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REPORT 5

The Influence of Subjective and Psycho-social Factors on People's Resilience: Conceptual Framework and Empirical Evidence

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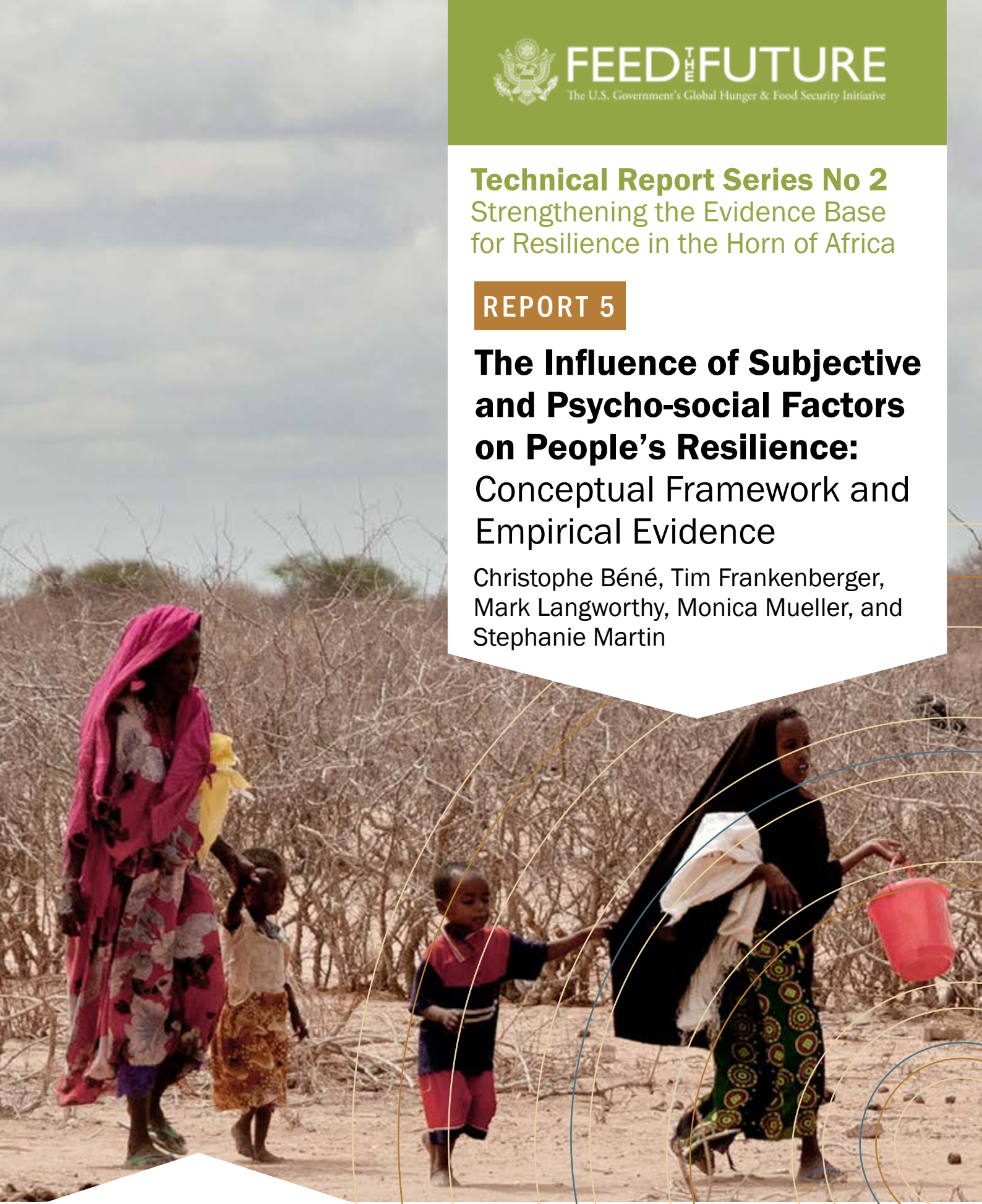

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1 Introduction and context

Since the rise of resilience as a key concept in the humanitarian and development sphere, and its recognition as a central mechanism affecting the ability of people to deal with shocks and extreme events, a growing number of papers have attempted to identify the underlying primary determinants of resilience. So far the focus of this empirical search has been mainly on financial (i.e. income, assets), technical (e.g. knowledge, skills, education, capacity) and institutional (e.g. governance, social capital) factors. A large body of literature, for instance, points out how better-off households are more likely to bounce back better or more quickly after a disaster than less well-off households in the same community, even if the former may have lost a greater amount of assets (in terms of value) during the disaster e.g. (Carter, Little, Mogues & Negatu, 2007). Likewise, a growing body of research has been trying to establish the extent to which governance arrangements and community or group characteristics such as social cohesion or 'good' governance (e.g. leadership; participation and inclusiveness in decision-making) influence communities' ability to 'reconstruct' themselves after an extreme event (e.g. Schwarz et al., 2011; Woodson, Frankenberger, Smtih, Langworthy & Presnall, 2016).

Yet these same articles also recognize that only looking at tangible factors such as assets, livelihood strategies and financial or social capital does not capture everything that influences resilience. Improving understanding about individual or community resilience also requires accounting for more subjective elements, such as aspirations, expectations and motivations of individuals and households (Béné et al., 2016; Bernard & Taffesse, 2014; Jones & Tanner, 2015). Risk perception for instance, which is determined and influenced by cultural and other psycho-social factors, affects how people respond to shocks and stressors. "Risk perceptions are socially constructed with different communities predisposed to attend to, fear and socially amplify some risks while ignoring, discounting or attenuating others" (APA, 2009: 26).

The emerging evidence from the field therefore stresses the need to include psycho-social factors and subjective measures in theories of change alongside economic and other traditional variables to build our understanding of what factors contribute to resilience at different levels. Related concepts that have gained traction in the climate change literature include the influence of cultural factors, aspirations, self-efficacy, well-being and attitudes toward innovation and learning (Brown & Westaway, 2011; Constas et al., 2014; Frankenberger & Nelson, 2013a; Griffin, 2013; Grothmann & Patt, 2005).

