



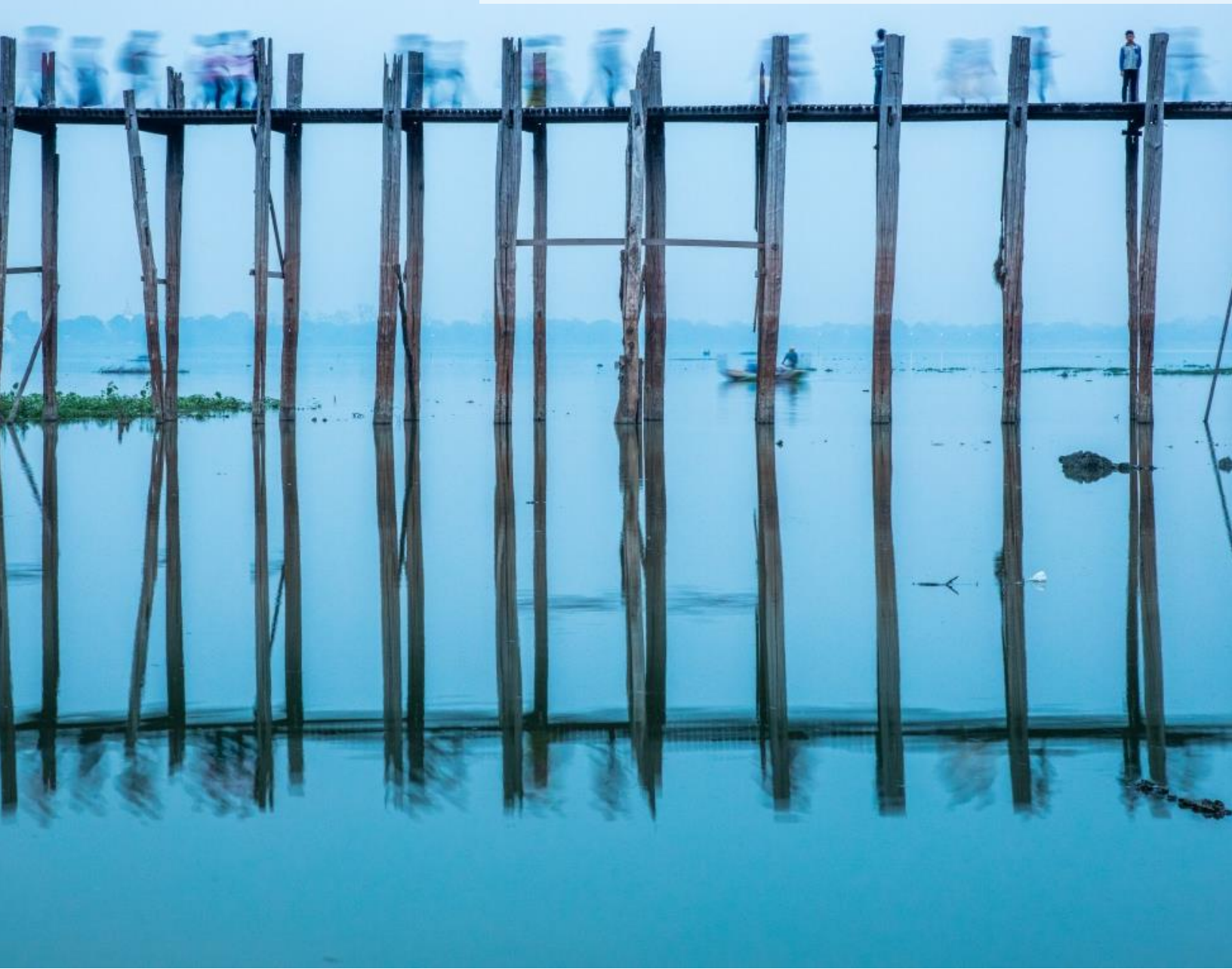
USAID
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RESILIENCE MEASUREMENT PRACTICAL GUIDANCE NOTE SERIES

4

Resilience Analysis



About the Resilience Evaluation, Analysis and Learning (REAL) Associate Award:

REAL is a consortium-led effort funded by the USAID Center for Resilience. It was established to respond to growing demand among USAID Missions, host governments, implementing organizations, and other key stakeholders for rigorous, yet practical, monitoring, evaluation, strategic analysis, and capacity building support. Led by Save the Children, REAL draws on the expertise of its partners: Food for the Hungry, Mercy Corps, and TANGO International.

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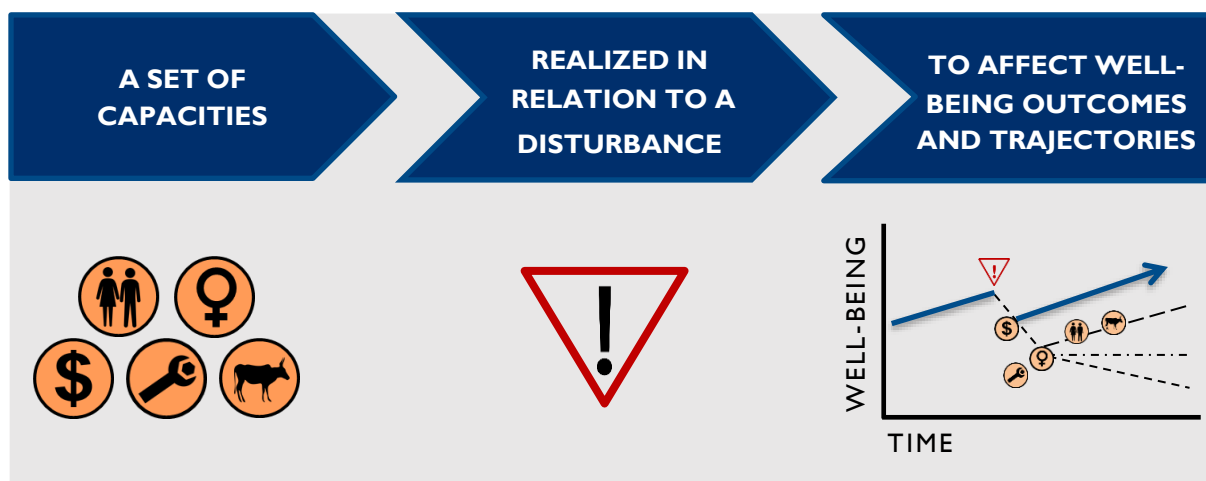
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1. Introduction

