Seasonality Revisited

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Livelihoods Impact Analysis and Seasonality in Ethiopia

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Draft

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Introduction

Growing evidence suggests that disaster occurrences have undermined progress towards the Millennium Development Goals. Reducing poverty and hunger is contingent on the establishment of a set of policies and associated programmes that support people's livelihood systems and strategies and 'proof' these against ongoing expected and unexpected hazards. It is well recognized that a failure to address inter-annual disaster risks can undermine years of investment in poverty reduction measures. What is less well recognized is that a similar failure to take into account intra-annual – or seasonal – variability can also erode efforts to protect lives and livelihoods.

An understanding of *when* certain things happen in the annual cycle of rural livelihoods is an important basis for programming development and emergency assistance. The goal of humanitarian and development assistance – to protect and support lives and livelihoods – presupposes that we know when productive activities occur throughout the year so we can ensure timely support; that we avoid imposing unsustainable labour or investment demands at critical times of the year; that we ensure aid is delivered during periods when it will be of most use, and create the least harm.

The challenge we face now is not to argue for the importance of understanding more about seasonality; there is abundant evidence to support this claim. Rather, the challenge is to develop tools and approaches that regularly bring these seasonal patterns to light, and allow us to link them, in an effective operational way, to development and emergency planning processes.

The Livelihood Impact Analysis Spreadsheet (LIAS), developed within the context of the Ethiopian early warning system in response to a growing need to integrate an understanding of livelihoods into the emergency assessment process, begins to address the challenge stated above. The following briefly explains how the LIAS can be used to help:

1. identify the relative importance of different sources of food and income for rural households in 170 livelihood zones in Ethiopia
2. highlight the variable seasonal impact of hazards, depending on their timing

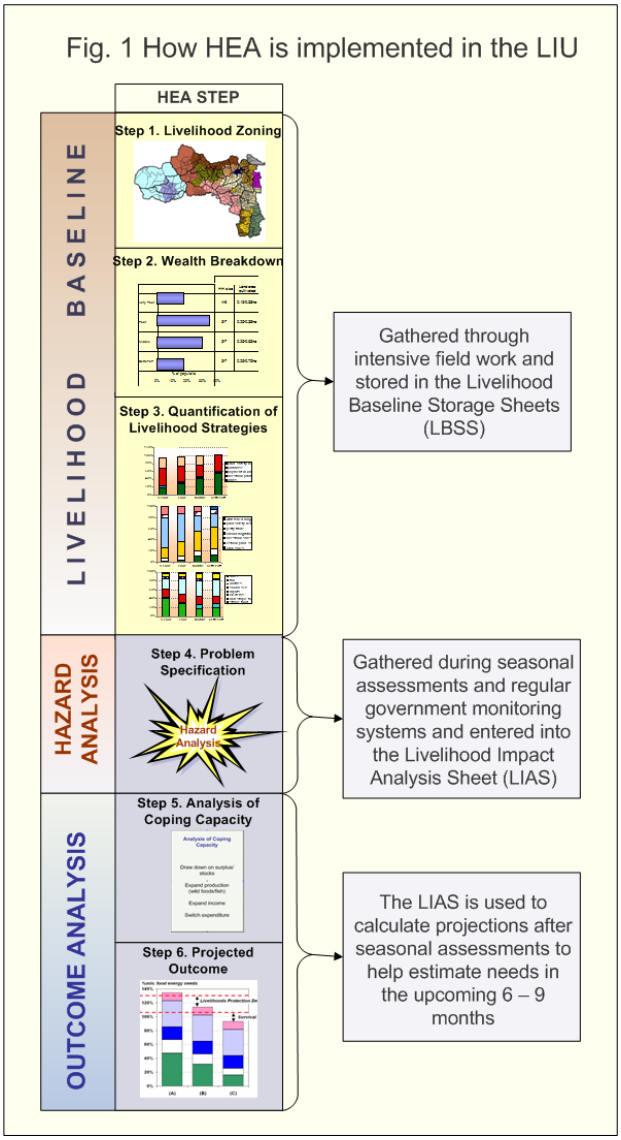
These functions are important for

- improving the accuracy and timing of emergency assistance
- guiding nutritional surveillance
- customizing monitoring indicators and schedules
- suggesting leverage points for development support

Background

The Livelihoods Integration Unit (LIU) was established in 2006[1] within the Ethiopian government's Disaster Prevention and Preparedness Agency (DPPA)[2] in order to build the capacity within the government's early warning system to take into consideration the complex livelihood systems at play throughout Ethiopia. The establishment of the system followed five years of pilot activity and consensus building within Ethiopia's humanitarian community, which tested the relative merits of different approaches. The outcome of this process was a decision to transform the indicator-based, largely crop-focused early warning system into one that was grounded in a systematic understanding of rural households across the country. The analytical framework that was chosen to implement this decision is called the Household Economy Approach (HEA)[3].

Fig. 1 How HEA is implemented in the LIU



1 The LIU is funded by USAID. The overall objective of the LIU is to build the capacity of the Early Warning Department to utilize a common livelihoods-based, quantitative framework for providing early warning of food crises, and for assessing and analysing emergency needs. The project came about after years of pilot exercises and deliberation on the part of the inter-agency Early Warning Working Group.