In summary, although shocks, unforeseen events and changes affecting people's lives and livelihoods are part of an 'objective' (i.e. measurable) reality, the evidence suggests that individual and collective responses and adaptation are also influenced by the subjective perceptions that people have about that reality (Camfield & McGregor, 2005; McLaughlin & Dietz, 2008; Weber,

2005). In these circumstances, it becomes as important to try and understand people's perceptions about a particular event (e.g. a cyclone) as it is to assess the quantitative impacts of that particular event if one wants to make progress toward understanding which factors contribute to resilience.

However, understanding such perceptions and the wider psycho-social factors that underlie them is challenging, largely because these psycho-social factors are malleable and evolve over time under the influence of some of the more traditional factors mentioned above (i.e. wealth, knowledge, education). Their analysis is also confounded by the fact that communities are not homogenous, either in terms of exposure to threats or in terms of individuals' access to resources. Whether small or large, communities are highly varied in terms of age, gender, class and ethnicity. These differences are highly significant to the vulnerability and resilience of individuals.

The objective of this paper is to further investigate these questions, conceptually and empirically. Although resilience researchers and development practitioners are beginning to acknowledge the influence of these psychosocial and cognitive factors and the importance of concepts such as "subjective resilience", the conceptual framework underlying these ideas is still lacking. In this context, we propose, first, to review the available evidence, keeping in mind that this evidence relates mainly to adaptive capacity and willingness to engage in innovation, for which a lot of research has been done in the last 10 years, and not to resilience *per se*, for which there is still an important lack of focused analyses. We will then develop a conceptual model which deconstructs and identifies some of the elements and mechanisms at work in relation to subjective resilience. Finally, we will examine several case studies to explore a series of hypotheses testing the relevance of psychosocial factors and individual perceptions in explaining individual, household and community responses and capacity to handle shocks.

2

Literature review on subjective elements of **resilience**

This literature review focuses primarily on how individuals perceive the risks of shocks and stresses to which they are susceptible, how they view their capacity to adapt to shocks and stresses in order to attain satisfactory or improved livelihood outcomes and how these perceptions affect actions people take to adapt. This information is assessed largely via methodologies of qualitative inquiry, subjective assessment and psychometric testing. This section reviews the core ideas with respect to three types of psychosocial measures that are posited to influence adaptive capacity: **risk perception**, **self-efficacy** and **aspirations**.

RISK PERCEPTION

Risk perception has two meanings in the resilience literature. These are worth distinguishing because the precise definition has implications for measurement and interpretation. One meaning is the perceived risk of experiencing a slow-onset or sudden shock (e.g. drought or earthquake, respectively). Another meaning is the perceived risk associated with following a certain course of action to maintain or improve one's livelihood outcomes or wellbeing in response to a shock or stress.

The perception of risk is influenced by what information is available and accessible and by the ways people assess and value the information. One such example of the type of information available is predictions about seasonal and long-term climate conditions, which can come from either scientific modelling or traditional knowledge. The importance of the latter is increasingly appreciated in resilience work. "Historical and current adaptation is and continues to be informed by perceptions and local knowledge based on perceptions and previous experience of weather and climate" (Adger et al., 2009, p. 346). Adger, Barnett, Chapin and Ellemor (2011) argue that social processes and relations have an important role in people's perceptions of risks and their own adaptive capacity. They recognize that social processes and relations may be difficult to measure but are as important as natural, human and financial capital for understanding resilience.

Risk perception is also influenced by the source of information. An individual's immediate social circle may provide the most highly valued information with family and neighbours being the most timely, proximate and trusted information sources. This is a function of bonding social capital.[1] Close information sources share knowledge about historical events and their own experience assessing and managing risk and shocks (Frankenberger & Nelson, 2013a). These sources

[1]*Woodson et al., (2016). The effects of social capital on resilience: Evidence from Ethiopia, Kenya, Uganda, Niger and Burkina Faso. Report prepared by the Technical Consortium, a project of the CGIAR. Technical Report Series No 2: Strengthening the Evidence Base for Resilience in the Horn of Africa. Nairobi, Kenya: A joint International Livestock Research Institute (ILRI) and TANGO International publication. (in press)*

in turn, form part of a "social world" that further mediates how information is collected, constructed, represented and amplified. This world extends beyond family and neighbours to broader social exposure and connections, such as links to friends, overheard conversations, media and risk advisories from official sources. "Such vicarious social learning includes the individual and cultural learning of adaptive practices and competencies with respect to risk, danger and uncertainty" (APA 2009, pp. 56-57).

Linking Perception To Response In Zimbabwe

Grothmann and Patt (2005) found past models of adaptation to climate change to be deficient because they omit cognitive factors. They examine the psychological linkages between perception and response to understand where the greatest constraints to action lie. Their research utilizes findings from a project in Zimbabwe (Patt & Gwata, 2002), which focused on communicating rainfall forecasts (lower than normal rainfall) and its possible effects on maize harvests. In the study area, farmers received timely information about predicted rainfall and the potential benefits of millet over maize, given the predicted level. Moreover, millet seed was less expensive than maize. Nonetheless, farmers largely chose not to plant millet, even though millet was a better choice from an objective evaluation (i.e. lower cost, likely higher yields). Grothmann and Patt's model helped to explain that first, farmers' decisions were not sensitive to objective evaluations of relative likelihoods of different outcomes, and second, farmers were "unwilling to believe that their actions can actually protect themselves from harm" (Grothmann & Patt, 2005, p. 208).

SELF-EFFICACY

To date, research on the role of self-efficacy in resilience has focused on academic achievement (Martin & Marsh, 2008), poverty (Canvin, Marttila, Burstrom & Whitehead, 2009) and health (Yi, Vitaliano, Smith, Yi & Weinger, 2008). In their work on health, Yi et al. (2008) consider self-efficacy to be a component of resilience itself. However, none of this research was conducted in the context of developing countries.

Brown and Westaway (2011) define self-efficacy as the "belief in one's own ability to perform a task and to manage prospective situations". They write that self-efficacy is among the subjective and relational factors, which, along with objective measures, determine how people cope with shocks and stresses. The authors note the need for systematic analysis in order to more fully understand responses. As noted by APA (2009), in responding to a shock or stressor, people evaluate their abilities with respect to possible responses, e.g. one assesses "one's ability to engage in a behaviour (i.e. self-efficacy), the likelihood of a behaviour to result in the desired outcome (i.e. response efficacy), constraints on response options, and the relative perceived costs and benefits of responses.