Resilience has emerged as a way to understand and address the increasing complexity and magnitude of risk in humanitarian and development contexts. Yet, the ability to develop strategies and programs that increase resilience requires robust measurement and analysis methods. The USAID *Resilience Measurement Practical Guidance Note Series* intends to provide new insights based on recent efforts to assess, analyze, monitor, and evaluate resilience. The first guidance note in this series, [“Risk and Resilience Assessments,”](#) introduces resilience assessments and when, why and how to conduct them. The second, [“Measuring Shocks and Stresses,”](#) describes how to measure and analyze shocks and stresses, while the third, [“Measuring Resilience Capacities,”](#) details how to think about and measure absorptive, adaptive and transformative capacities. In this fourth guidance note, we describe approaches for conducting resilience analysis.

USAID defines resilience as “the ability of people, households, communities, countries and systems to mitigate, adapt to and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.”¹ This definition describes the relationship between three elements that form the basis of a resilience measurement framework – resilience capacities, shocks and stresses, and well-being outcomes (see Figure 1).²

Figure 1: Simplified Resilience Measurement Framework³



As mentioned above, guidance notes 2 and 3 detail how to measure the first two components (capacities and shocks) of the resilience measurement framework. This guidance note describes well-being outcomes and focuses on various quantitative and qualitative approaches to analyzing these three components of the resilience measurement framework.

¹ USAID (2013).

² While there are important and meaningful differences between shocks and stresses, this document uses the term “shocks” to refer to both shocks and stresses for the sake of brevity and convenience.

³ Adapted from Mercy Corps (2016): Resilience Framework

1.1. Learning Objectives

Data analysis is a technical skill, and resilience analysis is no exception; it is anticipated that many readers will need additional technical assistance after reading this guidance note. This document provides an overview of many of the quantitative and qualitative approaches used for resilience analysis, and identifies examples and resources for further exploration and capacity development. As such, this guidance note is not a comprehensive step-by-step “how-to,” rather it aims to:

- Help readers understand the purpose and function of common approaches to quantitative and qualitative data analysis, i.e. what kinds of questions the analysis will be able to answer.
- Equip readers with a basic understanding of what is entailed in each of the analytical approaches, what types of data are required, and what skills are needed to implement the different analyses.
- Illustrate the main assumptions, strengths and weaknesses of the different analytical approaches highlighted in this guidance note.

1.2. Steps for Conducting a Resilience Analysis

Guidance for conducting data analysis must begin with a discussion of the research process, as the analytical approach selected is driven by the research purpose and questions. For the purposes of this guidance note, the following four steps are integral to conducting any resilience analysis:⁴

1. **Define research purpose:** how will this analysis be used, by whom?
2. **Define research questions:** based on the research purpose, what are the key research questions that would best serve the overall purpose?
3. **Explore range of methodological/analytical options:** based on the research questions, what types of analyses are required, what indicators are needed, over what time period/frequency, etc.
4. **Select appropriate method(s)** based on:
 - a. Ability to respond to questions effectively and rigorously
 - b. Data requirements
 - c. Financial, time, and personnel constraints, etc.

Section two addresses the first two steps in this process while sections three and four explore the range of methodological and analytical options and section five summarizes the main messages.

⁴ For simplicity, some steps are omitted (e.g. literature review, planning for data collection, fieldwork, reporting, etc.) as they are beyond the scope of this guidance note.

2. Defining Research Purpose and Objectives

Having a clear understanding of the research purpose and objectives is integral to formulating clear and researchable questions. There are two broad purposes for resilience analysis. The first focuses on gaining an understanding of resilience dynamics in a specific context, ultimately in order to set strategies for investment or programming that effectively enhances household and community resilience. Studies with this aim can be described as resilience assessments or exploratory research. The second broad purpose of a resilience analysis is to gain an understanding of what intervention(s) are effective at building resilience. Studies with this aim are typically impact evaluations. While the distinction between these two research purposes is important, it does not suggest that they are mutually exclusive; rather they are usually complementary in terms of themes explored and can even rely on the same data sources if designed accordingly. For both research purposes there are generally three broad categories of research objectives, described briefly below.

- **Determining existing levels** of various resilience capacities, household coping strategies, shock exposure and wellbeing outcomes to gain a **descriptive understanding** of the context
- **Understanding trends** over time of the variables mentioned above
- **Exploring relationships:**
 - among resilience capacities, household responses, and households resilience, in the context of a shock;
 - and between these variables and resilience activities and humanitarian response.

In Sections 2.1-2.3, each of these objectives are described in more detail with illustrative research questions. This is not and cannot be an exhaustive list of research questions, and the questions are intentionally generic. They illustrate the range of questions resilience analyses typically seek to address and, hopefully, enable readers to define and refine their own research questions, understand which of the three research objectives it falls under, and subsequently understand what analytical tools are available and appropriate to answer them.

