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Asia Resilience Review

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About REAL:

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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Acronyms

ACCCRN	Asian Cities Climate Change Resilience Network
ADB	Asian Development Bank
CCA	climate change adaptation
DFiD	Department for International Development (of the United Kingdom)
EERR	Economic of Early Response and Resilience
FGD	focus group discussion
GFDM	Global Flood and Drought Monitor
KII	key informant interview
HEA	Household Economy Approach
LDC	least developed country
LECZ	low-elevation coastal zone
M&E	monitoring and evaluation
NGO	non-governmental organization
PAHAL	Promoting Agriculture, Health and Alternative Livelihoods
REAL	Resilience Evaluation, Analysis and Learning
RMS	recurrent monitoring system
SABAL	Sustainable Action for Resilience and Food Security
SHOUHARDO	Strengthening Household Ability to Respond to Development Opportunities
STRESS	strategic resilience assessment methodology
USAID	United States Agency for International Development
WFP	United Nations World Food Programme

I. Introduction

The past seven years have seen tremendous advances in the definition of resilience in humanitarian and development contexts, and methodological innovation in resilience measurement. The relevance of understanding resilience to improving program outcomes and cost-effectiveness is reflected in increasing donor support and scholarship on resilience, and in the emergence of global communities of practice such as the U.S. Agency for International Development (USAID) Center for Resilience, established after large-scale humanitarian emergencies in the Horn of Africa and the Sahel in 2011-2012. Other examples include the Resilience Measurement Technical Working Group, formed in 2013 under the Food Security Information Network and the Global Resilience Partnership, jointly created in 2014 by the Rockefeller Foundation, USAID, and the Swedish International Development Cooperation Agency. In addition, some international non-governmental organizations (NGOs), such as Mercy Corps, are making strong contributions to resilience research and its applications.

Much of the work on resilience in international development to date has focused on climate shocks and stresses in Africa; the African context was the starting point for conceptualizing resilience frameworks and indicators. However, these are not necessarily one-size-fits-all. Intra- and inter-regional differences in types of shocks experienced, urban-rural population distribution, livelihood profile, demographics, conflict scenarios, migration trends, and cultural factors call for adapting resilience measurement methodologies and indicators to suit different contexts.

Asia has a different shock context and risk profile compared to Africa. While both regions have their own internal diversity, there are regional overarching differences, such as the proportion of the population residing in coastal areas (and thus in exposure to certain kinds of severe weather events); urban density; national wealth; educational attainment; proportion of the population engaged in agricultural versus industrial, technical, or coastal livelihoods; and the nature of social capital.

This paper summarizes the learnings presented in the Asia Resilience Monitoring, Evaluation and Learning (MEL) Workshop held in Bangkok, Thailand in July 2017, sponsored by the USAID Center for Resilience and the Resilience Evaluation, Analysis and Learning (REAL) Associate Award. It examines the Asia resilience context and implications for measuring resilience in the region, and seeks to address the following high-level research questions:

- What are important features of the resilience context in Asia?
- How has resilience been measured in Asia?
- What are the key trends and findings in Asia resilience to date?
- What are some recommended strategies for future investments in resilience efforts in Asia?

The paper starts by reviewing definitions of key resilience concepts and providing an overall resilience framework that has been applied globally. Section III highlights important characteristics that distinguish resilience in Asia from other regions and Section IV describes measurement approaches that have been adapted and utilized in Asia. Section V reviews key trends in findings from several studies of resilience in Asian development programs. The paper concludes with strategic recommendations for ways forward in resilience measurement, analysis, and programming in Asia.

II. Definitions

This section defines key terms used in the conceptualization and measurement of resilience, as applicable to this paper.

Resilience

There is a convergence of definitions of resilience across USAID, the Rockefeller Foundation, and the Resilience Measurement Technical Working Group; the definitions are similar and apply to both rural and urban areas. “All definitions focus on vulnerable populations (at multiple scales) that are exposed to shocks and stressors; all emphasize capacities that enable people to manage these shocks and stressors; and all focus on development outcomes” (Frankenberger and Petryniak, 2016).

Box 1: Defining Resilience

USAID: [Resilience is] the ability of people, households, communities, countries and systems (social, economic, ecological) to mitigate, adapt to, recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth.

- USAID (2015a)

The Rockefeller Foundation: City resilience describes the capacity of cities to function, so that the people living and working in cities – particularly the poor and vulnerable – survive and thrive no matter what stresses or shocks they encounter.

- The Rockefeller Foundation (2015)

Resilience Measurement Technical Working Group: Resilience is the capacity that ensures adverse stressors and shocks do not have long-lasting adverse development consequences.

- FSIN Web site accessed 18 June 2018 <http://www.fsincop.net/topics/resilience-measurement/en/>

All definitions of resilience above refer to shocks and stresses, which may be *covariate*—large-scale extreme events affecting significant numbers of people (drought, flood, conflict), or *idiosyncratic*—meaning that they are particular to one or few household(s) (e.g., illness, crop pests).

Resilience Capacities

A key concept in how resilience manifests and can be measured is that of *resilience capacity*. Resilience capacity is a set of conditions, attributes, or skills that enable households to achieve resilience in the face of shocks. There are three types of resilience capacities: absorptive, adaptive, and transformative (Béné et al. 2016 and 2012, Frankenberger et al. 2013):

- **Absorptive capacity** is the ability to minimize exposure to shocks and stresses (*ex ante*) where possible and to recover quickly when exposed (*ex post*).
- **Adaptive capacity** involves making proactive and informed choices about alternative livelihood strategies based on changing conditions.
- **Transformative capacity** refers to enabling conditions that foster more lasting resilience. It relates to governance mechanisms, access to markets, services and infrastructure, community networks, and formal safety nets that are part of the wider system in which households and communities are embedded.

These complex concepts are measured by combining a variety of component indicators into an overall index measure. Resilience indices and components are discussed more in depth in Section IV.

Social Capital

Social capital is a key resilience capacity. Social capital resources can help households recover from idiosyncratic shocks and aid community recovery from covariate shocks. There are three types of social capital (Aldrich 2012; Elliott, Haney and Sams-Abiodun 2010; Wetterberg 2004; Woolcock and Narayan 2000):

- **Bonding social capital** is seen in the bonds between community members. It involves principles and norms such as trust, reciprocity, and cooperation. Bonding social capital is often drawn on in the disaster context, where survivors work closely to help each other to cope and recover.
- **Bridging social capital** connects members of one community or group to other communities or groups. It often crosses ethnic/racial lines, geographic boundaries, and language groups. Bridging social capital can facilitate links to external assets in that households with social ties outside their immediate community can draw on these links when local resources are insufficient or unavailable.
- **Linking social capital** is seen in trusted social networks between individuals and groups interacting across explicit, institutionalized, formal boundaries in society. Linked networks are particularly important for economic development and resilience because they provide resources and information that are otherwise unavailable. This type of social capital is often conceived of as a vertical link between a network and some form of authority or power in the social sphere.

III. What is Unique about Resilience in the Asia Context?

Asia has several characteristics that are either unique or more prominent than in other regions and that have implications for resilience programming, measurement, and analysis. This section describes important features of the Asian shock context, livelihoods, urban population, human capital resources, local governance, and social factors. These features are important to reflect when designing indicators capable of capturing resilience capacities in Asian contexts.

Shock Context

This overview focuses on covariate shocks prominent in Asia. This marks a key difference in the focus to date in the Asia region on the application and measurement of resilience, which has been on household-level idiosyncratic shocks and stresses such as illness or death of a household member, large expenses (e.g., dowry, funeral, traditional celebrations), or crop loss due to pest infestation.

Environmental and Climate-related Hazards

Much of Asia is highly susceptible to environmental hazards such as heavy rainfall, sea-level rise, flooding, drought, tropical cyclones, and heat and cold extremes. Areas along the Himalayan belt are at risk of earthquakes. Low-elevation and coastal areas, urban centers and other densely populated areas are especially vulnerable to climate shocks, which are increasing in frequency and severity (ADB 2017a). As shown in Table I, in several Asian countries, the population is highly concentrated in coastal

zones—more than a quarter of the population in Cambodia, Myanmar, and Thailand, and as much as half the population in Bangladesh and Viet Nam. Population growth in coastal areas is an increasing challenge. Coastal zones are economic centers and thus a magnet for regional labor, and their populations are expected to increase substantially, doubling in Bangladesh, India, the Philippines, and Viet Nam by 2060 (ADB 2017a: 11).

Large coastal populations and high population density contribute to vulnerability to severe weather events. The historical vulnerability of the Asia region to recurrent climate-related catastrophes is evident in Climate Risk Index data from 1997-2016. Seven of the top 10 most affected countries are in Asia: Myanmar (3rd most affected), Philippines (5th), Bangladesh (6th), Pakistan (7th), Vietnam (8th), and Thailand (9th) (Eckstein, Künzel and Schäfer 2018).

Table 1: Share of area and population of low-elevation coastal zones in selected countries of Asia, 2000

Country	LECZ area as share of total country area (%)	LECZ population as share of total country population (%)
Bangladesh	40.2	48.7
Cambodia	7.5	25.7
People's Republic of China	2.0	11.3
India	2.6	6.1
Indonesia	9.1	18.4
Myanmar	7.3	27.8
Pakistan	2.9	3.2
Philippines	6.8	16.7
Thailand	6.8	26.0
Viet Nam	20.2	54.7
LECZ = low-elevation coastal zone		

Source: Asian Development Bank (ADB). 2017a. A Region at Risk: the Human Dimensions of Climate Change in Asia and the Pacific. Page 11. Adapted from B. Neumann et al. 2015. Future Coastal Population Growth and Exposure to Sea-Level Rise and Coastal Flooding—A Global Assessment PLOS One. 10 (6). e0131375.

Agricultural and Marine Productivity and Livelihoods

Climate-related shocks and stresses in Asia are having a significant impact on livelihood systems and food security in the region. One important issue is water; climate change and rapid population and economic growth are expected to exacerbate water scarcity. Already, "...[D]eclining soil productivity, groundwater depletion, and declining water availability, as well as increased pest incidence and salinity, threaten food security in the region" (ADB 2017a: xi). Climate change is also projected to pose increasing threats to both agriculture and coastal livelihoods such as fishing and tourism (ADB 2017a: xi).

Upward warming and precipitation trends over the long term are projected to generally decrease yields of cereal crops, especially in South and Southeast Asia, which affects the region's food security as well as the viability of agricultural livelihoods (ADB 2017a: 55-56). Demand for water resources for agricultural and industrial uses and for human consumption will increase with climate change effects (ADB 2017a: 56). The increasing potential for more slow-onset disasters, such as drought, precipitated by climate change can have severe impacts on agricultural livelihoods and food security (World Bank 2016a).

The rise of Asia's regional economies and rapid human development has mitigated the environmental vulnerabilities to some degree, especially with regard to the shift away from agricultural livelihoods, and economic diversification. However, "[T]he same developments have opened up new avenues of exposure and vulnerability. Coastal populations and assets are highly at risk from projected rises in sea level and the intensification of extreme weather events. Urbanized populations are exposed to heat stress hazards. National and increasingly integrated regional economic systems are vulnerable to disruptions in supply chain networks. Populations are migrating away from areas where climate change impacts represent an increasing threat" (ADB 2017a: iv).