2 The LIU was moved under the Ministry of Agriculture and Rural Development (MOARD) Disaster Management Food Security Sector (Disaster Management Food Security Sector) when the DPPA was dissolved in 2008.

3 The LIU uses the Household Economy Approach (HEA) as an organizing framework. HEA draws out the components of people's livelihoods, and allows analysts to systematically determine how people will be affected by a wide range of shocks, including those related to weather, markets, policies, and health. It provides a holistic picture of how people live, what puts them at risk of food or non-food shortages, and ultimately which types of responses (food, cash, or in kind non-food) are most appropriate. For more on HEA refer to The Practitioners Guide to HEA, FEG, SC UK, RHVP, 2008 or write to info@feg-consulting.com.

The LIU's Analytical Framework

At the heart of HEA is the contention that in order to predict the effects of any hazard or set of hazards in a bad year, you need first to be able to understand the ways that people piece together their livelihoods in normal years. Not every household will be vulnerable to every hazard; and in order to distinguish between those who will and will not be affected, we need to be able to understand the community structures and relationships that link households to their local economy, and the wider economic systems that link them to the outside world.

Figure 1 summarizes the three main components of HEA: 1. Livelihood Baselines; 2. Hazard Analysis; and 3. Outcome Analysis. In HEA quantified information from the livelihood baselines is linked to quantified data from the hazard analysis to generate projections about whether people will or will not be able to meet their basic needs. This process – of combining baseline and hazard information to make projections – is referred to in HEA as Outcome Analysis[4].

By July 2009 the LIU will have finished a comprehensive livelihood baseline for all rural areas in Ethiopia. There are 170 livelihood zones in Ethiopia, and for each of these a set of data has been stored that captures:

- the relative importance of sources of food, cash income and expenditure for each wealth group;
- a seasonal calendar that indicates the main production and marketing periods, along with other information on health and intra-annual hazards;
- the basic reference data for monitoring hazards, including time series data for crop production and staple prices

One of the main advantages to the HEA baseline information is that it can be used in a dynamic risk analysis process once imported into an analytical tool called the Livelihood Impact Analysis Sheet (LIAS). The LIAS, and in particular its seasonal functionality, is discussed further below.

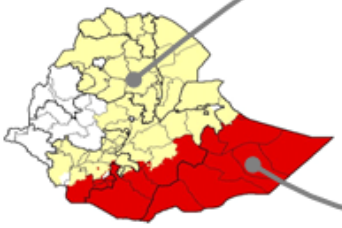
[4] For more information on how HEA is used in the LIU please see "The Livelihoods Integration Unit: Uses of the Information and Analysis", Livelihoods Integration Unit (LIU), MOARD/DMFSS, Addis Ababa. 2009.

Quantifying Seasonal Access

Important to note for the purposes of this paper is that the quantified information on livelihood strategies is seasonally-specific. Every source of food and cash income is time-bound, and this is reflected in the data stored in the Livelihood Baseline Storage Sheets (LBSS).

For instance, Figure 3, below, shows a small section of the data included in the LBSS for Degahbur Agropastoral Livelihood Zone in Somali Region of Ethiopia. In this area, as shown in Figure 2, there are two rainy seasons: the first season occurs from April to May; the second is from October to November.

Fig. 2. Names of Seasons in Ethiopia



Source: Mark Lawrence, FEG Consulting, for the LIU

Areas where kremt is the main season:			
	1st Season Apr-May	2nd Season Jun-Sep	3rd Season Dec
Afar	Sugum	Karma	Dada
Tigrinya	Belgi	Kremti	-
Amharic	Belg	Kremt	-
Oromifa	Afrasa	Gana	-
Somali	Diraac	Keren	Heys

Areas where belg is the main season:		
	1st Season Apr-May	2nd Season Oct-Nov
Oromifa	Gana	Hagaya
Somali	Gu	Deyr

This rainfall is crucial for pasture regeneration, which sustains the camel, cattle and goat/sheep herds upon which people depend. As shown in Figure 3, the food value generated by each of these seasons can be captured in quantitative terms.

Fig. 3 Quantifying Seasonal Food & Cash Income Sources

Degahbur Agropastoral Livelihood Baseline Spreadsheet

1	Somali Region Baseline Update - Jan-Jun	Degahbur Agropastoral L			
2		SUMMARY			
3	WEALTH GROUP	BASELINE			
4	District	Very Poor	Poor	Middle	B/Off
5	Village/settlement				
6	Interview number				
7	Interviewers				
685					
686					
687					
688	Food Summary - detailed				
689	**Livestock products**				
690	Camels' milk - season 1	0%	2%	15%	32%
691	Camels' milk - season 2	0%	1%	7%	14%
692	Cows' milk - season 1	0%	1%	4%	5%
693	Cows' milk - season 2	0%	1%	3%	5%
694	Sheep's milk - season 1	0%	1%	0%	0%
695	Sheep's milk - season 2	0%	0%	0%	0%
696	Goats' milk - season 1	0%	4%	7%	7%
697	Goats' milk - season 2	0%	0%	1%	1%
698	Own meat	0%	1%	6%	6%
699	**Crops**				

Shown here is the contribution of camels' milk to the annual kilocalorie needs of very poor, poor, middle and better off households (from left to right respectively)

The first line shows the importance of camel milk obtained during the **April-May rains**: 32% of annual needs for better off households; 15% for middle, 2% for poor, and 0% for very poor households.