2.1. Descriptive Analyses of the Context

Descriptive analysis of the context is the most basic analysis that should be conducted on any dataset, regardless of the research purpose. Descriptive analyses report summary statistics (e.g. average, median, standard deviation, etc.) for the overall sample and any sub-groups (e.g. sex, ethnicity, caste, geographic location, etc.) that the study was designed to compare. Descriptive analyses contribute to analyzing resilience by answering research questions like:

- What are existing levels of various resilience capacities in the population(s) of interest?
- How do households typically respond to various shocks? That is, what are the primary coping strategies used, how do they vary over time, are they positive or negative, etc.

- What types of shocks is the population of interest experiencing? What is the severity, frequency and duration?
- How do households and communities respond to shocks experienced?
- What are current levels of wellbeing and other intermediate outcomes of interest?

2.2. Understanding Trends

Often resilience analysis will look at trends over time using repeated cross-sectional or panel (also known as longitudinal) data, both of which involve multiple rounds of data collection over time (described in detail in Section 3.3.1 below). This enables individuals to better understand temporal patterns (e.g. stability, volatility, growth, decline) in resilience capacities, shock exposure, coping strategies, and wellbeing; thus providing insight into households' ability to recover from shocks. Typical types of research questions examining trends over time include:

- How are levels of resilience capacities changing over time? Is there evidence of growth or depletion?
- How is shock exposure evolving over time? Is there evidence of cascading, or downstream effects of various shocks (e.g. drought-induced crop failures leading to price shocks for staple foods)?
- Are household/community responses to shocks becoming increasingly negative as resilience capacities become depleted over time or positive as capacities increase over time?
- Is household wellbeing being maintained, improving or worsening over time? That is, have households been resilient to the shocks they faced over the time period in question?

2.3. Exploring Relationships

The third common research objective in resilience analysis is exploring relationships between shocks, resilience capacities, and well-being. This relationship is often formulated in a series of three research questions that assume some version of the following:

1. What is the relationship between shocks and household wellbeing?
2. Which resilience capacities are associated with maintained or improved wellbeing outcomes?
3. Which capacities serve to reduce the negative effect of shocks on household wellbeing?

The third question above is essential for analyzing resilience.

In addition to those three core questions, resilience analysis can explore other important research questions, including:

- Which resilience capacities are associated with using positive coping strategies and preventing the use of negative coping strategies?

- What is the relationship between household and community resilience capacities?
- Which interventions serve to build households' resilience capacities?
- Which interventions enable households to cope with shocks in a positive way?
- Which interventions enhance households' resilience to shocks?
- What is the return on investment in building resilience in terms of development gains made and preserved and humanitarian response costs avoided?
- What factors enable households to escape poverty and remain out of poverty over time, even when confronted by shocks?

Recent Examples of Resilience Research Questions

Two recently conducted studies leveraged project baseline data from Nepal and Bangladesh to analyze household resilience to shocks. Because this was based on secondary data, the pool of potential research questions was limited subject to data availability, however the primary types of indicators needed (shocks, capacities and wellbeing outcomes) were all present.

In Nepal, the research focused on the following questions:⁵

1. Which resilience capacities are associated with positive well-being outcomes, including recovery from shock, in the combined program areas?
2. Are there coping strategies that households use to deal with shocks that lead to better – or, conversely, act as barriers to – well-being outcomes?
3. How do planned project activities enhance resilience and lead to better well-being outcomes?

While in Bangladesh, the research focused on the following:⁶

1. Do resilience capacities mitigate the negative effects of shocks for select well-being outcome indicators, including poverty, dietary diversity, hunger, and wasting among children?
2. What is the relationship between resilience capacities and adoption of coping strategies to recover from shocks?

There are two important features to note: first is that these questions were explicitly selected to improve resilience programming design and implementation. Second is the nature of the questions themselves - they are clear, concise, and few in number. Ambiguous or overly ambitious research questions cannot truly be operationalized, and if there are too many research questions, the design, execution, and analysis of the study can become extremely cumbersome and researchers risk not being able to answer all (or any) of their research questions. When in doubt, it is better to study a few questions well than many questions poorly.

⁵ See Bower et al. (2017) for details.

⁶ See Brown et al. (2017) for details.

3. The Quantitative Analysis Process

The main takeaway from this section is that resilience research designs and analytical approaches must be guided by the research questions one wants answered. This requires a clear understanding of whether answering those questions entails descriptive analyses of context, trend analysis, and/or analysis of relationships. This section focuses on approaches that have been used to date and the key considerations and constraints that guided the decision to use one approach over another. There is constant innovation in this space and significant opportunities remain; those engaged in conducting resilience analyses should continually explore new possibilities to adapt and apply study designs and analysis tools.

For any quantitative analysis there is a general process that can be followed. Note that the steps are inter-dependent and this process is often iterative, particularly steps 1 through 4 and 5 through 7.

1. Specify the estimation models, a formal equation that translates the research question(s) into an empirical model that can be estimated quantitatively (Section 3.1 below)
2. After specifying the estimation model, the specific variables included must be identified (Section 3.2)
3. Determine the appropriate sample size through power calculations⁷
4. Based on the features of the estimation model and the variables used, select an appropriate analytical approach (Section 3.3)
5. Validate assumptions associated with the estimation technique with the data, transform data as needed to meet said assumptions (Section 3.3)
6. Assess model performance and iterate as needed (Section 3.3)
7. Interpret results. This stage of analysis should be conducted with multiple stakeholders bringing diverse perspectives together to make sense of emergent findings, dynamics and patterns.

