MEASURING RESILIENCE

Use this resource to find out more about measuring resilience

Hover your mouse over this box then press CTRL + Click to find out how to use the material presented. Alternatively go the contents page, pick a topic and start your journey from there.

DOI: http://dx.doi.org/10.12774/eod_tg.may2016.sturgess2

First published May 2016

Table of Contents

How to use and navigate this resource **3**

Key Contacts **6**

1. Can we quantify resilience? **7**

Why measure resilience? 7

Conceptual and methodological challenges 7

How can we quantify resilience? 8

2. Resilience measurement frameworks **15**

Reviews and critiques of resilience measurement frameworks 17

3. Measuring resilience in practice **23**

Trends and learning from attempts to measure resilience 23

Practical guidance on measuring resilience 27

Understanding degrees of resilience 29

4. Reducing adverse livelihood impacts from shocks or stresses **31**

Evidence from Household Economy Analysis 31

Early action and response 33

5. Key messages **40**

Glossary **41**

Recommended Resources **43**

Overview of resources 43

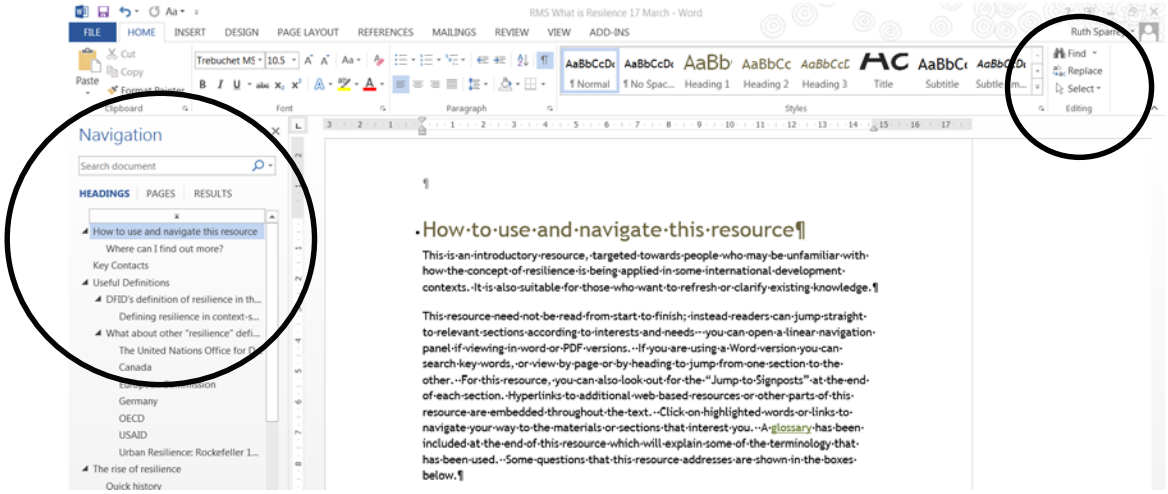
Bibliography **48**

HOW TO USE AND NAVIGATE THIS RESOURCE

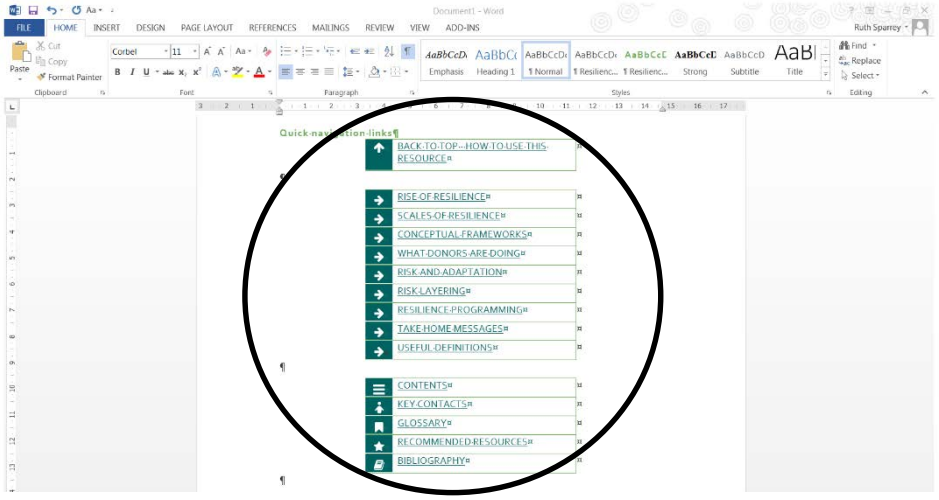
This resource is about measuring resilience in international development contexts. It is suitable for people who understand the fundamental concept of resilience but want to learn more about measuring resilience.

This resource need not be read from start to finish; instead readers can jump straight to relevant sections according to interests and needs. Here are some ways that you can do this:

1. You can open a linear navigation panel if viewing in Word. From here you can search key words, view by page, or use the headings to jump from one section to the other. Pull up your navigation panel by clicking "Find" from the Home Tab on your document.



2. You can also look out for the "Quick Jump to" links at the end of each section. Click the hyperlink to where you want to go.



3. Hyperlinks to web based resources or other parts of this resource are embedded throughout the text. Click on highlighted words or links to navigate your way to the materials or sections that interest you.
4. A glossary has been included at the end of this resource which will explain some of the terminology that has been used.

To return to where you were before clicking a hyperlink press the ALT Key and the ← Left Arrow on your keyboard together. This acts like the back arrow on a web page.

5. Some questions that this resource addresses are shown in the boxes below.

Why measure resilience?	Can we quantify resilience?	How can we measure resilience?
How has resilience been measured in practice?	Where can I find guidance on measuring resilience?	Are DFID programmes measuring resilience?
What are the key messages on measuring resilience?	How can we reduce effects of shocks on livelihoods?	What is early action and is it cost effective?

Practitioners may be most interested in the following sections:

- Trends and learning from attempts to measure resilience
- Monitoring and evaluating resilience interventions
- Guidance on data sources

Where can I find out more?

There are two ways to find further information.

1. Firstly, if you are DFID staff you can contact the DFID Virtual Community of Practice on Resilience, or get in touch with a key contact for specific expertise. We have started a list of key contacts which will be updated periodically. This resource is available to DFID personnel.
2. Secondly, you can follow the links embedded in the text or take a look at some recommended resources and ideas for further reading (see Recommended Resources).

Acknowledgements

Special thanks to Christopher Béné of CGIAR for his comments on drafts of this resource.

Quick navigation links

↑	BACK TO TOP - HOW TO USE THIS RESOURCE

→	CAN WE QUANTIFY RESILIENCE?
→	RESILIENCE MEASUREMENT FRAMEWORKS
→	MEASURING RESILIENCE IN PRACTICE
→	REDUCING ADVERSE LIVELIHOODS IMPACTS
→	KEY MESSAGES

☰	CONTENTS
🔖	GLOSSARY
★	RECOMMENDED RESOURCES
📖	BIBLIOGRAPHY

KEY CONTACTS

The Food Security Information Network (FSIN) has a Resilience Measurement Community of Practice (RM CoP) that provides access to an online knowledge exchange platform. This is aimed at people interested in the link between resilience and food security/human development.

The Rockefeller Foundation has awarded a USD $800,000 grant to the Windward Fund to launch the **Resilience Measurement Community of Practice**. This is a project to bring together leading experts and M&E practitioners to advance the practice of resilience measurement and build the evidence base for investments in resilience. **Point of contact:** Dr Maliha Khan, Interim Coordinator, Resilience Measurement-M&E Community of Practice.

FAO has established a Resilience Analysis Unit (RAU) in Nairobi with the Intergovernmental Authority for Development (IGAD). The RAU aims to: i) develop resilience measurement and analysis capacities; and ii) inform policy processes and resilience programming in the Horn of Africa.

BACK TO TOP – KEY CONTACTS

PREVIOUS SECTION – HOW TO USE THIS RESOURCE

CAN WE QUANTIFY RESILIENCE?

RESILIENCE MEASUREMENT FRAMEWORKS

MEASURING RESILIENCE IN PRACTICE

REDUCING ADVERSE LIVELIHOODS IMPACTS

KEY MESSAGES

CONTENTS

GLOSSARY

RECOMMENDED RESOURCES

BIBLIOGRAPHY

1. CAN WE QUANTIFY RESILIENCE?

This section considers the rationale for measuring resilience, conceptual and methodological challenges, and general principles for how resilience can be measured. It also provides an overview of some common methods of quantifying resilience.

WHY MEASURE RESILIENCE?

> "Questions of what to measure, whom to measure, how often to measure, what methods to use, and at what scale are still being debated." IFPRI international conference on resilience, 2014

The drive to justify investments and monitor the success of resilience programming is gaining momentum, in line with the prominence of the concept of resilience in post-2015 development discourse. Despite some differences in wording in definitions of resilience (see the 'What is Resilience?' resource), there is some convergence of understanding that resilience is an intermediate rather than final outcome and a combination of capacities or assets that lead to other positive wellbeing outcomes.

The Food Security Information Network argues that if no clear guidelines exist on how to reliably and credibly measure resilience, decision makers will not be able to make informed choices about which resilience interventions are most effective. Measuring food insecurity for example, drives accurate diagnosis as well as timely and appropriate response (Barrett, 2010). However, it is hampered by both conceptual and methodological challenges, as we discuss below.

CONCEPTUAL AND METHODOLOGICAL CHALLENGES

Conceptual challenges

Conceptually, it is difficult to measure something unless we know exactly what it is that has to be measured, but definitions of resilience do not facilitate this. It is also difficult to relate resilience to thresholds even though a spectrum of resilience makes more sense than a yes/no definition. Theoretical resilience frameworks are often not linked to attempts to measure resilience. While most current quantification efforts focus on household level; the links between resilience of individuals, households, communities, infrastructure and countries are not straightforward. It is hard to measure adaptive capacity (ability to deal with change) as it has psychological, cultural, technical, financial, social and political components. Other difficult questions need to be considered:

- What about vulnerability traps (similar to poverty traps but barriers could be economic, cultural, political or psychological)?
- Are there minimum preconditions for building resilience – economic opportunities, governance, equity? How does this affect fragile states?
- What about future resilience? Things that have contributed to resilience in the past might not do so in the future. Resilience is dynamic.

(Summarised from Levine, 2014)

Resilience is not directly observable per se but must be placed in relation to a given outcome e.g. resilience to conflict or climate change and identifiable shocks. (Resilient Africa Network)

Resilience is necessarily specific to contexts - time, space, livelihood and shocks (resilience of who/what? to what?), but this precludes generic indicators of resilience and therefore makes comparisons difficult.

Additionally, the multi-scale, dynamic and multi-dimensional nature of resilience means that many standard survey instruments are ill-suited to measuring resilience in a holistic way (Béné et al., 2015).

Methodological challenges

It may not be easy to obtain data that is both reliable and meaningful. It is easier to measure formal dimensions of life (e.g. formal membership of an organisation), than informal dimensions (e.g. interplay of informal social relations) but formal dimensions might offer less meaningful insights into resilience. It is also important to distinguish people from locations, since quantification techniques which combine parameters relating to people and to places in a single measure can lead to erroneous assumptions.

(Summarised from Levine, 2014. For further details, see full paper Assessing Resilience: Why quantification misses the point.)

Resilience measurement in relation to food insecurity is more difficult than measuring income poverty or infant mortality because of the unpredictability of shocks. Often there is a reliance on using the data that is available rather than data derived from a more systematic approach (Béné et al., 2015).

HOW CAN WE QUANTIFY RESILIENCE?

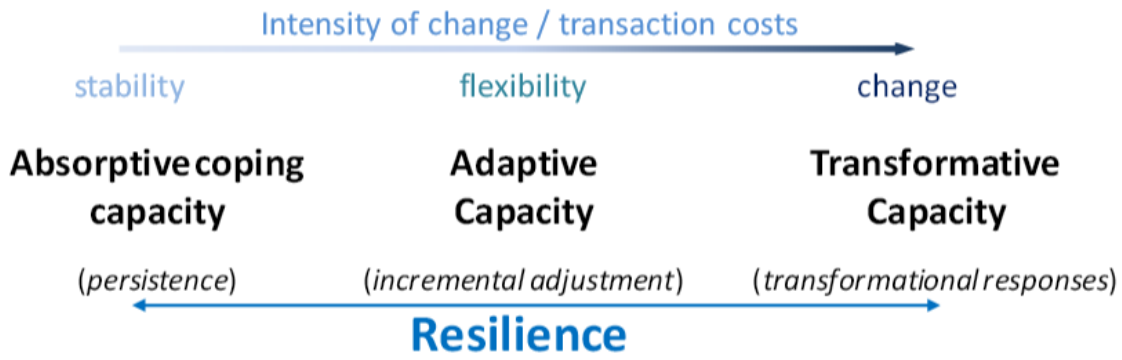
General principles

Despite the challenges outlined above, there has been progress in forming general principles to underpin attempts to quantify resilience and in constructing relevant indicators for use on programmes (see section on resilience measurement frameworks). These include the 3-D Resilience Framework; the Food Security Information Network's principles and common analytical model; and 'costs of resilience'.

The 3-D Resilience Framework

In the 3-D Resilience Framework, Béné et al.(2012) propose that resilience emerges as the result of three capacities: absorptive, adaptive and transformative capacities. Each capacity leads to a different outcome: persistence, incremental adjustment, or transformational responses.

FIGURE 1: THE 3D RESILIENCE FRAMEWORK



(Source: Béné et al., 2012, p.21, also see updated version in Béné et al., 2016)

Food Security Information Network's principles and common analytical model

The Food Security Information Network (FSIN) Resilience Measurement Technical Working Group drafted ten principles for measuring resilience with a focus on food security (Constas, Frankenberger and Hoddinott, 2014). These can be summarised as follows:

1. View resilience in terms of absorptive, adaptive and transformative capacity – (see figure above and Glossary) with a minimum threshold that allows households/communities to function in the face of shocks and stressors.
2. Include subjective assessments and qualitative data as well as quantitative data.
3. Recognise that systems are complex and non-linear.
4. Be specific about types of shocks or stressors that threaten a development outcome.
5. Include indicators that help to identify whether return to a previous state is desirable or not.
6. Recognise inherent systemic volatility.
7. Consider multiple scales and interactions at multiple levels.
8. Design timing of measurements to account for rates of change and dynamic factors.
9. Build on studies of vulnerability.
10. Design measures that account for heterogeneous responses to shocks.

