Shock Waves: Managing the Impacts of Climate Change on Poverty

Background Paper

The Role of Inequality in Climate-Poverty Debates

Petra Tschakert
Abstract

There is no doubt that the poorest people are already and will continue to be most severely impacted by climatic changes, including shifting trends as well as more frequent and severe extreme events. Yet, new insights on the dynamics and distribution of poverty point to the need to comprehend where the poor and poorest are, how they are poor, and why their poverty constrains their abilities to cope with and adapt to occurring and predicted changes. This paper draws on a diverse and growing literature on climate change and poverty to argue that uneven power relations more so than exposure and sensitivity to climatic hazards make the poor and disadvantaged distinctly more vulnerable than more affluent, privileged, and powerful groups and individuals. Further, climatic stressors and climate change as well as climate policies, often entangled with social exclusion and institutional neglect, compound the issue of poverty and exacerbate human precariousness, hence acting as a threat multiplier. The paper compares different approaches to assessing poverty, and explores structural processes and power dynamics that drive or perpetuate inequalities. The paper also investigates how the currently nonpoor may become transient or chronic poor, how climate change may exacerbate poverty traps, and how interventions to curb emissions and multidimensional poverty may be tackled to pursue climate-resilient development pathways.

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The Role of Inequality in Climate-Poverty Debates

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Introduction

Since the Fourth Assessment Report of the IPCC (2007), the understanding of the linkages between climate change, poverty, and vulnerability has been growing substantially. There is no doubt that the poorest people are already and will continue to be most severely impacted by climatic changes, including shifting trends as well as more frequent and more severe extreme events. Yet, new insights with respect to the dynamics and distribution of poverty point to the need to better comprehend where the poor and poorest are, how they are poor, and why their poverty constrains their abilities to cope with and adapt to occurring and predicted changes. The simplistic assumption that poor people live predominantly in poor countries and are vulnerable because they lack financial resources and other key assets to prepare and respond no longer withstands empirical context-specific evidence to the contrary.

The time is ripe to shift our lens from poor countries to poor people, independent of where they live. Lessons learned from Hurricane Katrina and Superstorm Sandy in the United States as well as the European heat waves reveal significant pockets of poverty and inequality in high-income countries (HICs) that make successful adaptation among the poor there more and more a question of political priority, in addition to the more familiar challenges of adaptation deficits or gaps in the global South. Poverty pockets and increasing inequality also characterize middle-income countries (MICs), for instance China, Brazil, and South Africa. In fact, the largest share of poor people – more than one billion – living under $1.25/day and a second billion between $1.25 and $2/day to date exists in MICs, compared to an additional 320 million and 170 million in low-income countries (LICs), respectively (Sumner 2012).

Moreover, it is now well understood that poverty is not limited to income poverty; it also includes deprivations in basic services such as health, education, and standard of living, hunger, illiteracy, social exclusion, loss of sense of belonging and identity, and disempowerment, often reflected in truncated core capabilities to flourish and protect oneself and others. Poverty encompassing multiple deprivations is known as multidimensional poverty (UNDP, 1990) and captured in the Multidimensional Poverty Index (MPI) (UNDP, 2010). In 2014, this index, encompassing 108 developing countries (31 LICs, 67 MICs, and 10 HICs) corresponding to 78% of the world’s populations, reported 1.6 billion people as multidimensional poor (Alkire et al. 2014). This means poor in dimensions of education, health, and living standards. This assessment, however, does not include China and Argentina, and none of the >30 high-income OECD countries, hence missing poverty in countries with significant affluence. Even so, this number is higher than the current 1.2 billion of people living on <$1.25/day, understood as extreme poor (World Bank 2014a). The MPI also captures intensity of poverty as degree of deprivation (e.g. not having electricity, not having improved sanitation), as well as destitution as an extreme expression of poverty. In 2014, roughly half of all multidimensionally poor people fell into this category of destitution. Based on 2005/06 data, close to 350 million destitute people live in India (a lower MIC) alone or 28.5% of the country’s total population (Alkire et al. 2014). In 2010, calculated from the same data set, India’s poorest eight largest states together shared more people in MPI than the 26 poorest countries in Africa together (ibid). The challenges for fair and timely adaptation to climatic changes are enormous.
A focus on multiple deprivations rather than merely monetary aspects of poverty allows us to understand that many people are poor because they are socially, economically, culturally, politically, institutionally, or otherwise marginalized in their society and hence have limited options and capacities to adapt to climatic and other stressors. Such a broadened perspective prevents us from essentializing the poor as one homogeneous entity (not ‘us’, but ‘them’) and acknowledges gradients of poverty and prosperity. As a consequence, when assessing the impacts of climate change on the poor, scholars and practitioners who straddle the fields of development, climate science, and poverty studies recommend an appreciation of the poor as a complex, dynamic, and shifting social entity, for LICs, MICs, and HICs.

Although there is a strong link between poverty and vulnerability, the two concepts are not synonymous. Not all vulnerable people are poor, and those labeled ‘poor’ are poor for different reasons and hence experience climate change differently (Olsson et al. 2014a). Moreover, much of the literature has examined why poor people tend to be particularly exposed to the negative impacts of climate change, for instance by living in flood-prone areas where rents are cheap. Yet, less attention has been paid to systemic vulnerabilities that make certain individuals and groups of people less capable of preparing for, withstanding, and recovering from stressors and shocks. These are vulnerabilities ‘baked’ into the world we live in, independent of climate change, yet they fundamentally shape adaptive response capacities. The Fifth Assessment Report of the IPCC (AR5) explicitly frames vulnerability as one key element of being at risk, in addition to climatic hazards and exposure, not merely a part of it. This conceptualization of vulnerability allows us to identify inequalities that exist in every society as well as uneven local to global development processes that create or exacerbate such inequalities. Together, they result in heightened propensity or predisposition to be adversely affected (IPCC 2014a).

Hence, to understand the structural relations between poverty and vulnerability, more explicit attention needs to be paid to the often concealed dynamics that limit the choices poor people — homeless people in urban centers, marginalized castes, disadvantaged female single-headed households — have to build adaptive capacities while having to deal with climatic and other stressors, simultaneously or cumulatively. Such convergence of stressors can push their already fragile livelihoods over a critical threshold and into poverty traps. Climatic extreme events such as excessive temperatures, droughts, and hurricanes, and subsequent disasters ranging from heat waves and scorched harvests to flooding, have repeatedly revealed poor people’s inability to cope and recover. However, modest shifts in trends and localized small disasters that may not even be reflected in typical meteorological records (e.g. strong winds that destroy a smallholder’s harvest) can also harm the well-being of the poorest and most vulnerable populations. In combination with other crises, they trigger or cement downward livelihood trajectories from which it becomes exceedingly difficult to escape.

In this paper, I draw on a diverse and growing literature on climate change and poverty to argue that uneven power relations more so than exposure and sensitivity to climatic hazards make the poor and disadvantaged members of society distinctly more vulnerable than more affluent, privileged, and powerful groups and individuals, across the country spectrum of income levels. I further argue that climatic stressors/climate change as well as climate policies, often entangled with social exclusion and
institutional neglect, compound the issue of poverty and exacerbate human precariousness, hence acting as a threat multiplier.

The paper provides an extension to the proposed analytical framework by elaborating in more detail on societal inequalities that shape abilities to cope with and adapt to negative impacts of climate change, with an explicit focus on relations between poor and non-poor people, and across cities, countries, and regions. The paper begins with a comparison between monetary versus other approaches to poverty, namely the capability approach and the relational poverty approach. Next, it explores structural processes and power dynamics that drive or perpetuate inequalities. These first two segments complement sections 2.2 (Falling into poverty) and 2.3 (Poverty traps and escapes) in the analytical framework. The paper then expands on the role of multiple stressors and cumulative events in the context of climate change impacts on poor people’s welfare, and then adds to the existing framing around risk management (section 2.4) to explain limitations in response capacities.

The goal is to investigate how the currently non-poor may become transient or chronic poor, how climate change may exacerbate poverty traps, and how interventions to curb both emissions and multidimensional poverty may be tackled in order to pursue climate-resilient development pathways.

Throughout this background paper, an attempt is made not to essentialize or homogenize ‘the poor,’ but to employ this term as proposed in Ch13 Livelihoods and Poverty of the IPCC AR5, WGII, encompassing “people living in poverty, people facing multiple deprivations, and the socially and economically disadvantaged, as part of a conceptualization broader than income-based measures of poverty, acknowledging gradients of prosperity and poverty” (Olsson et al. 2014a: 798).
Inequalities as the core of an analytical framework on climate change and poverty

1. Why do people ‘fall into poverty’? Relational drivers of poverty

One conventional way to conceptualize the complex aspects and dynamics of poverty is around assets, shocks and crises, and losses. Through this lens, the main reasons that typically push people into poverty are: existential limitations that encompass a lack or loss of assets below a given asset poverty line (e.g. lost crops or livestock), stochastic lacks (lost income below a defined income poverty line), changes in household demographics or life cycle (e.g. young children or other dependents expanding a new family), and shocks and crises that temporarily or permanently destroy assets and undermine productivity (e.g. natural disasters, a death in the family, global spikes in food prices). However, this understanding of ‘becoming poor’ adopts a rather narrow dichotomous view that suggests either individual failure on the part of the ‘newly poor’ or remote or indirect circumstances for which nobody in particular can be blamed. In either case, the discursive result of this conceptualization is an impoverished subject who happens to be thrown into an existence of lack, in analogy to Martin Heidegger’s conceptualization of ‘having-been-thrown into the world’.

Of course, poverty scholars such as Amartya Sen (2003) would readily cite structural stressors or changes, such as technological change or trade liberalization that produce the very shocks for individual households or entire groups of people that then force them into poverty. While explicit attention to such higher-level drivers and indistinct forces is indeed important, the framing of these structural stressors as abstract occurrences obscures the social relations that underlie them. These social relations are at the very core of creating poverty and privilege, simultaneously, as a dialectical pair. One requires the other. They also generate poverty narratives, the distinct modes in which poverty is understood and talked about, which in turn delineates the way in which poverty is assessed and the way solutions to poverty eradication are conceived, often within a narrow window that prioritizes emphasis on assets and productivity. This paper aims to widen this window of understanding by highlighting other aspects of poverty that are often overlooked or left out from an analysis.

In a recent review paper on climate change and poverty, Leichenko and Silva (2014) compare the monetary approach to poverty with two alternative approaches (Table 1). While monetary approaches, especially those that focus on income, assets, and consumption, provide easy comparison across people and places and facilitate tracking of poverty statistics over time, approaches that forefront human capabilities, choices, opportunities, cultural differences, and values (e.g. Sen 1985, 1999; Nussbaum 2001, 2011; Alkire 2005) are more suited to explore the lived and context-specific realities of poverty through people’s daily experiences. A relational poverty lens, as a third approach (Pogge 2009; Sheppard et al. 2009; Mosse 2010; Butler 2011; Lawson 2012; Elwood and Lawson 2013; Bonds 2013; Lawson and Elwood 2014) comprehends poverty not as a product of individual lack or failure, but as a result of
unequal social relations between the haves and the have-nots that exclude the latter from participating as recognized citizens in their own societies. Moreover, by highlighting the relationship between the poor and the non-poor, such a relational poverty lens draws attention to exercises of power that allow certain groups of people to benefit from structural changes while preventing others from doing just the same. Hence, unlike monetary approaches, it acknowledges that poverty does not occur in isolation from privilege, quite the contrary – it is a result of privilege in one place while blaming the impoverished subject for his/her own misfortune and perpetual lagging behind compared to what is generally understood as an acceptable and desirable standard of progress and well-being.

Table 1: Three common theoretical approaches to poverty (Source: Leichenko and Silva 2014)

|                          | Monetary | Capabilities | Social Exclusion/Relational |
|--------------------------|----------|--------------|-----------------------------|
| Definition of poverty    | Income (or consumption) falls below a minimum threshold of resources (e.g., poverty line) | Deprivation of a person’s abilities to live a life they have reason to value | Individuals or groups who are wholly or partially excluded from participating in the society in which they live |
| Indicator(s)             | Monetary metrics (income, consumption, assets) | Multidimensional: freedoms, choices, and opportunities (includes monetary dimension) | Multidimensional: social rules, customary laws, and social networks |
| Key assumptions          | Monetary indicators are a good proxy for other aspects of welfare throughout different societies | Money is a poor proxy for overall well-being. Choices and freedoms have intrinsic value whereas money does not | The factors that allow some people to escape poverty are the same that allow for the exclusion of others |
| Type of poverty          | Absolute and relative | Relative and relational |
| Unit of analysis         | Individual (although monetary figures usually collected at household level) | Individual or group (but poverty is characterized as a social relationship between the poor and the non-poor) |
| Pros                     | Monetary measures easily facilitate comparisons across people and places | Accounts for publicly provided goods and services; considers cultural differences in what people value | Accounts for distributional issues and inequalities; specific attention to unequal power relationships |
| Cons                     | Excludes publicly provided goods and services (e.g., schools, clinics); neglects power relationships | Difficult to make cross-country comparisons | Difficult to make cross-country comparisons |

Let us consider people who ‘become poor’ due to the dispossession of their livelihoods, for instance as a result of the conversion of cropland to biofuel plantations in Mozambique as a climate change policy response, or exploitative labor regimes in affluent nations that suppress fair and livable wages. Social relations behind the creation of these newly poor do not only entail uneven interpersonal relations that produce differential losses and gains between some individuals. More importantly, they include a whole suite of institutional arrangements and social policies that can push entire populations to the margin of existence while a small minority flourishes. Such social processes of marginalization are rampant under neoliberal economic regimes, the rolling back of the welfare state, and social austerity measures.

