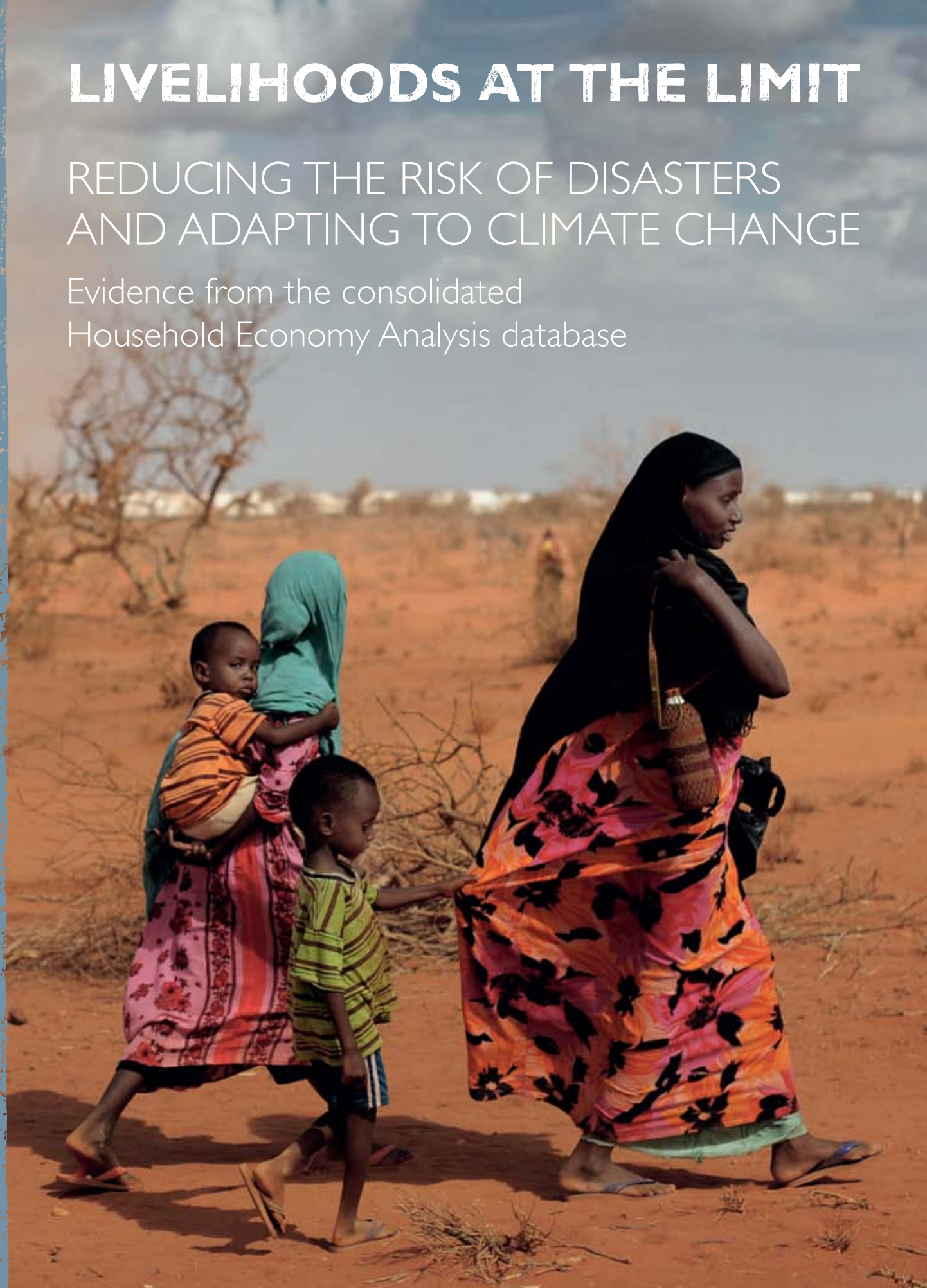
LIVELIHOODS AT THE LIMIT

REDUCING THE RISK OF DISASTERS AND ADAPTING TO CLIMATE CHANGE

Evidence from the consolidated Household Economy Analysis database



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Cover photo: During the east Africa food crisis in 2011 a mother and her children arrive from Somalia at Dollo Ado, Ethiopia. (Photo: Jan Grarup/Noor for Save the Children)

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EXECUTIVE SUMMARY

This report is one of a series of five reports and papers that aims to give critical insights into key questions about what resilience means and how to achieve it in different livelihood contexts.

The report presents evidence from a consolidated set of household economy data from more than 300 distinct livelihood zones in 26 countries: Botswana, Burkina Faso, Cambodia, Chad, Colombia, Djibouti, Ethiopia, Haiti, Indonesia, Côte d'Ivoire, Kenya, Lesotho, Liberia, Mali, Mauritania, Mozambique, Myanmar (Burma), Namibia, Niger, Nigeria, Pakistan, Rwanda, Senegal, Somalia, Uganda, and Zimbabwe. This wealth of relatively untapped information should be valuable to governments and international organisations who are striving to achieve value-for-money programme and policy investments as aid budgets come under increasing pressure.

This report draws on the compiled Household Economy Analysis (HEA) dataset and established HEA dedicated analysis tools to answer some of the most pressing questions (operational and policy-related) about disaster risk reduction (DRR) and climate change adaptation (CCA) in a range of livelihood contexts:

1. Which single shock has the most damaging impact on households' ability to meet their minimum food and livelihood requirements?
2. Does diversification always help reduce the risk of disaster?
3. Will increasing poor households' agricultural production increase their resilience in the face of climate change?
4. What hazards are pastoralists most vulnerable to and what does resilience mean for a pastoralist economy?

The HEA database can help shed light on the risk of livelihood crises within the context of a shifting and dynamic set of natural and man-made hazards.

Overall, the report raises questions about the efficacy of pursuing a strategy based on diversifying livelihoods as a means of increasing vulnerable households' resilience and reducing the risks they face.

Increasing levels of income, as well as finding truly independent income sources within a diversifying rural economy, appear to be critical for reducing risk and building resilience.

It is not clear that improving smallholder agriculture on its own provides *significant protection against disaster risks*, and it depends very much on what methods are used to increase production as to whether or not reduced disaster risks will be an associated benefit.

Given that development investments intended to increase resilience can sometimes have the opposite effect, putting households at greater risk in the short term, it is essential for resilience programmes to conduct 'pre-flight' analysis on their interventions.

Existing information about pastoralist livelihoods needs to be taken into account when devising resilience programmes and policies for pastoralist areas. Of particular relevance are: the critical nature of livestock and market hazards; the requirement for long herd-recovery periods after droughts; shared vulnerability among all wealth groups and the redistributive effects of pastoralist economies.

BACKGROUND

Household Economy Analysis (HEA) was originally developed some 20 years ago as a systems-based approach for assessing household food security. HEA studies investigate how access to food is inextricably linked to households' broader livelihoods – how they produce food and generate cash income, what they need to spend money on in order to survive, and in turn how they are connected to larger economic systems.

To date, more than 300 HEA baseline studies have been generated covering much of Africa as well as locations as far apart as Nicaragua and Pakistan. HEA produces quantified analyses of the economic operations of typical households within a given ecologically and economically homogenous area defined as a 'livelihood zone'. It categorises households into one of four wealth groups according to local criteria (very poor, poor, middle income, and better off), so that distinct descriptions are made of four levels of wealth from the poorest to the better-off.

The available HEA studies, ever-growing in number, constitute a major information resource on rural and urban livelihoods in developing countries. Because the information was collected strictly according to the same rubric, this is a unified dataset that allows for comparisons to be made across a plethora of different ecologies and economies. HEA baseline studies (at the national and local levels) have been used most often to guide humanitarian decision-making, typically in the arena of emergency assistance; but they have untapped value as a base of evidence to help guide the value-for-money investments of government and international aid development funds, and in helping define (and refine) what resilience means, and how to achieve it, in different livelihood contexts.

This report draws on the compiled HEA baseline dataset and established HEA scenario analysis tools to provide empirical evidence to answer key policy and operational questions related to disaster risk reduction (DRR) and climate change adaptation (CCA). Particularly important in DRR is the issue of how the risk of livelihood crises can be understood in light of a shifting and dynamic set of natural and man-made hazards.

In this thematic report, issues of equity will be explored where relevant; because all the HEA data are disaggregated by socioeconomic group, it is possible to obtain a clear picture of which groups

WHERE THIS REPORT FITS

This report is part of a larger effort undertaken by Save the Children UK and The Food Economy Group drawing on a recently consolidated set of HEA data from a range of livelihood contexts across 26 countries. The outputs from this effort include:

1. Regional databases containing all the baseline information for each livelihood zone, with a written profile for each individual study.
2. Three thematic reports targeted at specific decision-maker groups covering: food security and nutrition; social protection; and disaster risk reduction and adaptation to climate change. This report is one of those thematic papers.
3. A summary paper that pulls these themes together and a peer-reviewed paper for publication in a journal.
4. A dedicated website containing all the HEA data and profiles used in this study, as well as older HEA-based reports (pre-2005) and the small but growing collection of Cost of Diet studies using HEA baseline data.

might be most (and least) affected within a particular geographic area. Part of the information contained in the HEA database comes from fragile states, or what might be identified as fragile regions within states, in terms of relative weakness of institutions and precarious market conditions.

THE HEA DATA AND ANALYSIS

Before moving on to the findings of the report, it is important first to understand a little more about HEA and the particular analysis used to answer the DRR questions introduced above. The HEA data contained in the consolidated HEA dataset comes from rigorous, intensive field interviews with thousands of rural and urban household members. HEA is a systematic way of organising and making more powerful the economic realities of local people by providing a structured format in which essential economic information about people's livelihoods can be stored, compared and analysed.[1] This report draws on HEA data from 233 livelihood zones in seven African countries – Zimbabwe, Ethiopia, Burkina Faso, Mali, Niger, Somalia and Kenya. The fieldwork to gather HEA data in one livelihood zone takes approximately two weeks, covering eight villages or sites, with focus groups from four wealth groups interviewed in each village. In total then, these data represent findings from interviews with more than 30,000 people in more than 1,800 villages. This wealth of data is arguably the richest and most comprehensive source of comparative information available on local livelihoods in the areas covered by the dataset. However, the dataset is influenced by the heavy proportion of studies in certain countries where national datasets have been developed and a focus on food-insecure areas of countries where there is partial coverage.

The analysis that was conducted for this report used a form of HEA outcome analysis, which combines the baseline HEA data and hazard (or positive change) scenarios to generate projections about household-level impacts.[2] Because the work involved in setting up the outcome analysis facility is time-consuming, it was only applied to 233 of the 316 livelihood zones contained in the database; these zones include three national coverage data sets (Ethiopia, Zimbabwe and Burkina Faso) as well as sub-national zones from Mali, Niger, Somalia and Kenya. Future analysis using data from all 316 livelihood zones would be possible with sufficient time.

THE DRR/CCA CONTEXT

Disaster risk reduction (DRR) encompasses the range of policies, strategies and activities (including prevention, mitigation and response) designed to minimise the risks of a disaster occurring (or reoccurring). For the limited purposes of this report, climate change adaptation (CCA) is viewed as one of a number of critical hazard sets found within the context of DRR. Climate change is unique in the magnitude of its scope and the requirement to make far-reaching predictions; but for the purposes of our analysis, its proximate effects – changes in weather patterns, potential disruption of markets and transportation routes, loss of productive assets, etc – are the same as many of the other hazards that would typically be dealt with in the context of DRR.

DRR aims to reduce disaster risks through systematic efforts to analyse and reduce the *causal factors* of disasters. The causal aspect is important, because it reminds us that not every hazard results in a disaster and, given the need for pre-emptive action, much of the challenge for analysts and practitioners is to determine just where we need to focus our attention in order to reduce the risk of current and future disasters. Having some idea of what combination of events and circumstances might lead to disastrous

FOUR KEY QUESTIONS

This report answers four key questions:

- Which single shock has the most damaging impact on households' ability to meet their minimum food and livelihood requirements?
- Does diversification always help reduce the risk of disaster?
- Will increasing poor households' agricultural production increase their resilience in the face of climate change?
- What hazards are pastoralists most vulnerable to and what does resilience mean for a pastoralist economy?

outcomes helps us hone our current activities. **It is the interaction of particular hazards (of a certain type and magnitude), the vulnerability of particular populations to those hazards, and their ability to respond effectively to the hazards that results (or fails to result) in disasters.** This causal relationship can be expressed in a formula that lies at the heart of DRR: *R* (the risk of disaster) is a function of *H* (hazard) and *V* (vulnerability), mitigated by *C* (capacity to cope); or $R = f(H,V)/C$.[3] This formula is essential to DRR planning and implementation, and is a critical analytical device because it helps to circumscribe logical entry points and identify where to make the most effective investments.

HEA started out as an early operational expression of the DRR formula. The HEA baseline is a collection of field information that reveals a population's vulnerability to different hazards (*V*) and its ability to cope with them (*C*). The outcome analysis procedures of HEA combine information about real or projected hazards (*H*) with the baseline information to estimate the likely risk (*R*) of food security and livelihood disasters. Reducing disaster risks rests on our ability to employ an analytical framework that incorporates these core components and links them together in a logical, coherent and systematic way.