3.1. Specifying Estimation Models

During the design phase of any study, a key initial question to address is which variables to include in the estimation model. This decision must be based on a logically sound articulation of the relationship(s) of interest formulated in the research question(s).⁸ ***The importance of thinking through what relationship(s) the study is testing, how this can be represented in a formal estimation model, and what data are needed cannot be overstated.*** Failure to dedicate enough

⁷ This is a critical step that should not be overlooked. A detailed treatment of sampling is out of scope for this guidance note, but see Gertler et al. (2016) pp.261-289 for an introduction to power calculations and additional resources.

⁸ Note that, per Conostas et al. (2014): “expressions of this kind are variously referred to as functional forms, specifications, estimation models, formulae, prediction models, or simply models.” These terms are used interchangeably.

up front consideration and resources to this can result in inaccurate analyses that do not adequately respond to research questions.⁹

By way of example for the process of developing estimation models, recall the aforementioned three key relationships that are explored in resilience analysis:

1. What is the relationship between shocks and household wellbeing?
2. Which resilience capacities are associated with maintained or improved wellbeing outcomes?
3. Which capacities serve to reduce the negative effect of shocks on household wellbeing?

The first of these questions—*what is the relationship between shocks and household wellbeing*—can be represented by the following estimation model (Smith, et al., 2015):

$$\text{Wellbeing} = f(\text{shocks}, \text{HH characteristics}, \text{community}) \quad (1)$$

This estimation model evaluates the relationship between household wellbeing and shock exposure while controlling for household characteristics and community of residence in order to determine the unique effect of shocks on household wellbeing. It can be estimated using regression analysis (more on this in Section 3.4 below).

The second question—*which resilience capacities are associated with maintained or improved wellbeing outcomes*—is answered using the estimation model below. The dependent variable is now the *change* in well-being over the course of a shock, and resilience capacity is added as an independent variable.

$$\text{Change in wellbeing} = f(\text{resilience capacity}, \text{shocks}, \text{HH characteristics}, \text{community}) \quad (2)$$

Finally, the third question—*which capacities serve to reduce the negative effect of shocks on household wellbeing*—is answered using the following model:

$$\text{Wellbeing} = f(\text{resilience capacity}, \text{shocks}, \text{shocks} * \text{resilience capacity}, \text{HH characteristics}, \text{community}) \quad (3)$$

This estimation model includes an **interaction term**, which in this example is represented by shock exposure multiplied by resilience capacity. In general, interaction terms are useful when the relationship between an independent variable and the dependent variable is influenced by a third variable.¹⁰ Estimation of equation three above should reveal the magnitude and direction of the relationship between the following and wellbeing:

- the specified resilience capacity (e.g. access to financial services)
- shock exposure (e.g. reported frequency and severity of a given shock)

⁹ A helpful introduction to variable selection is Dolan (2016).

¹⁰ For more information on interaction terms, see Grace-Martin (n.d.).

- household characteristics (e.g. number of income earners, education of household head, etc.)
- community characteristics (e.g. proximity to major market, urban/rural, etc.)

In addition, estimating the equation above will also tell us about the magnitude and direction of the relationship between the interaction term (in this case shocks*resilience capacity) and wellbeing – in other words, whether the effects of shocks depend on the level of resilience capacities a household or community has. Specifically, we would hope to see that having a resilience capacity *lessens* or *eliminates* the negative effects of shocks on well-being, which is an indication that they improve households' resilience.

Measuring Resilience or Measuring Resilience Capacity?

Before exploring analytical approaches to resilience analysis, it is important to distinguish between *resilience* and *resilience capacity*, since this has implications for what we measure and how we analyze. Recall from the USAID definition above that resilience is fundamentally the ability to manage and recover from shocks. In practice, this involves measuring change in well-being outcomes and/or households' perceptions of their ability to recover over the course of a shock, taking into account whether recovery occurred through the use of negative coping strategies that undermine the ability to recover from future shocks.¹¹ Section 3.3.2.3 below provides an example of this analysis.

While resilience is an ability to manage or recover, **resilience capacities** “are a set of conditions that are thought to enable households to achieve resilience in the face of shocks”.¹² Those conditions vary by context and can include household characteristics (e.g. demographic composition, education, etc.), household resource base (e.g. livelihood strategy, assets, etc.), to broader environmental factors (e.g. infrastructure, social and political environment, etc.). Given their complexity, measuring the resilience capacities requires measuring a variety of indicators relevant in a particular setting. Readers are encouraged to refer to [*Guidance Note No. 3 – Measuring Resilience Capacities*](#) for more information.

3.2. Indicator and Index Selection and Construction

The estimation model described above formalizes the relationship(s) of interest and provides some sense of the indicators and indices needed for analysis. As presented in the simplified estimation model in the previous section, indicators measuring capacities, shocks, and wellbeing outcomes are fundamental for any resilience analysis. Guidance notes 2 and 3 of this series provide details on how to measure shocks and capacities respectively.

¹¹ Smith et al. (2015)

¹² Ibid.

The following list provides commonly used wellbeing indicators, but is by no means exhaustive. Alternatives exist and should be selected based on the research objectives and data available.

- [Household Dietary Diversity Score \(HDDS\)](#)¹³
- [Household Food Insecurity Access Scale \(HFIAS\)](#)¹⁴
- [Household Hunger Scale \(HHS\)](#)¹⁵
- [Food Consumption Score \(FCS\)](#)¹⁶
- [Progress out of Poverty Index \(PPI\)](#)¹⁷
- [Consumption-based Poverty Rate \(aka poverty headcount\)](#)¹⁸
- [Consumption-based Depth of Poverty \(aka poverty gap\)](#)¹⁹
- [Child Nutritional Status, specifically low weight for height or wasting](#)²⁰

Often there are multiple ways of measuring a particular characteristic (e.g. food security, social capital, etc.), and there are a few things analysts should consider. First is *measurement error* – the variables included need to be measured accurately and consistently. Minimizing error is done in part by using validated measures and putting protocols in place to facilitate and validate data quality. Another consideration is how *time-sensitive* the indicators are; are they capturing features that are likely to change quickly or slowly over time? Depending on the time horizon the research is focused on, analysts may want to prioritize “faster” indicators over “slower” ones. In addition, depending on the objectives of the study, analysts may want to select *multiple wellbeing outcomes* that capture important development outcomes (e.g. food security, economic status, etc.) and the various dimensions of wellbeing.