(For further information, see Resilience Measurement Principles: Towards an Agenda for Measurement Design.*)*

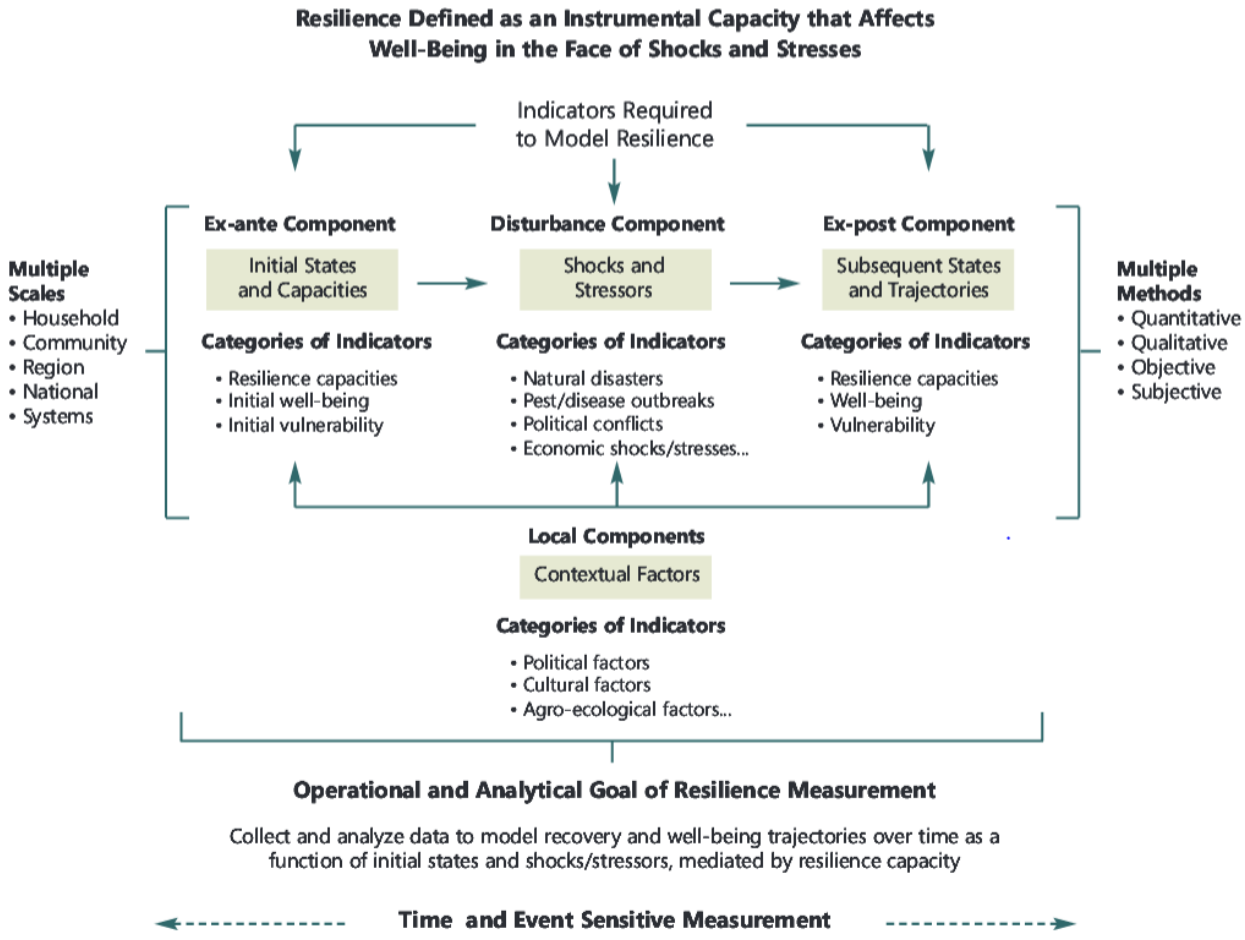
FSIN built on this work to propose a common analytical model (see figure below) for measuring resilience according to three components (ex-ante, disturbance and ex-post) with different categories of indicators (Constas et al., 2014).

Ex-ante component - data describing the initial state before a shock.

Disturbance component - data describing the effects of shocks and stresses.

Ex-post component - data on the subsequent states/trajectories after shocks.

FIGURE 2: FSIN'S COMMON ANALYTICAL MODEL FOR RESILIENCE MEASUREMENT



(Source: Constas et al., FAO/IFPRI/WFP, 2014, *p.14)*

'Costs of resilience'

Béné, 2013 put forward the idea that 'costs of resilience' (costs to go through a shock) provide an independent metric to quantify resilience across scales and dimensions. 'Costs' refer not only to financial costs but also to ecological, social, psychological, and nutritional costs (however, some are more easily quantifiable than others). The resilience costs can be calculated by adding together the anticipation, impact and recovery costs:

- ***Anticipation costs*** - the ex-ante investments for disaster/shock preparedness.
- ***Impact costs*** - the costs of destruction following the impact of the shock.
- ***Recovery costs*** - the ex-post recovery costs, including adaptation and aid.

Resilience costs = anticipation costs + impact costs + recovery costs.

The lower the resilience costs, the more resilient a system is. (Béné, 2013)

Levine (**2014,** link) cautions that instead of searching for a universal measurement of resilience, it might be more productive to focus on: impact monitoring; learning about which interventions are most useful in different situations; understanding the determinants of resilience (though this in itself might require

measuring resilience); making a political case for investment in resilience; and making comparative assessments of need to target resources.

Overview of common methods for quantifying resilience

Attempts to quantify resilience can be grouped into quantification that is based on i) functionality; ii) indicators and characteristics; iii) access to food, iv) activities; v) subjective perceptions and vi) 'costs of resilience', as shown in the table below. The most common way of quantifying resilience is to use indicators (see Resilience Measurement Frameworks).

TABLE 1: OVERVIEW OF DIFFERENT WAYS OF QUANTIFYING RESILIENCE

QUANTIFICATION BASED ON:	DESCRIPTION AND EXAMPLES	STRENGTHS	WEAKNESSES
Indicators and household or community characteristics (see Resilience Measurement Frameworks)	Uses observable socio-economic variables (e.g. income, access to safety nets, social capital, assets) as proxies to measure resilience, drawing on approaches such as sustainable livelihoods approach e.g. FAO / Oxfam / Livelihood Vulnerability Index	Considers resilience from a range of different dimensions	Reflects the context/judgement of organisation or researcher in terms of which indicators of resilience to include May neglect less tangible but significant considerations Difficult to compare across different contexts and frameworks Interactions between dimensions and scales may not be captured
Functionality	Infrastructure, e.g. a system to measure seismic resilience	Measures a functionality which has an unambiguous and uncontested definition – objective	Rarely considers different thresholds - loss of functionality does not distinguish between ability to resist loss and ability to recover quickly
Access to food	Household Economy Approach	Useful in practice because scope is restricted – does not purport to go beyond what it can coherently analyse Provides clear, quantified conclusions which can usefully inform actions	Limited scope misses important aspects of resilience (e.g., institutions, non-economic goals) Assesses current well-being, not ability to maintain future well-being
Activities	Putting a monetary value on improvements in resilience level – value for money (VfM) of resilience activities (See Is Early Action Cost Effective?)	Illustrates VfM of investments, provides headline figures Enables early assessment of relative value of interventions	Power, politics, institutions not considered Does not attempt to understand why people are resilient/vulnerable
Subjective perceptions (see below)	An individual's self-evaluation of their household's capabilities and capacities in responding to risk See Jones and Tanner, 2015	Beneficiaries focus on the aspects of resilience most relevant to them Multi-dimensional May improve policy-makers' understanding	Risk of tactical responses e.g. respondents exaggerating vulnerability to receive assistance Cross-cultural comparison might be difficult

QUANTIFICATION BASED ON:	DESCRIPTION AND EXAMPLES	STRENGTHS	WEAKNESSES
	Bene et al., 2016	of effectiveness of resilience activities and therefore improve targeting	May require complementary objective data
'Costs of resilience'- costs to go through a shock (see above, Béné, 2013)	Resilience costs = anticipation costs + impact costs + recovery costs. The lower the resilience costs, the more resilient a system is.	Provides an independent metric to quantify resilience across scales and dimensions	Not all the costs (financial, social, psychological, ecological and nutritional costs) are easily quantifiable

(Content in table based on Levine, 2014; Jones and Tanner, 2015; and Béné, 2013. For practical considerations/implications on programmes, see Measuring Resilience in Practice section.*)*

What about 'subjective resilience'?

Subjective resilience relates to an individual's self-evaluation of their own or their household's capabilities and capacities to handle future events. Subjective measures can capture information about risks and the impact of shocks as well as self-assessments and aspirations (Maxwell et al., 2015). It may provide a useful bottom-up tool for capturing the voice of beneficiaries. However, a careful understanding of the political economy of a situation is needed when measuring subjective resilience to overcome potential problems of reliability of self-reported resilience. (Jones and Tanner, 2015)

Béné et al. (2016) suggest that resilience is determined by more than tangible factors such as income or assets, but is also subjectively constructed. Subjective elements of resilience include risk perception, self-efficacy and aspirations. People's perceptions about their ability to handle future shocks and stressors affect decisions on short-term and longer term livelihood coping strategies and their willingness to engage in particular types of responses (absorptive, adaptive, transformative). Subjective resilience may therefore be as important as objective resilience.

The box below shows examples of types of questions that could be used to evaluate subjective resilience, looking at different components of resilience.

BOX 1: EXAMPLE OF QUESTIONS USED TO EVALUATE SUBJECTIVE RESILIENCE

A subset (or all) of the following items may be rated on a 7- or 5-point scale ranging from Strongly Disagree (1) to Strongly Agree (7):

[Q6] 'If heavy flooding was to occur in my area tomorrow, my household would be able to successfully cope with the threats posed by the floods' OR 'If heavy flooding was to occur in my area tomorrow, my household would be able to fully recover from the damage caused by the floods within 6 months.'

Component of resilience: Coping capacity

[Q7] 'If the rate and intensity of flooding was to increase significantly in the next 5 years, my household would have the ability to successfully adapt to the changing threats posed by the floods' OR 'If the rate and intensity of flooding was to significantly increase in the next 5 years, my household would have the ability to successfully adapt to the changing threats posed by the floods, even if this required us to completely change our way of life.'

Component of resilience: Adaptive capacity (the latter is explicitly probing transformative capacity)

[Q8] 'If heavy flooding was to occur in my area tomorrow, my household would have access to sufficient financial resources to ensure that we fully recover from the threats posed by the floods.'

Component of resilience: Financial capital

[Q9] 'If heavy flooding was to occur in my area tomorrow, my household would be able to draw on the support of family and friends to ensure that we fully recover from the threats posed by the floods.'

Component of resilience: Social capital

(Source: Jones and Tanner, 2015, p. 15)

For a literature review on subjective elements of resilience, in terms of adaptive capacity, see Chapter 2 of The Influence of Subjective and Psycho-social Factors on People's Resilience: Conceptual Framework and Empirical Evidence (Béné et al., 2016).

Additional resources: ODI paper Measuring 'subjective resilience': using people's perceptions to quantify household resilience (Jones and Tanner, 2015) and the Food Security Information Network's working paper Qualitative Data and Subjective Indicators for Resilience Measurement (Maxwell et al., 2015).

BACK TO TOP - CAN WE QUANTIFY RESILIENCE?

RESILIENCE MEASUREMENT FRAMEWORKS

→	MEASURING RESILIENCE IN PRACTICE
→	REDUCING ADVERSE LIVELIHOODS IMPACTS
→	KEY MESSAGES

☰	CONTENTS
💡	HOW TO USE THIS RESOURCE
🔖	GLOSSARY
★	RECOMMENDED RESOURCES
📖	BIBLIOGRAPHY

2. RESILIENCE MEASUREMENT FRAMEWORKS

This section looks at resilience measurement frameworks, dimensions and indicators of resilience; and useful reviews of the frameworks. One of the most common ways of measuring resilience to date has been to use a framework that considers different dimensions of resilience, and proposes related indicators to gauge levels of resilience. The table below provides a snapshot of some of the frameworks proposed since 2008 *(this is not an exhaustive list)*.

