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# Background Paper for the Expert Consultation on Resilience Measurement for Food Security

February 2013

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## Executive Summary

Recurring crises in the Horn of Africa, the Sahel, and parts of Asia over the last few decades have cost international donors and national governments millions of dollars (Frankenberger et al. 2012). Despite meeting short-term humanitarian needs regarding survival, large-scale emergency interventions have not substantially improved regional or local capacity to withstand future shocks and stresses (USAID 2011). As a result, the concept of resilience has emerged as a plausible framework for substantially improving regional or local capacity to withstand future shocks and stresses, and reducing the need for humanitarian response. The main value of using a resilience concept lies in integrating approaches and communities of practice rather than as a novel approach to addressing poverty and food insecurity (Béné et al. 2012).

Given the relatively recent emergence of the concept of resilience within the wider development community, there is an understandable scarcity of robust, verifiable evidence of impact among programmes seeking to build resilience (DfID 2011; Headey et al. 2012). A major milestone in achieving resilience at a significant scale will be the ability to measure resilience outcomes at the household, community and national levels. Empirical evidence is needed that illustrates what factors consistently contribute to resilience, to what types of shocks and in what contexts.

While various models for measuring resilience are currently under development (ACCRA 2012; Frankenberger et al. 2012; Hughes 2012; TANGO 2012a), few have been field-tested and adopted as “standard.” This is partly due to the fact that resilience is inherently difficult to measure. Nonetheless, such information is critical for assessing the relative potential of different approaches to building resilience in the face of recurring shocks.

To move forward with a common understanding by practitioners and stakeholders on resilience measurement, an Expert Consultation supported by FAO and WFP is being held in Rome, February 19-21, 2013 in order to discuss the latest work that has been carried out in measuring resilience. This background paper summarizes the different approaches to measuring resilience that are currently ongoing in order for practitioners, donors and other stakeholders to arrive at a common understanding of the key measurement issues and best approaches for going forward.

### Conceptual Framework

A resilience conceptual framework is needed to help ensure that policy makers and practitioners clearly understand the factors and processes that influence vulnerability and resilience at the household and community levels. Several such frameworks have already been developed (Annex 1). The resilience framework presented here integrates a livelihoods approach, a disaster risk reduction (DRR) approach, and elements of a climate change (CC) approach to address the underlying causes of vulnerability. This combined approach emphasizes the importance of access to productive assets, institutional structures and processes, and household livelihood strategies; and preparedness, prevention, response and recovery activities formulated in response to shocks and climate-related changes.

## **Measurement Principles**

Resilience is a dynamic process that involves changes over time. Thus, there is likely not one generalized way to measure resilience that is appropriate across all contexts – or by all implementing actors. Rather, it may be more feasible to reach agreement on how to measure the impact of specific types of interventions on resilience of specific populations to specific types of shocks or stresses (Barrett and Constan 2012). However, certain measurement principles are broadly applicable.

### *Context-specific*

Resilience is context-specific, i.e., it is defined by the type of change or shock experienced, as well as by the social, economic, environmental, and political context in which the shock occurred and household or community response decisions are made. Context is dynamic, rather than static, and changes according to how individuals, households or communities deal with and respond to risks and shocks (Alinovi et al. 2010), which in turn results in a new set of contextual factors needing to be incorporated into resilience-building approaches and measures of impact (Frankenberger et al. 2012).

### *Temporal considerations*

Ideally, measurements of resilience should be based on time-series, preferably panel data collected from the same households over time (TANGO 2012c). Data from panel studies in developing countries is rarely available and can be difficult to obtain. Cross-sectional data has been used for estimating empirical models of resilience (or vulnerability), but often does not shed light on the risk management strategies (e.g., adaptive strategies or coping strategies) used by households to adapt to shocks (Frankenberger et al. 2012).

### *Thresholds/tipping points*

Measuring resilience involves measuring household and community trajectories in coping with shocks and how those trajectories change based on household and community responses. However, change is not constant over time, nor is it necessarily gradual; rather, it involves tipping points or critical thresholds, beyond which change happens – either positive or negative (Alinovi et al. 2009). Tipping points lead to discernible shifts in behavior and performance. It is important to identify potential tipping points in order to determine the prevailing trajectory and well-being outcomes of households. It is also important to determine whether such transitions are structural or transitory.

### *Technical capacity*

Resilience is a complex concept and its measurement should reflect that complexity, which will require the technical ability to utilize sophisticated methods of analysis (e.g., econometric models, factor and regression analysis) and to correctly analyze and interpret the results. In the absence of such expertise, proxy indicators that can be easily collected by local implementing partners (e.g., NGOs) are needed as meaningful resilience measurements. Qualitative measures are also important, as they contribute to a better understanding of the perceived significance of changes that are measured quantitatively.

### *Culturally-relevant*

M&E systems for measuring the impact of resilience programming should prioritize approaches that engage local actors and affected communities, and include measures of success that are meaningful to

them. Measures of resilience must be culturally appropriate and employ benchmarks for success that are culturally-relevant. There is no ‘one size fits all.’

#### *Community-level and higher level measurement*

More research is needed on measuring resilience at the community and higher systems levels, as households may achieve some level of resilience on their own but will be limited if local and regional institutions and governance systems do not promote resilience-supportive policies and programming. Common inhibitors of community resilience are weak access to markets, poor communal management of natural resources, limited education and health facilities, and non-existent or inflexible credit mechanisms.

#### *Inter-scalar relationships*

Individuals, households and communities form an interrelated hierarchy of scalar dependencies; individuals operate within households, which operate within communities, which operate within larger governance units (e.g., districts, departments, regions) (Barrett and Conostas 2012). Measuring resilience must take into account the functional connections and interactions that cause one level (e.g., household) to influence – positively or negatively – another level (e.g., community) as well as interactions between levels. Additionally, variability is not constant over time and tends to vary according to scale (e.g., households, communities, wider ecosystems).

#### *Aspirations/motivation*

Attitudes, or aspirations, influence the preferences, choices, and behaviors of individuals (and groups) as well as the relationships they form within a particular community, and are shaped, in part, by socio-cultural attitudes and norms. Thus, aspirations have both a household-level and community-level component. Resilience depends not only on household access to and use of assets, but also on if and how households attempt to manage risk (including taking risks) and how their attitudes impact such decisions. Resilience cannot be achieved in the absence of desire and pro-active effort to better one’s future, such as when individuals, households, or communities believe their lot in life is destiny and they are powerless to change.

#### *Natural resources/ecosystem health*

Natural resource-based livelihoods (e.g., agriculture, livestock, charcoal-making, wood gathering, wild-harvesting of foods and medicinal plants, fishing) are highly vulnerable to the effects of deforestation, encroachment into and degradation of fragile ecosystems, overgrazing, and improper land management, all of which undermine household and community resilience. Given the heavy reliance of communities on the natural resource base in developing countries, factors contributing to ecosystem health – rather than just access to such resources – cannot be ignored in measuring resilience (Béné et al. 2012). Communally-based land-tenure systems often undermine household willingness to invest in resilience-promoting improvements (e.g., improved practices, infrastructure) on land that they do not own.

## **Current Practices Measuring Resilience**

To date, a number of models for measuring resilience have been proposed by agencies working to address these measurement challenges. The FAO has developed an index for measuring resilience based on different factors that lead to coping/adapting success in several countries (Palestine, Kenya, Sudan, South Sudan, and Ethiopia) and plans to modify this index for use in Somalia. FAO has also done a great deal of work on vulnerability analysis. WFP and FAO have been working on a shock impact simulation (SIS) model that was tested in Pakistan, Nepal, Bangladesh and Tajikistan. WFP has also been doing trends analysis in Niger to measure resilience. CRS has been attempting to measure resilience in Niger as part of its USAID-funded programme. Mercy Corps is trying to measure resilience in its programmes in Somalia, and Oxfam GB has been working on measuring resilience using a characteristics approach to get around the temporal challenge associated with measuring resilience by specifying particular characteristics of a system (e.g., household, community) that are assumed to be associated with coping and/or adaptation success. Similar to Oxfam's approach, ACCRA is utilizing the Local Adaptive Capacity (LAC) framework to identify characteristics related to adaptive capacity. Tulane University's framework for analyzing resilience utilizes a mixed method strategy to examine the relationship between exposure to shock, humanitarian assistance and resilience outcomes in Haiti. The Food Economy Group is using Household Economy Analysis (HEA) to model resilience and compare costs of different response scenarios in pastoral areas of Ethiopia and Kenya. As part of the USAID-funded REGAL project in Northern Kenya, Kimetrica is measuring resilience as a function of income and expenditure outcomes. In collaboration with CARE and Oxfam US, Cornell has been working to identify a core set of principles for measuring resilience. IDS has been working on ways to measure resilience and DfID has been funding studies on the economics of early response and disaster resilience. In collaboration with the International Institute for Applied Systems Analysis (IIASA) in Thailand, IFAD is conducting a study of community resilience based on assets, disaster awareness and preparedness, and adaptive capacity. Tufts University has been working on measuring resilience in Tigray, Ethiopia and finally, USAID is measuring resilience in two projects in the Horn of Africa.

## **General Considerations for Measuring Resilience**

Resilience to shocks and stresses is properly viewed as a process rather than a static state, with its determinants changing within evolving social, economic and environmental contexts. A resilience assessment measures change over time, and must take into account both a capability perspective (e.g., absorptive, adaptive, transformative) and an outcome perspective (e.g., key welfare or food security outcomes).

In order to assess resilience among households, communities or systems, the types of shocks or stresses they experience must be measured. Shocks are natural, social, economic, and political in nature. They can occur as slow or rapid onset shocks (e.g., earthquakes, floods, disease outbreaks) or longer-term stresses or trends (e.g., environmental degradation, price inflation, political instability, conflict) and can affect individuals and specific households (idiosyncratic) or entire communities/populations (covariate). Shocks can be transitory, seasonal, or structural, and their frequency, severity and duration can vary widely. Some shocks are occurring with such frequency or are of such duration that they are no longer considered "shocks" but rather as "the norm." Thus, determining what

constitutes a shock for the target group is a necessary and prerequisite step to measuring how households respond to shocks.

Absorptive capacity – the ability to minimize exposure to shocks and stresses (ex ante) where possible, and to recover quickly when exposed (ex post) – is a key measure of resilience. When assessing absorptive capacity, it's important to distinguish between positive and negative coping strategies. Positive coping strategies enable households to withstand periodic shocks without adversely affecting livelihood security or jeopardizing the health and nutrition of individual members (e.g., using cash savings, consuming reserve food stocks, relying on formal and informal safety nets). Negative coping strategies can have a permanent and debilitating impact on household capacity to manage future risk (e.g., selling productive assets, reducing quantity and quality of food consumed, relying on risky livelihood activities).

The ability to quickly and effectively respond to changing environmental, climatic, social, political and economic conditions (i.e., adaptive capacity) is a central factor in achieving resilience at all levels. Adaptive capacity involves making proactive and informed choices about alternative livelihood strategies based on changing conditions. This could entail accessing a diverse array of productive assets (e.g., natural resources, land, credit, markets, livestock, linkages to input suppliers), improved human capital (e.g., health, education, nutrition), participation in diverse and equitable social networks (e.g., self-help groups, savings groups), accessing and utilizing information on changing market and climatic conditions, and openness to new practices (e.g., sustainable agriculture practices, value-added practices) and technological innovation (e.g., cell phones, cash transfers). Diversification of livelihood strategies also contributes to adaptive capacity, as long as the livelihood activities are not all sensitive to the same types of shock or too many in number such that no single livelihood strategy yields significant income.