This paper uses a large collection of HEA baseline data from sub-Saharan Africa to help us establish '*V*' and '*C*', along with a sophisticated set of existing outcome analysis tools for estimating '*R*', in order to explore the four key DRR policy and programme planning questions highlighted in the text box on page 2.

KEY QUESTION 1

Which single shock has the most damaging impact on households' ability to meet their minimum food and livelihood requirements?

In addressing this question we aim to determine which discrete economic shock has the most damaging impact on a household's ability to meet its minimum requirements.

We distinguish between larger *hazards* (such as drought or market collapse) and the specific economic *shocks* that these hazards translate into at the household level. Every global natural or man-made hazard, whether flood, drought or market disruption, results in a complicated set of interrelated economic shocks at the household level. Data complied by the Emergency Events Database (EM-DAT), a global disaster database maintained by the Centre for Research on the Epidemiology of Disasters (CRED) in Brussels, show that over a 21-year period (from 1980 to 2001), drought alone was responsible for around 50% of all deaths from natural hazards (including storms, floods, earthquakes, volcanoes and landslides). Drought is, by far, the most persistent and deadly natural hazard in Africa, and it is, and will continue to be, an important and devastating manifestation of climate change in many parts of the world. As such, we chose to model the multi-shock effects of drought to address the second and third questions posed in this report. Given that many of the specific household-level economic shocks related to drought – such as crop losses, reduced livestock income, reduced labour income and increases in staple food prices – are also common outcomes of other natural hazards, the broad outlines of this scenario are also relevant for hazards other than drought.

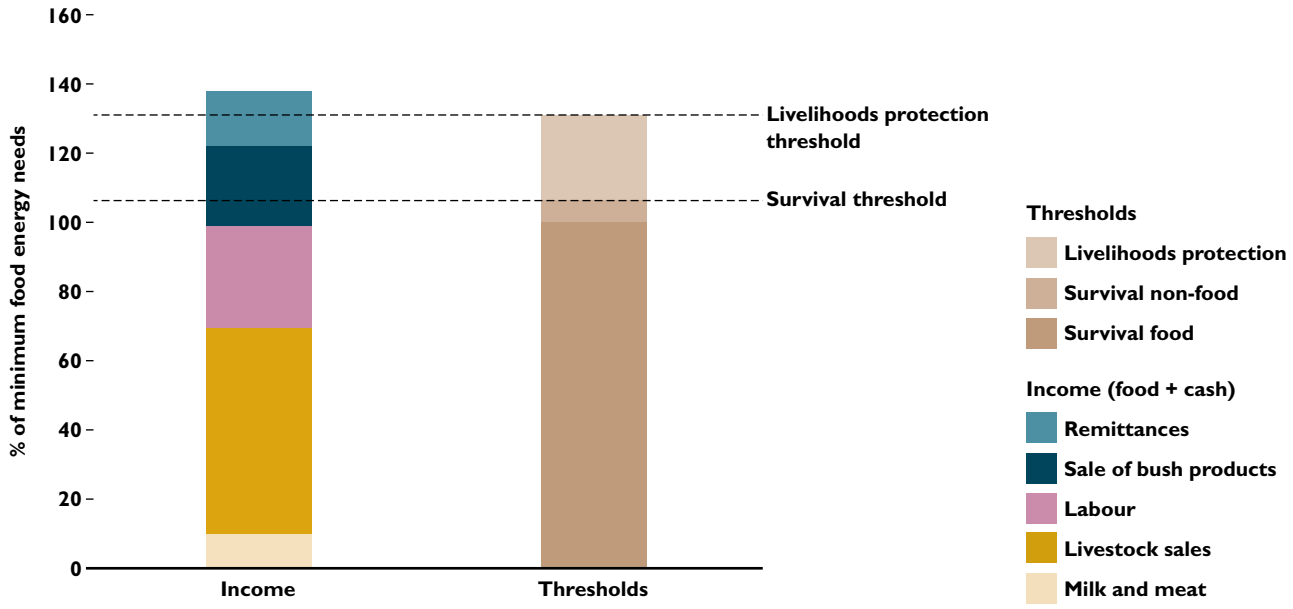
As already noted, drought has multiple economic impacts. We will look at the combined effect of these multiple shocks later, but in addressing the first question, we focus on each individual strand that makes up the drought hazard. This relationship between single shocks and the risk of livelihood crisis is relevant to mitigation efforts, because it can help to calibrate early warning and response systems more accurately and can shed light on causal relationships that may not be fully appreciated in the policy/programme planning realm. In essence, this question is an attempt to tease out the connection between vulnerability and risk. By imposing one shock at a time and calculating the change in risk, we can see differences in the vulnerability of discrete populations to a changing hazard landscape.

Before presenting the findings, it is important to explain two key aspects of HEA that are crucial to interpreting the results: 1. the reference or baseline year; and 2. the thresholds.

In HEA, a **baseline** picture of local livelihoods is developed from intensive fieldwork. This baseline provides a reference point for understanding how changes that affect different aspects of the local economy (such as market disruptions, changes in weather and livestock disease) will filter down to the household. The baseline or reference year is the period of time for which the baseline data is relevant and it is associated with an actual recent year. It is important to note that the reference year is not always an average year. The process in HEA referred to as outcome analysis starts with the baseline picture, adds in the effects of different shocks, either real or postulated, and determines whether or not people can still meet their basic needs. So what are basic needs? This is where the **thresholds** come in. In HEA, basic needs are currently defined by two different thresholds: the **survival threshold** and the **livelihoods protection threshold** (see Figure 1).

The **survival threshold** represents the most basic of needs, including minimum calorie requirements, the costs associated with food preparation and water (if purchased). The **livelihoods protection threshold** represents what it costs to maintain the locally specific livelihood system. This threshold varies by livelihood

FIGURE 1. THE TWO THRESHOLDS



The **survival threshold** represents the total income required to cover:

- 100% of minimum food energy needs (2,100 calories per person per day)
- plus the cost associated with food preparation and consumption (i.e. salt, soap, kerosene and/or firewood for cooking and basic lighting
- plus any expenditure on water for human consumption.

The **livelihoods protection threshold** represents the total income required to sustain local livelihoods. This means total expenditure to:

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

zone and wealth group, because what it costs for a poor cropping household with a quarter of a hectare to maintain its livelihood is clearly different from what it costs for a pastoralist household with 200 cattle to maintain its livelihood. In other words, the livelihoods protection threshold represents the household-level costs of generating food and livelihood security in a particular livelihood zone in the medium to long term *without depleting asset levels unsustainably*. The results presented in this report are based on the livelihoods protection threshold, because that is the measure of livelihood security that is most consistent with achieving the goals inherent in DRR.

Returning to the first question – which shock has the most damaging impacts on households' ability to meet their minimum food and livelihood requirements – we can consider the results in three ways: first, aggregated at the national level (Figure 2); second, grouped by three aggregate livelihood zone groupings (Figure 3); and third, by eleven livelihood zone clusters (Figure 4). We used HEA-based outcome analysis to model the effects of five discrete shocks on households' ability to meet their minimum needs. The shocks (covering crops, livestock, labour, self-employment and food purchase) were each set at the same level – 75% of the baseline year values (see box on page 6, 'How the shocks are defined for the first key question'). For example, if a household obtained 1,000kg of grain from its own crops in the baseline year, the crop shock imposed in this analysis would reduce own crops to 250kg. Likewise, if a household in the baseline year obtained the equivalent of $100 in income from livestock sales in the baseline year, this scenario posits that it is only able to get $25 after the livestock income shock, and a similar treatment is made with the other shocks.

HOW THE SHOCKS ARE DEFINED FOR THE FIRST KEY QUESTION

Crop shock: a 75% reduction in crop income, which could occur as a result of drought, flooding, pests or other hazards.

Livestock shock: a 75% reduction in livestock income, which could be the result of livestock disease, drought, conflict (which reduces access to grazing lands), an export ban, etc.

Labour shock: a 75% reduction in labour income, which is often the outcome of drought (on-farm hiring is reduced as harvests fail) or possibly a border closing (if migratory labour is important) or other market-related hazards.

Self-employment shock: a 75% reduction in self-employment income, which could result from a ban on firewood sales or losses in sales of wild fruits due to drought, or any number of other events that affect either the commodities people collect, build or generate for sale or the markets they sell them through.

Purchase shock: a fourfold increase in staple food prices (reducing purchasing power by 75%). Price increases are a common outcome of drought, but they can also be brought on by market closures, changes in global policies, conflict, etc.

Note: People's coping capacity expands when one income source is reduced. These analyses include this expansion of coping to the extent that it does not harm people's basic livelihoods.

EVIDENCE FROM THE HEA DATABASE

When we view the results at the national level, it is the crop shock that puts households at most risk in all three countries (Ethiopia, Zimbabwe and Burkina Faso). A 75% loss of crop production nationally creates a livelihoods protection deficit for three-quarters of the population in Zimbabwe, just over half the population in Ethiopia, and 44% of the population in Burkina Faso. The next most damaging shocks for Zimbabwe and Ethiopia are labour, livestock and purchase, with the relative importance of these varying by country: in Zimbabwe it is labour-related shocks, followed by livestock shocks and purchase shocks; in Ethiopia this is reversed, with purchase shocks coming in second, then livestock and labour. In Burkina Faso, purchase is second to crop shocks, and the remaining shocks (livestock, labour and self-employment income) seem to have very little effect, reflecting the lesser importance of these livelihood options for households across Burkina Faso.

Of particular interest here is the fact that overall, Zimbabwe appears to be more at risk from livelihood crises than Ethiopia. This may largely reflect the massive disruption to the Zimbabwean economy that has occurred in the previous decade, resulting in a new and very tenuous rural economy. The reference year for Zimbabwe was the consumption year 2009/2010 – a time when people's livelihoods were already severely stretched, having been through years of economic chaos and disruption. By contrast, the reference years for the livelihood zones in Ethiopia were generally speaking relatively stable and productive ones. Since the reference year, which varies from country to country, forms the starting point for the analysis, the starting deficits are included in the hazard analysis and are reflected in the outcomes. The fact that you are not starting at the same baseline in each country is a reality that needs to be taken into account when conducting *any* kind of analysis for DRR, which makes analysis challenging because of the constantly shifting array of factors influencing analysis, including a dynamic set of inter- and intra-annual hazards, and people's vulnerability to and ability to cope with these hazards. The reason that HEA outcome analysis provides a useful tool to explore DRR issues is that it was systematically developed to incorporate these complex dynamic variables, while generating fairly simple and straightforward results.

Figure 2 provides an aggregate view for each of the three countries, helping to answer the question in the broadest of terms. However, it is possible to organise the data differently, and by combining livelihood zones into three large groupings, we can see the impact on aggregate livelihood zone groupings. Each livelihood zone is a composite of households within a geographic space that share similar options for obtaining food and cash income. As a very general statement, these livelihood zones fall into three broad categories: cropping, pastoral and agro-pastoral (see