ASPIRATIONS

The concept of aspirations encompasses beliefs, preferences, and capacities relevant to the future and future-oriented behaviour (Appadurai, 2001; Bernard, Dercon & Taffesse, 2011; Bernard & Taffesse, 2012, 2014; Rao & Walton, 2004). One concept relevant to aspirations is fatalism, which Bernard et al., (2011) define as: "...a sense of helplessness that a person may feel with regard to proactively modifying his or her future. From an economic perspective, and to the extent that it relates to current action and its impact on future outcomes, fatalism is equivalent to not making the necessary investments to better one's well-being. It may thus be the case that people refrain from making investments that would enhance their well-being because they believe, in a boundedly rational way, that such investments are either infeasible or would not lead to significant changes (p. 2)."

Fatalism has been used in resilience research to construct measures of aspirations and is defined as, "the sense of being powerless to enact change and having no control over life's events (Smith et al., 2015; TANGO, 2014)".

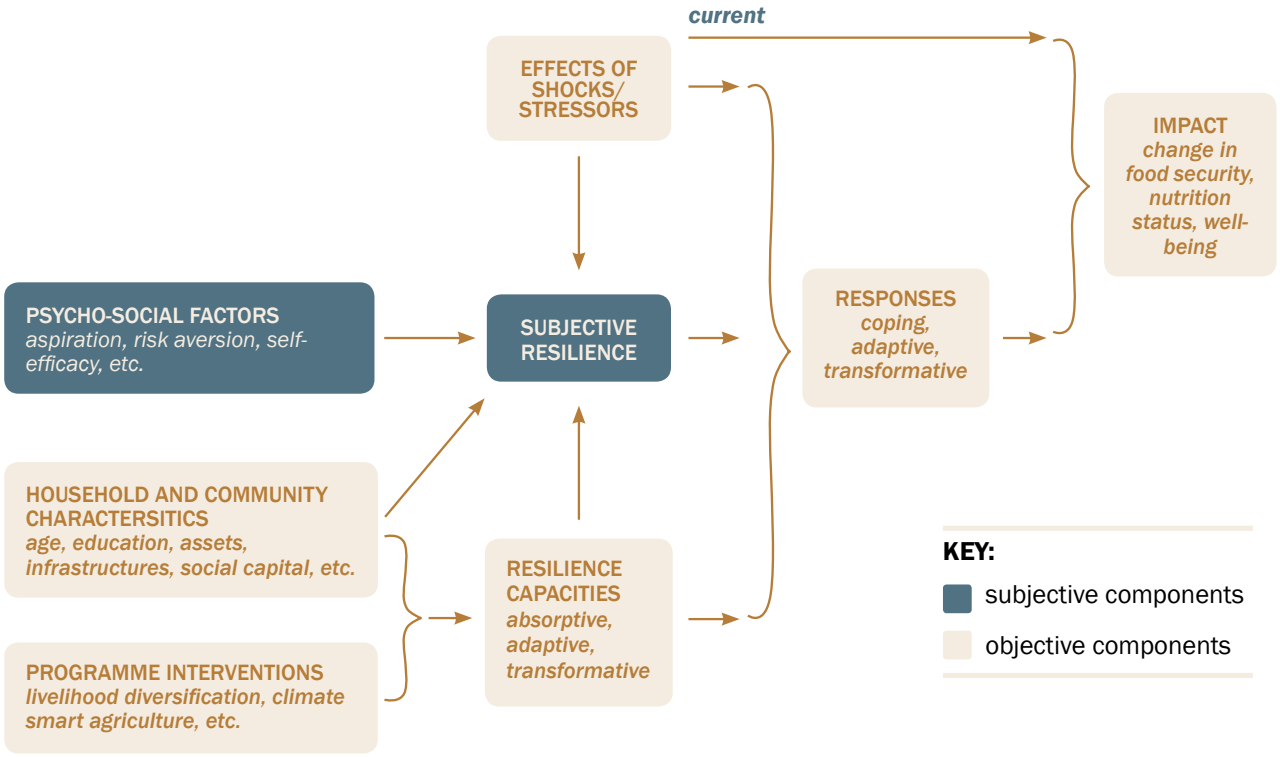
Other concepts and measurements used in the construction of aspirations' models include locus of control, depression scales and self-efficacy; however the nuances across these concepts may pose analytical problems because they

differ from aspirations in significant ways (Bernard & Taffesse, 2012, 2014).
In their assessment of four studies on aspirations in different contexts in Nicaragua, Ethiopia, India and China, Bernard and Taffesse (2014) find that all studies, "…converge towards the importance of aspirations in influencing future-oriented behaviour – whether it is school enrolment, nutrition or other future-enhancing investments. They also support the idea of aspiration windows argued by Ray (2006), whereby aspirations are positively influenced by 'relevant peers' in one's community. Altogether, these features provide substantive support to the idea that the relationships described exist over and above issues of measurement errors highlighted in the economic literature, thereby calling for further empirical investigation of the role played by aspirations in affecting well-being, as well as the process by which aspirations are formed."

3 Conceptual framework

The focus of this section is the development of a conceptual framework, the aim of which is to deconstruct the relationships between key elements of decision making processes used by households when responding to shocks and stressors. The development of this framework builds on work by Béné, Frankenberger & Nelson (2015) and Béné et al. (2016), in which the authors postulated that the outcomes of an adverse event, measured in terms of change in household wellbeing, food security or nutrition status, do not merely result from the direct impact of the initial shock (e.g. destruction of assets, loss of livestock, physical injuries) but are instead the result of the shock's immediate impact combined with the medium- to long-term impacts of responses employed to counteract the shock (cf. Fig.4 in Béné et al., 2015). To use a concrete example, when a household decides to send their eldest son to the capital city following the loss of two consecutive harvests due to ongoing severe drought, the ultimate outcome of this event is not merely the impact of the drought and subsequent loss of harvests but rather the combination of that impact with the long-term consequences of the household's response (i.e. sending the son away). A neighbour in the same community who experienced the same event (loss of harvests due to drought) might have responded differently (e.g. borrowing money). The outcome for the neighbour's household will be different, even though it was exposed to the same initial shock. Our framework is represented in Figure 1. The following paragraphs detail the conceptual foundation behind it.