Box 2: Support for Resilience to Climate Change in Asia

While climate change threatens to intensify the frequency and magnitude of severe weather events, "the [Asia] region has both the economic capacity and weight of influence to change the present fossil-fuel based development pathway and curb global emissions" (ADB 2017a: x).

Indeed, there is substantial donor activity around climate change adaptation (CCA), both globally and in Asia. Global accords such as the Kyoto Protocol and the United Nations Framework Convention on Climate Change have spawned several multilateral funds to support CCA, such as:

- World Bank Adaptation Fund, (CCA and resilience projects);
- Special Climate Change Fund (concrete, small-scale adaptation projects and technology transfer);
- Green Climate Fund (adaptation and mitigation; livelihoods and health);
- Global Environment Facility (biodiversity, international waters, land degradation, chemicals, and waste); and
- Least Developed Countries Fund.

All of these funds focus on Least Developed Countries and/or developing countries.¹ Of the 63 projects approved by the Adaptation Fund as of March 2017 (total value US\$416 million), the Asia/ South Asia/ Pacific region has the most projects (23 projects or 37 percent) (TANGO 2018a: 5).

The topicality of resilience and the support for resilience approaches in Asia is also manifest in the various regional bodies and networks focused on integrating a resilience lens into policies and programs in areas such as urban climate change resilience, urban planning, and disaster risk reduction. One example is the Asian Cities Climate Change Resilience Network (ACCCRN), launched in 2016 with the support of the Rockefeller Foundation and now present in Bangladesh, India, Indonesia, Philippines, Thailand, and Vietnam.

- ACCCRN Web site accessed 21 May 2018. <https://www.acccrn.net/about-acccrn/history>

Urban Population Growth

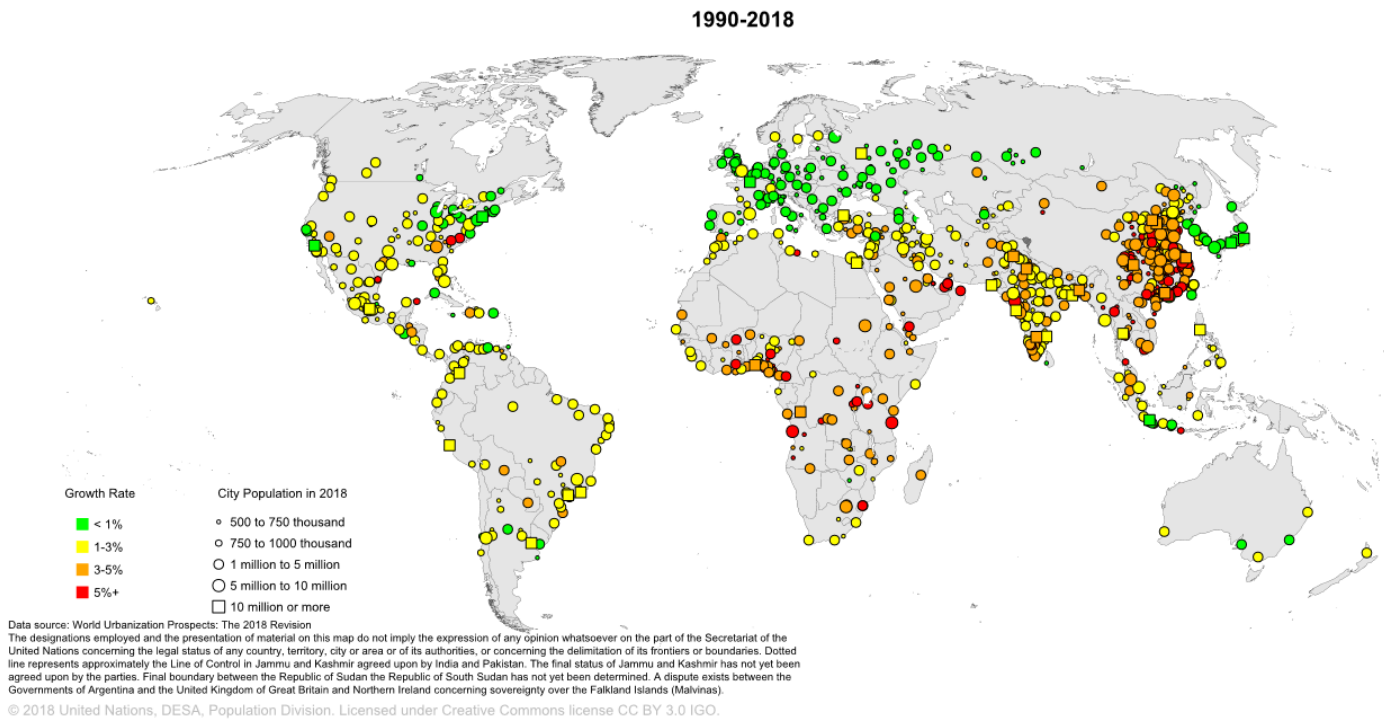
Asia currently accounts for 54 percent of the world's urban population, with projections of continued growth on a massive scale. By 2050, the urban population is expected to increase by 416 million in India and by 255 million in China (UN DESA 2018a). As illustrated in

¹ For a current review of multilateral climate funds, see Amerasinghe, Niranjali Manel; Thwaites, Joe; Larsen, Gaia and Ballesteros, Athena. 2017. *The Future of the Funds: Exploring the Architecture of Multilateral Climate Finance*. Published by World Resources Institute. <http://www.wri.org/publication/future-of-the-funds>

Figure 1, over the last 30 years the fastest-growing urban areas have been concentrated in the Asia region. The three largest cities in the world today are all in Asia: Tokyo (37 million inhabitants), New Delhi (29 million), and Shanghai (26 million); Mumbai, Beijing and Dhaka are close behind, each with nearly 20 million inhabitants (UN DESA 2018b).

While the growth of these “megacities” (pop. >10 million) is staggering, “some of the fastest-growing urban agglomerations are cities with fewer than one million inhabitants, many of them located in Asia and Africa. While one in eight people live in 33 megacities worldwide, close to half of the world’s urban dwellers reside in much smaller settlements with fewer than 500,000 inhabitants” (UN DESA 2018b). A major shock in these areas thus can affect a much larger number of people, clustered in spaces that are poorly equipped to withstand disasters, than ever before.

Figure 1: Growth rates of urban agglomerations by size class, 1990-2018



Source: United Nations Department of Economic and Social Affairs, Population Division. 2018a. World Urbanization Prospects: 2018 Revision. <https://esa.un.org/unpd/wup/>

Some characteristics of fast-urbanizing areas to keep in mind as they relate to resilience capacities include (Frankenberger and Petryniak 2016):

- Increased competition for employment
- More marked wealth disparities across urban population segments, compared to more homogenous rural areas
- Reliance on food purchase via cash or credit rather than on one’s own food production; sensitivity to price hikes when rural production is low

- Environmental and industrial pollution and associated health hazards, e.g., respiratory ailments, skin ailments, hazards related to water and sanitation
- Public health risks related to inadequate housing and overcrowding, e.g. rapid disease transmission (acute respiratory infections, meningitis, typhus, cholera, scabies)²
- Inadequate urban infrastructure, e.g., water, sanitation, waste management, electricity, transportation, especially in peri-urban areas and informal settlements; it may also be challenging to integrate informal settlements and transient populations into early warning systems and disaster risk management plans
- Inadequate social services, e.g., education, health
- Differences across and within neighborhoods, e.g., in access to services, levels of social cohesion, ethnic enclaves.

While intensive urbanization in Asia poses many challenges to infrastructure and human services, it also brings productivity gains and economic growth. In South Asia, for example, average GDP grew nearly 56 percent during 2000–2012, from \$2,560 to \$4,000,³ at an average annual growth of more than 3.8 percent (cited in Ellis and Roberts 2016: 1); absolute poverty decreased from half the population living on less than \$1.25 a day in 1999 to under one-third in 2010. Urbanization “thus presents South Asian countries with an opportunity to transform their economies and join the ranks of richer countries in both prosperity and livability” (Ellis and Roberts 2016: 1). The expansion of urban population, economy, and industry in the Asia region is a capacity that can be tapped to build resilience.

Box 3: Vulnerability of Cities to Disasters

“Often located along the coastline, in flood plains, or along seismic rifts, with their concentration of assets and people, cities are vulnerable to disasters. The combination of rapid and unplanned urbanization, which takes place on marginal lands and hazardous areas in combination with poorly constructed settlements and degraded ecosystems, puts more people and more assets into harm’s way. Rapidly growing peri-urban, small, and middle-sized cities are particularly at risk. Often lacking financial resources, infrastructure, services and the capacity to manage the increase in urban population, their exposure is increasing and will translate into heavy loss of life and property in case of climate and disaster events, unless proactive measures are mainstreamed into urban governance and planning processes.”

- World Bank (2012a: vii)

Center of Trade Activity

Urban areas in Asia are important trade centers and thus especially vulnerable to shocks that can affect trade on a global scale: “Disruption in supply chains caused by extreme weather events can propagate through the globalized trade network. Since Asia’s industries are particularly highly interlinked, extreme events in Asia can have strong repercussions within the region as well as in the rest of the world. Conversely, Asia’s production and consumption can suffer from events outside the region” (ADB 2017a: xii).

² WHO Website “What are the health risks related to overcrowding?” Accessed 19 June 2018.

http://www.who.int/water_sanitation_health/emergencies/qa/emergencies_qa9/en/

³ GDP per capita is measured in 2011 constant international dollars using purchasing power-parity exchange rates.