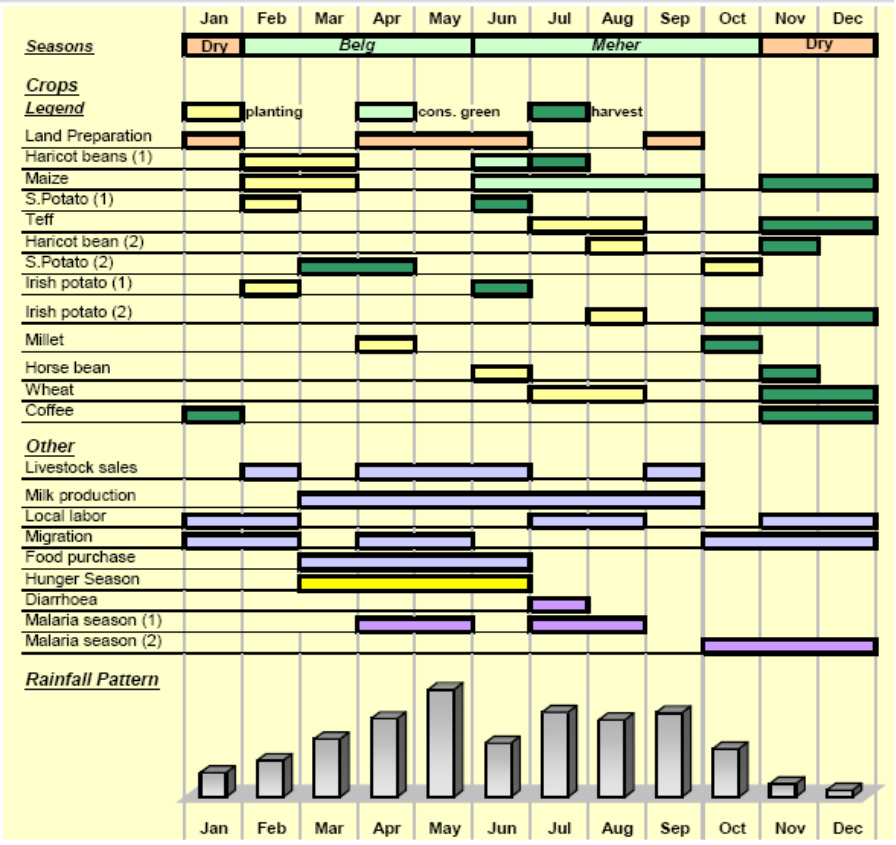
The second line shows the importance of camel milk obtained during the **October-November rains**: 14% for better off households, 7% for middle, 1% for poor, and 0% for very poor households.

Source: LIU/MOARD

The implications of having this data on hand by season are that it is now possible to analyse how a failure in the *Gu* (Apr-May) or the *Deyr* rains (Oct-Nov) will translate into effects on access to food at the household level. This is important for two reasons: it improves our monitoring precision; and it increases the accuracy and timing of emergency interventions.

In addition, for each Livelihood Zone, a detailed seasonal calendar exists, documenting the main cropping seasons and associated activities (preparation, planting, weeding, harvesting); livestock production seasons (birthing, milking, etc.); main marketing seasons (crops, livestock, labour, etc.); seasonal health risks; and other activities. Figure 4 provides an example of a seasonal calendar from Kedida-Badewacho Livelihood Zone in SNNPR. These seasonal calendars contain powerful insights into rural life. It is in their ability to convey something about the complexity of people's lives that we can see the hidden constraints and opportunities that regulate household activities. We are able to understand a little better why households with little labour would be hard pressed during January, February and March, when planting times coincide with the tail end of the coffee harvest, as well as migratory and local labour opportunities. We can see why the second sweet potato harvest is so critical, filling a March-April gap at the height of the hunger season. And we can see why an emergency food intervention, if deemed appropriate, would be a good time to hand out mosquito nets as well.

Fig. 4 Seasonal Calendar for Kedida-Badewacho Coffee Livelihood Zone



Source of rainfall data: National Meteorological Service Agency (NMSA) Data Archives (long-term average).

Livelihood Impact Analysis

The LBSS, illustrated briefly above, is useful because it stores the livelihoods information in a standard, accessible format, but as it stands, this baseline information on its own is static. In order to conduct a dynamic analysis, the baseline information is exported to the Livelihood Impact Analysis Sheet (LIAS)[5]. The LIAS is used for Outcome Analysis (see Figure 1). It allows program staff to enter a real or hypothetical problem specification (e.g. a climatic or market shock) and review the outcome in figures and in graphs. The analysis can be used for both emergency response and development planning.

