



# EXECUTIVE SUMMARY

## The geography of poverty, disasters and climate extremes in 2030

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### Key messages

- Extreme weather linked to climate change is increasing and will likely cause more disasters. Such disasters, especially those linked to drought, can be the most important cause of impoverishment, cancelling progress on poverty reduction.
- Up to 325 million extremely poor people will be living in the 49 most hazard-prone countries in 2030, the majority in South Asia and sub-Saharan Africa.
- The 11 countries most at risk of disaster-induced poverty are Bangladesh, Democratic Republic of the Congo, Ethiopia, Kenya, Madagascar, Nepal, Nigeria, Pakistan, South Sudan, Sudan and Uganda.
- Disaster risk management should be a key component of poverty reduction efforts, focusing on protecting livelihoods as well as saving lives. There is a need to identify and then act where the poor and disaster risks are most concentrated.
- The post-2015 development goals must include targets on disasters and climate change, recognising the threat they pose to the headline goal of eradicating extreme poverty by 2030.

Climate change and exposure to ‘natural’ disasters threaten to derail international efforts to eradicate poverty by 2030. As temperatures warm, many of the world’s poorest and most vulnerable citizens will face the growing risks linked to more intense or lengthy droughts, extreme rainfall and flooding and severe heat waves – risks that threaten lives and livelihoods, as well as the hard-won gains made on poverty in recent decades. The impoverishing impact of both climate change and natural disasters is so grave that the UN Secretary General’s High Level Panel (HLP) on Post-2015 Development Goals<sup>1</sup> has suggested a target to be added to the first proposed post-2015 development goal on ending poverty: ‘to build resilience and reduce the number of deaths caused by disasters’.

We already know that disasters have a distinct geography,<sup>2</sup> that poverty is concentrated in particular parts of the world and that climate change has an impact on extremes of heat, rainfall and droughts in many regions.<sup>3</sup> But how will these patterns overlap in 2030, the probable end point for the next set of development goals, and how serious a threat do disasters and climate change pose to our prospects of eliminating extreme poverty in the next two decades?

This report, *The geography of poverty, disasters and climate extremes in 2030*, examines the relationship between disasters and poverty. It concludes that, without concerted action, up to 325 million extremely poor people could be living in the 49 countries most exposed to the full range of natural hazards and climate extremes in 2030.<sup>4</sup> It maps out where the poorest people are likely to live and develops a range of scenarios to identify potential patterns of vulnerability to extreme weather and earthquakes – who is going to be vulnerable and why. These scenarios are dynamic: they consider how the threats may change, which

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countries face the greatest risk and what role can be played by disaster risk management (DRM).

The report argues that if the international community is serious about eradicating poverty by 2030, it must put DRM at the heart of poverty eradication efforts. Without this, the target of ending poverty may not be within reach.

