not, for example, make sense to include the sale of ***all*** livestock in the outcome analysis, as this would delay intervention until all livestock had been sold – rendering pastoral households destitute, for example. Likewise it makes no sense to include undesirable stress-induced activities such as prostitution in the calculation of outcome, since this would reduce the estimated assistance requirement by an amount equivalent to the income that can be earned from prostitution.

pastoral setting, it is usual to increase livestock sales in a bad year. This again is an appropriate response to economic stress - provided the increase in sales is not excessive.

The limits of coping

Outcome analysis does not model household behaviour. It identifies the point at which households will no longer have the option to use acceptable coping mechanisms.

In household economy analysis, therefore, the most important characteristic of a coping strategy is its cost, where cost is measured in terms of the effect on livelihood assets, on future production by the household, and on the health and welfare of individual household members. But it is important to note that including a particular coping strategy in the analysis does not imply that households will necessarily follow that particular strategy. For example, if the analysis takes into account the income that could be earned from the sale of additional (but not all) livestock, it does not imply that households will necessarily take up that strategy. Rather than sell more animals than usual, they may decide to employ one or more of the other strategies open to them – including those considered to be more damaging: they may reduce food intake, or send a household member away permanently to find work. The point is that the analysis of household coping is not an attempt to model behaviour - that is, to predict which options a household will definitely take up in a crisis and which they won't. Rather, it is an attempt to define a level of access below which households have little choice but to pursue strategies that are likely to be damaging in the long term; in other words, a level of access below which the analysis shows that intervention is appropriate.

Figure 4: An Example of an Outcome Analysis for Poor Households from the Wolayita Maize and Root Crop Livelihood Zone in Southern Ethiopia

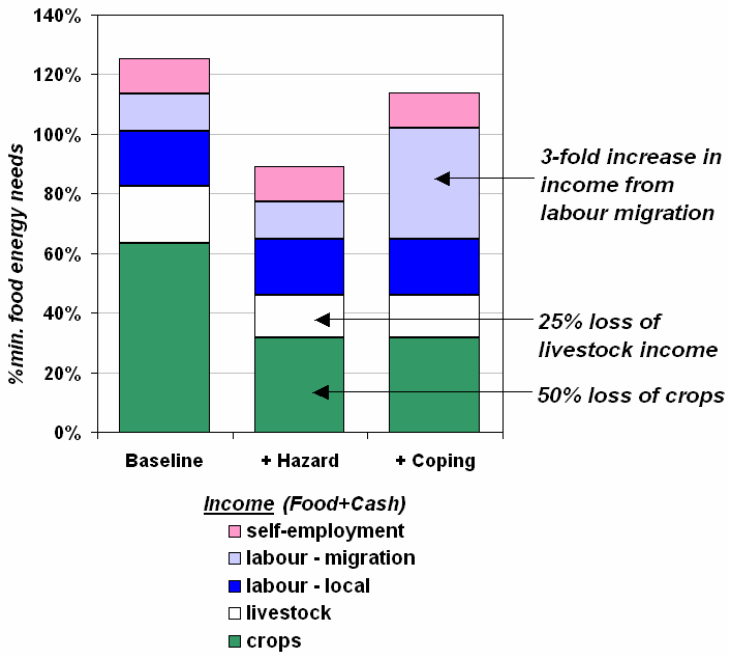
Three types of quantitative data are combined to predict outcome; data on baseline sources of food and cash, data on the hazard and data on coping strategies.

First of all, the effects of the hazard on baseline sources of food and cash income are calculated (middle bar in the chart).

Then the effect of any coping strategies is added in (right-hand bar).

The result is an estimate of maximum total food and cash income for the current year.

Note: *In this graphic, food and cash income have been added together and, in this case, expressed in food terms. (The results could also be expressed in cash terms – see* ***Figure 5****).*



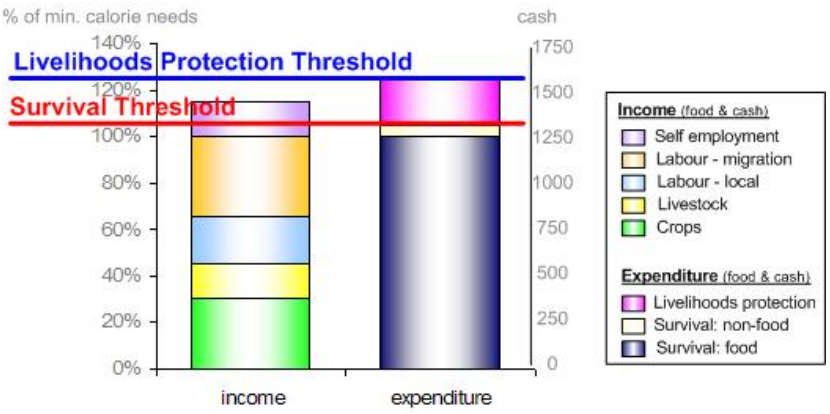
Predicted outcomes: defining the intervention threshold

The predicted outcome step is a systematic attempt to determine where different households fall in relation to clearly defined intervention thresholds. It is an analysis designed to set forth, with the best available evidence, a clear picture of which groups of households will be unable to respond on their own to a shock, without the use of strategies that would undermine either their health or their longer term welfare. It provides decision makers with a transparent link between household realities and a justification for providing external support of a particular type and amount, and for a set duration. Just as important, it makes clear the likely consequence of a failure to mount an external intervention and establishes useful monitoring indicators and thresholds in order to appropriately adjust response plans as time goes by.

The output from an outcome analysis is an estimate of total food and cash income for the current year, once the cumulative effects of current hazards and income generated from low- and medium-cost coping strategies have been taken into account (see **Figure 4**).

Figure 5: Comparison of Projected Income against Two Clearly Defined Thresholds

Projected total income (including income from low- and medium-cost coping strategies) is compared against two thresholds defined on the basis of local patterns of expenditure.



The Survival Threshold represents the total income required to cover:

a) 100% of minimum food energy needs (2100 kcals per person), plus
b) the costs associated with food preparation and consumption (i.e. salt, soap, kerosene and/or firewood for cooking and basic lighting), plus
c) any expenditure on water for human consumption.

Note: *Items included in categories b) and c) together make up the survival non-food expenditure basket, represented by the brown bar in the expenditure graphic.*

The Livelihoods Protection Threshold represents the total income required to sustain local livelihoods. This means total expenditure to:

a) ensure basic survival (see above), plus
b) maintain access to basic services (e.g. routine medical and schooling expenses), plus
c) sustain livelihoods in the medium to longer term (e.g. regular purchases of seeds, fertilizer, veterinary drugs, etc.), plus
d) achieve a minimum locally acceptable standard of living (e.g. purchase of basic clothing, coffee/tea, etc.)

The next step is to compare projected total income against two clearly defined thresholds to determine whether an intervention of some kind is required. The two thresholds – the ***Livelihoods Protection Threshold*** and the ***Survival Threshold*** – are described in **Figure 5**.

The ***Survival Threshold*** is the amount of food and cash income required to ensure survival in the short-term, i.e. to cover minimum food and non-food needs. The "survival non-food" category generally includes the costs of preparing and consuming food plus any cash expenditure on water for human consumption. In highland Ethiopia, the basic items required in addition to staple food itself are salt (to add minimum flavour), soap (so that hands can be washed before eating) and a very small amount of kerosene (so that people can see to prepare and consume food in the evenings). In most rural agricultural areas, water is obtained free of charge, and there is no need to include water in the survival non-food expenditure basket. Expenditure on water can be significant in other settings, however, e.g. in urban areas and among pastoralists. In these cases, lack of cash may prevent people from accessing sufficient water, even where it is available, and so water should be included in the list of expenditures required for survival. In this type of situation, the existence of a survival deficit (see **Figure 6**) indicates that an intervention to improve access to water will be required in addition to any measures that may be necessary to improve water supply.

Shelter and clothing are also basic requirements for survival, and it may on rare occasions be appropriate to include these in the "survival: non-food" basket. The point to bear in mind here is that the items included in the "survival: non-food" basket should be those required to ensure survival in the short term. In most settled rural situations, expenditure on shelter and clothing can usually be forgone in a bad year, with repairs to housing and replacement of clothes being postponed until better times. Situations in which failure to spend money on shelter and clothing could be life-threatening might include war (where shelters are destroyed and clothing looted), and sudden onset disasters such as an earthquake, hurricane or flood.