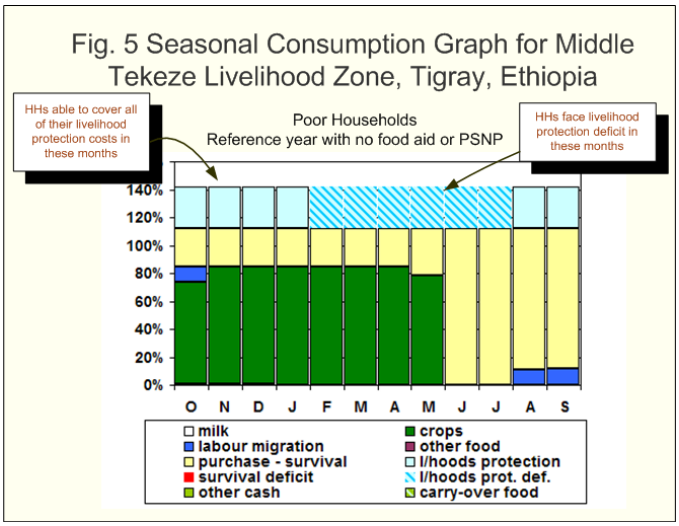
The spreadsheet makes use of HEA protocols to estimate hazard impacts at household level. Three types of data are used for the analysis: 1) Livelihoods baseline data, i.e. data on baseline food, income and expenditure; 2) Coping strategy data, i.e. estimates of the amounts of additional food and cash income that can be accessed to help deal with a hazard; and 3) Hazard data, i.e. data that defines the problem, including changes

[5] Mark Lawrence, of FEG, is the author of the LIAS, and designed the mapping, price, rainfall and livestock monitoring tools currently in use by the LIU.

in crop and livestock production compared to the baseline, changes in market prices, etc. An annual projection is used to ensure sufficient resources are on hand before a crisis occurs; and in the best of worlds the projection encourages remedial action to avert the worst outcomes.

Seasonal Functionality

The LIAS has a seasonal component that combines seasonal calendar data with quantitative food and cash data from the LBSS, making it possible to project the seasonal pattern of consumption. Figure 5 presents a seasonal graph for a poor household in the Middle Tekeze Livelihood Zone in Tigray, Ethiopia.



How to Read the Seasonal Consumption Graphs

The seasonal consumption graphs illustrate the monthly patterns of food and cash consumption and expenditure. The white, green and purple bars represent food that is directly produced and consumed, such as crops, milk, and wild foods or fish. The yellow bar represents food and non-food items that are purchased for survival, using available cash. The light blue solid bar represents items purchased in order to cover other basic livelihood requirements, such as agricultural inputs and school fees. The thatched blue bar shows times of the year when the household is unable to cover the costs of its basic livelihood requirements. The solid red bar shows times of the year when households are unable to cover their minimum survival (food and non-food) requirements.

The graph shows the seasonal importance of own crop production from October through May, followed by exclusive reliance on the market until the harvest starts again the next October. Poor households in this zone meet their survival requirements in the reference year, but are unable, without external assistance, to cover costs to ensure a sustainable livelihood (e.g. agricultural inputs, school fees, health costs, etc.) for six months of the year.

Examples of Seasonal Livelihood Impacts

The graph in Figure 5 illustrates a seasonal consumption graph for a reference year. The seasonal component of the LIAS can also be used in scenario analysis to help estimate when deficits are likely to occur, and when people will be able to once again meet their

needs on their own – both crucial pieces of information for contingency and emergency response planning. It can also help explain how the timing of a specific hazard can affect the outcome of a households' entire year.

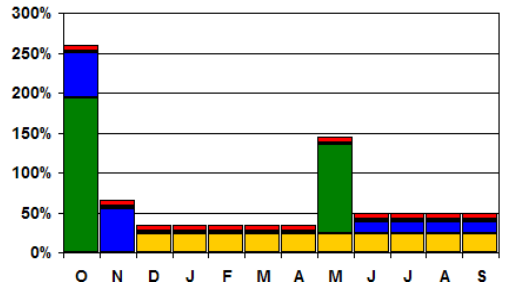
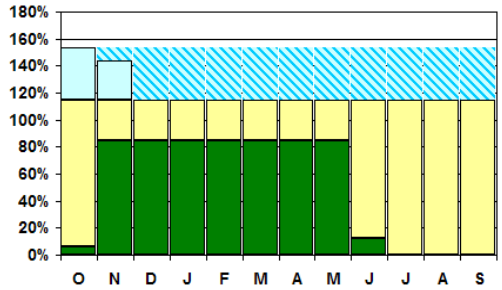
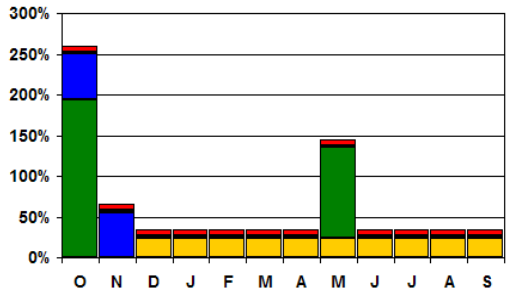
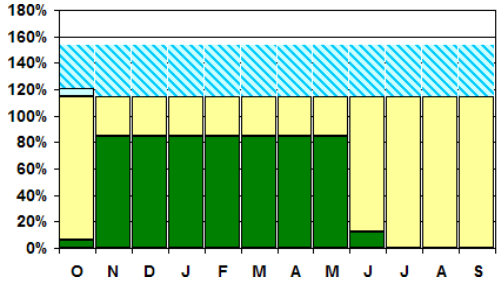
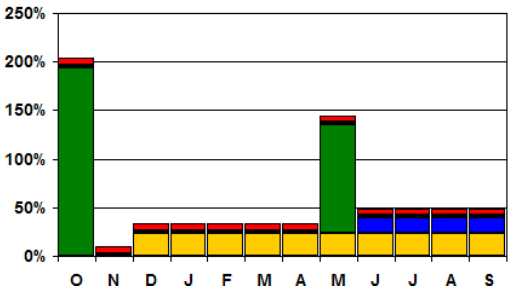
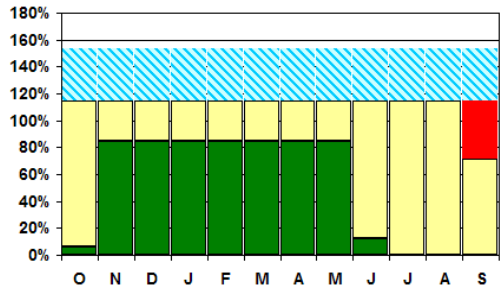
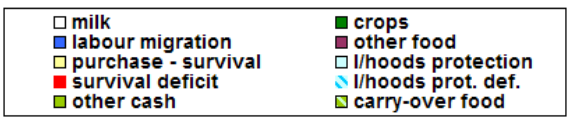
The timing of hazard impacts