Resilience assessment includes measuring whether households and communities are able to move beyond chronic poverty and food insecurity as a result of governance and institutional structures, processes and systems (Béné et al. 2012). Households or communities may be able to effectively deal with shocks or stresses by reducing their risks and implementing adaptive strategies that mitigate the impact of future shocks yet be unable to transform these gains into the ability to “bounce back better” from shocks or stresses, i.e., to manifest resilience. Appropriate indicators of transformative capacity include the existence of formal safety nets, early warning systems, improved communications systems, laws/policies that promote gender-equity, peace building and conflict resolution mechanisms, and sustainable natural resource management practices.

Measurement of resilience is also informed by assessment of more traditional indicators of development such as food security, nutrition, human capital and livelihood security. The degree to which a particular household, community or population may be considered resilient is determined in part by their ability to maintain general well-being (e.g., food, shelter, income, health, safety) in the event of periodic shocks (e.g., natural disasters, conflict, price volatility). Even though improvement in these indicators is likely to be incremental over the long-term, they provide the foundation for transformational social and economic development at the national and regional levels.

## Moving Resilience Measurement Forward

The scarcity of verifiable evidence on the impact of resilience programming suggests the need for continued research regarding how best to assess or measure household reaction to the shocks and stresses they experience, as well as the extent to which programme interventions enhance resilience to those shocks. Panel-type data represents the ideal source of data to measure resilience. Attempts should also be made to collect data from on-going survey efforts (e.g., LSMS, HIES, DHS, USAID PBS surveys) wherever possible. In addition to primary research conducted according to standard research protocols, less costly alternatives are needed for implementing agencies whose staff may not possess the technical or statistical backgrounds required to design or implement such research projects. Qualitative data can enhance quantitative findings and should be included in measuring resilience.

A number of issues were identified that need further consideration by practitioners, stakeholders and donors. These are highlighted below:

- **Do we view resilience as a process or as an outcome?** How it is conceptualized will have significant effect on what is measured and how.
- **How frequently should data collection take place?** Increasing measurement intensity of a few key variables could capture adaptive processes in rapidly changing shock environments.
- **Resilience to what?** Do we consider resilience to specific shocks or resilience to all shocks?
- **What type of resilience?** Do we need to be clear about the type of resilience we are measuring (i.e., economic resilience) or do we assume that resilience is a multi-dimensional measure?
- **Thresholds and tipping points.** How do we derive these in resilient pathway trajectories?
- **What if there is no shock?** Can we still measure resilience?
- **Culturally meaningful measures.** How do we reconcile externally derived measures versus participatory, culturally-relevant measures of resilience?
- **Multiple-level resilience measures.** How do we measure resilience at different levels (e.g., household, community, national)?
- **Measuring resilience over time.** The value of panel surveys versus cross-sectional surveys.
- **The importance of qualitative measures of resilience.** How do we use mixed methods approaches to better capture resilience changes?

## I. Introduction

Given the relatively recent emergence of the concept of resilience within the wider development community, there is an understandable scarcity of robust, verifiable evidence of impact among programmes seeking to build resilience (DfID 2011; Headey et al. 2012). Looking forward, a major milestone in achieving resilience at a significant scale will be the ability to measure resilience outcomes at the household, community and national levels. Importantly for policy, programming and resource procurement, the development of robust measures of resilience will also enable evaluation of the effectiveness of various initiatives specifically aimed at enhancing resilience to food security shocks.

Resilience can only be measured directly after a shock, based on how well a community or household has coped or adapted after the shock. In particular, measurement systems must answer the questions: “Resilience of whom?” and “Resilience to what?” Given that shocks are unpredictable and may not occur within the timeframe of programme implementation, additional questions needing to be answered include whether it’s possible to determine, in the absence of shocks, if interventions are actually enhancing household or community resilience. Can resilience be tested in the absence of shocks? Longitudinal studies designed to understand how households behave prior to, during and in recovery from shocks and stresses are needed, though few relief agencies or development programmes have the resources or technical capacity to conduct such studies.

To date, a number of models for measuring resilience have been proposed by agencies working to address these measurement challenges. The FAO has developed an index for measuring resilience based on different factors that lead to coping/adapting success in several countries (Palestine, Kenya, Sudan, South Sudan, and Ethiopia) and plans on modifying this index for use in Somalia. FAO has also done a great deal of work on vulnerability analysis. WFP and FAO have been working on a shock impact simulation (SIS) model that was tested in Pakistan, Nepal, Bangladesh and Tajikistan. WFP has also been doing trends analysis in Niger to measure resilience. CRS has been attempting to measure resilience in Niger as part of its USAID-funded programme. Mercy Corps is trying to measure resilience in its programmes in Somalia and Oxfam GB has been working on measuring resilience using a characteristics approach to get around the temporal challenge associated with measuring resilience by specifying particular characteristics of a system (e.g., household, community) that are assumed to be associated with coping and/or adaptation success. Similar to Oxfam’s approach, ACCRA is utilizing the Local Adaptive Capacity (LAC) framework to identify characteristics related to adaptive capacity. Tulane University’s framework for analyzing resilience utilizes a mixed method strategy to examine the relationship between exposure to shock, humanitarian assistance and resilience outcomes in Haiti. The Food Economy Group is using Household Economy Analysis (HEA) to model resilience and compare costs of different response scenarios in pastoral areas of Ethiopia and Kenya. As part of the USAID-funded REGAL project in Northern Kenya, Kimetrica is measuring resilience as a function of income and expenditure outcomes. In collaboration with CARE and Oxfam US, Cornell has been working to identify a core set of principles for measuring resilience. IDS has been working on ways to measure resilience and DfID has been funding studies on the economics of early response and disaster resilience. In collaboration with the International Institute for Applied Systems Analysis (IIASA) in Thailand, IFAD is conducting a study of community resilience based on assets, disaster awareness and preparedness, and

adaptive capacity. Tufts University has been working on measuring resilience in Tigray, Ethiopia and finally, USAID is measuring resilience in two projects in the Horn of Africa.

Many of these models for measuring resilience focus on household level characteristics and determinants and do not go far beyond the traditional socio-economic indices for assessing vulnerability. Missing are other important landscape-level factors important to resilience, such as governance, insecurity and institutional interactions.

To move the measurement of resilience forward, FAO and WFP are hosting an Expert Consultation in Rome, February 19-21, 2013 in order to discuss the latest work that has been carried out in measuring resilience. The purpose of this paper is to summarize the different approaches to measuring resilience that are currently on-going in order for practitioners, donors and other stakeholders to arrive at a common understanding of the key measurement issues and best approaches for going forward.

## II. Why Measure Resilience?

Recurring crises in the Horn of Africa, the Sahel, and parts of Asia over the last few decades have broadly exposed the inadequacies of humanitarian assistance responses and have cost international donors and national governments millions of dollars (Frankenberger et al. 2012). Despite meeting short-term humanitarian needs regarding survival, large-scale emergency interventions have not substantially improved regional or local capacity to withstand future shocks and stresses (USAID 2011). Given the likelihood of climate-related shocks and stresses continuing to occur – and indeed increase in frequency and severity, combined with the growing recognition of the need to complement shorter-term humanitarian efforts with longer-term development activities, focus has recently shifted to promoting resilience in chronically vulnerable populations as a viable strategy for international assistance programmes.

The main value of using a resilience concept lies in integrating approaches and communities of practice rather than as a novel approach to addressing poverty and food insecurity (Béné et al. 2012). Building resilience requires helping people cope with change, adapt to new and changing circumstances, and facilitate governance and institutional changes that promote good policies, plans and programmes to support wider development at sufficient scale and over a long enough time period to have lasting benefits. Although resilience is an intuitive concept, it is quite difficult to measure directly as well as through related concepts like adaptive capacity and absorptive capacity. Despite big investments by donors in programmes aimed at promoting resilience, there is little reliable evidence to inform these investments.

Shifting from emergency responses to building resilience has been shown to provide good value for money. The World Meteorological Organization (WMO) and the United Nations International Strategy for Disaster Reduction (UN/ISDR) estimate that “one dollar invested in disaster preparedness can save seven dollars’ worth of disaster-related economic losses” (WMO 2009). Thus investing in resilience programming that reduces exposure to risk is significantly more cost-effective than post-disaster responses. However, despite investment of hundreds of millions of dollars in humanitarian assistance, there is scant evidence of exactly *which* approaches to building resilience represent the best ‘value for money’.

Given the lack of consensus on the best approaches to measuring resilience, it is easy for any intervention in any context to be relabeled as resilience building. In order to inform development, implementation and evaluation of programmes aimed at enhancing resilience, empirical evidence is needed that illustrates what factors consistently contribute to resilience, to what types of shocks and in what contexts. While various models for measuring resilience are currently under development (ACCRA 2012; Frankenberger et al. 2012; Hughes 2012; TANGO 2012a), few have been field-tested and adopted as “standard.” This is partly due to the fact that resilience is inherently difficult to measure. Nonetheless, such information is critical for assessing the relative potential of different approaches to building resilience in the face of recurrent shocks.

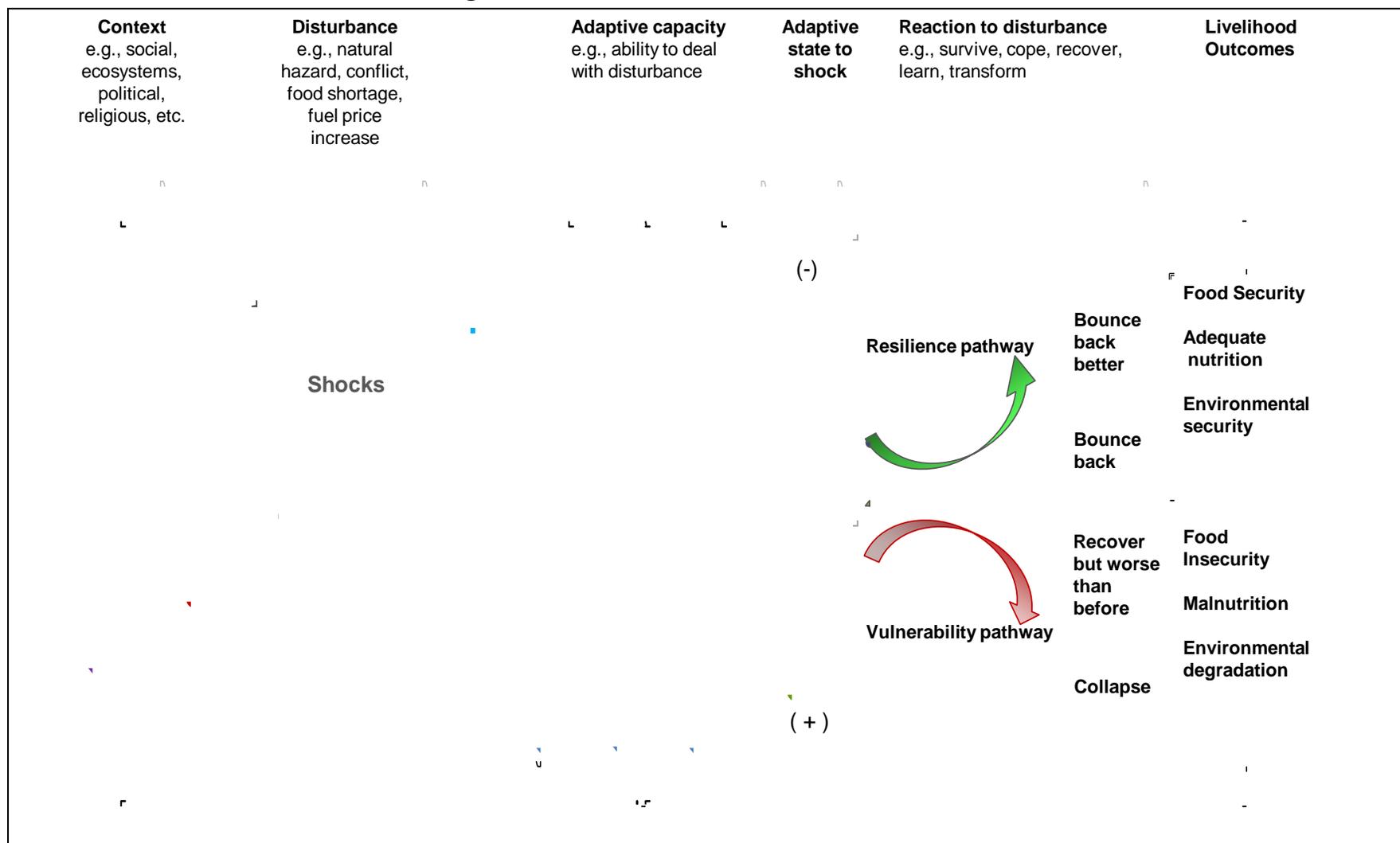
### **III. A Conceptual Framework That Captures the Dimensions of Resilience**

Adoption of a conceptual framework for the assessment of resilience is important for providing a comprehensive picture of the specific elements that contribute to resilience and clarifying the types of information that must be collected in order to adequately measure it. It also helps users understand how shocks, stresses and long-term trends (e.g., institutional, economic, socio-political or environmental factors) affect livelihoods security. Within constantly changing natural, social and economic environments, a conceptual framework for resilience assessment can ultimately help determine whether households, communities and larger populations are on a trajectory toward greater vulnerability or greater resilience (DfID 1999; Frankenberger et al. 2012). A number of conceptual frameworks have recently been developed and are presented in Annex 1.