The ***Livelihoods Protection Threshold*** is the amount of food and cash income required to protect local livelihoods. This means a level of income that gives people the option to maintain expenditure on basic non-food goods and services at the levels prevailing in the reference year (assuming the reference year was neither especially good not especially bad). This does not mean that people will have exactly the same standard of living as in the reference year (since the livelihoods protection basket excludes non-essential items such as beer and cigarettes), nor that they will pursue exactly the same activities as in the reference year (since the *Livelihoods Protection Threshold* is set at a level that assumes additional income can be generated from low- and medium-cost coping strategies). But it does mean that – provided they prioritise these items – people can continue to spend similar amounts of money on inputs and on health and education as in the reference year.

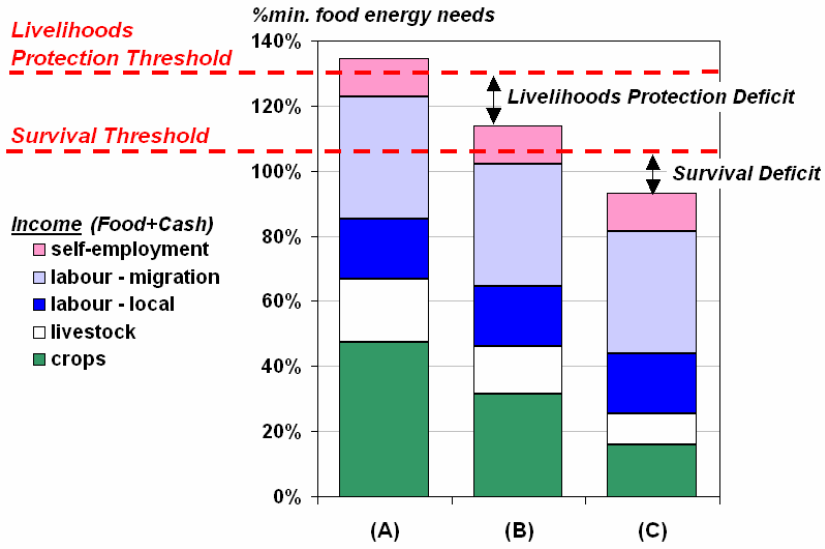
Besides these essential non-food goods and services, the *Livelihoods Protection* expenditure basket can also contain a number of items that – while not absolutely essential for survival – can nonetheless be considered essential in terms of sustaining a minimum locally acceptable standard of living. It is usually quite easy to identify these items through discussions with local key informants. Tea and sugar, for example, are considered essential among Somalis, and it is appropriate to include these in the *Livelihoods Protection* basket in Somali areas. For highland Ethiopians, on the other hand, tea and sugar will be replaced in the *Livelihoods Protection* basket by coffee and berberi (a mix of spices based on chilli pepper). Clearly, the exact composition of the *Livelihoods Protection* Basket will vary from livelihood zone to livelihood zone, depending upon local circumstances. This applies not only to items such as tea and coffee, but also to inputs (e.g. veterinary drugs in pastoral areas verses fertilizer in agricultural areas) and to health expenditures (e.g. expenditure on anti-malarials in lowland but not highland areas).

Figure 6: What it means if total income falls below one or other threshold

If total income falls below one or the other threshold, this implies that an intervention of some kind is required.

The figure compares three different situations, of progressively greater severity and urgency.

(A) – No deficit: In this situation, total income (including income from low and medium-cost coping strategies) is sufficient to ensure basic survival and to protect existing patterns of livelihood. There is no pressing need for an emergency intervention.



(B) – Livelihoods Protection Deficit: Total income is no longer sufficient to cover the cost of survival plus the expenditure required to protect local livelihoods, and an intervention of some kind is required to cover the deficit. At this level, local people can still cover expenditure on survival (including the consumption of 2100 kcals per person per day), provided they accord these needs a high enough priority. In other words, people should not have to go hungry at this level[1], although they will have to resort to other high-cost strategies including a reduction in expenditure on productive inputs, on health and on education. The primary objective of intervention at this level is to protect livelihoods, both in the current year and for the future.

(C) – Survival Deficit: At this level, total income is insufficient to cover the cost of survival, even if full use is made of all the available low- and medium-cost coping strategies, and all the money usually used to protect livelihoods is switched to the purchase of staple foods. It is very probable that people facing this type of deficit will go hungry, unless they resort to other undesirable high-cost coping strategies (see **Box 2** for a description of these). The primary objective of intervention at this level is to protect health and life in the short-term.

The difference between situations (B) and (C) is primarily one of the scale and urgency of the problem. There is no implication that different types of intervention should be used to address different types of deficit, e.g. that a survival deficit should be addressed through the distribution of food aid or that a non-food intervention is required to address a livelihoods protection deficit. The only point to bear in mind in relation to the type of deficit is that the intervention selected must be commensurate with the scale and urgency of the problem. There is little point, for example, in proposing a distribution of soap to fill a survival deficit. Something much larger in scale will generally be required, which will usually mean a distribution of food or cash, or a market intervention on a relatively large scale.

[1] Although they may choose to do so, if, for example, not increasing livestock sales or not migrating for labour has a higher priority than maintaining food intake.

Another important point about the *Livelihoods Protection Threshold* is that, as defined here, it is set relative to local conditions rather than relative to international standards, such as

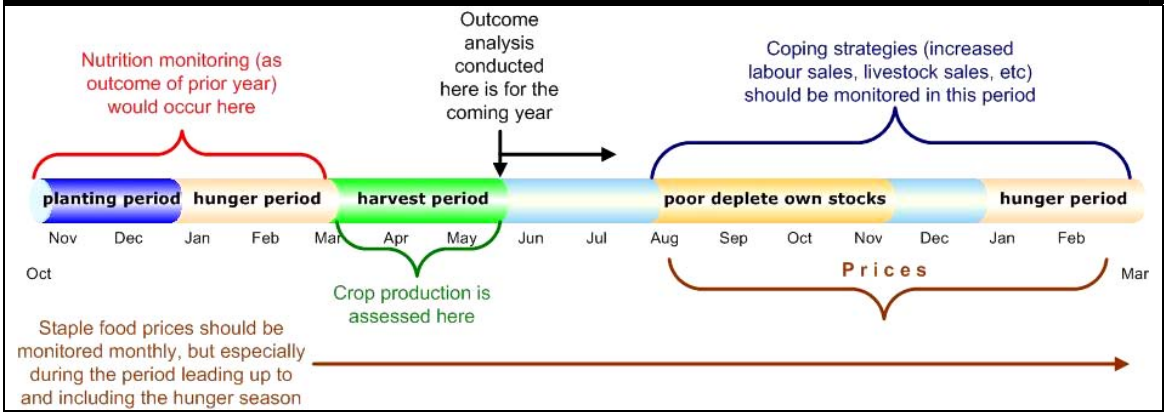
Sphere. This is an area for further debate and further work, i.e. should the *Livelihoods Protection Threshold* be set relative to international standards? and if so, which standards should be adopted for those items not covered by, for example, Sphere (which does not include standards for firewood or for fertilizer, for example).

When and what to monitor: the monitoring cycle

Typically an Outcome Analysis covers a 12-month period beginning with the main harvest (in an agricultural setting) or the main season rains (in a pastoral setting). An initial analysis will normally be prepared immediately after the harvest or after the rains, projecting access for the next 12 months, with updates prepared at various times during the remainder of the year (e.g. after a subsidiary harvest or secondary rainy season). In many cases it will be useful to prepare a preliminary analysis before any assessment fieldwork is undertaken, using whatever information is available to hand, and then to re-run the analysis once the fieldwork has been completed. This type of preliminary analysis can help identify gaps in the available data, which in turn helps with the planning of the fieldwork.

Different aspects of the livelihood system should be monitored at relevant times during the production and consumption year, see **Figure 7**. For instance, just as it makes sense to conduct the national crop assessment(s) during the harvest period (or periods), it makes sense to monitor predicted coping responses at the time they are projected to occur – usually in the period just after poorer households run out of their own stocks.

Figure 7. A typical monitoring timeline in southern Africa



Malnutrition rates are an outcome indicator, meaning they reflect the reality after a crisis, rather than providing an indication of an impending crisis. Therefore, it makes the most sense to monitor these at the tail end of the consumption season, during the hunger months. Keep in mind they will be reflecting the previous year's conditions at this time. Prices, another critical input to the outcome analysis, need to be monitored against the projected trajectory throughout the consumption year, but especially in the period leading up to and including the hunger season. This is because, as discussed previously, in the hunger season, prices will be the main determinant of food security for poorer households, who typically depend on the market to secure the majority of their food after they run out of their own stocks. The **predicted outcome scenarios** will be linked to assumptions about what will happen to prices, and these assumptions need to be carefully monitored. See **Box 3** on page 18 for more on price projections. If the actual price diverges from the predicted one, the projected household needs will have to be adjusted.

HOW TO DO THE CALCULATIONS

A number of calculations are involved in designing a problem specification and in incorporating a household's coping capacity into the outcome analysis. The following section provides guidance on these calculations.