The series of graphs below illustrates this point. The first row shows the situation in the reference year for very poor households in Raya Valley Livelihood Zone, with the graph on the left indicating the seasonal pattern of cash income generation, and the graph on the right showing the pattern of seasonal consumption. There are two periods in which agricultural labour is important: weeding/prep labour income is generated from June through September; while harvest labour contributes to households' cash pool in October and November. Very poor households are able to cover all of their survival requirements in the reference year, but can meet their livelihood protection costs in only one month – October.

Using the LIAS to analyse the effects of a labour disruption, it is possible to see the relative importance of weeding/prep labour versus harvest labour. With a loss of weeding labour, households continue to cover their survival requirements, although they lose most of their livelihood protection expenditure. However, the picture changes if harvest labour in October/November is lost, resulting in a survival deficit that emerges months later towards the end of the next year's hunger season in September, when all savings and stocks have run out; here is evidence that the cash income households generate in one month can have critical implications for household welfare throughout the year[6].

[6] The results of this analysis depend heavily on whether or not one assumes that households save cash to cover future deficits. A critical point to make with regards to HEA is that outcome analysis is not designed to model behaviour. Instead, it provides a projection of what access and options are possible. It models the limits of coping. This is consistent with an approach that aims to determine when emergency assistance is necessary. In practice there is likely to be a wide range of variability when it comes to the discipline of different households with respect to spending. At this time the savings option in the LIAS can be set to either assume households will save, or to assume they will not. Further options to model different patterns of saving can be added at a later date if deemed necessary.

Fig. 6 The seasonal effects of income losses in Raya Valley Livelihood Zone, very poor hhs

Seasonal Cash Income	Seasonal Consumption
Reference Year	
	
Scenario #1: Loss of weeding/prep labour	
	
Scenario #2: Loss of harvest labour	
	
	

Multiple Hazard Analysis

While the example above is interesting from a theoretical point of view, providing a method for isolating the impact of a single hazard, real-life hazards are rarely single events. The figure below provides an example of how the seasonal analysis was used to analyse the compounded effects of multiple hazards, helping explain the severe food crisis experienced in parts of SNNPR in 2008.

In this area, a failure of the *belg* rains can lead to rapid declines in nutritional status between January and June, often with very little warning. The seasonal analysis presented below shows how this can happen.[7]

Failure of the *belg* rains not only resulted in a loss of sweet potatoes, but agricultural labour, upon which poor households depend. The demand for agricultural labour dries up if there are insufficient rains. It was due to this lack of income, in combination with a steep increase in staple prices (associated with the global food price crisis) that malnutrition was emerging long before the sweet potato crop would have normally been harvested. The series of graphics shows the effects of this sequence of hazards on poor households in the Wolayita Maize & Root Crop LZ in SNNPR.