Migration in Asia

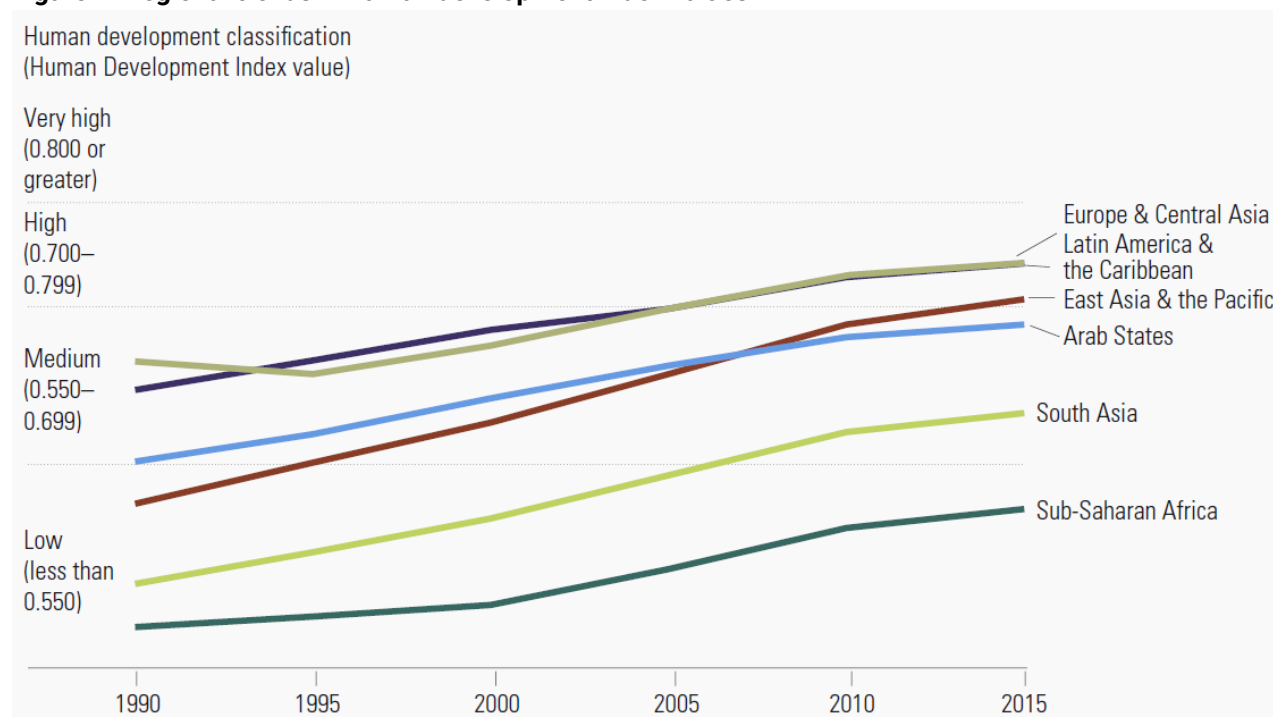
The rate of migration in Asia has been accelerating over the last two decades. Between 2000 and 2010, migration within the region grew by an average of 1.5 million international migrants per year and between 2010 and 2017, the annual growth rate rose to 1.7 million (UN DESA 2017: 3). “In 2017, Asia-to-Asia constituted the largest regional migration corridor in the world, with some 63 million international migrants born in that region residing in another country of Asia” (UN DESA 2017: 23).

Much of this migration is from rural to urban areas, and driven by climate change impacts such as rising temperatures, water scarcity, and natural disasters that are increasing in frequency and severity (ADB 2017a: iv, xii). Continuing trends in climate change and migration can result in highly taxing consequences for urban infrastructure and resilience in urban areas: “The depreciation and degradation of natural resources through climate change threatens to lead to an increase in rural poverty and migration to cities, which will in turn add to the growth of informal settlements. Cities, as a result, will be vulnerable to both global climate events, due to their reliance on global supply chains, and local disasters, due to the vulnerability of the makeshift settlements that migrants often inhabit in urban slums. While a 2°C temperature rise will already lead to moderate risks in some regions, a 4°C increase could trigger severe disruptions of ecosystem services vital to the Asian economy. This could lead to humanitarian disasters in many nations and result in unmanageable migration surges, or locked-in populations” (ADB 2017a: xii).

Gendered aspects of migration are important to note. Between 2000 and 2017, male migration in Asia increased by 73 percent, while female migration increased at the far lower rate of 48 percent (UN DESA 2017: 9). This disparity was driven largely by the demand for (male) workers in West Asian oil-producing countries. When men leave, women often become *de facto* heads of household, which may or may not alter intra-household gender dynamics in terms of decision-making authority over matters such as household expenditures. Remittances from household members living abroad can influence household resilience capacity, and the connections migrants form with the communities where they work can contribute to bridging social capital.

Human Capital

Human capital resources in the Asia region augur well for resilience building and countering the potential severity of shocks and their impacts. In the past decades, the region has made significant progress on development indicators such as maternal mortality, extreme poverty, and access to improved drinking water sources (UNDP 2016). As shown in Figure 2, the human development index in the region has exhibited a strong upward trend in since 1990. While disparities in educational achievement and the rate of economic growth persist within and among countries in the region, and educational quality lags, overall resilience efforts in Asia are favored by the region’s high literacy and education levels, even in lower-middle income and low-income countries. South Asia has seen a strong increase in youth literacy, especially for women (UNDP 2016: 28).

Figure 2: Regional trends in human development index values

Source: Human Development Report Office. UNDP Human Development Report 2016.

http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf

Social and Cultural Characteristics

A number of social and cultural factors particular to Asia are relevant to resilience. These features should be taken into consideration in the design of resilience measurement instruments, especially modules regarding social capital and basic demographic information, to ensure capture of variables that may have a relationship to resilience capacity:

Predominance of caste systems. The social stratification of caste systems in Asia is often accompanied by distinct characterization of occupations/livelihoods, economic stratification, and differences in access to power structures. Cultural norms inhibit mobility among castes, and the existence of fixed caste boundaries can result in expanding (among higher castes) or limiting (among lower castes) the ability of caste members to access resilience resources. For example, caste characteristics may influence access to social and political networks, employment/livelihood options, location and quality of housing and associated access to civil and social infrastructure, gender dynamics, and access to education. Caste membership may also influence perceptions of self-worth, aspirations, and feeling of control over one's circumstances.

Social diversity. Asia has a wide variety of social groupings based on caste (as discussed above), ethnicity, geography, language, and religion. The Asia-Pacific region has 705 self-identified indigenous groups (UNDP 2016: 63–64). Asia is also home to more than 2,300 living languages.⁴ This diversity can

⁴⁴ Nations Online Web site. Accessed 20 June 2018. 2009 figure. <http://www.nationsonline.org/oneworld/languages.htm>

be an asset or a constraint for resilience capacities, affecting access to education, social networks, governance structures, and political processes.

Religious and ethnic conflict. In some areas, religious and ethnic tensions are a source of conflict, which factors into community resilience. Examples of conflict in the region based on social characteristics and struggles over minority rights include Rohingya Muslims persecuted in Myanmar living as refugees Bangladesh; conflict in the Muslim-majority areas of the Autonomous Region in Muslim Mindanao in southern Philippines over land, natural resources, and preservation of Muslim identity; Buddhist-Muslim tensions in Sri Lanka; and discrimination and violence against Dalits and indigenous people in India.

Cultural practices. Cultural practices in some areas of Asia, notably ones that perpetuate the subordination of women, are highly relevant to resilience capacities. Centuries-old traditions and norms such as those around sex selection during pregnancy, child marriage, dowry, honor killings, rights of inheritance, and women's mobility, pervade and are perpetuated by societal power structures and are very difficult domains in which to effect change. Discriminatory practices against women seen in the region factor into societal-level transformative capacity and also have household-level implications in areas such as women's access to information, control over household income and assets, self-image, and women's and child health.⁵

Local Governance Capacity

Local governments play an important role in supporting community and household resilience. In principle, local governments are responsive and accountable to their constituents. They are responsible for promoting and managing many aspects of community well-being such as economic health, emergency services, city planning, road infrastructure, public works, waste management, and public health. Relevant to extreme weather events and natural disasters, the role of local governments in providing disaster early warning, preparedness and response systems is critical to reducing risk levels for populations and economies (World Bank 2012a: viii).

Local governments in Asia generally have limited decision-making power due to “unclear institutional roles and limited functional and revenue assignments” (Ellis and Roberts 2016: 5). These factors, and the dependence on resources from higher levels of government, constrain local government capacity for service delivery and for resilience-building efforts such as CCA initiatives. Local government access to international climate funds (Adaptation Fund, Global Climate Fund) is limited by accreditation and eligibility requirements that favor national entities (Archer et al. 2017: 26-27). Access to national climate funds can also be difficult, as funding may be earmarked for targeted geographic areas or higher administrative levels, or have associated eligibility requirements that local governments cannot meet.

Local government capacity for monitoring and evaluation (M&E) of resilience strategies and climate change action plans is another challenge. A recent study of city resilience strategies in Philippines, Bangladesh, India and Indonesia found the lack of M&E frameworks and strategies to be a major limitation: “The absence of developed M&E planning in the resilience strategies was primarily the product of a lack of evaluative capacity, both in terms of resources and knowledge of M&E tools. However, many city government representatives noted that they did not regularly undertake M&E

⁵ See Niaz and Hassan (2006).

activities of any city plans, unless an external donor enforced this requirement. M&E is under-developed in many of the climate resilience strategies prepared through the ACCCRN programme reflecting the broader need to develop capacity and tools in this area” (Archer et al. 2017: 29).

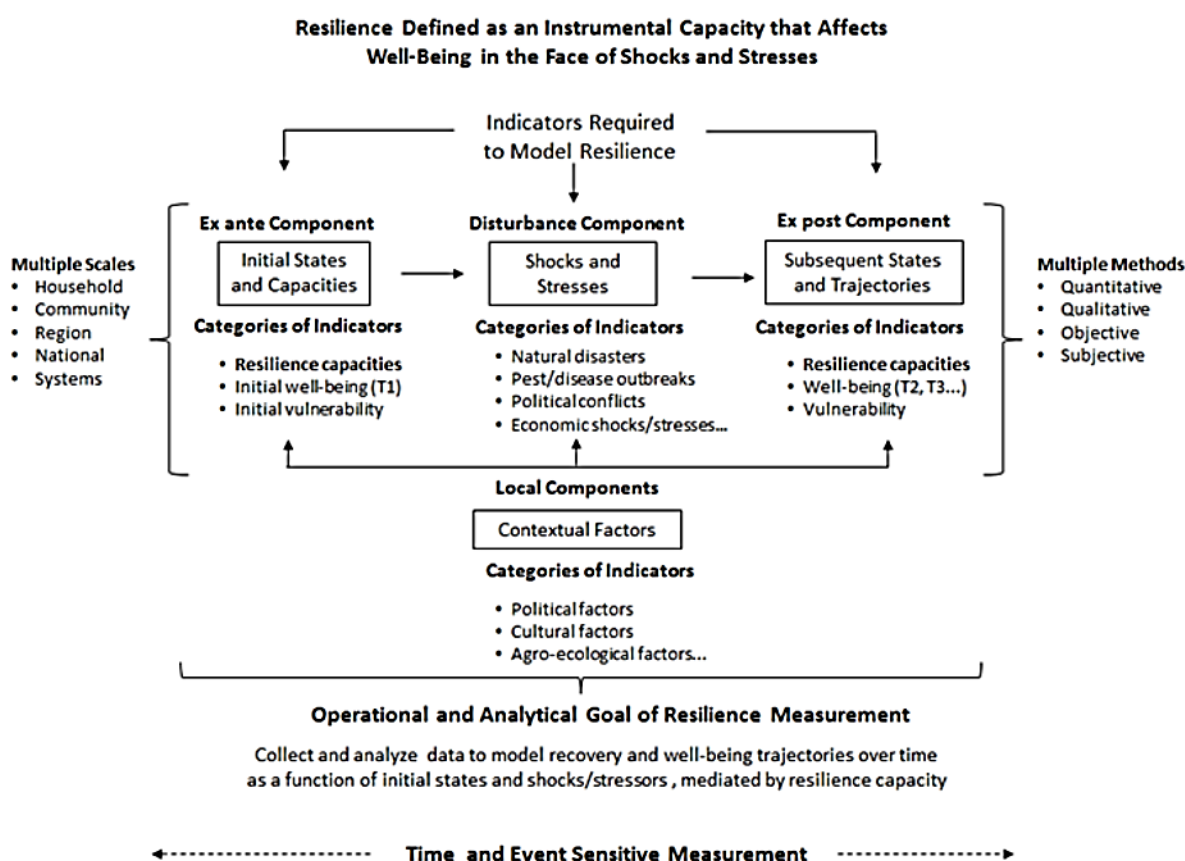
IV. Current Measurement Approaches

This section describes current approaches to resilience measurement, focusing on what's worked and the challenges relevant to the Asia context and operating environment.