TABLE 2: EXAMPLES OF RESILIENCE MEASUREMENT FRAMEWORKS AND INDICATORS

FRAMEWORK/TOOL	DIMENSIONS/CHARACTERISTICS OF RESILIENCE	INDICATORS OR EXAMPLES OF INDICATORS	APPLIED IN PRACTICE?
ARUP/Rockefeller Foundation City Resilience Framework	» Health and wellbeing of individuals » Infrastructure and environment » Economy and society » Leadership and strategy (knowledge)	» Diverse livelihoods and employment » Reliable communication and mobility » Availability of financial resources » Integrated development planning	This is a tool drafted in 2014 for measuring resilience of cities – unclear if it has been used yet.
DFID Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) projects	3A's – anticipatory capacity, adaptive capacity, absorptive capacity and transformation (see Glossary)	For each project there will be specific outcome indicators relating to individuals (# of people with enhanced resilience). DFID's guide to developing indicators suggests considering dimensions common to other frameworks (i.e. assets, access to services, adaptive capacity, income and food access, safety nets)	Yes, as part of monitoring and evaluation framework for projects under BRACED. See The 3As: Tracking resilience across BRACED
FAO Resilience Index Measurement and Analysis Model (RIMA) [earlier version] [next version – RIMA II]	*Physical dimensions* » Income and Food Access » Access to Basic Services » Assets » Social Safety Nets [Model was later updated to include: » Enabling institutional environment » Natural environment » Agricultural practice/technology] *Capacity dimensions* » Adaptive capacity » Sensitivity	» Average per person daily income » Access to school, markets, health facilities » Amount of cash and in-kind assistance » Housing (nr of rooms owned) » Diversity of income sources » Expenditure change	Early version applied in West Bank/Gaza, and Niger, then used as diagnostic tool in Ethiopia, Kenya and Sudan, and for impact evaluation in Somalia and South Sudan. Part of WFP/UNICEF/FAO joint resilience strategy.
Feinstein International Center, Tufts University/World Vision	Aims to look at resilience in terms of changes in livelihood strategies, household asset portfolios,	» Household food insecurity and access scale » Coping strategies index » Food consumption score	Applied to northern Ethiopia and case study published see website, further studies anticipated in Sudan, Bangladesh and Haiti

FRAMEWORK/TOOL	DIMENSIONS/CHARACTERISTICS OF RESILIENCE	INDICATORS OR EXAMPLES OF INDICATORS	APPLIED IN PRACTICE?
Livelihoods Change Over Time Model	policies and institutions, extending to measuring change in event of shocks/acute crises	» Illness score » Value of productive assets: land, livestock and tools » Net debt » Income (per capita daily expenditure as proxy)	
Oxfam GB Multi-Dimensional Approach to Measuring Resilience	» Livelihood viability » Innovation potential » Contingency resources & support access » Integrity of natural & built environment » Social and institutional capability	Specific indicators/characteristics are developed for each context using bottom-up approach. Examples of social capability indicators: » Participation in drought preparedness meetings » Awareness of local action on adaptation	See Lessons learned from measuring resilience in Oxfam's large-N effectiveness reviews
Tracking Adaptation and Measuring Development (TAMD)	(Not a resilience measurement framework *per se*, but tracks adaptation success) Track 1 – climate risk management Track 2 – development performance	» Awareness of climate risks, trends, prospects, response options » Numbers of people becoming more or less vulnerable, measured by context-specific indicators	The pre-cursor to BRACED methodology, TAMD has been piloted in Kenya, Nepal, Pakistan and Mozambique since 2012 (see IIED website)
USAID Measurement Framework for Community Resilience	» Income and food access » Assets » Adaptive capacity » Social capital and safety nets » Governance » Nutrition and health	» Per capita expenditure (income proxy) » Change in household asset ownership » Access to credit » % of households with access to positive coping strategies » # of effective laws on natural resources » Prevalence of stunted children under 5	For Horn of Africa and Sahel topline indicators are being used (reduction in humanitarian assistance needs; depth of poverty; moderate to severe hunger; global acute malnutrition) Piloting measuring capacities in Ethiopia and Kenya.

REVIEWS AND CRITIQUES OF RESILIENCE MEASUREMENT FRAMEWORKS

As the snapshot above indicates, there is a plethora of different resilience measurement frameworks that vary in terms of purpose, scale, focus and method of analysis. This means they are not directly comparable. Nevertheless, there is considerable overlap in terms of dimensions of resilience and indicators used.

(For a good summary of resilience measurement approaches by the Food Security Information Network, see the Annex of A Common Analytical Model for Resilience Measurement*.)*

Before looking at comparative reviews of measurement frameworks, we consider some of the limitations of participatory approaches, characteristics-based versus capacity-based approaches and how the dynamic nature of resilience can be addressed in attempts to measure resilience.

Limitations of participatory resilience measurement approaches

Approaches like Oxfam's Multi-dimensional Approach and the UNDP's Community-Based Resilience Analysis (CoBRA) allow households and communities to define resilience and develop indicators themselves. CoBRA has no predefined components or indicators of resilience. While such approaches are participatory and inclusive, they have several limitations:

- Because characteristics are contextually defined, they require significant effort by researchers to identify them
- Some of these characteristics are challenging to measure
- Levels of resilience of different groups cannot be directly compared because of the specificity of the approach
- CoBRA's resilience attainment scores are perceptual and subject to change and cannot be used to evaluate individual programmes or services

(Source: Hughes and Bushell, 2013 *p.12-13 and* UNDP, 2014*, p. 25-28.)*

Characteristics-based versus capacity-based approaches

The Food Security Information Network (FSIN) noted that ***thinking on measuring resilience is moving away from characteristics-based approaches (e.g. Oxfam's approach) towards capacity-based approaches*** (Constas et al., 2014, p.44)**.** The weakness of characteristics-based approaches is that they may lead to circular logic whereby resilience is measured using the same characteristics that are considered the key elements of resilience. Also they may not adequately consider shocks or the relevance of the identified characteristics when shocks do occur. Finally, resilience is not static, and its determinants are constantly changing.

The value of resilience as a concept is that it combines programing with risk management approaches that build absorptive, adaptive and transformative capacities (Mitchell, 2013). In this vein, DFID's BRACED programme (see next section) focuses on the '3As' for measuring resilience – anticipatory capacity, adaptive capacity, absorptive capacity plus transformation (see Glossary).

Addressing the dynamic nature of resilience

Tufts University Feinstein International Center work on resilient livelihoods in Ethiopia identified that a major weakness of past approaches to measuring resilience is that they presumed the existence of a steady state ("equilibrium") to which households bounce back. To address this, they advocated measuring

resilience by analysing how livelihoods change over time and in response to what stimuli. Similarly, FAO published 'A dynamic analysis of resilience in Uganda' in 2016, estimating how resilience changes over time.

Comparative reviews and critiques

Here are some useful comparative reviews and analysis of resilience measurement frameworks (more detail follows):

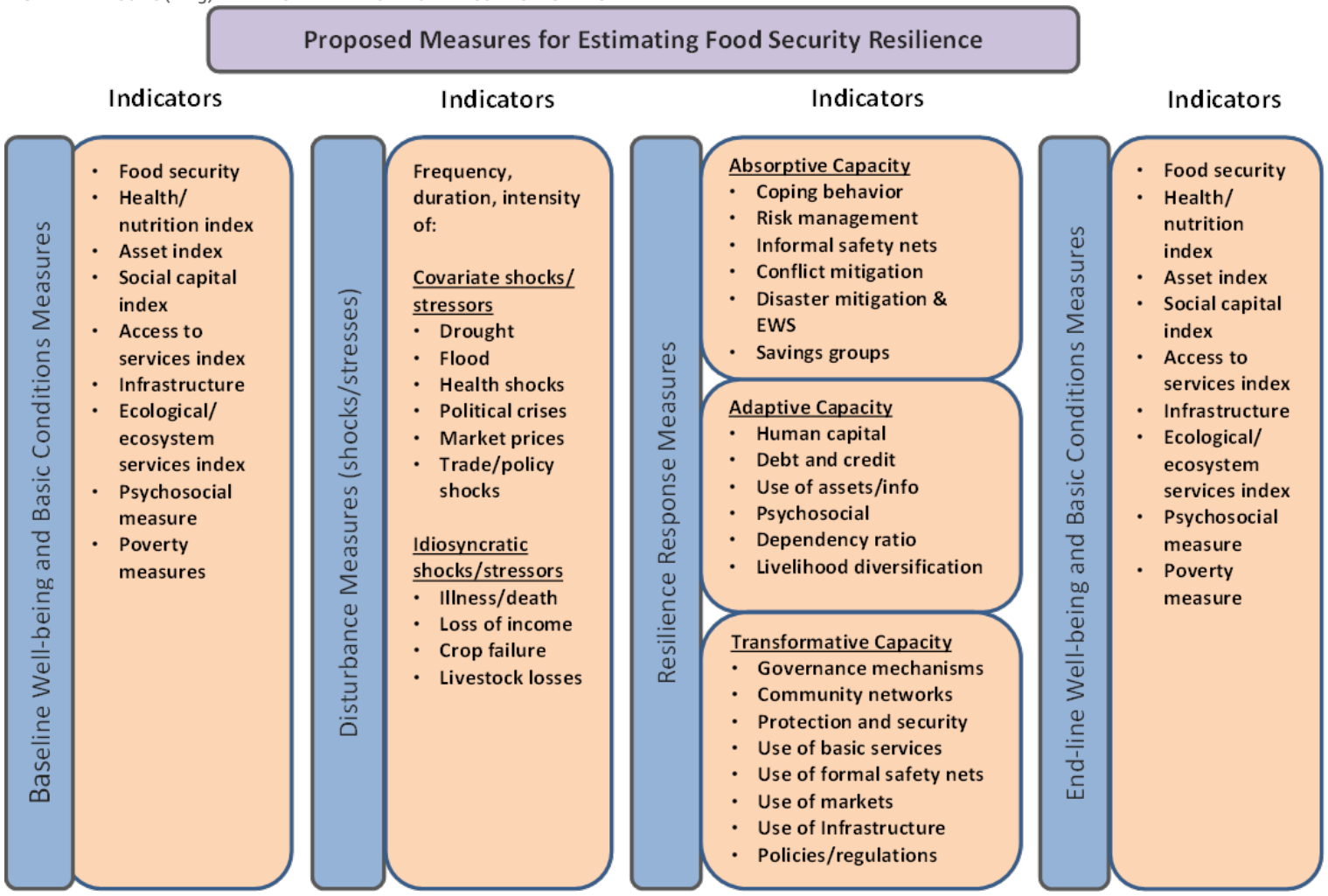
1. Frankenberger and Nelson - for *a review of key measurement approaches and a proposed analytical framework*
2. Evidence on Demand review – identifies common dimensions across other framework; this was used to guide resilience measurement on BRACED
3. ODI overview - for limitations associated with conceptual entry points and indicators
4. Frankenberger et al. - for an analysis of resilience measurement practices among NGOs

Frankenberger and Nelson (2013)

See: pages 3-5 of: Summary of the Expert Consultation on Resilience Measurement for Food Security

Following an expert consultation on measuring resilience with stakeholders from FAO, WFP, USAID and other organisation in February 2013, Frankenberger and Nelson prepared a summary paper that reviewed key approaches for measuring resilience. This review and the expert consultation led to the drafting of an analytical framework for measuring resilience that was framed in terms of capacities and indicators at different points in time (see figure below). The FSIN built on this work to produce its general principles for measuring resilience.

FIGURE 3: FRANKENBERGER AND NELSON'S (2013) ANALYTICAL FRAMEWORK FOR MEASURING RESILIENCE



(Source: Frankenberger and Nelson, 2013*, p.8)*

Evidence on Demand review (Brooks, Aure and Whiteside, 2014)

See Section 4 of: Assessing the impact of ICF programmes on household and community resilience to climate variability and climate change

An Evidence on Demand review was produced to guide resilience measurement and development of indicators for DFID projects under the BRACED programme. This looked at seven different frameworks (Africa Climate Change Resilience Alliance , FAO, Oxfam, Tulane University, University of Florence, WFP and Tufts University/World Vision) and found that the following dimensions were consistently represented across the frameworks:

- Assets
- Access to services
- Adaptive capacity
- Income and food access
- Safety nets

Other dimensions that appeared in some of the frameworks, but not others included:

- Livelihood viability
- Institutional and governance contexts
- Natural and built infrastructural contexts
- Personal circumstances e.g. psychological resilience, personal connections

ODI overview (Schipper and Langston, 2015)

See: A comparative overview of resilience measurement frameworks: analysing indicators and approaches

ODI completed a comparative overview of resilience measurement frameworks. Their analysis showed that:

- each framework is strongly influenced by its conceptual entry point, making a comparison only partially possible and justifying the development of further frameworks;
- there is a clear gap between the theory on resilience and the way in which the indicators focus on well-being and general development factors; and
- indicators may not always provide a complete picture of resilience.

Frankenberger et al. (2014)

See: Current approaches to resilience programming among non-governmental organisations

This review highlights some of the weaknesses in NGO resilience measurement practices (see figure below).

- Initial and subsequent state measures: contextual factors and systems are often underrepresented
- Disturbance measures: the interval between a shock and data collection need to be minimised and data on ongoing stresses should also be collected
- Capacity measures: there is a tendency to focus on capacities that align with an organisation's theory of change
- Scales of measurement: Households and communities are the most common scales of measurement but multi-level and systems-oriented approaches might be appropriate, including higher-level indicators, such as trade and price policies. Currently there is no measurement framework that allows simultaneous multi-scale resilience measurement.

» Temporal aspects: it is common for NGOs to collect data at quasi-arbitrary points and at times to support accountability, but high frequency data collection would be more useful

FIGURE 3: ANALYSIS OF RESILIENCE MEASUREMENT PRACTICES

Orienting question	Potential dimensions	Examples of measurement dimensions
Substantive features of resilience measurement		
Initial- and subsequent-state measures What is the outcome of interest?	• Dimensions of well-being • Contextual factors • Systems	• Poverty, food security, health, social connectedness • The contexts and systems that enable attainment of targeted outcomes
Disturbance measures To what set of conditions is resilience a response?	• Covariate shocks • Idiosyncratic shocks • Stresses • Cumulative effects of stresses	• Catastrophic events, climate change, sociopolitical events, health events, agricultural events, economic events
Capacity measures What resources and responses are included as measures of resilience capacities?	Resources: • Human-social • Economic-financial • Political-institutional • Material-physical • Agroecological • Ecological	• Individual capacity, social cohesion, asset holdings and productive assets, markets, stability of government and institutions, physical infrastructure (roads, electricity, and the like), resources to support agricultural production, natural resources
Structural-methodological features of resilience measurement		
Scale of measurement For whom or for what entities will the capacity for resilience be examined?	• Individuals • Households • Communities • Institutions and governments • National economies	• Individual demographic subcategories (such as women, children, displaced persons, a community), geographic subcategories (such as urban, peri-urban, rural), institutional functioning, components of national economy (such as trade)
Temporal aspects of measurement At what points in time will data be collected?	• Frequency • Specific timing • Duration	• Quasi-arbitrary points (such as baseline, midline, endline), developmentally sensitive, episodically determined (such as the occurrence of a shock event)
Type of measurement What types of data are included as part of resilience measurement?	• Objective and subjective • Qualitative and quantitative	• Factual records of shocks • Perceptual data on well-being • Projective data on future states • Rating scales, interviews, ethnographic observations

(Source: Frankenberger et al., 2014, p.21, taken from Constas, M. Resilience Sensitivity Analysis: Criteria to Support the Review of Resilience Metrics - in preparation)

BACK TO TOP - RESILIENCE MEASUREMENT FRAMEWORKS

CAN WE QUANTIFY RESILIENCE?