Figure 1: Conceptual framework representing two components of resilience



As the purpose of this paper is to explore the role of subjective elements and psycho-social mechanisms and factors that contribute to resilience, it is useful to characterize the factors that contribute to resilience as objective and subjective. The more 'objective' component is a combination of tangible factors operating at the individual, household or community level such as income, assets, livelihood strategies, capacities, knowledge or access to infrastructure and services. As mentioned earlier there is a rich and growing body of literature describing these. Although further research is still necessary, some consensus is emerging around the role of some factors, for instance, the key role of assets and social capital in affecting households' resilience (Smith et al., 2015). The second component of resilience, the subjective element, is the subject of further examination in this paper. Multiple psycho-social and cognitive elements make up this subjective dimension but operate essentially at the individual level (although the projected perception which they create may be related to household or community levels). Some of these have been mentioned previously in this paper (e.g. risk aversion, self-efficacy, confidence, aspiration).[2] Until recently however, most of these are discussed in the literature in relation to adaption, adaptive capacity or willingness to engage in change/innovation but not with respect to resilience.

[2] We leave this list open, as the objective here is not to pretend that we cover or discuss all of them, but simply to recognize that many psycho-social factors are potentially involved.

Subjective resilience is the perception that individuals, households, or communities have about their ability to handle *future* shocks and stressors (Béné et al., 2016). Subjective resilience relates to the assumption that people have a good understanding of the factors that enable them to manage shocks and adverse events. Household subjective resilience, therefore, relates to the self-evaluation of individuals' or households' capacities and is strongly related to and influenced by the psycho-social factors mentioned above (e.g. self-confidence, risk aversion). It is important to distinguish these factors as collectively comprising a subsequent specific cognitive component, which can also be made up of other, more concrete elements such as the household's socio-economic situation or previous experience with similar shocks. An illustration of subjective resilience, building on the previous example, could involve the household response taking into account the fact that the eldest son is no longer living with the family. Given these circumstances, the household could then turn to other immediate options, and draw on the resources of extended family if necessary. Different experiences influence people's perceptions of their capacity to manage future shocks/stressors. Subjective resilience is also influenced by NGO or government 'resilience strengthening' interventions (e.g. capacity building, group training). Such interventions often aim to improve household revenue and community cohesion; they also alter community members' perceptions about their ability to manage current and future shocks.

To a large extent, the concept of subjective resilience, as described here, is very close to the concept of "perceived adaptive capacity" defined in the socio-cognitive model by Grothmann and Patt (2005) describing adaptation to climate

change. The Grothmann and Patt (2005) model examines decision-making processes through which people consider whether or not to adapt and the authors emphasise that decisions are based mainly on subjective perception as opposed to "objective adaptive ability". In their words, "The objective ability or capacity of a human actor (what an individual, group or a culture could do, indicated by the availability and the access to resources) only partly determines if an adaptive response is taken. [Equally important is] the subjective or perceived ability of human actors (...)" (Grothmann & Patt, 2005, p. 202).

The important point is that subjective resilience, like perceived adaptive capacity, is assumed to be a critical element in the households' decision-making process. The decision is not simply about whether or not households should engage in a response, but about the choice (nature and intensity) between different types of coping strategies, including adaptive and transformative responses. To use a relevant example, in the *Char* region in northern Bangladesh, households that lose their homes and assets to erosion or flooding usually have to choose between staying in their village and rebuilding their livelihoods, or migrating to an urban centre. Group discussions reveal that the decision to stay or migrate is made based on household perceptions about their ability to restore their livelihoods (Béné personal observation, 2015). If people feel that they can rebuild their livelihood, they stay; if they feel that they have lost so much land or assets that they will not be able to recover, they migrate. This decision is based on cognitive, partially subjective processes whereby people evaluate whether and to what extent they expect to be able to 'bounce back' and what response they need to put in place to achieve this. The long-term outcome (in terms of change in household members' wellbeing) largely depends on this decision, not simply on initial losses caused by the shock event.

Figure 1 depicts how subjective resilience, along with the underlying psycho-social factors and more objective factors (e.g. household socioeconomic and demographic characteristics: age, education, assets, social and human capitals) contribute to the outcomes resulting from the chosen household response. The figure highlights the central argument of this paper. To achieve a more appropriate understanding of household resilience, one needs to consider not only the objective (observable) determinants of resilience, but also the less tangible (and perhaps more importantly) subjective factors that influence resilience; those that are derived from psycho-social factors such as individual self-confidence, attitude toward risk or self-efficacy, and that translate into the perceived ability of people to handle shocks/stressors in the future.

4

Empirical evidence – testing the framework

The previous section presented the main argument of this paper from a theoretical or conceptual perspective. This section tests the empirical validity of this argument through the analysis of several examples derived from recent research conducted by the authors of this paper in Africa and Asia. The selection of examples was guided by the availability of data associated with household resilience and the subjective or psycho-social aspects of this resilience. This second condition was relatively challenging as most of the attention in resilience analysis with respect to food security has so far focused primarily or exclusively on the more tangible potential determinants of resilience (i.e. assets, education, skills, social capital or human capital). A larger pool of data is available on this in the literature on climate change adaptation (e.g. Adger et al., 2009; Crane, Roncoli & Hoogenboom, 2011), but very little is available covering resilience (with the exception of Marshall & Marshall, 2007). Two different pieces of research were used, (1) a study on fishing communities in Ghana, Fiji, Vietnam and Sri Lanka (Béné et al., 2016), and (2) rural households in two regions of Ethiopia (Smith et al., 2015).