## The links between disasters and poverty

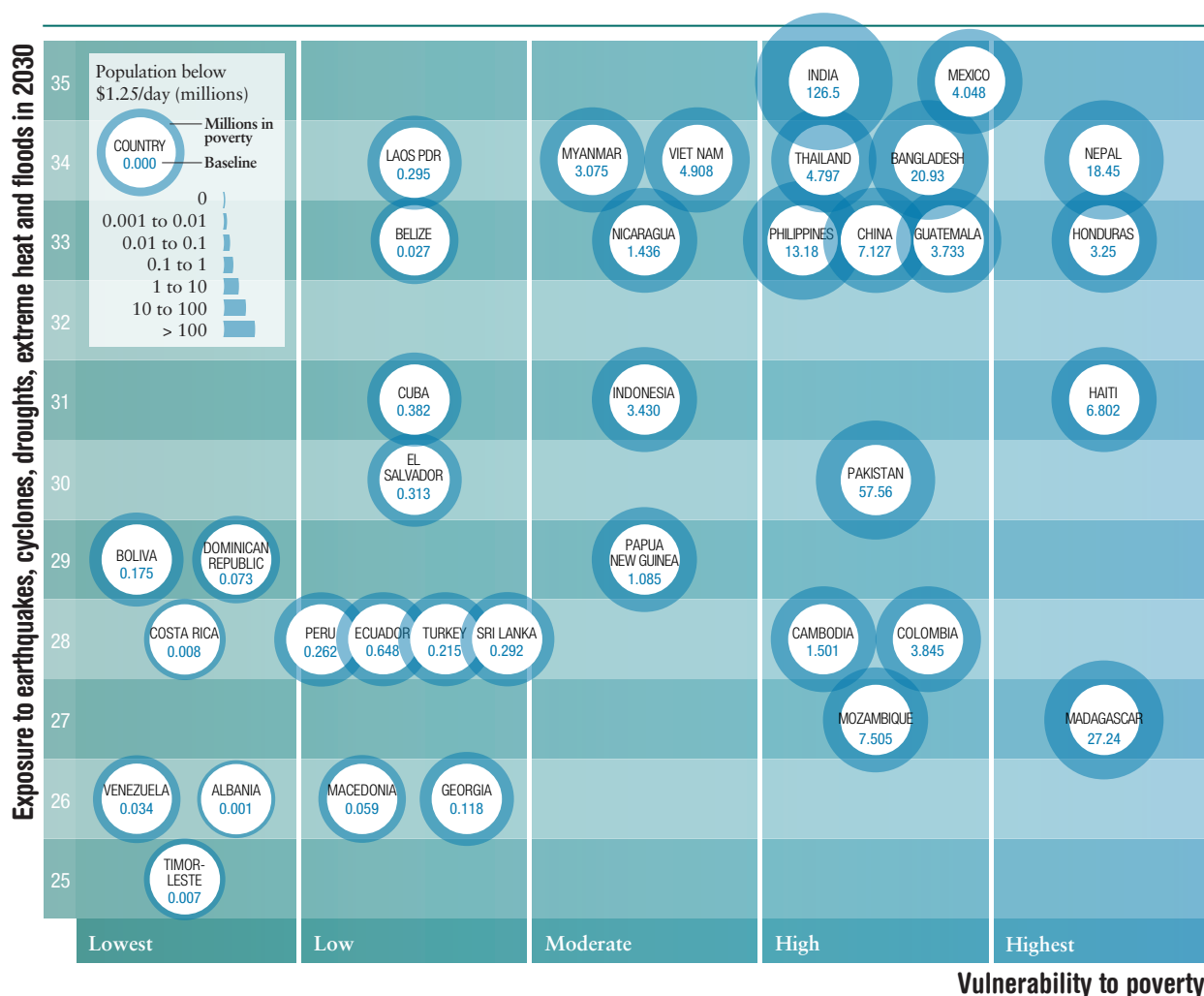
In combining climate, disaster and poverty projections, the report finds that high levels of poverty will still be seen in 2030 if we follow a 'business as usual' approach. Discounting earthquake and cyclone exposure, and assessing just drought, extreme temperature and flood hazards alone, reveals that between 176 and 319 million extremely poor people will be living in the

45 countries most exposed to these hazards by 2030. This is a major concern as drought and flood hazards are among the most potent shocks when it comes to causing long-term impoverishment.

Natural disasters spiral into human catastrophes when they entrench the poverty that already exists and pull more people down into poverty as their assets vanish, together with their means to generate an income. The risk of impoverishment is linked to lack of access to the markets, capital, assets and insurance mechanisms that can help people to cope and to rebuild. This combination of exposure to climate vulnerability and limited access to social safety nets, to land and to work is a serious risk factor, as is living in a remote rural area.

Good DRM can reduce the impact of disasters on poor people, as highlighted by the vast difference in the human impact of natural hazards. In 2010,

**Figure A: Projected poverty levels in 2030 in countries ranking highest on the multi-hazard (earthquakes, cyclones, droughts, extreme heat and floods) index<sup>5</sup>**



NOTE: The figure shows a set of countries with the highest exposure to the five hazards in 2030, plotted against their 'vulnerability to poverty', which is a measure of the risk they face of future poverty when presented with shocks, such as 'natural' disasters (see Chapter 2). The circles indicate projected poverty numbers for each of the countries in 2030 assuming a baseline projection. This graphic does not account for the capacity of each country to manage disaster risk, which is why the countries plotted here differ from the lists of countries highlighted in the text.

for example, 11% of those exposed to the Haiti earthquake lost their lives, compared to 0.1% of those who experienced the Chile earthquake.<sup>6</sup> In 2008, Cyclone Nargis killed 138,000 people in Myanmar, while Hurricane Gustav, a storm of similar strength, killed just 153 in the Caribbean and US. Hazard-prone countries with big populations living in poverty, particularly those clustered in sub-Saharan Africa and South Asia, lack the capacity to manage disaster risks or the threats from climate change. So, continuing with the status quo will result in millions of poor people left without proper protection in the face of ever-growing disaster threats.