Poverty amid plenty often goes unnoticed, yet can be pervasive. In the United States, a total of 46 million people were recorded as poor in 2013, representing 15% of the entire population (DeNavas-Walt and Proctor 2014). This is the highest number in the country since the beginning of systematic measurements in 1959. The United States is also the country with the highest inequality compared to
other OECD countries, with the exception of Chile: the income Gini index for the United States in 2013 was 40.8, compared to Sweden with the lowest index of 25.0, Chile 52.1, and South Africa and Namibia (non-OECD) scoring >60.0 (China not included) (World Bank 2013). High income inequality indicates high poverty rates among certain segments of society as the flipside to extreme affluence in other social strata.

Here are examples from some major cities in the United States. San Francisco (total population 805,235) and Seattle (total population 608,660) are two large cities with relatively high median household income, $75,604 and $65,277, respectively. In San Francisco, 46% of all households in the city make more than US $100,000/year and 32% in Seattle. If we consider mean income in USS for married couples, San Francisco reports $151,993 and Seattle $142,827. These numbers are consistently higher than equivalents for New York and Los Angeles. However, with 1.5% of its entire population, Seattle has the highest rate of homeless people compared to San Francisco (0.87%) and New York (0.78%) although only slightly higher than Los Angeles (1.42%). In absolute numbers, not surprisingly, New York and Los Angeles have the highest numbers of homeless people in the country, 64,060 and 53,798, respectively. Yet, the concentration of homeless people in Seattle, a city of relative wealth, is surprising. Seattle also has the highest number of Black or African Americans living below the poverty level (32.7%) compared to New York (22.7%) and Los Angeles (27.8%) (HUD 2013; US Census Bureau Fact Finder), which further complicates the picture of privilege and marginalization along the line of race.

Why do such statistics matter for understanding the impacts of climate change on poverty? They matter because, in comparison with burgeoning case studies and comparative analyses on poor people in poor countries, the climate change literature and debates on poor people in developed countries and their experiences with a changing climate have been astoundingly mute. The poor in upper MICs (e.g. China, Brazil, South Africa) and HICs (e.g. OECD countries) have been largely invisible, insufficiently accounted and represented in international poverty metrics and in-depth climate change inquiries. The same is true for growing inequalities behind cloaked processes of impoverishment (‘falling into poverty’) and marginalization. Even progressive poverty measures, such as the Multidimensional Poverty Index (UNDP, 2010) do not capture poverty in HICs. In fact, Chapter 13 on Livelihoods and Poverty in the AR5 noted the limited research on climate change impacts on poor people in more affluent nations as a major gap in knowledge (Olsson et al. 2014a). The exception stems from extreme events, especially hurricanes and heat waves, during which the ugly face of western/northern poverty all of a sudden becomes shockingly visible. Vignette 1 exposes differential merit in protecting socially vulnerable versus affluent people and regions against sea level rise in the United States. A closer look at the 1995 Chicago and 2003 European heat waves, provided in Vignette 4, reveals disproportionate and premature death among poor, disadvantaged, and socially isolated segments in society.

One of the prime reasons why poverty and inequality in MICs and HICs have been understudied is related to the narratives that encapsulate the essence of ‘the poor’ in affluent nations. In the United States, the dominant narrative about poor people in general, including single mothers on food stamps, and homeless people in specific, is imbued with notions of individual failure – lack, laziness, wretched early upbringing, even genetics – or ill-fated circumstances such as a tornado or landslide that must
have engulfed all household assets. According to Tim Harris (2014), founder of Real Change, an alternative newspaper in Seattle, homelessness in the city is a crippling form of institutionalized dehumanization that produces a highly stigmatizing narrative in which the homeless are portrayed as ‘filth’ and ‘contamination’, as ‘being in the way’ while the rich voice their angst about feeling ‘unsafe’. Such a narrative, carefully crafted to protect the cherished notion of American individual success, opens the door to particular sets of policies that, instead of addressing the precarious adaptive needs of homeless people, produce misdemeanor criminals, often highly racialized, who are rendered even more invisible by being removed from the streets (e.g. laws on panhandling) and incarcerated. Such criminalization of homeless citizens then shapes who is considered as ‘deserving poor’ and protected, for instance in the case of cold spells and heat waves, and who is not.

Let us consider the recent increase in homeless people in France. In only ten years (2001-2011), the number of people without a home (sans domicile fixe) has doubled, now amounting to 141,500, with roughly one-fourth of them employed and more than half of foreign origin (Yaouancq et al. 2013). Being without shelter counts as lack in physical assets. Not having a bed or a roof over one’s head is without any doubt measurable in national statistics. What remains largely invisible, though, are the social and urban planning policies that discount these unwanted poor by prescribing their removal from urban landscapes of daily interactions. As summarized in a newspaper article right after Christmas 2014, anti-homeless efforts in some French cities include the fencing of benches to make them inaccessible, the replacement of such sought-after sleeping spots with iron spears, mini cactus gardens, stone mounts, and other pseudo-artistic creations, and the barely noticeable downward tilting of plastic chairs in the Paris metro so that disgracefully falling asleep on these chairs is no longer possible (Brändle 2014).

At the backdrop of a recent cold spell across the country and the death of at least six homeless people with nowhere to sleep in December 2014, public outrage against these latest manifestations of anti-social poverty politics highlights the urgent need to investigate this and similar cases and shed light on the increasingly heinous strategies implemented or attempted to address ‘la misère sociale.’ Many of these strategies silence and render invisible the growing number of destitute people in affluent societies in France and beyond. "On ne meurt pas de froid, on meurt de mal-logement" (one does not die because of the cold but because of housing-impairedness) (Nice Matin 2014). The Fondation Abbé-Pierre (2014), using the term ‘mal-logement’ to connote housing for the disadvantaged, estimated a total of 3,700,000 individuals in 2014 as housing-disadvantaged, including the ~140,000 homeless, as well as more than 5 million people harmed (‘fragilisés’) by the housing crisis and a further 10 million directly or indirectly impacted.

Insights into examples of homelessness in affluent nations suggest that the discursive framing of the poor as ‘undeserving’ (O’Connor 2002; Mosse 2010) — constructing them as lazy and dangerous filth that does not belong, that tarnishes the shiny existence of the privileged and the public spaces they occupy — further deepens the dichotomy between privilege and marginalization. It fortifies the view that ‘they’ (the others) are poor because of personal failure, that not having a home must be their intrinsic fault, that their deprived state must be a result of not having worked hard enough like any other respective citizen. The same framing protects the privileged and the social relations that make
possible and sustain this divide between wealth and destitution, by means of willful omission. Poverty becomes subject to othering (‘they’, not ‘us’) while the benefits that accrue to ‘us’ at ‘their’ expense become silenced. As shown in the example of homeless people in Seattle and France, it is not only about assets (lacking a place to sleep). It is about relational practices (‘they’ scare/embarrass ‘us’) and social policies that put disadvantaged populations even further at risk of becoming harmed. It is about undermining the poor’s already slim set of adaptive responses to stressors, including cold spells, flooding from sea level rise, and processes of urban disinvestment and hardened institutions.

Concerted efforts to address factors that adequately capture poor people’s constrained response capacities and limits to adaptation, independent of where they live, ought to include explicit attention to this growing divide between the privileged and the marginalized. This means more emphasis on structural drivers of poverty that go beyond an analysis of assets and shocks, focusing on mechanisms of deprivation, exclusion, and disenfranchisement, such as exploitative labor regimes, repressive social and housing policies, and dynamics of criminalization. Some mainstream poverty frameworks do acknowledge the concept of exclusion, often folded under ‘asset dynamics’. Yet, such consideration may only apply in the context of shocks to individuals or a community that may lead to forgone income or missed opportunities. Capturing exclusion under social capital is insufficient to convey the systematic erosion of capabilities through exclusionary social policies and other harmful institutional arrangements. I propose social exclusion as one distinct category as part of an ‘arch of structural constraints’ that shapes multidimensional vulnerabilities and adaptive capacities (see Section 5, Figure 9).

So far, it seems that the predominant focus on climate change impacts on the poor in poor countries has successfully diverted attention from exclusionary and failed social policies in more affluent nations. This, in turn, has prevented a critical inquiry of unequal power relations that underlie differences in adaptive capacities between the poor and the non-poor. Even in countries where multiple facets of poverty are very much present in daily discourses and national poverty-reduction strategies, for instance in India, relational dynamics that produce ‘the poor’ and their vulnerabilities remain obscured (see an insightful exception in Vignette 2 below). Yet, the time is ripe to fill this gap by expanding our existing methodological tool sets, observations, and measurements to better capture such cross-scalar mechanisms that serve the privileged while further marginalizing the already disadvantaged.

To date, a lack of substantive case studies does not allow for a systematic assessment of these mechanisms across economic and cultural contexts. Hence, standardized metrics across countries and societies are currently beyond reach. At the same time, such comparable metrics may not be needed as long as the analytical focus of climate change and poverty studies encompasses appreciation of entrenched and emerging relational drivers of poverty and solid evidence is collected through in-depth, context-specific inquiries. Below are two initial case studies that serve as a starting point for such a relational analysis. Vignette 1 explores differential merit in protecting socially vulnerable versus affluent people and regions against sea level rise in the United States. Vignette 2 describes how the inclusion of marginalized farmers into exploitative dependency relationships with more affluent and powerful social actors in rural India exacerbates poverty and vulnerability to climatic stressors among the former while further enriching the latter.
1) Sea level rise in the coastal United States

In a simulation of disadvantaged populations at risk of future sea level rise, Martinich and colleagues (2013) assess not only disproportionate impacts of sea level rise stemming from exposure of coastal communities, but also differential merit in protecting some areas from inundation while leaving others at risk of abandonment. In the Gulf region of the United States, the model results suggest that over 99% of the most socially vulnerable populations live in areas unlikely to benefit from protection compared to only 8% of the least socially vulnerable groups (those with highest resilience) who live in the same areas. The study focuses on four regions (North Atlantic, South Atlantic, Gulf, and Pacific) and combines the Social Vulnerability Index (SoVI), introduced by Cutter et al. (2003) and applied to demographic variables available for coastal census tracts in these four regions, with the national coastal property model (NCPM), developed by EPA and collaborators. Three distinct sea level rise scenarios throughout the 21st century are used (low = 28.5cm rise by 2100 compared to 1990 levels; medium = 66.9cm rise; and high = 126.3cm rise) to identify areas at risk and adaptation responses considered economically efficient based on property value, elevation, and protection costs. The adaptation responses are protection (e.g. sea wall construction and maintenance), beach nourishment through replacement of sand, and abandonment.

Table 2: Dominant Social Vulnerability Index components for four regions in the United States and their percent variance explained by regional principal component analyses (Source: Martinich et al. 2013)
The SoVI yields a small set of dominant variables for each of the four regions emerging from a principal component analysis. Table 2 illustrates these components and their importance. Poverty ranks highest as a driver of social vulnerability; yet, age, family structure, participation in the labor force, rural/urban differences, and foreign-born also carry explanatory value in some or all regions. Occupation and being female are additional drivers. Wealth acts as a protective component, considered as reducing vulnerability. Figure 1 shows the distribution of differentially socially vulnerable census tracts for the Gulf region, visually highlighting the contrast between high numbers of high social vulnerability along the southern coast of Texas and several pockets of least socially vulnerable populations in much of Florida.

Overall, almost 750,000 people (22% of the population in the areas assessed) and 6,700 sq km (46% of the land area at risk) fall under highest and second highest social vulnerability categories. More than half of the entire population at risk lives along the Gulf coast.