The resilience conceptual framework presented here integrates a livelihoods approach, a disaster risk reduction (DRR) approach, and elements of a climate change approach to address the underlying causes of vulnerability. The livelihoods approach emphasizes the importance of access to productive assets, institutional structures and processes, and the livelihood strategies pursued by households. Alternatively, the DRR approach focuses on preparedness, prevention, response and recovery activities formulated in response to potential disasters. Finally, the climate change adaptation (CCA) approach is similar to that of DRR, but focuses specifically on actions to be taken in response to, and preparation for on-going changes in climate. It goes beyond the DRR approach in giving careful consideration to potential threats caused by the loss of biodiversity and a decrease in ecosystem services.

The overall objective of the resilience assessment framework is to enable policy makers and practitioners to have a comprehensive understanding of the factors and processes influencing vulnerability and resilience at the household and community levels. It helps identify gaps in key livelihood assets, the functioning of structures and processes of key institutions, and the livelihood strategies of vulnerable households. The extent and nature of community and household responses to shocks and stresses will result either in increased vulnerability or increased adaptive capacity and resilience over time.

**Figure 1: Resilience Assessment Framework**



TANGO 2012. Adapted from DFID Disaster Resilience Framework (2011), TANGO Livelihoods Framework (2007), DFID Sustainable Livelihoods Framework (1999) and CARE Household Livelihood Security Framework (2002).

In light of the continually changing social, economic and natural environments in most developing countries, resilience to shocks and stresses is properly viewed as a process rather than a static state. A resilience assessment must be comprehensive in order to identify the causal factors that must be addressed in resilience programming. To the extent possible, resilience assessments should involve multiple partners (government, NGOs, research institutions, community representatives) and technical expertise across multiple sectors. Box 1 (below) provides a brief description of the individual components of the conceptual framework for resilience assessment.

Whenever possible resilience assessments should be government-led, multi-sectoral and multi-agency endeavors. This will enable a common understanding among all stakeholders as to the main causes that are preventing households and communities from becoming resilient.

Once the assessment is done, it will be possible to identify the locations and populations where resilience action is needed, the causal factors that are preventing households and communities from becoming resilient, the identification of the key leverage points to focus on as part of a Theory of Change, and the interventions that should be included in a resilience programme.

“A resilient system has the capacity to respond positively to change, maintaining or improving function; this includes monitoring, anticipating and managing known risks and vulnerabilities to existing shocks and stresses while being able to address uncertainties in the future. Change and responses may be incremental or transformational.”

- IRWG, 2012

### Box 1: Elements of the Resilience Assessment Framework

**Context** – environmental, political, social, economic, historical, demographic, religious, conflict and policy conditions that affect, and are affected by adaptive capacity (ability of HHs, communities, and governments to cope with shocks).

**Level of aggregation** – the unit of analysis for determining resilience of what or whom (the individual, household, community, institution, government, or ecosystem). The relationships between various levels is a ‘nested hierarchy’, i.e., resilient individuals and HHs are the foundation for resilient communities. It is critical to note that resilience at one level does not automatically result in resilience at higher levels, i.e., resilient households do not necessarily result in resilient communities.

**Disturbance** - may come in the form of rapid onset or slow onset *shocks* (e.g., earthquakes or droughts) or longer-term *stresses* (e.g., environmental degradation, political instability). Experience shows that it is typically easier to mobilize resources for rapid onset shocks than slow onset shocks and stresses. In assessing resilience it is important to acknowledge that some disturbances are idiosyncratic (affecting only certain individuals or households) whereas others are covariate (affecting an entire population or geographic area). Also resilience to one type of shock (e.g., drought) does not ensure resilience to others (e.g., food price increases, conflict).

**Exposure** – a function of the magnitude, frequency, and duration of shocks.

### Box 1: Elements of the Resilience Assessment Framework

**Adaptive Capacity** – the nature and extent of access to and use of resources in order to deal with disturbance. Adaptive capacity both affects and is affected by the larger context and is comprised of three basic, but interrelated elements – livelihood assets; transforming structures and processes; and livelihood strategies.

- **Livelihood Assets** – tangible and intangible assets that allow individuals and households to meet their basic needs. Livelihood security depends on a sustainable combination of six assets/capitals: financial; physical; political; human; social; and natural. Certain assets are interdependent on others. Asset levels and quality can be improved and/or repaired. Landscapes can be restored, soils improved, new skills and abilities can be learned, and new markets can be developed or accessed. Livelihood assets can and should be grown and improved.
- **Structures and processes** – these are embodied in the formal and informal institutions that enable or inhibit the resilience of individuals, households and communities. Examples include national, regional, and local governments; civil society; religious institutions; trade associations; resource networks; shared customs and norms; informal/traditional governance structures; policies and laws.
- **Livelihood strategies** – represent the distinct or combined strategies that individuals and households pursue to make a living and cope with shocks. It is critical to note that different livelihood strategies have various risks associated with potential shocks and that certain coping strategies may have negative and permanent consequences with respect to resilience.

**Sensitivity** – is a cumulative outcome of the previous element that determines the degree to which an individual, household or community will be affected by a given shock or stress. Greater sensitivity implies a lower degree of resilience whereas lower sensitivity implies greater resilience.

**Resilience and Vulnerability Pathways** – the term ‘pathways’ underscores the idea that both vulnerability and resilience are properly viewed as processes rather than static states. Households or communities that are able to use their adaptive capacity to manage the shocks or stresses they are exposed to and incrementally reduce their vulnerability are less sensitive and are on a resilience pathway. Households that are not able to use their adaptive capacity to manage shocks or stresses are sensitive and are likely to go down a vulnerability pathway.

**Livelihood Outcomes** – these are the needs and objectives that households are trying to realize. Resilient individuals, communities and households will be able to meet their food security needs, will have access to adequate nutrition, their environment will be protected, they will have income security, health security, will be able to educate their children, and they will be able to participate in the decisions that affect their lives. Vulnerable households experience deficits, or a high risk of deficits in each of these aspects.

## IV. Measurement Principles

Resilience is a dynamic process that involves changes over time rather than an observed outcome that can be measured at a particular point in time. Thus, there is likely not one generalized way to measure resilience that is appropriate across all contexts – or by all implementing actors. Rather, it may be more feasible to reach agreement on how to measure the impact of specific types of interventions on resilience of specific populations to specific types of shocks or stresses (Barrett and Constanas 2012). For

measuring resilience more broadly, a more constructive approach might be to define measurement principles that can be applied to specific contexts.

#### *Context-specific*

As previously noted, resilience is context-specific; it is defined by the type of change or shock experienced, as well as by the social, economic, environmental, and political context in which the shock occurred and household or community response decisions are made. Context is dynamic, rather than static, and changes according to how individuals, households or communities deal with and respond to risks and shocks (Alinovi et al. 2010), which in turn results in a new set of contextual factors needing to be incorporated into resilience-building approaches and measures of impact (Frankenberger et al. 2012). In other words, current context is not only affected by previous conditions but will also affect future conditions.

To date, resilience has often (but not exclusively) been measured by determining whether an individual, household, or community successfully adapted to or coped with a shock – *after* the shock. Identification of contextual factors that explain the variation in how individuals, households and communities respond to shocks and stressors within and between contexts represents a key measurement of resilience. Contextual measurements should include formal and informal social and governance structures and processes, as they support or limit the capacity of individuals, households and communities to respond to shocks.

#### *Temporal considerations*

Ideally, measurements of resilience should be based on time-series, preferably panel data collected from the same households over time (TANGO 2012c). Data from panel studies in developing countries is rarely available, and is difficult to obtain in areas where internal migration is common. Cross-sectional data has been used for estimating empirical models of resilience (or vulnerability), but often does not shed light on the risk management strategies (e.g., adaptive strategies or coping strategies) used by households to adapt to shocks (Frankenberger et al. 2012).

#### *Thresholds/tipping points*

At its core, resilience is represented by several trajectories that reflect one or more well-being outcomes: bounce back better, bounce back, recover but worse than before, and collapse. Measuring resilience involves measuring household and community trajectories in coping with shocks and how those trajectories change based on household and community responses. However, change is not constant over time, nor is it necessarily gradual; rather, it involves tipping points or critical thresholds, beyond which change happens – either positive or negative (Alinovi et al. 2009). Tipping points lead to discernible shifts in behavior and performance. The underlying structure, or system, must change (e.g., through changes in cultural, economic or sociopolitical institutions, or the introduction of new technologies or markets) in order to facilitate the behavioral change that leads to a shift, or transition, from one trajectory to another (Barrett and Constanas 2012). It is important to identify potential tipping points in order to determine the prevailing trajectory and well-being outcomes. It is also important to determine whether such transitions are structural or transitory.

### *Technical capacity*

If resilience is to become a viable and large-scale programming option for development and humanitarian efforts, different measurement approaches may be necessary depending on who is doing the measuring. Resilience is a complex concept and its measurement should reflect that complexity, which will require the technical ability to utilize sophisticated methods of analysis (e.g., econometric models, factor and regression analysis) and to correctly analyze and interpret the results. In the absence of such expertise, proxy indicators that can be easily collected by local implementing partners (e.g., NGOs) are needed as meaningful resilience measurements. Heavier emphasis on qualitative measures may be more appropriate and feasible for local entities whereas UN agencies or INGOs may have both the human and financial resources to undertake longer-term panel studies and analysis of large quantitative datasets. Qualitative measures are important generally, as they contribute to a better understanding of the perceived significance of changes that are measured quantitatively.

### *Culturally-relevant*

M&E systems for measuring the impact of resilience programming should prioritize approaches that engage local actors and affected communities, and include measures of success that are meaningful to them. Measures of resilience must be culturally appropriate and employ benchmarks for success that are culturally-relevant. There is no 'one size fits all.'

### *Community-level and higher level measurement*

To date, assessments of resilience primarily emphasize individual or household-level measurements, particularly of adaptive and absorptive capacities. More research is needed on measuring resilience at the community and higher systems levels, as households may achieve some level of resilience on their own but will be limited if local and regional institutions and governance systems do not promote resilience-supportive policies and programming. Common inhibitors of community resilience are weak access to markets, poor communal management of natural resources, limited education and health facilities, and non-existent or inflexible credit mechanisms. For example, current value chain and market approaches focus primarily on household resilience. However, these approaches contribute to household resilience only so far as they are supported by governance and institutional mechanisms at the community and national levels; access to functioning markets depends on physical infrastructure (including roads, communication systems, etc.), availability of relevant and timely market and price information, and policies and laws that support small producers.