Calculating the Problem Specification

A production problem

Household economy baseline data provide the starting point for investigating the effect that a hazard will have on household access to food and non-food goods and services. The baseline levels provide the reference point for all problem specifications. Suppose a typical 'poor' household harvests 10 x 50 kg sacks of sorghum in the reference year. This would be enough to cover roughly 50% of minimum annual food energy needs (the baseline). If sorghum production is reduced to half of reference by drought (the hazard), it follows that 'poor' households will harvest 5 sacks on average, and their access to own sorghum production will fall to only 25% of annual food needs (the outcome). This very simple calculation can be summarised as follows:

$$\text{Current year access to own sorghum production} = \text{Reference year access to own sorghum production} \times \frac{\text{Current year production}}{\text{Reference year production}}$$

$$= 50\% \times \frac{5 \text{ bags}}{10 \text{ bags}} = 25\%$$

For this type of calculation, the hazard has to be expressed in quantitative terms, e.g. crop production = 50% of reference; sorghum purchase price = 120% of reference, and so on. This process of expressing the hazard in quantitative terms is known in household economy analysis as 'problem specification'. In the above example the sorghum crop production problem, expressed in percentage terms, equals:

$$\text{Crop production problem (district data)} = \frac{5 \text{ bags}}{10 \text{ bags}} \times 100 = 50\%$$

District level data can also be used to derive a crop production problem, with the advantage that this is the level at which most data are collected by government and non-government monitoring systems. Suppose district production in the reference year is 36,000 MT, and in the current year is 18,000 MT, then:

$$\text{Crop production problem (district data)} = \frac{18{,}000 \text{ MT}}{36{,}000 \text{ MT}} \times 100 = 50\%$$

This same basic calculation can be used to derive a 'problem specification' for each of the various sources of food and cash income. It is obvious, however, that these calculations can only be done if the relevant data for the reference year are available (e.g. the figure of 36,000 MT for district level sorghum production in the above example). This is why it is so

important to compile a set of reference year monitoring data for use alongside the household economy baseline data on food, income and expenditure (see Chapter 3, **Annex A**, Interview Forms)

An income problem

The total amount of cash income generated from a particular source varies as a function of:

i) access to the income source (i.e. quantity), and
ii) the price for which it can be sold.

These two aspects of the problem are specified separately, and then combined to derive the overall or consolidated problem. The following examples should make this clearer.

Example 1: Calculating a Problem Specification for Cattle Sales

Suppose there is an outbreak of foot and mouth disease in a particular area. This may have two effects: to reduce cattle sales and to reduce cattle prices, which will both tend to reduce the income of households that normally sell cattle. Suppose a household sells four cattle in the reference year, for 100,000 SS each, making total livestock income 400,000 SS. If it can only sell three in the current year, for 80,000 SS each, then this year's income will be 240,000 SS in total. In this case,

$$\text{The 'quantity' problem} = \frac{\text{3 cattle sold this year}}{\text{4 cattle sold in the reference year}} \times 100 = 75\%$$

$$\text{The 'price' problem} = \frac{\text{80,000 SS this year}}{\text{100,000 SS in the reference year}} \times 100 = 80\%$$

$$\text{The overall or 'consolidated' problem} = 75\% \times 80\% = 60\%$$

$$\text{current income} = \text{400,000 SS (reference year income)} \times 60\% = \text{240,000 SS}$$

Example 2: Calculating a Problem Specification for Sorghum Sales

Suppose there is a severe drought and a failure of the sorghum harvest in a particular district. This may have two effects: 1. to reduce the amount of sorghum available for sale and 2. to increase sorghum prices, which together will change the income of households that normally sell sorghum. Suppose a household sells 4 sacks of sorghum in the reference year, for 30,000 SS per sack, making sorghum cash income 120,000 SS. If there is a 50% failure of the harvest, it follows that it can only sell 2 sacks in the current year[1], but perhaps at a higher price of 45,000 SS. In this case, this year's income will be 90,000 SS in total, and:

$$\text{The 'quantity' problem} = \frac{\text{2 sacks sorghum sold this year}}{\text{4 sacks sorghum sold in the reference year}} \times 100 = 50\%$$

$$\text{The 'price' problem} = \frac{\text{45,000 SS this year}}{\text{30,000 SS in the reference year}} \times 100 = 150\%$$

$$\text{The overall or 'consolidated' problem} = 50\% \times 150\% = 75\%$$

$$\text{and current income} = 120{,}000 \text{ SS (reference year income)} \times 75\% = 90{,}000 \text{ SS}$$

Note that there is a seasonal component to this particular analysis, since farmers (especially poor farmers) tend to sell staple cereals after the harvest. The sales price in the baseline is therefore a post-harvest price, and the current year price should also be post-harvest.

[1] Assuming for the moment that there is no 'switching' between sales and consumption

Example 3: Calculating a Change in the Cost of the Minimum Non-Food and Livelihoods Protection Expenditure Baskets

In the same way as it is possible to calculate a price problem for various sources of food and cash income, it is also possible to incorporate changes in the cost of the *survival non-food* and *livelihoods protection* expenditure baskets. Suppose that sugar is an important component of the *livelihoods protection* expenditure basket (as it is in Somalia), and that the price of sugar increases by 20%, then the overall price problem for the essential expenditure basket (103%) can be calculated as follows:

Component of livelihoods protection expenditure basket	Cost of basket in the reference year	Price problem (%)	Cost of basket in the current year
Sugar	175,000 SS	120%	210,000 SS
Other items	950,000 SS	100%	950,000 SS
Total	1,125,000 SS	103%	1,160,000 SS

Changes in staple food prices also need to be taken into account. This is done by calculating a staple food price problem as follows:

$$\text{Staple food price problem} = \frac{\text{Price of staple food this year}}{\text{Price of staple food in the reference year}} \times 100$$

There are potentially two types of difficulty with this calculation:

a) ***the time of year when purchases are made:*** In cropping zones, purchases tend to be seasonal, with most food being bought in the pre-harvest hungry season months. It follows that pre-harvest prices should be used when calculating the staple food price problem. For pastoral zones, on the other hand, where staple food purchases tend to be less seasonal, it is appropriate to base the staple price problem on a 12-month average for prices.

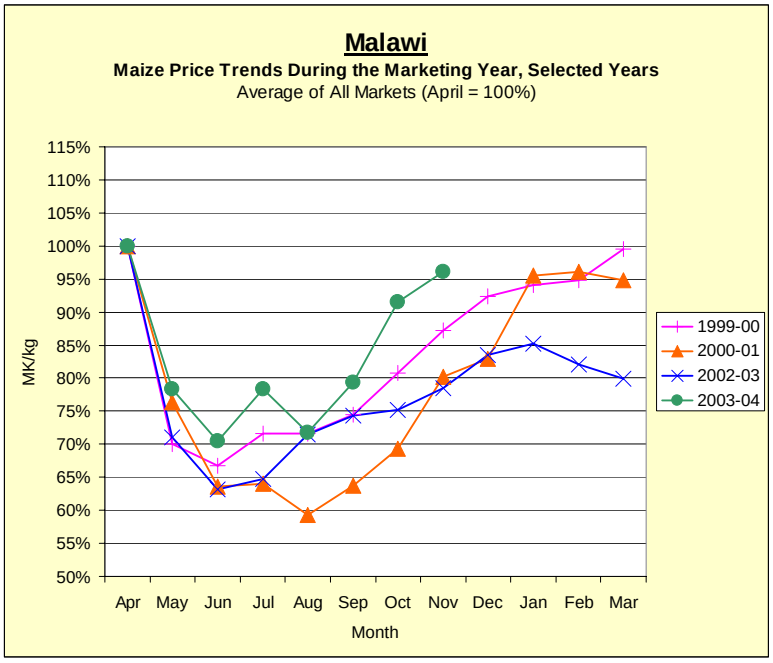
b) ***the time of year the assessment is being undertaken:*** For the purposes of decision-making it is important that the assessment should be undertaken as early in the consumption year as possible. In the case of a cropping zone, this usually means at about the time of the main harvest. The problem is that a staple food price is

required for the following hungry season, which may be 8-12 months after the current harvest and the current assessment. It follows that a price projection has to be prepared in advance. There are two ways of doing this. The first is to base the projection upon an analysis of seasonal trends in prices (see **Box 3** below). The second (which can be used in the conjunction with the first) is to develop a projection based upon information from traders and others with first hand knowledge of market conditions.