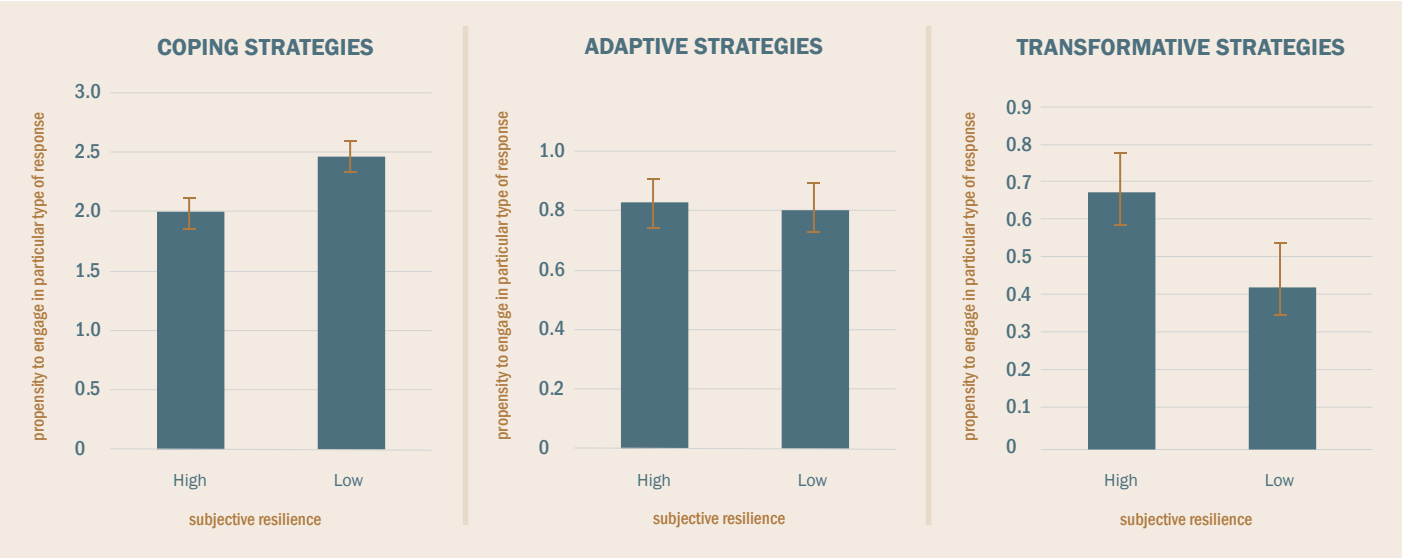
For these datasets, the following two hypotheses were tested more formally:

1. The choice of the responses put in place by households is not solely dependent on tangible factors, but also reflects the subjective dimension of resilience, in particular the perception that people have of their own ability to handle future shocks and stressors.
2. Psycho-social factors such as risk aversion, self-confidence or degree of fatalism are potentially important elements in influencing the ability of people to recover from shocks/stressors.

Hypothesis 1: Subjective resilience does influence households' response to shocks/stressors

Within the study on fishing communities (1), a question had been included which was intended to measure the level of subjective resilience amongst households, where 'subjective resilience' was defined in line with the interpretation presented earlier in this paper (i.e. the perceived ability of households to manage future shocks). The query was asked in relation to the most frequently observed shocks and stressors in the communities. The individual scores for each shocks/stressors were averaged for each household and then computed at the community level, thus defining two distinct groups: households with a subjective resilience score above the average score of the community ("high subjective resilience") and those with a subjective resilience score below the average ("low subjective resilience"), respectively. The propensity of engaging in different types of responses was then computed for these two groups. Figure 2 summarizes the results.

Figure 2: Comparison of the propensity to engage in different types of strategies (responses) for the two groups of fishing households



Note: those with a subjective resilience score above the community average score (noted "high") and those with a subjective resilience score below the community average score (noted "low"). Error bars: 95% confidence intervals

The analysis shows that the two groups are characterized by statistically different propensities to engage in different types of responses. In particular, when responses were divided into coping strategies (reducing expenses, reducing food consumption, borrowing money or selling assets); adaptive strategies (diversification within the fishery; adoption of new fishing techniques); and transformative strategies (migration, diversification outside the fishery sector), the data reveals that the households with lower subjective resilience act in a different manner than the households with the higher subjective resilience. In particular, lower subjective resilience households are more likely to engage in detrimental coping strategies and less likely (or less willing) to adopt transformative strategies than households with higher subjective resilience (t-test $p < 0.0001$ for both tests). No difference was found between the two groups in relation to their respective propensities to engage in adaptive response.

The hypothesis which postulates a possible relationship between the choice of responses put in place by households in relation to shock/stressor and psycho-social factors was also tested using a household survey that was conducted in two regions in Ethiopia (Jijiga and Borena). In this case no question had been specifically formulated to estimate the level of subjective resilience of these households but a series of questions had been included to assess some of the psycho-social factors which were thought to influence people's perceptions about their subjective resilience. In particular, an index was constructed of the self-assessed degree of control that people have over their lives, which is sometime referred to as 'self-efficacy' in the literature (see e.g. Brown & Westaway, 2011, earlier in this paper).[3]

Table 1 presents the series of questions that were included in the questionnaire to assess this self-efficacy score.

[3] Brown and Westaway (2011) definition of self-efficacy is "the belief in one's own ability to perform a task and to manage prospective situations".

Table 1: Evaluation of household self-efficacy

	STRONGLY DISAGREE	DISAGREE	SLIGHTLY DISAGREE	SLIGHTLY AGREE	AGREE	STRONGLY AGREE
I feel like what happens in my life is mostly determined by powerful peoples.						
My life is chiefly controlled by other powerful people.						
I can mostly determine what will happen in my life.						
When I get what I want, It is usually because I worked hard for it.						
My life is determined by my own actions.						

Note: The first two questions were reverse-coded for the analysis.

Ordinary least squares (OLS) regressions were run to determine whether this self-efficacy score influenced the choice of people's responses to shocks/stressors. Exposure to 18 different kinds of shocks, which occurred in the 12 months prior to the survey, were recorded and used for the analysis.

Table 2 shows the regression results for the two regions (Jijiga and Borena). In Jijiga, people's self-efficacy score appears to be statistically negatively correlated with the propensity to engage in coping strategies ($p = 0.012$) – meaning people with a higher sense of control over their own life seem to be less prone to engage in coping strategies. In Borena, on the other hand, this relationship was not found to be statistically significant. Other factors that appear to have a statistically positive impact on the propensity of households to engage in coping strategies are the cumulative number of shocks faced by the households and the extent of livelihood diversification. In another paper in this series, social capital does have a positive effect on people not turning to negative coping strategies.

Table 2: Results of the ordinary least squares (OLS) regression models used with the Ethiopian dataset to assess the influence of self-efficacy on households' propensity to engage in coping strategies.

