Scenario Development for Food Security Early Warning

Guidance for Famine Early Warning Systems Network (FEWS NET) Staff and Partners

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Introduction

Food security early warning requires the estimation of future food security outcomes many months in advance. However, *definitely* predicting the future is almost impossible given the complex web of factors which will shape food security during the period ahead. Given that early warning is the primary mandate of the FEWS NET project, how then can these two conflicting issues be reconciled? The answer is scenario development.

Scenario development relies on the creation of specific, informed assumptions about future events, their effects, and the likely responses of various actors. In combination with an understanding of current conditions, these assumptions allow for the estimation of future food security outcomes. In addition, a clear description of key assumptions facilitates both the explanation of the food security analysis to colleagues and partners and the process of updating scenarios as new information becomes available. For these reasons, scenario development is a key pillar of FEWS NET’s work.

This document provides general guidance on food security scenario development for a wide range of contexts. Specific guidance on how FEWS NET Representatives should apply scenario building for Food Security Outlooks (e.g., scenario types, scenario duration, etc) will be provided separately.

This guidance document is divided into the following sections:

- Section 1 – An overview of the steps of scenario development
- Section 2 – Guiding principles
- Section 3 – Scenario building: A step-by-step example
- Section 4 – Glossary of key terms
SECTION 1: An overview of the steps to scenario development

At its core, scenario development is little more than a sophisticated “if – then” statement. For the purpose of early warning, however, getting from “if” to “then” involves a multi-step process that requires analysis and assumptions at each stage (Figure 1).

To begin, step 1 of scenario development involves making three choices. First, the geographic scope of the scenario needs to be determined. What area(s) will the analyst build a scenario for: a livelihood zone, a region, or a smaller administrative area? Keep in mind that the more heterogeneous the area, the more difficult scenario building will be. Therefore, if the final scenario needs to cover a large area (such as an entire country or region), breaking this area into smaller pieces (i.e. livelihoods zones, or smaller admin units), and developing a number of smaller scenarios, will facilitate better analysis. Second, the time period of interest needs to be established. For example, will the scenario cover a three-month period or the entire consumption year? Finally, analysts must choose what type of scenario to develop (e.g., a best case scenario, a worst case scenario, a most likely scenario). Note that identifying the “most likely” outcomes is often the most useful for decision makers.

The remaining steps should be performed for each area identified in step 1:

In step 2, current food security conditions and outcomes should be summarized. Are households in the area of concern currently meeting basic food needs? Why or why not? How are they doing so? Through seasonally typical means, like crop production or purchases? Or through less common means, like food aid or atypical selling of productive assets? If deficits do exist, which households are most affected (e.g. a specific wealth group or sub-population)? Are levels of malnutrition and mortality high? And how do they compare to seasonal norms?

The level of vulnerability to future shocks should also be assessed at this stage. What are households vulnerable to? And why are they vulnerable? For example, households in an area may be vulnerable to poor crop production because they rely on agricultural labor during the harvest season for a significant proportion of annual household income. Identifying vulnerabilities is important because it will help to highlight issues that should be considered when making assumptions about shocks and effects in later steps.

Step 3 has two parts. First, likely shocks (also known as hazard events) are identified and the level and extent of these shocks are estimated. Remember that both positive and negative shocks should be identified at this stage. Once likely shocks have been identified, assumptions often need to be made about the timing, duration, and severity of the expected shocks. Frequently, multiple shocks may be expected to occur during the scenario period. For example, a policy decision to stop input subsidies could occur shortly after poor rainfall is forecast and while conflict continues along a key border point.
In the second part of step 3, factors which are expected to behave normally during the scenario period, and are relevant to food security, should be highlighted. For example, if cereal prices are expected to follow their typical seasonal pattern during the scenario period or if expenditure on agricultural inputs is expected to be normal, these are not shocks, but given their relevance to food security they should be explicitly identified during this step of the analysis.

In **step 4**, the direct effects of the identified shocks are estimated. “Direct effects” here refers to precise thing(s) that the shock directly disrupts or alters. For example, poor rains directly affect crop production, as does the lack of inputs. Likewise, conflict may directly affect market access. Better information on the direct effect of a hazard event usually becomes available as the season progresses. However, in order to provide early warning, analysts often need to make assumptions about how a hazard event will affect certain things, such as crop production and market access, given that clear information on these impacts may not yet be available. These assumptions may be based on historical or reference-year information or simply on expert opinion (where historical and other information does not exist). In some cases, the shock may directly affect the household, such as a flood that destroys homes or takes lives. However, in most cases, households are impacted indirectly.