### *Inter-scalar relationships*

Individuals, households and communities do not exist or operate in isolation from each other. Rather, they form an interrelated hierarchy of scalar dependencies; individuals operate within households, which operate within communities, which operate within larger governance units (e.g., districts, departments, regions) (Barrett and Constanas 2012). Measuring resilience must take into account the functional connections and interactions that cause one level (e.g., household) to influence – positively or negatively – another level (e.g., community) as well as interactions between levels. Additionally, variability is not constant over time and tends to vary according to scale (e.g., households, communities, wider ecosystems).

### *Aspirations/motivation*

Measures of resilience – and vulnerability – must consider the role that attitudes and expectations concerning future well-being (i.e., food and livelihood security) play in determining household resilience (Frankenberger et al. 2007). Attitudes, or aspirations, influence the preferences, choices, and behaviors of individuals (and groups) as well as the relationships they form within a particular community. Resilience depends not only on household access to and use of assets, but also on if and how households attempt to manage risk (including taking risks) and how their attitudes impact such decisions. Resilience cannot be achieved in the absence of desire and pro-active effort to better one's future. In rural Ethiopia, a strong work ethic<sup>1</sup> was considered a key characteristic of resilient households, in contrast to households that believed their lot in life was destiny and they were powerless to change (Frankenberger et al. 2007). Interestingly, many members of resilient households identified in the study were found to have spent substantial time visiting or working outside of their villages. Combined with findings from the analysis of household aspirations, this suggests that such experiences expose individuals to role models and positive alternatives to the status quo, expanding one's aspirations.

Individual attitudes and behavior are shaped, in part, by socio-cultural attitudes and norms. Thus, aspirations have both a household-level and community-level component. Evidence suggests that women play a large role in household resilience. Their ability to contribute, however, can be limited by socio-cultural, gender-based or religious restrictions on their mobility, participation in decision-making (at both the household and community levels), and access to productive assets, credit, markets and certain livelihood activities. For example, education is an obvious factor contributing to resilience at both the household and community levels. Yet in many households and communities in developing countries, there are cultural restrictions on girls attending school, at least past a certain age.

### *Natural resources/ecosystem health*

Natural resource-based livelihoods (e.g., agriculture, livestock, charcoal-making, wood gathering, wild-harvesting of foods and medicinal plants, fishing) are highly vulnerable to the effects of deforestation, encroachment into and degradation of fragile ecosystems, overgrazing, and improper land management. The resulting soil erosion, loss of vegetation, loss of biodiversity and loss of ecosystem services undermine household and community resilience, particularly given the predominance of communal rather than private ownership of resources.

The importance of healthy ecosystems and sustainable management of natural resources is recognized in most resilience frameworks as part of the asset base. However, emphasis is often on household access to and/or control of natural resources rather than their state of health and prospects for long-term sustainability. Given the heavy reliance of communities on the natural resource base, factors contributing to ecosystem health cannot be ignored in measuring resilience (Béné et al. 2012).

Use of appropriate natural resource management practices, including farming and livestock practices, contributes to healthy and productive agricultural soils, abundant grasses and pasturelands, healthy forests, increased prevalence of beneficial insects, decreased incidence of plant and animal diseases,

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<sup>1</sup> Characterized by the belief that one is responsible for one's own success/failure and that success results from hard work.

clean water, rising water tables, etc. Unfortunately, communally-based land-tenure systems often undermine household willingness to invest in resilience-promoting improvements (e.g., improved practices, infrastructure) on land that they do not own.

## V. Current Practices in Measuring Resilience

Achieving resilience at significant scale will require the ability to measure resilience outcomes at the individual, household and community levels. However, measuring resilience is not simply about measuring outcomes, but rather measuring *changes* in outcomes over time, particularly as a function of specific programmes or policies. To date, few measures have been developed that provide objective, verifiable information critical to assess the relative potential of different approaches to building resilience to food insecurity.

The examples below represent a sampling of methodologies being employed by NGOs, UN agencies and other actors to measure resilience and assess the impacts of their resilience programming at the household or community levels. Though not exhaustive, this list illustrates some of what is currently being done in terms of resilience measurement.

### ***Food and Agriculture Organization (FAO)***

The index developed by FAO estimates resilience as a latent variable made up of a number of context-specific components. In the first stage, an index for each component is estimated separately using an iterated principal factor analysis over a set of observed variables. In the second stage, the resilience index is derived using a factor analysis on the interacting components estimated in the first stage in which the resilience index is a weighted sum of the factors generated using Bartlett's scoring method and the weights are the proportions of variance explained by each factor (Alinovi et al. 2010). As presented in the analysis of resilience in Palestine, the components used were:

- Assets: housing, durable index, tropical livestock units (TLU), land owned
- Income and food access: income/expenditures, Household Food Insecurity Access Score (HFIAS), Dietary Diversity Score (DDS)
- Access to basic services: physical access to/quality of health services, education, security, mobility/transportation, water, electricity and phone networks
- Social safety nets: cash/in-kind assistance, quality of assistance, job assistance, frequency of assistance
- Adaptive capacity: income diversity, level of education, employment ratio, coping strategies, food consumption ratio
- Stability: household jobs lost, changes to income/expenditures, safety net dependency, stability of education system, capacity to maintain stability in future

In the Kenya analysis of resilience, additional components were taken into consideration (based on a review of the literature and contextual analysis): agricultural practice and technologies were introduced, and assets were split into agricultural and non-agricultural assets.

One of the advantages of the FAO approach is that it is based on existing household surveys (e.g., LSMS, HIES, HBS), which makes it less demanding in terms of primary data collection. Also, this

approach allows for gender and livelihoods disaggregated analysis (provided that the dataset is large enough – as the above mentioned surveys are).

This resilience index has been used in impact evaluation exercises utilizing a quasi experimental design in South Kordofan (Sudan), Jonglei and Upper Nile (South Sudan) and in the Gaza Strip.

A panel dataset is expected to be developed as part of the FAO/WFP/UNICEF joint strategy and programme to build resilience in Somalia. This joint initiative seeks to invest in medium- and long-term development interventions that improve the capacity of Somali households and communities to prepare for, respond to and recover from shocks and stresses (FAO, WFP, UNICEF 2012). Through the construction of a panel dataset, and using different dimensions of resilience (as drafted in the programme document), a resilience dynamic analysis will be conducted and will measure both the impact of interventions and the dynamics effects on the resilience index and its components.

### ***World Food Programme (WFP)***

WFP has recently used trend analysis of historical food security indicators to measure household resilience in Niger (WFP 2012). Analysis focused primarily on the speed and extent of recovery following a drought in 2009. Relying on annual post-harvest household surveys conducted each year since 2006 as part of the country's early warning system, baseline values used in the analysis were developed by averaging values from 2006, 2007, and 2008, considered "typical" agricultural years. Household recovery indicators were monitored in 2010 and 2011. Recovery rate (at one year post-shock) and recovery time (time needed to return to the pre-crisis baseline value) were used to measure resilience as determined by three household food security indicators: coping strategy index (CSI), food consumption score (FCS) and cereal stock duration.

Results indicate that recovery can be a slow process, at least for these food security indicators. Even when bumper crop harvests occur after a shock, recovery may still take several years. This lag in recovery time may have significant implications for resilience programming and measurement, if this is a broadly applicable result. Although certain limitations may exist (e.g., bias from repeated measures, lack of seasonal variation), use of food security indicators commonly collected in existing household data collection surveys lend themselves readily to trend analysis.

In partnership with FAO, WFP is also developing a Shock Impact Simulation (SIS) Model for estimating the ex-ante, current, and ex-post impacts of shocks in order to support intervention decisions, policy and planning (WFP and FAO 2012). The model combines data from the World Bank, FAO, WFP and national sources on key household, livelihood, economic, market and production variables that can be used to model the effects of six different shock factors (agricultural production, agricultural inputs/costs, commodity retail/wholesale prices, wage rate, remittances and transfers, and macro-economic factors and trade policies) on livelihoods and food security outcomes.

The SIS model uses the same approach as the Agricultural Household Models (AHM) and is based on a number of modules (e.g., market monitoring, crop production monitoring, income generation, household budget allocation) that track changes in shock factors, and utilizes past patterns (e.g., linked

to VAM/GIEWS<sup>2</sup>) or forecasts determined by a partial equilibrium model or short-term price analysis. The model allows use of different thresholds based on policy intervention objectives, and can simulate impacts for various grouping factors (e.g., gender, geographical area, small-holders).

### **USAID**

USAID supports resilience and economic growth in the Sahel and Horn of Africa through its Feed The Future (FTF) programme. In part, USAID's resilience programming is based on the cost/benefit, or 'value for money,' theory that investing in resilience is less expensive than humanitarian assistance (Collins 2012). Logically, investments in resilience should lead to reductions in the need for humanitarian responses. This will be tested using FAO's resilience framework to identify factors that contribute to household resilience to food security shocks and stresses.

The USAID model focuses on six domains of resilience, each of which "contribute to and collectively constitute" resilience (Collins 2012): income and food access, assets, social capital/safety nets, nutrition and health, adaptive capacity, and governance. Indicators of stability (over time) are included in each domain. Three "topline" measures, reflecting what USAID considers to be representative of its resilience investments in the two regions, have been selected: prevalence of households with moderate or severe hunger (based on the Household Hunger Scale), depth of poverty (the difference between mean income and the poverty line), and prevalence of Global Acute Malnutrition (GAM).

In Kenya USAID will utilize WFP planned beneficiary numbers as a proxy for humanitarian assistance needs (i.e., increased resilience will lead to a reduction in the need for humanitarian assistance), which will be normalized by severity of drought using the Water Requirements Satisfaction Index (WRSI) and the Normalized Differences Vegetation Index (NDVI). If food price increases affect humanitarian assistance responses, food commodity prices may also be used as a normalization factor.

This approach attempts to use existing data collection efforts as much as possible rather than rely on new survey data. Data collected through population-based surveys (PBS) for Feed the Future projects, annual monitoring for a specific project, and other ongoing studies carried out by the government or other institutions are used to acquire appropriate data. In addition, qualitative data and focused surveys will be used to supplement this information.

### **Tufts University/World Vision**

In collaboration with World Vision, a research partnership between the Feinstein International Center at Tufts University and the College of Dryland Agriculture and Natural Resources at Mekelle University in Tigray is measuring resilience in Northern Ethiopia by assessing "livelihoods change over time" (LCOT) (Vaitla et al. 2012). World Vision's work has focused primarily on disaster risk reduction programming and contributed significantly to the LCOT survey, which collects panel data twice a year to assess household resilience to the "hunger season," an annually recurring shock.

The LCOT approach adopted here captures both static livelihood outcomes (e.g., food security, health status, education level), which are typically measured in a fairly linear manner, and more complex outcomes based on dynamic interactions between livelihood strategies, policies and programmes, and

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<sup>2</sup> Vulnerability Assessment Mapping/Global Information and Early Warning System.

institutions, which can enhance or limit household responses. Based on a livelihoods cycle framework, the LCOT assessment involves first understanding the shocks inherent in the system (i.e., what types of shocks or hazards are occurring within the targeted population), and subsequently how a given shock affects different stages of the livelihoods cycle (i.e., how assets are affected by a particular shock, how production and other decisions are impacted by a shock, and how policies/institutions mitigate the risk of a shock). Such information is then used to identify who is most vulnerable to what types of shocks. Rather than collect the large amount of data required to directly measure various parts of the livelihoods cycle, a model is used to estimate relationships between initial asset levels, variables at different stages of the livelihoods cycle, and outcome measures of household resilience (Viatla et al. 2012).