FIGURE 2. WHICH SHOCK HAS THE MOST DAMAGING IMPACT? – NATIONAL LEVEL

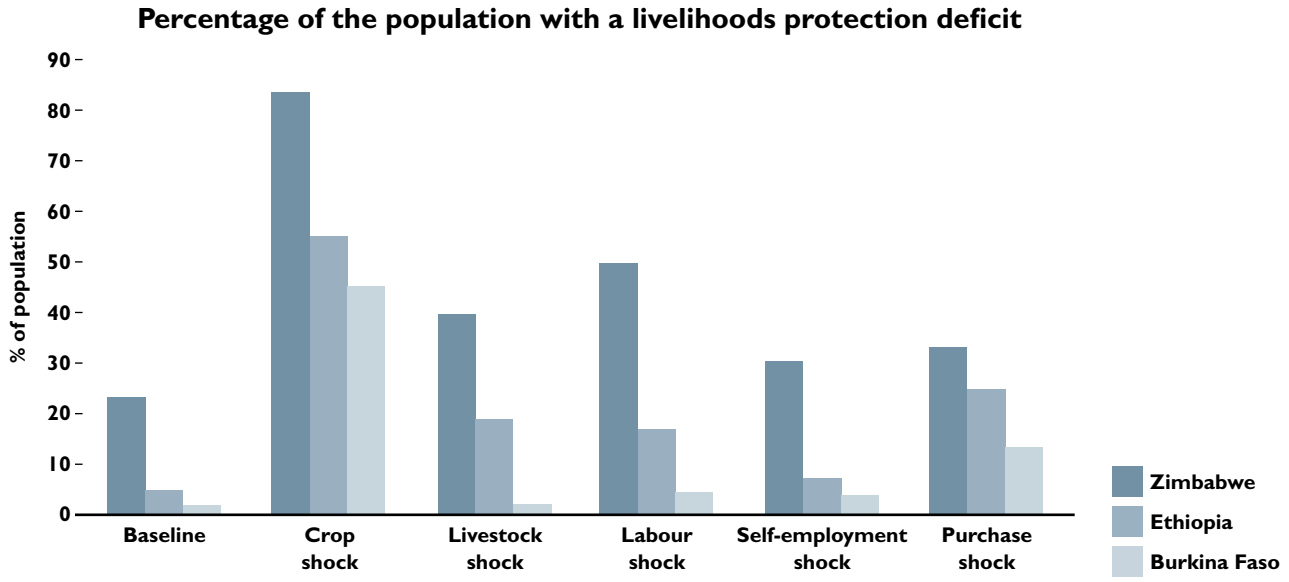
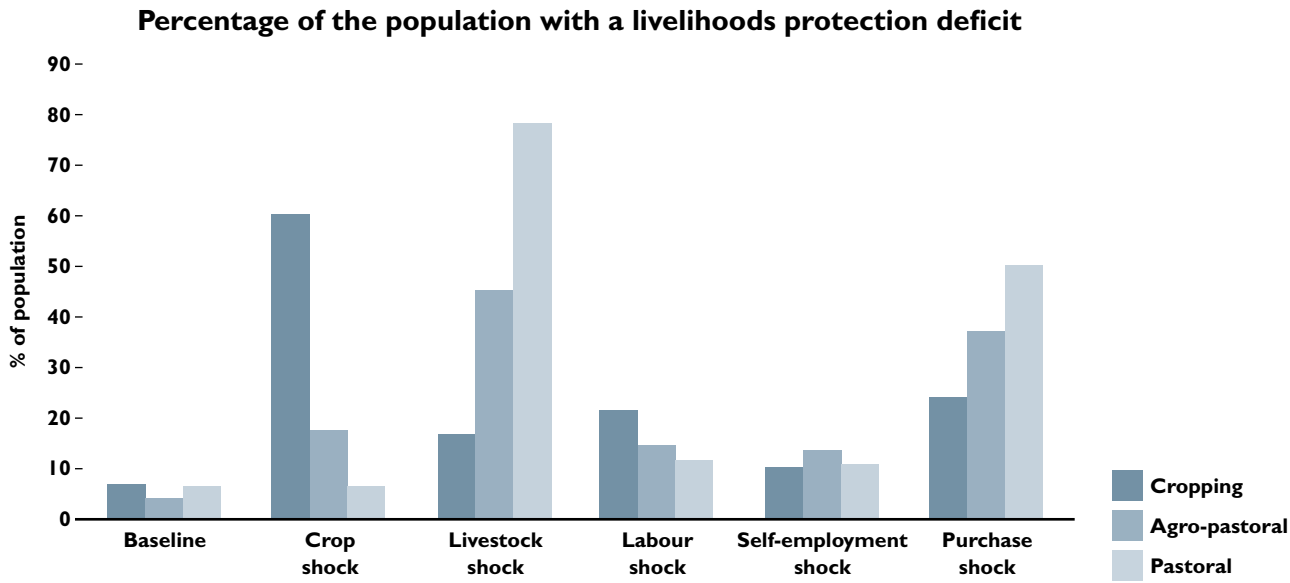


FIGURE 3. WHICH SHOCK HAS THE MOST DAMAGING IMPACT? – BY AGGREGATE LIVELIHOOD ZONE GROUPING



box 'How the aggregate livelihood zone groupings are defined'). Figure 3 presents the data so that we can see which types of livelihood zone are most affected by which shocks. Because the ingredients of people's livelihoods determine the degree to which they will be affected by different shocks, it makes sense that the outcome analysis will be more meaningful at the level of livelihood zone rather than administrative zone.

For cropping livelihood zones (i.e., zones where total income from crops is dominant) crop-related shocks hit hardest, followed by losses in purchasing power and labour income. Livestock shocks create a deficit

HOW THE AGGREGATE LIVELIHOOD ZONE GROUPINGS ARE DEFINED

Cropping: generally mixed farming, with no migration of livestock

Agro-pastoral: livestock migrate plus some crops grown

Pastoral: livestock migrate, no crop production

for almost 70% of the population in agro-pastoral and pastoral livelihood zones, with a purchase shock having the second most damaging effect. What is made clear by this analysis is the particular impact that livestock and purchase shocks have on pastoral and agro-pastoral zones, and the importance of purchasing power for all types of zone.

In order to view the impacts with even more precision we can disaggregate livelihood zones into more refined sub-groups or clusters. For example, in some cropping zones poorer households might depend heavily on local labour as a second source of income, whereas in other cropping areas, poor households might depend more heavily on livestock income. So a labour shock would have a greater impact on the first area than the second, and a livestock shock will create greater problems in the second than in the first. Therefore, we grouped the zones into eleven distinct livelihood zone clusters, reflecting the variation in main income sources found in the database. The maps in Figure 4 illustrate this grouping. In essence these maps reflect areas of common vulnerability to hazards. The same shock scenarios were modelled again using these livelihood zone clusters, and the results are provided in Figure 5. It is important to note that the purchase shock has the most negative across-the-board effects for all clusters, second only to the crop shock. This reflects the high degree to which poorer rural households depend on purchasing food in today's world. The

FIGURE 4. MAPS OF LIVELIHOOD ZONE CLUSTERS BY MAIN INCOME SOURCES

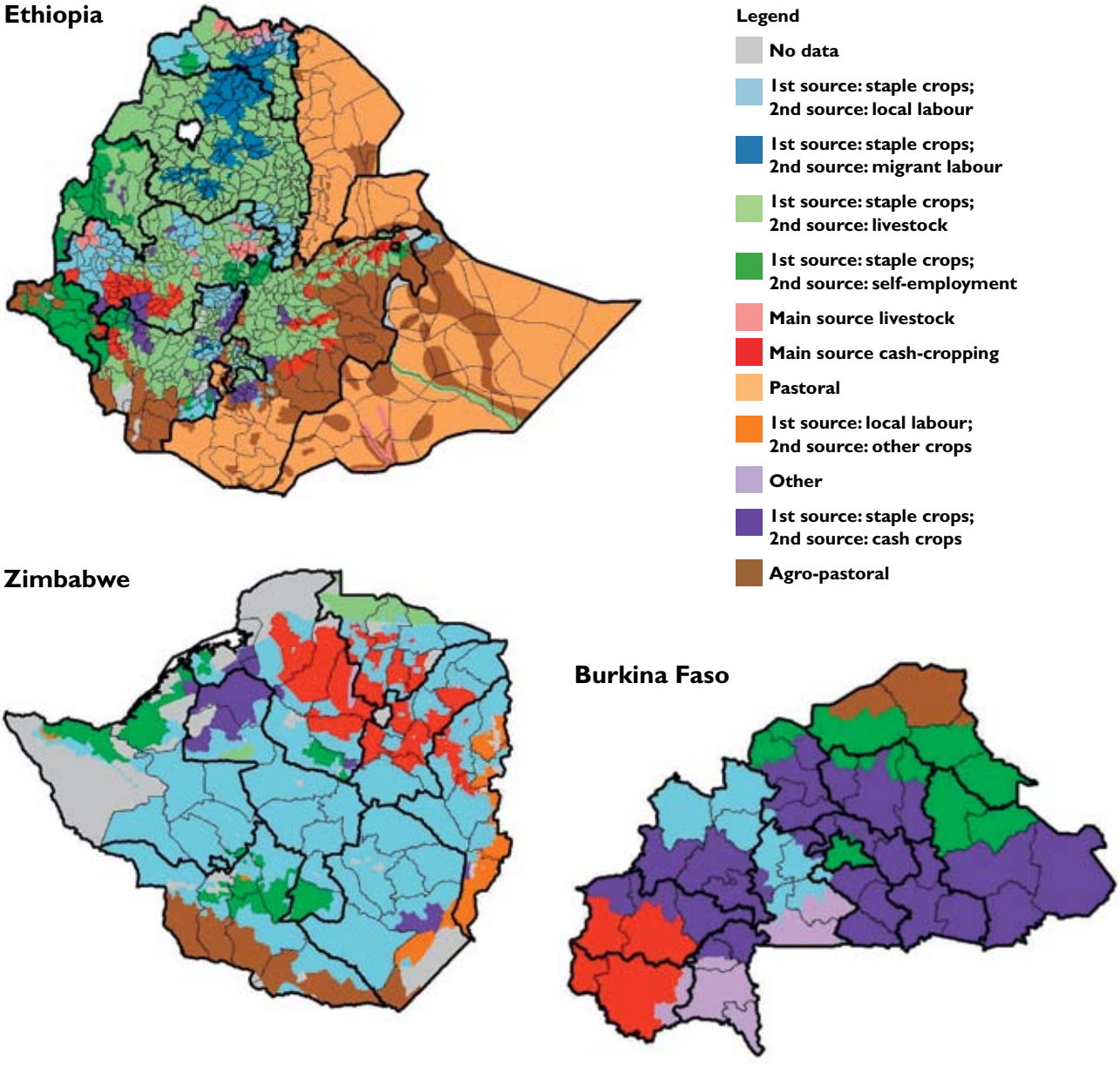
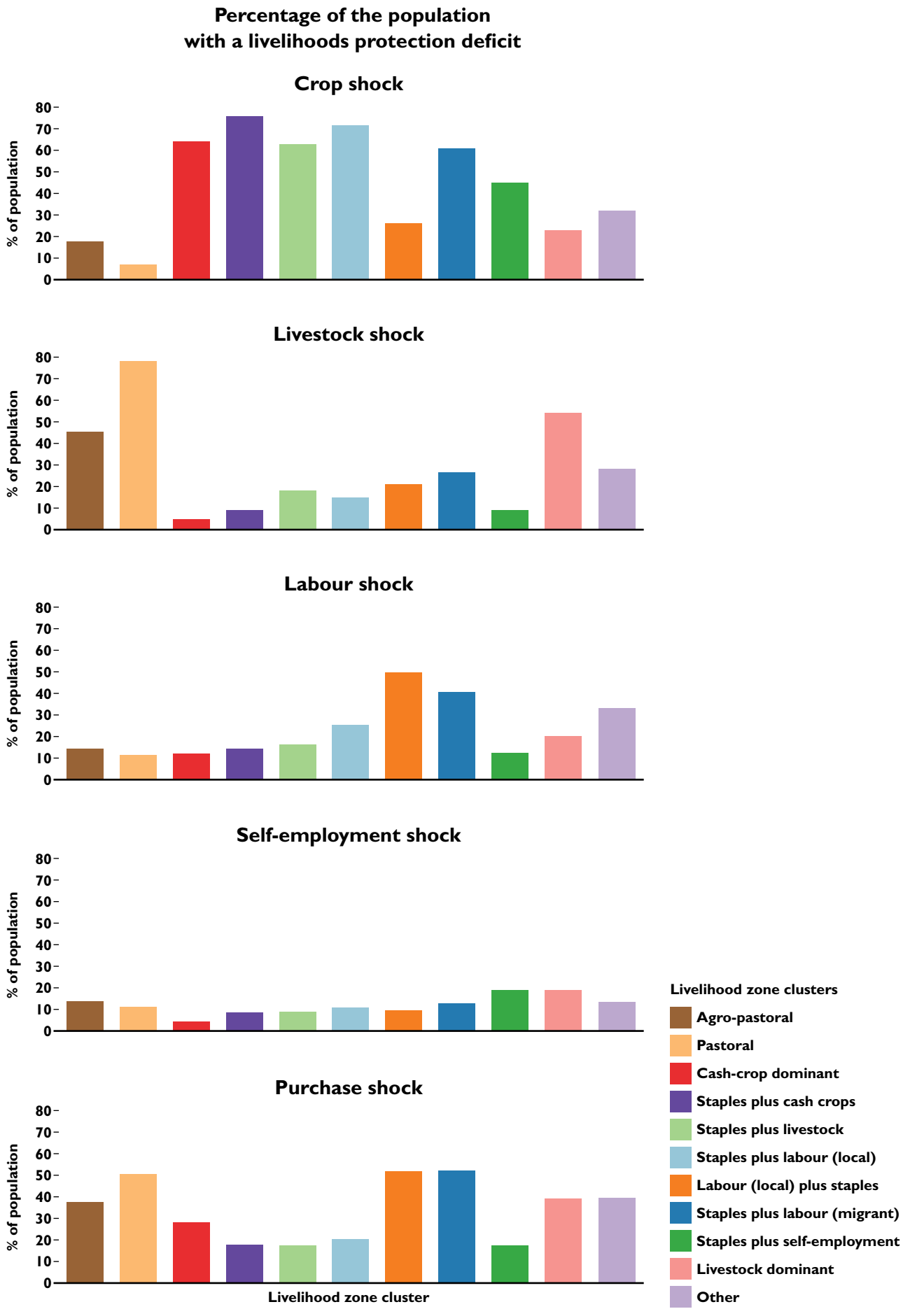


FIGURE 5. DISCRETE SHOCK IMPACT ANALYSIS: LIVELIHOOD ZONE CLUSTER



reliance on marketed staple food is no longer just an urban phenomenon. It also reminds us of the critical interdependencies in our increasingly globalised world; a change in food policy in one part of the globe can undermine livelihoods in a village half the world away.

Combining the results from Figure 5 with the maps shown in Figure 4 along with a seasonal activity chart produces a useful starting point for setting up customised monitoring systems that pick up fine-tuned early warning signals.

Modelling who is most affected by which kind of shock, and to what degree, is critical in disaster risk assessment. As shown in the examples above, this is a facility that HEA outcome analysis provides.