Frequently resilience analyses use indices combining multiple variables into a single measure. There are two commonly used statistical methods of constructing indices: factor analysis and principal components analysis (PCA).²¹ Regardless of what method is used, analysts should be transparent and use sound logic when selecting what indicators to include in the index, and provide clear rationale for how their specific combination provides an appropriate and meaningful measure of the underlying phenomena of interest.

Constructing indices is attractive because it simplifies complex, multi-faceted concepts. However, summarizing multiple variables can hide underlying factors. Analyzing an index alone only tells part of the story, and analysts should also look at individual components to determine what underlying

¹³ Swindale, A. and Bilinsky, P. (2006)

¹⁴ Coates, J., Swindale, A., Bilinsky, P. (2007)

¹⁵ Ballard, T., Coates, J., Swindale, A., & Deitchler, M. (2011)

¹⁶ WFP (2008)

¹⁷ See website: <http://www.povertyindex.org/>

¹⁸ Haughton, J., Khandker, S.R. (2009)

¹⁹ Haughton, J., Khandker, S.R. (2009)

²⁰ See website: <http://www.who.int/childgrowth/en/>

²¹ For more details refer to d'Errico, M., Garbero, A., Constan M. (2016), OECD (2008), and Abeyasekera, S. (2005)

drivers may be present. For example, an index of broad resilience capacities (e.g. adaptive, absorptive or transformative) can also be deconstructed to look at the individual resilience capacities (e.g. access to financial services, bonding social capital, etc.) to better understand the underlying relationship between individual capacities and wellbeing.

3.3. Illustrative Quantitative Analysis Approaches

3.3.1. Descriptive and Trend Analysis

The most basic quantitative analysis involves reported descriptive statistics for the sample. Descriptive statistics are simply averages (e.g. average household size, per capita income, etc.) or percentages (e.g. percent of households under the poverty line, etc.) Often these statistics are reported for important sub-populations (e.g. region, sex, ethnicity, etc.) to provide insight into any important differences that may exist between groups. Measuring variation over time is critical for resilience analysis, and trend analysis is an effective tool to describe how factors vary over time, e.g. food security trends, poverty trends, shock exposure, etc. In its simplest form, trend analysis is merely reporting the same descriptive statistics over time.

Data Structure: Cross-sectional and Panel Data

A *cross-sectional data structure* refers to data collected from a single random sample of a population at a single point in time. If this process were repeated two or more times, then the resulting data structure could be a *pooled cross-section*, for example, a baseline and endline survey using two independently drawn random samples, i.e. each survey round uses a different sample of households. This was the approach used in two rounds of data collection for the Resilience and Economic Growth in Arid Lands (REGAL) project funded by USAID and implemented in Kenya. *Panel data* refers to data collected over two or more survey rounds from the *same* individuals/households over time. Because panel data requires visiting the same respondents multiple times, processes must be put in place to track the respondents over time, and sample size calculations must account for lost/missing respondents, such as collecting GPS coordinates for households.²²

So when should we use a cross-sectional, pooled cross-sectional or panel design? Cross-sectional studies are useful when the research questions are primarily focused on analyzing data from one point in time only.²³ Often we are interested in analyzing trends and relationships over time, requiring pooled cross-sectional or panel designs. In practice, panel data has generally been preferred for resilience analysis, because it captures variation in household response to shock and changes in wellbeing and resilience capacities over time.²⁴

²² See Witoelar, F. (2011) for guidance in tracking households.

²³ d'Errico, M., Garbero, A., Constan M. (2016)

²⁴ Wooldridge (2013)

3.3.2. Regression Analysis

Most resilience analyses to date have used statistical regressions to examine relationships between shocks and stresses experienced, resilience capacities, and well-being outcomes of interest. This section gives a basic description of commonly used regression techniques in resilience analyses, provides practical examples, and identifies additional resources.²⁵ More information on implementing and interpreting regression analysis can be found in the references and resources section of this guidance note.

Regression is a type of statistical analysis that estimates the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis allows us to see what the expected value of the dependent variable is as one incrementally changes the value of an independent variable, holding all other independent variables constant. Note that this does not always imply a causal relationship. To enable a causal interpretation of regression results, we must use an experimental or quasi-experimental research design or specialized regression techniques.²⁶

3.3.2.1. Ordinary Least Squares (OLS) Regression

OLS regression is the most basic regression technique that identifies the magnitude (i.e. strong versus weak) and direction (i.e. positive versus negative) of the relationships between the dependent and independent variables, keeping other variables in the model constant. Other important information reported in regression analysis is the statistical significance of the coefficients (i.e. is it statistically significantly different from zero) of the independent variables and statistics regarding how well the estimated model fits the actual data.²⁷

3.3.2.2. Probit and Logit Models

OLS regression is appropriate when the dependent variable can take on a range of values, e.g. number/types of food consumed, per capita expenditure, etc. Sometimes, however, in resilience analysis the dependent variable of interest is binary, meaning it can only take on two values – e.g. poor/non-poor, food secure/food insecure, positive deviant/non-positive deviant, used a specific response/did not use, etc.²⁸ When this is the case, probit or logit regression models are more appropriate. The distinctions between probit and logit models are based primarily on technical details and will likely be inconsequential in most circumstances.²⁹ For our purposes, more important than the distinctions between the two models is how they are interpreted. As for OLS regression,

²⁵ Determining whether regression analysis is appropriate for your research questions is based in part by whether key assumptions are met. See Hair et al. (2010) for a fuller treatment of these assumptions and Osborne, J.W. & Waters, E. (2002) for guidance on how to test these assumptions.