To measure resilience, the study utilizes a number of indices, scores and individual variables to look at changes in seven indicators of livelihoods outcomes and household well-being across years (i.e., from hunger season to hunger season):

- Household Food Insecurity and Access Scale (HFIAS)
- Coping Strategies Index (CSI)
- Food Consumption Score (FCS)
- Illness Score
- Value of Productive Assets
- Net Debt
- Income (per capita daily expenditure)

The HFIAS, CSI, and FCS are used to assess food security. An illness score measures human capital. Additional scores (or indices) include access to community resources (i.e., access to community-owned land, pasture/grazing land, water sources, forest resources), support network score (i.e., ability to access non-family networks in case of a shock), social participation score (i.e., household participation in formal and informal groups), and crop diversity index (i.e., cropping systems patterns). Asset variables include both those more likely to change in the short-term (e.g., value of land, livestock, productive assets) as well as those more likely to change over the long-term (e.g., literacy, participation in social organizations).

The study measures both current livelihood status and LCOT, and analyzes underlying factors of change for each of the four resilience pathways for how households respond to shocks (i.e., bounce back better, bounce back, recover but worse than before, collapse) (Frankenberger et al. 2012). Findings from the study remain preliminary, as only one year of data has so far been collected (i.e., one hunger season and one post-harvest season), but suggest that programme impact will depend more on factors associated with “change” rather than factors associated with “current status”, and that these factors will vary depending on how households change over time (i.e., which resilience pathway households experience).

### ***Tulane University***

Through the Humanitarian Assistance Evaluation, Tulane University’s Disaster Resilience Leadership Academy (DRLA) and the State University of Haiti (UEH) developed a framework for analyzing resilience

and the effects of humanitarian assistance on resilience outcomes in the aftermath of the 2010 earthquake (Tulane and UEH 2012). The evaluation utilized a mixed methods strategy, drawing on existing secondary data and primary data collection, including household survey data, community level key informant interviews and qualitative data from focus groups to explore the relationship between exposure to humanitarian assistance and resilience outcomes from the perspective of stakeholders and affected Haitian communities. Stakeholders included the Government of Haiti, the Interim Haiti Recovery Commission (IHRC), Haitian civil society, local and international NGOs, the United Nations, the Red Cross movement, the donor community and academia.

To measure the relationship between a shock, resilience and humanitarian assistance, a Haiti Resilience Impact and Change Model was developed and is based on three components: the resilience characteristics of an individual, household or community; the scope and nature of the shock; and the presence and type of humanitarian response. The framework also illustrates how individuals, households and communities who experience a shock adapt, absorb, erode or fail. A key strategy utilized in developing the evaluation involved stakeholder input to guide design and implementation, help identify resilience indicators of significance in the Haiti context, and develop survey tools. Based on stakeholder input, resilience was measured at the household level, which resulted in the exclusion of certain community-level resilience themes (e.g., governance, environment), as they are not measured at the household level.

The sampling strategy was designed to allow comparison of residents living in camps with those not living in camps in affected and non-directly affected areas. The survey involved measures of seven resilience dimensions, including indicators related to levels of well-being and psychosocial stress, which were developed with input from stakeholders. The seven dimensions are:

- **Wealth:** This dimension includes financial and physical capital, income expenditures and food security/consumption measures.
- **Debt and Credit:** This dimension includes information on the use of credit to access food and non-food items necessary for survival. Although access to credit can increase household resilience, use of credit (i.e., accumulation of debt) for survival is an indication of vulnerability.
- **Coping Behaviors:** This dimension includes household behaviors used to respond to shocks as well as those they might use to respond to future shocks. This dimension does not focus on the ability of households to respond, but rather on the consequences of certain coping strategies (i.e., negative) that can lead to loss of household resources.
- **Human Capital:** Human capital involves the skills and abilities that enable households/individuals to generate income and have access to food and goods and services. For the purposes of the Humanitarian Assistance Evaluation, this is represented by level of education and workforce capacity within the household.
- **Protection and Security:** Protection and security were measured in terms of self-reported experiences, perceptions and opinions of household members related to their personal sense of security and their reported exposure to personal and property crime.

- **Community Networks:** Related to the concept of social capital, this dimension reflects the connectedness of households to groups—particularly those related to livelihoods, income or decision-making within the community— and community decision processes.
- **Psychosocial Status:** Psychological status and well-being of household heads is a dimension of resilience not often measured but that can affect how individuals and households manage risks, and respond and adapt – or fail to adapt – to shocks and stresses. The composite psychosocial score used here was created using two composite scales based on household survey data. The General Health Questionnaire – 12 (GHQ-12) measures acute psychological stress resulting from loss of sleep from worrying, loss of concentration, difficulty making decisions, depression, etc. The Well-Being Index (WBI) rates respondent perceptions regarding their personal satisfaction in eight life categories, including standard of living, health, relationships, safety, community-connectedness, etc.

Combining multiple relevant indicators, a quantitative composite score was calculated for each dimension using principal component analysis (PCA). Applied to the entire sample of households, standardized dimension scores were calculated, all of which averaged zero at the national level. The scores measured household resilience at a specific point in time with higher scores reflecting higher household resilience. After creating the seven composite scores (i.e., one for each dimension), the indicators were analyzed in the post-earthquake context to measure the impact of humanitarian assistance on resilience using multiple regression analysis. Propensity score matching was used to control for differences between households based on potential targeting criteria for humanitarian assistance. As the greatest predictor of other resilience dimensions, wealth variables were included in the regression analysis as independent variables; the effects of humanitarian assistance are analyzed with and without wealth variables.

The composite scores of the seven dimensions of resilience are then mapped onto radar graphs (similar to those utilized in the FAO analysis) to visually illustrate resilience outcomes for camp/non-camp areas that were directly affected by the earthquake.

Qualitative data from focus groups verified and enhanced findings from – and included relevant aspects of resilience not included in – the household survey.

### ***University of Florence***

Using panel data from national household surveys in which households were interviewed in both 1998 and 2001, the study builds on the approach developed by Alinovi et al. (2010; 2009) in order to measure resilience of rural households affected by Hurricane Mitch in 1999 (Ciani 2012). The study produces a single agricultural resilience index, which is itself a composite index made up of 11 latent variables estimated through factor analysis:

- **Income and food access:** per capita income
- **Access to basic services:** distance to the nearest health facility, school, water source, and access to a safe sanitation system, electricity
- **Agricultural assets:** value of land, livestock (TLU), machinery and other capital assets owned
- **Non-agricultural assets:** value of the house in which the family lives, and durables owned

- Household technological level: value of all agricultural and non-agricultural capital and installations owned, hired and shared by the household
- Social Safety nets: transfers received from public institutions
- Social Safety Nets: transfers received from other households, NGOs, religious organizations, etc.
- Adaptive Capacity: number of household members who are income earners, number of sectors of employment earned by household members, educational attainment of all household members/household head, employment ratio, food share, health insurance)
- Physical Connectivity: household owns at least one TV, whether paved/maintained roads reach household, household owns at least one motorized means of transportation
- Household Structure: dependency ratio
- Economic Connectivity: share of food to total household expenses, access to credit, ownership of financial assets

This study expands on the previous work of Alinovi et al. (2010; 2009) by adding household characteristics, given their importance in determining household livelihood strategies, and includes social, economic and physical “connectivity”, which suggests whether households are able to tap into alternative options for taking advantage of the opportunities and accessing the resources needed in order to deal effectively with shocks, i.e., to adapt. It also eliminates the stability component of the FAO resilience index because it is a cross-sectoral dimension of resilience whose variables are themselves influenced by household vulnerability/resilience to shocks.

### ***Catholic Relief Services (CRS)***

Faced with a potential pre-harvest food crisis for 2012 in Niger, Mali and Burkina Faso, CRS initiated a Sahelian Resiliency Study to gain a better understanding of resilient households in Niger (TANGO 2012a). The study analyzes not only exposure to specific types of shocks, but also the types of risk management strategies households adopt in order to deal with them, including coping responses (short-term adjustments until the household returns to its prior livelihood strategy) and adaptive responses (structural changes in livelihood strategies in response to shocks or longer-term stressors). Thus, analysis provides the empirical basis for examining differences in risk management strategies adopted by households supported by Food For Peace (FFP), and how those differences lead to differences in both current food security status and household resilience (TANGO 2012b).

The conceptual framework on which the study is based (Frankenberger et al. 2012) posits generally that households and communities are more capable of dealing with shocks and stresses when they have more than one way of earning a living (i.e., engage in a diversity of livelihood strategies), access to sufficient livelihood assets (e.g., financial markets, good education, social networks, roads, water) and access to formal and informal governance structures that promote resource management and policies, laws, and social/cultural norms that enable households and communities to manifest adaptive capacity (e.g., delivery of basic services, security, access to safety nets, rule of law).

Using both quantitative and qualitative data, the study examines food security outcome indicators (including a food security index), household responses to specific shocks (i.e., coping and adaptive strategies), and household perceptions of factors that determine and constrain their ability to cope

with shocks, including community-level structures and processes that enable or limit the range of adaptive responses to various types of shocks that are available to households. To minimize problems of non-comparability of beneficiary and control groups, either from targeting of programme interventions or self-selection bias, propensity-score matching (PSM) was used to ensure that each household in the beneficiary group had a control group match with 'similar' demographic and asset related characteristics. Cases that could not be matched were excluded from the sample. This approach more accurately identifies the impacts of CRS programme interventions on food security and vulnerability (and whether households are more likely to experience food insecurity in the future) by controlling for other household and community-level characteristics.

Household resilience is assessed with cross-sectional data from households using three key outcome measures: improved ability to manage risk, improved adaptive capacity, and improved development indicators. Indicators being used to assess resilience include:

- A household resilience index comprising household hunger and coping strategies (HHS), dietary diversity (HDDS), % household expenditures on food, and livestock owned (kg);
- Shocks experienced by households over the past year, including covariate and idiosyncratic shocks;
- Household livelihood strategies;
- Household adoption of specific risk management strategies in response to shocks;
- Household ownership/access to capital (physical, natural, financial, social, political, human); and
- Contextual information about access to infrastructure and services.

Households on a pathway toward resilience are able to cope with shocks, to learn from past shocks and prepare for future ones while remaining food secure, ultimately moving beyond poverty and food insecurity.

Findings in the Sahel resilience study highlight the need to collect data over time in order to obtain a fuller understanding of the factors that affect resilience. By looking at the change in these variables over longer periods of time, as well as across households, it will be possible to better identify those factors that enhance household resilience.

### ***Oxfam GB***

In collaboration with a local partner in the Horn of Africa, Oxfam is working to increase resilience to drought of agro-pastoralist communities in Somalia (Hughes 2011). Specifically, the programme aims to increase availability of and community access to water and pasture resources, improve livestock health, and improve community capacity in drought preparedness. An assessment of the programme's effectiveness in building resilience circumvents the temporal requirements typically associated with measuring resilience by promoting the view that there are certain household and community characteristics that affect how well a household or community is able to cope with or adapt to shocks.

This "characteristics approach" attempts to identify reliable determinants of household and community-level resilience that can be assessed prior to shocks occurring. The caveat is, of course, that this type of assessment doesn't address whether the characteristics identified are actually relevant when a shock eventually occurs. Nonetheless, such research continues to add to the growing body of evidence on factors contributing to resilience and adaptive capacity.

