Loss & Damage

The recent SREX report and the UNFCCC loss and damage discourse

A starting point for the debate

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Introduction

The topic of loss and damage in the context of climate change is a major focus in the adaptation discussion under the United Nations Framework Convention on Climate Change (UNFCCC) climate talks in 2012. The IPCC Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX) is the first endeavour of its kind to conduct a scientific assessment of the nexus between climate extremes and climate change. The report carries significant weight, authority and scientific value and will be an important contribution to both the disaster risk reduction agenda and the Loss and Damage (L&D) Work Programme.

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The aim of this policy paper is to outline the implications of the IPCC SREX on the L&D discourse under the UNFCCC. This special report could contribute substantially to understanding L&D, and provide insight about what this entails for vulnerable countries. In each session of the negotiations on loss and damage in Bonn in May 2012, many Parties expressed a desire for the main messages of the SREX to be highlighted.

However, despite the fact that it has fastly become a widely cited document, many people are still only aware of the SREX's Summary for Policymakers (SPM). The SPM that was approved line-by-line by government officials is presented here and analysed in relation to questions that provide framing for the activities in the work programme (see Textbox in the middle of the document). However, the full report of the SREX offers a wealth of information on nearly 600 pages. Therefore, the authors pick on further areas from the full report in an attempt to highlight informations that are relevant for the L&D debate.

Background of the UNFCCC Work Programme on L&D

Though it first appeared only in 2007 in the Bali Action Plan, L&D due to adverse climate impacts is steeped in history and context in the climate negotiations. The consensus of Parties at the climate summit in Cancun to establish a "work programme in order to consider approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change" (the L&D work programme)[1] is the amalgam of a variety of demands that date back to the foundation of the UNFCCC itself. Since the 1990s the Alliance of Small Island States (AOSIS) has maintained that States harmed by loss and damage related to climate change should be able to seek compensation to rehabilitate damage to their societies. The underlying rationale for this proposal was to establish consequences for emitting greenhouse gases in an effort to create strong incentive for mitigation[2]. In the mid-2000s, when it was realized that some climate change impacts were no longer fully avoidable and were already occurring, adaptation to climate change achieved a much higher profile in the climate negotiations. Subsequently, issues such as disaster risk reduction and tools such as insurance mechanisms have provided the framing for the issue of L&D.

The work programme on L&D represents the first comprehensive attempt of the international community to take steps to address the issue of L&D in the UNFCCC context. Parties in Cancun (2010) and subsequently at the climate summit in Durban (2011) structured the work programme along three thematic areas:

- Thematic area 1: Assessing the risk of loss and damage associated with the adverse effects of climate change and the current knowledge on the same;
- Thematic area 2: A range of approaches to address loss and damage associated with the

[1] Decision 1/CP.16, paragraphs 25-29.

[2] Vanuatu tabled the proposal for a mechanism that would compensate countries for the effects of sea-level rise. The proposal did not survive the negotiation process of the UNFCCC, but is still reflected in the word "insurance" as an adaptation measure. A theoretical explanation is the Coase Theorem, which stipulates that bargaining between agents can achieve a socially optimal outcome with respect to external damages caused by economic activity as long as property rights are well defined, meaning the responsible party is clearly liable for the caused damages.

adverse effects of climate change, including impacts related to extreme weather events and slow onset events, taking into consideration experience at all levels;

- Thematic area 3: The role of the Convention in enhancing the implementation of approaches to address loss and damage associated with the adverse effects of climate change.

The climate summit in Doha (COP18) at the end of 2012 is expected to identify further steps on the L&D agenda. L&D is a substantial part of the Cancun Adaptation Framework – a yet unprecedented effort within the UNFCCC to enhance adaptation activities worldwide. In identifying the right activities to address L&D from climate impacts and in placing L&D in the right context of the climate regime, it is important to find the right mix. Incorporating the needs of affected countries means that action taken under L&D should address the full continuum of climate impacts and time-scales, from today to the future.

...it is important that negotiators are also mindful of the legacy of the first framing of the debate...

The continuum would go beyond a mere disaster risk management approach for extreme events to address the needs associated with slow-onset climate impacts. In face of existing greenhouse gas emission trajectories that carry potential catastrophic consequences, such as large scale changes in the earth system, negotiators should be mindful of how the debate on L & D was initially framed. This is namely, that truly holistic climate risk management includes incentives for the global community to create swift mitigation actions.

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The mandate for the work programme towards COP 18 in Doha is to among other things consider the establishment of an "International Climate Risk Insurance Facility"[3] and a "mechanism to address loss and damage"[4].

Background and Scope to the IPCC SREX

The idea of launching a special report on extreme events and disasters, with an emphasis on risk management, was spawned in August 2008, when Norway in cooperation with the United Nations International Strategy for Disaster Reduction (UNISDR) issued a proposal to the 29th Session of the IPCC Panel.

Following a scoping meeting in spring 2009, it was decided that Working Group I and II of the IPCC would jointly prepare the special report. The Summary for Policymakers was agreed upon at a joint meeting of Working Group I and II of the IPCC in Kampala, Uganda, in November 2011. The full report was released in March 2012.