Figure 1: Social Vulnerability Index results for the Gulf region. The green areas depict less vulnerable areas (<-0.5 standard deviations from the mean) and the pink areas more vulnerable areas (>0.5 standard deviations from the mean). (Source: Martinich et al. 2013)

What is interesting are the findings from the property model that outlines economically efficient response options to threats from sea level rise. From an adaptation perspective, the likely expectation would be to protect the most vulnerable by enhancing their adaptive capacities.
However, the model results clearly indicate that the most land projected to be abandoned (not protected) is in areas with high or highest social vulnerability. Similarly, a large proportion of highly socially vulnerable people live in areas likely to be slated for abandonment. At the same time, less socially vulnerable areas are likely to benefit from protection.

Figure 2 illustrates the roughly comparable number of people at risk between the Gulf and the North Atlantic, but strikingly different response options, all under a medium sea level rise scenario. With increasing social vulnerability, the proportion of areas likely to be abandoned increases as well. The underlying assumption is that in areas where “the cost of protective measures is less than the benefit of avoided property value loss”, protection (armor) will occur or, in the case of beach frontage, nourishment. Where the cost of protection exceeds benefit (especially given low property value or low-value land), structures and land will be abandoned and hence lost. Additional factors not included in this analysis, such as sites of cultural values or local zoning laws, could add further nuances to the results.

![Figure 2: Number of people at risk from medium sea level rise, as simulated, and differential response options with increasing social vulnerability between the Gulf region and the North Atlantic. (Source: Martinich et al. 2013)](image)

The results of this simulation suggest that the poor and other socially disadvantaged Americans along the Gulf coast are not only more exposed to the impacts of sea level rise but also and, most disturbingly, not worth protecting, at least not from an economic efficiency perspective. The relative higher merit of protecting the higher-value properties and prevent the comparatively much larger losses of the least vulnerable (the affluent populations) directly impacts what residual resources would be available to invest in adaptation of those most vulnerable and hence most in need. This dilemma illustrates the relational mechanism of vulnerability, poverty, and adaptation. Differential adaptive capacities do not only result from differential asset bases, investments, or risk-taking behavior. They can be and in many cases are a direct result of uneven power structures that profit the rich at the expense of the poor. The former is not independent of the latter. To counter this imbalance, large investments would be
needed to cover the costs of adaptation among the most vulnerable, as well as strong political will to set just priorities and incentives to protect those with the least adaptive capacities.

2) Agrarian poverty and relational vulnerabilities in India

In a case study from semi-arid Andhra Pradesh, southern India, Taylor (2013) demonstrates how poor and marginalized farming populations become entangled in social, economic, and political relationships that generate their vulnerability to climatic changes while creating relative security for others. While studies examining local manifestations of climate change often emphasize changes in consumption patterns, asset availability and flexibility, and impacts on productivity, they can obscure the unequal geographies of power and the political mechanisms that create and sustain marginality and, thus, blind us with respect to needed adaptive solutions (Mosse, 2010; Tschakert et al. 2013). In Taylor’s (2013) words, “the relative security of some social groups is achieved through the production of insecurity among others” (318). Although set in a distinctly different cultural and geographic context compared to the above vignette on coastal communities in the United States, similar dynamics are at work.

In rural Andhra Pradesh, uneven control over key productive assets, primarily land, water, labor, and credit produces not only differential insecurity but also hierarchical displacement of security, across the farming population. Processes of relational vulnerability and associated poverty do not simply occur because subordinate groups lack assets or income. Neither are they the only ones to encounter rising temperatures, higher unpredictability of rainfall events, and increasingly severe droughts (such as those in 2012-13). They are relationally poor because they depend on access to assets that are in control of the more affluent and dominant groups.

Unlike many other studies that focus on the exclusion of the poor from processes of production, Taylor, building on Mosse (2010) and Hickey and du Toit (2007), explains how ‘adverse inclusion’ of the subordinate groups may lock them into highly unequal power dynamics by being dependent on other social actors to transform their assets into meaningful lives. Practically, this lock-in occurs as less endowed individuals and households, lacking other choices, take up contract work with advanced salaries to be repaid as a debt. Or, they may seek credits from intermediary merchants at high interest rates in order to participate in new forms of agriculture and trade relations geared toward high-yield varieties, fertilizer, and pesticides. While the more affluent farmers and merchants extract raising surplus through these debt relations, creating new opportunities for themselves and becoming new rural elites, the subordinate groups could easily find themselves in spiraling debt traps. These traps may force desperate farmers to engage is distress sales that further benefit the privileged.

By focusing explicitly on such uneven landscapes of power and privilege, and the lack of options to circumvent extractive and impoverishing practices, this case study reveals how poverty is created as vulnerabilities and risks of the marginalized segments of society serve “as a buttress
to the security of others” (Taylor 2013: 319). Rural development programs, in particular the 2005 Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) that guarantees each rural household the right to 100 days paid labor per year, such as on irrigation channels, can disrupt such cycles of dependency, even if shortcomings such as late payments or limited skill-building have been reported (Mehta et al. 2011). More importantly, though, a guaranteed working day quota may increase the bargaining power of subordinate groups, especially unskilled female workers, and reduce distress migration. Taylor concludes that the inadvertent achievement of shifting power relations through MGNREGA may have been more crucial than the state’s intent to facilitate climate change adaptation through public work on watersheds.

2. A (renewed) emphasis on structural drivers of vulnerabilities: Approaching poverty traps and escapes through uneven development

Poverty traps and escapes are useful conceptual constructs and entry points to understanding poverty dynamics. They demand that we examine why certain people can bargain their way out of the limitations that their asset base provide and why others cannot. For this purpose, the framework considers three domains: first, the various assets or capitals people have at their disposal as well as social protection from third parties (the state, international actors, or NGOs); second, asset dynamics, including exclusion, voice, and willingness and ability to save; and third, risk taking and managing. In the section below, I aim to further expand these conceptual and analytical notions of traps and escapes by reminding us of the role of structural vulnerabilities that create differential risks for the poor and the non-poor. The intent is to shed further light on the linkages between poverty and marginalization on the one hand and limitations in people’s ability to cope with and adapt to stressors and shocks from climatic changes on the other hand.

A large portion of the literature on climate change impacts on poverty since the early 1990s adopted an understanding of vulnerability that implies a direct link to climate change. This particular framing sees the vulnerability of people, sectors, and ecosystems as driven by climate change or a particular climate hazard, as defined in the AR4: “Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity” (Baede et al. 2007). An almost identical definition shapes the treatment of vulnerability in the IPCC’s Third Assessment Report (2001). It progressively expands on the understanding of the concept in the Second Assessment Report where it defines vulnerability “the extent to which climate change may damage or harm a system. It depends not only on a system’s sensitivity but also on its ability to adapt to new climatic conditions” (IPCC 1995: 28). Why does tracing a definition matter for understanding climate change impacts on poverty? It matters because examining a dominant discourse, and its subsequent shifts, allows us to explain why the large majority of studies, publications, and reports since the 1990s tended to focus predominantly on
exposure and sensitivity of people and places to climatic changes and stressors. It explains why substantially less attention was paid to structural inequalities and relational dynamics that shape poverty and privilege and, as a consequence, adaptation potentials. This early emphasis on exposure and sensitivity generated an abundance of vulnerability maps and indices that consequently have influenced policy decisions on adaptation funding. Many of these may not necessarily have been in line with lived poverty experiences, destitution, adaptation needs, and poverty reduction.

This initial bias continues to characterize much of the debate to date as well as practical interventions that aim to enhance adaptation and adaptive capacities. In retrospect, it becomes clear that this impacts-exposure conceptualization of vulnerability provided little insight into the nuts and bolts of adaptive capacity, discouraged in-depth research on the more slippery dimensions of the concept, and provided few guidelines for measuring progress. As a consequence, this biased focus on exposure and sensitivity to impacts as well as the preoccupation with impact magnitude, timing, likelihood and persistence has obscured key social drivers of vulnerability that are typically not dependent on climate hazards, such as persistent poverty or exclusionary social policies.

A recent literature review of >500 articles up until 2012 in four selected journals whose scope includes climate change, vulnerability, and adaptation reveals that 70% of all studies assessed were entrenched in an understanding of climate change as the main source of vulnerability, following the impacts-exposure conceptualization, while <5% explicitly engaged with the social roots of vulnerability (Bassett and Fogelman 2013). Although critiqued for its narrow methodology (Lorenz et al. 2014), the review reminds us of the need to re-emphasize the structural drivers of vulnerability, and remind ourselves of the distinction between what Karen O’Brien and colleagues (2007) labeled outcome vulnerability (reflecting the interaction between climate change and capacity to cope) and contextual vulnerability (reflecting intrinsic characteristics of a social system or society, rooted in political economy and multi-layered institutional relations). Indeed, abundant efforts have been made to describe, measure, and map the former, for instance in vulnerability hotspot maps. Examples range from global and regional maps depicting low to high vulnerabilities in the context of shifting demographics, food insecurity, water resources, humanitarian crises, and conflict (for a compelling overview, see de Sherbinin 2014). At the same time, such vulnerability maps, as well as indices, tend to mask the inequalities and dynamics of marginalization that create poverty and vulnerability in the first place. They also mask the relational drivers of poverty, those explored in the above two vignettes, and keep inequalities and vulnerabilities entrenched in increasingly unequal societies (Taylor 2013; Tschakert et al. 2013).

The IPCC’s Fifth Assessment Report (2014), building on the Special Report on Extreme Events (SREX, 2011) corrects this bias toward equating vulnerability with climate hazards. Reflecting a growing body of literature on social, political, economic, and institutional dynamics that shape systemic, structural, and intrinsic vulnerability, the updated definition sees vulnerability as “propensity or predisposition to be adversely affected”,... encompass[ing] a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt” (IPCC 2014b). It sees these vulnerabilities tied to inequalities baked into any given society and uneven development pathways. Chapter 19 “Emergent Risks and Key Vulnerabilities” in the AR5, WGII, states with high confidence that vulnerability
and exposure of communities and social-ecological systems are dynamic and intimately connected to
development (Oppenheimer et al. 2014) rather than the timing and magnitude of climatic impacts. This
conceptual shift from hazard-driven to development-driven vulnerability captures a fundamental
rethinking of deep-rooted linkages between climate change, poverty, and adaptive capacities. As a
triplet, climate hazards, exposure, and vulnerability shape risks (see Figure 3).

![Figure 3: Risk from climate-related impacts results from the interaction of climate-related hazards
(including hazardous events and trends) with the vulnerability and exposure of human and natural
systems. Changes in both the climate system (left) and socioeconomic processes including adaptation
and mitigation (right) are drivers of hazards, exposure, and vulnerability (IPCC 2014a).]

Chapter 19, AR5, WGII further highlights five criteria that are proposed to identify key vulnerabilities
(Oppenheimer et al. 2014). These criteria encourage a much more critical examination of drivers of
poverty and social marginalization as expressions of multi-layered inequalities and uneven development
in a way that may inspire a new generation of poverty studies to explore patterns of exclusion and
relational dynamics that create and exacerbate poverty, poverty traps, and new poverty pockets:
1) Exposure of a society, community, or social-ecological system to climatic stressors (while distinct from
structural vulnerability, exposure combines with vulnerability to create key vulnerabilities); 2) Import ance
of the vulnerable system(s) (crucial for the survival of particular societal groups, especially
when combined with processes of social marginalization); 3) Limited ability of societies, communities, or
social-ecological systems to cope with and to build adaptive capacities to reduce or limit the adverse
consequences of climate-related hazard; 4) Persistence of vulnerable conditions and degree of
irreversibility of consequences (including chronic poverty and marginalization, insecure land tenure
arrangements, and the inability to replace a system or compensate for losses and damages); and 5) Presence
of conditions that make societies highly susceptible to cumulative stressors in complex and
multiple-interacting systems (including persistent poverty and conflict). These facets of key vulnerability
indeed differ strikingly from the conceptual coupling of vulnerability with various dimensions of climate
impacts as assessed up to the AR4.
This conceptual shift from hazard-driven to development-driven vulnerability in the climate change community is crucial when exploring the fundamental question this paper addresses, namely: Why are poor people less able to adapt to climate change? We can no longer content ourselves with mapping the exposure of poor people or poor countries to climatic hazards (e.g. poor people’s settlements in flood-prone areas; the large majority of a country like Bangladesh being at risk from sea level rise). The same is true for exclusively monetary assessments of the limited financial and physical assets that prevent poor people from adequately preparing and responding to climatic stressors and shocks. This shift compels us to more fully explore the contextual and political drivers as well as the structural relations that make certain individuals and groups more vulnerable and increase their risk of being harmed by climate change. This is likely to alter the focus on what is measurable and map-able. Furthermore, it obliges us to shift our gaze from poor countries in the global South to poor, disadvantaged, and marginalized populations across the globe — for instance the homeless people in places like Seattle or countries like France — and examine the structural conditions that create and maintain poverty pockets in high-income countries (HICs), often in juxtaposition to excessive wealth and affluence.