Resilience Causal Framework

Resilience measurement occurs within a dynamic, layered context that requires practical methods to assess well-being in the face of shocks. The resilience causal framework shown in Figure 3 guides the conceptual organization and implementation of resilience measurement as discussed in this paper, and illustrates the different types of indicators that need to be measured, when (e.g., *ex ante* or *ex post*, at what scale, and how they can be measured to model resilience.

Figure 3: Resilience causal framework



Source: Food Security Information Network, Resilience Measurement Technical Working Group, Technical Series No. 2, A Common Analytical Model for Resilience Measurement, November 2014.

A key principle of resilience measurement is that resilience capacities are used in preparation for and in response to a disturbance or shock. Resilience capacity thus draws on a wide array of resources that cover human, social, economic, physical, programmatic, and ecological factors and should be indexed

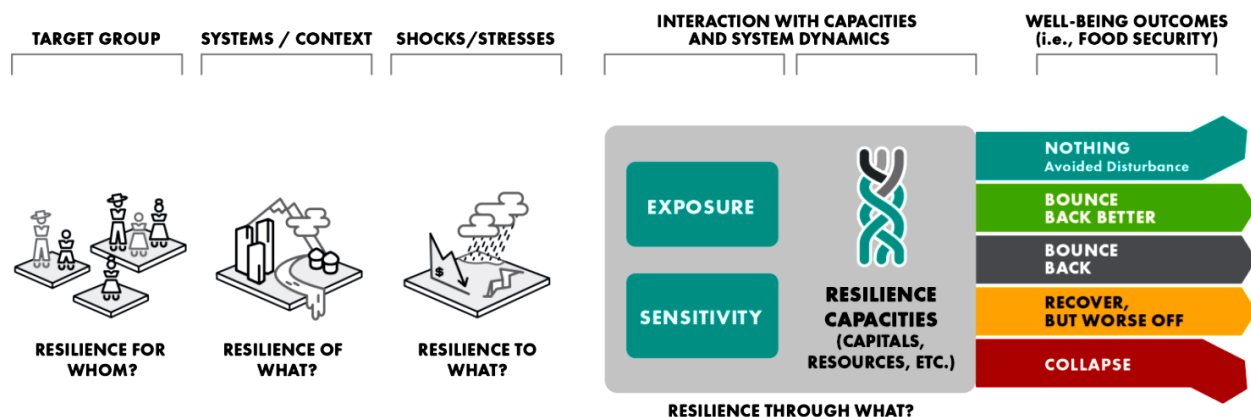
to a given well-being outcome. Resilience capacity may be observed at a discrete level but is constructed using information from multiple scales.

Resilience Conceptual Framework

Measuring resilience capacities requires first identifying the capacities that are present in a given context within a given population, the shocks and stresses they are subject to, and the well-being outcomes that should be measured. The key components that need to be taken into account in resilience programming and measurement are generally the same in rural and urban settings, though modelling the components in urban contexts should consider the increased systems complexity of cities. In both rural and urban settings, we are concerned about the vulnerable and marginalized populations in a given context that are exposed to shocks and stresses.

Mercy Corps has articulated the resilience conceptual framework through five key questions: Resilience for Whom? – the population of interest; Resilience of What? – the context and systems that people are embedded in and the constraints and development challenges within those systems; Resilience to What – the range of shocks and stresses that impact the system and concerned population; Resilience Through What – the capacities that are embedded or lacking within the context that help people manage shocks and stresses; and Well-being Outcomes – the development outcomes people are trying to achieve in the face of shocks and stresses. These key components are identified in the resilience conceptual framework presented in Figure 4 below. The framework is consistent with the resilience causal framework and serves as the basis for Mercy Corps' STRESS methodology (discussed in next section).

Figure 4: Mercy Corps resilience conceptual framework



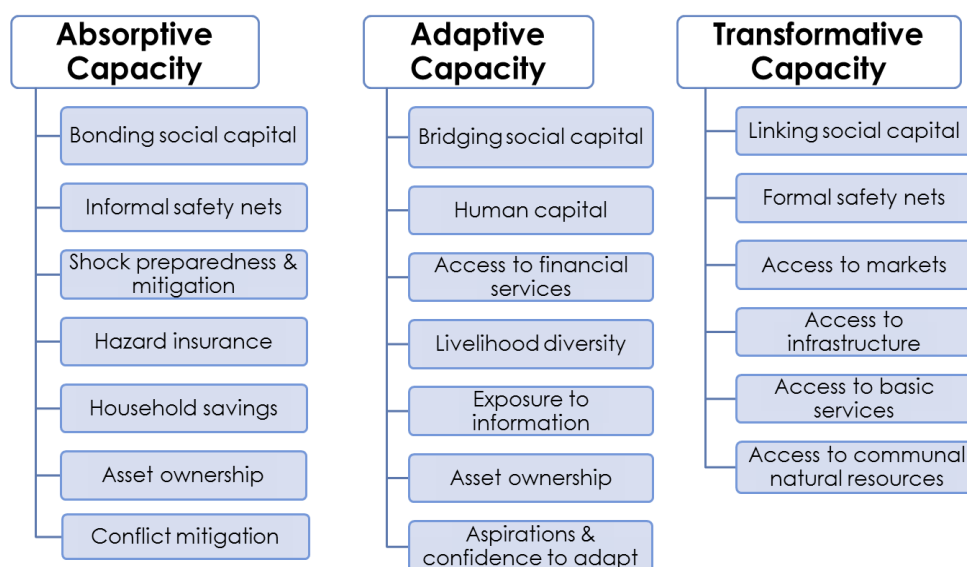
Source: Mercy Corps 2016; adapted from the TANGO Resilience Conceptual Framework 2014.

Resilience Indicators

The indicators used in resilience measurement may be individual indicators or composite/index indicators. They are measured at the household, inter-household, community, and systems levels. These same indicators may be part of a performance monitoring system. Indicator data may derive from surveys, interviews/focus groups, monitoring activities and other secondary sources. Typical resilience indicators are shown in Figure 5. Programs may further customize resilience indicators; for example, CARE's USAID Title II-funded Strengthening Household Ability to Respond to Development

Opportunities (SHOUHARDO) II program in Bangladesh included women's empowerment and governance as indicators under Transformative Capacity.

Figure 5: Resilience indicators



Methodologies in Use

Several innovative approaches to data collection have been piloted in Asia to determine what responses are appropriate to a specific context. This section highlights specific works of research in Asia that illustrate the use of current resilience measurement methodologies.

STRESS Assessment Methodology

One approach developed by Mercy Corps and used in Asia is the “Strategic Resilience Assessment Methodology” (STRESS) process, created to “build an understanding of the dynamic social, ecological and economic systems within which communities are embedded” (Mercy Corps 2015). The STRESS assessment is a process for understanding risks, drivers and required capacities to build resilience in a given context. STRESS assessments have four phases: (1) Scope: review team and expert knowledge through participatory workshops and identify knowledge gaps; (2) Inform: conduct secondary literature review; complement with qualitative field methods; (3) Analyze: develop risk profiles and evaluate resilience capacities; and (4) Strategize: develop a resilience-focused, measurable theory of change. The methodology focuses on systems mapping on well-being outcomes, risk analysis, and resilience capacities. It helps develop effective, measurable resilience-building strategies, and is anchored in the five resilience questions described above and represented in Figure 4 (see Vaughn and Shepard (2018) for a detailed discussion of the methodology)

Mercy Corps has used the STRESS approach in Nepal for the USAID-funded Promoting Agriculture, Health, and Alternative Livelihoods (PAHAL) program, in India, and in rural areas of Mongolia. In PAHAL, the approach identified climate variability and deforestation as critical stresses that affected food production systems. These stresses also contributed to the use of migration as a coping strategy, which changed the social dynamics of the program areas. The assessment enabled Mercy Corps and stakeholders to identify resilience strategies for specific risks, for example, promoting appropriate

financial services and products to counter stress migration, together with accountable, responsive and equitable government and household decision-making to enable better governance systems. In Chennai, India, an urban STRESS assessment enabled the creation of a causal systems map that showed that the city's fragmented institutions and infrastructure create challenges for balancing economic growth with environmental safeguards. The assessment also generated a map of the capacities of Chennai's urban systems that showed that recovery, particularly for small and medium-sized businesses, depends on the intensity of the disaster as well as the general business environment (Sagara, 2017a).

Research on Resilience to Floods in Bangladesh

In Bangladesh, TANGO International used primary data collected by the USAID-funded CARE SHOUHARDO II program to identify factors that enhanced the resilience capacities of households affected by large-scale flooding in northern Bangladesh in 2014. The goal of SHOUHARDO II was to improve household food security, improve the health and nutrition of children under two years of age, and address some of the systemic causes of food insecurity. Program strategies included strengthening gender equality, governance, assisting households to prepare for and mitigate disaster risk, and supporting households to adapt to climate change. SHOUHARDO II included a disaster and climate risk management component that provided comprehensive training to village committees, local governments, and volunteers on disaster management, and training to households on disaster mitigation measures. The research examined the relationship between food security and resilience capacity and posed two main questions: 1) Does resilience capacity reduce the negative impacts of shocks on food security? and 2) Which dimensions of resilience capacity matter the most?

The methodology employed quantitative analysis to determine the extent to which resilience capacity helped protect the well-being of households experiencing a severe shock and reduce the negative impact of shocks on household food security information useful for planning future interventions. TANGO used primary data from mid-term and endline surveys carried out by SHOUHARDO II in 2012 and 2014. The cross-sectional surveys used a two-stage, random sampling design encompassing over 400,000 households. Panel data were also collected from a subsample of 358 households from both surveys. The large dataset of 8,415 households in 193 villages made it possible to use cross-sectional regression techniques to identify statistically significant relationships among key variables that affect resilience capacities. The panel data, while not a representative sample of the four program areas, enabled the use of more rigorous empirical techniques. Panel data and measures of changes in household food security facilitated an assessment of the role of household resilience capacity in responding to the floods (Smith and Frankenberger 2014). The study also used secondary data from two sources: the Princeton University Global Flood and Drought Monitor, a real-time, satellite-based flood and drought monitoring and forecast system; and qualitative data from the SHOUHARDO II M&E Village Grading Dataset, which collected data on each program village to assess progress on program goals. The village data were used to measure resilience capacity indicators including social capital, disaster preparedness and mitigation, and local governance.

In general, “the multivariate [regression analysis] specifications treat resilience capacity, in the face of shocks and stressors, as a key determinant of well-being outcomes. Other determinants [of resilience], used as controls, include shock exposure, structural household characteristics, and community characteristics” (TANGO 2017a: 3). The analysis shows relationships between resilience capacities and

outcomes as predicted values or probabilities of outcomes. While the researchers note that the nature of the data does not allow the analysis of causal impacts of shocks and resilience capacity on household food security, the data do allow an analysis of whether resilience capacities played a role.