Figures A and B highlight the countries of concern that are assessed in this study. Every one of them is prone to the multiple hazards assessed in this study, and is also likely to see high levels of extreme poverty in 2030. Here, we see that, unless something changes – and changes fast – up to 118 million extremely poor people in sub-Saharan Africa will be exposed to drought, flood and extreme heat hazards alone in 2030:<sup>7</sup> Chad (4-5 million), Central African Republic (3 million), Democratic Republic of the Congo (20-30 million), Ethiopia (12-22million), Liberia (1-2 million), Nigeria (14-22 million), Uganda (3-6 million) are countries with the highest concentrations.<sup>8</sup>

When combining all of the data sets,<sup>9</sup> the following findings emerge.

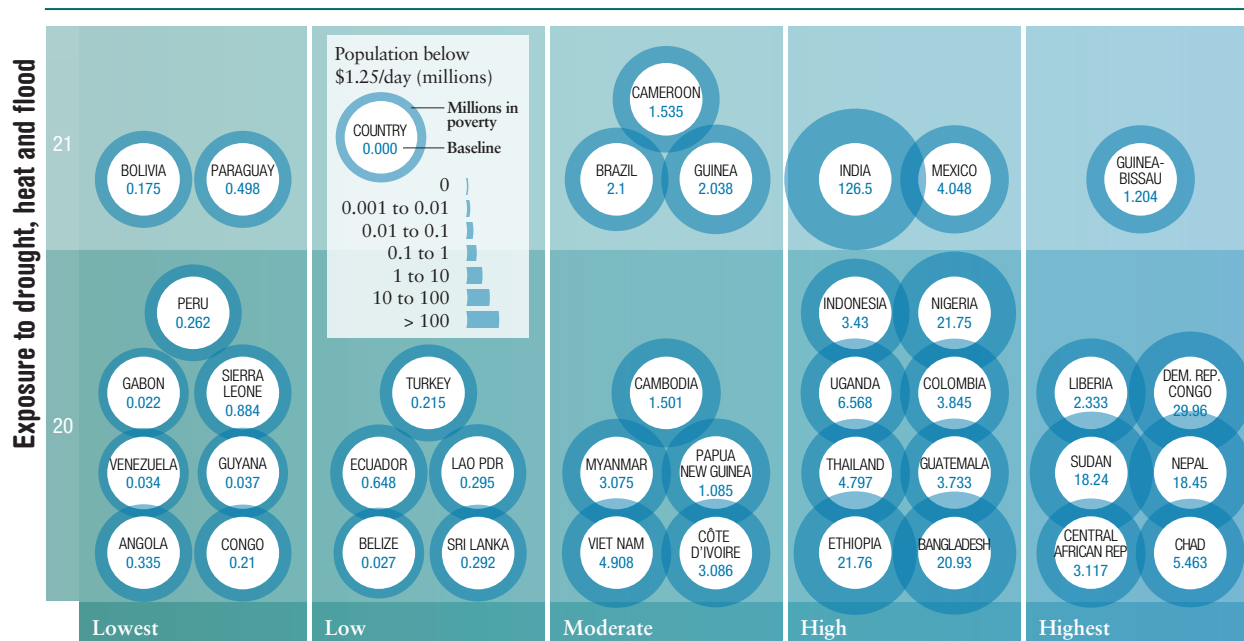
By 2030, 11 countries will have high *numbers* of people in poverty, high multi-hazard exposure and inadequate capacity to minimise the impacts: **Bangladesh, Democratic Republic of the Congo, Ethiopia, Kenya, Madagascar, Nepal, Nigeria, Pakistan, South Sudan,<sup>10</sup> Sudan and Uganda.**

Another 10 countries have high *proportions* of people in poverty, high multi-hazard exposure and inadequate capacity to minimise the impacts: **Benin, Central African Republic, Chad, Gambia, Guinea Bissau, Haiti, Liberia, Mali, North Korea and Zimbabwe.**

**Niger, Somalia and Yemen** could also feature in this list. While their total exposure to hazards, other than drought, is relatively low, these are countries that have high levels of poverty and low levels of DRM capacity.