MEASURING RESILIENCE IN PRACTICE

REDUCING ADVERSE LIVELIHOODS IMPACTS

KEY MESSAGES

CONTENTS
HOW TO USE THIS RESOURCE
GLOSSARY
RECOMMENDED RESOURCES
BIBLIOGRAPHY

3. MEASURING RESILIENCE IN PRACTICE

This section considers lessons and developments from measuring resilience by organisations such as FAO and on programmes such as BRACED. It also provides signposts to resources that offer practical guidance for practitioners.

TRENDS AND LEARNING FROM ATTEMPTS TO MEASURE RESILIENCE

Resilience measurement is in its infancy and as such a robust body of literature on the effectiveness of indicators does not yet exist. However, by looking at how the practice has developed over recent years, we can gain insights into how theory has translated into practice. There is most experience in measuring resilience in the fields of food security (FAO analysis in multiple countries) and climate change adaptation (TAMD and more recently BRACED). There is also some experience in the fields of livelihoods (Ethiopia – Tufts/Feinstein, Chars Livelihoods Programme) and humanitarian response (Somalia - BRCiS).

We will look at the need for high quality data, how FAO has developed its measurement framework, the trend for using mixed methods approaches with reference to some examples in Somalia and experiences so far from Oxfam and BRACED.

Different types of indicators

System resilience indicators look at the main components of the system over time e.g. Frankenberger and Nelson's (**2013**) analytical framework (**see Figure 3** above) provides indicators for baseline and endline wellbeing, indicators of disturbance (shocks/stresses), and indicators of resilience response (absorptive, adaptive and transformative capacity).

Negative resilience indicators look at whether people are using strategies to boost resilience that may have negative impacts e.g. consuming fewer meals, taking children out of school.

Process indicators look at whether resilience planning or roadmaps are being applied.

Output, outcome and impact indicators show the results of programming – often used in logframes. *Proxy indicators* may be needed for resilience as it is not always directly observable. Resilience is often seen as an *intermediate outcome* rather than an end in itself. (See next section on **monitoring and evaluating resilience interventions**.)

Need for high quality data

Quantitative tools such as FAO's Resilience Index Measurement and Analysis (RIMA) draw on data that may not always be readily available e.g. World Bank's Living Standard Measurement Study (LSMS), Integrated Household Budget Survey.

Data must be collected at frequent intervals because assessing and understanding the impacts of shocks and external interventions requires recent pre-shock baselines. However, standard economic surveys, such as the Living Standards Measurement Survey (LSMS) and Demographic and Health Surveys provide infrequent measurements; typically every 4-5 years. WFP's Food Security Monitoring Surveys are more frequent – typically conducted twice a year.

Two successful examples of generating high quality data for monitoring and analysing vulnerability are the Arid Lands Resource Management Programme (ALRMP), which has collected data in the most drought-prone regions of Kenya from 1988 to present, and Helen Keller International's Nutrition Surveillance Program in Bangladesh, which collected data from 1990 to 2003 and again from 2009 to present. Both of these surveys are long term, high frequency, and clearly focused on measuring and understanding the causes and consequences of household and individual-level shocks and stressors.

Weak domestic capacity for gathering data should not be assumed - widespread use of mobile phones even in the poorest countries makes surveys, e.g. of semi-nomadic pastoralists, far more feasible.

(Summarised from Barrett and Headey, 2014, see pages 9-12)

How FAO's Resilience Index and Measurement Analysis (RIMA) has evolved

Following the first application of RIMA in over 10 countries, in 2015 FAO improved the methodology and developed a second version, RIMA-II (also see FAO Slideshare presentation). RIMA-II measures resilience both directly and indirectly to provide a more comprehensive picture. The direct measure provides descriptive information on household resilience capacity based on assets, access to basic services, social safety nets and adaptive capacity. The indirect measure is concerned with estimating the determinants of changes in resilience capacity and food recovery. It establishes causal relationships between observed variables and wellbeing indicators. Shocks are included in a regression model for estimating their impact and food security indicators are viewed as the outcome of resilience. It is still largely a quantitative approach.

Trend towards mixed methods approaches – combining qualitative and quantitative data

The Building Resilient Communities in Somalia (BRCiS, 2013-2017) is a DFID-funded NGO humanitarian consortium comprising Concern, Norwegian Refugee Council, Save the Children, International Rescue Committee and CESVI.

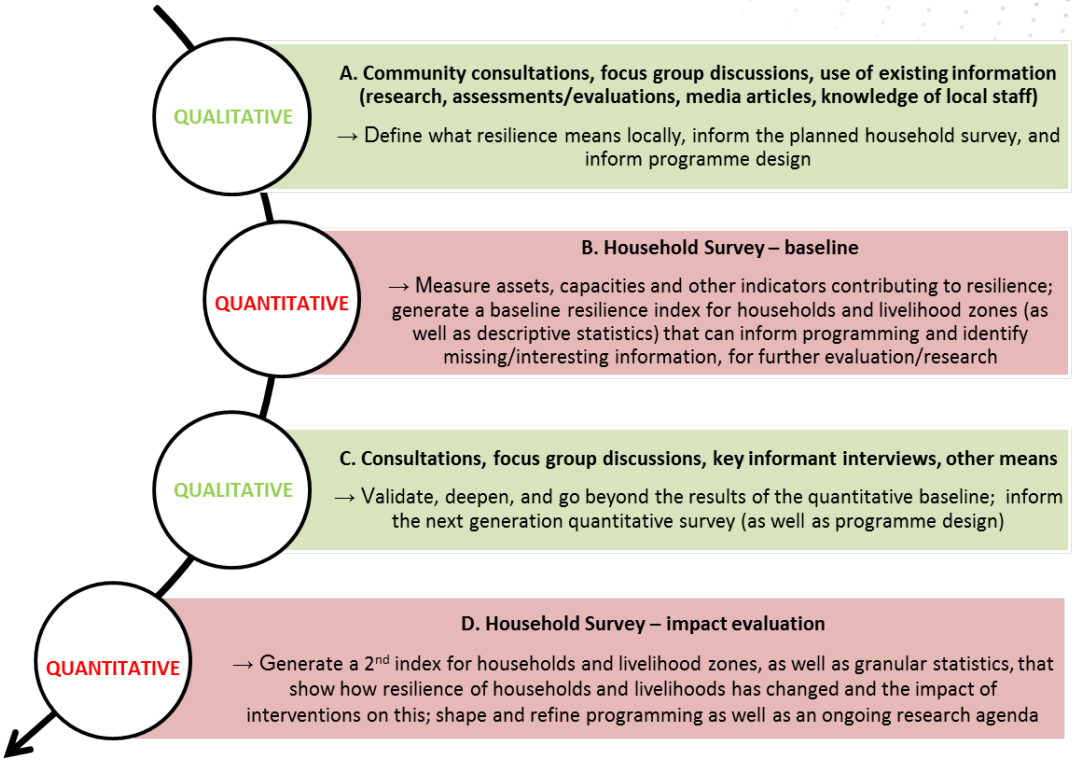
In the first phase of the programme, the international and local NGOs involved in BRCiS spent time with the communities to understand hazards, sources of internal conflicts, threats to their security, root causes of vulnerabilities and capacities, resources and assets. This participatory process led to the development of locally-adapted understanding of resilience, based on the attributes of each village.

To evaluate the impact of the programme, they are using a combination of internationally recognised indicators: the Coping Strategies Index, the Dietary Diversity Score, Food Consumption Score and the Household Asset Score. They added a number of indicators relevant to Somali society in general and for the communities in particular. These ranged from literacy levels, access to safe water and sanitation, income diversification to community capacity to solve internal disputes. Qualitative information is collected by their staff on a weekly basis.

FAO/UNICEF/WFP mixed methods approach and multi-level analysis

The FAO/UNICEF/WFP joint strategy also applied a mixed methods approach in Somalia building on FAO's quantitative RIMA tool, but furthermore it began to look at **multiple levels and institutional issues.**

The FAO-UNICEF-WFP baseline survey in Somalia in 2014 began with qualitative data collection, using community consultations, focus group discussions, key informant interviews and existing research, at the individual, household and community levels. After that, a quantitative step involved a structured household survey; but it went beyond household level information by asking questions about the wider 'enabling environment' including security, governance, and environment. See pages 17-20 of http://resilience.igad.int/attachments/article/212/Resilience Focus Magazine_final.pdf



(Source: http://agrilinks.org/blog/kindred-spirits-talk-resilience-measurement*)*

Subjective resilience

FAO has started to look at the subjective resilience of farmers and pastoralists through the Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP)

The self-assessment tool was developed starting in mid-2013 by FAO and partners and has been tested or piloted in 8 sub-Saharan African countries (Angola, Burkina Faso, Mali, Senegal, South Sudan, Uganda, Zambia, Zimbabwe). SHARP is both a project planning tool as well as a monitoring tool which works by first identifying areas of poor resilience and providing a baseline upon which changes can be assessed. It seeks to assess governance, environmental, social and economic resilience with local facilitators in a participatory manner via a tool that can be accessed from electronic tablets.

The Bangladesh Chars Livelihoods Programme (CLP) has attempted to measure improvements in disaster resilience. This had been done qualitatively, via key informant interviews. The qualitative survey was based on changes in people's capacities and understanding (governance, risk assessment, knowledge and education and disaster preparedness and response).

Lessons from Oxfam GB's experiences

After applying its framework in practice, Oxfam GB (Fuller and Lain, 2015) acknowledged some limitations, including the difficulty in measuring resilience characteristics without a comparative group, challenges around using 'diversification of income sources' as an indicator of resilience (diversification may not always be positive), and difficulty in finding indicators for their dimension of 'innovation potential'. See Measuring Resilience: Lessons learned from measuring resilience in Oxfam's large-N Effectiveness Reviews

(N.B. Oxfam is itself reviewing its dimensions of resilience and moving towards a new measurement strategy to better reflect capacities (Fuller and Lain, 2015, p.9).

Case study: Building Resilience and Adaptation to Climate Extremes and Disasters

Example from a climate change adaptation programme: Lessons so far from BRACED (DFID-funded, 2014-2017)

BRACED aims to build the resilience of more than 5 million vulnerable people against climate extremes and disasters and is one of the world's largest programmes aimed at resilience. DFID funding for BRACED, under the UK's International Climate Fund (ICF) involves provision of 3-year grants to 15 projects. For more detailed information on the projects, see this background infographic on BRACED.

The fourth ICF key performance indicator (KPI4) is 'the number of people with improved resilience as a result of ICF support'. The aim of ICF KPI4 is to facilitate evaluation of project effectiveness by enabling M&E systems to measure changes in people's situations (circumstances, capacities, assets, contexts, etc.) that affect their ability to plan for, avoid, cope with, recover from, and adapt to evolving climate shocks and stresses (i.e. their resilience).

Lessons from KPI4 application under BRACED

Challenges in application – these are mainly related to consistency of interpretation by implementing partners:

- Defining resilience – multiple interpretations and objectives in different contexts. Development and measurement of context-specific indicators requires collection of primary data, e.g. participatory surveys, which is resource intensive. Simple aggregation across projects may not stand up to scrutiny.
- Frequency of reporting differs which will present a challenge to report on KPI4 systematically at the programme-level on an annual basis
- Different methods for data collection and data analysis will be appropriate for different contexts. Some projects will generate data from household surveys, others will not.
- Considerable scope for reporting errors when KPI4 numbers are generated across households, communities, regions and projects, which are then aggregated to the programme level.
- The ultimate unit of reporting for KPI4 is a number. This in itself will not support project or programme-level learning.

(Source: Gregorowski, 2016 – internal paper, no link available)

Tracking Adaptation and Measuring Development (TAMD) was the pre-cursor to BRACED and tracked adaptation to climate change rather than resilience per se. The IIED website has full reports on the process of applying TAMD in Pakistan, Kenya, Ethiopia and Mozambique and feasibility results.

PRACTICAL GUIDANCE ON MEASURING RESILIENCE

Monitoring and evaluating resilience interventions

Programme evaluation can be based on an assessment of whether a programme has contributed to increased resilience, as measured in terms of improvements in key indicators of resilience. This may not be without challenges (see box). Ideally, resilience indicators will be tracked alongside relevant indicators of human well-being and losses that reflect the effects of shocks and stresses. These indicators can be linked in a theory of change. (Brooks, Aure and Whiteside, 2014).

For further information on how to develop indicators on resilience, see pages 15-17 of this DFID guidance for BRACED.

Béné, Frankenberger and Nelson (2015, link) propose four key factors to consider in measuring resilience on programmes:

1. Identify the wellbeing outcomes to be achieved, and measure resilience in relation to these outcomes.
2. Identify the shocks and stressors that individuals, households, communities and larger systems are exposed to (and the severity and duration of these).
3. Measure the absorptive, adaptive and transformative capacities (see Glossary) in relation to these shocks and stressors at different levels.
4. Identify the responses of individuals, households, communities and larger systems to these shocks and stressors and trajectories of wellbeing outcomes.