However, it is also essential to be able to make an educated projection about which hazard (or more realistically, combination of hazards) is most likely to occur in the coming years, especially in the face of climate change. Climate scientists, demographers, market researchers and other scientists are best positioned to work on these types of hazard projections, not HEA analysts.

HEA outcome analysis needs to be paired with the hazard projections generated by leading climate and other scientific research; in this way it can provide a powerful means of conducting end-to-end prospective disaster risk assessment, linking up macro-level changes to household-level effects.

KEY QUESTION 2

Does diversification always help reduce the risk of disaster?

In DRR/CCA programme and policy discussions livelihood diversification is increasingly being seen as a key strategy to build resilience and reduce disaster risks:

> *"Diversification can assist households to insulate themselves from environmental and economic shocks, trends and seasonality – in effect, to be less vulnerable… livelihood diversification is generally a good thing for rural poverty reduction. It helps to lessen the vulnerability of the poor to food insecurity and livelihood collapse."* [4]

> *"Two key strategies are generally considered to reduce vulnerability to disaster: 1) decreasing the impacts of hazards on lives and resources through prevention, protection and preparedness; and 2) increasing resilience by strengthening and diversifying livelihood options."* [5]

But does diversification always reduce the risk of disaster? We addressed this question by choosing from the HEA database six examples of typical poor wealth groups from Kenya, Zimbabwe, Burkina Faso, Mali and Ethiopia, each with different levels of income diversity; we then modelled a typical drought scenario (see box opposite) to see whether or not diversification played a role in reducing the risk of a negative outcome. This data does not reflect the situation for an individual household, but rather the consolidated evidence from poor households in a particular livelihood zone. To minimise the effect of differing income levels on the results, we chose wealth groups with total income levels in a similar range.

COMPONENTS OF THE DROUGHT SCENARIO

The drought scenario referred to throughout this paper uses the following multi-shock problem specification:

- 50% of baseline crop production
- 25% of baseline milk/meat for consumption
- 75% of baseline payment in kind (food) from local labour
- 55% of baseline income from local labour
- 50% of baseline income from cash crop sales
- 75% of baseline income from self employment
- 40% of baseline income from livestock sales
- Doubling of food prices

EVIDENCE FROM THE HEA DATABASE

The baseline picture for these six groups is presented in Figure 6. Although their total income is similar, the ways they obtain this income is quite different, and the level of diversification within these livelihoods varies.

The households on the left have the highest degree of diversification (seven different options), and those on the right have the lowest degree (four options).

Figure 7 shows the results of the drought scenario outcome analysis. The deficit is shown as a total deficit, combining the livelihoods and survival deficits. If the proposition that diversification helps reduce disaster risks were true, one might expect to see lower deficits on the left side and higher deficits on the right side. This is not the case. In fact, the opposite appears to be true, with the two most diversified livelihood zones also showing the highest deficits. In this limited sample, the livelihood zone with the lowest deficit is in Mali, where the featured households pursue a livelihood relying heavily on labour. The households with the most diversification (MAP, in Kenya, shown on the left) and those with the least (JTM, in Ethiopia, shown on the right) have almost identical total income levels to start with, but after the drought, MAP has a deficit more than 10% higher than JTM.

FIGURE 6. BASELINE LIVELIHOOD PATTERNS FOR SIX POOR HOUSEHOLD GROUPINGS

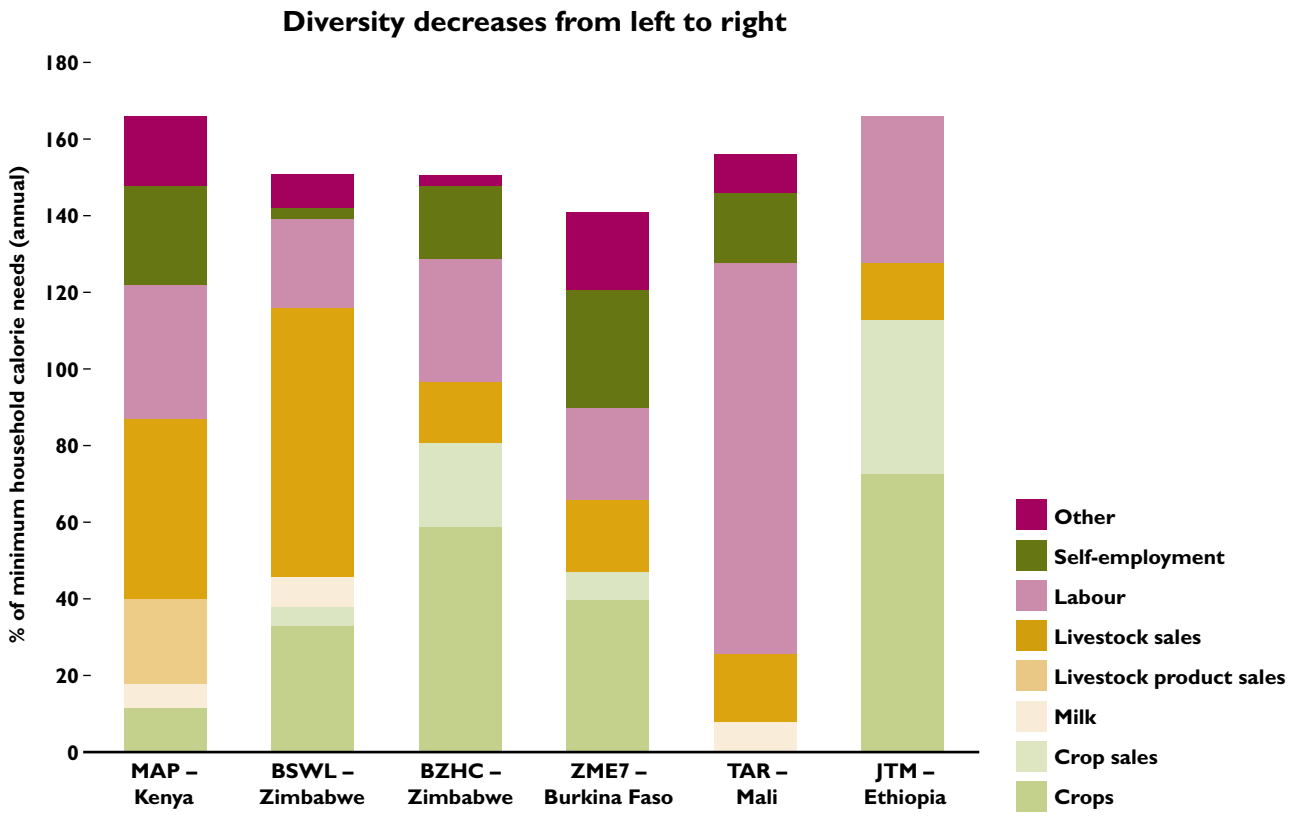
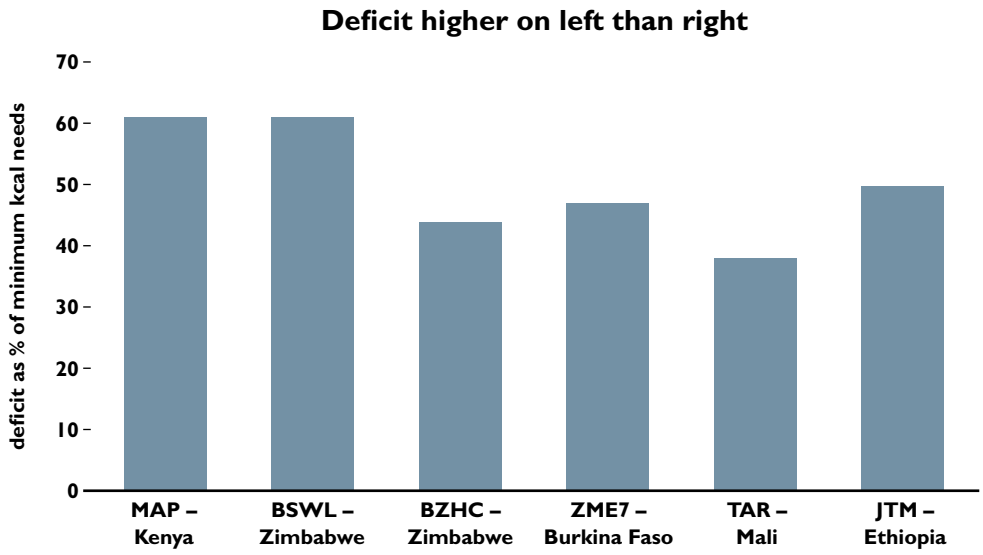
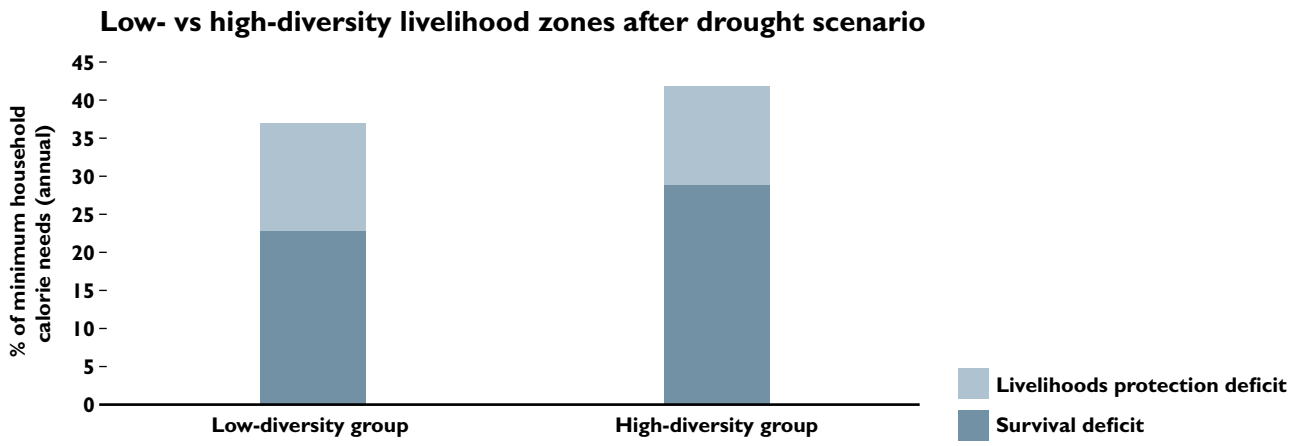


FIGURE 7. POST-DROUGHT SCENARIO DEFICITS FOR SIX POOR HOUSEHOLD GROUPINGS



But does this small sampling of livelihood zones reflect a trend in the larger set of data? To answer this question we looked across all of the livelihood zones in the HEA database, organising poor households into two categories characterised by their level of diversity. The low-diversity group (comprising 97 livelihood zones) is defined by livelihood zones where the two most important food/income sources contribute more than 80% of the total income of poor households, leaving a much smaller share for other sources of food/income. The high-diversity group (comprising 84 livelihood zones) includes zones where households draw more evenly on a wider range of food and income sources. Again, we ran the same drought scenario, and we present the results of this analysis in Figure 8.

FIGURE 8. POST-DROUGHT RESULTS FOR POOR HOUSEHOLDS, GROUPED BY DIVERSITY LEVEL



As with the individual zone analysis, the lower diversity group has a less severe deficit than the higher diversity group.

Why is this?

One answer is that 'diversity' in rural economies is perhaps an illusion. The relationships between all food and income sources make them – to a certain degree – vulnerable to all the same hazards. The two figures below illustrate this point: Figure 9 shows the baseline data for poor households, grouped by aggregate livelihood type. Figure 10 shows how these food and income options are all directly or indirectly vulnerable to a common hazard; being thus tied together, they are less diverse than they appear.