In total 220 authors from 62 countries worked on the report and more than 18,000 review comments were incorporated. The report thus carries substantial weight, authority and scientific vadility and will make an important contribution to the disaster risk reduction agenda (especially the post-Hyogo Framework negotiations for the period after 2015) and likewise to climate change adaptation policy. In the first half of 2012 the IPCC, with the support of the Government of Norway and the Climate Development Knowledge Network (CDKN), is conducting a series of regional outreach meetings to present the findings of the SREX to decision makers. Therefore, this section explores the statements of the SREX Summary for Policymakers with

[3] Decision 1/CP.16, paragraph 28.
[4] Decision 7/CP.17

regards to guiding questions for the L&D work programme formulated by Parties in Durban.

The SREX is a comprehensive assessment of the scientific literature on issues that range from the relationship between climate change and extreme weather and climate events ("climate extremes") to the implications of these events for society and sustainable development. The assessment evaluates the interaction of climatic, environmental, and human factors that can lead to impacts and disasters, options for managing the risks posed by impacts and disasters, and the important role that non-climatic factors play in determining impacts.

The SREX addresses, for the first time, how the integration of expertise in climate science, disaster risk management, and adaptation can inform discussions about the methods for reducing and managing the risks of extreme events and disasters in a changing climate. The report evaluates the role of climate change in altering characteristics of extreme events (such as changes in frequency, intensity or pattern of extreme events). It assesses experience with a wide range of options used by institutions, organizations, and communities to reduce exposure and vulnerability, and improve resilience, to climate extremes.

However, the SREX only addresses a part of the whole spectrum of L&D associated with the adverse effects of climate change. It does not adequately cover issues related to long-term slow onset adverse effects like sea-level rise, glacial melting, ocean acidification or desertification, reflecting less experience of the international community on this longer term potentially societal and economical system shifting processes[5].

The framing of the SREX: Misfit for mitigation policy discussion of loss & damage in the UNFCCC?

The probing question is how the SREX should frame the debates in the work programm on L& D. In its founding document, the SREX is framed as "taking a risk perspective in order to identify synergies to promote sustainable development, reduce the risk of climate-related damages and take advantage of climate-related opportunities" and as exploring "policy linkages with risk reduction"[6]. The approach reflected in the scoping

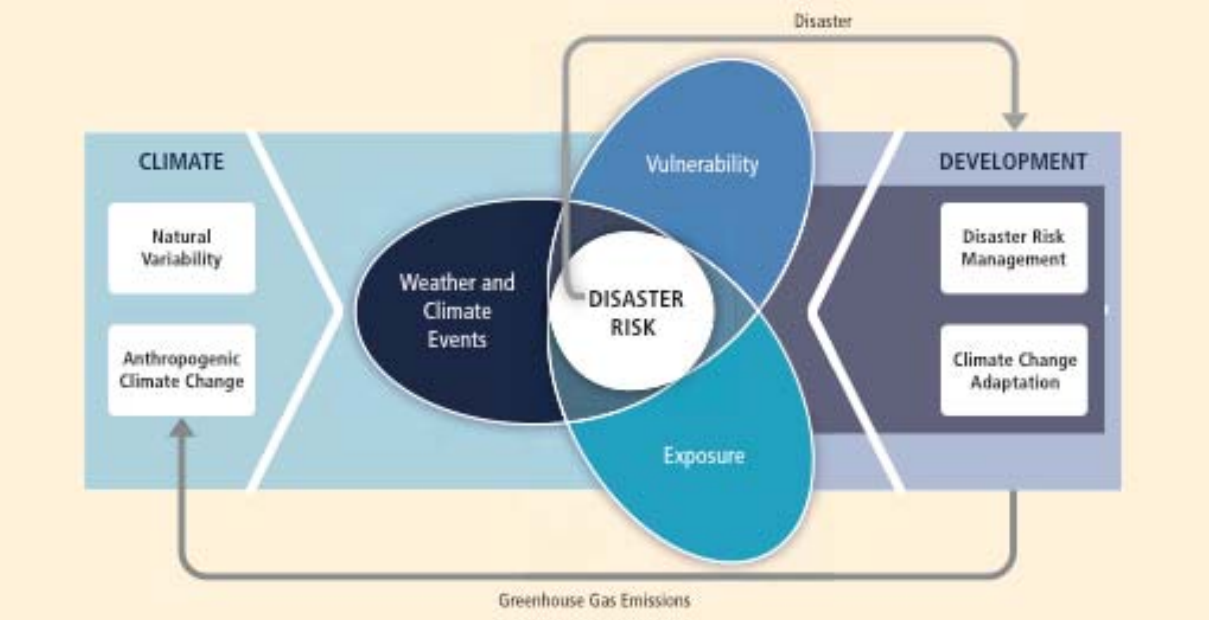

Figure 1: The conceptual model of the IPCC SREX starting from exposure and vulnerability highlighting the need to include Disaster Risk Management and Climate Change Adaptation within development processes. Source: IPCC (2012a: 2)

[5] Mentioned in a recent report of the first expert meeting in the L&D work programme: FCCC/SBI/2012/INF.3