²⁶ There is a wealth of guidance and reference material on the various types of impact evaluation designs and this guidance note will not go into detail of the many different types of designs available. A good starting point for readers is:

<http://usaidprojectstarter.org/content/impact-evaluation-designs>

²⁷ How well the model fits is defined in part by the predictive power, or R^2 , which is beyond the scope of this guidance. For more information see: Frost (2013, 30 May)

²⁸ These models can be expanded upon to include ordinal or categorical dependent variables (i.e. variables that can take on more than two meaningful values, but are not continuous variables), but for simplicity only the binary case is considered here.

²⁹ See Giles (2016) and Liao (1994) for more details.

for both models the most basic interpretation is the sign (i.e. direction) and statistical significance of the estimated coefficients. Because it is a binary outcome, these models provide an estimate of the probability of the event occurring given a change in the independent variable. For example, it can tell us how the likelihood of being food secure changes as resilience capacity increases.³⁰

3.3.2.3. Growth Regression

Growth regression has long been used by economists focused on various dimensions of economic growth at the national and cross-national level. Increasingly, it is being used at a national and sub-national level to understand poverty and resilience dynamics.^{31,32} In this application, growth regression can be used to explore what factors are associated with changes in wellbeing in the face of shocks (see estimation model two above). The dependent variable is a measure of change between two points in time in the wellbeing outcome, a direct measure of households' resilience.

Resilience Analysis in Recurrent Monitoring Surveys

Recurrent monitoring surveys (RMS) are periodic surveys from a panel of households that are usually triggered by a pre-defined shock of a specific magnitude.³³ Smith and Frankenberger (2017) used growth regressions with RMS data in Ethiopia.³⁴ Over 400 households were randomly selected from the project baseline survey for the RMS, and when severe drought struck, monthly data was collected for six months. Because the researchers had pre-drought data on key household characteristics and post-drought data from multiple points in time, they were able to gain unique insights into how households' response and recovery evolved over time. This facilitated analysis of what enabled positive deviant households to recover from the drought (described further in section 4.1), the relationship between resilience capacities and coping strategies, and identifying which resilience capacities should be strengthened to increase household resilience to drought.³⁵

Unlike OLS and probit/logit regression (which can be done on either panel or cross-sectional data), growth regressions requires panel data for calculating changes in wellbeing over time from the same households.³⁶ This approach also controls for the baseline value of the dependent variable by including it as an independent variable. Interpreting the results of growth regressions is similar to OLS, with the distinction that the coefficients measure the relationship to the growth in the dependent variable over time and not an absolute level at a specific time.

³⁰ For more details, refer to Liao, T.F. (1994)

³¹ See Temple (1999) for an overview of growth regression and its application in macroeconomics.

³² See Dercon, Hoddinott & Woldehanna (2011) and Smith & Frankenberger (2017)

³³ See <http://www.fsnnetwork.org/overview-recurrent-monitoring-survey-rms> for more details

³⁴ For more on recurrent monitoring surveys, refer to: Frankenberger, T., Smith, L., & Griffin, T. (2017)

³⁵ For more information on RMS, refer to <http://www.fsnnetwork.org/overview-recurrent-monitoring-survey-rms>

³⁶ See Temple (1999) for a full treatment

4. Illustrative Qualitative Analysis Approaches

Quantitative methods alone are insufficient to gain an understanding of resilience dynamics; using mixed-methods approaches is indispensable for a comprehensive resilience analysis. This section details some of the qualitative information needs and tools unique to resilience analysis.³⁷ There remains significant exploratory research to better understand resilience, and qualitative data is useful for rendering rich data on concepts and phenomena that are poorly understood or difficult to quantify. Qualitative data can help us understand how shocks are experienced over space and time, and provide insight into the how and why of households' response and how this evolves in relation to shocks. Insights from qualitative data can improve understanding of complex dynamics and relationships, which can help explain or validate quantitative results or identify and describe new concepts or relationships that should be incorporated into future quantitative models or indices.

While the benefits of qualitative and mixed-method approaches are clear, they are confronted by challenges that can result in poor execution or integration.³⁸ Maxwell et al (2015) posits that qualitative methods may erroneously be “equated with methodological looseness”, but in reality they often “require more skill and judgement on the part of the interviewer.” Collecting nuanced qualitative data that goes beyond superficial observation requires talented and dedicated researchers and resources, careful planning and consideration of the research instruments, and a strategy to integrate data rather than

Frontiers of Qualitative Resilience Research

One exciting new area of exploratory research focuses on the influence of psychosocial factors on resilience. Béné et al (2016) posit that household resilience is actually a complex combination of relatively objectively measurable resources (e.g. household socio-economic and demographic characteristics, asset base, access to infrastructure, etc.) and subjective psycho-social characteristics like risk perception, self-efficacy, aspirations, etc. Moreover, they find evidence that these psychosocial factors are directly related to how households choose to invest and cope with shocks. Béné et al (2016) conclude that “better insights are needed not only into the social, institutional, and economic mechanisms that influence individual and collective capacity to respond to shocks and stressors, but also around *the perceptions, subjective motivations and cognitive elements of individuals and households' decision-making processes* [emphasis added], in order to unpack and better understand the factors that influence behavior and decisions around resilience.” The authors also note that while capturing this information is difficult, it is indispensable for future research on the processes that constitute resilience. Qualitative inquiry is uniquely suited to provide insights into these poorly understood concepts as well as contribute to the development of appropriate quantitative proxy measures.