Oxfam considers the following five dimensions to be key factors in resilience:

- **Livelihood viability:** In general, households with access to a diversity of less climate-sensitive livelihood activities are less likely to be negatively impacted by climate-related shocks than households with fewer and more climate-sensitive alternatives. This dimension suggests that households are more resilient when engaged in diverse livelihoods activities, draw from a varied crop/livestock portfolio, and have access to early warning information.
- **Innovation potential:** This dimension depends on the ability of households to actually change or alter their livelihood strategies in response to climate-related shocks – either ex ante or ex post. It includes the willingness of households to take risks in order to affect such changes, their knowledge about and attitudes toward climate change, and their access to climate trend and market information.
- **Contingency resources and support access:** This dimension involves the support systems that households and communities draw upon in order to adapt to climate-related shocks. Factors include household savings, social support systems, food and seed reserves, insurance mechanisms, and familial and community support networks.
- **Integrity of the natural and built environment:** This dimension recognizes that households and communities can only be as resilient as the natural resources upon which their livelihoods are based. When ecosystems are well managed and healthy, households and communities are more likely to be able to deal with and adapt to shocks than if they relied on degraded ecosystems. Factors contributing to this dimension include improved farming practices, healthy soils, improved livestock grazing practices, etc.
- **Social and institutional capability:** This dimension suggests that households are more resilient if they are connected to efforts that can mobilize action on disaster risk reduction and adaptation measures at the community-level and beyond. This includes factors such as community disaster planning committees, linkages to external support, access to essential services during shocks/hazards, and community awareness and participation.

Though Oxfam views these five dimensions as critical to household resilience, the specific characteristics determining resilience and/or adaptation in a particular context vary widely.

Oxfam's approach allows for assessing programme effects on resilience in the absence of shock and uses as the counterfactual, purposively selected comparison communities in which Oxfam interventions were not employed. It does not, however, measure actual outcomes in response to shock; it does not "test" the predictive power of the determinants.

Additionally, Oxfam has developed an assessment of impact process using propensity score matching (PSM) and regression to compare country-level performance with Oxfam's global Adaptation and Risk Reduction (ARR) indicator, or to compare results for specific dimensions or characteristics of resilience (Hughes 2012). This process builds on the Alkire-Foster (AF) Method and allows for comparing measures of vulnerability (e.g., adjusted headcount ratio, adjusted deprivation gap, average deprivation share) between intervention and comparison groups.

It involves assigning weights to the five key dimensions of resilience, determining cut-offs and weights for each indicator, constructing “counting vectors” (i.e., % of indicators in which each household is deprived), and determining a vulnerability cut-off. Indices are computed and used to compare differences in the relative contributions of individual indicators between intervention and comparison groups.

Advantages of this approach include the ability to assess resilience in the absence of shocks, identification of gaps and thus direction for programming, and use in situation analysis and intervention design. However, many of the characteristics are perception-based and difficult to measure, and are measured at the household rather than community level. Finally, it remains to be seen whether this approach delivers the “right package” in terms of determining resilience characteristics for a specific context.

### ***Mercy Corps***

Anecdotal evidence from Mercy Corps’ peace building programme in southern Ethiopia – Strengthening Institutions for Peace and Development (SIPED) – suggested that pastoralist communities participating in SIPED were more resilient to drought than non-participant communities (Kurtz and Scarborough 2011). A follow-up study revealed that resilience of the pastoralist groups was determined by freedom of movement and access to natural resources, and that effective peace building interventions can contribute to creating the enabling conditions that promote resilience in the Horn of Africa.

Building on the SIPED work and follow-up research findings, Mercy Corps initiated a study to determine the factors that most influenced household resilience (or lack thereof) during the multiple shocks (i.e., ongoing conflict, restricted humanitarian access, failure of rains) that contributed to the 2011 famine in Somalia. Information gleaned from the study will generate evidence to inform Mercy Corps and partner strategies for, and investment in, resilience and stabilization efforts in areas of southern Somalia that have been “newly liberated” by the Transitional Federal Government (TFG). In addition to the work in Somalia, Mercy Corps is undertaking research on if and how peace-building programmes strengthen resilience of pastoralist groups in the Horn of Africa, and to develop reliable measures and predictors of resilience. Based on new Mercy Corps conflict management programmes in Uganda and southern Ethiopia (pending funding), the research will combine a quasi-experimental design with comparative case studies to generate evidence-based results on the relationship between conflict and resilience, and the impact of peace-building efforts.

Mercy Corps’ involvement with resilience and its measurement are evolving. The Somalia effort attempts to go beyond measuring household well-being outcomes to measure system-level variables (e.g., governance, institutional capacity). By focusing primarily on how households respond to shock (i.e., coping and adaptive strategies), the SIPED study may not have fully captured the determinants of resilience to drought for pastoralist communities in southern Ethiopia. The Somalia study attempts to measure both the type of shock households are exposed to, as well as the extent of the exposure. This is essential given that the determinants of resilience to one shock (e.g., drought) may differ from the determinants of resilience to a different shock (e.g., food price increases).

In the Somalia study, several dependent variables were regressed against a variety of explanatory variables. Though the signs (+/-) varied with the inferential model used, significant variables include sex of household head, quality of housing, access to water/grazing/ agricultural land, quality of grazing, conflict security, number of cattle, livelihood diversity (number of income sources, number of livestock/crops produced), exposure to shocks, social support and protection (formal and informal), access to services (education, veterinary services, markets, telephones, loans), mobility/displacement, confidence to adapt (success results from hard work, willing to try new livelihoods strategies), and changes in agricultural/livestock activities over the last 3 years.

### ***Africa Climate Change Resilience Alliance (ACCRA)***

The Africa Climate Change Resilience Alliance (ACCRA) is a consortium of NGOs (Oxfam GB, the Overseas Development Institute (ODI), Save the Children Alliance, CARE International and World Vision International) that promotes evidence-based design and implementation of humanitarian and development interventions to improve the adaptive capacity of poor and vulnerable communities (Oxfam GB 2011). Developed as part of ACCRA, the Local Adaptive Capacity (LAC) Framework focuses on the intangible and dynamic processes and functions that support adaptive capacity – particularly in the context of climate change – in addition to more asset-based approaches of traditional frameworks (Jones et al. 2010). The framework identifies five distinct but related characteristics of adaptive capacity and assumes that improvements in any of these characteristics will lead to improved adaptive capacity.

Key characteristics and features of the LAC framework:

- **Asset base:** The availability of and access to key assets underscores the ability of households or communities to respond to changing conditions. These are the financial, physical, natural, social, political and human capitals required to respond to climate-related, social, economic and other shocks. However, adaptive capacity may depend on more than a simple “more is better” accumulation of individual assets. Rather, access to a wide diversity of assets that are essentially substitutable may be equally important (Ospina and Heeks 2010).
- **Institutions and entitlements:** Adaptive capacity at the local level depends on the existence and proper functioning of an institutional environment that allows fair and equitable access to key assets and resources, participation in decision-making processes, and empowerment to all groups, and especially to the most marginalized and vulnerable elements of the population.
- **Knowledge and Information:** In order to adapt to changing conditions, households and communities must be able to access and assess information and knowledge about risks and shocks, and what adaptation options exist to mitigate the impact of such events. Their ability to implement appropriate adaptation strategies (i.e., to adapt) also depends on their access to relevant information (e.g., early warning systems, climate/market information). This dimension is linked to the institutional context as it relates to the collection, analysis and dissemination of information and knowledge. Adaptive capacity is enhanced through the integration of “formal” information from external sources with “informal” or traditional knowledge from local sources. This extends beyond information regarding the hazard or shock itself to include information about technical and

behavioral options to mitigate or deal with potential impacts (e.g., where to find seeds of new crop varieties, how to apply for financing) (Jones et al. 2010).

- **Innovation:** The ability of households and communities to innovate and take risks in order to deal with social, economic or environmental changes requires an enabling environment that promotes and supports experimentation and exploration of solutions – either large-scale or local-level – in order to take advantage of opportunities presented by changing conditions. While this dimension generally promotes innovation and risk-taking, the environment in particular needs to be protected from risky innovations that threaten the health of natural resources and integrity of functioning ecosystems. The ability to innovate is closely linked to information and knowledge as well as the asset base.
- **Flexible forward-looking decision-making and governance:** Adaptive governance (i.e., informed decision-making, transparency, flexibility) is an important aspect of adaptive capacity at the household, community and national levels. The ability of households to adapt to changing conditions or shocks is enhanced or limited by the level of adaptive capacity in local or national governance systems and institutions. Local organizations and national institutions that are well-informed about future trends (e.g., climatic, markets) can plan for and implement measures to reduce potentially negative impacts – or to take full advantage of positive ones. Adaptive governance involves both a technical component (i.e., technical capacity of institutions) as well as a “power relations” component. Decisions are often determined more by special interests than technical considerations (Jones et al. 2010). The LAC framework allows for analyzing power, accountability or responsiveness of governance structures.

ACCRA’s research focuses on understanding how social protection, livelihoods and DRR projects build adaptive capacity to climate change, and to use those results to help donors, development partners and governments plan and implement interventions that build communities’ adaptive capacity.

### ***Food Economy Group (FEG)***

As a livelihoods-based approach to analyzing how households access food, income and other assets for their survival and growth, Household Economy Analysis (HEA) can shed light on appropriate types of short-term emergency or longer-term development assistance and is being increasingly used to model resilience building and safety net programmes (Coulter 2012). HEA utilizes information on levels of household access to food and income, factors affecting household access to food and income, and the low- and medium-risk coping strategies households use to increase food or income when exposed to a shock. HEA includes determining survival and livelihoods protection thresholds (i.e., minimum requirements for survival and to protect livelihoods), both based on local expenditure patterns (Venton et al. 2012).

The FEG is using two approaches to model and compare costs of three response scenarios (i.e., late response, early response, and building resilience) to drought and to provide measures of impact of each scenario on household food security and resilience in pastoral areas of Ethiopia and Kenya. As a bottom-up approach, the HEA model provides household-level data on the estimates of the cost of aid and livestock losses under different levels of drought (i.e., high, medium and low magnitude droughts

based on various percentages of annual short-term mean rainfall levels 1996-2007). The top-down approach utilizes national-level data to estimate the cost of response under the different levels of drought. Both approaches use a 20-year timeframe with a discounted rate of 10%<sup>3</sup>; high magnitude droughts are assumed to occur every five years, a conservative estimate (Venton et al. 2012).

Results suggest that early response is far more cost effective than late humanitarian response in both Kenya and Ethiopia. While some ambiguity exists regarding the cost of building resilience, it appears that the benefits of doing so far outweigh the costs, particularly over longer timeframes. Though the costs of building resilience are higher than early response, it is estimated that the benefit to cost ratio of building resilience is 2.8:1 in Ethiopia and 2.9:1 in Kenya over 20 years. Thus, in both cases, for every \$1 USD spent on resilience, approximately \$3 USD of benefits accrue from reduced humanitarian aid costs and animal losses. Prioritizing early response in the short-term may be as cost-effective an approach as resilience building over the long-term but longer-term support enhances value for money investments (Venton 2012).

While the results from the study contribute to the evidence-base on resilience building as a more cost effective strategy than humanitarian aid, there remains a significant lack of data on which types of resilience interventions provide the most value for money. This is largely because benefits resulting from resilience programming will vary, depending on contextual factors as well as implementation strategies.

A potential limitation of the study includes the heavy reliance on proxies as estimates for the costs of humanitarian assistance, building resilience, livestock losses, the impact of drought, etc. In all cases, conservative estimates were used. Additionally, the study assumed that the costs of building resilience could be measured by assessing the costs of livestock, water and education interventions. A more systematic approach to assessing the relative costs and benefits of resilience interventions – and in other contexts – is needed, including the potential reductions in humanitarian assistance that accrue over time.