Challenges of adaptation and resilience M&E on programmes

Attribution of changes in resilience to programme activities is potentially very challenging – may require counterfactuals, robust control groups

Short timescales of programmes compared with timescales of climate adaptation and timescales necessary to capture change in assets and capacities

Confusion over what is meant by 'successful' adaptation and resilience building

Where successful adaptation/resilience building is defined, it tends to be in terms of impact indicators that are difficult to measure in programme contexts

M&E of adaptation and resilience programmes tends to focus on outputs and spending, meaning M&E and associated indicators fail to assess effectiveness at outcome level

Tendency for programme planners to want 'universal' indicators based on secondary data – but these may not exist

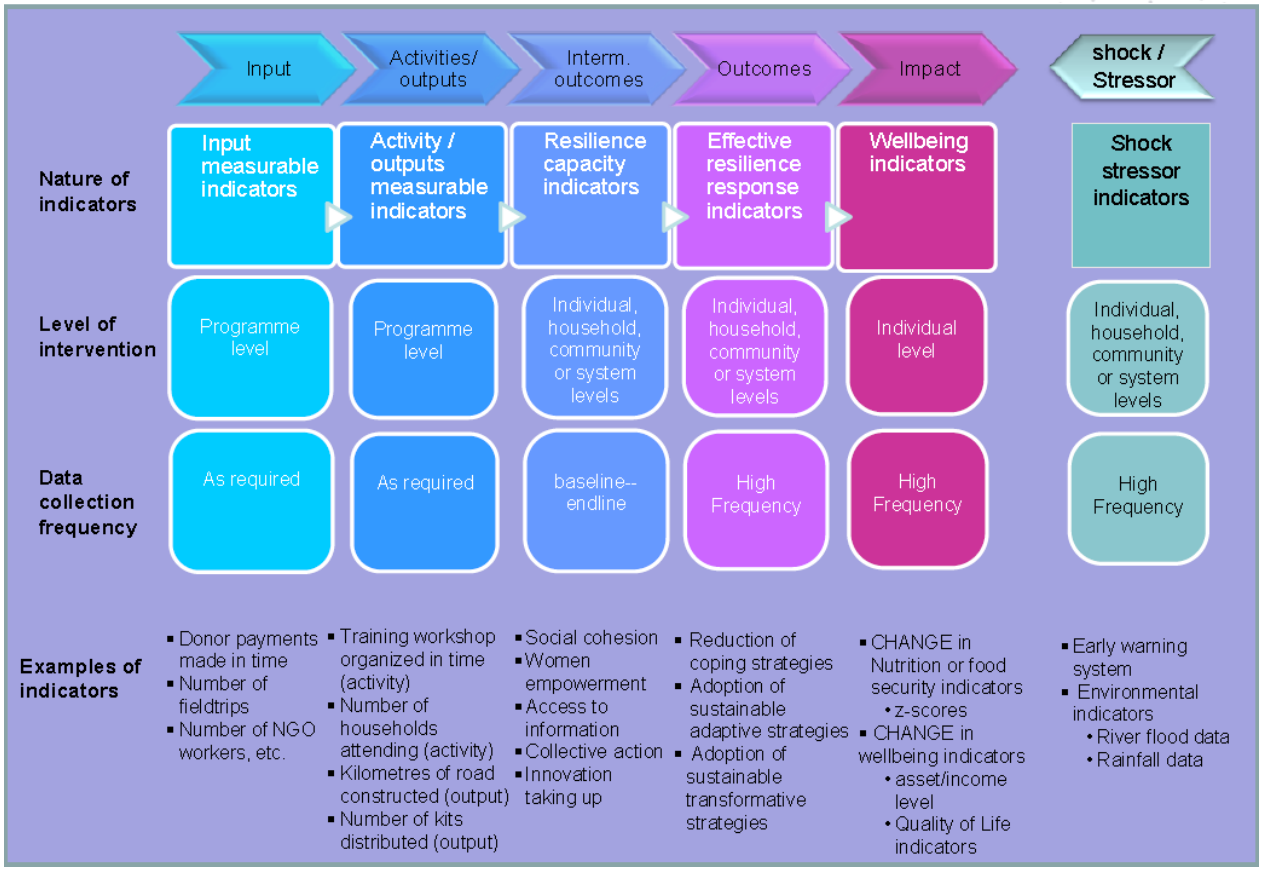
(Source: Gregorowski, 2016 – internal paper produced for DFID on BRACED lesson learning – no link available)

Echoing the FSIN model, they highlighted the need for indicators to look at ex-ante, disturbance and ex-post components (see Glossary).

Monitoring and evaluation (M&E) systems designed for resilience programmes should measure intermediate outcomes through indicators of resilience response (i.e. how people responded), measuring changes in both positive and negative behaviours. What matters is the relative change in indicators in the face of shocks (Béné, Frankenberger and Nelson, 2015).

The figure below shows a suggested logframe for a resilience intervention, with examples of indicators at each stage (input indicators, output indicators, outcome indicators etc.)

FIGURE 4: LOGFRAME FOR M&E OF RESILIENCE INTERVENTIONS



(Source: Béné, Frankenberger and Nelson, 2015*, p.15)*

Guidance on data sources, subjective indicators, measuring shocks, and systems analysis

The Food Security Information Network (FSIN) Resilience Measurement Technical Working Group has published four technical briefing papers to assist field practitioners in measuring resilience.

These are:

» Household Data Sources for Measuring and Understanding Resilience;

» Qualitative Data and Subjective Indicators for Resilience Measurement;

» Measuring Shocks and Stressors; and

» Systems Analysis in the Context of Resilience.

DFID's Methodology for reporting against KPI4 (pages 15-17) also provides guidance on how to develop indicators for resilience, originally compiled for the BRACED programme.

UNDERSTANDING DEGREES OF RESILIENCE

Resilience is not a static state and can be better understood as a dynamic spectrum of capacities that leads to better wellbeing outcomes.

According to the UNDP, *"to be disaster resilient, a household (or community) should be able to maintain a sufficient level of income and production above the livelihood protection threshold during both normal periods and crisis periods to meet the minimum required expenditure and consumption." (UNDP, 2014, p.28).*

This implies that there is a minimum threshold of resilience. In practice, thresholds of resilience are often subjectively defined (especially in NGO frameworks). In the Household Economy Approach (see Glossary) basic needs are currently defined by two different thresholds: the survival threshold and the livelihoods protection threshold. The **survival threshold** represents the most basic of needs, including minimum calorie requirements, and costs associated with food preparation and water. The **livelihoods protection threshold** represents what it costs to maintain the locally specific livelihood system. (Boudreau, 2013, p. 4)

Oxfam GB methodology includes asking households questions about minimum thresholds of resilience in order to develop indicators. That entails understanding the minimum level a household must be able to sustain at any time, to provide for its members, i.e. to be 'resilient' and the factors, characteristics and capacities of households that help to maintain this state/minimum level (Oxfam, 2015)

A Christian Aid-led consortium on a BRACED project considers an increase in income as an important indicator of adaptive capacity. It aims to understand changes in income through a threshold scoring system by looking at how communities graduate from one income bracket to another or by understanding the degree of self-sufficiency in securing access to food. These thresholds are not pre-determined but are defined by the communities themselves (Bahadur, 2015)

How do we know when we have 'done enough'?

It is probably not practical to see resilience as a primary programme objective in itself, but rather the concept should shape how a programme is implemented to achieve other objectives i.e. **success of an intervention is not measured by resilience *per se* but by achieving other specific positive livelihood outcomes** such as food security (Constas et al., 2014, p. 46).

What are the limits of resilience?

In practice, it would be difficult to forecast the limits of resilience in different development contexts, or to predict how much disturbance (shocks and stresses) a system (e.g. household, community, government, ecosystem or infrastructure system) could withstand without collapsing.

This is for several reasons: resilience is dynamic and, as we have seen, ways of measuring resilience are contested. There are also limitations of using resilience as an overarching narrative.[1] The concept of resilience may not adequately reflect social dynamics, including issues of agency and power (Béné et al., 2012). There may be trade-offs and asymmetries in resilience between different individuals within a system. Additionally, resilience does not necessarily lead to well-being outcomes – in order to respond to deteriorating situations, people may adjust their expectations and aspirations downwards ('adaptive preference'). Resilient infrastructure in terms of integrity might not improve the resilience of communities or individual livelihoods.

Transformational change may require challenging the status quo that is maintained by culture and powerful interests. These may present barriers to transformation through land-use legislation, resource management practices, and institutions (Béné et al., 2012, p. 22-23). **Therefore, political economy analysis is crucial in considering resilience.**

[1] This argument is based on Béné et al. 2012 Resilience: New Utopia or New Tyranny? Reflection about the Potentials and Limits of the Concept of Resilience in Relation to Vulnerability Reduction Programmes

MEASURING RESILIENCE IN PRACTICE

CAN WE QUANTIFY RESILIENCE?
RESILIENCE MEASUREMENT FRAMEWORKS
REDUCING ADVERSE LIVELIHOODS IMPACTS
KEY MESSAGES

CONTENTS
HOW TO USE THIS RESOURCE
GLOSSARY
RECOMMENDED RESOURCES
BIBLIOGRAPHY

4. REDUCING ADVERSE LIVELIHOOD IMPACTS FROM SHOCKS OR STRESSES

This section considers evidence to guide effective policy choices for reducing or preventing adverse livelihood impacts from shocks or stresses. This includes signposts to case studies and evidence, such as:

- Analysis of Household Economy Approach datasets in terms of livelihoods resilience
- Resources on resilient livelihoods programming
- Early action/response and evidence on cost-effectiveness of early action

Note that a holistic approach to planning livelihoods should not overlook the possible impacts of infrastructure investments on livelihoods and whether the proposed infrastructure is being planned as part of a climate resilient pathway. For more details, see Infrastructure resources (sections on risk assessment, and overall strategy development and multi-sector planning).

EVIDENCE FROM HOUSEHOLD ECONOMY ANALYSIS

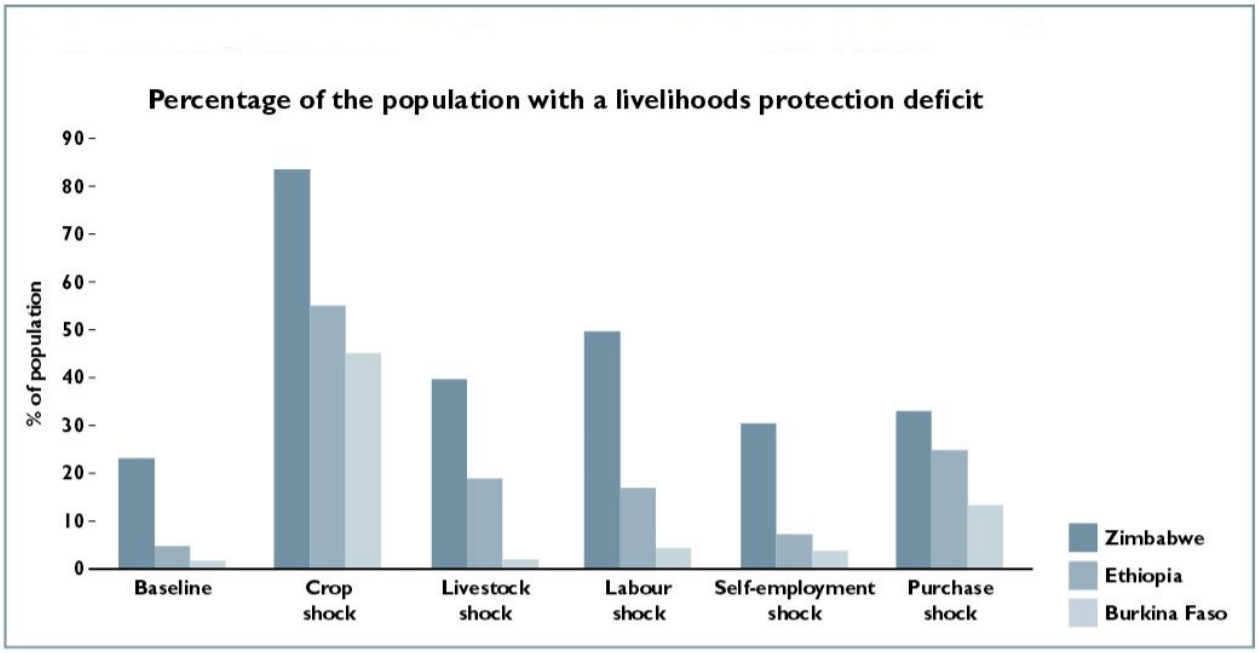
Evidence from the consolidated Household Economy Analysis (HEA) dataset compiled from more than 300 distinct livelihood zones in 26 countries was used to answer four questions (Boudreau, 2013):

- 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?

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

At the national level, the HEA found that it is crop shock that puts households at most risk in three countries (Ethiopia, Zimbabwe and Burkina Faso).

FIGURE 5: WHICH SHOCK HAS MOST DAMAGING IMPACT AT NATIONAL LEVEL?



(Source: Boudreau/Save the Children, 2013*, p.7)*

Does diversification always help reduce the risk of disaster?

No. A post-drought scenario analysis showed that the two most diversified livelihood zones also showed the highest deficits. It was suggested that the relationships between allegedly diverse food and income sources made them all vulnerable to the same hazards.

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

Not necessarily - although the agricultural investment was found to offset the deficits to a small degree, a significant livelihood protection deficit remains for a large proportion of the population in all three countries. Increasing one's reliance on crop production may also increase vulnerability to weather-related hazards. An increase in production may correlate with increased costs associated with maintaining the household's livelihood strategies.

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

Pastoralists rely heavily on their own livestock to provide them with milk and cash from livestock and livestock product sales. They purchase the vast majority of their food. Other important income sources are: the sale of (usually herding) labour to better-off pastoralist households within their communities; self-employment and gifts from relatives. The most damaging hazards for pastoralists are drought, livestock and market related. This suggests focusing resilience-building efforts on 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". (Boudreau, 2013, p.21)

(Summarised from Boudreau, 2013*)*

Resources on resilient livelihoods programming

Further resources on resilience livelihoods programming include evidence on climate-resilient economic development, USAID's work in Ethiopia's Drylands, World Vision's resilience programming, the EU Resilience Compendium and an evaluation of FAO/IFAD's pastoral development work.