Figure 9 presents a generalised statement – drawn from the consolidated database – of how poor households obtain their food and cash income. The bar chart on the left shows total income in cropping livelihood zones; the middle bar chart shows the same for agro-pastoral livelihood zones; and the

FIGURE 9. BASELINE INCOME SOURCES OF POOR HOUSEHOLDS, BY AGGREGATE LIVELIHOOD ZONE GROUPINGS

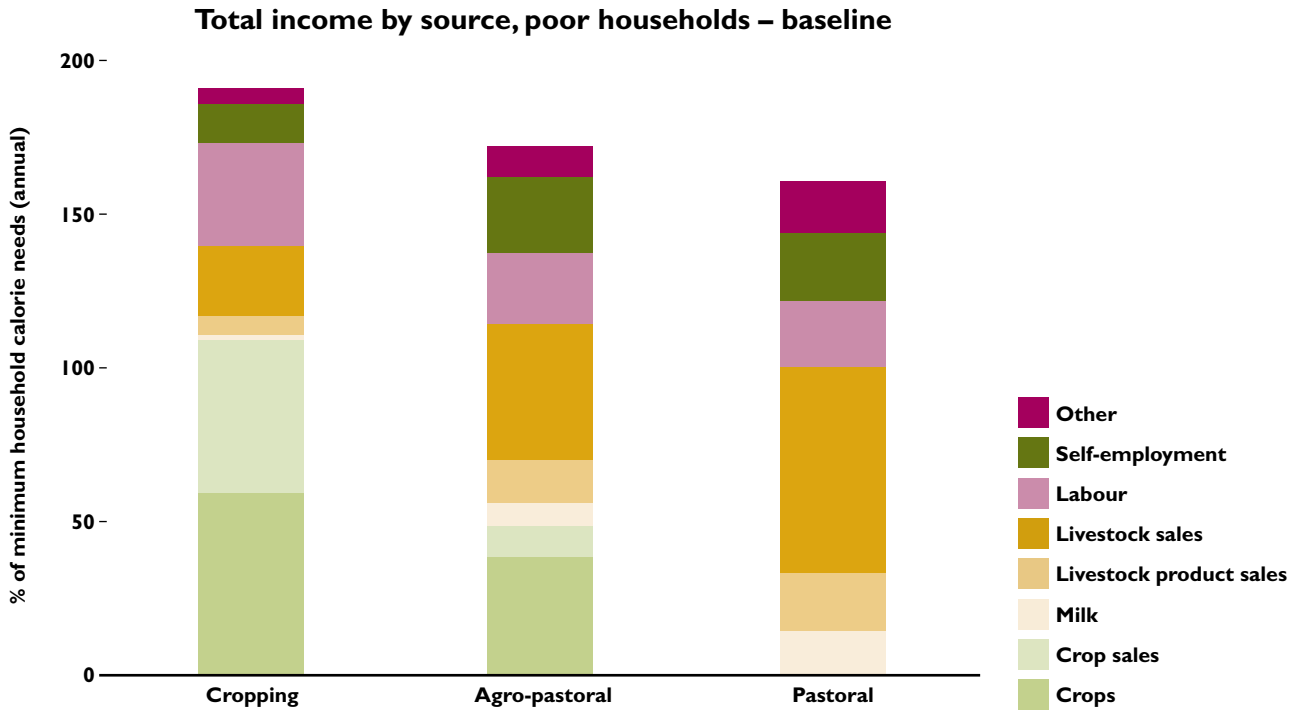
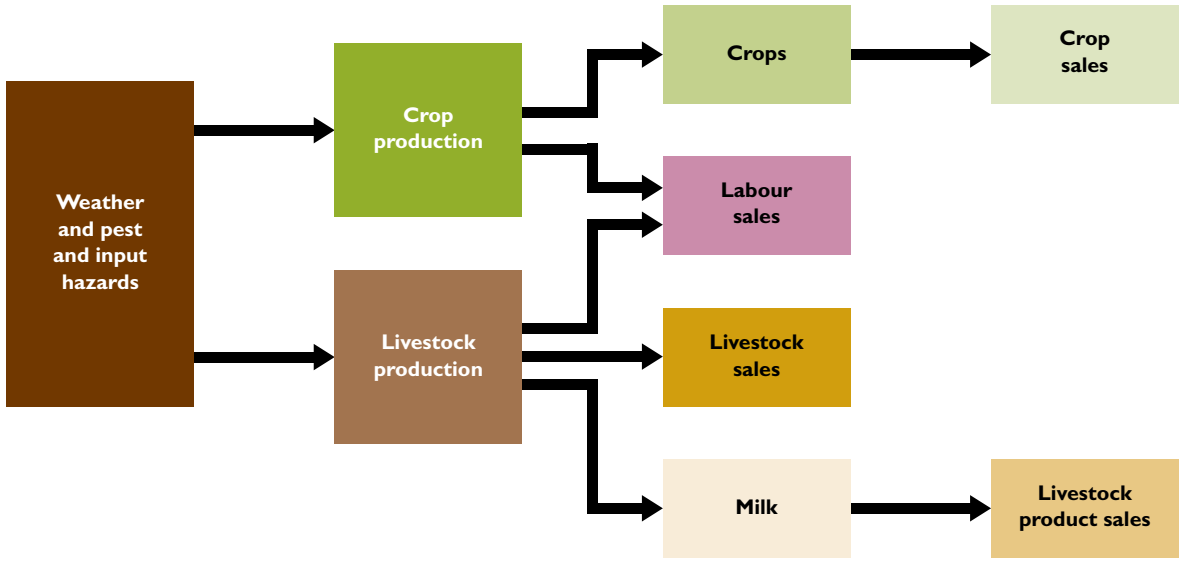


FIGURE 10. LINKS BETWEEN RURAL INCOME SOURCES



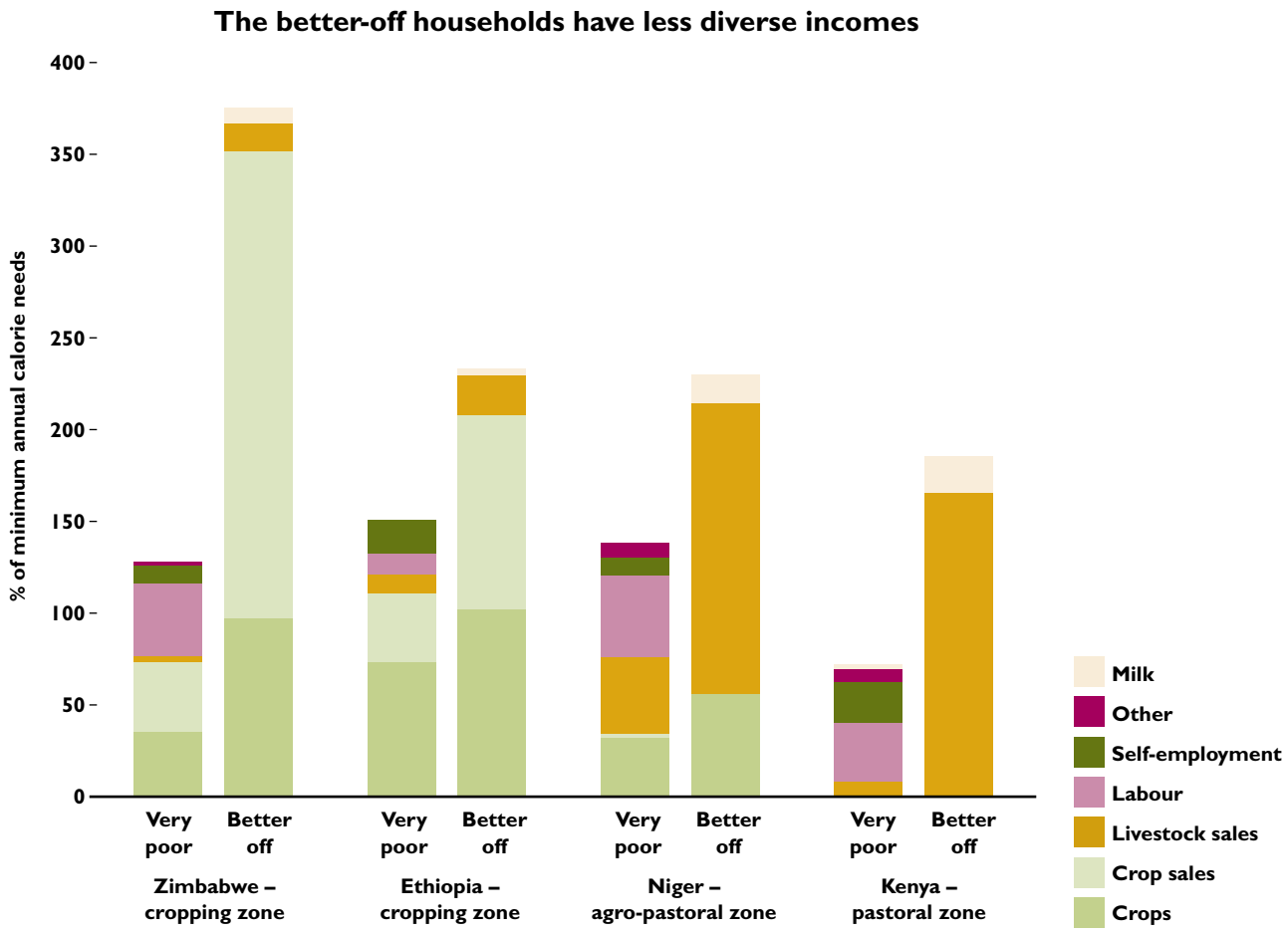
bar chart on the right presents the data for the pastoral livelihood zones. Years of HEA data from around the world turn up the same **limited set of options** for rural households everywhere. What is important to note within the context of discussing diversification is that, with a few exceptions, the livelihood options are inter-related and almost invariably affected by the same set of hazards.

As shown in Figure 10, two main drivers – crop and livestock production – underpin six of the eight food and cash sources for poor households listed in Figure 9. Crop production determines the degree to which households can rely on crops for consumption and sale; livestock production determines how much milk can be consumed and sold, as well as how much cash income is derived from livestock sales. In most rural areas, labour sales are local and informal, and are tied to demand from better-off households, which hire poorer households for planting, weeding and harvesting, or to take care of livestock herds. Therefore, crop and livestock production levels often indirectly affect labour sales as well. There are some zones where migrant labour supplements or replaces local labour, and in these areas labour income is independent of local production conditions. Further, depending on what falls into the 'self employment' and 'other' categories (often including things like charcoal and firewood sales, tree and pole sales, grass sales, wild food sales, and gifts), the 'other' category may or may not offer a degree of independence from these two fundamental engines (crop and livestock production).

When it comes to lowering the risk of livelihood and survival deficits, the results of scenario analysis consistently show that what really appears to matter is the level of *income*, rather than the level of *diversity*; furthermore, the data suggests that higher income households are in fact *less* diverse in their livelihood strategies than poorer households. This is demonstrated in Figure 11, which highlights selected data taken from cropping, agro-pastoral and pastoral zones in Zimbabwe, Ethiopia, Niger and Kenya. Better-off households build wealth through returns on their crop and livestock investments. Their 'portfolios' tend to be almost entirely made up of a combination of crops (for household consumption), crop sales, livestock sales and milk. They are able to do so because they own large tracts of land and/or livestock. By owning the means of production, they are able to generate more income, but this means they end up concentrating their efforts on fewer livelihood options. Poorer households, on the other hand, cobble together their income from small amounts of their own production (crop or livestock-based) and labour sales, filling in gaps with self employment and other income-generating activities, none of which afford enough income on their own to sustain the household through the year.

It is logical to posit that this concentrated reliance on one or two primary sources of food and income would increase better-off households' vulnerability to production-related hazards, and strictly speaking it does; but better-off households' overall risk of

FIGURE 11. WEALTH DIFFERENCES AND DIVERSITY



disaster is lower because the high levels of income they are able to generate offset the losses associated with most shocks. Poorer households live much closer to the edge; their more diversified livelihoods do not appear to afford them significant protection.

If diversity means a balanced distribution of truly independent, non-related sources of income that are not vulnerable to the same hazards in the same ways, it is hard to imagine what that would realistically look like in a rural setting where most paths lead back to the two primary sources of production – crops and livestock.

Having said that, to the extent that *labour demand* can be protected, it does shelter people from weather-related hazards. Efforts aimed at shoring up employment schemes, reducing the cost of migrant labour for migrating households, ensuring affordable access to health care for labourers and building new sources of labour demand must all be part of an equation aimed at reducing the risk of livelihood-related disasters for rural poor.

KEY QUESTION 3

Will increasing poor households' agricultural production increase their resilience in the face of climate change?

Measures aimed at increasing agricultural production are among the most prevalent development and resilience-building interventions throughout the world. On the face of it, these measures appear to make sense, because so many of the target countries for development agencies have an agricultural economic base. But is this an approach that makes sense in the context of DRR and CCA?

In order to explore this question with the available HEA data and evidence, we have run a scenario in which we have increased agricultural production across the board to see to what extent this improves poor households' ability to withstand the effects of a typical drought.

This agriculture improvement scenario was purposely kept simple, positing a 25% increase in yield on a quarter hectare resulting from the investment of improved seeds and fertiliser. We estimated that this would result in an additional 15% of annual calories (roughly two sacks of grain) per household, and a marginal increase in the livelihood protection threshold[6] across the board reflecting the costs of improved seeds and fertilisers. No other changes were made. With more data, a much more sophisticated analysis could be done, taking into account, for example the opportunity costs associated with diverting labour to agriculture away from self-employment or labour; or considering different types of high-value crops, which would generate more cash income; or taking into account the different productive capacity of specific livelihood zones.

In the absence of detailed project data, however, the layering of multiple conjectures and assumptions serves only to obfuscate. This simpler scenario is meant to offer a preliminary starting point for discussions around just how much of a reduction in risk it might be reasonable to expect given the realistic potential for increasing yields.