[6] Proposal for an IPCC Special Report on Managing the Risk of Extreme Events to Advance Climate Change Adaptation; Proposal by Norway and the Secretariat of the UN

of the SREX comes from the mandate of the UNISDR brought into climate policy. The UNISDR founding mandate states that the "Strategy is premised on an appreciation of the fact that the loss of life and destruction resulting from disasters are not inevitable and can be mitigated[7] by reducing the vulnerability of communities to natural hazards. (...) In other words, natural disasters can be prevented through conscious human action designed to reduce vulnerability" [8]. Taking such a predominantly social construction risk view in the design of the SREX provided also for its final conclusions. The SREX in its conclusions is not best qualified to optimize decision-making regarding optimal greenhouse gas mitigation choices because it was unable to analyze impacts vis-à-vis certain emission pathways [9]. Neither does it discount the possibility of "unknown unknowns"[10] both of which are highly relevant to implement the precautionary principle – an essential approach in mitigation policy. It is important that the dentification of vulnerability and exposure as a main intervention point does not lead to the depriorization of mitigation options. In this context it is also important to acknowledge that slow-onset stressors have the potential to further drive vulnerability itself, especially in the long-term.

Conclusion – SREX a starting point – not necessarily an endpoint for discussions on L&D

That said, greenhouse gas emission levels that are already locked in mean that societies in the countries affected will have to transform in the face of L&D. These countries will have to implement boldly and swiftly policies and measures to withstand the inevitability of L&D. Identifying the right interplay between local, regional and national responses as well as the role of the international community will be a pivotal piece of the work programme on L&D.

The SREX provides the best scientific assessment available to date. It collects the scientific assessments

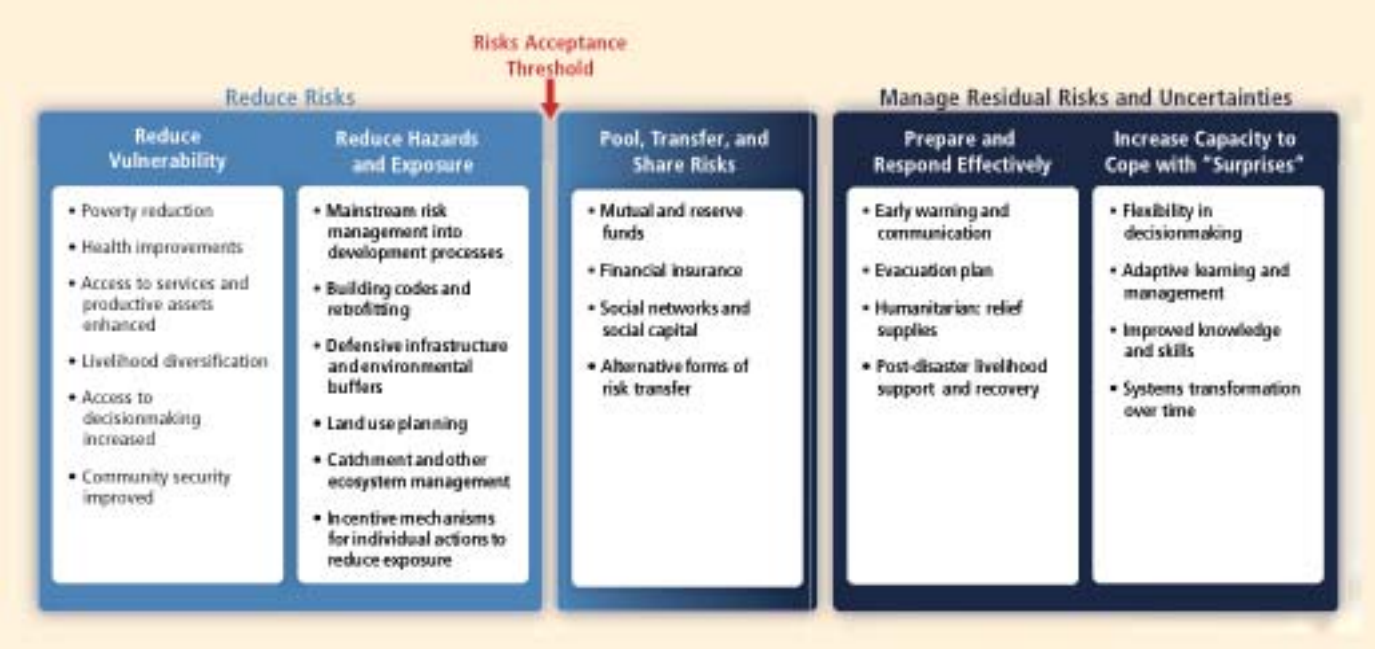

Figure 2: Complementary response measures for observed and projected disaster risks supported by respective institutional and individual capacity for making informed decisions. Source: IPCC (2012b: 361)

[8] Secretary General Report, 2001: Implementation of the International Strategy for Disaster Reduction A/56/68-E/2001/63

[9] Comment by Germany in IPCC plenary, IPCC WG 1 and 2 meeting, November 2011, Kampala

[10] See IPCC, 2012b, p.122: surprises/abrupt climate change for an explanation, why concepts such as tipping elements where not included in the report.

of interdisciplinary research. The report in its entirety provides nuanced views on opportunities, challenges, gaps and case studies for addressing L&D at different levels. It also provides valuable lessons on how to better integrate different agendas, for example those of DRR and adaptation to climate change.