### ***Kimetrica***

In presenting a measure of resilience that might be used to develop tools for measuring changes in resilience over time for the USAID-funded REGAL project in Northern Kenya, Kimetrica draws on the vulnerability literature to develop a causal model consistent with economic theory and core assumptions of the USAID Feed the Future framework (Watkins and Levi 2012). Taking into account that resilience is context-specific (i.e., resilience of whom and to what?) and that resilience – like vulnerability – is multi-dimensional, Kimetrica's model looks specifically at household resilience to drought as a function of income/expenditure outcomes. Thus, the measure of resilience would look at how household income or expenditure varies as a result of drought. Recognizing that resilience is more than simply the opposite of vulnerability in that it reflects the ability to cope with shocks over time, Kimetrica's model considers how shocks from drought affect variability in short-term outcomes (e.g.,

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<sup>3</sup> Discount rates are used in these types of analysis to reflect the time preference for money – in other words, a dollar today is worth more to someone than a dollar tomorrow. 10% is in line with central bank rates in both countries, as well as rates used for development projects.

income, household assets, retail prices) as well as household expenditure (or consumption) outcomes over a prolonged period of time.

Data will need to be collected from a variety of sources and over a long period of time. Remote-sensing data can be used to determine the impact of drought (Normalized Difference Vegetation Index; NDVI). However, the study suggests piggy-backing on existing efforts, such as the NDMA Early Warning System in Kenya that collects some household level data on income, expenditure/consumption, assets and limited pricing data. DMA collects price data for key foods and livestock.

Given insurmountable problems preventing contamination between control and treatment groups, Kimetrica argues for using econometrics techniques to track how cumulative “exposure” to programme interventions influences change in resilience over time. A household-specific score that measures how much the household has interacted with or benefitted from various elements of the programme would be regressed onto a household resilience score (i.e., change in resilience over the life of the project) to estimate the impact of REGAL programming on resilience.

### **IFAD**

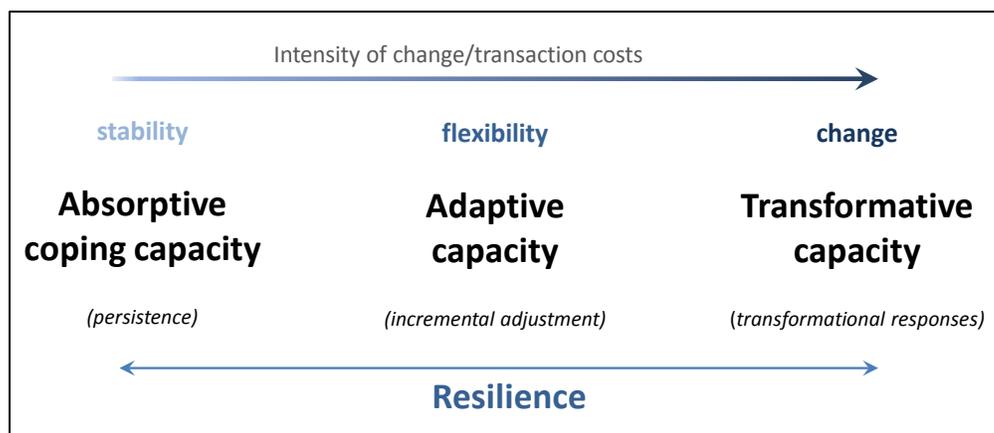
Community resilience to climate-related shocks, in particular, rising sea-levels, storm surges, and floods, is being measured by IFAD and the International Institute for Applied Systems Analysis (IIASA) in Phang Nga, Thailand (Garbero and Muttarak 2012). The study considers communities vulnerable to a shock if the risk of the shock results in a loss of well-being outcomes such that individuals or households within the community are unable to cope. In the current study, resilience is a function of assets (e.g., human, financial, social), disaster awareness and preparedness, and adaptive capacity.

The study uses data from a community survey administered as a mail questionnaire to 352 communities/villages in Phang Nga in 2012, which had a response rate of 80%. Data includes information on economic/livelihood activities, history of natural disasters, perceptions/awareness of climate change and its impacts, and coping strategies. Demographic information, education levels and labor market data are derived from the 2010 local area census. Data is matched to the Ministry of Interior’s data in order to obtain information on village infrastructure, employment, agricultural productivity, income, health and sanitation, knowledge and education, community strength, and natural resources/environment.

## **VI. General Considerations for Measuring Resilience**

Resilience implies the ability of individuals, households, communities or institutions to deal with shocks by adapting, learning, and innovating to minimize impacts of shocks in the future. Building resilience requires an integrated approach, and a long-term commitment to improving three critical capacities: absorptive capacity (disaster risk management), adaptive capacity (medium-term livelihood adjustments to a changing context) and transformative capacity (escaping chronic poverty through improved governance and enabling conditions) (Béné et al. 2012).

**Figure 2: Functional roles of resilience programming**



Source: Béné et al. 2012

Under a resilience programming framework, improved disaster risk management aims to improve **absorptive capacity** at the community and household levels, helping them to both reduce risk of exposure to shocks and stresses and to absorb the impacts of shocks without suffering permanent, negative impacts on their longer-term livelihood security (Frankenberger et al. 2012). Humanitarian assistance can provide the stability necessary for complementary development efforts that strengthen the **adaptive capacity** of communities and households by improving their ability to respond to longer-term social, economic and environmental change (e.g., livelihood diversification, asset accumulation, improved social and human capital). The continuous, incremental change needed to achieve these objectives underscores the importance of longer-term development strategies and funding streams for improving adaptive capacity. Finally, the **transformative capacity** of socio-ecological systems is primarily influenced by the governance structures and other enabling conditions for achieving resilience on a large scale. Building transformative capacity (i.e., enhancing governance and enabling conditions) will require a combination of technological innovations, institutional reforms, behaviour shifts, and cultural changes among relevant stakeholders at the international, regional, national, and sub-national levels (O’Brien 2011). Strong barriers to transformation often exist, given that such changes typically require alteration of systems that are maintained and protected by influential stakeholders (Béné et al. 2012). As such, enhancing transformational capacity – or promoting improved governance and enabling conditions – must be acknowledged as a long-term endeavor likely to be achieved over a long time frame.

Measuring resilience involves measuring change over time. Measurement systems must explain different resilience outcomes among distinct populations and accurately gauge the resilience of the populations to a range of idiosyncratic and covariate shocks.<sup>4</sup> While measurement systems must be tailored to the particular context and programme strategy, M&E systems for measuring resilience should enable in-depth analysis of indicators under five broad resilience measures.

<sup>4</sup> One of the shortcomings of much of the existing empirical research on vulnerability is that it is not assessing vulnerability with respect to specific types of shocks or populations, but rather assesses vulnerability of homogenous communities to all types of shocks (both idiosyncratic and covariate).

## **Key Resilience Measures**

**Shocks/stresses:** In order to assess resilience among households, communities or systems, the types of shocks or stresses they experience must be measured; the effectiveness of resilience programming can only be assessed within the context of a specific shock. Shocks are natural, social, economic, and political in nature. They can occur as slow or rapid onset shocks (e.g., earthquakes, floods, disease outbreaks) or longer-term stresses or trends (e.g., environmental degradation, price inflation, political instability, conflict) and can affect individuals and specific households (idiosyncratic) or entire communities/ populations (covariate). Shocks can be transitory, seasonal, or structural, and their frequency, severity and duration can vary widely. Some shocks are occurring with such frequency or are of such duration that they are no longer considered “shocks” but rather as “the norm.” Thus, determining what constitutes a shock for the target group is a necessary and prerequisite step to measuring how households respond to shocks.

The shock index developed as part of Tuft University’s work with resilience in Ethiopia provides a good example of how to measure both covariate and idiosyncratic shocks. The index comprises cumulatively ranked hazards such as climate- and weather-related hazards (e.g., drought, hail, frost), natural resource-related hazards (e.g., lack of access to water, environmental degradation), disease-related hazards (e.g., human, crop, livestock), economic hazards (e.g., food prices, unemployment), population-based hazards (e.g., population growth, geographic isolation, migration), and conflict-related hazards (e.g., war/conflict, displacement, returnees).

**Improved Absorptive Capacity:** The ability to effectively manage risk is a key measure of resilience. It includes the ability to minimize exposure to shocks and stresses where possible, and to recover quickly when exposure to shocks cannot be avoided. When assessing absorptive capacity, it’s important to distinguish between positive and negative coping strategies. Positive coping strategies enable households to withstand periodic shocks without adversely affecting livelihood security or jeopardizing the health and nutrition of individual members. This may include use of cash savings, consumption of reserve food stocks or reliance on formal and informal safety nets. Alternatively, negative coping strategies – such as divestment of productive assets, reduction of food consumption, or reliance on risky livelihood activities – can have a permanent and debilitating impact on a households’ capacity to manage future risk. When developing specific indicators of absorptive capacity, it should be noted that effective risk management entails both ex ante (risk prevention) and ex post (risk mitigation) activities. Likewise, the presence of necessary structures (e.g., flood prevention, erosion control) and systems (e.g., informal safety nets, conflict resolution mechanisms) should be viewed as positive contributors to resilience, even in the absence of the shocks and stresses they were designed to prevent.

WFP’s trend analysis work in Niger of three food security indicators (i.e., CSI, cereal stock duration, FCS) in Niger is a somewhat unique attempt to measure this dimension of resilience (i.e., absorptive capacity) by looking at both the rate of recovery of communities one year post shock as well as the recovery time required for an indicator to return to its pre-shock average level. In as much as results suggest that recovery from a shock can take longer than previously thought, even in light of subsequent increased crop yields, how long it actually takes for households and communities to recover from any particular shock is critical to understanding absorptive capacity, and ultimately resilience.

**Improved Adaptive Capacity:** The ability to quickly and effectively respond to uncertain changes in environmental, climatic, social, political and economic conditions is a central factor in achieving resilience at all levels. In contrast to reactive coping strategies, adaptive strategies are proactive and entail making informed choices about alternative livelihood strategies in light of changing conditions. This could entail diversification of livelihood strategies, access to a diverse array of productive assets (e.g., natural resources, land, credit, markets, livestock, linkages to input suppliers), improved human capital (e.g., health, education, nutrition), participation in diverse and equitable social networks (e.g., self-help groups, savings groups), information on changing market and climatic conditions, and openness to new practices (e.g., sustainable agriculture practices, value-added practices) and technological innovation (e.g., cell phones, cash transfers).

It should be noted that while livelihoods – or income – diversification is a generally agreed strategy for improved adaptive capacity, there is a point of diminishing returns associated with how many livelihood strategies (or sources of income) are being employed. That is, diversification per se is not necessarily a positive outcome; one could have too many ways to make a living, all of which might be sensitive to the same type of shock. This would not represent a situation in which increased diversity enhances “resilience” in the face of a shock. The individual – or household – could be stretched too thin, running from one income-generating activity to another, none of which is enhancing their ability to cope with shock.

Current efforts by Mercy Corps in Somalia and CRS in Niger to measure resilience employ an empirical model that includes not only collection of a range of quantitative data on characteristics defining vulnerable households but also factors that influence household choice of risk management strategies in the context of a particular shock, and how interventions strengthen household adaptive capacity and resilience to future shocks.

**Improved Transformative Capacity:** The ability of households and communities to move beyond chronic poverty and food insecurity is enhanced by governance and institutional structures, processes and systems that promote resilience (Béné et al. 2012). Households or communities may be able to effectively deal with shocks or stresses by reducing their risks and implementing adaptive strategies that mitigate the impact of future shocks yet be unable to escape a state of chronic vulnerability because of circumstances beyond their control. War, regional conflict, weak governance, lack of physical infrastructure (e.g., roads, communications, water), and lack of basic services (e.g., education, health, sanitation) all limit the capacity of households and communities to transform gains from improved absorptive and adaptive capacities into the ability to “bounce back better” from shocks or stresses, i.e., to manifest resilience. Appropriate indicators of transformative capacity include the existence of formal safety nets, early warning systems, improved communications systems, laws/policies that promote gender-equity, and peace building and conflict resolution mechanisms.