Resilience in Food for Peace Title II Program Areas in Bangladesh

Further research by TANGO sought to provide insights into factors that strengthen household and community resilience in three USAID FFP-funded Title II programs in Bangladesh: SHOUHARDO III, Nobo Jatra, and SAPLING. It complements a 2016 population-based baseline survey by ICF International and examined a wide variety of shocks across the three program areas over a period of 12 months. TANGO's resilience research sought to address two questions: (1) Do resilience capacities mitigate the negative effects of shocks for select well-being outcome indicators, including poverty, dietary diversity, hunger, and child wasting? and (2) What is the relationship between resilience capacities and coping strategies used to recover from shocks?

Over 2,700 households from the three program areas were analyzed in the resilience study.⁶ Only households that experienced shocks in the previous 12 months were included in TANGO's analysis in order to ensure methodological consistency with other resilience studies that use a 12-month recall period to minimize recall bias.⁷

Findings regarding household exposure to shock and utilization of coping strategies to respond to shock were disaggregated by program area to help explain differential impacts of the most relevant shock in each region. Key well-being outcomes and resilience capacities were also disaggregated by program area. TANGO's quantitative data analysis used both descriptive results (e.g., means and percentages of households disaggregated by program area) and multivariate analysis. Both descriptive and multivariate results incorporate sample weights and techniques to account for the clustering and stratification used as part of the sample design, such as the use of corrected standard errors, a technique employed in analyzing complex samples. Resilience capacity indexes were generated using (exploratory) factor analysis methods and are consistent with the methods employed by ICF as part of their baseline analysis of the SHOUHARDO III, Nobo Jatra, and SAPLING projects (ICF 2017).

Research into Strengthening Household and Community Resilience in Nepal

Following a devastating earthquake in Nepal in April 2015, the USAID Office of Food for Peace and the Center for Resilience supported a study to compare the impacts of the disaster on households in the Promoting Agriculture, Health, and Alternative Livelihoods (PAHAL) and Sustainable Action for Resilience and Food Security (SABAL) program areas. A key purpose of the study was to establish a nascent evidence base for improving resilience programming. The broad objectives of both projects are to strengthen and diversify livelihoods, improve mitigation of risks and improve resilience of households, and improve health and nutrition of food insecure populations, especially pregnant and lactating women and children under five. Over 90 percent of program households experienced the shock. The research used a population-based baseline household survey of 6,840 households equally divided between the two project areas, and a community survey conducted by ICF from December 2015 to February 2016 (TANGO 2017b).

⁶ The sample included 1,139 households in SHOUHARDO III; 1,165 in Nobo Jatra; and 1,134 households in SAPLING.

⁷ A detailed discussion of the baseline study sample design is found in the ICF Baseline Study Draft Report (ICF 2017).

The baseline data were used to address three questions: (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 SABAL/PAHAL programming activities enhance resilience and lead to better well-being outcomes?

The analysis disaggregated household shock exposure and use of coping strategies by project area, as different areas experienced differential impacts from the main shock (the April 2015 earthquake) corresponding to project geographies. Key well-being outcomes, resilience capacities, and selected program indicators related to WASH and adoption of agricultural practices were disaggregated by caste, an important socio-economic characteristic that influences states of well-being and resilience. The study used both descriptive statistics and multivariate regression analysis. The multivariate analysis “treat(s) resilience capacity, in the face of shocks and stresses, as a key determinant of well-being outcomes. Other determinants, used as controls, include shock exposure, structural household characteristics, and community characteristics” (TANGO 2017b). The methodology also examines household response to shocks and stresses (i.e., household coping strategies) and well-being outcomes, and relates WASH and improved agricultural practices to improved resilience.

Quantitative Data Analysis

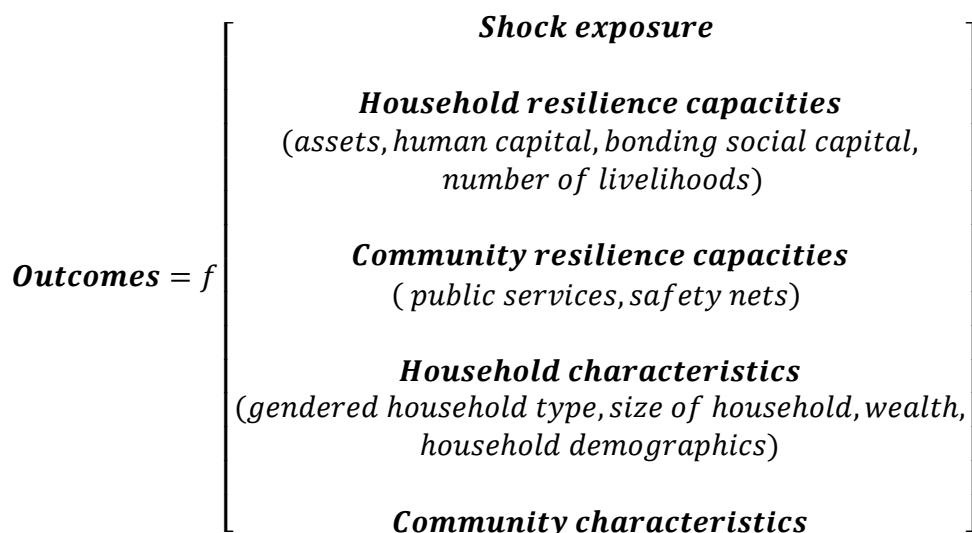
A range of quantitative data analysis methods are used in analyzing resilience:

Basic descriptive analysis (i.e., means and percentages of households against selected indicators) includes trends in shock exposure over survey rounds, use of coping strategies, well-being outcomes, and resilience capacities.

For *climate shock exposure*, household GPS coordinates can be used to employ satellite data on rainfall, soil moisture and vegetation coverage deviations.

Descriptive statistics (means and percentages) are reported by geographical area and for important population sub-groups of interest.

Multivariate (regression) analysis. In general, the multivariate specifications treat resilience capacity, in the face of shocks and stressors, as a key determinant of well-being outcomes. Other determinants, used as controls, include shock exposure, structural household characteristics, and community characteristics. In addition, the relationships between the underlying components of the resilience capacity indexes and well-being outcomes are analyzed as shown in Equation 1:

Figure 6: Multivariate specifications for resilience capacity

Household and community resilience are included in regression equations as the primary explanatory variables in their index form (i.e., absorptive capacity index, adaptive capacity index, and transformative capacity index) and decomposed into components (i.e., bonding social capital, human capital, access to financial services, etc.). Next, resilience capacities are treated as determinants of shock coping strategies. A general hypothesis is that absorptive, adaptive, and transformative capacities influence households to adopt coping strategies that promote better recovery and other well-being outcomes (TANGO 2017a).

Multivariate analysis used in the Nepal resilience study employed two estimators depending on the particular specification and distribution of the dependent variable (i.e., outcomes). Dichotomous dependent variables were estimated with a probit estimator and continuous dependent variables are estimated using an ordinary least squares (OLS) estimator (TANGO 2017b).

Predicted values of outcomes. Resilience analysis explores the relationships between household shock exposure, capacities, and well-being outcomes.

The relationships between resilience capacities and outcomes are presented as predicted values or probabilities of outcomes. For example, in the resilience research on the three Title II programs in Bangladesh, the predicted values of the outcomes are computed using the estimated results from the respective regression specifications at varying values of resilience capacities (i.e., 0 to 1 in 0.05 increments; at the 25th percentile of a respective resilience capacity compared to at the 75th percentile of the resilience capacity; 0 and 1 if the resilience capacity is a binary variable) while holding all values of other explanatory variables constant at their means (TANGO 2017a).

Factor analysis was used to generate resilience capacity indexes for the three Title II programs in Bangladesh. A detailed discussion of how resilience capacities and resilience capacity indices were generated for the baseline of the three Title II programs are described in detail in the Bangladesh Resilience Research Report (TANGO 2017a).

Advanced quantitative techniques (growth regressions) are employed to understand which resilience capacities assisted households to recover, which enabled positive coping strategies, and which

prevented negative coping strategies. When using regression analysis, the dependent variable is the change in food security over time, and the independent variables include shock exposure, initial well-being levels, and household and community characteristics (Frankenberger, 2017b).

Qualitative Data Analysis

Qualitative information is critical to understanding the complex phenomenon of resilience. While quantitative data are the primary tool for understanding resilience, a mixed-methods approach enables a more comprehensive analysis that is better able to explain and predict resilience outcomes. Qualitative data allow insights into the influence of psychosocial traits on resilience, and on the role that social relations and power, social networks, social capital and aspirations play in resilience capacities. While quantitative analysis is the main way in which resilience is explored, qualitative information provides a dimension to resilience analysis that cannot be numerically explained. Conflict dynamics, people's perception of the severity and impact of shocks and the trade-offs they make to survive, and their opinion of the quality of services are a few of the determinants of resilience capacities that are explored through qualitative inquiry (Maxwell, et al, 2015).

Qualitative data are collected from key informant interviews and focus group discussions through a set of tools that are designed to elicit information about how households and communities prepare for, respond to and recover from shocks and stresses. The tools are designed to provide context for quantitative findings and to allow in-depth exploration of people's knowledge and practices around resilience. Qualitative data are transferred into topically-structured matrices and analyzed to identify patterns in responses to better explain quantitative findings. Responses from participants from all survey rounds are used to interpret and supplement findings from quantitative data analysis and identify differences in perceptions between groups, by gender and age, and over time.

Positive-deviant analysis can be used to find out which resilience capacities and coping strategies enabled households' success in managing shock.

Recurrent Monitoring Systems

Overview

Recurrent Monitoring Systems (RMS) are real-time data collection methods used to inform program implementers as to whether their interventions are building resilience, to identify the most critical points for initiating early response to a disaster risk, and to introduce crisis modifiers and other shock-responsive actions. RMS are part of a program's M&E systems and are established at the outset of a program to ensure that they are in place and ready to be operationalized when a shock is imminent

RMS have three main features: (1) real-time data collection following a predetermined shock trigger, (2) high-frequency, panel data collection of short duration, and (3) small sample size. RMS data collection activities are launched when trigger indicators, which are monitored from program outset, reach shock thresholds. Data sources for trigger indicators depend on the specific shocks or stresses that the RMS is designed to be sensitive to, and should include both objective and subjective metrics. (Frankenberger, 2017b) Once trigger indicators confirm the occurrence of a shock, RMS data collection should begin.

RMS employs both quantitative data and community qualitative surveys:

- *Quantitative survey*: A panel subsample is drawn from the baseline sample to monitor a small number of households (~400-800) at regular intervals to capture real-time impacts and changes in how people cope after a shock, and their rate of recovery.
- *Questionnaires* are short (15-20 minutes) and focus on shock exposure, resilience capacities, coping strategies, and well-being outcomes. It is important to include indicators that are sensitive to rapid change (i.e., “fast” variables).
- *Qualitative data* are gathered from sources (i.e., focus groups and key informants) that help contextualize quantitative indicators and define local concepts of resilience.