The SREX compiles experiences and defines parameters for particular approaches and tools such as insurance mechanisms, that are often referred to in the UNFCCC. However, as mentioned previously, the SREX framework speaks only partially to the spectrum of L&D. Figure 2 gives a response measure matrix featured in the SREX. This includes measures to reduce risks, both by way of reducing vulnerability as well as hazard and exposures, and by pooling and sharing risks, as well as managing residual risks and uncertainties. This matrix provides a starting point for action on L&D, however it is clear that it is not catering to slow-onset processes in a targeted fashion.

> *"SREX: State of the art on attribution of loss & damage to extreme events?"*

Moreover, the solid input of IPCC Working Group I means that the SREX can also be seen as a state-of-the art overview in terms of attributing fingerprints of climate change in existing loss data. Nonetheless, the SREX like any other synthesis paper had to impose a cut-off date for considering articles in the scientific literature, which means that some potentially important contributions in articles published after the cut-off date did not make it into the document.[11] In the short term the conclusions of the SREX might have implications for discussions about the utility of establishing more formal mechanisms in L&D. These would be based on attributing the component of hydro-metrological losses for which climate change is responsible to historical or actual emissions. The subsequent sections explore some insights from the SREX in relation to key issues raised thus far in the L&D debate.

[11] For example Rahmstorf, S., & D. Coumou (2011): Increase of Extreme Events in a Warming World". Proceedings of the National Academy of Sciences http://www.pnas.org/content/early/2011/10/18/1101766108

Some insights from the Summary for Policymakers

Key determinants for loss and damage associated with climate change impacts

"**The severity of the impacts of climate extremes depends strongly on the level of the exposure and vulnerability to these extremes (high confidence). Trends in exposure and vulnerability are major drivers of changes in disaster risk (high confidence).**" (IPCC, 2012: 8).	Understanding the multi-faceted nature of both exposure and vulnerability is therefore a prerequisite for determining how weather and climate events contribute to the occurrence of disasters, and for designing and implementing effective adaptation and disaster risk management strategies. It is to be noted that vulnerability reduction is a core common element of adaptation and disaster risk management.
"**Exposure and vulnerability are dynamic, varying across temporal and spatial scales, and depend on economic, social, geographic, demographic, cultural, institutional, governance, and environmental factors (high confidence).**" (IPCC, 2012: 5).	Individuals and communities are differentially exposed and vulnerable based on inequalities expressed through levels of wealth and education, disability, and health status, as well as gender, age, class, and other social and cultural characteristics.
"**Settlement patterns, urbanization, and changes in socioeconomic conditions have all influenced observed trends in exposure and vulnerability to climate extremes (high confidence).**" (IPCC, 2012: 5-6).	For example, coastal settlements, including in small islands and mega-deltas, and mountain settlements are exposed and vulnerable to climate extremes in both developed and developing countries, but with differences among regions and countries. Rapid urbanization and the growth of megacities, especially in developing countries, have led to the emergence of highly vulnerable urban communities, particularly through informal settlements and inadequate land management.
"**Development practice, policy, and outcomes are critical to shaping disaster risk, which may be increased by shortcomings in development (high confidence).**" (IPCC, 2012: 8).	High exposure and vulnerability are generally the outcome of skewed development processes such as those associated with environmental degradation, rapid and unplanned urbanization in hazardous areas, failures of governance, and the scarcity of livelihood options for the poor. Increasing global interconnectivity and the mutual interdependence of economic and ecological systems can have sometimes contrasting effects, reducing or amplifying vulnerability and disaster risk.

State of knowledge of current loss and damage from climate extremes

"**Economic losses from weather- and climate-related disasters have increased, but with large spatial and interannual variability (high confidence, based on high agreement, medium evidence).**" (IPCC, 2012: 7).	Global weather- and climate-related disaster losses reported over the last few decades reflect mainly monetized direct damages to assets, and are unequally distributed. Estimates of annual losses have ranged since 1980 from a few US$ billion to above 200 billion (in 2010 dollars), with the highest value for 2005 (the year of Hurricane Katrina). Loss estimates are lower- bound estimates because many impacts (such as loss of human lives, cultural heritage, and ecosystem services) are difficult to value and monetize, and thus they are poorly reflected in estimates of losses. Impacts on the informal or undocumented economy as well as indirect economic effects can be very important in some areas and sectors, but are generally not counted in reported estimates of losses.
"Economic, including insured, disaster losses associated with weather, climate, and geophysical events are higher in developed countries. Fatality rates and economic losses expressed as a proportion of gross domestic product (GDP) are higher in developing countries (high confidence)." (IPCC, 2012: 7).	Economic losses and fatalities described in this paragraph pertain to all disasters associated with weather, climate, and – oddly – geophysical events. Disaster impacts on human health, ecosystems and environmental sustainability have been given minor attention compared to the focus on economic loss in the SPM. In addition, the SPM does not mention the evolution of human losses due to weather- and climate-related disasters. However, according to some authors, both global mortality (i.e. the number of people killed) and mortality rates (i.e. the proportion of people killed) associated with extreme weather events have declined since the 1920s (Goklany, 2009 ; Hoeppe & Gurenko, 2006).
"**Increasing exposure of people and economic assets has been the major cause of long-term increases in economic losses from weather- and climate-related disasters (high confidence). Long-term trends in economic disaster losses adjusted for wealth and population increases have not been attributed to climate change, but a role for climate change has not been excluded (high agreement, medium evidence).**" (IPCC, 2012: 7).	These conclusions are subject to a number of limitations in studies to date. Vulnerability is a key factor in disaster losses, yet it is not well accounted for. Other limitations are: (i) data availability, as most data are available for standard economic sectors in developed countries; and (ii) type of hazards studied, as most studies focus on cyclones, where confidence in observed trends and attribution of changes to human influence is low. The second conclusion is subject to additional limitations: (iii) the processes used to adjust loss data over time, and (iv) record length.