EVIDENCE FROM THE HEA DATABASE

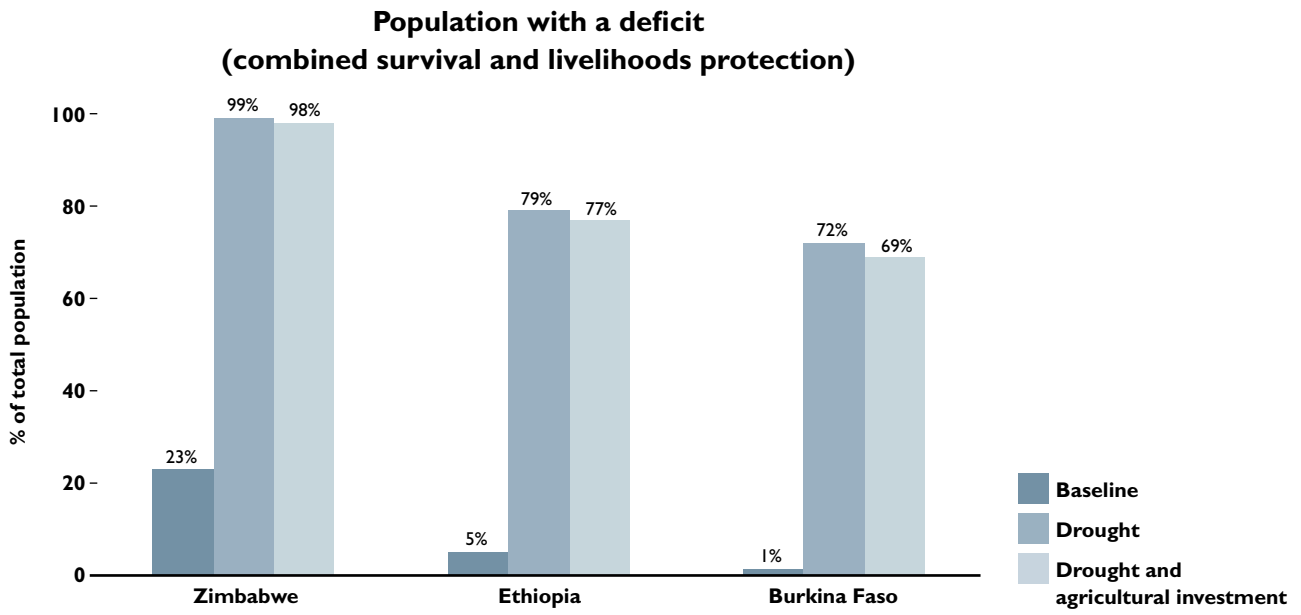
The bar charts in Figure 12 and Figure 13 present the results of this analysis at the national level, demonstrating the effects of improved household-level agricultural output on reducing the risk of a deficit for households in Zimbabwe, Ethiopia and Burkina Faso.

Figure 12 shows the percentage of the population with a combined livelihood and survival deficit (i.e., the total deficit) given three circumstances: first in the baseline year; second after a drought scenario[7] applied in a blanket fashion across all livelihood zones; and third with the benefits of the agricultural gains from the agricultural investment scenario described in the paragraphs above.

Figure 13 shows the impact of the agricultural production increase on reducing the size of the total deficit for those with a deficit. It should be noted that in real life a drought would not uniformly affect every area of a country with equal magnitude, but using a blanket drought helps reduce the 'noise' that would occur were you to use a realistic geographically-variegated drought scenario, and it allows one to see more easily the areas of the map that are most at risk given a multi-shock hazard, such as drought.

As one can see from the charts, although the agricultural investment offsets the deficits to a small degree, a significant livelihood protection deficit remains for a large proportion of the population in all three countries.

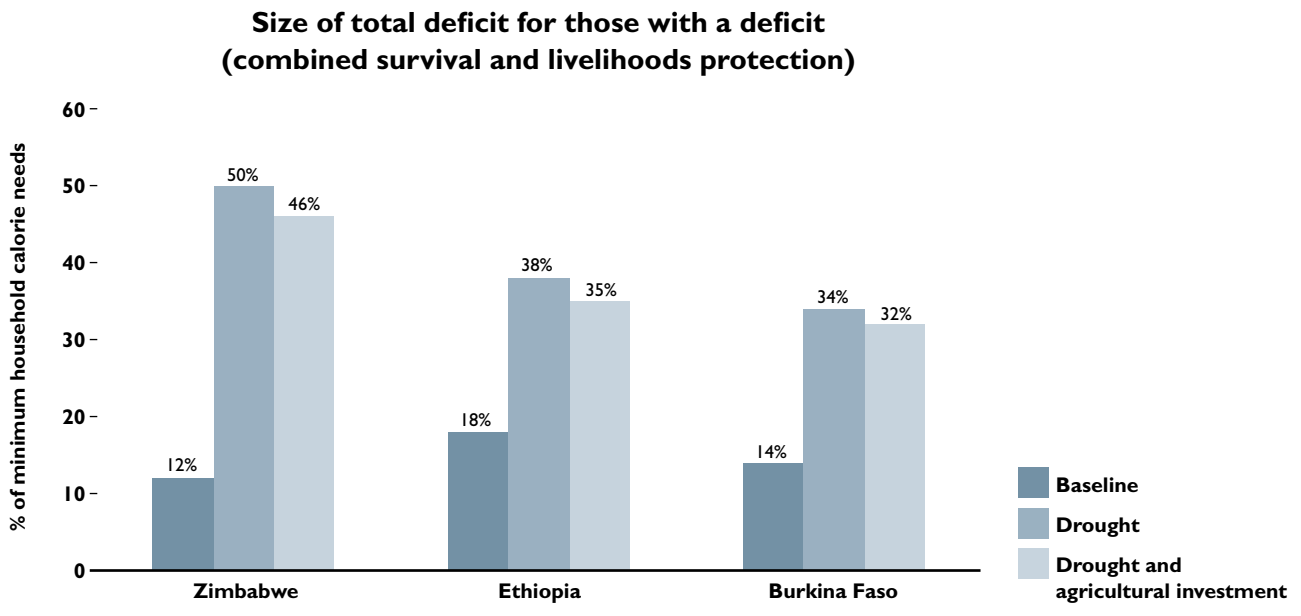
FIGURE 12. RESULTS OF INCREASED AGRICULTURAL PRODUCTION SCENARIO: POPULATION WITH A DEFICIT



The results are surprising: one would assume that two extra sacks of grain per household per year would have a greater impact on reducing a household's risk. So why does it end up meaning so little? First, drought does not discriminate and would reduce the newly achieved production to the same degree it does the baseline production. In some sense, by increasing one's reliance on crop production, one also increases one's vulnerability to weather-related (and other types of production) hazards.

Second, a necessary corollary to the increased production is an increase in the household's livelihood protection threshold – or the costs associated with maintaining the household's livelihood strategies.

FIGURE 13. RESULTS OF INCREASED AGRICULTURAL PRODUCTION SCENARIO: SIZE OF TOTAL DEFICIT



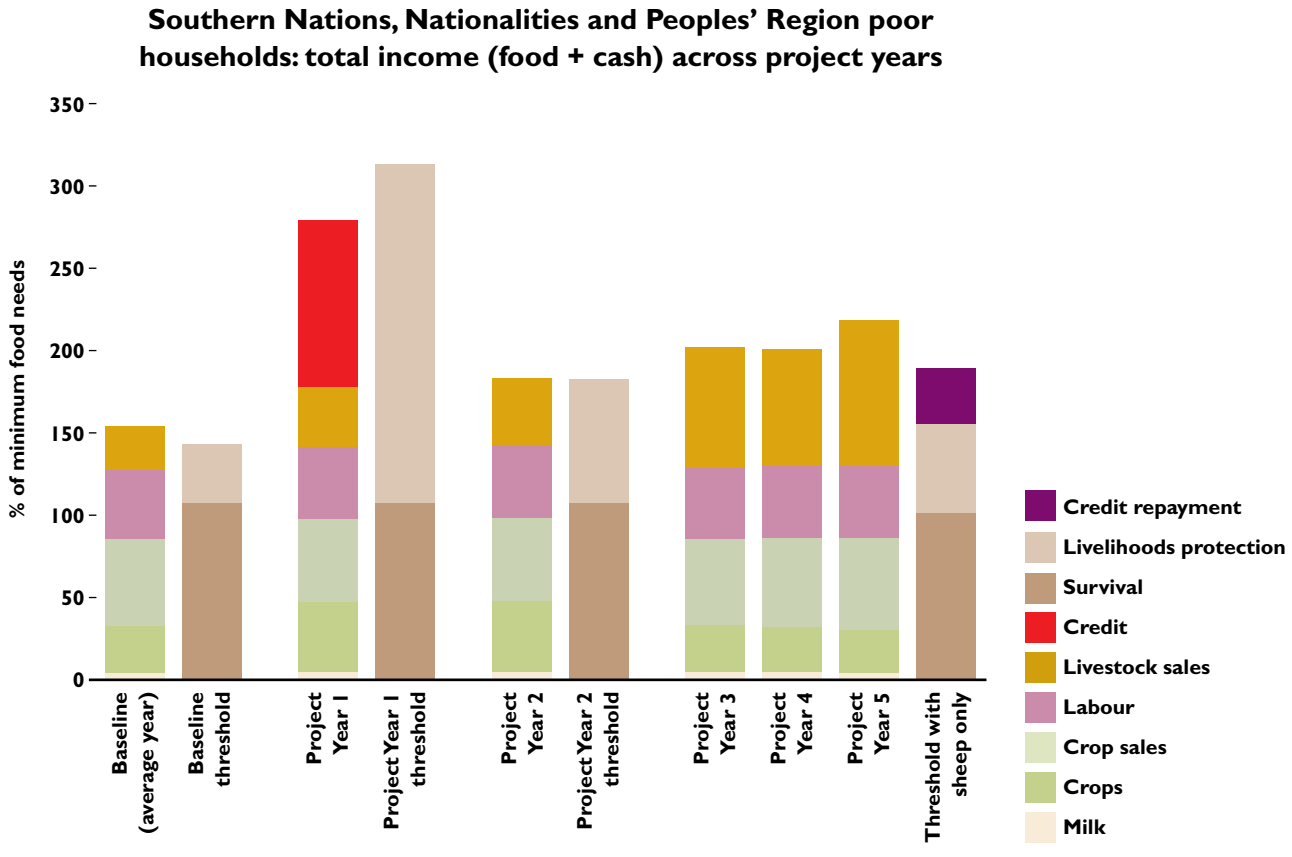
More money needs to be spent on seeds and fertilisers in order to achieve this additional output. With a higher livelihoods protection threshold, the net gains diminish.

Obviously, the method used to increase agricultural production makes a difference in the result. For instance, with an irrigation scheme, the agricultural gains could be protected against drought; however, an increase in the livelihoods protection threshold, associated with increased investment costs, would also need to be factored in and may, in the short term, actually increase people's risk of livelihood crisis. It would be valuable to conduct additional analyses using different combinations of investment packages and sets of assumptions to see whether an ideal 'package to livelihood zone' combination could be achieved.

It has been shown in other HEA-based analyses that development investments intended to increase resilience can actually have the opposite effect, putting households at greater risk of disaster, at least in the short term. In Ethiopia, for example, a five-year projection was made using data from the Other Food Security Programme (OFSP) investments, to estimate the net gains for different households with different development packages (e.g., ox fattening, irrigated agriculture and shoats, and ox and shoats). The analysis showed that in the first year of an ox-fattening and shoat/dairy project, the investments required to maintain the oxen and sheep/goats would exceed a household's income, creating a livelihoods protection deficit in the short term. (See Figure 14.)

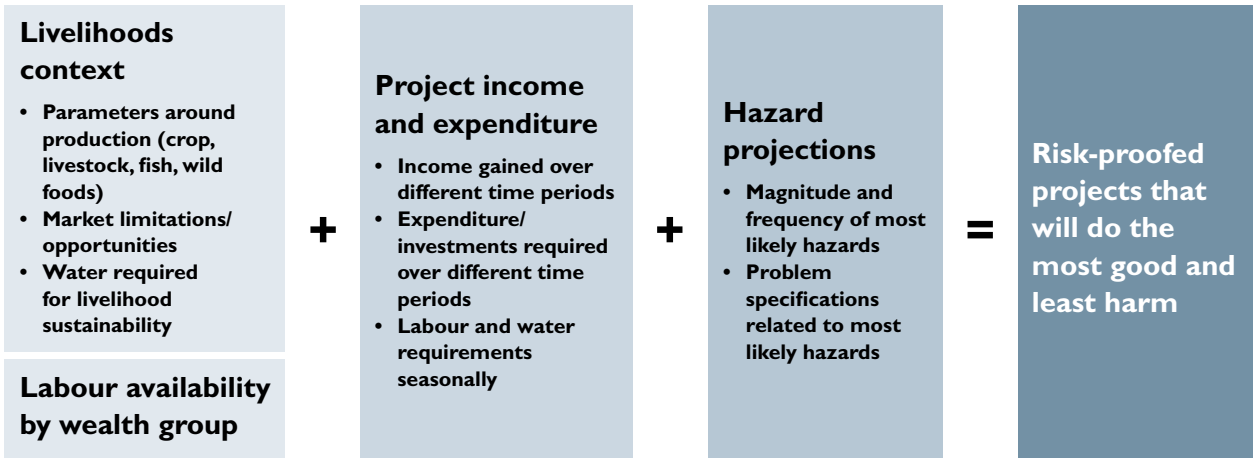
Only after the sale of the ox in the second year of the project would ox maintenance costs decrease and income from shoat sales begin to rise as the herd size progressively increases. Keeping in mind that the projections made in this five-year scenario do not consider the impact of inter-annual production hazards, such as drought or livestock disease, one can immediately see that any such shock in Project Year 1 would cause enormous harm for the poor household, already stretched beyond its means. In a country like Ethiopia, especially in the context of increasing weather variability related to climate change, this is more likely than not to occur.