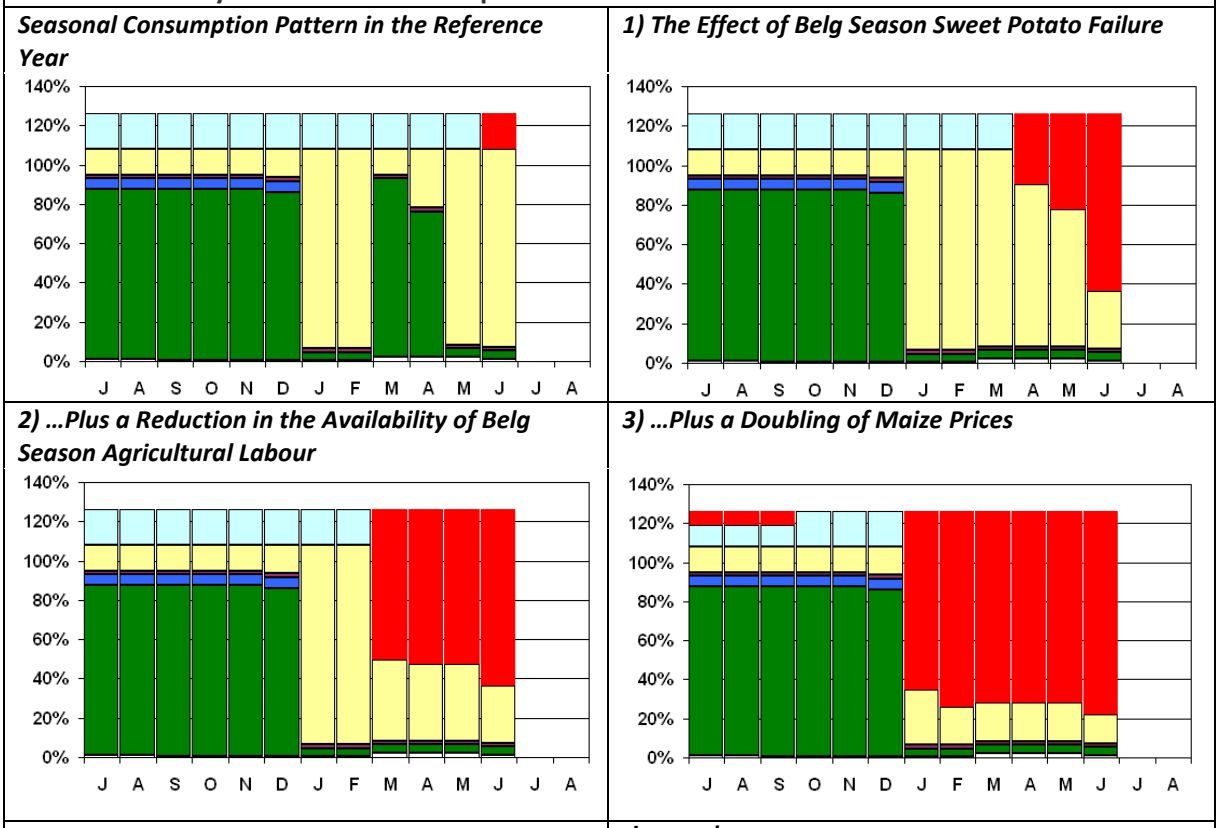
1) **Failure of belg season sweet potatoes.** Planted at the end of the *meher* season in October, *belg* season sweet potatoes mature during the *belg* rains and provide an important stopgap between March and May. A failure of this crop is by itself enough to create deficits from April-June, but not before.

2) **Reduced availability of agricultural labour.** Agricultural labour is the single most important source of cash income from January onwards. If the *belg* rains fail, there is less labour available, and the deficit gets larger.

3) **Increases in maize prices.** Once the *belg* season sweet potatoes have failed, purchase becomes the most important source of food. As prices rise, so less food can be purchased, and the bigger the deficit becomes.

[7] LIU/MOARD, Uses of the Livelihood Baseline and Analysis, March 2009

Fig. 7 Seasonal Analysis Showing the Effects of Severe Belg Rain Failure on Poor Households in the Wolayita Maize & Root Crop LZ of SNNPR



The graphs show seasonal patterns of ***consumption***, compared to two thresholds – the survival threshold and the livelihood protection threshold. Sources of food are shown by month (crops in green, purchase in yellow, etc.). Expenditure on livelihoods protection is shown in light blue.

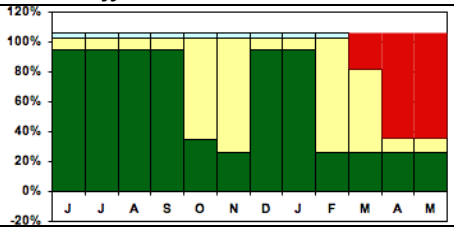
Source: Mark Lawrence, FEG

Guiding Nutritional Surveillance

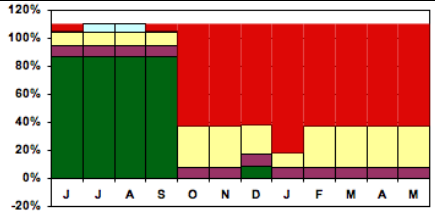
Seasonal outputs from the LIAS can also help guide nutritional monitoring schedules, because they indicate areas where nutritional stress is likely to be highest, and identify which households will be at risk and when. Figure 8 presents the results of the 2009 *belg* seasonal assessment for poor households in three different livelihood zones in SNNPR. The results strongly suggest that nutritional status should be monitored closely in Burji and Bena from October to May.