- Vivid Economics Climate-resilient economic development – this contains four case studies in Rwanda, Senegal, Mozambique and Philippines. It has found that inclusive agricultural development in Rwanda, focusing on new crops, new practices, and new markets, has reduced poverty and improved the resilience of agriculture, but has not diversified the economy or climate risk. Expansion of tourism and services sector has contributed to diversification of the Senegalese economy and strengthened resilience to drought, but has increased exposure to other risks.
- USAID: Resilience in action: Changing Horizons in Ethiopia's Drylands. USAID 2014
- World Vision resilience programming – including holistic rangeland management in Somalia and governance, ecosystems and livelihoods in Kenya. Also see Promoting Local Adaptive Capacity: Experiences from Africa and Asia.
- EU Resilience Compendium - showcases a diversity of risk reduction and resilience examples from different parts of the world, with different organisations, including resilient livelihoods, mainstreaming disaster risk reduction in agriculture, social protection market-based approaches.
- FAO and IFAD's Engagement in Pastoral Development: Joint Evaluation Synthesis

EARLY ACTION AND RESPONSE

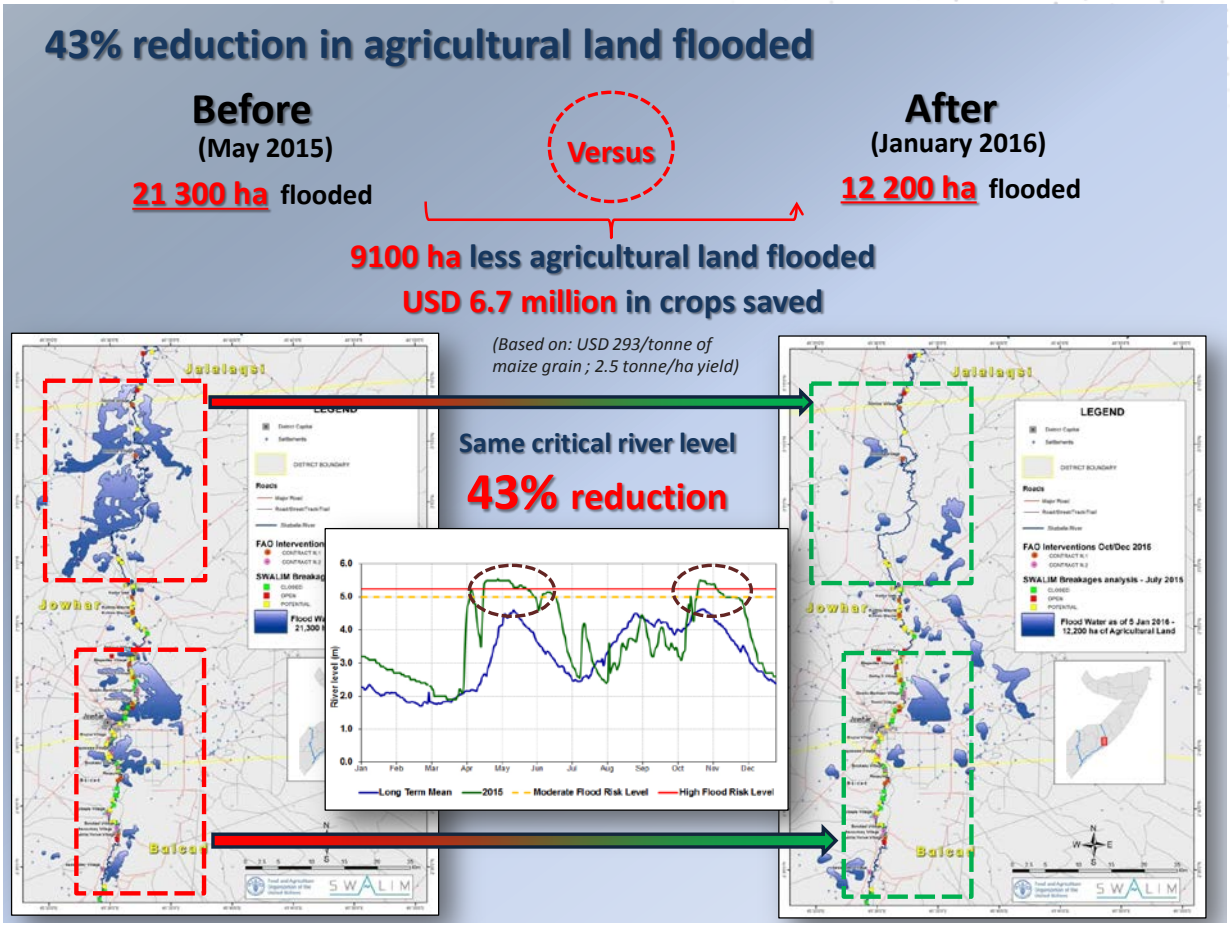
What is early action and response?

Early action and response refers to interventions that enable individuals, communities and governments to prepare for, mitigate or prevent disasters.

Example of DFID work in early action and emergency preparedness

DFID invested £1m into the Food and Agriculture Organisation's (FAO) work in river bank protection in the Shabelle River embankment in Somalia. FAO claim that there was a 43% reduction in agricultural land flooded from 2015 to 2016 and a return on investment of $6.7m. While there were also complementary support measures, this has clearly demonstrated value for money. The figure below provides a visual comparison of areas affected by floods in May 2015 and in January 2016 [areas in blue on the maps]. It shows a drastic reduction of flooded areas, mainly along the portions of Shabelle River embankment where FAO intervened.

FIGURE 6: RETURN ON INVESTMENT OF FAO INTERVENTION IN RIVER BANK PROTECTION IN SOMALIA



(Source: DFID Somalia/FAO, 2016)

DFID has also been funding emergency preparedness and responses to El Nino in its country offices (e.g. in Somalia through the Internal Risk Facility under the Multi-Year Humanitarian Programme). DFID are currently trying to measure the benefits and cost-effectiveness of this early response – this may provide further evidence in future.

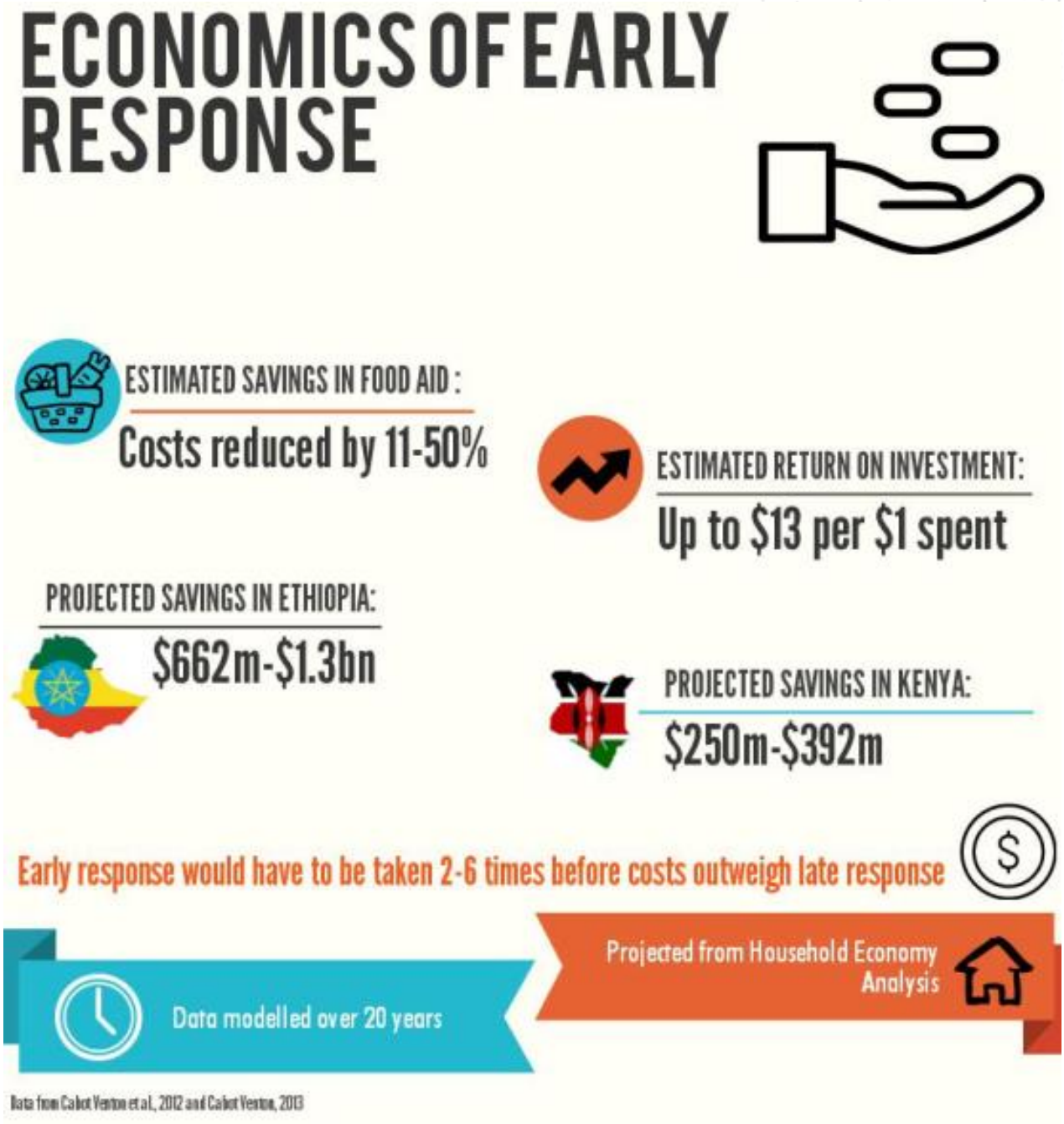
Is early action cost effective?

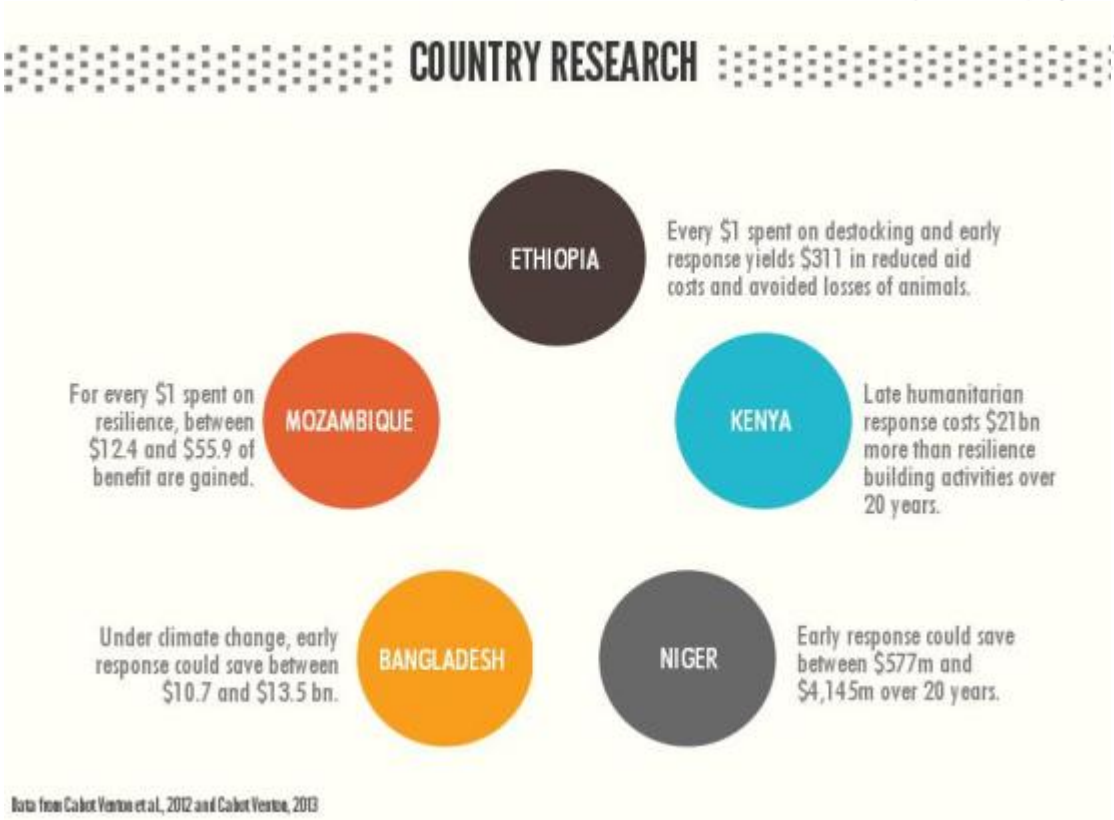
The evidence base to support cost-effectiveness of early action/response is growing, though there are limitations associated with cost-benefit analysis (CBA) and not all studies are comparable.