3. Intersecting dimensions of inequality

In this section, let us explore how inequality is part and parcel of key vulnerabilities and how intersecting dimensions of inequality may help us understand differential abilities to cope with and adapt to climatic and other stressors along a continuum of poverty and prosperity. An analysis that draws on both the many aspects of structural and contextual vulnerability and intersecting dimensions of inequality (an intersectionality lens) allows us to be more nuanced when examining obstacles to adaptive capacities.

An intersectionality lens can serve well as a complement and extension to a focus on various asset categories. It addresses exclusion and lack of voice as aspects of poverty traps. Gender, age, race, ethnicity, indigeneity, class, caste, and (dis-)ability and other dimensions of identity that shape inequalities can indeed constrain income and consumption, as well as access to other key assets, productivity, and opportunities. Yet, considering exclusion as a sub-component of social capital, as sometimes proposed, seems insufficient to capture the ramifications of intersecting dimensions of inequality in the context of climate change adaptation. It appears more opportune to capture inequality as a major yet highly context-specific and often obscured stressor to individuals, households, and groups of people that shapes differential risks, beyond the availability and flexibility of assets. As illustrated in the case of relational poverty in Andhra Pradesh, India, inequality between the marginalized and the privileged and the unequal power relations that materialize are practiced and reproduced, and they determine to which extent assets can be transformed into meaningful lives. Let us therefore unpack inequalities behind poverty.

The AR5 draws explicit attention to the interaction of limited capacities and opportunities on the one hand and multidimensional vulnerability on the other hand that result from the interplay of inequalities in societies, socio-economic development pathways, and climate change as well as climate change
responses and policies (Olsson et al. 2014a, and IPCC 2014c). Figure 4 illustrates this interplay. This conceptualization provides the next layer of analysis to Figure 3 (risks) by deconstructing vulnerability. Privileged people enjoy many and often far-reaching capacities and opportunities while their vulnerability is very low, owing to their flexibility in mobilizing and accessing resources and creating or deepening positions of power. Marginalized populations, on the other hand, have low capacities and limited opportunities while living in conditions of high vulnerability. This is due to their limited, non-productive, or non-existent resources, safety nets, or supportive social policies that prevent them from sliding from transient into chronic poverty or destitution.

Many more people are likely to be marginalized than privileged, although no worldwide assessment can substantiate this claim with hard data beyond income. Inequality across society is growing and the divide between the have and the have nots is wider than ever before. Inequalities between the rich and the poor arise not or not only because of monetary differences, but because those who are poor and marginalized face intersecting dimensions of inequality in their own societies due to their gender, class, ethnicity/indigeneity, age, race, caste, and (dis)ability. These dimensions of inequality are typically reflected in socioeconomic status, income, asset dynamics, power relations, and a voice (or agency) in adaptive decision making and action, and also exposure, and are the product of both dynamic and persistent social processes.

Moreover, the poor are not equally poor, and inequalities among poor people and population subgroups also deserve attention as they constrain adaptive choices. Few measures exist that facilitate comparing inequality across space and time, with only initial results for drilling down to dimensions of inequality along the lines of gender, age, class, race, caste, ethnicity, indigeneity, and (dis-)ability, or combinations of those, as suggested in Figure 4. Alkire and Seth (2014) present a country and sub-regional comparisons of inequality among poor people in 90 countries. Findings suggest that the poorest
of the poor are left behind. For instance, as shown in Table 3, Yemen and India have the same Multidimensional Poverty Index (MPI), nearly the same incidence of poverty (A) and intensity of poverty (H), and even an almost identical disparity between sub-regional MPIs (V₀), yet Yemen has a higher inequality in individual deprivation scores (V) than India. This infers otherwise invisible divides along cultural, rural/urban, or inequality lines, most likely reflecting disadvantage due to gender, age, class, caste, ethnicity, religion, or any combination of these. The comparison between Togo and Bangladesh, reveals stronger regional disparities, all other parameters being equal, implying more deprivation in specific sub-regions in Togo that may also conceal deep-seated patterns of inequality played out in geographic divides.

Table 3: Example of four countries showing similar Multidimensional Poverty Indices (MPIs) but different inequality levels among the poor and different levels of disparity across regional MPIs (Source: Alkire and Seth 2014)

| Country | Year | MPI | A   | H   | Inequality Among The Poor | Disparity Between MPIs | Number of Regions |
|---------|------|-----|-----|-----|--------------------------|------------------------|------------------|
| Yemen   | 2006 | 0.283 | 53.9% | 52.5% | 0.274 | 0.052 | 21 |
| India   | 2005 | 0.283 | 52.7% | 53.7% | 0.234 | 0.050 | 29 |
| Togo    | 2010 | 0.250 | 50.3% | 49.8% | 0.194 | 0.042 | 6 |
| Bangladesh | 2011 | 0.253 | 49.5% | 51.2% | 0.192 | 0.004 | 7 |

An example of a country comparison regarding changes in MPI over time detects differential progress among ethnic groups in Benin and Kenya (Alkire and Vaz 2014). In Benin (Figure 5a), no reduction in poverty was observed among the Peulh, the poorest ethnic group with the highest MPI in the initial year, and a similar stagnation can be seen for the Dendi, although their MPI was not as high at the beginning. In contrast, all other six ethnic groups show reductions in MPI, with the largest reductions among the least poor ethnicities, the Yoruba, Fon, and Adja. Such an increase in disparity across ethnic groups reveals how horizontal inequality – among the poor – is growing. As explored later in the scenarios, such horizontal inequality can trigger hostility and conflict (Stewart 2010). The experience in Kenya (Figure 5b) shows a more encouraging and pro-poor trend overall as the highest reduction in MPI has occurred among the poorest ethnic group, the Somali, lessening the gap to the least poor group, the Kikuyu.

Such examples are essential because they reflect entrenched inequalities in society that, if unaddressed, constitute serious challenges in the context of climate change and available response options, even if overall poverty within a country is reduced. As shown here, inequality along ethnic lines can constitute a poverty trap through social exclusion of an entire group, often the socio-politically least supported and hence the most disadvantaged ethnicity. This exclusion then constrains opportunities, including opportunities in education, healthier nutrition, safe drinking water and sanitation that all influence human capital, as well as opportunities to expand and transform other assets, and mobility. Consequently, limited opportunities increase risks under multiple stressors, including climatic stressors, and are likely to force disadvantaged groups to engage in distress sales, for instance livestock among
desperate pastoral groups. Such curtailed opportunities are also likely to limit the poor to low-risk activities that are also low-return and, thus, perpetuate their deprived status. In the absence of pro-poor policies, including social protection and targeted financial instruments, the chances of destitute individuals and groups to escape poverty shrink dramatically.

Figure 5: Reductions in Multidimensional Poverty Index (MPI) by ethnic groups a) Benin; b) Kenya. (Source: Alkire and Vaz 2014)

In the context of climate change, a relatively small yet growing literature explores the role of inequality in differential experiences of climatic impacts and in the range and flexibility of response options. A comparatively solid evidence base stems from indigenous peoples in the Arctic, including those in the Russian North, where early impact studies became more sophisticated and much faster than in other indigenous settings. The consensus is that indigenous peoples whose knowledge, values, and lifestyles are marginalized and are excluded from decision-making processes and policy making are also at high risk from climate change as their capacities and opportunities dwindle while stressors mount. For example, work with Alaskan Natives shows that their social, economic, and political marginalization has long historic roots, reflected in structural failures in addressing climate change without simultaneously addressing salient issues of social inequality (Shearer 2012). The combination of climatic stressors that may already have exceeded lived experiences and persistent marginalization accelerate the gradual disappearance of cultural points of reference, observed for both Arctic communities and indigenous populations in low lying islands such as the Torres Straight Islanders in Australia (Adger et al. 2014; Olsson et al. 2014a). This erosion of cultural and social assets further weakens adaptive potentials.

Chapter 12 Human Security, AR5, WGII, devotes an entire section to indigenous peoples (Adger et al. 2014). Main findings suggest that “changing weather and climatic conditions threaten cultural practices embedded in livelihoods and expressed in narratives, world views, identity, community cohesion, and sense of place” (medium evidence, high agreement). Although indigenous peoples as well as other natural resource-dependent communities have extensive knowledge and long traditions adapting to climatic changes and socio-ecological conditions, this type of knowledge is often overlooked both in research, policy making, and adaptation planning, which represents one additional reflection of persistent exclusion. An insightful example comes from the Himalayas where government regulations of
traditional building materials and practices erode indigenous knowledge (Rautela 2005, cited in Adger et al. 2014).

The chapter also notes that the large majority of studies on climate change and indigeneity have focused on rural settings while leaving a knowledge gap with respect to urban indigenous communities. Main obstacles that undermine indigenous peoples’ adaptive efforts to maintain cultures, livelihoods, and traditional food sources stem from relocation enforced by governments, obstacles regarding knowledge transmission between generations, dependencies created by disaster relief and ill-suited policies, and inadequate entitlements and rights as currently provided through the Western judicial system. Additional barriers result from lack of voice and inclusion in formal, governmental decision-making processes over resources and development opportunities, for instance tourism and industrial activities, which may increase rather than reduce risks.

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**Short case studies (vignettes)**

3) *Indigeneity as a driver of inequality in the highlands of Bolivia*

Studies on the state of glaciers in the tropical Andes (see Rabatel et al. 2013 for a good overview) show unprecedented glacier retreat in this part of the world over the last three decades, at least since the Little Ice Age in the mid-17th–early 18th century. Mass balance records show declining trends, with a critical threshold possibly crossed in the late 1970s. Measurements indicate that the surface temperature of the Pacific Ocean drives the reduction in mass balance and dramatic shrinkage in glaciers more so than precipitation, coupled with temperature increase and higher frequency of El Niño events. Now, how do these climatic stressors interact with inequality along the axis of indigeneity?

McDowell and Hess (2012) depict differential consequences for marginalized Aymara farmers in the highlands of Bolivia, Municipality of Palca, who experience the dramatic retreat of the Mururata glacier compounded with a host of other environmental and social stressors. Various stressors over time are at play that put many Aymara highland farmers precariously close to a poverty trap while already having trapped the poorest of the poor: pervasive poverty, the legacy of a major agrarian reform in the 1950s, volatility in the agricultural market, bureaucratic hurdles in obtaining land titles and accessing bank loans, lacking support for irrigation infrastructure and technical assistance, and institutional racism and systemic discrimination against indigenous citizens, although the last has decreased over the last 15 years. All these factors are now overlaid with delayed seasonal rainfall, increased temperature, unpredictable frost, and more intense hailstorms.

Livelihood trajectories among the Aymara vary between farmers depending on key assets, particularly financial and physical capital (e.g. land at various levels of altitude). Some few
households with the financial resources to purchase herds of cattle and additional land at altitudes suitable for fruit and vegetable trees are better able to navigate changes in glacial melt water than the majority of less endowed farmers who are in no position to switch to income-generating livestock or high-labor crops. Their livelihood and adaptive trajectories differ, they may even be moving in opposite directions, yet are affected by the same ecological constraints.

Extreme flooding events in Palca wash away precious farm land, further exacerbating land scarcity. In response, those who have limited land to start with refrain from crop rotation and fallowing, which in turn contributes to the proliferation of pests on crops. Again, only the more affluent farmers are able to afford required amounts of pesticides. Moreover, to illustrate a case of differential vulnerability, evidence from the Andes (also observed in the Himalayas) suggest that uneven allocation of dwindling water from the glaciers and increased water prices are likely to hurt low-income and other disadvantaged groups first. This is the case, for instance, in La Paz and El Alto, the largest cities having experienced ~50% of retreat of the Tuni and Condoriri Glaciers over the last 50 years (Rossing 2010). To allow the poorest and most disadvantaged to escape poverty traps, institutional reforms and just policies are needed that provide social protection and expand ensured access to assets for more beneficial asset diversification and risk management options that are affordable to everybody, not only the most affluent.

Other dimensions of identity and inequality are less well understood. However, case studies of gender-differentiated impacts have mushroomed over the last decade and yielded important yet still partial insight into the role of intersecting inequality. There is also growing evidence of detrimental impacts on children, for instance through malnutrition, stunting, and inadequate water supply as a direct result of droughts or indirectly through food price increases (Olsson et al. 2014a; Smith et al. 2014). At the end of this section are two additional vignettes regarding inequality in the context of climate change: the first describes the role of age and race at the backdrop of the 1995 Chicago and the 2003 European heat wave. The second explores gender dimensions across changing climatic trends and extreme events.