FIGURE 14. TOTAL INCOME COMPARED WITH LIVELIHOODS PROTECTION THRESHOLD: OX-FATTENING AND SHOAT PACKAGES



Source: World Bank, OFSP, Lorraine Coulter 2009

FIGURE 15. A LIVELIHOODS-BASED MODEL FOR 'PRE-FLIGHT TESTING' DEVELOPMENT INTERVENTIONS



Source: The Food Economy Group

Risk-proofing development interventions requires dedicated information and analysis, including, at a minimum, the following ingredients: a clear picture of how people currently stitch together their livelihoods; the increased costs to the household of development investments; the potential returns at the household level on these investments; and the effects of projected hazards.

It is only by conducting this sort of analysis that we can reduce the risks of development harm and increase the likelihood of achieving positive outcomes. HEA provides a good starting point for helping to risk-proof development investments, supplying information on the livelihoods context and labour availability by wealth group, and offering a facility for tying together the additional required information in a dynamic, evidence-based model.

KEY QUESTION 4

What hazards are pastoralists most vulnerable to and what does resilience mean for a pastoralist economy?

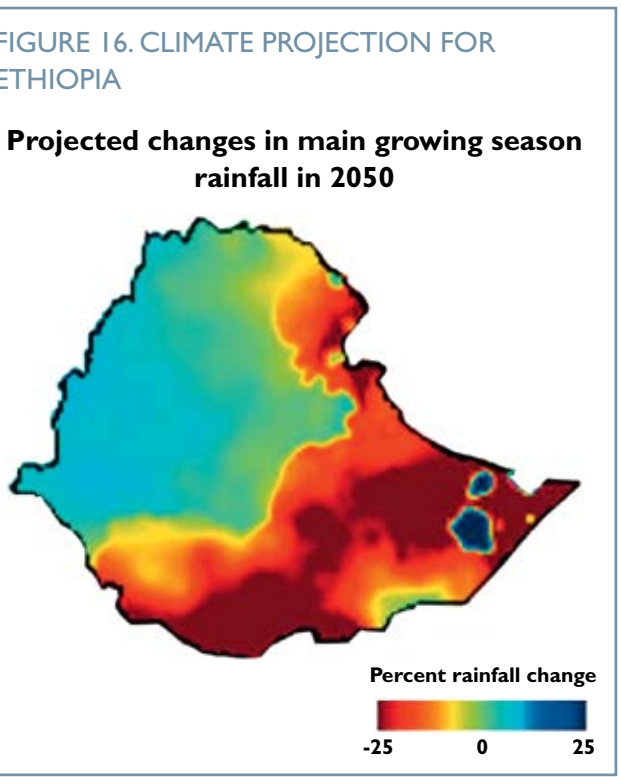
Much of the literature on DRR and CCA focuses almost exclusively on impacts related to crop production cycles and concerns about increasing resilience in agricultural settings.

It is common to come across references such as this: *"the frequency of droughts and floods are likely to affect crop production negatively, which could increase the number of people at risk from hunger and increased levels of displacement and migration."*[8] Or this: *"For many poor rural people, reliance on subsistence agriculture means that the impact of climate shocks and stresses are likely to have negative implications for their food and livelihood security, human capital and welfare"*.[9]

But pastoralists, especially those in the Horn of Africa, are already living through worsening weather hazards (arguably brought on by climate change) and the long-term prospects for them to maintain their current livelihood system appear to be diminishing. Pastoralists have been increasingly buffeted by numerous hazards, both climate-related and man-made. Successive years of poor rainfall, especially over the past two decades, along with diminished access to traditional dry-season grazing areas (due to competition from large commercial farms, small holder agriculture, wildlife reserves, military uses and urban settlements), have led to disastrous outcomes, including famine and extreme levels of malnutrition. As it becomes more and more lucrative for big farmers to move into marginal areas, or for smallholders to exploit the remaining water sources along rivers and seasonal *wadis*, pastoralists, whose claim to land has traditionally been secured through customary non-binding negotiations, are increasingly losing their access to grazing areas that sustain the basis of their livelihoods.

Projected rainfall in Ethiopia in 2050 (see Figure 16) shows prospects of a worsening future in pastoralist areas. The negative (red) anomalies are squarely located in the pastoral zones of Afar and Somali regions. In this sense pastoralists are the pioneers in this new age of climate variability, and the task of coming up with creative options for reducing their immediate disaster risks and helping them adapt to the climate change effects they are experiencing right now can help forge the tools needed to address future concerns in other areas. So what types of hazards are pastoralists most vulnerable to? And what is it about their specific economic strategies that should be kept in mind in the context of DRR and CCA?

FIGURE 16. CLIMATE PROJECTION FOR ETHIOPIA



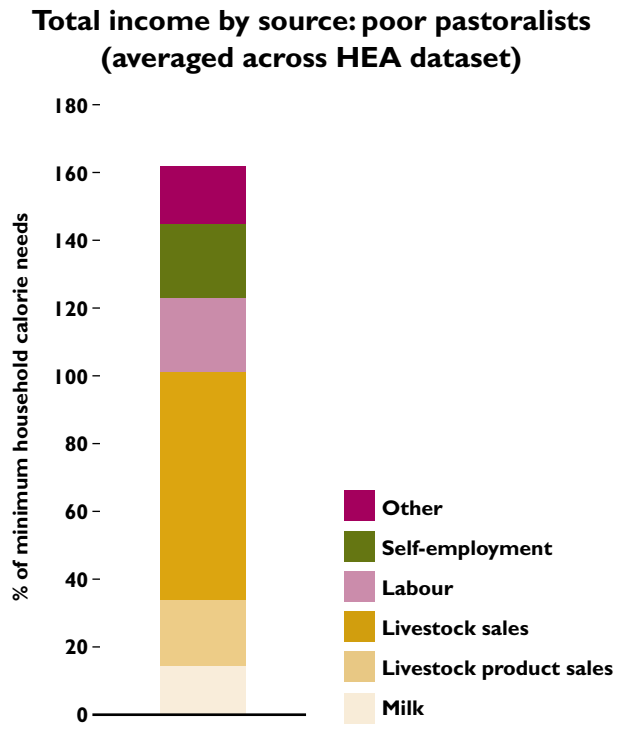
Source: Funk C, Brown M (2009) Declining Global Per Capita Agricultural Capacity Production and Warming Oceans Threaten Food Security, Food Security, DOI 10.1007/s12571-009-0026-y

EVIDENCE FROM THE HEA DATABASE

The HEA datasets include 20 pastoralist livelihood zones from Ethiopia, Mali, Niger, Kenya and Somalia. These zones make up less than 10% of the HEA data, which reflects their relative proportion in the general population. What defines pastoralists is their reliance on livestock, which produces both food and cash income for them; their tendency to migrate with their cattle seasonally; and the fact that they do not produce any crops. Figure 17 provides a summary of all the data contained in the HEA dataset for *poor* pastoralist households, showing total income by source.

This figure shows that even poor households in pastoralist zones, despite their much smaller herds, rely heavily on their own livestock to provide them with milk and cash from livestock and livestock product sales. Also important are: the sale of (usually herding) labour to better-off pastoralist households within their communities; self-employment (usually sales of charcoal or firewood); and gifts from richer relatives and neighbours (included in the 'other' category). Notably absent are crops, either for own consumption or sale.

FIGURE 17. POOR PASTORALIST LIVELIHOOD PATTERNS



But this somewhat static depiction of poor pastoralists does not adequately convey the symbiotic nature of pastoralist economies, in which richer households depend heavily on poorer ones to provide them with the labour they need to tend their large herds, and poorer households depend on richer ones to fill in their annual and interannual gaps with gifts of milk, grain, cash and animal loans. This dynamic is shown in Figure 18 using an example in Mali drawn from the HEA database.

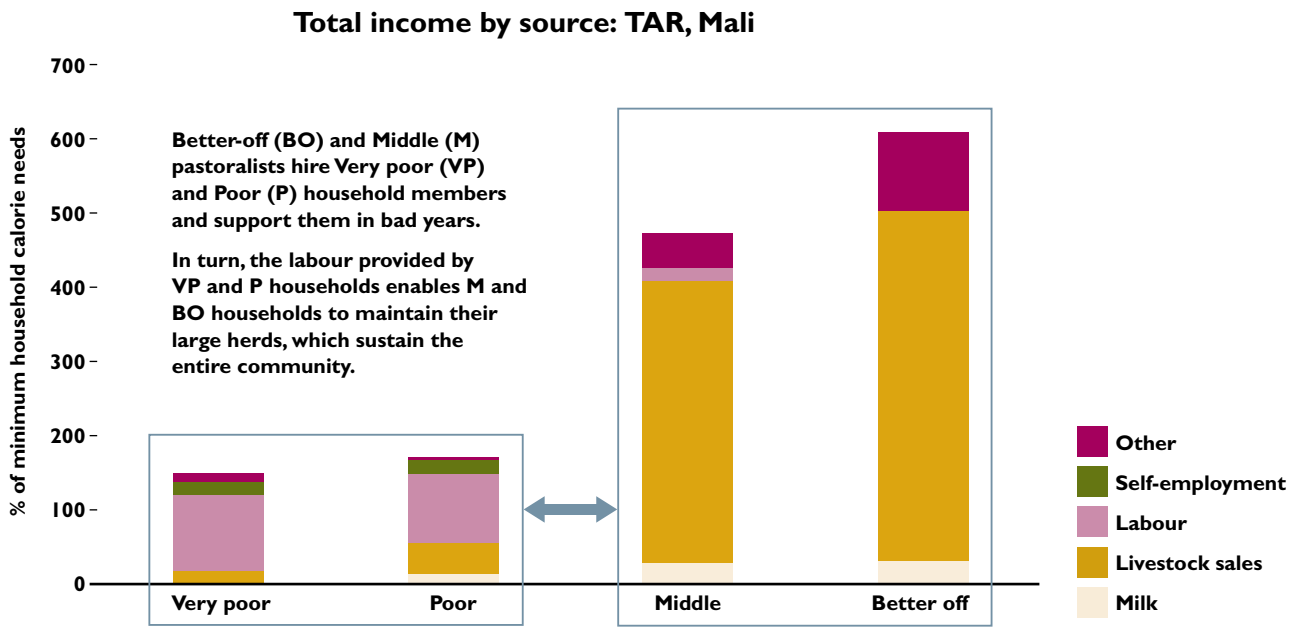
In the simplest terms, then, pastoralists produce a small amount of their own food in the form of milk and meat, but they purchase the vast majority of it. Their ability to purchase rests almost entirely on the health of their livestock herds and fluctuating market conditions.

It follows then that the most damaging hazards for pastoralists are livestock and market related. This is reflected in Figure 19, which highlights for pastoralists the single-shock analysis done previously in this report. Shown here are the critical threats posed by both livestock shocks and purchase-related shocks, especially market disruptions that affect either livestock or grain prices.

It is also important, in the context of DRR, to understand that pastoralists have laid claim to the most marginal of lands, surviving in these semi-arid zones where rainfall is unreliable at best by making the most of years with decent rainfall to build up herds, which one expects will be ravaged the next drought year, and by moving as necessary to the current season's prime grazing areas. In this way, successful pastoralists achieve a critical equilibrium that finds a balance over multiple years, oscillating between good and bad, surplus and dearth. Unsuccessful pastoralists tend to fall out of the system entirely, moving to peri-urban or urban areas or becoming destitute.

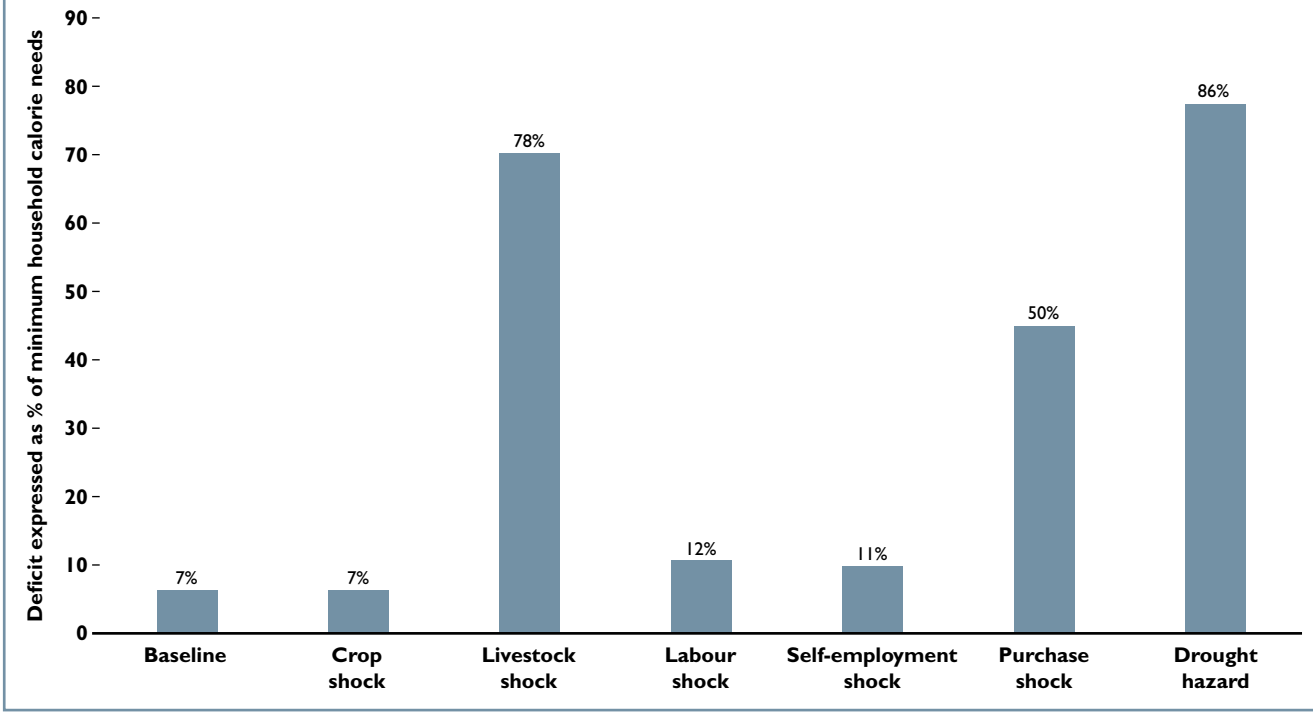
So what does it mean to build resilience in pastoralist areas? This report does not propose to answer that question fully; rather, in interpreting the HEA data, we make preliminary statements in order to frame a more informed debate. Taking a cue from the findings in Figure 19, it is logical to focus resilience-building efforts on two areas in particular: livestock health and market reliability. Fully functioning and integrated livestock markets, affordable veterinary care, a legal framework that ensures mobility and access to grazing areas, access to affordable supplementary livestock feed, and ensured access to water supplies are surely key components of any resilience-building effort in pastoralist zones.