Box 3. Staple price problem specification from Malawi

In Malawi the consumption year runs from April to March, and this example refers to an outcome analysis prepared in December 2003 for the period April 2003 to March 2004. The main period for maize purchases in Malawi runs from October to March. By December, of course, maize price data were not available for the whole of this period, and a price projection had to be prepared for the months ahead. This was done by reviewing seasonal price trends in recent years, as follows:

The right-hand graph shows seasonal maize price trends for 2003-04 and for three recent years (but excluding 2001-02, when prices rose very sharply). In 2003, maize prices fell in the post-harvest period, but not quite so far as in previous years, and from August onwards prices rose quite rapidly. Based upon this graph, it seemed likely that maize prices would reach a peak between January and March, and that the average price from October to March would be about 10% above the price in November. Since the overall average price in November (i.e. averaging across all markets surveyed) was 13.5 MK/kg, it follows that the average purchase price for Oct'03-Mar'04 would be approximately 15 MK/kg, or 1.5 MK/kg above the November price. This was the price used to prepare the staple food problem specification for this particular analysis.



Note: Prices are expressed as a percentage of the price in April in order to correct for inflation.

How to Calculate and Incorporate Coping Strategies

As discussed before in this chapter, the objective of Outcome Analysis is to investigate the effects of a hazard on future access to food and to non-food goods and services. This involves combining three types of information; information on baseline access, information on the hazard (i.e. factors affecting access to food and cash income, such as data on crop production or market prices) and information on coping strategies (i.e. the sources of food and cash income that people turn to when exposed to a hazard). The following formula, which should be familiar to you now, summarises the approach:

Baseline + Hazard + Coping Capacity = Outcome

Broadly speaking, there are three categories of activity that households can employ to maximise access in response to a hazard. They can:

1) Increase food access, by, for example, consuming rather than selling crops, increasing purchase and expanding alternative food sources (e.g. casual labour paid in food, wild foods, gifts, loans, etc.)

2) Increase cash income, by, for example, finding more paid work, selling additional livestock, etc.

3) Switch expenditure to staple food purchase, by reducing non-essential expenditure (e.g. clothes, cigarettes) and purchasing cheaper staple foods (e.g. sorghum rather than sugar).

Which strategies to include

As discussed already on **pages 8** and **9**, not all the coping strategies that are available to households are included in an outcome analysis. Strategies may be excluded if they have undesirable or damaging side effects that threaten the sustainability of livelihoods in the medium to longer term. In a crisis, the aim should be to prevent hunger *and* to preserve those assets that are essential to the way of life. Coping strategies can be classified as:

a) **Strategies that are not damaging to livelihoods**, e.g. changes in diet (switching to cheaper foods), sale of non-essential assets, migration of individuals for work, sustainable increases in livestock sales.

b) **Strategies that may be damaging to livelihoods**, e.g. sale of productive assets, unsustainable sale of livestock.

These latter strategies are generally excluded from an HEA Outcome Analysis, even if they are in fact common responses to crisis locally. This is because the objective of the outcome analysis is not simply to model household behaviour, but to identify the most appropriate types of intervention, and the scale of intervention required. In the analysis, outcome is measured in terms of total access to food and cash income after the effects of the hazard and the coping strategies have been taken into account. The practical implications of measuring access are that it enables the user to answer questions such as:

Quantifying coping

"Expandability" is the term used to describe the amount by which a given source of food or cash income can increase in response to a crisis.

- which wealth groups in which zones are likely to face a deficit?
- how many people will face a deficit?
- how big will the deficit be?

This type of information is essential for decision-making about various types of emergency intervention, including the need for food aid and other types of assistance - in which case the size of the deficit and the number of people affected are critical pieces of information. If follows from the outcome analysis equation

Baseline + Hazard + Coping Capacity = Outcome

that the deficit calculated will vary according to the magnitude of the coping capacity. Taking livestock sales as an example, we may assume that people sell no more livestock than in the reference year, or that they sell some additional livestock or that they sell all their livestock. As more livestock sales are included, so the deficit will tend to get smaller and the need for intervention will also appear to be less. However, excessive livestock sales, while reducing the immediate deficit, will also threaten the sustainability of livelihoods in the longer term, which is clearly undesirable. In the case of livestock sales, for example, the sale of some additional livestock could be included in the coping step, but not the sale of all livestock.

The following section uses the example of Somalia to provide a detailed example of which strategies are incorporated into the Outcome Analysis and which are left out, and why. Although based on Somalia, the strategies will be familiar to those working in rural areas of most developing countries.

Strategies available to rural Somali households

Table 3. Expandability: increasing food access

Particular Strategy	*Notes*	*Inc. in Analysis?*
Reduce sale/increase consumption of crops	This is potentially quite an important strategy in zones where 'poor' households sell rather than consume a proportion of their food crops. This is especially the case where the crop is sold post-harvest at a relatively low price. In a bad year all types of household can to some extent switch from selling to consuming food crops.	Yes
Consumption of any surplus	Better-off households in the more productive zones do not necessarily sell all their surplus production; they may also put some aside for storage. In a bad year that proportion of production that is normally stored can be diverted towards consumption.	Yes
Increase purchase	This is everywhere an important strategy for all wealth groups.	Yes
Increase gifts and loans	Gifts and loans may be in either food or cash. These are important strategies in Somalia, and they should be included in the analysis. It is, however, difficult to know by how much each of these sources can be expanded.	Yes
Expand other alternative food sources (e.g. wild foods)	There is very little access to wild foods that can yield significant amounts of food energy (such as wild grains or wild roots and tubers). This severely limits the effectiveness of wild food consumption as a response to crisis in Somalia.	No, these are not significant sources of additional food in bad years.

Table 4. Expandability: increasing cash income

Particular Strategy	*Notes*	*Inc. in Analysis?*
Increase sales/reduce consumption of milk and ghee/butter	Milk and ghee/butter are relatively high-value products and increasing the sale of these in a crisis is potentially quite an important coping strategy. (Where milk production declines, then it may only be possible to increase the proportion sold, rather than the absolute amount, but this still constitutes a potentially important coping strategy.) Unfortunately, relatively little is known of milk markets in Somalia, and the relationships between supply, price and	No

Table 4. Expandability: increasing cash income

Particular Strategy	*Notes*	*Inc. in Analysis?*
	demand. It seems likely that demand (i.e. the amount of money available to buy milk), which is mainly urban, will at best remain relatively constant in a crisis. If production declines (e.g. due to drought) and prices increase, then it is likely that the amounts purchased by urban households will decline. The overall effect may well be that sales remain a constant percentage of production. In this case it is safest to assume no expandability of milk and ghee/butter sales.	
Increase sales of livestock	Increased sale of livestock is a standard strategy for pastoralists. There are two factors to consider, a) livestock herd size (and the number of animals that can be sold without threatening the herd viability in the longer term) and b) the capacity of the market to absorb extra sales. Research data exist for a number of areas of East Africa that can be used to estimate sustainable levels of offtake, but little is known of the capacity of Somali markets to absorb the additional animals. The main market is urban. The basic assumption must be that there is some elasticity in urban demand (especially as prices fall), and that traders will buy wherever livestock are available and of reasonable quality. Availability will tend to be higher and prices lower in drought-affected areas, and traders will therefore move to and increase their purchases in these areas. In most cases, therefore, it is reasonable to assume some increase in livestock sales. In the case of a generalized and severe drought, however, it may be that the capacity of markets to absorb additional animals will be exceeded, in which case it may be best to reduce the expandability of livestock sales or to set it to zero.	Yes
Expand sale of labour locally	Casual labour may be paid for in either cash or food. Attempting to expand labour is an important coping strategy pursued by 'poor' households at times of crisis. The overall effectiveness of the strategy may be questioned however, since there is little evidence that local work opportunities increase significantly in a bad year, and labour rates are likely to decline when food is scarce. If we assume that the amount of money available to pay local labourers remains relatively constant (surely a best case scenario, since rural employers will be affected by local problems as well) then there would seem to be two possibilities. The first is that the same amount of work gets done at the 'normal' wage rate. The second is that more work gets done, but at a lower wage rate (perhaps the most likely, since poor households often report doing more work in a bad year). In either case, total income from local labour will remain constant, in which case it is not appropriate to specify any expandability for this income source.	No
Increase out-migration in search of labour	Out-migration in search of labour is an important strategy in certain areas.	Yes
Expand other income sources (e.g.	Not a great deal of information is available on the market for rural products such as firewood, grass, handicrafts etc.	No