What remains exceedingly rare are in-depth case studies that explore how different inequalities intersect, beyond the standard ‘2x2 model’ (e.g. race x age as illustrated in Vignette 4 on the Chicago heat wave). Looking back at the insights on climate change and indigenous peoples, it is striking that indigeneity is often assessed as a stand-alone category, even though being indigenous always inevitably means a specific gender, age, ability and so forth. An exception is work by Pearce et al. (2011) that points to heightened risks among male Inuit in Canada due to their hunting activities on insecure sea ice while women are likely to experience more harm from reduced food supplies and reduction in consumption. We urgently need compelling in-depth accounts of how several of the identity markers interact with each other and, in their specific constellation, how they drive vulnerability and capacities for adaptation, for instance gender with age and with indigeneity. In fact, Chapter 13 Livelihoods and Poverty identifies the limited knowledge on intersecting and simultaneous axes of privilege and marginalization as one of the major research gaps to date, leaving us with only few insights into which distinct drivers of vulnerability are at play in which particular contexts (Olsson et al. 2014a). These social
drivers are highly context-specific and tend to be clustered in diverse ways (e.g., class and ethnicity and ability in one case, gender and age in another).

More efforts are needed to depict the full spectrum of these intersecting social processes by learning from individual case studies and distilling both common patterns and distinct experiences of the ways in which these processes shape multidimensional vulnerability and differential capacities and opportunities to climate change. No specific set of methods or metrics exist to date to measure obstacles to coping and adaptation that result from intersecting inequalities. This is largely due to the fact that it remains exceedingly difficult if not impossible to a priori identify which dimensions of inequality are at play in a given context and ought to be examined. What is missing so far is an explicit attention to how relations among social identities are ‘mutually constitutive,’ meaning how “one category of identity, such as gender, takes its meaning as a category in relation to another category” (Shields 2008: 302). This is complicated by the many dimensions that can express inequality (see Figure 6), several of which are directly relevant for impacts from and adaptation to climate change (e.g. income, age) while others are likely to play a secondary role (e.g. religion, sexuality).

![Diagram of intersectionality](http://aaronjohannes.files.wordpress.com/2012/07/screen-shot-2012-07-02-at-1-31-40-pm.png)

**Figure 6:** Intersectionality displayed in a wheel diagram illustrating the various possibilities of co-constituting identities and inequalities
Source: [http://aaronjohannes.files.wordpress.com/2012/07/screen-shot-2012-07-02-at-1-31-40-pm.png](http://aaronjohannes.files.wordpress.com/2012/07/screen-shot-2012-07-02-at-1-31-40-pm.png)

- The innermost circle represents a person’s unique circumstances.
- The second circle from inside represents aspects of identity.
- The third circle from the inside represents different types of discrimination/isms/attitudes that impact identity.
- The outermost circle represents larger forces and structures that work together to reinforce exclusion.

*Note it is impossible to name every discrimination, identity or structure. These are just examples to help give a sense of what intersectionality is.*

So far, useful insight into this co-constitution of identities and inequalities stems from localized case studies only, some with explicit focus on climate change and others based on more general connections to environmental changes. A highly insightful example is Nightingale’s (2011) analysis of how multiple and often fragmented identities (also referred to as subjectivities) are produced at the intersection of gender and caste in Nepal. Her focus is on the everyday interactions of bodies in space, inside and outside the house, such as for food preparation and land management, and how these interactions
entrench, challenge, or shift social inequalities and social and environmental relationships. Instead of adopting a narrow conception of gender, in which gender is seen as separate from other dimensions of identity, Nightingale examines embodied performances along axes of social difference, demonstrating how boundaries of bodily purity and pollution, for both women and men, are bent by contesting vertical power dynamics between castes. For instance, her analysis illustrates how lower-caste members can circumvent exclusionary spaces in domestic arrangements, for instance gaining access to otherwise taboo areas in a home. By doing so, they make space for lateral power shifts that open up new opportunities for engagement with high-caste members, structural change, and well-being.

Fewer examples present intersectionality as a lived experience in the form of live stories of individuals that reflect in yet more detail how their dimensions of identity and disadvantage change over time and depending on social and spatial contexts. Valentine (2007) provides excellent insight into a woman's life experience in the United States in which the concept of ‘woman’ intersects with class, motherhood, sexuality, and disability (deafness), shedding light on interlocking expressions of privilege and oppression, strongly influenced by critical race studies. Such an analysis draws attention away from disadvantaged groups as homogenous entities by highlighting how dimensions of partial privilege, power, and discrimination within one and the same person are ‘done’ and ‘undone’. This is a reflection of shifting subject positions and power dynamics in particular spatial contexts (e.g. at the workplace, the Deaf club, in the family). For instance, the same woman is in a subordinate position as a woman and conjugal wife with her husband at home, with few options to defend herself against domestic violence. Yet, in the Deaf club, she is first and foremost culturally Deaf and empowered among equals. Power, exclusion, and sense of belonging shift with the fore- and backgrounding of different facets of identity and discrimination, and so do the adaptive response strategies against various stressors that occur in a person’s daily life. In other words, response strategies are not fixed based on just one identity marker.

A quote by Butler (1990) below illustrates this co-constitution of identity. By appreciating such critical ways of exploring inequality without falling into the trap of essentializing women, ethnicity, class, etc., we can envision that more sophisticated analyses on the linkage between intersectionality, poverty, and climate change impacts would most likely reveal multiple layers of harm and opportunities with fluid identities. Such analyses would further advance our understanding of poverty dynamics within life cycles and beyond, without the need to compare and measure differences between and across cases. This would require much more dynamic and context-specific analyses to be incorporated into more nuanced and flexible social protection programs. To date, however, we are a long way away from this goal.

If one “is” a woman, that is surely not all one is; the term fails to be exhaustive, not because a pregendered “person” transcends the specific paraphernalia of its gender, but because gender is not always constituted coherently or consistently in different historical contexts, and because gender intersects with racial, class, ethnic, sexual and regional modalities of discursively constituted identities. As a result, it becomes impossible to separate out “gender” from the political and cultural intersections in which is it inevitably produced and maintained. (Butler 1990: 3)
4) Inequality during the 1995 Chicago and 2003 European heat waves

Klinenberg’s (1999) social autopsy of the 1995 Chicago heat wave during which >500 people died directly from the heat and another >700 of premature death (deaths in excess of the weekly average) is a tragic and most detailed reminder of the role of racial inequality during extreme events. The European heat wave during the summer of 2003 affected a total of 16 countries and resulted in >70,000 additional deaths, including almost 15,000 deaths in France alone (Poumadère et al. 2005; Robine et al. 2008). Both exemplify how marginality and political neglect, centered around the intersecting axes of race, age, and gender, drive vulnerability to climatic extremes among societies’ poorest and most disadvantaged citizens in affluent nations. They also highlight the urban particularities that do not always go along with a more rural-focused asset and consumption framework. While the lack of air conditioning certainly exacerbates mounting temperatures in poor and small residential settings, the case studies highlight the more important role of failed social and urban policies that generated social isolation. Heat waves have also been referred to as “silent killers” that expose social inequalities in the face of risks (Klinenberg 2002). Chapter 12 Human Health of the AR5, WGII, confirms that people disadvantaged by race and ethnicity experience more harm from heat stress: for example, higher heat-related mortality has been reported for Black Americans, likely due to low economic status, chronic conditions such as overweight and diabetes, disrupted social networks, higher local crime rates, and displacement after extreme events (Smith et al. 2014).

In his analysis of the political economy of vulnerability and social isolation in the city of Chicago, Klinenberg (1999) outlines the confluence of new urban poverty, the decentralization, fragmentation, and privatization of social-service programs and down-sized public agencies due to the retrenchment of the welfare state, the deterioration of neighborhoods, the collapse of businesses, depopulation, and an associated rise in violence, and misguided public housing policies that precipitated what he calls the “anatomy of urban suffering” (250) and the “ring of death” (254) — the precariousness and heightened numbers of deaths among low-income, elderly, African-American citizens living in more violent neighborhoods predominantly in the south and southwestern parts of Chicago’s metropolis. According to his inquiry, Black seniors accounted for 45% of the deaths of citizens 65 years of age and older, with more men dying than women, arguably at least partially due to men’s weaker or non-existent social networks.

“Home alone, home afraid, home sick” describes how the outsourcing of service provisions obscured the rising level of insecurity and depth of deprivation among the poorest and most distressed individuals. The socially and spatially isolated, many of them poor elderly citizens, barricaded themselves in their small homes, refusing to leave their fortified single-room occupancy dwellings that range just one level above homelessness. They did this despite the suffocating heat that reached 106 °F and unusually high night temperatures up into the lower
80s, coupled with high humidity. The elderly in senior public housing units, which had also been opened to low-income substance abusers, were afraid to open windows or doors or leave their tightly sealed units to sleep outside, fearing to be attacked or robbed.

Lower social cohesion in Black neighborhoods, especially among elderly men, compared to social ties in white and Hispanic neighborhoods further heightened the death toll. Browning et al. (2009) build on Klinenberg’s analysis and confirm the role of commercial decline in entire disadvantaged neighborhoods as positively associated with heat wave mortality during the five-day period in July 1995. They argue that the decline in economic resources in particular neighborhoods over years coupled with other structural and infrastructural disadvantages encouraged middle-class flight. This, in turn, further destabilized essential neighborhood institutions, lowered home ownership while increasing turnover rates among local residents, and eroded stable and viable social networks among neighbors. The result of such neighborhood deterioration only became visible in what the authors call “stifling hot, and ultimately lethal, residences” (675). As Klinenberg (1999) shows, slow medical and political response coupled with the media’s natural disaster narrative contributed their share to rendering invisible the dimensions of social tragedy, with which the general public still wrestles, even today.

The European heat wave of August 2003 was among the worst since in-depth records started in 1976. Table 4 lists reported heat waves in Europe with associated mortality between 1976 and 2003. The exceedingly high numbers of 14,802 within two weeks in France alone (other sources speak of up to 14,947) represented an excess mortality of 60%, with +96.5% in the second week (Robine et al., 2008). Similar to the Chicago heat wave, social inequality was the key driver. Unlike more graphic extreme climate events such as floods, heat waves are not only silent killers but also a socially attenuated risk (Kaspenson in Klinenberg 1999). People often do not take heat seriously enough and fail to take early action. In the UK, elderly citizens are reported to have underestimated the severity of excessive heat, downplaying risk through their vital yet narrow social networks and failing to listen to heat warnings over the radio or TV (Wolf et al. 2010).

Most detailed inquiries from the 2003 European heat wave stem from France (Poumadère et al. 2005; Fouillet at al. 2006), reporting economic poverty, social isolation at home, and age and gender, coupled with sickness and other medical antecedents as responsible for the high death rate. The large majority of elderly victims (>90%) lived alone and among those almost half in one-room apartments as small as 10m² or less, known in Paris as ‘service rooms’ exposed to the sun and poorly insulated. Widowed, single, and divorced citizens were most affected by social isolation and deprivation, unable to reach out for help. Nonetheless, excellent organizational preparedness coupled with social care, such as in the case of a retirement home in Val de Marne south of Paris, illustrates that the high level of excess death could have been avoided. Unlike in Chicago, though, overall female mortality was 75% higher than for men, yet more working-age men died than women.
Yet, very similar to the US case study, public rejection of the dire reality followed, imbued in a sense of stigmatization that surrounds the elderly, the poor, the sick, and the socially isolated.