FIGURE 18. RELATIONSHIP AMONG PASTORALIST WEALTH GROUPS



A recent DFID-funded analysis that employed (in part) HEA outcome analysis to consider the costs of various humanitarian and resilience programmes in pastoralist areas of the Horn, concluded that building resilience in pastoralist areas will reduce the cost of intervention in the long term while saving lives and livelihoods.[10] In this study, a number of different scenarios were evaluated in an attempt to determine the cost of response in each case. These scenarios included: 1. Late response to drought – late humanitarian intervention; 2. Early response to drought – early humanitarian intervention; 3. Early response to drought with resilience programmes – both humanitarian and resilience programmes; and 4. Investments in resilience before drought so households could cope on their own. The costs

FIGURE 19. SINGLE-SHOCK ANALYSIS FOR PASTORALISTS



were modelled for agropastoral and pastoral areas in Somali and Oromiya regions of Ethiopia and for two livelihood zones in Kenya.

The key findings from the HEA outcome analysis conducted for this study were as follows:[11]

Because post-drought herd recovery takes a significant amount of time – at least five to six subsequent years of average rainfall after a high magnitude drought, and three to four years of average rainfall after a medium magnitude drought – livelihood protection deficits persist for pastoralists well beyond the year of the initial drought shock. In this study, the deficits can be found throughout the entire five-year projection at levels higher than those of the reference year.

Destocking interventions appear to be a cost-effective approach in the drought year, but need to be considered in parallel with the market's capacity to absorb additional supplies. Destocking helps better-off and middle households disproportionately, since poorer households have smaller herds and can destock only one or two animals at most.

Herd restocking interventions should be considered post-drought for a number of years given the lingering effects of the drought.

Supplementary livestock feeding and health interventions are necessary to ensure normal conceptions, reduce spontaneous abortions and maintain milk production rates. These types of interventions truly build resilience by maintaining normal herd dynamics, limiting livestock mortality rates, buoying birth rates, and thereby speeding recovery periods.

A second recent analysis that used HEA outcome analysis to investigate the degree to which social protection programmes in pastoralist areas of Ethiopia could cover survival and livelihood protection deficits raised questions about the nature of chronic food insecurity in pastoral and agro-pastoral areas and asked what this meant for social protection programming.[12]

In this study, a number of different year types were modelled and subsequently used to create hazard scenarios as an input to the HEA outcome analysis, which was conducted in five pastoralist/agro-pastoralist livelihood zones of Somali and Afar regions in Ethiopia. One of the findings was that in none of the five livelihood zones was there a livelihoods protection deficit in an 'average' year. To some extent this makes sense, since pastoralists who cannot survive even an average year must cease to be viable pastoralists. But this raises a question about the nature of chronic food insecurity in pastoral and agro-pastoral areas in general and whether it is valid to think in terms of a food security 'set point' in areas that are defined in large part by seasonal and inter-annual fluctuation.

If there is no 'set point', but rather a careful balancing between surplus and deficit years, the key to resilience in pastoralist areas would seem to be to determine the outside ranges of these two year types to ensure that, on the one hand, herd sizes were large enough to ensure sufficient buffers in the worst years, while at the same time not so large as to become unsustainable from a carrying capacity point of view.

One other point from this study is worth mentioning here: in the bad year scenarios, the entire population faced a deficit in four of the zones (and all but the better-off wealth group had a gap in the fifth zone). This tells us something about the nature of vulnerability in pastoralist areas. All households are dependent on livestock, so no wealth group is buffered from the effects of a shock that undermines livestock health. Better-off households have more livestock, which means they can sustain losses for a longer period, but it also means their livelihood protection costs are higher, because their productive investments need to match these large numbers. With the losses sustained in a bad year, all wealth groups quickly reach a point where they can no longer meet their survival and livelihood protection needs.

The point was made in this second study that, in light of the fact that there is not a direct relationship between poverty and vulnerability amongst pastoralists, and because there are such tight interdependencies built into the social support systems in these communities, issues of targeting need careful consideration in pastoralist settings.

CONCLUSIONS

If the goal of DRR is to reduce the risk of disasters (*R*), the overarching operational questions relate to how this can best be done. Actions can be directed at reducing the frequency and magnitude of different *hazards* (*H*); and/or towards reducing people's *vulnerability* (*V*) to the hazards; and/or increasing their *capacity to cope* (*C*). Most DRR activities today are aimed at achieving the latter two (i.e., reduced vulnerability and increased ability to cope), because it is generally accepted that natural hazards are not – at least in the short term – amenable to human intervention. Building 'resilience', widely referred to in DRR and CCA circles, encompasses these last two components of the DRR formula (*V* and *C*).

What makes DRR a unique field of work is that it is based on a proposition of conditionality. *If* we can reduce vulnerability and increase people's ability to cope, we will reduce the risk of disaster occurrences. But 'vulnerability' is a meaningless concept on its own; it exists in a dialectic relationship with hazards. People are variably vulnerable to different hazards: rain fed-dependent farmers are highly vulnerable to drought; poor urban dwellers are highly vulnerable to changes in food prices. **Analysing the interaction between hazards and vulnerability and coping capacity in both current and future settings is what moves DRR beyond the static field of traditional emergency assessment and response into a dynamic arena of risk analysis and mitigation.**

HEA's unique ability to conduct dynamic scenario analysis is what makes it so appropriate for DRR-related enquiries. Preliminary insights drawn from the limited analysis conducted for this report offer evidence for that contention. In summary, these insights are as follows:

An early warning and prospective disaster risk assessment system that is customised to pick up on the spatial variations in underlying livelihoods will be more accurate than one that is focused solely on hazards. HEA data contribute to the early warning and risk assessment component of DRR by providing a vulnerability map that is disaggregated to reflect areas where people are bound by a common vulnerability to the same hazards.

Crop shocks have the most damaging effect on livelihoods for the households in the 233 livelihood zones included in the analysis conducted for this paper. But livestock, purchase and labour shocks – far less commonly monitored throughout the world – can also cause substantial damage and, depending on the livelihood zone, can be far more critical than crops. Monitoring systems need to make a concerted effort to integrate mechanisms for systematically and effectively monitoring these critical shocks (in addition to crop production) if prospective disaster risk assessments hope to get things right.

Across all livelihood zones, price shocks create a significant impact, second only to crop shocks. This reflects the high degree to which poorer rural households today are heavily reliant on purchasing their food. In our increasingly globalised world, where a change in food policy in one part of the globe can undermine livelihoods in a village half the world away, it is important to remember that price shocks reduce food access for both *urban* and *rural* households, who are increasingly tied to global markets.

The evidence and analysis in this paper raises questions about the efficacy of pursuing a strategy based on diversifying livelihoods to increase resilience and reduce risk. Given the fundamental connections between the two primary production systems (crop and livestock) and household sources of food and cash income – as well as the economic arrangements linking poor and better-off households – it is not clear what a realistic picture of a truly diversified livelihood looks like in rural areas. With the exception of off-farm labour/employment and certain types of self-employment, few rural options offer protection from the primary production hazards.

Finding ways to increase levels of income, as well as cultivating truly independent and diverse income sources, appears to be critical for reducing risk and building resilience.

It is not clear that improving smallholder agriculture on its own provides *significant protection against disaster risks* and it depends very much on what methods are used to increase production as to whether or not a reduction in disaster risks will be an associated benefit. Assuming that it was possible to set up conditions that would enable everyone everywhere to produce an additional two sacks of grain (or 15% of the household's annual food needs) using improved seeds and fertilisers, this would lead to only a minimal reduction (1–3%) in the percentage of people facing a deficit in the event of a drought.

Given that development investments intended to increase resilience can sometimes have the opposite effect, putting households at greater risk in the short term, it is essential for resilience programmes to conduct 'pre-flight' analysis on their interventions. HEA provides a good starting point for helping to risk-proof development investments, supplying information on livelihoods and labour availability by wealth group, and offering a facility for tying together the additional required information (such as investment costs, potential returns and projected hazards) in a dynamic and evidence-based model.

Pastoralist communities offer an immediate opportunity and a compelling case for learning as much as we can about what strategies are most effective in building resilience and developing adaptive capacities, since many of them live in areas projected to experience the devastating impacts of climate change. In devising these strategies, existing information about pastoralist livelihoods needs to be taken into account. Of particular relevance are: the critical nature of livestock and market hazards; the requirement for long herd-recovery periods after droughts; shared vulnerability among all wealth groups and the redistributive practices within pastoralist economies. These factors suggest that resilience programming in pastoralist areas needs to concentrate on building strong, flexible and integrated livestock and staple food markets, and providing affordable access to livestock health services. Targeting to the poorest in pastoralist areas may not be the best approach given the fact that in severe events better-off pastoralists also tend to face deficits, and the shared community risk is traditionally managed through redistributive mechanisms. While pastoralists expect, and can recover on their own from, moderate bad years, exceptional droughts and consecutive bad years require long-term recovery strategies that are most cost-effective when enacted early.

Areas of further research suggested by the analysis conducted in this paper, which could be supported at least in part by the HEA database, include:

- Is diversification itself a barrier to economic growth for poor households?
- To what extent do urban–rural linkages reduce disaster risks and, in the context of diversification, is this a promising area for investment?
- Would increasing herd sizes help reduce the risk of livelihood disasters for pastoralists?
- Can we pair livelihood zone clusters with optimal investment packages that strike a balance between economic growth and disaster risk reduction?

ENDNOTES

[1] For more on the HEA methodology, see *The Practitioners' Guide to HEA* (http://www.heawebsite.org/about-household-economy-approach).

[2] The forthcoming food security report draws directly on the baseline data without conducting outcome analysis. The forthcoming social protection report also uses outcome analysis, but towards a different end, as it is concerned more pointedly with thresholds for poverty.

[3] See UNISDR, *Terminology on Disaster Risk Reduction*, 2009, pages 12 and 13

[4] F Ellis and E Allison, Overseas Development Group, University of East Anglia, UK, *Livelihood Diversification and Natural Resource Access*, FAO, Livelihood Support Programme (LSP), January 2004, p. iv

[5] Practical Action, *Elements of Disaster Resilience: Lessons from Bangladesh*, Mainstreaming Livelihood-Centred Approaches to Disaster Management Project, 2010, p. 1

[6] The increase in the livelihoods protection threshold in this scenario is equivalent to 6.5% of household annual calorie requirements.

[7] For details on the drought scenario, please see the text box on page 11.

[8] ISDR Briefing Note No 1, Climate Change and Disaster Risk Reduction

[9] M Davies, K Oswald, T Mitchell and T Tanner, Climate change adaptation, disaster risk reduction and social protection, in *Promoting Pro-Poor Growth: Social protection*, OECD, 2009

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LIVELIHOODS AT THE LIMIT

REDUCING THE RISK OF DISASTERS AND ADAPTING TO CLIMATE CHANGE

Evidence from the consolidated Household Economy Analysis database

This report draws on the compiled Household Economy Analysis dataset and analysis tools to answer some of the most pressing questions about disaster risk reduction and climate change adaptation in a range of livelihood contexts:

- Which single shock has the most damaging impact on households' ability to meet their minimum food and livelihood requirements?
- Does diversification always help reduce the risk of disaster?
- Will increasing poor households' agricultural production increase their resilience in the face of climate change?
- What hazards are pastoralists most vulnerable to? And what does resilience mean for a pastoralist economy?

This is one of five reports and papers in the *Livelihoods at the Limit* series, which offers critical insights into key questions about what resilience means and how to achieve it in different livelihood contexts.

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