**Step 5** focuses on describing the chains of events which connect the direct effects of shocks to household-level impacts during the scenario period. These events are also known as “indirect effects”. Indirect effects are distinguished from direct effects in one (or more) of three ways:

1. **Timing**: Indirect effects happen after direct effects, though the length of time between direct and indirect effects can be quite variable. *Example: Food prices increase after conflict constrains market access.*
2. **Geography**: Indirect effects may happen in a different area than the shock and direct effects. *Example: Market supplies in a food deficit area may decrease following drought and poor production in a surplus-producing area.*
3. **Location along the supply chain**: The type of effect, direct or indirect, may depend on where people or households are located along the supply chain. *Example: A production shock would affect farmers directly and would then have indirect effects on other groups like laborers, traders, and consumers, whereas a food-price shock would affect consumers directly.*

**Figure 2.** An example of indirect effects

<table>
<thead>
<tr>
<th>STEP 3: A. Identify likely shocks and estimate their level and extent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHOCK</strong></td>
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<td>Rainfall is 75 percent of average</td>
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<table>
<thead>
<tr>
<th>STEP 4: Estimate the direct effects of these shocks/events</th>
</tr>
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<tbody>
<tr>
<td><strong>DIRECT EFFECT</strong></td>
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<tr>
<td>Maize production is 80 percent of the 5-year average</td>
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<tr>
<th>STEP 5: Describe the chain of events through which these direct effects will impact households</th>
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<tbody>
<tr>
<td><strong>INDIRECT EFFECT</strong></td>
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<tr>
<td>Middle and better off households will hire 25 percent less labor for weeding and harvesting</td>
</tr>
<tr>
<td><strong>INDIRECT EFFECT</strong></td>
</tr>
<tr>
<td>Increased competition for jobs will drive wages down 20 percent</td>
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<tr>
<td><strong>INDIRECT EFFECT</strong></td>
</tr>
<tr>
<td>Market supplies of maize will be 10 percent lower than normal</td>
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<tr>
<td><strong>INDIRECT EFFECT</strong></td>
</tr>
<tr>
<td>Maize prices will be 15 percent higher than normal throughout the consumption year</td>
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<tr>
<th><strong>INDIRECT EFFECT/HH IMPACT</strong></th>
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<tbody>
<tr>
<td>Household stocks will decline 30 percent</td>
</tr>
<tr>
<td><strong>INDIRECT EFFECT/HH IMPACT</strong></td>
</tr>
<tr>
<td>Income from wage labor will decline 40 percent</td>
</tr>
<tr>
<td><strong>INDIRECT EFFECT/HH IMPACT</strong></td>
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<tr>
<td>Household purchasing power will decline</td>
</tr>
</tbody>
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Source: FEWS NET
This chain of events between a direct effect and an impact at the household level may be very short in some cases and longer in others. Figure 2 illustrates a simple example of one shock, one direct effect, and the indirect effects which lead to household level impacts. In one case, the chain of events between the direct effect (poor maize production) and household impact (a decline in HH stocks) is very short. However in another case, the chain of events between the direct effect (poor maize production) and household impacts (declining labor income) is more involved. As in step 4, better information on these “indirect effects” may become available later in the season. However, before this information is available, clear assumptions may need to be made in order to construct a useful scenario.

In **step 6**, household and external response options are considered and assumptions about their probable impact on the situation are developed. Where livelihoods information (i.e. baselines, profiles) does exist, it provides useful information on household coping. However, some assumptions may still need to be made. For example, we may know that poor households typically send one member for migratory labor in a bad year. We may have to assume, however, that there is enough demand to support these laborers. Where little or no livelihoods information exists, assumptions may need to be made about how and to what degree households will be able to cope. These assumptions may be based on historical data, anecdotal information, or expert judgment and experience. In addition to assumptions about household response, similar assumptions should be made about the level, timing, and duration of external response (e.g., humanitarian aid, policy decisions, and trader decisions).

In **step 7**, information on initial household-level outcomes (Step 5) and response (Step 6) are pulled together and considered within the context of local livelihood systems to estimate final projected food security outcomes. Remember, in these scenarios we are interested in food security outcomes for people ([See glossary for full definition of food security outcomes](#)). For example, once assumptions about coping and external response have been accounted for, will the household see a net reduction in food and/or income access? Will the impact be significant enough to threaten household livelihood security? Will it be significant enough that households will face food deficits and/or increased risk of acute malnutrition? Ideally, these food security outcomes should be analyzed by livelihood zone(s) and disaggregated both geographically and by population group (e.g., wealth group).

Where livelihood baseline information exists, outcome analyses can be run to project the level and extent of survival and livelihoods protection deficits. In countries where baseline data does not exist, projections should be made based on assumptions about the extent to which a shock will reduce household income and ability to access food. These assumptions may be informed by other types of livelihoods data, like profiles or simple zone descriptions. Even where livelihood baselines do exist, some household-level assumptions need to be made. For example, we assume that households will behave as they did in the baseline year provided assets and opportunities available to them are the same.