	JIJIGA: OLS TOTAL COPING STRATEGIES			BORENA: OLS TOTAL COPING STRATEGIES		
	∂	t	sig	∂	t	sig
SELF-EFFICACY AND SOCIAL CAPITAL						
Self-efficacy	-0.059	-2.601	**	0.011	1.166	
Bonding index	0.016	3.871	***	-0.001	-0.481	
Bridging index	0.025	4.143	***	0.011	4.111	***
Linking index	0.007	0.704		0.002	0.333	
OTHER HOUSEHOLD CHARACTERISTICS AND SHOCK EXPOSURE						
Count of shocks	0.286	5.347	***	0.359	8.157	***
Count of livelihoods	0.796	5.688	***	1.209	7.603	***
Wealth index	0.035	1.535		-0.004	-0.480	
Human capital index	0.628	1.341		0.114	0.471	
Age head of household	0.008	1.212		-0.004	-1.005	
Household size	-0.005	-0.092		0.094	2.956	**
Female headed	0.146	0.400		0.099	0.444	
Bartira clan	-0.262	-0.302				
Jidwaaq clan	0.439	0.274				
Issa clan	1.985	1.250				
Issaq clan	0.060	0.069				
Abasquul clan	0.173	0.254				
Giri clan	0.076	0.085				
Geri clan	-0.278	-0.209	**			
Other (specify)	-0.057	-0.064				
Borena clan				0.567	3.768	***
_cons	-0.850	-0.604		-0.480	-0.783	
Number of obs	1154			1463		
R-squared	0.1980			0.2515		

Hypothesis 2: Psycho-social factors do influence the ability of people to recover from shocks/stressors

If, as the analysis of the subjective resilience in fishing communities and the Jijiga analysis above suggest, psycho-social factors have some influence on the type of strategies put in place by households to respond to adverse events, one can also envisage that some of these psycho-social variables may also have some effect on the level of recovery of those same households. This hypothesis is explored using the same data sets employed to probe the previous hypothesis.

Estimating the effective (objective) level of resilience may be methodologically (or even conceptually) challenging (Béné, 2013; Frankenberger & Nelson, 2013b). In theory, high frequency panel datasets would be required (Barrett & Headey, 2014; Béné et al., 2015) and these are not readily available. In the absence of such panel data, however, it is still possible to assess the level of recovery of

households to shock and stressors through self-reported scores. While the use of psychometric measurements in the specific case of resilience could be subject to adaptive preference[4], it is possible to mitigate (or to reduce) this risk (see e.g. Béné et al., 2016) and generate reliable self-reported scores.

Using the data from the fishing communities surveyed in Ghana, Fiji, Vietnam and Sri Lanka, a resilience index (understood as the ability to handle **past** shocks and stressors) was constructed, specifically applying the self-reported scores associated with each of the different types of shocks/stressors that had affected the households over the past 5 years. The index was then aggregated at the household level to obtain a household resilience index (see details in Béné et al., 2016). From this, the potential influence of households' **subjective** resilience on the resilience index could be explored, using a mixed effect regression model and controlling for other factors such as assets, education or even severity of shocks. The results are displayed in Table 3.

[4] The deliberate or reflexive process by which people adjust their expectations and aspirations when trying to cope with deterioration in living conditions (see, e.g. Nussbaum, 2001; Teschl and Comim, 2005).

Table 3. Results of the mixed effect regression model used with the Ghana-Fiji-Vietnam-Sri-Lanka dataset to assess the effect of subjective resilience on the household resilience index

RESILIENCE	COEF.	Z	SIG
Subject_Res	1.74	14.76	***
Severity_very high	-1.74	-3.68	***
Severity_high	-1.61	-3.42	***
Severity_medium	2.5	3.3	***
Severity_low	5.29	2.45	*
Categ_event_shock	0.46	1.58	
Categ_event_stressor	1.02	2.65	**
Predictab_very low	-0.13	-0.31	
Predictab_medium	0.87	1.72	
Predictab_fair	-0.13	-0.39	
Predictab_good	0.33	0.76	
Time_year	-0.16	-1.84	
Loss _Asset	0.89	2.62	**
Loss_Income	-1.57	-3.46	**
Disrupt_Family	-0.76	-2.22	*
Reduc_Food	0.32	0.91	
Reduc_Exp	0.33	0.76	
Borrow_money	0.4	1.29	
Sell_Assets	-0.74	-2.17	
Seek_Support	0.56	1.88	
New_Collab	-1.66	-5.63	
Change_Fish	-0.36	-1.27	
Increase_Fisheffort	0.52	1.55	
Diversif_out	-0.42	-1.42	
Exit_Fishery	-0.05	-0.13	
Migrate	0.6	1.94	
Sex_head	-0.21	-0.36	
Age_head	-0.03	-2.79	
Edu_head	0.05	1.84	
Size_household	0.11	1.92	
Log_Asset	0.18	0.42	
Constant	329.78	1.86	
Random-effects parameters	**Estimate**		
countrycode: Independent			
sd(Satis_Financial)	0.53		
sd(Satis_Livelihood)	0.36		
sd(Satis_Housing)	0.18		
sd(Satis_Social)	0.76		
sd(Satis_SocCrisis)	0.79		
sd(Satis_Educ)	0.25		
sd(_cons)	1.6		
commcode: Identity			
sd(_cons)	0.49		
sd(Residual)	2.79		
Number of obs	**719**		

	sd(_cons)	0.49	0.30	0.148	1.621
	sd(Residual)	2.79	0.08	2.639	2.941
LR test vs. linear regression:		chi2(8)	67.15	Prob > chi2	0.000

The analysis shows that subjective resilience does have a strong and statistically significant impact on the ability of households to effectively handle shocks and stressors ($p < 0.0001$). Other factors also play significant roles, some examples of which follow. The severity of the shocks, the disruption of regular income and family life, the selling of assets as a coping strategy and the age of the household head all have negative effects on the resilience of households. But the factor that shows the greatest associative significance – as indicated by the coefficient z score – is subjective resilience.

The datasets from the two communities in Ethiopia (Jijiga and Borena) were also used to explore the potential relationship between shock recovery and the more subjective or cognitive elements of people's lives. In this instance, however, the household resilience index was not computed directly but a comparable index of self-reported recovery from the 18 types of shocks/stressors that had occurred in the last 12 months was available. The household recovery index was then constructed by averaging the self-reported scores obtained for each type of shock/stressor.

Table 4 displays the results of the Tobit[5] models used to explore the relation between this household recovery index and the self-efficacy score.

[5] The tobit model, or the censored regression model, is designed to estimate linear relationships between variables when there is either left- or right-censoring in the dependent variable.

Table 4: Results of the Tobit (censored regression) models using the Ethiopian dataset to assess the influence of self-efficacy on households' recovery (mean of reported recovery over 18 shocks).