Table 4. Expandability: increasing cash income		
Particular Strategy	*Notes*	*Inc. in Analysis?*
sale of firewood)	in Somalia. Demand is probably relatively inflexible, so that any increase in market supply will tend to be counteracted by a reduction in prices, bringing little net benefit to the rural producer. In this case, total income from these sources will remain constant, and it is not appropriate to specify any expandability. In the case of firewood and charcoal, there is the additional consideration of the effect on the environment to consider. These negative effects are a further reason for not including any expansion of these activities in the analysis.	
Sell other assets	Poor and middle households in Somalia own few assets that can be sold in the event of a crisis, and those assets that are owned (e.g. clothes, basic furniture) tend to be of low value. Moreover, prices are likely to fall quite sharply in a crisis, as supply rapidly exceeds demand. Asset sales are unlikely to be an effective response to crisis therefore.	No
Increase gifts, remittances and loans	These are important strategies in Somalia, and they should be included in the analysis. It is, however, difficult to know by how much each of these sources can be expanded.	Yes

Table 5. Expandability: switching expenditure to staple food purchase		
Particular Strategy	*Notes*	*Inc. in Analysis?*
Reduce non-essential expenditure (e.g. clothes, cigarettes, *khat*)	Reducing non-essential expenditure and using the money to purchase staple foods or other essential items is potentially quite an important strategy for all wealth groups.	Yes
Purchase cheaper staple foods	Sugar in everywhere purchased by all wealth groups in Somalia and in some areas there is scope for switching expenditure from more expensive sugar calories to cheaper sorghum. There may also be scope for reducing expenditure on meat, oil and pulses, and using the money to purchase cheaper staple foods.	Yes

Please see the Team Leaders' Supplement, **Annex A: Expandability – Calculations and Storage** for more on the expandability calculations.

AN EXAMPLE OF HOW THE APPROACH WORKS

The following worked example (**pages 23** to **26**) is designed to introduce the practitioner to how all the steps in HEA Outcome Analysis are put together and to revisit the types of calculations that are made. The example is from the Meru Lowland Livelihood Zone in Meru District, Kenya. It concerns households in the "middle" wealth category, with a household size of 6 people. It is run using the example 'current' year of 2001 and the example 'reference' year of 1998.

Once this initial worked example has been completed, a more general Standard Calculation Format is introduced (**page 30** onwards). The format is helpful because it encourages a common approach to the calculations. It also has the advantage that information on coping strategies is recorded in a set fashion so that once these and the baseline data have been entered, the format can be used repeatedly to analyse different scenarios. The Standard Calculation Format is the foundation for the *Single Zone Spreadsheet*, which is introduced in the Team Leaders' Supplement.

The basic output from an Outcome Analysis is a calculation of deficit. Two types of deficit are calculated – the *survival deficit* and the *livelihoods protection deficit* (see **page 13**). In the initial examples set out below (**pages 23** to **30**), only one deficit is calculated. This is equivalent to the total deficit (*survival plus livelihoods protection*). The separate calculation of the *survival* and *livelihoods protection* deficits is explained from **page 31** onwards.

The Baseline

Sources of food

There are two rainy seasons in this zone and farmers plant in both seasons, but only one season is reliable: the so-called 'short' rains in October – December (referred to here as the main season). Crops planted during the second season (the so-called 'long' rains from March – May) are eaten green or straight from the fields and do not produce a dry harvest. A farmer's consumption year runs from the start of the green harvest in January to the following December. In other words, it can be considered a calendar year.

The following table indicates the contribution of each different source of food to household annual requirements. The results are also entered in Column A of **Table 1** *on* ***page* 26***.*

The basis of the calculations is detailed in Chapter 3 and also in Session 8 (*Introduction to the Kilocalorie Calculations*) in Module 2 (*Baseline Assessment*) of the **Training Guide**. A short review is provided here: If a household of 6 people was to only consume maize, it would require 11½ sacks (1150 kg) to meet their minimum food energy requirements for a whole year. If they were to only consume beans, they would require 1200 kg. If they were only to consume milk, they would require 6,500 litres for a whole year.

Food source	*Description*	*Total food*
Green crops	Households eat green crops in both rainy seasons, annually covering 2 full months of food income (one month from each season).	2/12 mo = 17%
Harvested maize (minus sales and seed)	The main season harvest is in February. 6 sacks (of 100kg each) of maize are produced. 1½ sacks are sold, ½ a sack is kept for seed and the 4 remaining are consumed.	4/11.5 sacks = 35%
Milk (minus sales)	Middle households own 2 cows that yield 1 litre of milk each per day for 10 months of the year. Half the milk is consumed	300/6500 liters = 5%

Food source	*Description*	*Total food*
	and the other half is sold.	
Payment in kind	In most middle households, the man migrates to neighbouring highland areas to work for about three months of the year. While he is away, he receives all his meals from his employer. This food is entered in Table 1 as 'payment in kind'.	1/6 people x 3/12 months = 4%
Purchase	The household purchases the remainder of its food, or approximately 4 sacks of maize and 50 kg of beans.	4/11.5 sacks maize = 35% 50/1200 kg beans = 4%
Total Food	→	**100%**

Sources of income

The table below provides the contribution of each source of income for middle households. The results are also entered in Column A of **Table 2** *on* ***page* 26**.

Income source	*Description*	*Total income*
Sale of livestock	sell 2 calves at Sh 6000 each	12000
Sale of livestock products	sell 1 litre of milk per day at 25 shillings per litre for 10 months (calculated assuming 1 month = 30 days)	7500
Sale of own crops	sell 1½ sacks maize at 550 shillings each	825
Labour sales	Work for 5 days per week for 3 months at 60 shillings per day (calculated assuming 1 month = 4 weeks)	3600
Sale of firewood	sell 4 bundles per week throughout the year at 30 shillings per bundle (calculated taking 1 year = 52 weeks)	6240
Total income	→	**30165**

Note: Sh = Kenya Shilling

Expenditure

Food*: Totalling up daily / weekly purchases, the household bought 4 sacks of maize and 50kg of beans during the reference year. Maize cost 10 shillings a kilo and beans 25 shillings per kilo.*

Item	*Quantity*	*Price*	*Total shillings*
Maize	400 kg	10 shillings/kg	4000
Beans	50 kg	25 shillings/kg	1250
Total	→	→	**5250**

Non-food items: The remainder of household expenditure goes on non-staple items in the reference year. The household did not save any money in the reference year, so income equalled expenditure.

These results are summarised in Column A of **Table 3** *on* ***page* 27**.

The Hazard

The major problem affecting the Meru Lowland zone in 2001 was a lack of rain in both 1999 and 2000, which resulted in harvest failure for the second year in a row. In addition, livestock sales were increased during 2000 to cope with the drought in that year.

The situation after the main season rains of October - December 2000 was:

- **Short rains crops**: Little maize germinated and, after normal green consumption (one month), only 1½ sacks were harvested. 0.1 sack was kept for seed and 1.4 sacks were kept for consumption.
- **Long rains crops**: The forecast for the second season rains in March to May was a likelihood of poor rains. It was predicted that there would be no second harvest, but growing conditions would be sufficient for enough maize production to be eaten green for a month, as in the reference year.
- **Livestock**: On average one cow was sold during the drought in 2000 (the previous year) and the remaining cows have failed to give birth, which means that farmers had no calves to sell and no milk production in 2001.
- **Prices**: Maize and beans had doubled in price from the reference year.

The results of the scenario for 2001, assuming that everything else was unchanged, is presented in Column B of **Tables 1 - 3** on **page 26** to show the immediate impact of the drought on each source of food and income, before the responses to the hazard are taken into account.

Coping Strategies

When the contribution of baseline sources of food declines, households try to expand the amount of food they can get from the remaining options, or they seek alternative options. The following coping strategies are employed in the Meru Lowlands:

- Households want to preserve their **livestock assets** and therefore they don't want to sell their one remaining cow, especially because that cow is of limited market value due to deteriorating condition as a result of the prolonged drought.
- Households double the number of days they **collect firewood**, and if necessary take it further to sell so as to get the same price as in a normal year.
- Men look for **migratory work** earlier and stay away for longer, thereby doubling the food and cash income from migratory labour.
- Households **minimise expenditure** on non-food items to 725 shillings per month (8700 per year) during the drought year.
- Households use their remaining income to **purchase** maize alone. They are given **gifts** of beans, in a similar quantity to what they used to buy, by neighbours.
- In 2001, there were no major relief distributions, nor school feeding. No gifts of money were received from better-off households in the zone or from relatives living in other parts of Meru or outside the district.

Column C of **Tables 1 - 3** on page 26 presents the 'final picture' for 2001, after taking into account the above options for households to expand their food and cash income. This includes the amount of maize that they could buy if they spent all remaining income, after minimum non-staple expenditure, on maize.

The results suggest that once the effects of the hazard and the coping by middle households are taken into account, there remains a deficit equivalent to 11% of annual food

needs. This indicates that some type of intervention would be required to bring middle households' access to food up to minimal levels.