When discussing food security outcomes, a mediocre scenario might say “Over the next 6 months food insecurity will increase in the northern agropastoral areas to high and extreme levels”. A better scenario might say something like:

"**Over the next 6 months food insecurity will increase in the northern agropastoral areas to high and extreme levels.** Almost all poor households will face food deficits of up to 20 percent during the peak lean season (September-October) even once significant coping has occurred – likely in the form of livestock sales and increased charcoal production. Among middle income households, those who rely heavily on bean production (about 40 percent of the wealth group), will experience food deficits of 5-10 percent during the same period. Households from both wealth groups that live in the three western districts, where market access is poorer, will likely face even larger deficits, assuming that food assistance programs are"

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1. For information on survival and livelihoods protection thresholds see The Practitioner’s Guide to HEA, which can be reached via the ‘Livelihoods’ section of the FEWS NET website under ‘Guidance and Tools’. [http://v4.fews.net/Pages/livelihoods.aspx?loc=6&I=en](http://v4.fews.net/Pages/livelihoods.aspx?loc=6&I=en)
not initiated. A typical migration from these areas towards the regional capital is likely to take place by August. Better-off households, about 15 percent of the region’s population, will meet all food and non-food needs. Levels of global acute malnutrition, which typically range from 7 to 9 percent during September–October are expected to be above-normal though increased mortality is not expected.

In step 8, events that can change the scenario outcomes are identified and the impacts of these alternative assumptions are described. As discussed above, scenario building requires that food security analysts make many assumptions. For some of these assumptions, the individual or group building the scenario may feel very confident. For other assumptions, they may feel less confident. Additionally, there may be events which are unlikely, but would have a significant impact on food security outcomes (e.g., a hurricane in Haiti) if they occurred. It is important that, in addition to a most likely scenario, information reflecting this uncertainty is also communicated to decision makers. Therefore, to ensure that decision makers have all the necessary information and to ensure that analysts have an opportunity to explain why things may turn out differently than anticipated, it is good practice to identify the key events which, though they are not included in the main scenario, are possible and would result in different food security outcomes than those identified in Step 7.

To accomplish this, all of the various assumptions that were made during the scenario building process should be revisited. This review should include both assumptions about shocks in Step 3 (e.g., how will rainfall perform), as well as assumptions made in other steps of the scenario building process (e.g., assumptions about direct/indirect impacts or response). Next, the analyst should identify the key assumptions in which they have less confidence or which are particularly important to the scenario outcomes. Finally, one should describe how food security outcomes would be different if each of the identified assumptions was incorrect. For example, imagine that an analyst is developing a scenario two months before the start of the main rainy season. The analyst has a medium-term precipitation forecast and, based on this information, has assumed that in the most likely situation rainfall totals will be 20 percent better than normal. This assumption has then informed other assumptions about crop production, labor demand, food prices, and, eventually, food security outcomes. However, the analyst has limited confidence in these forecasts. Therefore, at the end of her scenario the analyst describes how the scenario might change if rainfall is only average, or alternatively, how it would change if rainfall was below normal. This way, if the assumption about above-normal rainfall turns out to be incorrect, decision makers will already have an initial set of information on the ways in which projected food security outcomes will change. Note that these descriptions of how things may turn out differently can be brief. The objective here is not to develop another full scenario, but instead to highlight monitoring priorities.
SECTION 2: Guiding principles

In addition to following the eight steps outlined above, the following guiding principles should be considered when building food security scenarios.

A. Align scenario development with the Disaster Risk Reduction Framework

It order to maintain consistency, food security scenario development needs to use a common vocabulary. Because famine early warning is essentially a form of disaster risk analysis, it makes sense to adopt a vocabulary that is consistent with the internationally agreed upon Disaster Risk Reduction (DRR) framework. Disaster risk is typically understood as a function of some hazard and the vulnerability of a population to that hazard (and likewise, their ability to cope). This relationship can be expressed as follows:

\[
\text{RISK} = f(\text{Hazard, Vulnerability/Coping Capacity})
\]

The DRR framework, expressed in this way, is powerful because it helps us differentiate between cause and effect. ‘Risk’ is the effect or outcome we are measuring, specifically the ‘risk of food insecurity’. There are two factors that cause this outcome: the external cause, which is the hazard; and the internal cause, which is a combination of people’s vulnerability to that hazard, and their capacity to cope with it.

In food security analysis, a household may be ‘vulnerable’ to a particular hazard, but not necessarily at ‘risk’ of food insecurity. Why is this the case? First, a household’s level of vulnerability to a particular hazard will vary depending on how the household meets its basic needs, which is related to its livelihood system – i.e., the assets or capitals (social, natural, physical, financial, productive, and human) available to it. For instance, if a household meets these needs by relying primarily on crop production, then a staple price shock will not necessarily put this household at risk of food insecurity. A drought, on the other hand, may. Second, the magnitude of the hazard is important to consider, as there are variations within each year and from year to year. Third, even if a household is vulnerable to a hazard, it may still be able to effectively respond, or cope, by increasing reliance on livelihood strategies not affected by that hazard, or by drawing down on food stocks or savings. So, the risk of food insecurity depends not only on the household’s vulnerability to a hazard, but also the magnitude of that hazard and the coping capacity of households in the short- and medium-term.