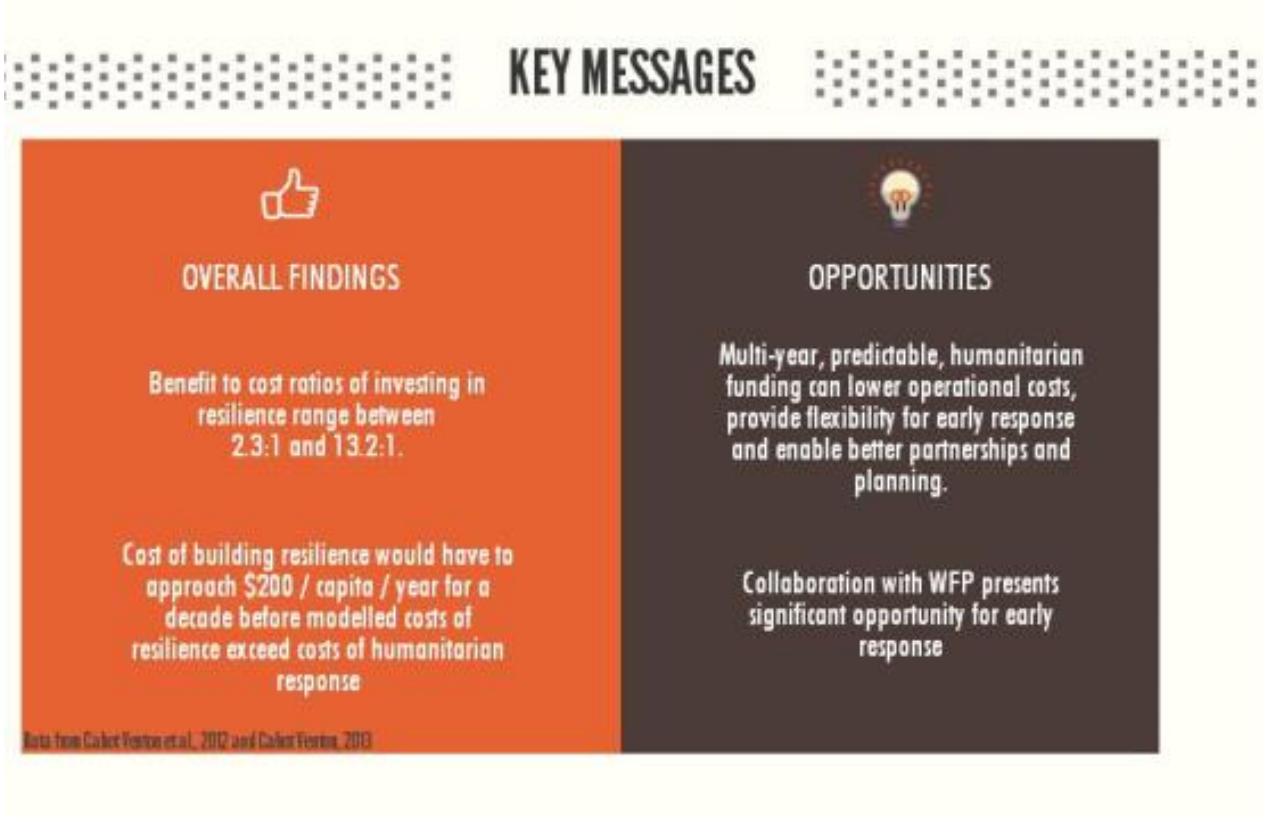
Findings from a DFID-funded study

The infographic below is derived from data from a DFID-funded study (Cabot Venton et al., 2012) on cost effectiveness of building resilience to disasters as compared with the cost of relief and early response. Phase I piloted methodology in Kenya and Ethiopia. Phase II expanded to Bangladesh, Mozambique and Niger.

FIGURE 7: THE ECONOMICS OF EARLY RESPONSE







Detailed findings from DFID-funded-study (Cabot Venton et al. 2012; Cabot Venton, 2013)

- Early response is far more cost effective than late humanitarian response, even under conservative estimates, big potential savings across all case studies – returns as high as $13 for every $1 spent
- In Ethiopia, Household Economy Analysis suggests that early response could save $662m -$1.3bn.

- The cost of building resilience would have to approach $200 per capita per year for a decade before modelled costs of resilience exceed costs of humanitarian response.
- Multi-year humanitarian funding can lower operational costs, provide flexibility for early response and enable better partnerships and planning through predictable funding.
- Early response can reduce costs of food aid by 11-50%
- Economic concerns over false early response are unwarranted
- Collaboration with World Food Programme presents significant opportunity for early response

Other studies that support cost effectiveness of early action and response

1. UNICEF/WFP Return on Investment (ROI) for Emergency Preparedness Study
2. Disaster mitigation is cost effective (Kelman, 2014)
3. A cost-benefit analysis of Practical Action's livelihood-centred disaster risk reduction project in Nepal (Practical Action, 2011)

UNICEF/WFP Return on Investment (ROI) for Emergency Preparedness Study

This 2014 paper researched 50 different preparedness investments in three pilot countries (Chad, Pakistan and Madagascar). Key findings:

- Initial investment of $5.6 million was found to yield potential savings of $12 million in future emergency operations (average ROI greater than 2).
- Investments saved more than 1 week in emergency response, on average.
- Investments in human capital (e.g. training) provided the highest relative ROI, though infrastructure and pre-positioned goods were also financially sound investments.

Disaster mitigation is cost effective (Kelman, 2014)

This is a short briefing based on more detailed case studies by the same author. Key findings:

- The most cost-effective forms of disaster risk reduction investment tend to be non-structural e.g. land use planning, warning systems, and household-level changes but separation from structural changes is difficult as they go hand in hand
- Value added of small investments is particularly high where large-scale infrastructure (satellite networks, forecasting models) already exists.
- Cost-benefit analysis (CBA) requires numbers – but not all costs/benefits are readily quantifiable.

A cost-benefit analysis of Practical Action's livelihood-centred disaster risk reduction project in Nepal

This study provides a systematic cost-benefit analysis of a community-based disaster risk management (DRM) project led by Practical Action in two districts of Nepal over the period 2007 to 2010. The results are shown below (r = social discount rate[2]; see Glossary for explanation of terminology in the table). The present value of benefits exceeds the total costs of the project activities in all cases, suggesting that the DRM approach offers value for money.

For background information on cost-benefit analysis in disaster management and reviews of a range of CBAs, see *Cost benefit analysis for community based climate and disaster risk management: synthesis report* (Cabot Venton, 2010)

[2] The discount rate used to calculate the present value of costs and benefits in a social cost-benefit analysis. The higher the social discount rate used, the lower is the weight effectively given to future benefits or costs compared to present benefits or costs.

FIGURE 8: RESULTS OF PRACTICAL ACTION'S COST-BENEFIT ANALYSIS IN NEPAL

Summary Table: Main Results of the Cost-Benefit Analysis

(Figures in £ unless indicated otherwise)

	r = 5%	r = 10%	r = 15%
		10-Year Horizon	
Prevent Value of Benefits	383,764	306,287	250,831
Present Value of Costs	265,253	241,527	221,657
Net Present Value	118,511	64,760	29,174
Benefit-Cost Ratio	1.45	1.27	1.13
Internal Rate of Return		22.2%	
		20-Year Horizon	
Prevent Value of Benefits	611,774	393,484	310,501
Present Value of Costs	300,235	261,717	233,688
Net Present Value	311,539	131,767	76,812
Benefit-Cost Ratio	2.04	1.50	1.33
Internal Rate of Return		26.3%	

(Source: Practical Action, 2011, p.3)

Is the evidence base on early action robust?

A review[3] of more than 20 studies (Shreve and Kelman, 2014) cautions that while many cost-benefit analyses support the economic effectiveness of disaster risk reduction (DRR), there are limitations in quality of research. This includes weaknesses with regards to: sensitivity analysis, consideration of climate change, evaluation of the duration of benefits, broader consideration of the process of vulnerability, and potential disadvantages of DRR. Different studies are not directly comparable.

BACK TO TOP - REDUCING ADVERSE LIVELIHOODS IMPACTS

CAN WE QUANTIFY RESILIENCE?

RESILIENCE MEASUREMENT FRAMEWORKS

MEASURING RESILIENCE IN PRACTICE

KEY MESSAGES

CONTENTS

HOW TO USE THIS RESOURCE

GLOSSARY

[3] Shreve and Kelman, 2014. Does mitigation save? Reviewing cost-benefit analyses of disaster risk reduction

RECOMMENDED RESOURCES

BIBLIOGRAPHY

5. KEY MESSAGES

This section looks at the take-home messages of this resource.

1	Measuring resilience in practice is hampered by both conceptual and methodological challenges, including finding reliable and meaningful data. [further details]
2	There is much overlap between different resilience measurement frameworks in terms of indicators and dimensions of resilience. [further details]
3	Attempts to measure resilience have moved towards capacity-based approaches; with resilience understood in the context of capacity to respond to defined shocks or stresses. [further details]
4	Measurement of tangible factors such as assets and financial capital may not capture everything that influences resilience - subjective perceptions of resilience and power dynamics matter too. [further details]
5	Resilience measurement is still in its infancy but is most developed in climate change adaptation and food security contexts - further evidence will emerge from programmes such as BRACED. [further details]
6	There is much overlap between different resilience measurement frameworks in terms of indicators and dimensions of resilience. [further details]

BACK TO TOP – KEY MESSAGES

CAN WE QUANTIFY RESILIENCE?

RESILIENCE MEASUREMENT FRAMEWORKS

MEASURING RESILIENCE IN PRACTICE

REDUCING ADVERSE LIVELIHOOD IMPACTS

CONTENTS

HOW TO USE THIS RESOURCE

GLOSSARY

RECOMMENDED RESOURCES

BIBLIOGRAPHY

GLOSSARY

Absorptive capacity - the ability of a system or actors to prepare for, mitigate or prevent negative impacts, using predetermined coping responses in order to preserve and restore essential basic structures and functions. This includes coping mechanisms used during periods of shock.

Adaptive capacity - ability of actors (individuals, communities, governments) to adjust to a disturbance, moderate potential damage, take advantage of opportunities and cope with the consequences of a change.

Adaptive preference – when people adjust their expectations and aspirations downwards in order to respond to deteriorating situations

Anticipation costs - the ex-ante investments for disaster/shock preparedness (Béné, 2013)

Anticipatory capacity - ability of social systems to anticipate and reduce the impact of climate variability and extremes through preparedness and planning (BRACED, 2015)

Benefit-cost ratio - the ratio of the present value of the economic benefits to the present value of the economic costs of a project each discounted at the economic opportunity cost of capital. If the ratio is greater than 1, the project makes a positive net contribution to welfare. (Practical Action, 2011)

Covariate shocks – events such as climate shocks (e.g. droughts and floods) or conflict that typically affect groups or communities of people

Disturbance component/measure - data describing the effects of shocks and stresses.

Early action - interventions that enable individuals, communities and governments to prepare for, mitigate or prevent disasters.

Ex-ante component - data describing the initial state before a shock.

Ex-post component - data on the subsequent states/trajectories after shocks have occurred.

Household Economy Approach - The Household Economy Approach is a livelihoods-based framework for analysing the way people obtain access to the things they need to survive and prosper. It helps determine people's food and non-food needs and identify appropriate means of assistance, whether short-term emergency assistance or longer term development programmes or policy change. It was developed in the 1990s by Save the Children UK. (Save the Children, 2008)

Idiosyncratic shocks –events that have a negative impact at household level such as livestock death, job loss and illness of a household member

Impact costs - the costs of destruction following the impact of the shock (Béné, 2013)

Internal rate of return -the discount rate that would give a project a net present value of zero. (Practical Action, 2011)

Livelihoods protection threshold - what it costs to maintain the locally specific livelihood system (Save the Children, 2013)

Net present value - the difference between the discounted value of a stream of benefits and a discounted stream of costs. (Practical Action, 2011)

Present value -the value today of a future payment, or payments, discounted at an appropriate interest (discount) rate. For example, at an annual interest rate of 10 percent (r=0.1), a payment of £ 110 next year has a present value of £ 100 = £ 110/(1+r). (Practical Action, 2011)

Recovery costs - the ex-post recovery costs, including adaptation and aid

Shock - External short-term deviations from long-term trends that have substantial negative effects on people's current state of well-being, level of assets, livelihoods, or safety, or their ability to withstand future shocks (Zseleczky and Yosef, 2014)

Social discount rate -the discount rate used to calculate the present value of costs and benefits in a social cost-benefit analysis. In conception, the social discount rate should reflect the social opportunity cost of capital, i.e. the rate of return to capital in its best alternative use. The higher the social discount rate used, the lower is the weight effectively given to future benefits or costs compared to present benefits or costs. (Practical Action, 2011)

Stress/stressor – Slower onset phenomena with negative impacts such as gradual changes in temperature or water availability due to climate change

Survival threshold *- most basic of needs, including minimum calorie requirements, and costs associated with food preparation and water. (Save the Children, 2013)*

Transformation - pertains to the holistic and fundamental ways in which people's capacity to adapt to, anticipate and absorb shocks can be built, reshaped and enhanced (BRACED, 2015)

Transformative capacity - the ability to create an enabling environment through investment in good governance, infrastructure, formal and informal social protection mechanisms, basic service delivery and policies/regulations that constitute the conditions necessary for systemic change. (Carletto, Banerjee and Zezza, 2015)

→	CAN WE QUANTIFY RESILIENCE?
→	RESILIENCE MEASUREMENT FRAMEWORKS
→	MEASURING RESILIENCE IN PRACTICE
→	REDUCING ADVERSE LIVELIHOOD IMPACTS
→	KEY MESSAGES

☰	CONTENTS
💡	HOW TO USE THIS RESOURCE
🚶	KEY CONTACTS
★	RECOMMENDED RESOURCES
📖	BIBLIOGRAPHY

RECOMMENDED RESOURCES

OVERVIEW OF RESOURCES

How do we monitor and evaluate resilience?	How can resilience measurement methodologies be applied to DFID programmes?	Where can I find evidence on livelihood interventions and resilience?

The three resources that follow have been chosen on the basis of accessibility in terms of presentation and content, their relevance to understanding resilience and recommendations from DFID staff. For each resource we also include links to further reading/resources. Click on the links below to go directly to the resource or read our overviews first.

To jump straight to a relevant resource, hover the cursor over a question box without clicking. When you see the instruction "CTRL + Click to follow link" hold down the CTRL key, and then click. To return to the list hold ALT + Left Arrow key together.

- Assessing the impact of ICF programmes on household and community resilience to climate variability and climate change [**overview**]
- Design, Monitoring and Evaluation of Resilience Interventions: Conceptual and Empirical Considerations [**overview**]
- Reducing the risk of disasters and adapting to climate change: Evidence from the consolidated Household Economy Analysis database [**overview**]

TOP OF PAGE

CONTENTS
HOW TO USE THIS RESOURCE
KEY CONTACTS
GLOSSARY
BIBLIOGRAPHY

Assessing the impact of ICF programmes on household and community resilience to climate variability and climate change

[Click title to go to resource]

RECOMMENDED BY:

ANNIKA OLSSON

ECONOMIC ADVISER, CLIMATE CHANGE AND NRM, DFID NEPAL, AND RESILIENCE COMMUNITY OF PRACTICE

How the material could be used

This Evidence on Demand report was originally commissioned to guide thinking on how to develop indicators for resilience on the BRACED programme. It could equally be used in such a way on other climate change adaptation programmes.