This could be:

- a food aid intervention of some kind (free food distribution or food-for-work),
- a cash or voucher-based programme (free cash or vouchers or cash-for-work), or
- a market intervention to stabilise maize prices.

In each case, the data in **Tables 1 - 3** below can be used to estimate the level of assistance required. In the case of a food aid distribution, the amount of food aid required can be calculated from the deficit. The amount of cash required from a cash-for-work programme can be estimated from the amount of money needed to purchase maize to fill the deficit – assuming prices remain at twice the reference level. Finally, the level to which prices would need to be stabilised by a market intervention can be calculated, from the amount of money middle households have available for food purchase and the amount of food they need to buy.

Box 4. The Effect of Drought on Middle Households in the Meru Lowland Livelihood Zone, Meru District, Kenya

Table 1: Food Sources (% of annual HH food needs)	**Baseline (A)**	**Initial effect of shock (B)**	**Final picture (C)**
Green crops	17%	2/12 mo = 17%	17%
Harvested maize (minus sales & seed)	35%	1.4/11.5 sacks = 12%	12%
Milk (minus sales)	5%	0%	0%
Payment in kind	4%	4%	x 2 = 8%
Purchase – beans	4%	2% (see below)	None = 0%
Purchase – maize	35%	17% (see below)	48% (see below)
Gifts			4%
Total	100%	52%	89%
Deficit	0%	48%	11%

Table 2: Income Sources (in shillings)	**Baseline (A)**	**Initial effect of shock (B)**	**Final picture (C)**
Sale of livestock	12000	0	0
Sale of milk	7500	0	0
Sale of maize	825	0	0
Labour migration	3600	3600	x 2 = 7200
Sale of firewood	6240	6240	x 2 = 12480
Total	30165	9840	19680

Table 3: Expenditure (in shillings)	**Baseline (A)**	**Initial effect of shock (B)**	**Final picture (C)**
Maize	4000	4000	10980
Beans	1250	1250	0
Non-food items	24915	4590	8700
Total	30165	9840	19680

Notes on maize and bean purchase:

Column B: It has been assumed that expenditure on maize and beans remains constant. The amount purchased is halved, since prices for both items have doubled.

Column C: Maize purchase = 10980 ÷ 20 Sh/kg = 549 kg ÷ 1150 kg x 100 = 48%

Estimating Expandability

The above exercise is organised in the sequence baseline + hazard + coping capacity, with coping capacity being considered in relation to a specific hazard. For the analysis of other different hazards it is more useful to analyse expandability in general terms, independently of the hazard. This idea is explored further below, taking the Meru Lowlands as an example and entering the results into a Standard Calculation Format on page 30.

'Expandability' may be defined as the amount by which a given source of food or income can be increased in response to a hazard. Keep in mind that hazards have both direct and indirect effects, and the effect of the hazard may be to eliminate the gains sought by attempts to increase a source of income. Expandability refers only to the added value of an attempt, not to the attempt itself. Put another way, expandability represents the amount by which a given source of food or income can be expanded, provided access to that source of food or income remains the same as in the reference year. In the Meru Lowlands, for example, access to migratory labour can be doubled so long as conditions in the neighbouring highland zone – where migratory labour is found - remain normal. That doubling represents the expandability. If a drought affects the Meru highlands as well as the lowlands, this will reduce the ability of Meru lowlanders to find additional work there. For the moment, we will leave aside the hazard's effects on 'expandability' – they are taken into account later in the calculations.

In the Meru Lowlands we are told that a number of sources of food and income are expandable, as follows:

Table 6. Expandability of Food Sources (% minimum food needs)

Source of Food	*Expandability*	*Explanation*
Harvested Maize	13%	1½ sacks of maize are sold in the reference year, but none are sold in the drought year. The response in this case is to switch from selling to consuming maize. Provided the hazard does not affect the maize harvest, 1½ sacks can be consumed rather than sold, equivalent to 13% of minimum food needs.
Payment in kind	4%	In the reference year, the man migrates for 3 months of the year and receives all his meals from his employer. This provides the equivalent of 4% of the household's minimum food needs. In a bad year, the man can migrate for a further 3 months, generating another 4% of minimum food needs for the household.
Purchase - beans	-4%	Households cut back on the purchase of beans in a bad year, and purchased beans are replaced by gifts (see below). This reduction in purchase has the effect of *reducing* food access

		by 4%, so the expandability is negative.
Purchase - maize	xxx	It may be possible to expand maize purchases in a bad year. However, the expandability of maize purchases is not calculated in advance. Instead it is calculated from current year income and expenditure.
Gifts	4%	Gifts of food are not common in the reference year, but they are an option in a bad year. Middle households can expect to receive 50 kg of beans on average as a gift in a bad year, equivalent to 4% of minimum food needs.

Table 7. Expandability of Income Sources (Sh per year)

Source of Income	*Expandability*	*Explanation*
Livestock sales	0	In a reference year, middle households sell two calves for Sh 6000 each. The only way they can increase sales is by selling a milking cow (which is what they did in 2000). However, this is undesirable since it represents the sale of half the productive animals they own. The sale of this additional animal is therefore excluded from the analysis and expandability is set to zero.
Maize sales	-825	In a bad year, the 1½ sacks sold in the reference year are consumed instead. This has the effect of *reducing* income by Sh 825, so the expandability is negative.
Labour migration	3600	Income from labour migration can be doubled in a bad year, generating an additional Sh 3600 of income.
Firewood sales	6240	Income from firewood sales can be doubled in a bad year, generating an additional Sh 6240 of income.

In addition to these changes in food and income, changes in expenditure pattern are also an important component of the response:

Table 8. Changes in Expenditure Pattern

Expenditure Item	*Explanation*
Minimum non-staple	Households may minimise expenditure on non-essential food and non-food items. Minimum non-staple expenditure is the amount of money that should be spent to purchase basic food and non-food items ***besides*** staple foods. The minimum non-staple basket includes basic items such as salt, soap, water, kerosene for cooking, basic health costs etc[4]. In the case of the Meru lowlands, minimum non-staple expenditure amounts to Sh 8700 per year.
Purchase of cheaper staple foods	As well as minimising expenditure on everything other than staple foods, households may also switch from purchasing more expensive staples (e.g. beans) to cheaper items (e.g. maize). There is not a great deal of scope for this in the Meru Lowlands, since most money is already spent on the cheapest staple, maize. However, middle households do switch from purchasing a combination of maize and beans to purchasing maize only.

Calculating the Hazard

As discussed previously in the section on problem specifications, hazard effects are expressed in terms of the quantitative effect that the hazard has on access to each source of food and income, always expressed as a percentage of the baseline or reference quantity. In the Meru Lowlands example, the hazard or 'problem' is a relatively simple one, and is calculated as follows:

[4] Note that the minimum non-staple basket is here equal to the sum of the survival non-food and livelihoods protection baskets.

Table 9. Problem Specification			
Food or Income Source	*Baseline Quantity*	*Current/projected quantity*	*Current quantity as % of baseline quantity*
Green crops	2 months	2 months	100%
Maize	6 sacks	1.5 sacks	25%
Milk	300 liters	0 liters	0%
Livestock sales	2 calves x 6000 Sh	0 calves	0%
Other sources of food and income			100%

Calculating the Outcome

The outcome is calculated using the standard calculation format as follows (see Meru Lowlands example on next page):

1. Enter baseline information on food, income and expenditure into the 'Baseline' column.
2. Enter estimates of expandability for food and income into the 'Expandability' column.
3. Leave the row for maize purchase blank for the moment, as changes in purchase will be calculated from income and expenditure at step 9.
4. Add expandability to baseline access and enter the result in the 'Baseline + Expandability' column.
5. Enter the current problem of access to food and income in the 'Current problem' column.
6. Multiply the figures in 'Baseline + Expandability' by the corresponding 'Current problem' % and enter the result in the 'Final picture' column. Do this for all sources of food and income, except purchase.
7. Calculate total income (Sh 19680 in the example) and carry this down from **Table 2** to the bottom right-hand cell of **Table 3** (i.e. total expenditure).
8. Enter any change in the cost of the minimum non-staple basket into the 'Current problem' column of **Table 3**. Multiply the baseline minimum non-staple cost by the 'Current problem' % and enter the result in the 'Final Picture' column. In the Meru lowlands example, there is no change in the cost of the minimum non-staple basket, which remains Sh 8700.
9. Calculate the amount of money available for staple food purchase. In this case = 19680 – 8700 = 10980. Carry this down to **Table 4** (cash available). Calculate the amount of staple food that can be purchased, bearing in mind the price of staple food, and any change in this resulting from the hazard. In this case = 10980 ÷ 20 = 549 kg. Estimate the % of minimum food needs that could be covered by purchase (= 549 ÷ 1150 x 100 = 48%)
10. Carry the amount of staple food that can be purchased up to the 'final picture'/purchase row of **Table 1**.
11. Complete the calculation of total food access and calculate any deficit (**Table 1**).