B. Use historical data to inform assumptions

Making informed assumptions about future shocks, effects, and response will always require an assessment of current conditions and some level of expert judgment. However, historical data should also play an important role in informing the development of these assumptions. Historical information can include both quantitative data, like historical price or production data, and qualitative information, like an understanding of how households have coped with similar conditions in the past. For example, information on typical patterns of acute malnutrition could be used to inform estimates of the likely caseload for feeding centers over the coming 6 months. Or, analogue years could help to estimate the likely impacts of forecast rainfall on cropping.

C. Consider the relevant regional and international context

Although food security scenarios are typically developed on a country-by-country basis, it is important to consider regional factors in the analysis. Events in a neighboring or even a distant country can raise important questions about how food security conditions and outcomes will develop. It is important to recognize when such events are likely to impact household food security and to include this information when developing scenarios. For example, are there any trade policies in neighboring countries that will affect food supply and prices in the scenario? Will conflict in a neighboring country affect access to markets, land, or social services? Will above-average regional production offset localized production deficits? Will drought in major cereal-exporting countries (e.g., Thailand, Australia, and the U.S.A.) affect the price of imported cereals?
D. Include clear assumptions about humanitarian assistance

In many areas, humanitarian assistance in the form of food aid distributions, cash/food-for-work, water trucking, and nutritional support play an important role in mitigating food insecurity. In scenario building, incorporation of this type of assistance is critical for two reasons.

1. In areas where humanitarian assistance exists, it has effects on household food consumption, labor opportunities, market supplies and prices, and levels of acute malnutrition. Therefore, it is extremely difficult to remove its impacts from an assessment of current food security outcomes. For example, simply removing direct food aid distribution from an assessment of current food security does not provide an accurate picture of underlying conditions as less direct impacts, like those on price and nutrition, have not been accounted for.

2. The purpose of early warning analysis is to help decision makers prioritize scarce resources, therefore it is important to highlight areas where assistance (or likely assistance) is expected to mitigate future food insecurity so that remaining resources can be utilized elsewhere.

When developing Step 2 (Current food security conditions and outcomes), analysis should incorporate the impacts of all major assistance programs on food security outcomes. When looking ahead, analysts should make assumptions about assistance based on their knowledge of planned programming (Step 6). Assistance which has been planned and allocated for should be incorporated, along with any caveats regarding adequacy, targeting, timeliness, and anticipated impact. For example, the impacts of a regularly funded program like Ethiopia’s Productive Safety Net Program, or WFP’s long-term response in Somalia, should be included in assumptions about response. However, these assumptions might be qualified to address, for example, the likelihood of late delivery in Ethiopia and significant leakage in Somalia. Programs for which there is little clear information on the size, location and duration of assistance or where there is considerable uncertainty as to whether assistance will be allocated can be left out of scenario development but could be addressed in Step 8 when considering events which might change scenario outcomes. Remember, whatever assumptions are made about assistance, they should be clearly articulated so that analysis is as transparent as possible.

E. Incorporate seasonality into scenario analysis

Just as shocks will impact different households in different ways, they will impact households differently at different times during the scenario period. For example, a spike in staple food prices will have more of an impact if it occurs during a period when food stocks from own production are depleted and households are more reliant on purchases. Crop losses may affect agricultural laborers both during peak labor periods (loss of cash income and in-kind payment) as well as following the harvest (losses in own production for sale and consumption). Similarly, options for household response will change depending on the time of year. Households might typically rely on the collection of wild foods during the lean season. But, if the harvest is especially poor and food shortages begin earlier than normal, these foods may not yet be available. As such, scenarios should be sure to include a consideration of seasonality. Discussion of shocks, effects, and response should include information on timing and scenarios should describe food security outcomes over the course of the scenario period, not just at the end.

F. Provide clear descriptions of food security outcomes

Food security analysis is ultimately concerned with the food security outcomes for people. As such, scenarios must go beyond the prediction of shocks (e.g., crop failure or high food prices) and the description of food security conditions to an analysis of how these shocks will impact households and affect their food security. Food security outcomes should describe the level of food access and food utilization of households and people in the area of analysis. This includes a description of who is food insecure (e.g., what population or wealth group, size of the food insecure population), the expected duration of this food insecurity, the severity of this food insecurity, and any relevant comment on coping or external response.
SECTION 3: A step-by-step example of scenario development

This section provides an example scenario that follows the steps outlined above. This is a simplified example and does not consider the multitude of factors that could enter into a scenario. Instead, it provides an illustration of how the steps of scenario development fit together in order to predict food security outcomes. Our example will focus on the imaginary “Republic of Sanda”.

In February 2009 the Republic of Sanda’s National Vulnerability Committee (NVC) conducted its annual meeting and developed a food security scenario to inform assistance planning for the coming year.

STEP 1: Choosing areas of focus and scenario time frame

The NVC began by choosing areas of focus and a scenario time frame. Altogether, they developed scenarios for four areas. One area was the Midlands Cotton, Cereal, and Livestock Zone (MCCLZ). This area was chosen because it is a chronically food insecure area of the country and because forecasts for the main season rains were poor. Figure 3 includes a seasonal timeline for this area. The MCCLZ is unimodal, with the long rains normally falling from mid-February through the end of May. The last two months of the long rains correspond with the period of highest cereal prices and lowest household stocks, a period typically referred to as the lean season. The green cereal harvest occurs in June and the main cereal harvest begins in July and runs through September. The harvest of cotton, an important cash crop, runs from August to October. Local labor demand peaks during the cereal and cotton harvests. Later in the year, poor households migrate to other areas of Sanda for work. For those households which own livestock, milk production and sales are highest between May and September.