³⁷ While this guidance note does not go into detail on how to conduct rigorous qualitative research, it must be stated that the most effective, compelling qualitative research results from carefully designed, well-resourced, thorough and systematic studies. Before designing any resilience analysis (or any study for that matter), a firm understanding of the foundations of qualitative research is required. Some resources are identified in the Resources and Works Cited section, but readers are encouraged to explore these issues further.

³⁸ Note that these challenges are not unique to resilience analysis, but to qualitative and mixed methods research generally.

simply using qualitative data as background information for a quantitative analysis. When mixed-methods approaches are done well however, there are significant insights that cannot be realized through any one method alone.

Like any qualitative study, determining what information to collect can be difficult. The major types of qualitative data needs for resilience analysis provided by Maxwell et al (2015) provides a good starting point for designing qualitative instruments that can be further elaborated upon and contextualized, including:

- *Information about social relations and power dynamics:* resilience stems from more than the household and community ownership of assets and resources; it is also driven by fundamental power dynamics shaping who has access and control over those resources. While some manifestations of power inequity may be reflected in quantitative data, only qualitative data can capture the nuances of these complex relationships.
- *Information regarding trade-offs household confront vis-à-vis livelihood and coping strategies:* while these trade-offs may be conceptually understood, they are not often explored in depth in practice. For example, exploring decision-making around when and how a household should implement a particular response to a shock, even if it undermines the longer-term resilience or well-being of the household
- *Conflict dynamics (and other shocks that are not easily quantified):* most resilience analyses to date tend to focus on natural shocks (e.g. drought, flood, earthquake, etc.) but there is a marked dearth of evidence on conflict as a hazard and analysis of resilience or programmatic interventions to address vulnerability or improve resilience
- *Other factors and resilience capacities not easily quantified:* this is a broad category and includes measures of social capital, learning and innovation, household perceptions of various resources, shocks etc., individual psychosocial factors such as aspirations, self-efficacy etc.

Promising Practice for Qualitative Resilience Analysis

Virtually every study results in more questions, often more than the study itself has answered! With resilience analysis, sometimes we have the unique opportunity to go back and explore those questions we did not know to ask the first time. One key lesson learned from early recurrent monitoring surveys, for instance, was that qualitative tools can be adapted between survey rounds based on insights gained in previous rounds and other information gained in the interim. By coding qualitative data at multiple stages throughout analysis, emerging trends, patterns, and outliers (e.g. positive deviants discussed further below) can be identified and more data can be collected to explore these phenomena further. This is due to the fact that qualitative instruments (as opposed to less flexible quantitative instruments) can be modified iteratively to capture issues and trends as the circumstances evolve on the ground – be sure to capitalize on this benefit by carefully and intentionally revising qualitative instruments as needed.

While qualitative resilience analysis explores relatively new topics, it often employs familiar qualitative methods like focus group discussions and semi-structured interviews with key informants. Maxwell et al (2015) provides examples of how these have been implemented specifically for resilience analysis, and rather than recreate these here or describe familiar methods, this section introduces three less-familiar but particularly relevant tools to the resilience measurement field: positive deviant analysis, life history analysis, and social network analysis.

4.1. Positive Deviance Analysis

Positive deviance (PD) analysis emerged in the 1970s primarily in the field of nutrition research and is particularly useful for resilience analysis. At its core, PD seeks to identify individuals and households, and potentially communities that, despite exposure to similar constraints and adversities as their peers, are somehow able to overcome these obstacles and not only survive, but thrive. Stated differently, the conceptual goal of PD analysis is to identify and describe households that have effectively demonstrated their resilience. PD analysis attempts to uncover exactly what strategies enable these “positive deviants” to avoid a similar fate as their peers, ultimately with the intention of scaling up these behaviors throughout the community.³⁹ An early application of PD analysis was done by Frankenberger et al (2007), which relied on focus group discussion members to identify positive deviants in their communities for more in-depth key informant interviews. Smith and Frankenberger (2017) further evolved this approach to analyze quantitative panel data from recurrent monitoring surveys by identifying a group of households that were able to fare better than the average households over multiple droughts. After identifying this cohort, analyses were conducted to identify which resilience capacities distinguish PD households from non-PD households.

4.2. Life History Analysis

Recent research from Uganda, Bangladesh, and Ethiopia on resilience and sustainable poverty escapes conducted by ACDI/VOCA, USAID and the Overseas Development Institute (ODI) has examined why some households escape poverty and stay out of poverty, while others escape poverty only to fall back in over time.⁴⁰ An emerging finding is that many of the sources of resilience that protect household wellbeing in the face of recurrent shocks are also related to helping household stay out of poverty over time.

One innovative feature of these studies was the use of life histories to better understand why some households were able to sustainably escape and others were not. Based on quantitative results, communities with high proportions of households experiencing transitory and sustained poverty escapes were purposely selected and households were identified for in depth interviews on their life histories. These interviews investigated salient life events including shocks and positive factors that influenced their poverty status over the course of five life stages from childhood to older age.

³⁹ A Concept Note on applying the PD approach in resilience analysis is forthcoming under the REAL project. Readers may also refer to Positive Deviance Initiative, Tufts University (2010) for a primer.

⁴⁰ For details of the Life History methodology and access to the studies, refer to ODI & ACDI/VOCA (2016)

These life histories were then transcribed and coded, including codes related to resource base; attributes and capacities; activities; managing shocks; and strategies.