Why this is a good resource

Contains a useful review of existing methodologies for measuring resilience as well as thoughts on monitoring and evaluation.

Length and level of detail

Fairly long and detailed paper (104 pages) but does not require prior knowledge of the subject.

How to reference

Brooks, N. Aure, E. and Whiteside, M. 2014. *Assessing the impact of ICF programmes on household and community resilience to climate variability and climate change*, Evidence on Demand.

Links to further material

- DFID's Methodology for reporting against KPI4
- The 3As – Tracking Resilience Across BRACED

Was this resource useful?

Please contact us with comments on how you have used this resource or if you have further suggestions/questions.

Keywords [tags]

BRACED, resilience measurement, resilience measurement methodologies, monitoring and evaluation, M&E, climate change adaptation, resilience indicators

Design, Monitoring and Evaluation of Resilience Interventions: Conceptual and Empirical Considerations

[Click title to go to resource]

How the material could be used

This paper is useful for those that are interested in designing, monitoring and evaluating resilience interventions or components of programmes that include resilience as an intermediate outcome.

Why this is a good resource

This resource provides an accessible theoretical overview of what we know about measuring resilience before providing pragmatic guidance on indicator and logframe development.

Length and level of detail

Fairly concise (22 pages long) but may be better suited to those with some prior knowledge of the concept of resilience.

How to reference

Béné, C., Frankenberger, T., and Nelson, S. 2015. *Design, Monitoring and Evaluation of Resilience Interventions: Conceptual and Empirical Considerations*, IDS Working Paper 459, Brighton: Institute of Development Studies.

Links to further material

» Good overview of current thinking by ITAD: http://www.itad.com/better-understanding-and-measuring-resilience/

Was this resource useful?

Please contact us with comments on how you have used this resource or if you have further suggestions/questions.

Keywords [tags]

Resilience measurement, monitoring and evaluation, M&E, logframe, resilience indicators

Reducing the risk of disasters and adapting to climate change: Evidence from the consolidated Household Economy Analysis database

[Click title to go to resource]

How the material could be used

This material could be used to guide thinking on policy and programming choices - it provides evidence from Household Economy Analysis on questions of disaster risk reduction and climate change adaptation in a range of livelihoods contexts.

Why this is a good resource

This resource is framed around four key questions about resilience in relation to shocks, livelihood diversification, agricultural production, and pastoralism. It provides both descriptive and visual interpretation of data to answer the questions.

Length and level of detail

This resource is medium length (25 pages) and easy to understand - not aimed at a technical audience.

How to reference

Boudreau, T. 2013. *Livelihoods at the Limit: Reducing the risk of disasters and adapting to climate change, Evidence from the consolidated Household Economy Analysis database,* The Food Economy Group, Save the Children UK

Links to further material

- Promoting Local Adaptive Capacity: Experiences from Africa and Asia
- Vivid Economics Climate-resilient economic development
- EU Resilience Compendium

Was this resource useful?

Please contact us with comments on how you have used this resource or if you have further suggestions/questions.

Keywords [tags]

Household economy approach, HEA, livelihoods, pastoralism, livelihood diversification, shocks

BACK TO TOP - RECOMMENDED RESOURCES

CAN WE QUANTIFY RESILIENCE?

RESILIENCE MEASUREMENT FRAMEWORKS

→	MEASURING RESILIENCE IN PRACTICE
→	REDUCING ADVERSE LIVELIHOOD IMPACTS
→	KEY MESSAGES

☰	CONTENTS
💡	HOW TO USE THIS RESOURCE
🚶	KEY CONTACTS
🔖	GLOSSARY
★	RECOMMENDED RESOURCES
📖	BIBLIOGRAPHY

BIBLIOGRAPHY

All online resources accessed in March 2016.

Alinovi, L., Mane, E. and Romano, D. (2010) "Measuring Household Resilience to Food Insecurity: an Application to Palestinian Households", in *Agricultural Survey Methods*, by Benedetti et al. (eds.), John Wiley & Sons, April 2010.

Bahadur, A., Peters, K., Wilkinson, E., Pichon, F., Gray, K. and Tanner, T. 2015. *The 3As Tracking Resilience Across BRACED.* Available online at: http://www.braced.org/resources/i/?id=cd95acf8-68dd-4f48-9b41-24543f69f9f1

Barrett, C.B. 2010. "Measuring Food Insecurity." *Science* 327:825-828

Barrett, C. and Headey, D. 2014. *Measuring resilience in a volatile world: A proposal for a multi-country system of sentinel sites*, Building Resilience for Food and Nutrition Security, 2020 Conference Paper 1, May 2014, International Food Policy Research Institute. Available online at: http://barrett.dyson.cornell.edu/files/papers/2020resilienceconfpaper01.pdf

Béné, C., Frankenberger, T., Langworthy, M., Mueller, M. & Martin,S. 2016 *The Influence of Subjective and Psycho-social Factors on People's Resilience: Conceptual Framework and Empirical Evidence*. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No. 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication. Available online at: http://www.technicalconsortium.org/wp-content/uploads//2016/02/Report-5-The-influence-of-subjective-and-psychosocial_18Feb2016.pdf

Béné, C., Frankenberger, T., and Nelson, S. 2015. *Design, Monitoring and Evaluation of Resilience Interventions: Conceptual and Empirical Considerations*, IDS Working Paper 459, Brighton: Institute of Development Studies. Available online at: http://www.ids.ac.uk/publication/design-monitoring-and-evaluation-of-resilience-interventions-conceptual-and-empirical-considerations

Béné, C., Headey, D., Haddad, L. and von Grebmer, K., 2015. Is resilience a useful concept in the context of food security and nutrition programmes? Some conceptual and practical considerations. *Food Security*, pp.1-16. Available online at: http://link.springer.com/article/10.1007/s12571-015-0526-x

Béné, C. 2013. *Towards a Quantifiable Measure of Resilience*, IDS Working Paper 434, Brighton: Institute of Development Studies. Available online at: http://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/2990/Wp434.pdf;jsessionid=B69E2EEA86FED460E4E1B66668402D71?sequence=1

Béné, C., Godfrey-Wood, R., Newsham, A. and Davies, M., 2012. *Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes*. IDS Working Papers, 2012(405), pp.1-61. Available online at: http://onlinelibrary.wiley.com/doi/10.1111/j.2040-0209.2012.00405.x/abstract

Brooks, N. Aure, E. and Whiteside, M. 2014. *Assessing the impact of ICF programmes on household and community resilience to climate variability and climate change*, Evidence on Demand. Available online at: http://dx.doi.org/10.12774/eod_cr.june2014.brooksetal

Boudreau, T. 2013. *Livelihoods at the Limit: Reducing the risk of disasters and adapting to climate change, Evidence from the consolidated Household Economy Analysis database,* The Food Economy Group, Save the Children UK. Available online at: http://www.savethechildren.org.uk/sites/default/files/docs/Reducing_the_Risk_of_Disasters.pdf

Cabot Venton, C. et al. 2012. *The Economics of Early Response and Disaster Resilience: Lessons from Kenya and Ethiopia,* Economics of Resilience Final Report. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67330/Econ-Ear-Rec-Res-Full-Report_20.pdf

Cabot Venton, C. 2013. *The Economics of Early Response and Resilience: Evidence from Kenya, Ethiopia, Mozambique, Niger and Bangladesh,* Internal presentation to DFID.

Carletto, C., Banerjee, R. & Zezza, A. 2015. Household Data Sources for Measuring and Understanding Resilience. Resilience Measurement Technical Working Group. Technical Series No. 3. Rome: Food Security Information Network. Available at: http://www.fsincop.net/fileadmin/user_upload/fsin/docs/resources/FSIN_TechnicalSeries_3.pdf

Constas, M., Frankenberger, T. & Hoddinott, J. 2014. *Resilience Measurement Principles: Toward an Agenda for Measurement Design*. Resilience measurement Technical Working Group. Technical Series No. 1. Rome: Food Security Information Network, World Food Program and Food and Agriculture Organization. Available online at: http://www.fsincop.net/fileadmin/user_upload/fsin/docs/resources/FSIN_29jan_WEB_medium%20res.pdf

Constas M., Frankenberger T.R., Hoddinott J., Mock N., Romano D., Béné C. and Maxwell D. 2014 *A common analytical model for resilience measurement - causal framework and methodological options*. Resilience Measurement Technical Working Group, FSiN Technical Series Paper No. 2, World Food Program and Food and Agriculture Organization. Available online at:

http://www.fsincop.net/fileadmin/user_upload/fsin/docs/resources/FSIN_Paper2_WEB_1dic%20%28WEB%29.pdf

FAO.2014. *Household Resilience in Dolow, Somalia. Baseline Analysis for Impact Evaluation of FAO,* UNICEF-WFP Resilience Strategy. February 2014. Rome: FAO, UNICEF, WFP. Available online at: http://somaliangoconsortium.org/docs/key/33/2014/1400261836.pdf

Frankenberger, T. and Nelson, S. 2013. *Summary of the Expert Consultation on Resilience Measurement for Food Security,* TANGO International. Available at: https://agrilinks.org/library/summary-expert-consultation-resilience-measurement-food-security

Frankenberger, T., Constas, M., Nelson, S., and Starr, L. 2014 *Current approaches to resilience programming among non-governmental organisations*, Building Resilience for Food and Nutrition Security, 2020 Conference Paper 7, May 2014, International Food Policy Research Institute. Available from: http://www.ifpri.org/publication/current-approaches-resilience-programming-among-nongovernmental-organizations

Fuller, R. and Lain, J. 2015. *Measuring Resilience: Lessons learned from measuring resilience in Oxfam's large-N Effectiveness Reviews,* Oxfam GB. Available online at: http://policy-practice.oxfam.org.uk/publications/measuring-resilience-lessons-learned-from-measuring-resilience-in-oxfams-large-583601

Gregorowski, R. 2016. *Lesson learning on applying ICF KPI4: Number of people with improved resilience as a result of ICF support,* internal DFID document.

Hughes, K. and Bushell, H. 2013. *A Multidimensional Approach to Measuring Resilience, Oxfam GB.* Available online at: http://policy-practice.oxfam.org.uk/publications/a-multidimensional-approach-to-measuring-resilience-302641

Kelman I. 2014. *Disaster mitigation is cost effective. Background note for the World Development Report*. CICERO, Norway; 2014. Available online at: http://siteresources.worldbank.org/EXTNWDR2013/Resources/8258024-1352909193861/8936935-1356011448215/8986901-1380568255405/WDR14_bp_Disaster_Mitigation_is_Cost_Effective_Kelman.pdf

Jones, L. and Tanner, T. 2015. *Measuring subjective resilience: using peoples' perceptions to quantify household resilience*, Overseas Development Institute. Available online at: http://www.odi.org/publications/9631-measuring-subjective-resilience-using-peoples-perceptions-quantify-household-resilience

Levine, S. 2014. *Assessing resilience: why quantification misses the point*, Humanitarian Policy Group, Overseas Development Institute. Available online at: http://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/9049.pdf

Maxwell, D., Constas, M., Frankenberger, T., Klaus, D. & Mock, M. 2015. Qualitative Data and Subjective Indicators for Resilience Measurement. Resilience Measurement Technical Working Group. Technical Series No. 4. Rome: Food Security Information Network. Available at: http://www.fsincop.net/fileadmin/user_upload/fsin/docs/resources/FSIN_TechnicalSeries_4.pdf

Meerkatt, H. and Kolo, P. 2015. *UNICEF/WFP Return on Investment for Emergency Preparedness Study: Final report*, The Boston Consulting Group. Available online at: http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp272225.pdf

Mitchell, A. 2013. *Risk and Resilience: From Good Idea to Good Practice. a scoping study for the experts group on risk and resilience. organisation for economic Co-operation and development*. December 2013. available at: http://www.oecd.org/dac/FINAL%20WP%2013%20Resilience%20and%20Risk.pdf

Schipper, E.L.F. and Langston, L. 2015. *A comparative overview of resilience measurement frameworks: analysing indicators and approaches*, Working Paper 422, London: ODI. Available online at: http://www.odi.org/publications/9632-comparative-overview-resilience-measurement-frameworks-analysing-indicators-approaches

Shreve, C.M. and Kelman, I., 2014. Does mitigation save? Reviewing cost-benefit analyses of disaster risk reduction. *International journal of disaster risk reduction*, *10*, pp.213-235. DOI:10.1016/j.ijdrr.2014.08.004

UNDP. 2014. *Understanding Community Resilience: Findings from Community-Based Resilience Analysis (CoBRA) Assessments: Marsabit, Turkana and Kajiado counties, Kenya and Karamoja sub-region, Uganda*, UNDP Drylands Development Centre. Available online at: http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/sustainable%20land%20management/CoBRA/CoBRA_Assessments_Report.pdf

Willenbockel, D. 2011. *A Cost-Benefit Analysis of Practical Action's Livelihood-Centred Disaster Risk Reduction Project in Nepal*, Brighton:IDS.

Zseleczky, L. & Yosef, S. 2014. *Are Shocks Really Increasing? A selective review of the global frequency, severity, scope and impact of five types of shocks*. 2020 Conference Paper 5. May 2014. Washington, D.C.: IFPRI

BACK TO TOP - RESOURCE

CAN WE QUANTIFY RESILIENCE?

RESILIENCE MEASUREMENT FRAMEWORKS

MEASURING RESILIENCE IN PRACTICE

REDUCING ADVERSE LIVELIHOOD IMPACTS

KEY MESSAGES

CONTENTS
HOW TO USE THIS RESOURCE
KEY CONTACTS
GLOSSARY
RECOMMENDED RESOURCES
BIBLIOGRAPHY