The result obtained using this method is the same as that presented on page 26.

Box 5. Meru Lowlands Example Entered into the Standard Calculation Format

Livelihood Zone	Meru Lowlands, Kenya	Wealth Group	Middle
Baseline year/type	'Normal'	HH size	6
Current year/type	2nd year of drought	% of community HHs	50%

Table 1. Food	Baseline	Expandability	Baseline + Expandability	Current problem	Final picture
Green crops	17	0	17	100%	17
Maize	35	13	48	25%	12
Milk	5	0	5	0%	0
Payment in kind	4	4	8	100%	8
Purchase: beans	4	-4	0	100%	0
Purchase: maize	35	See below			48
Gifts	0	4	4	100%	4
Total					**89%**
Deficit					**11%**

Table 2. Cash income	Baseline	Expandability	Baseline + Expandability	Current problem	Final picture
Livestock sales	12000	0	12000	0%	0
Milk sales	7500	0	7500	0%	0
Maize sales	825	-825	0	25%	0
Labour migration	3600	3600	7200	100%	7200
Firewood sales	6240	6240	12480	100%	12480
Total	**30165**				**19680**

Table 3. Expenditure (cash)	Baseline			Current problem	Final picture
Minimum non-staple	8700			100%	8700
Staple food	5250				10980
Other	16215				
Total	**30165**				**19680**

Table 4. Staple purchase	Cash available	Price/kg	Kg purchased	% kcals
Maize	10980	20	549 ÷ 1150 x 100 =	48%

Splitting the Total Deficit between Livelihoods Protection and Survival Deficits

In the examples presented so far, a single total deficit has been calculated, equivalent to the sum of the survival and the livelihoods protection deficits (see **page 13**). In this section, this total deficit is split into its two component parts.

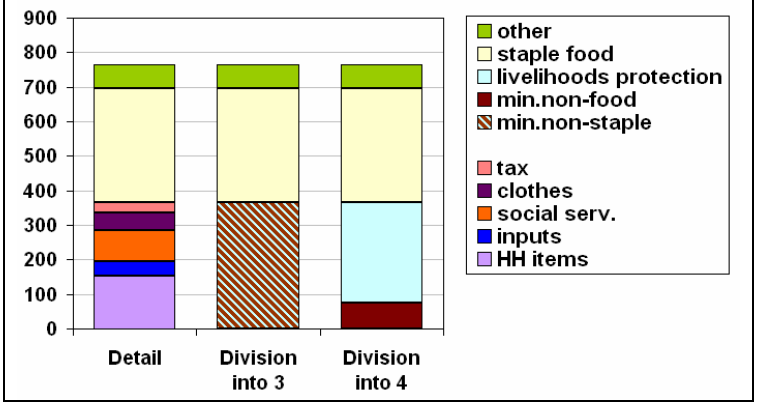
The first step is to refine the analysis of household expenditure (as illustrated in the right-hand graphic). So far, household expenditure has been split into three categories:

Minimum non-staple: The amount of money reserved for basic food and non-food expenses *besides* staple foods.

Staple: The amount of money spent on basic staple foods, i.e. those providing the bulk of food energy at minimum cost.

Box 6. Revision of expenditure categories

Wolayita Maize and Root Crop LZ, Ethiopia
Expenditure Patterns of
Poor Households (birr per year)



Other: The amount of money left over for expenditure on other non-essential or discretionary items, such as clothing, more than the minimum quantity of meat and vegetables, cigarettes, etc.

Minimum non-staple now needs to be divided into two categories:

Survival non-food: The amount of money required to cover the cost of preparing and consuming food plus any cash expenditure on water for human consumption. The survival non-food basket includes basic items such as salt, soap, kerosene for cooking, etc.

Livelihoods protection**:** The amount of money that must be spent on items that are essential in terms of i) maintaining access to basic services (e.g. routine medical and schooling expenses) or ii) the maintenance of livelihoods in the medium to longer term (e.g. purchase of seeds, fertilizer, veterinary drugs, etc.) or iii) the maintenance of a minimum acceptable standard of living (e.g. purchase of basic clothing, coffee/tea, etc.)

The graphs in **Box 7** illustrate the process of deficit calculation based upon this revised analysis of expenditure. The presentation of the results differs from that in **Figure 6** (where food and cash income were added together). Here separate graphs are presented of food access and patterns of expenditure. The following graphical conventions – used throughout the remainder of this guide - are also introduced:

a) to express the *survival deficit* in terms of food and to include this on the food access graph.
b) to express the *livelihoods protection* deficit in terms of cash and to include on the expenditure graph.

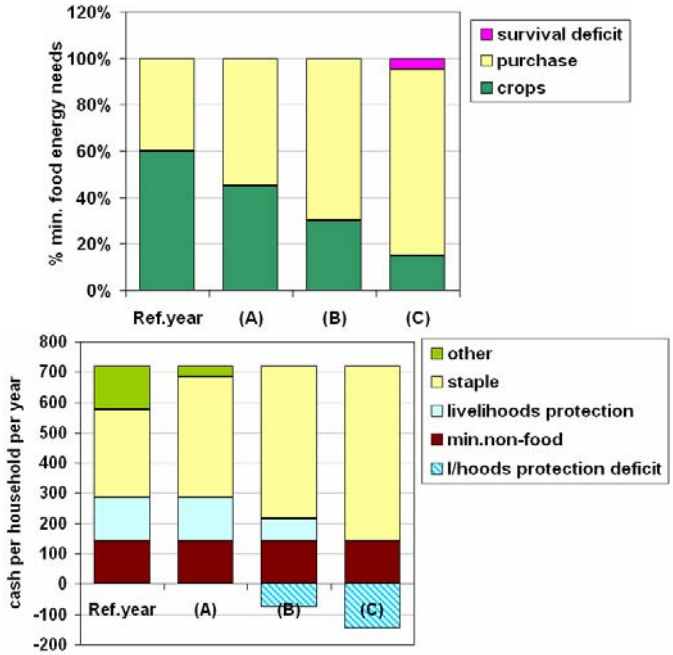
Note, however, that this is purely a convention in terms of graphing, so that the two deficits can be presented separately. It should not be taken to indicate that a survival deficit must be

addressed through a food aid intervention. Nor should it be taken to indicate that a *livelihoods protection* deficit must be addressed through a cash intervention.

The example is a very simple one in which there are only two sources of food (crops and purchase), and looks at the effect of different levels of crop failure (assuming this has no effect on total income).

Box 7. Calculation of Survival and Livelihoods Protection Deficits

Three scenarios showing the calculation of the survival and livelihoods protection deficits



Scenario	Crop failure	Type of Deficit
(A)	25%	None
(B)	50%	Livelihoods protection
(C)	75%	Survival + Livelihoods protection

(A) 25% crop failure: At this level households have enough food plus cash income to cover their basic survival (i.e. 100% of minimum food energy needs plus survival non-food expenditure) and to protect their livelihoods (livelihoods protection expenditure). This can be achieved by switching expenditure from 'other' to 'staple'. This type of switching is enough to compensate for the loss of crop production and there is no deficit.

(B) 50% crop failure: Households can no longer afford to cover both i) the increased expenditure on staple food required to compensate for the loss of crop production and ii) existing expenditure on the livelihoods protection basket. They do however have enough income to cover basic survival, provided they cut back on expenditure on livelihoods protection. At this level they face a *livelihoods protection deficit* (shown on the expenditure graph as the blue-shaded block below the x-axis).

(C) 75% crop failure. At this level, even if all expenditure (besides minimum – or survival non-food) were switched to staple purchase, it would still not be possible to cover 100% of minimum food needs. Households therefore face both a *survival* and a *livelihoods protection* deficit.

When setting up this type of analysis, there are important decisions to be taken about which items to include in the *survival non-food* and *livelihoods protection* baskets, and how much expenditure to include for each item. In the analysis presented above (which deals with poor households from the Wolayita Maize and Root Crop LZ in Ethiopia), the guiding principle is one of maintaining access for poor households at reference year levels (rather than trying to increase access to a higher, perhaps more acceptable level).

This means that the livelihoods protection basket for the poor is composed of items that are purchased routinely by poor households, and that the level of purchase is set at that prevailing in the reference year. This is appropriate for the type of Outcome Analysis

described here, where the objective is to determine the type and amount of assistance required to protect people against the worst effects of a particular hazard.