**Afghanistan, Cameroon, Myanmar and Papua New Guinea** also endure high exposure to hazard and moderate poverty (with at least 10% of their populations and/or 1 million people under the \$1.25 per day poverty line) and limited DRM capacity. While this report does not focus on the relationship between conflict, fragility, disasters and climate extremes, there is a striking overlap

**Figure B: Projected poverty levels in 2030 in countries with the highest exposure to droughts, extreme heat and floods**



NOTE: The figure shows a set of countries with the highest exposure to the three hazards in 2030, plotted against their 'vulnerability to poverty', which is a measure of the risk they face of future poverty when presented with shocks, such as 'natural' disasters (see Chapter 2). The circles indicate projected poverty numbers for each of the countries in 2030 assuming a baseline projection. These countries differ from figure A as it features just the countries particularly exposed to the three hazards rather than the full list of five hazards included in figure A.

between today's fragile states and the countries that are of greatest concern in terms of poverty and exposure to hazards in 2030.

**India** represents a special case. It has the highest numbers of people who are still likely to be living in poverty in 2030 and some of the highest exposure to hazards, yet has the central capacity to manage disaster risk. Given its size India needs to be treated as a cluster of separate sub-national entities, with some states causing considerable concern, including Assam, Madhya Pradesh, Odisha, Uttar Pradesh and West Bengal.

This list of countries and states represents a useful set of targets for serious attempts to end poverty, providing a checklist for international efforts to strengthen DRM systems and link these to poverty reduction efforts.

## The disaster threat to poverty reduction

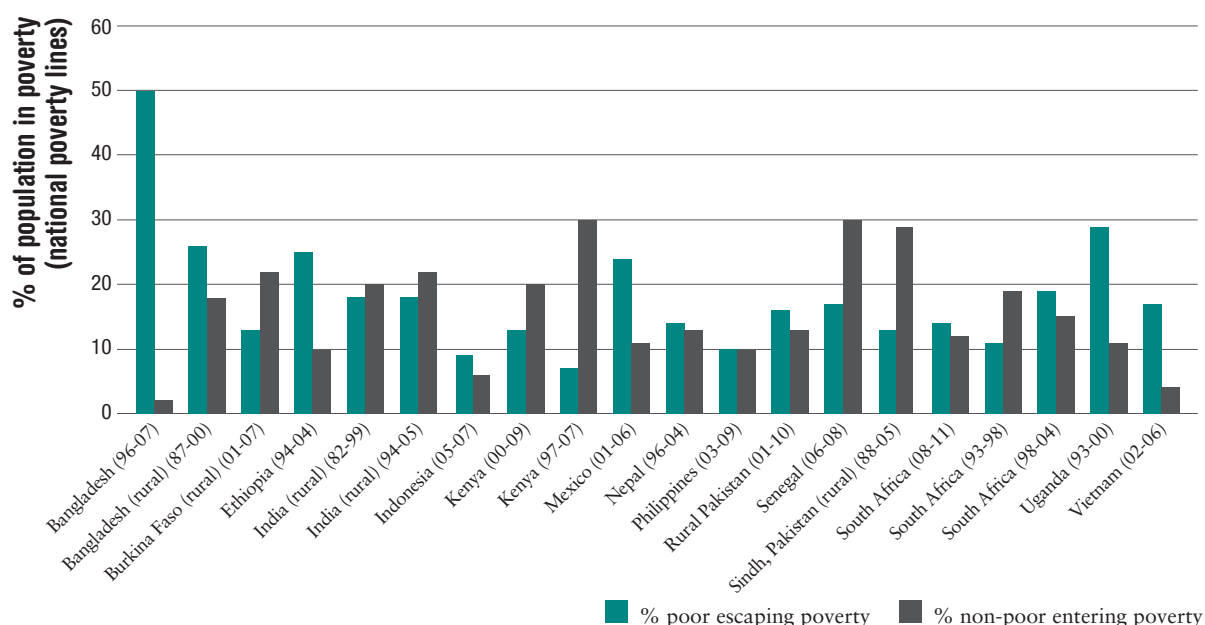
Detailed analysis of data from rural Ethiopia and Andhra Pradesh in India for this study suggests that where drought is a major risk it is also the single most important factor in impoverishment – outstripping, for example, ill health or dowry payments. This counters a view that is common