The NVC chose to create a scenario that covered the upcoming 16 months, from the start of the 2009 long rains though the end of the next year’s hunger season. Though this is a relatively long scenario period, the NVC hopes to use the scenario outcomes to inform early mitigation activities. The NVC also decided to develop a “most likely” scenario.

Figure 3. Choosing areas of focus and scenario time frame for the MCCLZ scenario
STEP 2: Summarize current food security conditions and outcomes and assess vulnerability

The next step is to summarize current food security conditions and outcomes and to assess vulnerability to shocks or hazard events. This information provides a starting point, or foundation, for your scenario building. Without understanding the current context, it is extremely difficult to project future conditions.

In the Sanda NVC meeting, the group described current conditions January 2009 in the following way:
- Last year’s crop production and labor demand were normal
- For poor households, own production lasted about five months, from August to December. This was normal.
- These households have now shifted to market purchases, as is typical for this time of year.
- Prices for maize, the main staple consumed in this area, are near the nominal five-year average.

Given these conditions, food security outcomes were estimated as follows:
- No widespread food deficits exist; households are generally food secure.

The group also identified two particular areas of vulnerability:
- Poor households rely heavily on labor to earn income and purchase cereals to supplement crop production. When the cropping season is poor, and labor demand declines, these households have limited coping options. These households are therefore highly vulnerable to staple food price increases and loss of labor opportunities associated with poor crop production.
- Mothers typically begin giving infants water as early as one month after birth. This makes children much more vulnerable to illness, especially when water shortages mean that available water is lower quality.

Figure 4. MCCLZ scenario: Current food security conditions and vulnerability

Source: FEWS NET
**STEP 3: Identify likely shocks and estimate their level and extent**

Once the area of focus and the timeframe of the scenario had been established, and current conditions and outcomes summarized, the group began to consider likely shocks and to identify key factors that were expected to behave normally.

In late January, the Sanda Meteorological Agency (SMA) released a probabilistic forecast which concluded the following: For the entire northern half of the country (where the MCCLZ is located), the probability of above-normal rainfall was 20 percent, the probability of normal rainfall was 25 percent and the probability of below-normal rainfall was 55 percent. The SMA identified 1988, 1991, and 1999 as analogue years. During these years, rainfall in the MCCLZ ranged from 25 to 50 percent below the long-term average. In one of the years, rains also ended 1 month early. After reviewing the forecasts, historical data, and the current food security context, the group developed the following assumption about a rainfall shock:

- Between March and June, rainfall totals will be ~40 percent below normal across the Midlands Cotton, Cereal, and Livestock Zone.

In addition to this shock, the group also assumed the following:

- No trade bans would be enacted by neighboring countries during the scenario period and as a result regional markets would function normally.
- Area planted would be normal.

**Figure 5. MCCLZ scenario: Identifying shocks and factors that will behave normally**
STEP 4: Estimating the direct effects of the shocks

After identifying below-average rainfall as an expected shock, the NVC then moved on to estimating the direct effects of this shock, as well as the timing and duration of these effects. Likely direct effects included:

- Based on a review of crop production in analog years, food crop harvests between late July and September will be 30 percent below normal.
- Because cotton needs more water than cereal crops, cotton harvests between August and October will be 40 percent below normal. The cotton that is harvested is likely to be of lower quality.
- The availability of pasture and browse will be poorer than normal and will be completely unavailable in normal grazing areas for up to half the season.
- The availability of drinking water for animals and humans will be lower than average.

Figure 6. MCCLZ scenario: Estimating direct effects

Source: FEWS NET
STEP 5: Describe the chain of events through which direct effects will impact households

Next, the NVC constructed the likely chains of events that would link the direct effects of poor rainfall to household level impacts. The development of these chains of events was based on livelihoods information, an understanding of market structure and behavior, and historical data. The indirect effects included:

- As a result of poor food crop production, household maize and sorghum stocks will be reduced by 20 percent.
- Households will also sell 40 percent less grain and will sell earlier in the year. This will lead to a 40 percent reduction in market supplies, a subsequent increase in local retail cereal prices, and a 25 percent decline in income from cereal sales.
- The poor quality of local cotton will push prices down 10 percent, reducing middle and better-off household income from cotton sales.
- Given poor pasture and browse, livestock body conditions will deteriorate and animals will produce little milk. This will result in reduced income from livestock sales (↘ 20 percent) and reduced milk consumption (↘ 25 percent) by households.
- The combination of reduced income from livestock sales, cereal sales, and cotton sales, and increased cereal prices will likely result in a 30-50 percent deterioration in household purchasing power.
- Finally, a decline in potable water availability will force households to shift to lower-quality water sources.