Fig. 8 Seasonal Consumption Graphs, results from three woredas in SNNPR, 2009 *Belg* Season Scenario Analysis

Amaro Woreda
Amaro Coffee and Enset Livelihood Zone



Burji Woreda
Southern Special Woredas Lowland Cereal

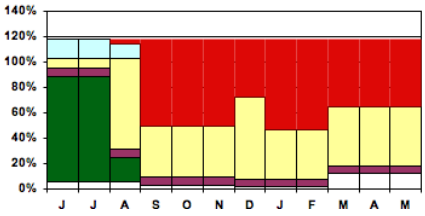


***Legend*:**

- milk
- crops
- labour migration
- other food
- purchase - survival
- l/hoods protection
- deficit

Source: Jane MacAskill, LIU

Bena Woreda
Southern Agro Pastoral Livelihood Zone



Customising Monitoring Indicators and Schedules

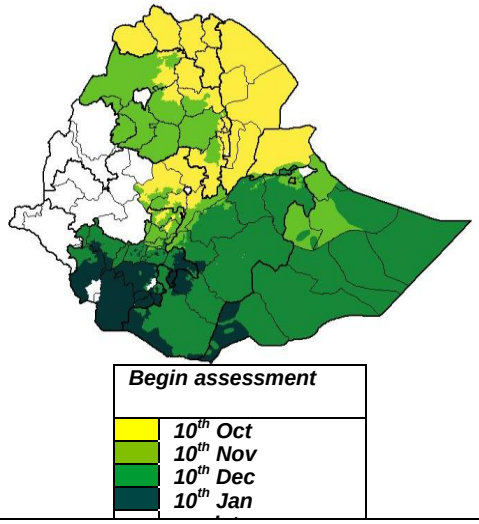
Seasonal assessments in Ethiopia are carried out twice a year: in June/July and in November. The June/July assessment checks on the status of the *belg* harvest as well as other key parameters (such as staple prices, livestock numbers and health, labour prices, etc.) and estimates the number of people who will require assistance in *belg* dependent areas in the coming year. In November, that status of the *meher* harvest is assessed, along with other key parameters. At this time numbers from the earlier *belg* assessment are meant to be updated as well. In June/July: the objective of the *belg* assessment is to assess the impact of the *belg* harvest together with other key parameters and b) to update the *meher* assessment in the *meher*-dependent areas if necessary.

A recent analysis of long term rainfall trends conducted by the LIU, and shown in Figure 9, provides evidence for a more refined approach to the timing of assessments. What the maps show is that there may be cause to revisit the current bi-annual June/July and November schedule, highlighting in particular the possibility of carrying out assessments in pastoral Afar up to a month earlier than the current schedule.

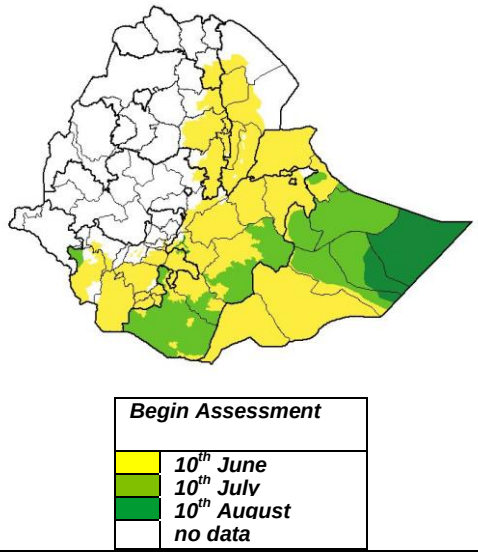
An especially sensitive monitoring system would also be calibrated to check – in a timely way – on the status of a larger set of seasonal activities as well, where relevant, such as labour migration, firewood sales, wild food collection and sales, fishing, petty trade, and so on.

Fig. 9 The earliest date that an assessment should be carried out

Meher/Deyr/Hagaya Assessment



Belg/Gu/Gana Assessment



Technical Notes

1) Basis for this analysis is as follows:
   a) Identify start and end of season, LZ by LZ, based upon an analysis of long term met data
   b) Allow for an early start to the season (max 1 month, less where interval between seasons is less than 1 month)
   c) Allow for a late end to the season (max 2 months, less where interval between seasons is less than 2 months)
   d) Calculate cumulative rainfall for each season for each year from 1996-2008
   e) Calculate the dekad in which 90% of that season's rainfall has fallen
   f) List these dekads in order from lowest to highest and take the 11th highest result out of 13 as the best estimate of when the rains can be considered over.
2) Measure is therefore, dekad in which 90% of seasonal rainfall has fallen in 11 (85%) of the last 13 years.