in the literature: that health-related shocks are the biggest factor in impoverishment. It should be noted that this result is only from two drought-prone areas, and would need to be confirmed by further research. Disaster-related impoverishment also appears to have a distinct within-country geography, being largely rural rather than urban. Figure C highlights this stark rural dimension and shows how impoverishment trends can easily cancel out escape routes from poverty in some countries.

The report also examines data from Ethiopia and Andhra Pradesh to explore whether there is an income threshold beyond which the risk of falling into poverty as a result of a disaster is reduced. While initial analysis found different plausible thresholds (suggesting that any threshold would be context-specific), further analysis suggests that the probability of impoverishment falls as household prosperity rises, rather than any particular income level acting as a threshold. Further research could explore this issue in more detail to find out if such thresholds exist. If so, they would be a useful aid to poverty reduction and DRM planning.

Analysis of trends suggests that poverty will be concentrated in particular areas in most countries in the future and in rural or disadvantaged regions in particular.<sup>11</sup> However, an assessment of poverty, hazards and DRM efforts in five countries of

**Figure C: Impoverishment trends can cancel out progress**

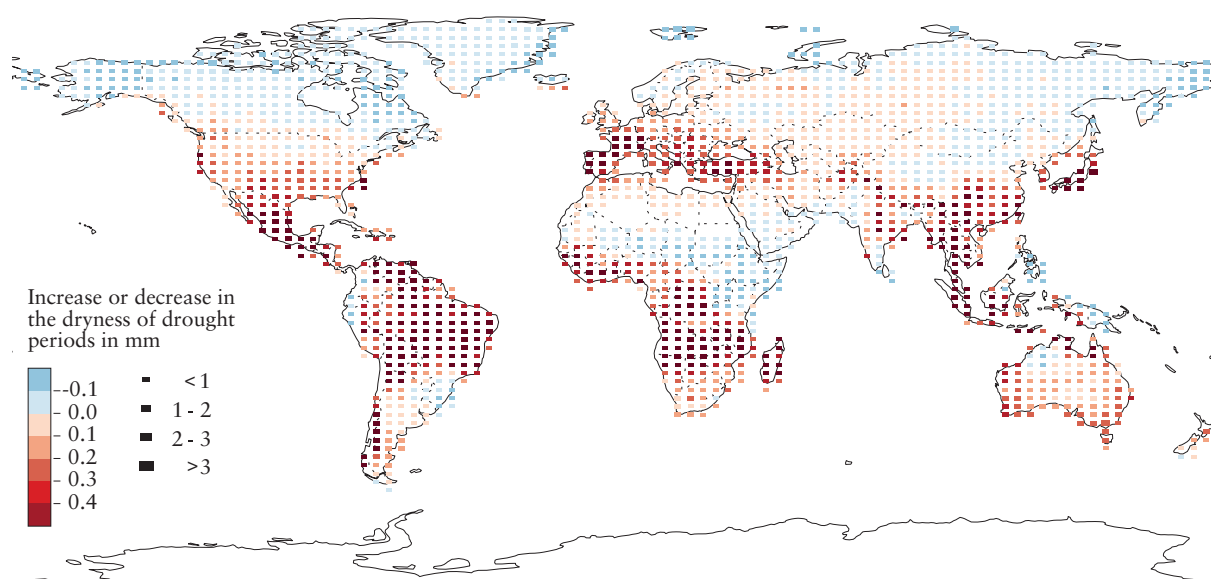


SOURCE: Lenhardt, A. and Shepherd, A. (2013) 'What happened to the poorest 50%?', Chronic Poverty Advisory Network, Challenge Paper 1.