State of knowledge of loss and damage from future climate change

"**Extreme events will have greater impacts on sectors with closer links to climate, such as water, agriculture and food security, forestry, health, and tourism."** (IPCC, 2012: 14)	However, climate change is in many instances only one of the drivers of future changes, and is not necessarily the most important driver at the local scale. Climate-related extremes are also expected to produce large impacts on infrastructure, although detailed analysis of potential and projected damages are limited to a few countries, infrastructure types, and sectors.
"**In many regions, the main drivers of future increases in economic losses due to some climate extremes will be socioeconomic in nature (medium confidence, based on medium agreement, limited evidence).**" (IPCC, 2012: 14)	Climate extremes are only one of the factors that affect risks, but few studies have specifically quantified the effects of changes in population, exposure of people and assets, and vulnerability as determinants of loss. However, the few studies available generally underline the important role of projected changes (increases) in population and capital at risk.
"**Disasters associated with climate extremes influence population mobility and relocation, affecting host and origin communities (medium agreement, medium evidence).**" (IPCC, 2012: 14)	If disasters occur more frequently and/or with greater magnitude, some local areas will become increasingly marginal as places to live or in which to maintain livelihoods. In such cases, migration and displacement could become permanent and could introduce new pressures in areas of relocation. For locations such as atolls, in some cases it is possible that many residents will have to relocate.

The Durban outcome on L&D and the IPCC SREX SPM

In Durban Parties formulated guiding questions for the activities under the work programme. These will be considered by the UNFCCC Secretariat in designing the expert meeting and regional workshops that take place in the spring and summer 2012. They will also provide direction for the technical work commissioned by the Secretariat, namely technical papers and literature reviews on the first two thematic areas of the work programme. The approach of this section is to relate the agreed conclusions of the SREX to the relevant questions posed by the Parties.

Thematic area 1: Assessing the risk of loss and damage associated with the adverse effects of climate change and the current knowledge on the same.

16. What are the data and information requirements for assessing impacts and climate risk, at different levels and for a broad range of sectors and ecosystems? What data are available and where are the gaps?

"***There is evidence from observations gathered since 1950 of change in some extremes. Confidence in observed changes in extremes depends on the quality and quantity of data and the availability of studies analyzing these data, which vary across regions and for different extremes. Assigning 'low confidence' in observed changes in a specific extreme on regional or global scales neither implies nor excludes the possibility of changes in this extreme.*** *Extreme events are rare, which means there are few data available to make assessments regarding changes in their frequency or intensity. The more rare the event the more difficult it is to identify long-term changes. Global-scale trends in a specific extreme may be either more reliable (e.g., for temperature extremes) or less reliable (e.g., for droughts) than some regional-scale trends, depending on the geographical uniformity of the trends in the specific extreme.*" (IPCC, 2012: 6).

"*It is very likely that there has been an overall decrease in the number of cold days and nights, and an overall increase in the number of warm days and nights, at the global scale, that is, for most land areas with sufficient data. It is likely that these changes have also occurred at the continental scale in North America, Europe, and Australia. There is medium confidence in a warming trend in daily temperature extremes in much of Asia. Confidence in observed trends in daily temperature extremes in Africa and South America generally varies from low to medium depending on the region. In many (but not all) regions over the globe with sufficient data, there is medium confidence that the length or number of warm spells or heat waves has increased.*" (IPCC, 2012: 6).

"*There have been statistically significant trends in the number of heavy precipitation events in some regions. It is likely that more of these regions have experienced increases than decreases, although there are strong regional and subregional variations in these trends.*" (IPCC, 2012: 6).

"*There is low confidence in any observed long-term (i.e., 40 years or more) increases in tropical cyclone activity (i.e., intensity, frequency, duration), after accounting for past changes in observing capabilities. It is likely that there has been a poleward shift in the main Northern and Southern Hemisphere extratropical storm tracks. There is low confidence in observed trends in small spatial-scale phenomena such as tornadoes and hail because of data inhomogeneities and inadequacies in monitoring systems.*" (IPCC, 2012: 6).

"*There is medium confidence that some regions of the world have experienced more intense and longer droughts, in particular in southern Europe and West Africa, but in some regions droughts have become less frequent, less intense, or shorter, for example, in central North America and northwestern Australia.*" (IPCC, 2012: 6).