Source: Mark Lawrence, LIU, 2009

Seasonal Leverage Points for Development

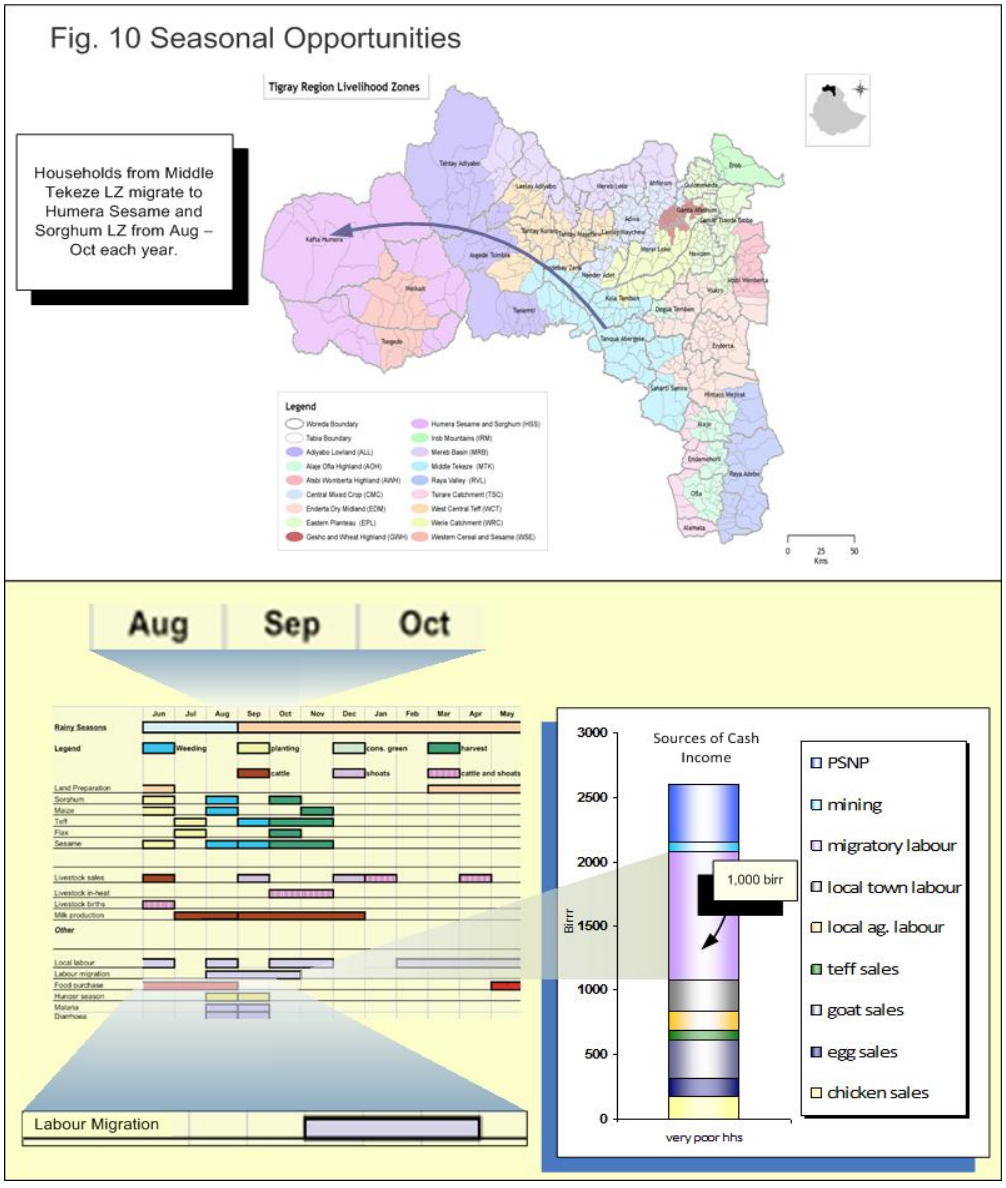
New opportunities for targeting development assistance may also be suggested by careful analysis of seasonal activities and intra-annual patterns of food and cash income. If we know when and where households engage in livelihood-related activities, we are better able to find creative options for adding value to these pursuits.

Figure 10 highlights the importance of seasonal migratory labour for poor households in the Middle Tekeze Livelihood Zone in Tigray. Infertile soils and recurrent droughts have made a significant part of the population in this zone food insecure. Lack of oxen further inhibits the capacity of poor households to fully utilize the land resources available to them. Because of a paucity of local opportunities, the poor and very poor seek labour opportunities elsewhere. As shown in the figure, approximately 1,000 of the 2,600 birr earned by very poor households each year comes from labour migration to Humera. However, the net gain is far less, because around 8 percent of this is spent on

transportation to Humera. In addition, malaria, which is endemic in the western lowlands, takes its toll, with health, productivity and wages all at risk.

Are there ways to provide extra assistance to these households during these months? Is it possible to seasonally boost the health clinic budgets in the sesame harvesting areas to cover the health needs of an influx of upwards of 200,000 people? Could transportation to the sesame areas be subsidized during these months? Is there a need to establish institutions aimed at protecting the rights and welfare of migrant workers?

While these particular options may or may not be viable, the detail provided by a seasonally textured description of local livelihoods stimulates debate and engagement that is, at the very least, relevant and specific to people's real needs.



Conclusion

A majority of the world's rural dwellers continue to depend on rain-fed agriculture to fuel (either directly or indirectly) their livelihoods. In this context, the norm is one of continual change. Natural hazards, such as drought, floods, and cyclones; and man-made hazards, like war, market disruption, policy change, etc. combine with the vulnerability of particular livelihood systems and households, resulting in either disasters or windfalls. The vulnerability of these livelihood systems is determined in part by intra-annual, or seasonal, cycles. Thus, seasonality, and the timing of hazards in relation to normal cycles, is a key factor in determining disaster outcomes.

Given that disasters have been responsible, in part, for undermining progress towards the Millennium Goals, it follows that we need to develop tools and procedures for systematically incorporating seasonality into ongoing analyses if we hope to achieve those goals.

As argued in this paper, the LIU has developed a set of procedures and tools that significantly improve our capacity to analyse: 1. the effects of external hazards on households' ability to secure what they need to live; and 2. the seasonal variations in households' access to food and cash income. In combination, these two analytical processes make it possible to conduct scenario analyses which show us how a hazard or set of hazards will affect households' **seasonal** access to food and cash income, thereby improving livelihoods-focused disaster risk assessment, emergency response and development planning capabilities.