NOTE: The figure shows historic poverty averages for the dates attached to each country name. While it highlights an overall positive trend in poverty reduction, for particular countries and geographies, for certain periods of time, impoverishment rates can cancel out escapes from poverty.



**Figure D: Projected change in the global drought hazard indicator between 1971-2000 and 2021-2050**



NOTE: The drought hazard indicator is a measure of how exposed an area is to droughts. This is measured as the deficit in rainfall during periods when the rainfall is below average, i.e. when rainfall is below average, how dry it is. The absolute measure of drought by this means is the shortfall of precipitation, compared to the mean precipitation at the time of year, in an average dry spell. The figure shows the change in drought by highlighting the increase or decrease in the dryness of drought periods, in mm. Blue squares indicate that droughts are getting less severe, red, more severe. The larger the square, the greater the agreement between multiple climate models.

concern – Ethiopia, Haiti, Madagascar, Nepal and Pakistan – finds that DRM policies and systems rarely focus on poverty or target the most disaster-prone regions explicitly. This may be explained by DRM programming being directed to high-value assets and to saving lives rather than protecting livelihoods. We need, therefore, risk modelling and mapping to focus the combined efforts of DRM and poverty reduction, and make them fit for purpose.

## How climate change will shape hazard trends by 2030

Climate models suggest that the severity and distribution of some hydro-meteorological hazards will change in the near future – even by 2030. Figure D, for example, shows how one indicator of the average drought severity will change between the late 20th century and the middle of the 21st. It shows the strong likelihood of more drought hazard in parts of Central and South America, Southern Europe, Eastern and South-eastern Asia and in a broad belt spanning southern Africa. These trends are particularly important for countries and areas that are likely to have high poverty rates in 2030, such as Democratic Republic of the Congo or northern India where drought exposure is only expected to increase.<sup>12</sup> While climate change will become an increasingly important driver of

changing hazard geography in the next two decades, the distribution of hazard exposure we see today will remain a strong predictor of exposure in 2030.

## Recommendations

This report argues that the post-2015 development goals must recognise the threat posed by disasters and climate change to the global headline goal of eradicating extreme poverty by 2030. The current Millennium Development Goals have not paid sufficient attention to the risk factors that push people into poverty and this should be rectified; including recognition of the role played by disasters. Poverty eradication efforts need to look beyond those living in poverty today to raise people above and beyond extreme poverty and reduce the risk of poverty reversals at a later date. This means addressing the risk factors – including disasters. This is crucial if the promise of a world free from extreme poverty is not to evaporate, just as this goal appears to be within reach.

We recommend, therefore, that a goal on ending poverty is coupled with targets on tackling key impoverishment factors, where natural disasters are a significant component and that these factors become the cornerstones of international and national efforts to reduce poverty overall. Accordingly, the post-2015 framework should

monitor progress beyond the \$1.25 per day poverty threshold to monitor higher thresholds, such as \$4 per day, beyond which the risk of falling into poverty would be greatly reduced. Identifying such thresholds requires further research.

Within a development context focused on eradicating poverty, international efforts to reduce disaster risk should concentrate on the countries at greatest risk of disaster-induced impoverishment and target specific sub-national trends. DRM efforts should focus on saving livelihoods as well as lives, giving equal weight to social protection and asset-building approaches alongside early warning systems. Disaster resilience efforts should also have clear strategies to reduce the poverty and build the assets of those affected by disasters, engaging people in long-term livelihood programmes. Beyond political commitment, this will take upfront and recurrent international investment in DRM until national revenues and individuals can adequately take on the challenge of providing protection. However, this is currently an underfunded area with just 40 cents in every \$100 of official development assistance (ODA) spent on reducing disaster risk. \$9 in every \$10 dollars spent on disasters is spent after the disaster has struck. Over the last 20 years, the countries highlighted in this report as being at greatest threat of disaster-induced impoverishment in 2030 have seen an average of just \$2million of ODA spent on reducing disaster risk each year.<sup>13</sup> This needs to change, with more money targeted to maximising disaster resilience and poverty reduction at the same time.