Figure 7. MCCLZ scenario: Connecting direct effects and household impacts
STEP 6: Consider household and external response

After describing initial household impacts, the NVC estimated the likely responses of various actors, including households, traders, the government, and humanitarian agencies. These responses include the following:

- Better-off households will hire 60 percent less agricultural labor this year due to poor cotton production. This will negatively impact poor household income, as these household rely on this labor for a substantial proportion of annual income.
- Poor households will rely on remittances and will send one additional household member to labor in the Highland Maize Zone where better rainfall is forecast. This combination of strategies is expected to bring in additional cash equivalent to 20 percent of annual poor household cash income, plus the food needs of these household members will be covered while away from home between October and December.
- Traders will make up for some of the market supply shortfall by bringing in additional cereals from the south, increasing cereal supplies and reducing cereal prices in the MCCL zone’s main market between December and June.
- Social safety-net programs will be ramped up, and the government will control cereal prices, in part by releasing 15,000 MT of maize from its strategic grain reserves.
- WFP will appeal for food aid, but food aid is not likely to arrive until late May, when it will help to mitigate food deficits during the final weeks of the lean season.

Figure 8. MCCLZ scenario: Household and external response
STEP 7: Estimate projected food security outcomes

Finally, the NVC considered both household impacts from Step 5 and the likely responses outlined in Step 6 in the context of local livelihoods in the MCCL zone. Using this combination of information, they then projected food security outcomes over the course of the scenario period. Their conclusions were as follows:

- Between February and May 2009, all households will be able to meet basic food needs, though a portion of poor households will have to sell 2-3 small livestock in order to do so. These sales are normal.
- Between June and December 2009, despite the poor harvest and the impacts on household food stocks and employment, poor households will likely meet basic food needs, though by the end of this period food purchases will likely be funded by additional, atypical livestock sales.
- Between January and March 2010 poor households will have less seed and will plant less.
- Between January and mid-May 2010, poor households (75,000 people) will face food deficits of up to 20 percent. Poor households are also likely to face very poor dietary diversity because of a reduction in milk and vegetables in the diet.
- During the final weeks of May 2010, WFP food aid will mitigate food deficits among poor households.
- Food shortages and water borne diseases will likely lead to an increase in the prevalence of acute malnutrition, especially if potable water does not reach this livelihood zone by March through either water trucking or construction of new boreholes.

Figure 9. MCCLZ scenario: Projected food security outcomes

Source: FEWS NET
Step 8: Identifying factors which could change the scenario outcomes

Once the scenario was completed, the NVC worked on identifying factors which could change the food security outcomes reflected in the scenario. Two possible events were identified:

- Main season rains are normal, rather than significantly below normal.
  - If this occurred, cereal and cash production, labor demand and pasture conditions are likely to be normal. As a result, no widespread food deficits would be expected during the scenario period.
- Traders do not respond as anticipated and no additional stocks flow to the MCCLZ from the south.
  - Local market cereal deficits remain at 40 percent, thus pushing food prices higher than current expectations. Food deficits, especially for poor households would be larger, particularly late in the hunger season.

Figure 10. Events which would change the scenario outcomes, and their likely effects

Source: FEWS NET
FINAL SCENARIO

The Midlands Cotton, Cereal, and Livestock Zone (MCCLZ) is a chronically food insecure area in the western part the country. The MCCLZ is unimodal, with the long rains normally falling from mid-February through the end of May. The last two months of the long rains correspond with the period of highest cereal prices and lowest household stocks, a period typically referred to as the lean season. The green cereal harvest occurs in June and the main cereal harvest begins in July and runs through September. The harvest of cotton, an important cash crop, occurs from August to October. Local labor demand peaks during the cereal and cotton harvests and is a key source of income for poor households. Later in the year, poor households migrate to other areas of Sando for work. For those households which own livestock, milk production and sales are highest between May and September.

In 2009, crop production and labor demand in the MCCLZ were normal. On average, poor households produced enough cereals for five months of consumption, from August to December. After December, poor households shifted normally to market purchases. Markets in the area are well supplied and prices for maize, the main staple consumed by the poor, range from 23 to 27 pesos/kg, close to the five-year average. No significant food deficits currently exist. However, households in this area, particularly the poor, face two key vulnerabilities. First, they rely heavily on local agricultural labor to earn income for market purchases which supplement crop production. Therefore, they are vulnerable to high food prices or declines in labor demand/wages and these events can put these households at significant risk of food insecurity. Also, poor infant feeding practices mean that children in this area are especially vulnerable to water-borne diseases, and therefore more at risk of acute malnutrition, especially during the dry season when potable water is scarce.