4.3. Social Network Analysis

Social Network Analysis (SNA) measures the patterns, connections, strength, and proximity over the various relationships present between individuals, households, communities and governments.⁴¹ SNA defies methodological categorization since it can be quantitative, qualitative or mixed-method in nature. To date, there are few if any examples of a formal traditional SNA conducted as part of a resilience analysis, although there are many examples of components of qualitative measures of social capital and resource access and control that provide some insight into social networks. However, it is widely agreed that access to information and resources (i.e. connectedness) is an important influential factor for resilience. Thus, SNA may be particularly useful at providing insight through formal analysis of these networks, meaning ripe opportunities for future research. Currently, Tufts University is conducting a formal mixed-method SNA in two districts targeted by the USAID-funded Promoting Agriculture, Health, and Alternative Livelihoods (PAHAL) project implemented by Mercy Corps in Nepal. This study focuses in part on measuring how and why the flow of capital and information enhances or constrains household resilience based on their relative position in the network and whether network position improves with receipt of remittances.

⁴¹ A good starting place to learn more about SNA is the International Network of SNA: <http://insna.org/>

5. Conclusion

This guidance note introduced and provided examples of some of the primary quantitative and qualitative approaches to conducting resilience analyses. This primer is meant only to be an introduction to the vast world of possibility for measuring, analyzing and programming for resilience. While many of the approaches mentioned in this guidance note are inherently technical and complicated (and textbooks would be required to explain them fully!) hopefully readers come away with a little more clarity on what resilience analysis can tell us, what are the key steps in conducting one, and what approaches have been used to date.

The main takeaways from this guidance note are:

- It is imperative to have a well-defined vision of the purpose and objectives of the resilience research – is it meant to gain a basic descriptive understanding of the context, understand trends over time, or explore critical relationships? Or some combination of these? Without having this vision, it is impossible to effectively develop the research questions that formulate the critical foundation of any resilience analysis
- After defining the objectives and specifying the research questions, researchers must begin developing formal estimation models that explicitly detail what relationships are of interest for the study. The research questions and these estimation models form the basis for identifying both the quantitative and qualitative data needs – such as:
 - What are the outcomes of interest?
 - What resilience capacities are of interest? Including both objective, easily measured characteristics and more subjective, psychosocial characteristics? For those subjective measures – what kind of data can be collected to illuminate any poorly understood dynamics
 - What other environmental factors do we need to take into account?
 - What are the main shocks we should consider?
- A comprehensive resilience analysis is almost always going to require mixed methods –while this research space has made tremendous gains in the last decade, there are still vastly underexplored dynamics that will require both quantitative measures that are representative of broad trends, dynamics and patterns and qualitative measures that provide depth, nuance, and richness where numbers fail to describe underlying phenomena

Not every project will have sufficient capacity and resources to undertake resilience analysis. However, without investing the time and resources into measuring and analyzing resilience, we cannot effectively design, implement or manage any projects that claim to build resilience. Any project with a resilience focus should strongly consider incorporating measures of shocks, capacities and wellbeing into their monitoring and evaluation systems and think carefully about what analyses will help inform, guide and improve their resilience-building strategies.

Helpful Resources

General Resilience Analysis Guidance

FSIN. (2015a). Measuring Shocks and Stresses as a Part of Resilience Measurement. Available at: <http://www.fsincop.net/resource-centre/detail/en/c/332112/>

FSIN. (2015b). Household Data Sources for Measuring and Understanding Resilience. Available at: <http://www.fsincop.net/resource-centre/detail/en/c/332107/>

FSIN. (2015c). Qualitative Data and Subjective Indicators for Resilience Measurement. Available at: <http://www.fsnnetwork.org/qualitative-data-and-subjective-indicators-resilience-measurement>

FSIN. (2016). Quantitative Analyses for Resilience Measurement. FSIN. 2016. Available at: <http://www.fsincop.net/resource-centre/detail/en/c/426111/>

USAID. (2017). An Overview of the Recurrent Monitoring Survey. Available at: <http://www.fsnnetwork.org/overview-recurrent-monitoring-survey-rms>

Sagara, B. (2018). *Resilience Measurement Practical Guidance Note Series 2: Measuring Shocks and Stresses*. Produced by Mercy Corps as part of the Resilience Evaluation, Analysis and Learning (REAL) Associate Award. Available at: <http://www.fsnnetwork.org/resilience-measurement-practical-guidance-series-guidance-note-2-%E2%80%93-measuring-shocks-and-stresses>

Vaughan, E. (2018). *Resilience Measurement Practical Guidance Note Series 3: Resilience Capacity Measurement*. Produced by Mercy Corps as part of the Resilience Evaluation, Analysis and Learning (REAL) Associate Award. Available at: <http://www.fsnnetwork.org/guidance-note-no-3-%E2%80%93-resilience-capacity-measurement>

Online Databased Tutorials for Econometric Analysis (Free)

Impact Evaluation in Practice. Available at: <http://www.worldbank.org/en/programs/sief-trust-fund/publication/impact-evaluation-in-practice>

Econometrics in R. Available at: <https://cran.r-project.org/doc/contrib/Farnsworth-EconometricsInR.pdf>

R Econometrics: Learn R for Applied Economics in a Comprehensive Way. Available at: <https://econometricswithr.wordpress.com/>

Using STATA for Principles of Econometrics. Available at: http://higheredbcs.wiley.com/legacy/college/hill/0470626739/manualsmp/using_stata_for_principles_of_econometrics.pdf?newwindow=true

General Online Tutorials for Data Analysis (Free and for Fee)

<https://www.udacity.com/> (Quantitative and Qualitative)

<https://www.edx.org/> (Quantitative and Qualitative)

<https://www.coursera.org/> (Quantitative and Qualitative)

<https://www.r-bloggers.com/how-to-learn-r-2/> (Quantitative only)

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