"There is limited to medium evidence available to assess climate-driven observed changes in the magnitude and frequency of floods at regional scales because the available instrumental records of floods at gauge stations are limited in space and time, and because of confounding effects of changes in land use and engineering. Furthermore, there is low agreement in this evidence, and thus overall low confidence at the global scale regarding even the sign of these changes. It is likely that there has been an increase in extreme coastal high water related to increases in mean sea level." (IPCC, 2012: 6-7).

"***There is evidence that some extremes have changed as a result of anthropogenic influences, including increases in atmospheric concentrations of greenhouse gases.*** *It is likely that anthropogenic influences have led to warming of extreme daily minimum and maximum temperatures at the global scale. There is medium confidence that anthropogenic influences have contributed to intensification of extreme precipitation at the global scale. It is likely that there has been an anthropogenic influence on increasing extreme coastal high water due to an increase in mean sea level. The uncertainties in the historical tropical cyclone records, the incomplete understanding of the physical mechanisms linking tropical cyclone metrics to climate change, and the degree of tropical cyclone variability provide only low confidence for the attribution of any detectable changes in tropical cyclone activity to anthropogenic influences. Attribution of single extreme events to anthropogenic climate change is challenging."* (IPCC, 2012: 7).

17. What methods and tools are available for risk assessment, including their requirements, strengths and weaknesses, and can they address social and environmental impacts?

No mention is made of methods and tools available for risk assessment in the SPM.

18. What are the capacity needs for applying risk assessment methods on the ground, including for facilitating their application in developing countries?

"***National systems are at the core of countries' capacity to meet the challenges of observed and projected trends in exposure, vulnerability, and weather and climate extremes (high agreement, robust evidence).*** *Effective national systems comprise multiple actors from national and sub-national governments, the private sector, research bodies, and civil society including community-based organizations, playing differential but complementary roles to manage risk, according to their accepted functions and capacities."* (IPCC, 2012: 9).

"Closer integration of disaster risk management and climate change adaptation, along with the incorporation of both into local, sub-national, national, and international development policies and practices, could provide benefits at all scales (high agreement, medium evidence). *Addressing social welfare, quality of life, infrastructure, and livelihoods, and incorporating a multi-hazards approach into planning and action for disasters in the short term, facilitates adaptation to climate extremes in the longer term, as is increasingly recognized internationally. Strategies and policies are more effective when they acknowledge multiple stressors, different prioritized values, and competing policy goals."* (IPCC, 2012: 9).

19. How can the results of risk assessments be optimally formulated in order to support decision-making? What are the desired methods for presenting the results of risk assessment exercises so that they drive decision-making?

No mention in the SPM.

Thematic area 2: A range of approaches to address loss and damage associated with the adverse effects of climate change, including impacts related to extreme weather events and slow onset events, taking into consideration experience at all levels.

20. What is the full range of approaches and tools that can be used to address the risk of loss and damage, at all

levels and for a broad range of sectors and ecosystems, considering both extreme weather events and slow onset events? Such approaches and tools include, inter alia, conventional, non-conventional and innovative instruments to address specific types of loss and damage in the context of this thematic area, especially those driven by the multiplying, magnifying and intensifying effects of climate change at the national, subnational and local levels. What is known about the relative cost-effectiveness of these tools?

> "***Measures that provide benefits under current climate and a range of future climate change scenarios, called low-regrets measures, are available starting points for addressing projected trends in exposure, vulnerability, and climate extremes. They have the potential to offer benefits now and lay the foundation for addressing projected changes (high agreement, medium evidence).*** *Many of these low-regrets strategies produce co-benefits, help address other development goals, such as improvements in livelihoods, human well-being, and biodiversity conservation, and help minimize the scope for maladaptation.*" (IPCC, 2012: 14).
>
> "*Potential low-regrets measures include early warning systems; risk communication between decisionmakers and local citizens; sustainable land management, including land use planning; and ecosystem management and restoration. Other low-regrets measures include improvements to health surveillance, water supply, sanitation, and irrigation and drainage systems; climate-proofing of infrastructure; development and enforcement of building codes; and better education and awareness.*" (IPCC, 2012: 14-15).

21. What are the foundational resource requirements (e.g. budget, infrastructure, and technical capacity for implementation) in order for different strategies and tools to be effectively applied?

> "***Appropriate and timely risk communication is critical for effective adaptation and disaster risk management (high confidence).*** *Explicit characterization of uncertainty and complexity strengthens risk communication. Effective risk communication builds on exchanging, sharing, and integrating knowledge about climate-related risks among all stakeholder groups. Among individual stakeholders and groups, perceptions of risk are driven by psychological and cultural factors, values, and beliefs.*" (IPCC, 2012: 15).
>
> "***Social, economic, and environmental sustainability can be enhanced by disaster risk management and adaptation approaches. A prerequisite for sustainability in the context of climate change is addressing the underlying causes of vulnerability, including the structural inequalities that create and sustain poverty and constrain access to resources (medium agreement, robust evidence).*** *This involves integrating disaster risk management and adaptation into all social, economic, and environmental policy domains.*" (IPCC, 2012: 18).