An important component of transformative capacity involves the health and management of the natural resource base upon which communities depend for their livelihoods. A healthy and functioning environment is foundational to all other resilience outcomes. Governance mechanisms for allocating land and other resources must be equitable, gender-sensitive and promote sustainable practices that preserve and enhance the soil, water, insect, bird, plant and animal resources comprising the

ecosystems on which people's livelihoods depend. One of the key resilience dimensions included in Oxfam's assessment of resilience involves ecosystem health rather than simply access to and/or control of natural resources. Mercy Corps is also trying to capture the impact of improved enabling conditions on household resilience in its Somalia study.

**Improved Development Indicators:** While monitoring of disaster risk management and adaptive capacity is important, measurement of resilience is also informed by assessment of more traditional indicators of development such as food security, nutrition, human capital and livelihood security. Even though improvement in these indicators is likely to be incremental over the long-term, they provide the foundation for transformational social and economic development at the national and regional levels. Achievement of gains in each of these areas is dependent on the ability to produce or purchase adequate amounts of nutritious and culturally appropriate food, the ability to earn adequate income, maintain the health of household members, and participate in decisions related to natural resources and other key assets. The degree to which a particular household, community or population may be considered resilient can also be determined in part by their ability to maintain general well-being (e.g., food, shelter, income, health, safety) in the event of periodic shocks (e.g., natural disasters, conflict, price volatility). This is the approach advocated by Kimetrica in Kenya.

## VII. Moving Resilience Measurement Forward

It is important to recognize that resilience measurement should take into account both a capability perspective (e.g., resources, skills, strategies, aspirations) and an outcome perspective (i.e., key welfare or food security outcomes). Many researchers opt for focusing only on outcome changes in the face of shocks as a much easier way to measure resilience than including both perspectives. In part this is facilitated by lack of general agreement on whether resilience is a process (which is extremely difficult to directly measure) or an end-state that can be achieved – and measured – at some point in time. This dilemma also underlies differences in approach to measuring resilience, i.e., whether it can be directly measured or requires development of latent variables or proxies.

How resilience is measured also depends on which outcomes are of interest (Watkins 2012). For example, economic resilience may be achieved for certain shocks but individuals and households may still feel psychologically vulnerable. Few resilience measures take psychometric factors into account. In addition, higher level outcome measures such as nutritional status or some proxy for health may be desirable but harder to achieve through interventions aimed at improved income and expenditures because of the range of other factors that influence these outcomes. This is why a theory of change is so important to setting up resilience measures. Measurement instruments must be capable of assessing a range of mechanisms within multiple domains that assist individuals, households and communities to adapt to adversity and change.

Many agencies are also interested in creating a “resilience index”. Several agencies/organizations have created indices around different dimensions of resilience and then combined these into an overall index of resilience (e.g., FAO, Tulane University). What is important in creating such indices is to make sure that explanatory information that enables us to know how to respond to non-resilient situations is not lost when indicators and indices get rolled up into a single measure of resilience.

The scarcity of verifiable evidence on the impact of resilience programming suggests the need for continued research regarding how best to assess or measure household reaction to the shocks and stresses they experience, as well as the extent to which programme interventions enhance resilience to those shocks. In addition to primary research conducted according to standard research protocols, less costly alternatives are needed for implementing agencies whose staff may not possess the technical or statistical backgrounds required to design or implement such research projects.

It is expected that information gained from such research would highlight key factors contributing to or constraining resilience beyond the more generic indicators of vulnerability (poverty, malnutrition, etc.) (Frankenberger et al. 2012). Additionally, resilience programming will be strengthened through enhanced knowledge management. This requires identifying and addressing critical knowledge gaps, and making programme-based knowledge available in a timely fashion and in reader-friendly formats to relevant stakeholders.

Resilience assessments, impact evaluation and enhanced knowledge management can shed light on achieving ‘value for money’ – a top priority among many national governments and donors. Objective and verifiable measurements on the impact of resilience interventions, combined with comprehensive and transparent accounting of costs incurred in humanitarian and longer-term resilience programming, can help facilitate greater investment in programming with the best potential to enhance resilience for vulnerable households and communities. Information gained from comprehensive resilience assessments will also provide critical insight into the proper sequencing and combination of relevant activities or interventions. Resilience programming will need to address immediate humanitarian needs and longer-term development objectives simultaneously.

As previously mentioned, panel-type data represents the ideal source of data to measure resilience. Approaches need to be developed to increase the intensity of measurement on a few variables in shock prone environments that are rapidly changing to capture the absorptive and adaptive capacity of households and communities living in these environments.

Whenever possible, data used for measuring resilience should be collected from a number of on-going survey efforts. The World Bank conducts comprehensive poverty studies, which provide data on income, food security, nutrition, shocks, livelihoods, markets, access to credit/savings, agricultural production, assets, education, etc. A potential limitation to the World Bank data, however, is that it is gathered at the country or regional level and not at the district or lower levels. Thus, its usefulness would be limited for assessing resilience at the household and community levels for specific areas. Population-based surveys (PBS) are required for USAID’s Feed the Future (FTF) programming and include data on income/livelihood diversity, access to credit, adoption of new technologies, access to/ownership of assets, conflict mitigation, infrastructure, governance structures, etc. National surveys, such as the Living Standard Measurement Surveys (LSMS) and Household Income and Expenditure Surveys (HIES) and Demographic Health Surveys are also relevant sources of data for measuring resilience.

### ***Unresolved Technical Issues and Next Steps***

Based on this review, a number of issues were identified that need further consideration in this resilience consultation. These are highlighted below:

- **Do we view resilience as a process or as an outcome?** How it is conceptualized will have significant effect on what is measured and how.
- **How frequently should data collection take place?** Increasing measurement intensity of a few key variables could capture adaptive processes in rapidly changing shock environments.
- **Resilience to what?** Do we consider resilience to specific shocks or resilience to all shocks?
- **What type of resilience?** Do we need to be clear about the type of resilience we are measuring (i.e., economic resilience) or do we assume that resilience is a multi-dimensional measure?
- **Thresholds and tipping points.** How do we derive these in resilient pathway trajectories?
- **What if there is no shock?** Can we still measure resilience?
- **Culturally meaningful measures.** How do we reconcile externally derived measures versus participatory, culturally-relevant measures of resilience?
- **Multiple-level resilience measures.** How do we measure resilience at different levels (e.g., household, community, national)?
- **Measuring resilience over time.** The value of panel surveys versus cross-sectional surveys.
- **The importance of qualitative measures of resilience.** How do we use mixed methods approaches to better capture resilience changes?

The organizers of this expert consultation hope that these and other issues highlighted in the presentations and discussions will be clarified or resolved to advance our understanding of how to measure resilience. Those issues that are not resolved will be the subject matter for future consultations. The lessons learned from this consultation will have immediate application in the FSIN learning agenda and will be shared with colleagues in the network to elicit their feedback on the practical uses of these approaches. In addition, this learning will be immediately applied in ongoing resilience studies being carried out in Kenya, Ethiopia, Somalia and Niger.

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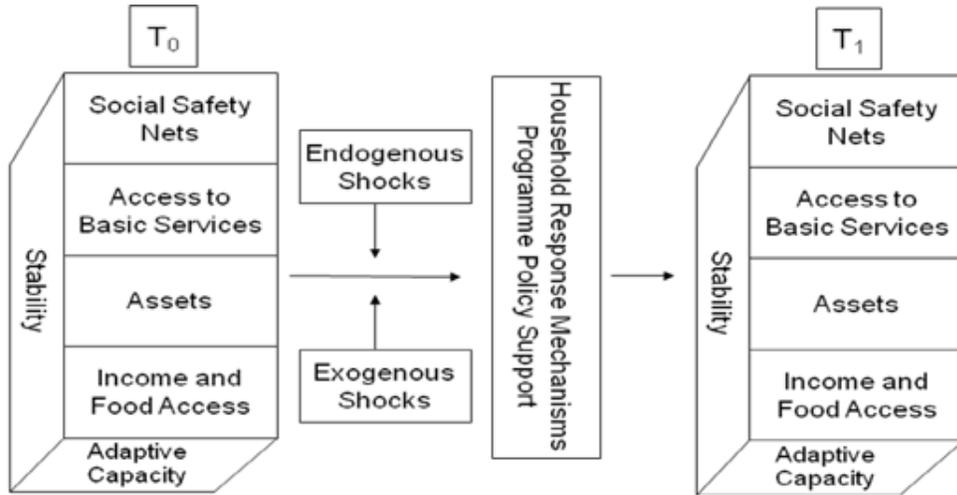
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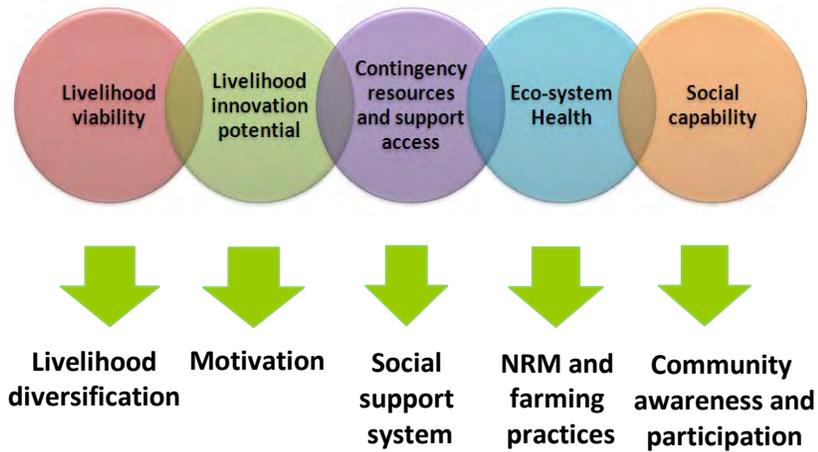
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## Annex 1. Resilience frameworks

### a) FAO



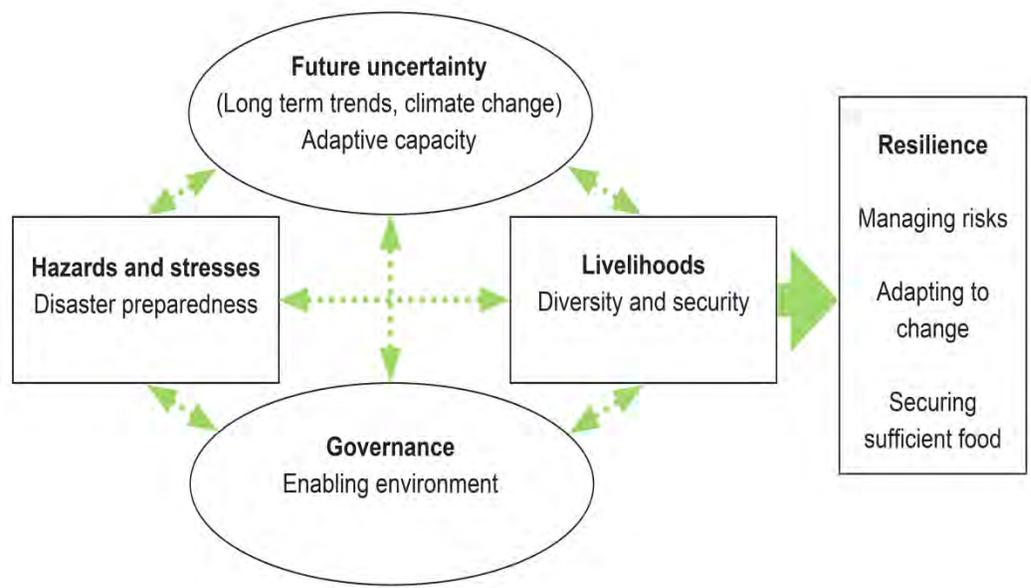
### b) Oxfam GB



**c) Tulane University**



**d) Practical Action**



e) Adapted from Fraser et al. 2011 (Neely et al. 2013)