	JIJIGA: TOBIT RECOVERY			BORENA: TOBIT RECOVERY		
	∂	t	sig	∂	t	sig
SELF-EFFICACY AND SOCIAL CAPITAL						
Self-efficacy	0.051	4.870	***		1.845	*
Bonding index	0.009	4.200	***	0.009	6.747	***
Bridging index	-0.002	-0.721		0.012	-5.649	***
Linking index	0.007	1.902	*	-0.008	2.977	***
OTHER HOUSEHOLD CHARACTERISTICS AND SHOCK EXPOSURE						
Count of shocks	0.051	2.366	**	0.062	4.122	***
Count of livelihoods	0.047	0.470		0.029	0.625	
Wealth index	0.005	0.645		-0.011	-2.108	**
Human capital index	0.470	2.464	**	0.241	2.407	**
Age head of household	0.000	-0.068		-0.002	-1.266	
Household size	-0.052	-3.064	***	-0.019	-1.043	
Female headed hh	0.140	0.524		-0.121	-1.125	
Bartira	-0.052	-0.155				
Jidwaaq	-1.193	-2.123	**			
Issa	0.097	0.232				
Issaq	0.052	0.170				
Abasquul	-0.091	-0.357				
Giri	-0.117	-0.326				
Geri	0.065	0.179				
Other (specify)	-0.277	-0.927				
Borena				-0.128	-1.616	
_cons	-0.638	-1.042		1.742	5.925	***
sigma	1.126	36.481	***	1.004	39.380	***
Number of obs	1140			1457		
Censored obs	421			232		
Abasquul	-0.091	-0.357				
Giri clan	-0.117	-0.326				
Geri clan	0.065	0.179				
Other clan	-0.277	-0.927				
_cons	-0.638	-1.042				
sigma	1.126	36.481	***			
Number of obs	1140					
Censored obs	421					

Table 4 shows that for both Jijiga and Borena regions the level of self-efficacy has a significant positive effect on the recovery index (respectively $p < 0.01$ and $p < 0.10$). This suggests that the perception that people have of their level of control over their own life – a strongly subjective element – positively influences their ability to recover from shocks/stressors. Other factors which seem to have a positive effect on recovery are: social capital (in particular bonding and linking

capitals) and human capital. The positive significance associated with shocks is probably due to its association with assets, rather than being of truly positive significance. Households with more assets are more exposed to shocks but are also more likely to recover. The negative association with respect to bridging capital is somewhat more difficult to explain.

The potential role that subjective resilience and self-efficacy may play for households in the choice of strategies to mitigate the impacts of specific shocks and stressors has been illustrated using the different models highlighted previously. Subjective resilience itself is expected to be strongly correlated with and influenced by psycho-social factors such as self-confidence, risk aversion, etc,. It does, however, need to be recognized as a distinct component which also incorporates more concrete elements such as the household's past experience in relation to similar shocks or the household socio-economic situation, rather than only psycho-social factors . Although this is not a key assumption in our conceptual framework, a deeper analysis of the factors that effectively influence the level of subjective resilience would also be relevant in the light of this discussion. The only dataset available that would allow this type of exploration, however, is the Ghana-Fiji-Vietnam-Sri-Lanka dataset.

Table 5 displays the results of the ordered probit[6] model that was run to identify potential determinants to households' subjective resilience. The model shows that the households' subjective resilience level is strongly determined by how households managed the same type of shock or stressor in the past, as well as by the severity of these shocks and stressors (in particular the most severe past shocks/stressors affect negatively the subjective resilience). Likewise, the predictability (or lack of thereof) of these shocks/stressors also affects – again negatively – the level of subjective resilience. None of the household demographic characteristics (e.g. age, education, size or even gender of the head) seems to have any influence on their subjective resilience, but the household assets level does.

[6] In statistics a probit model is a type of regression where the dependent variable can only take two values, for example, married or not married. The name is derived from 'probability" + "unit".

Table 5: Results of the ordered probit model used with the Ghana-Fiji-Vietnam-Sri-Lanka dataset to assess the determinants of households' subjective resilience

SUBJECT_RES	∂	z	sig
Recov_verylow	-1.2	-8.09	***
Recov_low	-0.49	-4.93	***
Recov_fair	0.13	0.62	
Recov_good	0.96	5.16	***
Recov_verygood	0.75	2.28	*
Severity_veryhigh	-0.35	-1.7	*
Severity_high	-0.26	-1.29	
Severity_medium	0	-0.01	
Severity_low	-0.58	-1.98	*
Predictab_verylow	-0.4	-2.28	*
Predictab_low	-0.28	-1.62	
Predictab_medium	-0.31	-1.44	
Predictab_fair	-0.17	-1.3	
Categ_event_shock	-0.1	-1.52	
Categ_event_stressor	-0.06	-0.67	
Loss _Asset	-0.07	-0.59	
Loss_Income	0.25	2.05	*
Disrupt_Family	0.04	0.3	
Age_head	0	0.31	
Edu_head	0	0.31	
Size_househol	-0.04	-1.72	**
Sex_head	0.11	0.51	
Log_Asset	0.34	2.86	**
/cut1	0.062		
/cut2	0.465		
/cut3	2.213		
/cut4	2.794		
Number of obs	1424		
Log pseudo likelihood			
(Std. Err. adjusted for 366 clusters in Household_ID)			

Discussion

5

Behavioural psychology and social sciences have long demonstrated that decisions are often, if not always, based on **perceptions** that people have about reality, and not on reality *per se* (Bandura, 1977; Jackson, 2005). In the context of climate change, for example, Wolf and her colleagues showed how the perception of heat waves being associated with low risks amongst elderly people in UK, limits their ability to engage in adequate responses (Wolf, Adger, Lorenzoni, Abrahamson & Raine, 2010). Likewise, Crane et al. (2011) demonstrate how in Mali, farmers and herders' self-assessed capacity to adopt a particular action or behaviour is conditioned by how they see themselves fitting into the particular social system to which they belong. The analysis demonstrates the strong connection between ethnic identity and type of livelihood and how this influences these groups' perceptions of what are appropriate, acceptable choices and roles in the social-ecological system they inhabit.

More generally, O'Riordan and Jordan (1999) highlight how individuals' preferences closely reflect the views they have of 'their' world, and how in this context cultural theory is a useful tool in exploring these processes (see also Leiserowitz, Kates & Parris, 2006). As Adger and his co-authors point out, people's decisions and actions in relation to risk are "socially constructed, subjective and mutable" (Adger et al., 2009, p.344) and shaped in part by deeply-embedded cultural and societal norms and values. Some of these processes operate at the individual level; others at the 'higher' community level. So far, however, a large majority of the literature that discusses those questions has focused on vulnerability and risk from a climate change adaptation perspective.