22. What are the lessons learned from existing efforts within both the public and private sectors, considering elements of design, limitations, challenges and best practices?

> "***Opportunities exist to create synergies in international finance for disaster risk management and adaptation to climate change, but these have not yet been fully realized (high confidence).*** *International funding for disaster risk reduction remains relatively low as compared to the scale of spending on international humanitarian response. Technology transfer and cooperation to advance disaster risk reduction and climate change adaptation are important. Coordination on technology transfer and cooperation between these two fields has been lacking, which has led to fragmented implementation.*" (IPCC, 2012: 15).
>
> "***Stronger efforts at the international level do not necessarily lead to substantive and rapid results at the local level (high confidence).*** *There is room for improved integration across scales from international to local.*" (IPCC, 2012: 15).

23. What are the links and synergies between risk reduction and other instruments such as risk transfer? How can comprehensive risk management portfolios or toolkits be designed?

"***Effective risk management generally involves a portfolio of actions to reduce and transfer risk and to respond to events and disasters, as opposed to a singular focus on any one action or type of action (high confidence).*** *Such integrated approaches are more effective when they are informed by and customized to specific local circumstances (high agreement, robust evidence). Successful strategies include a combination of hard infrastructure-based responses and soft solutions such as individual and institutional capacity building and ecosystem-based responses.*" (IPCC, 2012: 15).

"***The most effective adaptation and disaster risk reduction actions are those that offer development benefits in the relatively near term, as well as reductions in vulnerability over the longer term (high agreement, medium evidence).*** *There are tradeoffs between current decisions and long-term goals linked to diverse values, interests, and priorities for the future. Short- and long-term perspectives on disaster risk management and adaptation to climate change thus can be difficult to reconcile. Such reconciliation involves overcoming the disconnect between local risk management practices and national institutional and legal frameworks, policy, and planning.*" (IPCC, 2012: 18).

24. How can risk management approaches be tailored to national contexts? How can Parties and other stakeholders evaluate which tools might be most appropriate for their particular risks and circumstances?

"***National systems are at the core of countries' capacity to meet the challenges of observed and projected trends in exposure, vulnerability, and weather and climate extremes (high agreement, robust evidence).*** *Effective national systems comprise multiple actors from national and sub-national governments, the private sector, research bodies, and civil society including community-based organizations, playing differential but complementary roles to manage risk, according to their accepted functions and capacities.*" (IPCC, 2012: 9).

"***Integration of local knowledge with additional scientific and technical knowledge can improve disaster risk reduction and climate change adaptation (high agreement, robust evidence).*** *Local populations document their experiences with the changing climate, particularly extreme weather events, in many different ways, and this self- generated knowledge can uncover existing capacity within the community and important current shortcomings. Local participation supports community-based adaptation to benefit management of disaster risk and climate extremes. However, improvements in the availability of human and financial capital and of disaster risk and climate information customized for local stakeholders can enhance community-based adaptation (medium agreement, medium evidence).*" (IPCC, 2012: 15).

Areas for further discussion

The SREX: Building the Argument for International Action

One issue mentioned in Decision 1/CP.16 in Durban is the "possible development of a climate risk insurance facility"[12] as part of an arrangement to be considered in the work programme on L & D. In Decision 7/CP.17, adopted at the climate summit in Durban, Parties "appreciate the need to explore a range of approaches, including an international mechanism"[13]. What are the rationales to embark on international action on the issue? The SREX provides some general justifications on the question why international cooperation might be desirable in the field of risk transfer.[14]

Economic efficiency argument:
As the SREX lays out, international action might be justified to "address market deficiencies and inefficiencies, a rationale that can also be applied to international interventions". The types of interventions stated in the SREX are early warning systems, sharing risks and expertise or reducing costs by pooling risks so that diversification effects are utilized.

Box: Behind the scene - from within the IPCC plenary:
The Working Group I and II of the IPCC met in Kampala, Uganda, in November 2011 from the 14th until the morning of the 18th to adopt the wording of the Summary for Policymakers Report of the SREX.
The majority of the discussion focused on minor points and semantics and most contention occurred around the following issues.

- One of the most confrontational issues was the attempt of Germany to include mitigation in the report with the message that mitigation would help to decrease the risk of climate change. This was supported by UK and Norway, but Canada, echoed by China and Saudi Arabia, opposed adding such language to the SREX. The compromised wording found through informal consultation was: "Although mitigation of climate change is not the focus of this report, adaptation and mitigation can complement each other and together can significantly reduce the risk of climate change."

- There were different opinions on the wording of conclusions around natural variability. Several parties did not agree with the message that "climate signals are relatively small compared to natural climate variability". There was also disagreement about the following wording: "Irrespective of the magnitude of any anthropogenic changes in climate over the next century, a wide variety of natural weather and climate extremes will occur." This was changed to the adopted text: "Many extreme weather and climate events continue to be the result of natural climate variability. Natural variability will be an important factor in shaping future extremes in addition to the effect of anthropogenic changes in climate."