RMS is not a substitute for baseline, interim, and endline surveys, it complements them with timely information on the effects of and responses to shocks and stresses by households and communities. As resilience programming becomes more widely adopted, empirical evidence from M&E systems and other sources will be needed to measure how well households, communities, and systems manage shocks and stresses, and the performance of interventions to strengthen resilience capacities.

RMS in Asia

In Bangladesh, the CARE SHOUHARDO III program uses RMS as part of its overall M&E system. CARE's objectives in introducing RMS are to: (1) measure how effectively program interventions are contributing to the resilience capacities, and inform program decisions on how to adjust interventions accordingly; (2) increase understanding of which resilience capacities, in what form and where, have the greatest ability to help households mitigate shocks and stresses and achieve greater food security; and 3) provide evidence that allows the program to test and review its theory of change, and make adaptive management decisions. The RMS supports a SHOUHARDO III longitudinal study that tracks the rate at which beneficiaries adopt changes in project-promoted practices and will help program staff identify areas where a change in strategy may be needed.

The SHOUHARDO III RMS will cover 680 beneficiary households randomly selected from the baseline sample. It will collect data every six months for the next three years regarding the adoption of project-promoted practices related to livelihood activities, MCHN and hygiene, women's empowerment and decision-making, exposure to shocks and stresses, and household coping strategies. It will cover elements of absorptive, adaptive, and transformative capacities by gathering data on assets, savings, and credit; social capital, formal and informal safety nets, livelihoods, access to information, collective action and group participation, access to infrastructure and services, and information on livelihood and food security outcomes, including household income, household diet diversity, and household hunger (Langworthy, 2017).

V. Key Trends and Findings in the Asia Region⁸

Resilience Capacities

Absorptive Capacity

Households and communities with absorptive capacity are characterized by their ability to minimize their exposure to shocks and stresses, and to avoid permanent, negative impacts, through preventative measures and appropriate coping strategies.

The SHOUHARDO II resilience study showed that absorptive capacity was significant across the entire program area, and that household absorptive capacity helped to reduce the effects of the 2014 floods on hunger and food insecurity. The analysis showed that the greater this resilience capacity of households, the more able they were to mitigate the impact of the floods. The most important components of absorptive capacity in mitigating the flood impacts were bonding social capital and access to informal safety nets; asset ownership and the availability of disaster preparedness and mitigation measures also played important roles in reducing the impact of the 2014 disaster. A strong role for absorptive capacity would be expected in this situation of a rapid-onset climate shock as households gave priority to minimizing their exposure to the flood and recovering in its immediate aftermath (Smith and Frankenberger 2018).

In Bangladesh, the resilience analysis of households at baseline across the three Title II program areas showed very low absorptive capacity index scores: Nobo Jatra households 16.0, SHOUHARDO III 20.6, and SAPLING 14.0, out of a possible 100. Households also had very low asset scores (owning 3.7 asset types out of a possible 18), bonding social capital (average score of 12 out of 170); shock preparedness (7 percent of households), and savings (23 percent of households). “Almost none of the households in the sample have informal safety net support and/or access to preparedness and mitigation programs to counteract the impact of shocks. This may reflect a structural deficiency in community and social service infrastructure that supports shock preparedness” (TANGO 2017a).

The resilience analysis found that absorptive capacity has the greatest impact on household hunger and poverty in the three program areas. Improvements in household-level absorptive capacity are associated with higher incomes, lower poverty, higher food consumption, better dietary diversity, and a lower likelihood of household hunger, at any level of shock. Where differences were found in absorptive capacity across the three programs, they were mainly driven by the rate of household savings and accumulation of household assets (TANGO 2017a).

Further, absorptive capacity was found to have a strong influence on higher levels of poverty: “. . .at low initial levels of absorptive capacity, even a small increase (e.g., from 5 to 10) in the absorptive capacity score dramatically reduces the likelihood of poverty, whereas at higher initial levels of absorptive capacity, a similar increase (e.g., from 80 to 85) has a much lower reduction in the likelihood of poverty” leading to the conclusion that “households with higher absorptive and adaptive

⁸ Suggested further reading: recent research under the the *Resilience and Sustainable Poverty Escapes in Asia* project commissioned by the USAID Center for Resilience and conducted by the Overseas Development Institute (ODI). A summary and links to documents are available at <https://www.agrilinks.org/post/resilience-and-sustainable-poverty-escapes-asia-findings-synopses> and <https://www.odi.org/projects/2900-resilience-and-poverty-escapes>.

capacity are less likely to be poor [and are] are less likely to have moderate or severe hunger.” The Bangladesh resilience analysis further found that “Households with higher absorptive and adaptive capacity are more likely to consume a more diverse and nutritious diet, although the influence of either is not very strong” (TANGO 2017a).

In Nepal, it was found that improvements in both absorptive and adaptive capacity drive meaningful improvements in levels of poverty, expenditures, Household Dietary Diversity Score, household hunger, and recovery. Absorptive and adaptive capacities also are strongly related to reduction of poverty, more so than any individual program element. WASH and the adoption of improved agricultural practices are not strongly related to recovery, but there is evidence of a strong relationship in which they are related to better recovery through gains in absorptive and adaptive capacities (TANGO 2017b).

In urban contexts, resilience analysis must examine each of the resilience capacities at systems, community, household, and individual levels. Individuals and households have their own resilience capacities, but they are embedded within urban neighborhoods, which are further reliant on wider urban systems. Few resilience studies have been done in urban areas, but there are measures that city administrations can take to strengthen absorptive capacity in the face of shocks. In urban areas, absorptive capacity can help minimize the immediate effects of shocks on urban populations. For example, infrastructure such as sea walls, flood canals, and dams can protect cities from inundation; early warning systems and disaster risk planning can map out and publicize evacuation routes in order to improve response and recovery. City budgets can incorporate disaster contingency funds to prepare for covariate shocks, especially in areas where shocks and their effects are recurrent and predictable. Access to savings, credit and insurance for marginalized urban populations could help low-income people better prepare for and respond to threats such as coastal floods and windstorms, and enable them to maintain their food supply and employment after a shock (Frankenberger and Petryniak, 2016).

Adaptive Capacity

Adaptive capacity is built through the actions of households and communities to make forward-looking and informed choices about alternative livelihood strategies, based on an understanding of changing conditions.

The SHOUHARDO II resilience analysis showed that important aspects of adaptive capacity displayed by households were bridging social capital and exposure to information, along with asset ownership, livelihood diversity, and human capital. While all the resilience capacities came into play, the evidence for the importance of adaptive capacity was the most robust. Similarly, while all three resilience capacities contributed to more diverse diets, absorptive capacity made the largest contribution to household dietary diversity. Households with higher absorptive capacity were also shown to be more likely to have higher incomes. Psycho-social characteristics, e.g., aspirations and confidence to adapt, were also found to foster resilience (Smith and Frankenberger, 2018).

In the analysis of the three Title II programs in Bangladesh, the average adaptive capacity index values were relatively low: SAPLING 36.0, SHOUHARDO III 42.9, and Nobo Jatra 53.2. It was found that differences in adaptive capacity across the three areas are explained by variations in education, wealth (assets), and livelihood diversity (TANGO 2017a).

In Nepal, assets and access to markets were found to have the strongest impact on recovery. Absorptive and adaptive capacity also are positively related to recovery, but less so than direct impact of assets and markets. However, household resilience capacity was found to differ by caste, with higher castes possessing more assets and savings, and registering greater absorptive and adaptive capacity than lower castes (TANGO 2017b).

In urban areas, adaptive capacity—the capacity to modify certain conditions and practices—can help urban residents to reduce their exposure to shocks and stressors. For example, cities may offer many opportunities for livelihood diversification, though the risk posed by volatile markets can reduce employment opportunities. Access to financial services can enable households and businesses to diversify and pursue viable income-generating activities in the face of risk. Adaptive capacity can also be strengthened by offering opportunities for people to diversify their skills so they can pursue broader livelihood strategies (Frankenberger and Petryniak, 2016).

Transformative Capacity

Transformative capacity is the supportive enabling environment within which households and communities can access appropriate resources, and apply resilience strategies in order to absorb and adapt to shocks. It encompasses the governance mechanisms, policies/ regulations, infrastructure, community networks, cultural norms and formal and informal social protection mechanisms that constitute the enabling environment for systemic change. Transformative capacity creates the conditions to facilitate systemic change and a positive environment in which people are willing and able to invest and innovate while managing risk. These capacities include the formal and informal governance systems and institutions that operate at multiple scales (Frankenberger and Petryniak, 2016).

In the analysis of the 2014 Bangladesh floods, it was found that women's empowerment and local governance, two interventions supported by the SHOUHARDO II program, were the most important components of transformative capacity. At endline, indicators for women's empowerment (decision-making power, freedom of movement, income) showed significant gains, which likely helped to mitigate the impact of the floods (Smith and Frankenberger, 2018). SHOUHARDO II's support to community-level governance structures such as Village Development Committees helped communities to create and implement action plans, strengthening bridging social capital and transformative capacity.

Conversely, in the analysis of the three Title II program areas, it was found that transformative capacity did not have a strong influence on improvements in well-being. Transformative capacity levels were very low across all three program areas (6.8 out of 100). Households had little access to formal safety nets (average 0.08) from government and/or NGOs, and only 12.8% had access to agricultural extension services (TANGO 2017a).

An explanation for the low impact of transformative capacity is that transformative capacity is driven largely by access to formal safety nets. Households receiving assistance were identified by formal agencies (NGOs and government) as those who are less able to recover from shocks. Low transformative capacity may actually reflect effective targeting of formal safety nets to the most vulnerable households, who in turn are less likely to recover from shocks. Without access to formal safety nets, it is possible that these households would have been even less likely to recover. It was also found that transformative capacity negatively impacted the weight-for-height Z scores of children

under five, which may reflect accurate targeting of households that are worse off nutritionally (TANGO 2017a).

Transformative capacity has a positive but weak association with greater dietary diversity and the higher use of coping strategies. Households with more transformative capacity also tend to have a decreased ability to recover from shock, and higher levels of childhood wasting. The weak relationship between transformative capacity and outcomes could reflect an inability to capture salient dimensions of transformative capacity, such as quality of infrastructure and services and equitable distribution of services (TANGO 2017a).

In Nepal, transformative capacity is weakly associated with reductions in poverty, higher income, and higher dietary diversity and does not have as strong of an influence on well-being. “The weak relationships could reflect an inability to capture salient dimensions of transformative capacity, such as quality of infrastructure and services and equitable distribution of services. Transformative capacity is not frequently, nor meaningfully related to improvements in household-level outcomes; however, there is evidence that transformative capacity is positively related to absorptive and adaptive capacities” (TANGO 2017b).