## About this report

The report is structured in six sections. Section 1 outlines the links between disasters, poverty and impoverishment. Section 2 maps out the geography of poverty in 2030, while Section 3 highlights the projected geography of 'natural' hazards. Section 4 examines the capacity of the countries at greatest risk to reduce disaster risk and respond to disasters. Section 5 brings the analysis together to build a picture of both poverty and hazard risk in 2030, together with today's disaster risk management and adaptive capacity<sup>14</sup> highlighting possible variations to the trends and providing in-depth country analysis. Finally, Section 6 sets out possible policy responses for future international agreements, development cooperation, countries of concern and actions by the research community.

## Endnotes

1. <http://www.post2015hlp.org/>
2. UNISDR Global Assessment Report 2009.
3. Intergovernmental Panel on Climate Change Special Report on Managing the Risk of Climate Extremes and Disasters to Advance Climate Change Adaptation 2012.
4. According to the World Bank, 1.2 billion people still live on less than \$1.25 per day, despite massive strides on poverty in the past 30 years (<http://bit.ly/100eHPO>). The numbers of people living in extreme poverty in sub-Saharan Africa actually increased from 205 million in 1981 to 414 million in 2010.
5. Highest vulnerability >10% at less than \$0.75/day. High vulnerability >1,000,000 at less than \$0.75/day. Moderate vulnerability >10% at less than \$1.25/day and >1,000,000 at less than \$1.25/day. Lower vulnerability >10% at less than \$2.00/day and >1,000,000 at less than \$2.00/day. Lowest vulnerability >10% at less than \$4.00/day and >1,000,000 at less than \$4.00/day. Not vulnerable <10% at less than \$4.00/day and <1,000,000 at less than \$4.00/day. Hazards: Drought, extreme precipitation, temperature, cyclones, earthquakes. The Multi-hazard Index goes from 0 to 35.
6. <http://bit.ly/15F5MgK>
7. The multi-hazard index approach used to assess hazard exposure in 2030 biases results towards those countries exposed to earthquakes and cyclones. To counter this, we have developed a separate index just assessing exposure to weather events and hydro-meteorological hazards (droughts, extreme heat and floods). This second index highlights a much greater number of sub-Saharan African countries.
8. The range given here is a function of the poverty model used to generate these figures, with the lower projection being an 'optimistic scenario' and the higher projection being a 'pessimistic scenario'.
9. Future vulnerability to poverty and hazard projections, as well as a measure of DRM and adaptive capacity based on existing observation.
10. South Sudan poverty numbers are modelled on pre-secession Sudan poverty figures.
11. Measurement of urban poverty is difficult and likely to produce low estimates. However, fragmented evidence suggests that disasters are less likely to cause long-term impoverishment impacts in urban areas than in remote rural areas.
12. Just considering drought hazard alone, as defined by a deficit of rainfall during periods when the amount of rainfall falls below the climatological average for the time of year actually does little to highlight risks of food insecurity. In this index, a country like Niger has a lower drought exposure than the UK. This is related to the baseline period in the late 20th century – which in the Sahel has been especially dry – and a period in the mid-21st century, which is projected to be wetter compared to the baseline. This means Niger is considered to have low projected drought hazard. However, we know from research that the relationship between drought and food insecurity is highly complex and often has relatively little to do with rainfall deficits. This also supports our choice to include an index covering drought, heat and flood, which helps to normalise these idiosyncrasies.
13. Data on financial investments in disaster risk reduction taken from Kellett, J. and Caravani, A. (2013) *Financing Disaster Risk Reduction: International Aid over 20 Years*. Overseas Development Institute. The figure of \$2 million per year is taken from an assessment of 13 of the 22 countries highlighted in this report for which data is available. Bangladesh is not included as it is a radical outlier, receiving nearly \$1 billion for disaster risk reduction over the last 20 years, nearly 8 times more than any other country on the list.
14. No projection of disaster risk management capacity was possible for this study; as a proxy it has used a measure of today's capacity combined with adaptive capacity. See Chapter 4 for more detail.

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