It would not be appropriate for a more general analysis of poverty or of livelihood security, where the question may not be about maintaining the status quo, but about the absolute level of access and whether this is acceptable. Suppose, for example, that poor households can only afford to send one child to primary school, whereas on average they have two children of primary school age. For the purposes of an emergency needs assessment, the relevant question is 'can poor households continue to pay for one child to attend primary school', and the schooling costs for one child should be included in the livelihoods protection expenditure basket. For a more general assessment of poverty, however, the relevant question is 'can poor households afford to send all children of primary school age to school?', in which case it would be appropriate to include the schooling costs for two children in the livelihoods protection expenditure basket.

If the principle for the purposes of emergency assessment is to maintain access for poor households, what about the middle and the better-off groups? For these, a two-pronged approach is suggested. For:

> Household items: (salt, soap, kerosene, clothing): poor household expenditure should be the base for calculating the needs of other groups (with adjustment for household size).
>
> Schooling, medical costs and inputs: Reference year expenditure should be the basis for calculating the needs of different wealth groups.

The effect of this is to include more expenditure, and potentially more items, in the livelihoods protection expenditure basket of the middle and better-off compared to the poor (since these groups usually spend more on items such as schooling, health care and inputs). This may seem unfair, but it is consistent with the objective of maintaining existing access in a bad year.

In the next section, the Meru Lowlands example is re-visited to illustrate the separate calculation of survival and livelihoods protection deficits.

Defining Survival Non-food and Livelihoods Protection Expenditure Baskets: the Lowland Meru Example

The example below continues the analysis of the Meru Lowlands from **page 30**. The first step is to re-analyse the existing survival non-food expenditure basket and decide which items should be included in the survival and livelihoods protection baskets.

Box 8 suggests such a division. In this case only the most basic items are included as survival non-food. These are salt, soap and kerosene, for which expenditure totals 2460 Sh per household per year. All other items have been included in the livelihoods protection expenditure basket. This includes inputs (the only significant one in this LZ being water for animals), expenditure on social services (health and education), taxes and a limited number of expenditures to improve the palatability of the diet (small amounts of sugar and oil, and some expenditure on the grinding of grain).

The next step is to incorporate these two expenditure baskets into the Outcome Analysis. Instructions for doing this are provided below, followed by a re-working of the Meru

Box 8. Meru Lowlands Example: Definition of minimum non-food and livelihoods protection expenditure baskets

Item	*Amount and measure*	*Cost per measure*	*No. times purchased/year*	*Total expenditure/year*
Survival non-food expenditure				
Salt	1 kg	25 /kg	12	300
Soap	1 tablet	30 /tablet	52	1560
Kerosene	300 ml	50 /300 ml	12	600
Sub-total:				**2460**
Livelihoods protection expenditure				
Sugar	2 kg	40 /kg	12	960
Oil	1 l	50 /l	12	600
Grinding	10 kg	10 /kg	12	1200
Water for animals	Per week	50	20	1000
Taxes	Per year	400	1	400
Health costs	Per year	1200	1	1200
School fees	Per year	880	1	880
Sub-total:				**6240**
Total:				**8700**

Lowlands example with a separate calculation of the survival and the livelihoods protection deficits. The results of this analysis indicate that, given the conditions specified, middle

households face a livelihoods protection deficit equal to 2590 Sh per household. They do not, however, face a survival deficit. A review of the composition of the livelihoods protection expenditure basket suggests a number of ways in which this deficit might be filled, other than through the provision of cash or food assistance. The options, the combined value of which should total 2590 Sh per household include:

- Provision of cash
- Provision of food
- Provision of water free of charge
- A temporary waiving of school fees and the provision of free pens and notebooks
- A temporary reduction in health care charges and the provision of free drugs
- A waiving of taxes in the current year

Calculating the Outcome: Assuming the baseline access and expandability estimates have already been entered into the calculation format, along with the problem specification, the revised steps to complete the analysis are as follows:

1. Multiply the figures in 'Baseline + Expandability' by the corresponding 'Current problem' % and enter the result in the 'Final picture' column. Do this for all sources of food and income, except purchase.
2. Calculate total income (Sh 19680 in the example) and carry this down from **Table 2** to the 'Final Picture/Total' cell of **Table 3**.

3. Specify any change in the cost of the survival non-food and livelihoods protection baskets in the 'Current problem' column of **Table 3**. Multiply baseline minimum non-food cost by the 'Current problem' % and enter the result in the 'Final Picture' column. In the Meru lowlands example, there is no change in the cost of the survival non-food basket, which remains Sh 2460.
4. Calculate the amount of money available for staple food purchase as total minus survival non-food. In this case = 19680 – 2460 = 17220. Carry this down to **Table 4** (cash available). Calculate the amount of staple food that can be purchased, bearing in mind the price of staple food, and any change in this resulting from the hazard. In this case = 17220 ÷ 20 = 861 kg. Estimate the % of minimum food needs that could be covered by purchase (= 861 ÷ 1150 x 100 = 75%)
5. Carry the amount of staple food that can be purchased up to the 'final picture'/purchase row of **Table 1**. Add together the 'final picture' data for all food sources to estimate total food access.

   If total food access is less than 100%, then calculate the survival deficit (**Table 1**). To complete the expenditure analysis, enter the amount of cash available for staple purchase into **Table 3** (under staple food), and enter zero for expenditure on 'livelihoods protection' and 'other' (since it follows that if there is a survival deficit, then there will be no spare cash for either 'livelihoods protection' or 'other' expenditure). Finally, multiply livelihoods protection expenditure in the baseline by the current problem for livelihoods protection expenditure and enter the result under 'deficit' in the 'final picture' column of **Table 3** (this is the livelihoods protection deficit).

   If total food access is equal to or greater than 100% (as in the Meru Lowlands example), then calculate the %kcals that has to be purchased to bring total food up to 100% (59% in the example), and enter this for 'final picture/staple purchase' in **Table 1**. Now calculate how much it would cost to purchase these kcals and enter this under 'staple food' in the 'final picture' column of **Table 3** (1150 kg x 59% ÷ 100 x 20 Sh/kg = 13570 Sh in the example). Continuing with **Table 3**, multiply baseline livelihoods protection expenditure by the current problem for livelihoods protection expenditure and note the result (6240 in the example). Now calculate the amount of cash currently available for livelihoods protection expenditure as total expenditure – survival non-food – staple (3650 in the example). If this is greater than (or equal to) the current cost of the livelihoods protection expenditure basket (just noted), enter the latter figure into 'final picture/livelihoods protection expenditure'. If it is less, then enter the amount of cash available for livelihoods protection expenditure into 'final picture/livelihoods protection expenditure' and enter the difference between the two figures (current cost – cash available) as the 'final picture/livelihoods protection deficit'. (In the example, since 3650 is less than the current cost of the livelihoods protection expenditure basket, 6240, livelihoods protection expenditure is set to 3650 and the livelihoods protection deficit to 6240 – 3650 = 2590 Sh).

6. Finally, calculate expenditure on 'other' as total expenditure – survival non-food – staple – livelihoods protection (=0 in the example).

Box 9. Meru Lowlands example with analysis of survival and livelihoods protection deficits

Livelihood Zone	**Meru Lowlands, Kenya**	**Wealth Group**	**Middle**
Baseline year/type	'Normal'	HH size	6
Current year/type	2nd year of drought	% of community HHs	50%

Table 1: Food	*Baseline*	*Expandability*	*Baseline + Expandability*	*Current problem*	*Final picture*
Green crops	17	0	17	100%	17
Maize	35	13	48	25%	12
Milk	5	0	5	0%	0
Payment in kind	4	4	8	100%	8
Purchase: beans	4	-4	0	100%	0
Purchase: maize	35	See below			59
Gifts	0	4	4	100%	4
Total					100%
Survival deficit					**0%**

Table 2: Income (cash)	*Baseline*	*Expandability*	*Baseline + Expandability*	*Current problem*	*Final picture*
Livestock sales	12000	12000	24000	0%	0
Milk sales	7500	0	7500	0%	0
Maize sales	825	-825	0	25%	0
Labour migration	3600	3600	7200	100%	7200
Firewood sales	6240	6240	12480	100%	12480
Total	**30165**				**19680**

Table 3: Expenditure (cash)	*Baseline*	*Current problem*	*Final picture*
Survival non-food	2460	100%	2460
Livelihoods protection	6240	100%	3650
Staple food	5250		13570
Other	16215		0
Total	**30165**		**19680**
Livelihoods protection deficit			**2590**

Table 4: Staple purchase	*Cash available*	*Price/kg*	*Kg purchased*	% kcals
Maize	17220	20	861 ÷ 1150 =	75%

Having completed the Outcome Analysis, practitioners need to make sure that this information actually leads to appropriate action. Chapter 5, *Translating Outcomes into Action*, introduces the link between HEA information and action, and provides a number of case studies of HEA's application in different settings and towards different ends.