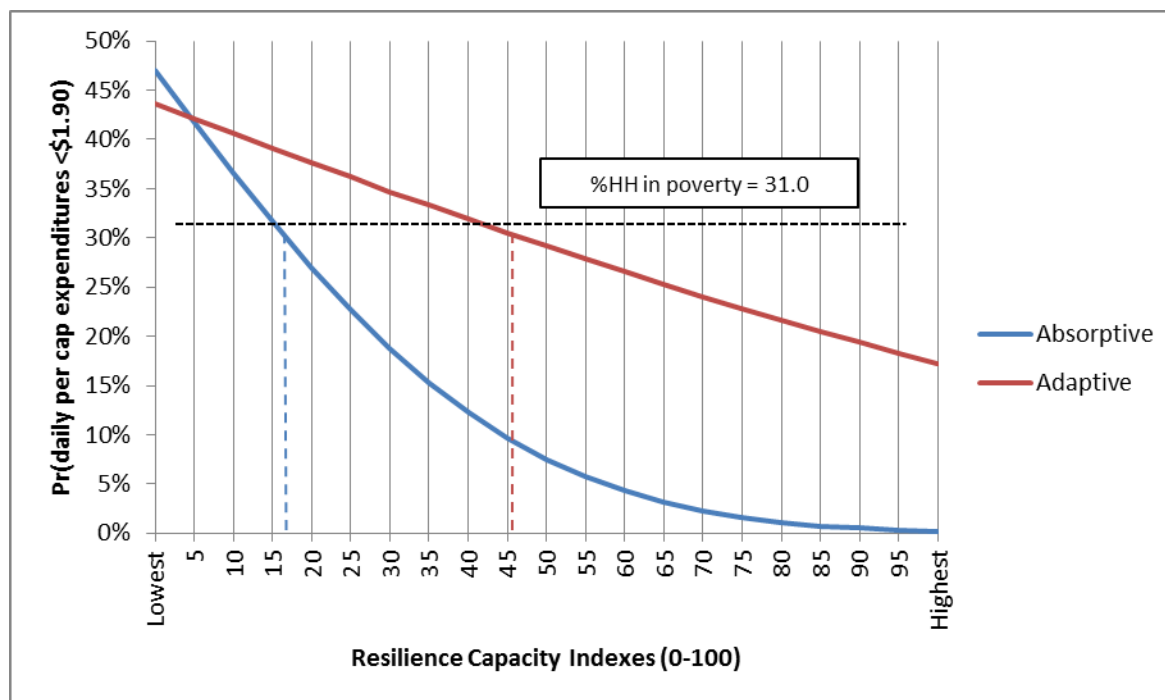
In urban areas, with their more complex administrative structures and formal systems, urban residents who are better linked to government bodies are in a position to advocate for their needs and hold formal government institutions accountable (Frankenberger and Petryniak, 2016).

Outcomes

Resilience analysis looks at which outcomes can be positively influenced through resilience interventions and at what outcomes or conditions (e.g., food security, poverty, nutrition and health, social, ecological, and economic systems) can be expected to influence resilience.

The 2015 resilience study of the SHOUHARDO III, Nobo Jatra, and SAPLING Title II programs in Bangladesh provided insight into factors that strengthen household resilience in Bangladesh. The resilience study found that households with higher absorptive and capacity adaptive capacity are less likely to be poor, and overall findings are that “Improvements in absorptive capacity is likely to lead to lower poverty, higher incomes, less hunger, and a more diverse diet (TANGO 2017a).

The analysis of the three Title II programs in Bangladesh did not find a strong relationship between absorptive or adaptive capacities and shock recovery, and a negative association between transformative capacity and recovery. As discussed above, this negative relationship may actually be a result of accurate targeting of formal safety nets to the most vulnerable households, for whom recovery would be more difficult without government or NGO assistance (TANGO 2017a). Overall, the finding that absorptive and adaptive capacities, as overall indexes, reduce hunger and poverty more than any other single measure suggest that most of the improvements in hunger and poverty are achieved through improvements made directly to absorptive and adaptive capacities (TANGO 2017a).

Figure 7: Probability of poverty predicted by absorptive and adaptive capacity levels

Source: TANGO 2017a

Other resilience analyses have found that households with higher absorptive or adaptive capacity are more likely to recover from shocks. For example, the World Food Programme's Enhancing Resilience to Natural Disasters and the Effects of Climate Change activity, implemented in northwest Bangladesh and the southern coastal belt, supported construction of rural infrastructure, and provided emergency preparedness and life skills training. An analysis found that the participating households were less likely to engage in negative coping strategies (e.g., reducing family expenses, taking loans, consuming less food of lower quality). An analysis of endline data from PROSHAR, a Title II program implemented by ACDI/VOCA in southern Bangladesh found that exposure to shocks in the previous 12 months had a negative impact on household food security, and that households with higher absorptive capacity are more likely to have adequate food and are less likely to go hungry (Frankenberger, 2017a). In Nepal, households with access to savings and remittances had greater absorptive capacity and therefore were more likely to recover from shocks (TANGO 2017b).

However, in the context of the Nepal Title II programs, resilience analysis has found that well-being outcomes can be improved, directly or indirectly, through improved absorptive, adaptive, or transformative capacities. There is strong evidence that absorptive and adaptive capacities contribute to improved outcomes in the face of shock. Components of absorptive capacity that appear to be particularly strong across all castes and likely contribute to improved well-being outcomes include access to informal safety nets, bonding social capital, and access to remittances. Components of adaptive capacity that support higher household resilience across castes includes higher levels of education, livelihood diversity, and access to financial services (TANGO 2017b).

Overall, in the Nepal analysis, several underlying components of resilience capacity directly support improvements in well-being, independent of their influence on absorptive, adaptive, or transformative

capacities. Access to savings and increases in household assets have a consistent and direct association with improved well-being outcomes. Access to markets has a strong, direct positive influence on households' ability to recover from shock. Household hunger decreases in association with higher education levels and bonding social capital. Bonding social capital, linking social capital, access to information, and access to infrastructure directly support reduced poverty. Notably, absorptive and adaptive capacities reduce hunger more than any of these other measures alone. This suggests that most of the improvements in hunger and poverty affected by the components of the resilience capacities are achieved through improvements made directly to absorptive, adaptive, and/or transformative capacities (TANGO 2017b).

In the Bangladesh analysis of the three Title II programs, it was found that several underlying components of resilience capacity directly support improvements in poverty and hunger, independent of their influence on absorptive, adaptive, or transformative capacities. Increases in household assets and bonding social capital, consistently and directly, are associated with better outcomes. Increased adoption of improved agricultural practices and greater access to formal safety nets directly support reduced hunger; while greater access to remittances, access to financial resources, higher education levels and greater livelihood diversity directly support reduced poverty.” Adoption of improved agricultural practices has the strongest influence on reducing hunger; those who engage in such practices are twice as likely to not experience hunger. Asset ownership reduces poverty more than any single other measure alone. “Movements from the bottom quarter of asset ownership to the highest quarter of households surveyed reduce the chances a household will be poor by roughly 20 percent” (TANGO 2017a).

Current Challenges to Resilience Measurement in the Asia Context

Certain data limitations affect recent resilience studies in Asia, many of which are constructed from data not explicitly collected for resilience analysis. For example, the Nepal Resilient Research Report relies on baseline data collected more than six months after the earthquake, when many households were already recovering from the shock. The Nepal baseline had data on a limited number of household responses to shocks, limiting the measures of coping strategies that could be analyzed. Important aspects of transformative capacity, e.g., quality of infrastructure and services, equitable distribution of services, participation in local governance, and gender equitable decision-making norms, were not adequately captured by the household survey and thus could not be included in the transformative capacity index (TANGO 2017b).

In the Bangladesh flood analysis study, two capacities that likely contributed to households' recovery could not be included due to lack of data: access to financial services, including savings and credit, and access to formal safety nets, such as the emergency food provided by CARE and the Bangladesh government (Smith and Frankenberger 2017). Further, women's empowerment and the quality of village governance were two elements of transformative capacity that may have mitigated the impacts of the flooding but were not quantitatively analyzed. Building on the growing conceptual and case study literatures on these subjects (e.g., Bedi et al., 2014; Leder, 2015; Gall & K. Nguyen, 2014), future quantitative studies will hopefully be able to explore these elements more fully. A key aspect of disaster preparedness and recovery in Bangladesh is the role of governance. On the issue of governance, future questions that are open to exploration include: (1) Which aspects matter the most when it comes to shock recovery—representativeness, responsiveness, transparency, accountability?;

(2) How specifically does governance serve to increase households' resilience, that is, which more proximate factors supporting resilience are enhanced by governance?; and (3) What are the drivers of resilience-enhancing good governance?

In urban areas, a major challenge for resilience measurement is the need to develop indicators to capture the contributions to resilience of the complex administrative systems and infrastructure that make cities function. It will be necessary to create indices to help measure the contribution of different systems, such as water and sanitation infrastructure, energy delivery systems, markets, or government disaster planning, to resilience. If such systems contribute to improved well-being in the face of shocks and stresses, the components of those systems need to be analyzed as resilience capacities (Frankenberger and Petryniak, 2016).

Social and cognitive factors play an important role in resilience, though few measurement frameworks fully consider psychosocial factors and individual resilience. Emerging research is generating evidence of the cognitive factors that influence well-being, aspirations, perception of risk, and self-efficacy. These less tangible factors, as well as the influence of social relations are difficult to measure and pose a challenge to efforts to capture resilience.

VI. Ways Forward: Recommendations for Future Investments in Resilience Measurement and Analysis

This section discusses recommendations for future investments in resilience measurement and analysis efforts in Asia.

A number of general principles regarding resilience measurement already discussed in this paper are considered valuable in the continuing M&E and research on resilience projects.

- **Use a resilience lens to analyze secondary data.** Substantial data are available through standard project monitoring and external sources such as the Princeton University Global Flood and Drought Monitor (GFDM), a real-time, satellite-based, flood/drought monitoring and seasonal forecast system. The GFDM allows Geographical Information System coordinates to be employed to download data from the internet for localized geographical areas.
- **Track data over time.** This includes RMS data to monitor resilience capacities over time and how capacities change in light of shocks experienced.
- **Emphasize data quality.** Data quality is a fundamental importance to resilience research. The suitability of indicators designed prior to undertaking resilience research must always be examined to ensure that the data collected suit the specific needs of resilience analysis. For example, a methodological limitation of a resilience study in Bangladesh was that the livelihood diversity measure used was "...not ideal, in that, it only counts the number of livelihoods employed by members of a given household. A better livelihood diversity measure would capture the number of different livelihoods in which a household participates across different livelihood risk profiles (e.g., climate risk, macroeconomic risk, etc.)" (TANGO 2017a: 4).
- **Work across scales.** Capturing data at household, community, and systems levels enables the assessment of resilience capacities at different levels, as well as the interaction between these levels.

The resilience approach is relatively new, and there is a lot to be learned about what works to build resilience. One difficulty is that while there is urgency to the need for resilience measurement and analysis, donor strategies may not have caught up to these needs and it is not always feasible to adequately address them through award funding. For example, there is growing tension between impact evaluation and performance evaluation in that donors may be more interested in an impact evaluation, yet projects need routine M&E. The potential exists for learning to inform advocacy efforts among key decision makers, yet resources for such activities need to be prioritized.

Considering these constraints, it is important to clearly define the aims of resilience measurement and analysis, and to prioritize M&E investments that will yield the most useful information while being cost-effective. This section identifies some areas for continued or new future emphasis, to aid decision-making around what aspects of resilience to measure, and how.