Table 4: Heat waves and attributed mortality in Europe (Source: Kovats and Hajat 2008)

| Heat wave event          | Attributable mortality (% increase) | Baseline measure                                      |
|--------------------------|------------------------------------|--------------------------------------------------------|
| 1976—London, UK          | 9.7% increase England and Wales and 15.4% Greater London | 31-day moving average of daily mortality in same year |
| 1981—Portugal            | 1906 excess deaths (all cause, all ages) in Portugal, 406 in Lisbon (month of July) | Predicted values                                      |
| 1983—Rome, Italy         | 35% increase in deaths in July 83 in 65+ age group | Compared with deaths in same month in previous year    |
| 1987—Athens, Greece      | estimated excess mortality >2000    | Time trend regression adjusted                         |
| July 21—31               | 997 excess deaths                  | Predicted values                                      |
| July 12—21               | 11.2% (768) in England and Wales, 23% (184) Greater London | 31-day moving average of daily mortality in previous two years |
| July 30—August 3         | 24.4% increase, 1057 (95% CI 913, 1201) | 31-day moving average of previous 2 years              |
| 1994—Netherlands         | 3134 (15%) in all Italian capitals | Deaths in same period in 2002                         |
| July 19—31               | 14802 (60%)                        | Average of deaths for same period in years 2000 to 2002|
| 2003—France              | 1854 (40%)                         | Deaths in same period in 1997—2001                    |
| August 1—31              | 3166 (8%)                          | Deaths in same period 1990—2002                        |
| 2003—Spain               | 975 deaths (6.9%)                  | Predicted values from Poisson regression model        |
| August 1—31              | 1400 deaths                         | Number of degrees above 72°F multiplied by the estimated number of excess deaths per degree (25–33 excess deaths) |
| 2003—Netherlands         | 1410 deaths                         | Calculations based on mortality of past five years    |
| June 1—August 23         | 1297 deaths for age group older than 65 | Average of deaths for same period in years 1985—2002 |
| 2003—Baden-Wuerttemberg, Germany | 2091 (17%). Mortality in London region: 616 deaths (42% excess) | Average of deaths for same period in years 1998 to 2002 |

Similar evidence that points toward age-related differential impacts from heat stress stems from the ten-year drought and wild fires in Australia during which social isolation, limited mobility, physical harm, and feelings of distress over lost home gardens and familiar landscapes undermined affective adaptation (Olsson et al. 2014a). Overall, health conditions among older people tend to prevent bodily capacities to respond to heat or air pollution (Smith et al. 2014).
5) Gender as a key driver in the mix of multidimensional inequalities

An abundance of case studies exist to date that illustrate the differential impacts of climate change on men and women. A good summary is provided by Chapter 13 Livelihoods and Poverty, the Gender Box, WGII, and additional examples from Chapter 12 Human Health. Impacts range from changes and losses to livelihoods and assets (e.g. taking up wage labor, reducing consumption levels, attracting specific illnesses such as water-borne diseases due to more interaction with water-logged environments, gain and loss of land as main asset) and increases in household and caring responsibilities, known as ‘feminization of responsibilities’ (e.g. increasing workloads, longer working hours, taking care of children, the elderly, and the sick) to occupational hazards (e.g. heat stress due to outside agricultural work or inside occupations), emotional and psychological distress (e.g. exhaustion and mental health issues due to overload of responsibilities, increase in domestic fights and gender-based violence due to stress, tension, loss, grief, and disrupted social networks), and mortality (e.g. social conditioning leading to drowning) (see Olsson et al. 2014a; Vincent et al. 2014a). Table 5 illustrates more specific gendered examples from Australia and India.

Table 5: Examples of gendered climate change experiences (Source: Olsson et al. 2014a)

| Experiences                      | Male farmers                                                                 | Female farmers                                                                 |
|---------------------------------|------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Increased workload              | Demanding tasks such as feeding livestock, carting water, destroying frail    | Assistance with farm tasks and working off the farm for additional income (A)   |
|                                 | animals (A)                                                                  |                                                                                |
|                                 | Increased migration for wage labor, typically farther away from home (I)     | Increased collection of firewood and uptake of wage labor (especially lower     |
|                                 |                                                                              | costs) in neighboring villages (I)                                            |
| Community interactions,        | Locked into farms, loss of political power (A)                              | Increased interactions and caregiving work, taking care of others’ health at   |
| isolation, and exploitation     | Exploitation by labor contractors when migrating (I)                        | the expense of their own (A)                                                  |
| Physical and psychological     | Feel denigrated (farmers seen as responsible for crisis), increased stress,  | Disadvantage in accessing institutional support and climate information (I)    |
| toll                             | social isolation, depression, and high suicide levels (A)                   |                                                                                |
|                                 | Increased anxiety to provide food and access loans and escape trap of         | Working lives appear indefinite, resulting in increased stress (A)             |
|                                 | indebtedness, increase in domestic fights, sometimes suicide (I)             |                                                                                |
|                                 | (A) = Australia (ten-year drought; 2003–2012), based on Alston (2011); (I) =| (A) = India (climate variability and changing climatic trends), based on       |
|                                 | India (climate variability and changing climatic trends), based on Lambrou    | Lambrou and Nielson (2013).                                                   |
|                                 | and Nielsen (2013).                                                         |                                                                                |

Chapter 13 concludes with very high confidence that climate-related hazards increase or heighten existing gender inequalities, intertwined with socioeconomic, institutional, cultural, and political drivers that perpetuate differential vulnerabilities. Gendered impacts result from differential access to social and environmental resources that are needed for adaptation as well as social exclusion from labor markets, decision-making processes and planning (Vincent et al. 2014). Earlier studies, focusing predominantly on women’s quasi-universal vulnerability under climate change, tended to obscure unequal power relations and structural drivers of inequality, largely to bring women onto the climate change map. More recent work has been trying to reverse this unfortunate one-dimensional portrayal and instead bring to the fore socially constructed gender differences that explain specific and shifting dimensions of vulnerability.

Revealing yet shocking evidence, for instance, comes from Lagos where poverty, class, political neglect, and gender discrimination interact with sea level rise and flooding (Ajibade et al. 2013).
Low-income women experience the brunt of successive flooding events as many have to eke out an existence in overcrowded and poorly drained slum settlements. A quote from a woman slum dweller underlines women’s precarious situations that intersect with flood events (ibid: 1718):

“...This place is a ghetto, so you can’t really say much about husbands. Husbands do not matter much in this type of situation, they give little. Most women here are single mothers, while some have husbands but their combined income is still very small. Most men are Okada riders (bike riders) while others are conductors and transporters; they belong to the union. Most of the union members have more than five wives. They just give the women whatever they have. So the women have to cater for themselves and their children”. (29 year-old woman from Badia)

Furthermore, more recent research demonstrates that gender roles, obligations, and tasks are rarely fixed. Instead, they are negotiated and contested in response to emerging constraints as well as opportunities, at times in culturally unexpected ways. They constitute resourceful adjustments to the dynamic and ever shifting context of livelihood decision making. Here are two examples. First, as a climate change response to altered cropping cycles and subsequent threats to rural livelihoods in Cambodia, men started logging trees and engaged in charcoal production for sale, despite cultural taboos, while women enrolled in wage labor and experimented with their new roles in livestock raising at home (Resurreccion 2011). Second, in Nepal, an intersectionality perspective (gender x caste) reveals that Dalit girls and women (‘untouchable’ caste) are required to provide more day labor to the high-caste Lama landlords while attending to growing drought-resistant buckwheat. In the meantime, Dalit men seek once culturally-taboo patronage protection to engage in cross-border trade to diversify their livelihoods. Both men and women expanded their asset flexibility and opportunity set as a result of shifts in the monsoon season, longer dry periods, and decreased snowfall, triggering new opportunities and new risks and oppression (Onta and Resurreccion 2011).

Just as the construction of poor people as helpless and their poverty as their intrinsic problem, a stereotyping of women as victims of climate change robs them of their agency to cope, adapt, and reverse entrenched and unequal power relations (Olsson et al. 2014a). The propagation of such negative female stereotypes, especially for Southern woman as “helpless, voiceless and largely unable to manage herself” (MacGregor 2010: 3) has been a particular concern in climate discourses as it conceals a contested discriminatory North-South dichotomy. Bee and colleagues (2012) observe that such a disempowering narrative is not only a totalizing construction of women that fails to disaggregate and differentiate, particularly of women of color in the global South. It is an easy tool to legitimize external, top-down interventions to address – under the mantle of urgency – the climate challenge ‘objectively and effectively.’ This further marginalizes and mutes a plethora of local and arguably contradictory voices, of both women and men, and dismisses their embodied and multifaceted experiences in responding to climatic stressors and shocks. Poor women and men struggle, actively and ingeniously, and deserve to be heard.
Let us consider, for instance, mortality from extreme events. An often evoked yet ultimately refuted claim exists that 14 times more women than men die as a consequence of natural disasters (see discussion in Arora-Jonsson 2011). This particular and other simplistic accounts of women’s propensity to dying in floods or hurricanes overlook socially and culturally constructed gender roles. Although there is statistical evidence that disasters from extreme events kill women at an earlier age than men, more women die in hurricanes and floods only when they are socioeconomically disadvantaged and when disasters exacerbate pre-existing patterns of discrimination baked into society (Olsson et al. 2014a; Vincent et al. 2014; Smith et al. 2014). This is a fundamental nuance to the gender-climate debate! In light of context- and place-specific constellations of differences, we need to switch on and off our multiple lenses rather than dissecting climate change impacts on women as a supposedly discrete social category.

When cultural traditions and social conditioning prohibit girls and women to learn how to swim, women will be more likely to drown in a flood. At the same time, however, in places where men are expected to demonstrate male risk-taking and be heroic life-savers at the forefront of rescue operations, more men have been recorded to die during floods, as in the case of Hurricane Mitch in Nicaragua (the case of ‘machismo’) or inundations in Vietnam. In China too, more men have been reported to die during floods due to work in agricultural fields. The point here is that gender roles by themselves rarely result in extreme harm, including death; it is the intersection of gender with other axes of marginalization or discrimination that is amplified during times of natural and/or political and economic calamities. It is at this intersection that vulnerability results in harm, and barriers and limits to adaptation materialize.

Finally, recognizing socially constructed gender roles and differential impacts is also a prerequisite for gender-sensitive adaptation options, understood as embedded in wider webs of unequal power relations and structural constraints. Insensitivity to gender and other dimensions of inequality risks perpetuating or potentially reinforcing existing vulnerabilities and, thus, increase risks for already disadvantaged groups. Vincent et al. (2014) cite adaptation options that require additional labor often not available to women (e.g. water conservation) and cash-cropping in rural areas that, culturally, is often reserved to men. Gender-equitable response strategies are those that address exclusion and lack of voice, often through education and strengthening of social capital. Evidence from Mozambique (Osbahr et al. 2008), for instance, illustrates that female-headed households and elderly citizens, lacking other key assets, often engage in reciprocal gifts of food and labor in order to nourish their social networks. Their ability to reciprocate, however, drops significantly during times of crises such as droughts, as gifts of food, small livestock, or cash and labor, on which their social networks rely, become harder and harder to produce. In the case of Ghana (Carr 2008), some husbands have been observed to prevent their wives from cultivating individual plots to compensate for yield losses due to shifts in seasonal rainfall patterns, only to maintain their own power positions. Carefully designed social protection programs can strategically support curtailed adaptive potentials. Sensitive response strategies before, during, and after crises as well as in anticipation of further shifts in
climatic trends can include rights-based approaches that tackle unequal institutional practices, such as those that determine fair participation and inclusion in adaptation planning.

Figure 7: Iterative and multi-scalar methodological framework for Inequality and Transformational Analyses, combining assessments (light gray/green) with enhancement of capacity for change (dark gray/purple). (Source: Tschakert et al. 2013).

Structural and persistent inequalities that are deeply entrenched in our societies, in addition to poverty and deprivation, drive vulnerabilities and, hence, undermine and constrain agency and capacities in adaptive decision-making processes. Standard vulnerability assessments typically fail to capture such intersecting complexities, especially if the core focus is on hazards and household assets or capital. Some of these complexities are situated at spatial scales smaller than the household, namely individuals and their bodies. Colleagues and I have presented the notion of Inequality and Transformation Analyses as a conceptual and methodological tool to allow for a more dynamic understanding of the role of inequalities for vulnerability (Tschakert et al. 2013). Such type of analysis not only lends itself to addressing barriers to reducing vulnerabilities that exist as a result of persistent inequalities, but it also creates exploratory environments that may be conducive for real social change. From a research perspective, such a framework allows us to complete the shift from impact-vulnerability assessments to analyses of structural and relational drivers of poverty and inequality that are at the core of multidimensional vulnerabilities. It also allows us to more explicitly to disentangle the various factors that create this unjust balance between flourishing and harm that transcends many of the case studies and vignettes discussed in this paper. The conceptual framework for such analyses, combining assessments with enhancing capacity for change, is depicted in Figure 7. The first component (upper left), in particular, allows us to better understand what capacities and opportunities particular social actors and groups bring to the table, and the range of factors and processes, including persistent inequalities, that curtail their ability to use these capacities and opportunities to their fullest potential.
4. Dynamic livelihoods and multiple stressors

Poor people rarely experience climatic stressors and subsequent shocks to their livelihoods and well-being in isolation. A long history of case studies confirms that climate change interacts with other stressors (e.g. social, environmental, economic, technological, and political changes). Institutional contexts and policies typically filter incoming stressors, ideally to lessen their effect, although exploitative social policies and economic austerity measures have shown opposite results. Shocks then occur to place-based livelihoods. Depending on inequalities, asset flexibility, and power structures, these shocks can range from modest to life-threatening. Poor people are most harmed when their adaptive potentials are limited and stressors occur simultaneously or back-to-back. In either case, they create critical thresholds that may mean a shift from transient to chronic poverty or a slippage into a poverty trap from which it is exceedingly difficult to escape. Hence, understanding climate change impacts on the poor requires both a multi-stressor and a dynamic perspective on people’s livelihoods. Yet, most available evidence provides only a snapshot of climate-related impacts on the well-being of the poor, missing out on livelihood struggles that may last over years.