It is hoped that the findings from this paper make clear the need to extend this to resilience. Resilience is not simply determined by some tangible factors such as income or level of assets, education or access to information, but is largely, subjectively constructed. Marshall and Marshall (2007), in one of the very few empirical studies on social resilience, found, for instance, that the response of people to changes (what these authors call 'social resilience') is determined by four key characteristics: (1) perception of risk associated with change; (2) perception of the ability to plan, learn and reorganize; (3) perception of the ability to cope with change; and (4) individual's interest in change. These findings point to key social variables that relate explicitly to cognitive and subjective dimensions (e.g. perception about risk, interest in change), as opposed to the material (income, assets, property rights) dimensions which are often emphasized to be key elements in the ability of people to buffer shocks. The Marshalls' results thus suggest that subjective perceptions of risk, knowledge and experience are important variables at the individual and societal level in determining whether and how response takes place.

Unfortunately, this type of analysis in relation to resilience is rare. As Brown and Westaway (2011) recognize in their review of agency, capacity and resilience in

the context of environmental change, "although it is hinted at, and suggested that, issues such as self-efficacy, empowerment, optimism, self-esteem, innovative thinking, decision-making, and perceptions may be of primary importance in determining how and whether people cope with shock, disturbances, and other types of stressors or change, there is no systematic interrogation or analysis of these dimensions."

In this context, the objective of this paper was to investigate further some of these issues, both conceptually and empirically and to demonstrate, if possible, the relevance of these interrogations. The key hypothesis was that resilience is not simply determined by objective factors and processes but is comprised of less tangible elements. In particular, the hypothesis that people's individual perception and self-confidence about their own ability to handle future events (what we refer to as subjective resilience), is key in the process of building household effective resilience. The rationale behind this assumption is the recognition that people must make decisions about whether or not the previous status quo (prior to the shocks/stressors' impact) is likely to be re-established relatively quickly (and would therefore necessitate short-term coping strategies) or whether new livelihoods and other strategies enabling recovery, will be necessary in a new future. These considerations strongly determine the types of responses (i.e. absorptive, adaptive, transformative) that people put in place in the immediate aftermath of an adverse event, thus affecting their ability/incentive/willingness to engage in particular types of responses.

Using empirical data from several recent research projects, we were able to confirm this assumption. Both the Ghana-Fiji-Vietnam-Sri-Lanka and Jijiga datasets show negative correlations between households' level of subjective resilience (or their self-efficacy score) and the propensity of those households to engage in coping strategies. The higher the sense of control people have over their lives and the more positive the perception about their own ability to handle (future) shocks/stressors, the lower the likelihood that these households will engage in detrimental short term responses. The Ghana-Fiji-Vietnam-Sri-Lanka dataset also clearly demonstrated that households which are characterized by higher than average subjective resilience levels have also a higher likelihood to engage in transformative strategies.

The second assumption which was tested empirically was the potential influence of these subjective components (subjective resilience and self-efficacy) on the actual ability of households to handle shocks/stressors. This assumption was again supported by analysis of the data. In the case of the Ghana-Fiji-Vietnam-Sri-Lanka dataset, the correlation between the level of subjective resilience and the household's resilience index was significant and positive, while in the Ethiopian

case, the data shows a positive correlation between the self-efficacy score and the recovery index for both Jijiga and Borena. This suggests that in both cases the perception that people have of their level of control over their own life – a strongly subjective element – influencs positively their ability to recover from shocks/ stressors.

The final empirical investigation focused on the determinants of subjective resilience. Households' subjective resilience is expected to be influenced by psycho-social factors such as self-confidence, risk aversion, societal values and norms, but also to reflect other more concrete elements such as the household's past experience in relation to similar shocks or the household socio-economic situation. This assumption was using data from the Ghana-Fiji-Vietnam-Sri-Lanka study. The results showed that the households' subjective resilience level was strongly determined by how households had managed the same shocks or stressors in the past, as well as by a series of characteristics of these shocks/ stressors, such as their levels of severity and predictability. None of the household demographic characteristics which had been recorded in the dataset seems to have had any influence on subjective resilience, with the exception of the level of assets.

When viewed collectively, these different results provide strong empirical evidence that the subjective dimension of resilience is an overlooked element of the overall resilience equation, and as such, needs to be more systematically considered in future research. In particular, better insights are needed not only into the social, institutional and economic mechanisms that influence individual and collective capacity to respond to shocks and stressors, but also around the perceptions, subjective motivations and cognitive elements of individuals and households' decision making processes, in order to unpack and better understand the factors that influence behaviour and decisions around resilience. This new requirement may represent some methodological challenges for researchers who have concentrated their thinking and research activities so far around more tangible and easily measurable determinants such as level of assets, income or the number of activities in which households are engaging.

Investigating the role of social capital as a key-determinant of resilience has recently been identified as an important additional step toward a better understanding of resilience (Woodson, Frankenberger, Smith, Langworthy & Presnall, 2016). The findings from this paper make the argument that the domain of research needs to be expanded even more broadly–beyond social capital indicators- into areas removed from the comfortable zone of quantifiable indicators. It is clear that information on psycho-social and subjective factors that are more difficult to capture such as aspirations needs to be collected, as well as individual and

collectively- constructed perceptions of one's ability to cope with risk and change. These are factors that may be difficult to measure, but as this paper has hopefully demonstrated, they are indispensable to future research if we aim to capture the set of processes that constitute people's objective and subjective construction of resilience.

The findings of this research, once firmed up and established through a larger body of applied research, will also have important implications for policy and intervention design. At present, the vast majority of the activities and interventions that are proposed as part of the vast pool of 'resilience building' projects implemented by NGOs and international development agencies, are essentially addressing the objective component of resilience, through activities such as livelihood diversification, micro-enterprise development, climate smart agriculture promotion, and others. All of these different activities are based on a theory of change that considers only the tangible determinants of resilience (e.g. building the asset-base, savings or income-generating capacity or the tangible elements of households' adaptive capacity). With such a focus, these programmes overlook the less tangible elements of the decision-making process around the choice of responses that households should put in place. The results of this paper, along with the already well-established and rapidly growing literature on adaptive capacity, emphasize the importance of subjective elements such as risk perception, self-efficacy and, as shown in the paper, the importance of household perceptions about their own capacity to manage shocks and stressors.

6

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