Based on recent forecasts by the Sanda Meteorological Agency, and comparisons to analogue years, it is likely that between March and June, main season rainfall totals will be ~40 percent below normal across the Midlands Cotton, Cereal, and Livestock Zone. As a direct result of this shortfall, and based on analog years, it is assumed that food crop harvests between late July and September will be 30 percent below normal and cotton harvests between August and October will be 40 percent below normal. The cotton that is harvested is likely to be of lower quality. In addition, the availability of pasture and browse will be poorer than normal and will be completely unavailable in normal grazing areas for up to half the season. The availability of drinking water for animals and humans will be lower than average. It is assumed that no trade bans will be enacted during this period and area planted will remain normal.

For households, these declines in crop and pasture production will reduce maize and sorghum stocks, and livestock body conditions and milk availability will be below average. Roughly 40 percent less grain will be available on local markets immediately following the harvest. Though additional supplies will flow in from neighboring areas and from government stocks, the reduction in stocks is expected to drive an above normal increase in local market cereal prices of between September and May 2009. Cereals normally increase 15-20 percent during this period. Cereal prices in the main regional market are also likely to increase, though the size of this increase will be smaller than in local markets. Households are also expected to shift to lower-quality water sources due to below-average availability of drinking water.

Despite the production shortfalls, middle and better-off households will produce enough grain for most of their consumption needs and will be able to purchase any additional cereal needs on local markets, despite higher prices. However, given poor cotton production, they will hire 60 percent less labor during the harvest period. Poor households will not produce enough grain or milk for their consumption needs and will not earn enough money from cotton sales or labor to purchase sufficient food on the market. In order to cope, poor households will rely on remittances and will send one additional household member to labor in the Highland Maize Zone where better rainfall is forecast. Social safety-net programs will be ramped up; the government will attempt to control cereal prices, in part through the release of 15,000 MT of maize from its strategic grain reserves. Traders will make up for some of the market supply shortfall by bringing in additional cereals from the south.
Once household, market, and government responses have been incorporated, the following food security outcomes are expected. First, between February and May 2009, all households will be able to meet basic food needs, though a portion of poor households will engage in normal livestock sales in order to do so. Second, between June and December 2009, despite the poor harvest and the impacts on household food stocks and employment, poor households will likely meet basic food needs, though by the end of this period, food purchases will likely be funded by atypical livestock sales, which may have longer-term impacts on herd sizes. Then, between January and May, poor households (75,000 people) will likely face food deficits of up to 20 percent. Poor households will also face very poor dietary diversity because of a reduction in milk and vegetables in the diet. Food shortages and water-borne diseases will likely lead to an increase in the prevalence of acute malnutrition, especially if potable water does not reach this livelihood zone, via trucking or new boreholes, by March. In late May, WFP food aid is expected to arrive and will mitigate food deficits among poor households during the final weeks of the lean season. Finally, poor households are expected to have less seed and therefore will plant less this year. This will affect 2010 production and food security, even if rainfall improves next year.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Impacts and food security outcomes</th>
<th>Likelihood of occurrence</th>
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<tbody>
<tr>
<td>Main season rains are normal, rather than significantly below-normal</td>
<td>Cereal and cash crop production, labor demand and pasture conditions are likely to be normal. As a result, no widespread food deficits would be expected during the scenario period.</td>
<td>Possible, but unlikely</td>
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<tr>
<td>Traders do not respond as anticipated and no additional stocks flow to the MCCLZ from the south</td>
<td>Local market cereal deficits remain at 30 percent, thus pushing food prices higher than current expectations. Food deficits, especially for poor households would be larger, particularly late in the hunger season</td>
<td>Very unlikely</td>
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Section 4 - Glossary of key terms

analogue year - a year in history that mimics/relates to the current year and can therefore help to support assumptions about how the current year may progress. In food security analysis, analogue years are most commonly used in relation to climate and seasonal forecasts. Information about current atmospheric and oceanic conditions/patterns is used to identify similar years which may suggest likely precipitation and temperature behavior. Analogue years can also be used to look at other issues, like market behavior and food prices.

assumptions – for the purpose of scenario building, assumptions are judgments about future conditions based on an analysis of alternative courses of events. Assumptions can be based on current conditions (e.g., rainfall pattern to date), on past experiences (a reference period, or how a similar series of events unfolded, such as a previous drought), official or unofficial estimates or projections, qualitative or quantitative data, and/or expert judgment. Assumptions can be made at any level of analysis (i.e., household, village, market, district, national, regional, or international). Assumptions form the basis of a scenario and support and reasonably limit its scope.

coping – contending with difficulties and acting to overcome them. In food security, we typically speak of coping capacity and coping strategies. Coping capacity refers to the ability of households to diversify and expand access to various sources of food, income, and other basic needs, and thus to cope with a specific stress. Coping strategies are the tactics used by households for this purpose. Coping strategies can be positive, neutral, or negative in terms of their impact on livelihood systems and individual wellbeing.

disaggregation – to divide into constituent parts. In scenario building, disaggregation is distinguishing responses, effects, impacts and outcomes across different geographic areas, entities (e.g., markets) or population groups (e.g., wealth, income, ethnic, or other socio-economic groups). It is important to provide information with the level of disaggregation that decision makers find appropriate given the responses they need to design, implement, or support.

effects – are the consequences of an event on a population group, geographic area, or the environment that are expected to have implications on food security (typically between now and the next agricultural season). Effects can be positive or negative; with most shocks there are those who benefit as well as those who suffer. Effects can be either direct or indirect.