Besides, typically more attention is paid to the effects of extreme events such as floods, droughts, and hurricanes. Comparatively limited work has been carried out that assesses the cumulative impacts of ‘small disasters’, such as strong winds, short periods of excessive heat, minor changes in the distribution of rainfall often not even captured in geographically sparse meteorological observations. Yet, for poor and marginalized populations, the cumulative effects of such ‘small disasters’ may have devastating impacts, even if lived experiences of harm and loss remain undetected (Olsson et al. 2014a).

Chapter 13, Livelihood and Poverty, provides two compelling examples for such a perspective. Vignette 6 illustrates livelihood dynamics among rural households in the drylands of Botswana. Vignette 7 explores converging dynamics in coastal communities in Bangladesh. A livelihood trajectory approach allows for the examination of a household’s strategic behavior that is rooted in historical contexts, in social differentiation and in perceptions of risk; it also allows for a deeper appreciation for the beliefs, needs, aspirations, and limitations of poor people’s lives, but one that remains contextualized in relation to power and institutions (de Haan and Zoomers 2005).

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Short case studies (vignettes)

6) Divergent livelihood trajectories in Botswana’s drylands

Tracking livelihood states in Botswana’s drylands provides insight into dynamic shifts between states/periods of resilience and vulnerability by focusing on three simultaneous and intersecting processes: agro-ecosystem resilience, livelihood strategies, and institutional capacity. The elicited livelihood trajectories reflect the shifting conditions between household and environmental flourishing and harm that make visible the inextricable linkages between social and natural systems.
Such an approach is vital for attesting that a) vulnerability and resilience can change significantly over time; b) the large majority of individuals or households are vulnerable at certain times while only very few are resilient throughout long periods of time; and c) the interplay between cultural, social, and ecological factors embedded in local histories together shape strategic behavior.

The social and the ecological (and the technical) are intimately linked and highly dynamic: extreme environmental conditions affect soil and water resources as well as landscapes; high seasonal and diurnal temperature variations, low average annual rainfalls, frequent and extended periods of drought, sporadic excessive rainfall events, and high soil heterogeneity require flexible livelihood activities. The latter entail temporary hotspots for hunting and gathering of wild fruits, pastoralism, farming, vegetable gardening, and small businesses. Superimposed on this already dynamic and sometimes volatile system are several significant environmental changes that have been observed between 1974 and 2005: a severe and prolonged drought in the mid-1980s, delays in the peak rainfall season by up to one month, increased unpredictability of rain-fall, drying up of lakes and rivers, and land degradation, mainly due to soil erosion and compaction.

Tables 6 (a and b): Examples of two livelihood trajectories: T (trajectory through time, reflecting a certain period of stress and shocks or opportunities), and factors leading to resilience (R) and vulnerability (V).
(Source: Sallu et al. 2010)

What happens when change becomes the norm? Livelihood trajectories shift over a 30-year period, as shown in Figure 8. At the backdrop of interrelated changing environmental conditions, variable assets stocks, uneven support from formal and informal institutions, and the multiple relations between people and between people and places, three types of household trajectories emerge:
accumulators, diversifiers, and dependents. While the accumulator households are able to capitalize on a crisis, they are not entirely immune to shocks. At the same time, highly vulnerable households may be able to recover from one shock, often through help from informal social networks, but a series of shocks can knock them out and make them entirely dependent on governmental support. Diversifiers fluctuate between periods of vulnerability and more resilient states.

Figure 8: Illustrative representation of the livelihood dynamics for the three categories of households in Botswana’s drylands, based on a case study by Sallu et al. (2010). The red boxes depict critical moments during which climatic, environmental, and social stressors converge, threatening livelihoods and well-being among the poor and the poorest. (Source: Olsson et al. 2014)

These trajectories do not occur in isolated bubbles. A relational poverty lens reveals interdependencies between individual households and between people and their places. While one may argue that environmental changes such as droughts affect everybody in a community, power differentials and policy decisions result in flourishing of some, to the detriment of others. For
instance, agricultural productivity hotspots were quickly claimed by local elites, and changes in hunting licenses also benefited the elites while poorer households lost out on previously freely accessible wild life. Elite accumulators, furthermore, could then invest in improved access to water (bore wells), transportation, and access to institutions and markets, positioning themselves more effectively to monitor and predict economic and institutional changes. While in one community inconsistent governmental support for the more destitute segments of the population spurred informal social support networks and fostered efforts to reach out to neighbors and family members, trust and reciprocity in another community eroded even further.

5. The impact of climate change on poverty alleviation

We need to better understand the impacts of climate change on poor people as well as their abilities to cope with and adapt to these impacts. For this purpose, analytical framework centered on channels (e.g. price-consumption, assets, productivity, and opportunities) are useful. These channels are conduits not only for escaping poverty but also for managing risks that emerge at the intersection of climatic hazards, exposure, and vulnerability. Figure 9 provides a compelling conceptualization for this interface, depicting an ever shifting context of risk, with complex and dynamic linkages between risks, channels for risk management, impacts, and traps and successful adaptation that, in turn, reshape vulnerabilities and adaptive capacities. This figure highlights the multiple structural constraints (orange bolts to the right) that influence the level of vulnerability of individuals, social groups, and entire communities. This ‘arch of structural constraints’ encapsulates the various aspects that keep or make some people poor (seen in a broad sense, including people who are disadvantaged and marginalized) while benefiting others.

Some of these constraints are applicable to entire countries or regions (e.g. uneven development pathways) while others are highly context-specific (e.g. uneven power relations in a household or a community). Together, they result in constellations of vulnerability for individuals and groups that drive risk, a particular climatic hazard and exposure being equal. We understand that climate change is only one of several possible stressors or hazards, others including conflict, new technologies, or corruption.

In order to manage risks before impacts occur as well as respond to impacts that have already occurred, individuals and households draw upon the four channels as flexibly as possible, with the ultimate goal to sustain meaningful lives with dignity and agency. For instance, feasible and appropriate adjustments to food budgets after price increases are likely to differ between impoverished and affluent families, between male heads of household and women and children, and between farmers and urban wage earners. Strategies to reduce physical or psychological harm to bodies (human capital) as well as labor productivity will depend on securing or negotiating access to protective measures. These, in turn, are typically controlled by social relations entrenched in uneven webs of power in addition to broader social and economic policies. Success or failure of juggling assets and opportunities are often driven not by a state of poverty per se but by intersecting axes of inequality along the lines of gender, race, age, class, ethnicity, indigeneity, caste, and (dis)ability, even in contexts where no difference exists in exposure, as in the case of heat waves or cold spells. Even in HICs, inequalities can significantly hamper adaptive
capacities. For instance, communities with concentrations of racial minorities and low-income households in the United States are reported to have lower adaptive capacities than more affluent areas, resulting from marginalization and multidimensional inequalities (Posey 2009).

Figure 9: Channels for household risk management employed to reduce risk from climatic hazards, exposure, and vulnerability and recover from impacts (driven by multiple structural constraints). Poverty is both a driver of vulnerability and a result of unsuccessful coping with and adaptation to impacts.

To date, there is substantial evidence that shows how more affluent households tend to smooth consumption when facing risks or after a crisis has occurred while poorer households will smooth assets and reduce their consumption levels, often eroding their health, their labor, and other human assets. How individuals and households prepare for and respond to asset losses is likely to vary whether they are dealing with a single stressor, a combination of stressors, or cumulative and recurrent stressors, all of which alter risk levels. Not surprisingly, poor and disadvantaged households will aim to lower risks by choosing low-risk strategies, even if they are likely to yield lower returns or even endanger them more. Farming families may opt for the most drought-resistant crop and forego cultivation of cash crops in anticipation of a drought. Poor urban residents may lock themselves into their miniscule dwellings during excessively high temperature just to avoid the risk of being robbed when sleeping outside. For
some households, migration constitutes an opportunity to find employment somewhere else and increase household income, most often for men, while absent husbands often mean increased labor duties for women who stay behind. For most disadvantaged households, migration may not even be an option. Chapter 12 Human Security of the AR5 (Adger et al. 2014) shows low ability to move when people are trapped in low levels of well-being (poverty, destitution) and high levels of environmental change (Figure 10).

An important element of this conceptualization is social protection (SP). SP measures are public and private initiatives that provide income or asset transfers to the poor, protect the vulnerable against livelihood risks, and enhance the social status and rights of the marginalized (Devereux and Sabates-Wheeler 2004). They are needed first to help people manage risks through the four channels specified and second to reduce the negative consequences of impacts once they have occurred. Both are crucial. The key objective of the former is to protect precious human capital and other assets. The purpose of the latter is to recover from losses in assets and productivity, and to create new opportunities (asset promotion). In both cases, they may involve core interventions, such as asset transfers, income transfers and public works, and complementary interventions, such as micro-credit services, social development, skills training and market enterprise programs. Table 7 depicts different types of social protection.

![Figure 10: Relationship between vulnerability to environmental change and mobility showing that populations most exposed and vulnerable to the impacts of climate change may have least ability to migrate (Source: Adger et al. 2014)](image-url)

The concepts of Adaptive Social Protection (ASP) (Davies et al. 2007; Davies and McGregor 2009) and Climate Responsive Social Protection (CRSP) (Kuriakose et al. 2012) both provide a framework for the integration of climate change adaptation and disaster risk reduction that goes beyond traditional social protection such as food-for-work programs. In spite of these conceptual advancements, there are only a
few detailed studies on the effectiveness of SP implementation for responding to and preparing for climate events and climatic changes, with the majority from South Asia and some in Sub-Saharan Africa. In a post-disaster environment, preliminary lessons from Ethiopia’s nation-wide Productive Safety Net Programme (PSNP), which assists the most chronically impoverished with cash transfers and cash-for-work schemes, revealed a positive effect on household food consumption (Devereux et al. 2006) and a reduction in ‘distress selling’ of assets as well as the protection of household assets (Slater et al. 2006). In Bangladesh, experiences of asset restocking following disasters demonstrate that such approaches can contribute to reducing vulnerability to climate shocks by providing liquidity and alternative sources of income during times of household stress (Davies et al. 2009).

Table 7: Types of social protection (Adapted after Arnall et al. 2010; Davies et al. 2009)

| Time frame       | Social protection category | Social protection instruments                                                                 | Role in crises and climate change adaptation                                      |
|------------------|----------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Short-term       | Asset protection (social assistance) | • Social service provision  
• Basic social transfers (food/cash)  
• Pension and disability schemes | Provides immediate protection and relief from poverty and deprivation  
Protects the most vulnerable to climate risks |
| Co-ping          | Prevention of asset erosion (insurance and diversification mechanisms) | • Safety nets  
• Social transfers  
• Public works programmes  
• Livelihood diversification  
• Weather-indexed crop insurance | Prevents damaging coping strategies as a result of risks to weather-dependent and climate-sensitive livelihoods |
| Long-term        | Asset promotion (economic opportunities) | • Social transfers  
• Access to credit  
• Asset transfers/protection  
• Starter packs (drought/flood-resistant)  
• Access to common property resources | Promotes resilience through livelihood diversification and security to withstand climate-related shocks  
Promotes opportunities arising from climate change |
|                  | Transformation (addressing underlying social vulnerabilities) | • Promotion of minority rights  
• Anti-discrimination campaigns  
• Social funds | Transforms social relations to combat discrimination underlying social and political vulnerability |

SP that fosters transformation (addressing underlying, structural, and systemic vulnerabilities) aims to empower disadvantaged individuals and groups to exercise their voice, combat discrimination, claim the right to protection when state or private safety nets fail, and transform unfavorable social relations, including unequal power relations and exclusion (Tschakert and Machado 2012). Yet, to date, few successful examples exist. One project in Bangladesh promotes skills training among poor, vulnerable, and socially excluded women to transform livelihoods, rather than boosting coping strategies, thereby explicitly ousting encrusted layers of inequality (Arnall et al. 2010). Many social protection projects fail to purposefully strengthen local collective capacity to tackle climate change while otherwise good programs like Brazil’s *Bolsa Família* and *Bolda Verde* have not been able to systematically reverse
Successful can reviewed multidimensional limitations of understanding entails how protection has worked for the poor in HICs, comparing welfare state records with social welfare programs squeezed by neo-liberal policies, for instance in the context of heat waves.