Value for Money

The impact of investments in resilience and early response to shocks can be measured via a number of “value for money” approaches. One methodology, Economic of Early Response and Resilience (EERR), draws on DFID research in Africa and Bangladesh and has been used to inform subsequent research by WFP. EERR applies the Household Economy Approach (HEA) to multi-year dynamic modeling to estimate food deficits. HEA analysis of income and thresholds quantifies the level of income and food that households need to survive and adequately sustain livelihoods to ensure other basic needs are met (REAL 2017). HEA is combined with scenario analysis to model the effects of droughts of different severity, early and late response (e.g. procurement of food commodities), and different intervention packages (e.g. emergency destocking, provision of veterinary services). The methodology results in a projected value for money of a “resilience + benefits” scenario that includes estimated values of averted humanitarian assistance; averted losses (e.g., livestock assets); and development/well-being outcomes (food and livelihood security at household level) (REAL 2017).

To make necessary budgetary and investment decisions, decision-makers seek consistent and quantitative tools to evaluate public investments.

- World Bank 2012a: x-xii

Another approach has been employed by TANGO to assess the moderating effect of project interventions on households that have experienced a shock using growth regressions and positive deviant analysis. Using RMS data from the Ethiopia PRIME project, TANGO tested project intervention intensity as a predictor of changes in food security and asset ownership over time. It also examined households that fared better than average over a drought episode to determine the contribution of PRIME interventions to household resilience. By analyzing coefficients for intervention intensity and shock exposure, the method is able to detect differential impacts on the resilience capacities of different PRIME intervention groups.

These two approaches are complementary: EERR is used as a model for national-level investments and RMS is for empirical analysis of household-level outcomes. RMS also informs decisions regarding better costing of “high-” and “low-” intensity intervention packages. These approaches could also be fine-tuned to increase their utility. For example, greater clarity is needed on the dynamics of household choices regarding coping strategies, there is a need for representative samples and for empirical evidence of change in humanitarian caseload/averted losses, and RMS should systematically integrate an iterative qualitative component.

Right-sizing Resilience Measurement Models

While resilience measurement uses many standard indicators collected through existing project monitoring, it also requires data on additional indicators specific to the resilience framework. Keeping in mind the additional resources needed to collect and analyze these data, and the added burden on project staff and beneficiaries, it is important to “right-size” M&E efforts for resilience projects to a level appropriate to the resources available and to research objectives, and to minimize the onus on all involved in data collection and processing. Table 2 presents an indicative list of indicators for “light” and “full” resilience measurement models. A “light” model may be more suitable for smaller projects in countries that the donor has not designated as resilience focus countries. In such projects, less information is required to measure most aspects of resilience. The “full” model is more appropriate for programs for which the donor has expressed a strong interest in resilience. These programs tend to be larger and more complex, with higher budgets. The full model attempts to capture nuanced and important household details and more community-level indicators to enable a comprehensive resilience analysis. This model thus calls for more indicators but also requires a higher level of investment to implement (Sagara, 2017b).

The indicator lists in Table 2 are highly generalized: it is critical to select and customize all indicators according to the project and context. The light model can be supplemented with measures from the fuller model according to M&E objectives and contextual needs. Both lists are based on past research regarding what information is important for understanding key resilience capacities.

Table 2: Resilience indicators for light versus heavy measurement models	
“Light” Model	“Full” Model
Bonding/bridging social capital	<<All “light” model indicators
Access to informal/formal safety nets, humanitarian assistance	Linking social capital, social network index, action, social cohesion
Access to savings, insurance	Access to financial services, markets, infrastructure, basic services, natural resources, agricultural extension
Asset ownership	Remittances
Education/training	Aspirations, locus of control, confidence to adapt
Livelihood diversification/risk profile	Coping Strategies Index (CSI)
Women’s empowerment	Access to information
Shock exposure and perceived ability to recover	Shock preparedness and mitigation
Depth of poverty	Participation in local decision making
Malnutrition (wasting)	
Experiential food security measure (e.g. HFIAS, FIES)	

Source: Sagara, 2017b

Adjust Frameworks to Rural versus Urban Contexts

While measuring resilience in rural and urban areas is based on a similar conceptual approach, these contexts are characterized by different vulnerabilities across neighborhoods, and heightened vulnerabilities in informal settlements. There are greater economic disparities in urban areas. Urban

systems have relatively higher complexity, and often have overlapping, unclear or disconnected administrative jurisdictions that may lead to conflicts that delay response.

Urban areas are at risk of large covariate natural hazards such as earthquakes, cyclones, and floods that affect infrastructure and operating systems. Transformative capacity is critical to urban resilience, which should be measured at the systems level, e.g., taking into account critical infrastructure and services such as water, power, etc. as well as policies, laws and leadership. Urban resilience depends on the larger governance environment and the design qualities of physical systems and municipal services. The characteristics of urban environments require different measurement criteria that focus on strengths and weaknesses and relative performance of systems over time.

Strengthening Resilience in Fragile Contexts

A high proportion of the poorest, most vulnerable households live in fragile contexts—environments characterized by political instability, conflict and violence, and often by additional risk factors such as natural hazards (e.g., droughts, floods, natural resource depletion) and socio-economic risks (e.g., population growth, displacement, and economic instability) (USAID C4R 2017). The combination of these factors increases the complexity of resilience analysis. Indicators of resilience capacity (e.g., assets, human capital, and social capital) must be considered in light of other factors that are fluid, highly context-specific, and difficult to measure. These include informal economic opportunity, gender equity, inclusivity and stability of governance institutions, and potential for violent conflict (REAL 2017).

Resilience measurement in fragile contexts requires reflection and response to the following questions (Asian Resilience MEL Session 3.4):

- What specific factors directly support or hinder household and community resilience in fragile contexts?
- How can contextual and systems analysis inform policy and programming in fragile contexts?
- How can we integrate drivers of conflict into our resilience frameworks?
- Are certain capacities correlated to the maintenance or improvement of well-being outcomes in the face of conflict? Are these unique to fragile contexts?
- What helps households/communities mitigate the occurrence and effects of conflict?
- What methods are most well suited to resilience research in fragile contexts?

Social and Cognitive Factors

Some of the key areas for future investigation into the role of social and cognitive factors in resilience are:

- What factors determine the aspirations and perceptions of self-efficacy of vulnerable populations? What is the effect on resilience capacities?
- How do different individual and community identities influence resilience capacities in different contexts?
- How do efforts to promote empowerment of vulnerable groups contribute to resilience capacities at individual and household levels?
- How do specific factors (e.g., access to financial services, livelihood diversification, and access to information) influence the ability and confidence to adapt to shocks and stresses?

- How do we refine our frameworks and analysis to better account for cognitive and psychosocial aspects of resilience?

Given the influence of culture on the factors above, it will be important to do advance work to contextualize these questions to the Asia (or other) context, and to analyze findings within the specific cultural framework.

Gender

Future resilience measurement efforts need to further focus on gender dynamics, household decision-making, and gender-specific resilience capacities at multiple levels. For example, with regard to women's empowerment, one question that needs examination is "What are the specific roles of the different aspects of empowerment, e.g., relative decision-making power within households, control over assets, freedom of movement, freedom from violence, women's education, and women's participation in political and civic life? Future studies also need to account for gender differences in vulnerabilities, exposure to risk, and impacts of shocks (Kumar and Quisumbing 2014).

There are also related areas for further inquiry that connect to gender. Resilience capacities—particularly informal safety nets, preparedness activities and the aspirations of caretakers—are potentially powerful links between resilience investments and child well-being: caretakers (who are usually women) must feel empowered to take care of their children. Empowerment may be a critical determinant of the effectiveness of child nutrition interventions. This needs to be reviewed more closely.

Important questions on gender to integrate into resilience measurement frameworks and tools include (REAL, 2017):

- How do gender differences and dynamics influence willingness and capacity to adapt livelihood strategies, aspirations, and different types of social capital?
- What differences in resilience capacities exist between men and women? What factors contribute to these differences?
- How do resilience capacities differ within gender groups (e.g., among elderly, persons of productive age, and teen and pre-teen males and females)?
- What (if any) adverse gender outcomes have resulted from resilience building efforts?
- How does women's empowerment affect household resilience capacities and outcomes? What differences exist across contexts?

Analysis of Resilience Capacities in the Context of Multiple Shocks

Shocks or stresses rarely occur as isolated events; rather, one shock often contributes to another, resulting in households experiencing several shocks or stresses simultaneously. Initial or primary shocks such as a severe weather event often cause or trigger "downstream" shocks. For example, high food prices can lead to social unrest, which can itself be experienced as a shock; drought can have a range of consequences with different onset points throughout the drought's trajectory (TANGO 2018b). For instance, prolonged lack of water and pasture due to drought can lead to livestock weight loss, ill health, and death and livestock prices may fall because markets are over-supplied with sick and emaciated animals. Drought also can cause crop failure and food shortages that trigger food price hikes. Household members, especially those working in agriculture and livestock, may lose their jobs and be unable to

afford food. Failed crops, lack of water, and cash shortages may additionally mean lower dietary diversity, increased malnutrition, and a higher incidence of diarrheal diseases, measles, and malaria.

One dimension of resilience analysis still in early stages of development is the interaction of resilience capacities with specific shocks when multiple, cumulative, and downstream shocks are in play. The potential for multiple shocks—as well as possible interactions among shocks—suggests that shocks should not be considered in isolation from each other (TANGO 2017b). This was the case in Nepal, where it was found that “Households affected by the earthquake were more likely to experience market price fluctuations and floods/landslides. Further, households that reported experiencing negative impacts, specifically from the earthquake, more often reported a household member falling seriously ill” (TANGO 2017b).

Some research indicates that the effects of downstream shocks generally outlast the initial shock (TANGO 2018b). For example, resilience analysis of household survey data in Somalia found that while the effects of drought leveled off in intensity, some effects continued past the point when the drought begins to decline. Other effects started with the onset of the drought, and then increased in intensity as the climate shock wound down. Still other downstream shocks had a much later onset, first appearing as drought began to decline.

As suggested above, initial shocks and downstream shocks may have different trajectories and durations. A household may experience a series of shocks (e.g. drought followed by earthquake), layering these trajectories atop of one another. One interesting question that arises from these phenomena is how resilience capacities influence responses to each of these different shocks over time, and vice versa, how different shocks at different stages influence resilience capacities. A related question is how exposure to one shock affects resilience to downstream and/or future shocks.

Engage in a Learning Agenda

Resilience measurement is a rapidly evolving field of practice. There are knowledge gaps and emerging research questions to be investigated. Looking ahead, organizations engaged in resilience research should prioritize and identify opportunities to address knowledge gaps and emerging research questions in resilience measurement and analysis. These include shock-specific analysis of resilience capacities at multiple levels, and how to strengthen resilience among mobile and among urban populations. A way forward is to prioritize thematic research areas for resilience analysis (e.g., gender, social relations), and use ongoing initiatives or create new opportunities to address knowledge gaps in different thematic areas.

Thematic research should also consider the influence of context on resilience capacities, whether urban, peri-urban, or rural (REAL, 2017).

The REAL Award learning agenda is an ongoing process to identify and refine themes and research questions relevant to resilience policy and programming. Project partners should look for opportunities to program or initiate research activities that offer a chance to test hypotheses and refine measurement and analysis approaches.

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