Direct effects are immediately linked to a shock. For example, in a particular district, rainfall of 50 percent below normal results in 20 percent crop failure. The crop failure is a direct effect of the rain failure.

Indirect effects are less closely linked to a shock. For example, in a particular district, rain failure results in 20 percent crop failure, which increases demand for purchased grains on the local market. The increased demand is an indirect effect of the rain failure.

food security conditions – the context with regard to external circumstances and influences related to food security. Food security conditions are different from food security outcomes as outcomes refer to the final situation faced by individuals and households once all conditions and response have been analyzed. For example, food security conditions may describe seasonal progress, food prices, and labor demand, while food security outcomes will describe whether households are able to access and utilize the food needed for a healthy life.

food security outcomes - are short-, immediate-, or longer-term changes in food security status resulting from a specified course of events. In relation to scenario development, the food security outcomes incorporate both initial household impacts as well as household and external response (i.e. the state of households after household coping has taken place, markets have responded, expected changes in governmental and non-governmental programs have occurred). Outcomes can be positive or negative. A description of food security outcomes should explain who is food insecure (e.g. what population or wealth group, size of the food insecure population), the expected duration of food insecurity, the severity of food insecurity, and any relevant comments on response.

hazard – A hazard is a situation that poses a level of threat to life, health, property, or environment. Most hazards are dormant or potential, with only a theoretical risk of harm. Once a hazard becomes "active", it is called a shock (or in
some cases, a hazard event). For example, an active volcano is a hazard whereas its eruption would be a shock. Hazards can be single, sequential, or combined in their origin and effects. They are characterized by their location, intensity, frequency, and probability. Hazard and vulnerability interact together to create risk. Hazards can have different origins: natural (geological, hydro-meteorological and biological) and/or induced by human processes (environmental degradation and technological, political, economic, or social threats).

**impacts** – although similar to effects, for the purposes of clarity for the scenario building process, the term impacts is reserved to refer to consequences at the household level (as a result of crop failure, intervention programs, etc). Impacts can be either intended or unintended, and can be positive or negative. For example, if local demand for a specific commodity is not met or not met at reasonable cost, some households in the area may face food deficits. In this case, food deficits are an impact of inadequate or unaffordable food supplies. For scenario building, impacts are distinguished from outcomes because outcomes reflect the combination of household impacts and expected response.

**normal conditions** – describe a typical situation with regard to external circumstance and influences. Normal conditions include typical or average attributes, characteristics, or relationships (e.g., weather, market behavior, livelihoods, etc). They provide a framework, baseline, or reference period that can then be compared to current and/or projected conditions.

**purchasing power** - the value of money, as measured by the quantity and quality of products and services it can buy. As prices move upwards, the purchasing power of individuals erodes, unless incomes also increase.

**response** – is any action taken before, during, or after a potential change in food security is identified that is taken with the intention to prevent or mitigate food insecurity or vulnerability to food insecurity and/or to avoid loss of life or livelihoods. Responses can come from households, local governments, communities and civil society, the private sector, non-governmental organizations, multilateral organizations, and other regional and international sources. Markets and traders may also respond to the effects of a shock, though the drivers behind their response may be different.

**risk** – the probability of harmful consequences or expected losses (of lives, livelihoods, persons injured, property, economic activity disrupted, or environment damaged) due to a particular hazard for a given area and reference period resulting from interactions between natural or human-induced hazards and vulnerable conditions. Risk can be expressed as the product of hazard and vulnerability: \( Risk = f(\text{hazard} \times \text{vulnerability/coping}) \)

**scenario** – in the context of food security analysis, an informed if/then analysis that communicates shocks, the direct and indirect effect of those hazards on different variables (e.g. food prices, production), response by both households and other actors, and the net food security outcomes for different households in specific geographic areas. Scenarios are rooted in a series of reasonable assumptions that are based on existing conditions, historical information, and expert judgment. Scenarios are used to project likely future conditions and inform decision making processes.

**scenario building** - is the process of estimating food security outcomes for a specific population by constructing possible courses of events. Scenario building allows for improved decision making by providing more complete consideration of possible outcomes and their implications. For food security analysis and early warning purposes, the outcomes of a scenario-building exercise are focused on the events, impacts and responses that have an effect on food security.

**shock** – an event or series of events (either rapid or slow-onset) which have a detrimental effect. For example, a failed harvest or rising food prices are examples of shocks that can negatively affect the food security of certain population groups. A shock differs from a hazard in that it is an event which has already occurred or is occurring while a hazard indicates a potential threat. (Sometimes shocks are also called "hazard events").

**vulnerability** – the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community or population group to hazards. There is no general state of vulnerability; people can only be vulnerable to something. For example, farmers cultivating along a river bank may be vulnerable to floods (which is likely to wash away their crops), but may not be vulnerable to drought (since they can irrigate their crops using water from the river).