Figure 9 also depicts poverty traps and successful adaptation. The former is likely to occur when multidimensional vulnerability is high, adaptive options sparse, risk from simultaneous or cumulative stressors and exposure high, results from efforts within the four risk management channels meager, and social protection absent, too late, non-portable, or ill-suited to address inequalities, possibly even reinforcing them. In practice, however, little evidence exists that provides such a clear picture. In fact, what might seem like a poverty trap to some investigators could be interpreted as resilience-enhancing by others. Leichenko and Silva (2014) use the case of Hurricane Mitch in Honduras in 1998 to reveal limitations in existing methodologies to clearly identify and delineate poverty traps. One of their reviewed studies reports long-lasting and durable impacts among poor and poorest households, partially resulting from defensive, low-risk economic strategies, suggesting indeed poverty traps. Another study, however, identifies opportunities for increased local resilience after such an extreme event. The latter entails institutional changes for more efficient flood protection, and positive changes in land tenure, agricultural production removed from risky floodplains, and income diversification. More nuanced and rigorous analyses would be needed to identify clearly who becomes trapped and who benefits, understanding that these two often form a relational pair in which both traps and enhanced resilience can co-exist.

Successful adaptation is more likely when the constraining factors are reversed, or at least most of them. Chapter 13 Livelihoods and Poverty provides evidence that points toward positive effects of autonomous adaptation on reducing poverty, including successful migration, productive diversification of livelihoods, food storage, and saving systems and relations of mutual support. Yet, diversification and storage are often not available options to the poorest while other options may drain their labor resources and deteriorate people’s health (Olsson et al. 2014a). Moreover, some successful adaptation among certain members of a household or a society can mean worsening conditions for the less fortunate or powerful, including local elite capture of adaptation projects or male outmigration. Few larger-scale adaptation projects have been systematically evaluated for their impacts on poverty reduction. Among the few is India’s Karnataka Watershed project that apparently increased income, employment, and agricultural productivity among the poorest and landless, thus also lifting equity (Olsson et al. 2014a).

Finally, Figure 9 illustrates the linkage between ‘the arch of structural constraints’ and climate hazards. For instance, uneven development pathways shape energy policies and mitigation strategies. And climate policies are explicitly designed to lower emissions or contribute to carbon capture and storage. At the same time, mitigation measures have their own impacts on poor people’s vulnerability. Chapter 13 Livelihoods and Poverty summarizes the so far rather sparse and premature evidence with respect to the Clean Development Mechanism (CDM), Reduction of Emissions from Deforestation and Forest
Degradation (REDD+), and biofuel production and large-scale land acquisitions (Olsson et al. 2014a). Although detailed impact evaluations are often not available, there is some consensus that CDM projects are often not pro-poor and that REDD+ projects may not lead to poverty reduction either. There are instances of observed harm to poor people and indigenous peoples, largely due to exclusion, uneven benefits, and disregard for property rights and gender engagement. As for biofuel projects, the chapter raises two major concerns, namely food price increases and dispossession of land, both disproportionately affecting the poor and marginalized. Examples include further disenfranchisement of smallholders and indigenous peoples, and reduced access to land and financial benefits among women.

Table 8: Key risks from climate change for poor people and their livelihoods and the potential for risk reduction through adaptation. Key risks are identified based on assessment of the literature and expert judgment by chapter authors, with evaluation of evidence and agreement in the supporting chapter sections. Each key risk is characterized as very low, low, medium, high, or very high. Risk levels are presented in three timeframes: present, near-term (2030–2040), and long-term (2080–2100). Near term indicates that projected levels of global mean temperature do not diverge substantially across emissions scenarios. Long-term differentiates between a global mean temperature increase of 2°C and 4°C above preindustrial levels. For each timeframe, risk levels are estimated for a continuation of current adaptation and for a hypothetical highly adaptive state. Bars that only show the latter indicate a limit to adaptation (see Chapter 16). Relevant climate variables are indicated by symbols. This table should not be used as a basis for ranking severity of risks. Source: Olsson et al. 2014

| Key risk                                                                 | Adaptation issues & prospects                                                                 | Climatic drivers | Level of risk & potential for adaptation |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------|-----------------------------------------|
| Deteriorating livelihoods in drylands, due to high and persistent poverty, Risk of reaching tipping points for crop and livestock production in small-scale farming and/or pastural livelihoods, (high confidence) [13.2.1.2, 13.2.3.1, 13.2.3.2, 13.2.3.3] | Adaptation options are limited owing to persistent poverty, declining land productivity, food insecurity, and limited government support due to marginalization. Rural-urban migration is a potential adaptation strategy. | Risk level: High | Risk level: Medium                       |
| Destruction and deterioration of assets: physical, human, land, and infrastructure, human (health), social (neighborhood belonging and identity), and financial (savings) due to floods in flood-prone areas, such as low-lying deltas, coasts, and small islands, (high confidence) [13.2.1.2, 13.2.3.1, 13.2.3.5, 13.2.4.1, 13.2.4.3] | Adaptation options are limited for people who cannot afford relocation to safer areas. Government support and private options (e.g., insurance) are limited for people with insecure or unclear tenure. | Risk level: Medium | Risk level: Medium                       |
| Shifts from transient to chronic poverty due to persistent economic and political marginalization of poor people combined with deteriorating food security, (high confidence) [13.2.1.2, 13.2.2.4] | Adaptation options are limited due to exclusion from markets and low government support. Policies for adaptation are unsuccessful because of failure to address persistent inequalities. | Risk level: Medium | Risk level: Medium                       |
| Declining work productivity, morbidity (e.g., dehydration, heat stroke, and heat exhaustion), and mortality from exposure to heat waves. Particularly at risk are agricultural and construction workers as well as children, homeless people, the elderly, and women who have to walk long hours to collect water, (high confidence) [13.2.1.3, 13.2.1.5, 13.2.2.4, 13.2.2.5, 13.2.2.6] | Adaptation options are limited for people who are dependent on agriculture and too poor to afford agricultural machinery. Adaptation options are limited in the construction sector where many poor people work under insecure arrangements. Adaptation might be impossible in certain areas in a 4°C world. | Risk level: Medium | Risk level: Medium                       |
| Declining agricultural yields, primarily in already hot climates, with adverse impacts on countries and communities highly dependent on agriculture. Declining yields may cause further deterioration of assets: financial (savings), human (health), social (social networks), and cultural (sense of belonging and identity), (high confidence) [13.2.2.2, 13.2.2.4] | Adaptation by changing livelihoods away from agriculture is limited owing to poverty and marginalization. Adaptation strategies such as early or late planting, inter-cropping, and shifting crops bring mixed benefits and have limitations, often depending on household resources and access to seasonal forecasts and longer term projections. In a 4°C world, adaptation in agriculture is very limited. | Risk level: Medium | Risk level: Medium                       |
| Reduced access to water for rural and urban poor people due to water scarcity and increasing competition for water (high confidence) [13.2.1.1, 13.2.1.3, 13.2.1.5, 13.2.1.6, 13.2.2.1, 13.2.2.3, 13.2.2.4, 13.2.2.5, 13.2.2.6] | Adaptation through reducing water use is not an option for the large number of people already lacking adequate access to safe water. Access to water is subject to various forms of discrimination, for instance due to gender and location. Poor and marginalized water users are unable to compete with water extraction by industries, large-scale agriculture, and other powerful users. | Risk level: Present | Risk level: Present                      |
It is important to note that risks that emerge at the intersection of climate hazards, exposure, and vulnerability will increase with rising temperature while the potential to reduce risk through adaptation will shrink, in some cases reaching limits to adaptation. Chapter 13 Livelihoods and Poverty provides six key risks, summarized in Table 8 above, that have strong support in the state-of-the-art understanding of climate change and poverty. The orange bars depict risks for the present and future.

Given the complexity of structural drivers of vulnerability and adaptive capacity (‘the arch of structural constraints’) and the context-specific experiences that are exceedingly difficult to measure and track over time, no overarching assessments exist to date that can answer with high confidence **three crucial and overarching questions of climate change impacts on the poor:**

1) How do climate change and climate policies affect current welfare of the poor?
2) Do climate change and climate policies make it more likely that non-poor, but vulnerable people fall into poverty in the future?
3) Will climate change and climate policies exacerbate poverty traps that make it harder to bring people out of poverty in the future?

Nonetheless, existing evidence and careful assessments of the literature on possible future impacts and risks offer valuable albeit incomplete insights. In some cases there is robust evidence across contexts and high agreement in the literature. In other cases, agreement may be high, but robust evidence is still lacking. Chapter 13 Livelihoods and Poverty notes the following highlights that are relevant to attempt initial answers to these three questions.

**Question 1:**

**Climate-related hazards exacerbate other stressors, often with negative outcomes for livelihoods, especially for people living in poverty (high confidence).**

- Climate-related hazards, including subtle shifts and trends to extreme events, affect poor people’s lives directly through impacts on livelihoods, such as losses in crop yields, destroyed homes, food insecurity, and loss of sense of place, and indirectly through increased food prices (robust evidence, high agreement).
- Urban and rural transient poor who face multiple deprivations slide into chronic poverty as a result of extreme events, or a series of events, when unable to rebuild their eroded assets. Poverty traps also arise from food price increase, restricted mobility, and discrimination (limited evidence, high agreement).
- Many events that affect poor people are weather-related and remain unrecognized by standard climate observations in many low-income countries, due to short time series and geographically sparse, aggregated, or partial data, inhibiting detection and attribution. Such events include short
periods of extreme temperature, minor changes in the distribution of rainfall, and strong wind events (robust evidence, high agreement).

Observed evidence suggests that climate change and climate variability worsen existing poverty, exacerbate inequalities, and trigger both new vulnerabilities and some opportunities for individuals and communities. Poor people are poor for different reasons and thus are not all equally affected, and not all vulnerable people are poor. Climate change interacts with non-climatic stressors and entrenched structural inequalities to shape vulnerabilities (very high confidence, based on robust evidence, high agreement).

- Socially and geographically disadvantaged people exposed to persistent inequalities at the intersection of various dimensions of discrimination based on gender, age, race, class, caste, indigeneity, and (dis)ability are particularly negatively affected by climate change and climate-related hazards. Context-specific conditions of marginalization shape multidimensional vulnerability and differential impacts (robust evidence, high agreement).
- Existing gender inequalities are increased or heightened by climate-related hazards. Gendered impacts result from customary and new roles in society, often entailing higher workloads, occupational hazards indoors and outdoors, psychological and emotional distress, and mortality in climate-related disasters (robust evidence, high agreement).
- There is little evidence that shows positive impacts of climate change on poor people, except isolated cases of social asset accumulation, agricultural diversification, disaster preparedness, and collective action. The more affluent often take advantage of shocks and crises, given their flexible assets and power status (robust evidence, high agreement).

Current policy responses for climate change mitigation or adaptation will result in mixed, and in some cases even detrimental, outcomes for poor and marginalized people, despite numerous potential synergies between climate policies and poverty reduction (medium confidence, based on limited evidence, high agreement).

- Mitigation policies with social co-benefits expected in their design, such as CDM and REDD+, have had limited or no effect in terms of poverty alleviation and sustainable development (limited evidence, high agreement).
- Mitigation efforts focused on land acquisition for biofuel production show preliminary negative impacts on the lives of poor people, such as dispossession of farmland and forests, in many developing countries, particularly for indigenous peoples and (women) smallholders (limited evidence, high agreement).

**Questions 2 and 3 (combined):**

Climate change will create new poor between now and 2100, in developing and developed countries, and jeopardize sustainable development. The majority of severe impacts are projected for urban
areas and some rural regions in Sub-Saharan Africa and Southeast Asia (medium confidence, based on medium evidence, medium agreement).

- Future impacts of climate change, extending from the near-term to the long-term, mostly expecting 2°C scenarios, will slow down economic growth and poverty reduction, further erode food security, and trigger new poverty traps, the latter particularly in urban areas and emerging hotspots of hunger (medium evidence, medium agreement).
- Climate change will exacerbate multidimensional poverty in most developing countries, including high mountain states, countries at risk from sea level rise, and countries with indigenous peoples. Climate change will also create new poverty pockets in countries with increasing inequality, in both developed and developing countries (medium evidence, medium agreement).
- Wage-labor dependent poor households that are net buyers of food will be particularly affected due to food price increases, in urban and rural areas, especially in regions with high food insecurity and high inequality (particularly in Africa), although the agricultural self-employed could benefit (medium evidence, medium agreement).
- Insurance schemes, social protection programs, and disaster risk reduction may enhance long-term livelihood resilience among poor and marginalized people, if policies address multidimensional poverty (limited evidence, high agreement).
- Climate-resilient development pathways will have only marginal effects on poverty reduction, unless structural inequalities are addressed and needs for equity among poor and non-poor people are met (limited evidence, high agreement).
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