- An intense discussion occurred around the issue of tropical cyclones. The sentence "There is low confidence that any observed long-term (i.e., 40 years or more) increases in tropical cyclone activity are robust, after accounting for past changes in observing capabilities" did not find consensus and was changed to "There is low confidence in any observed long-term trend (i.e., 40 years or more) increases in tropical cyclone activity (i.e., intensity, frequency, duration), after accounting for past change in observing capabilities. It is likely that there has been a poleward shift in the main Northern and Southern Hemisphere extra-tropical storm tracks. There is low confidence in observed trends in small spatial-scale phenomena such as tornadoes and hail because of data inhomogeneities and inadequacies in monitoring systems."

- There were strong differences in using words like race, class, and caste when describing vulnerable groups affected by climate change. They were deleted and replaced by "other social and cultural characteristics".

[12] 1/CP.16
[13] 7/CP.17
[14] IPCC 2012b, p.399 ff.

Shared responsibility argument:
Besides efficiency claims to justify international interventions, one can also consider shared responsibility and solidarity, especially with those least able to cope with the impacts of extreme events and changes, to argue for international action. Shared responsibility can take the form of ex-ante interventions to reduce vulnerability and poverty, as well as ex-post disaster response and assistance.

...shared responsibility and solidarity, especially with those least able to cope with the impacts of extreme events...

Moreover, beyond beckoning a sense of common human concern, the SREX argues that countries contributing most to climate change have an obligation to pay to reduce or compensate losses. This is the rationale underlying the "polluter pays principle". In addition, it maintains that countries have a "principled" obligation to support those who are most vulnerable and who have made a limited contribution to the climate change problem. [15]

Subsidiarity argument:
The SREX presents the subsidiarity argument, the heart of which is that centralized governing structures should only take action if deemed more effective or necessary than action at a lower unit. The underlying rationale is to reduce the dangers of isolating decisions from their point of intervention. Applying this concept of multi-level governance, however, requires cooperation between all levels of government. This itself can again be deemed a justification for international action.

These arguments are very relevant for the L&D debate. While designing options for addressing loss and damage, Parties should keep these principles in mind. In addressing the economic efficiency argument, decision makers might decide to establish risk transfer solutions at the level of greatest diversification (global) However, this might not be ideal from a subsidiarity point of view. Therefore, Parties in conducting the work under the work programme on L&D, can take the structure of the work (regional workshops) to develop option that comply with the subsidiarity principle.

IPCC SREX: Attribution of loss & damage – no, yes, depends

The question of attribution is often phrased in the context of loss & damage.[16]
The statement of attribution in the SPM of the SREX is ambiguous:[17]

Box: The attribution statement in the SPM

Increasing exposure of people and economic assets has been the major cause of long-term increases in economic losses from weather- and climate-related disasters (high confidence). Long-term trends in economic disaster losses adjusted for wealth and population increases have not been attributed to climate change, but a role for climate change has not been excluded (high agreement, medium evidence).

These conclusions are subject to a number of limitations in studies to date. Vulnerability is a key factor in disaster losses, yet it is not well accounted for. Other limitations are: (i) data availability, as most data are available for standard economic sectors in developed countries; and (ii) type of hazards studied, as most studies focus on cyclones, where confidence in observed trends and attribution of changes to human influence is low. The second conclusion is subject to additional limitations: (iii) the processes used to adjust loss data over time, and (iv) record length. (IPCC, 2012a: 9).

There is evidence that some extremes have changed as a result of anthropogenic influences, including increases in atmospheric concentrations of greenhouse gases. It is likely that anthropogenic influences have led to warming of extreme daily minimum and maximum temperatures at the global scale. There is medium confidence that anthropogenic influences have contributed to intensification of extreme precipitation

[15] SREX

[16] Ultimately, this concerns all debates in the UNFCCC, since climate change is defined "as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (UNFCCC, Art. 1.).
[17] IPCC 2012a, p.7

at the global scale. It is likely that there has been an anthropogenic influence on increasing extreme coastal high water due to an increase in mean sea level. The uncertainties in the historical tropical cyclone records, the incomplete understanding of the physical mechanisms linking tropical cyclone metrics to climate change, and the degree of tropical cyclone variability provide only low confidence for the attribution of any detectable changes in tropical cyclone activity to anthropogenic influences. Attribution of single extreme events to anthropogenic climate change is challenging.

Increasing exposure of people and economic assets has been the major cause of long-term increases in economic losses from weather- and climate-related disasters (high confidence). Long-term trends in economic disaster losses adjusted for wealth and population increases have not been attributed to climate change, but a role for climate change has not been excluded (high agreement, medium evidence). These conclusions are subject to a number of limitations in studies to date. Vulnerability is a key factor in disaster losses, yet it is not well accounted for. Other limitations are: (i) data availability, as most data are available for standard economic sectors in developed countries; and (ii) type of hazards studied, as most studies focus on cyclones, where confidence in observed trends and attribution of changes to human influence is low. The second conclusion is subject to additional limitations: (iii) the processes used to adjust loss data over time, and (iv) record length. [4.5.3]

How the sceptic views it:

SREX: A Handy Bullshit Button on Disasters and Climate Change

Roger Pielke Jr.[18]

The full report addresses the issue in a more nuanced way. The SREX makes the point that a changing climate can be expected to lead to changes in climate and weather extremes. Challenges exist "to associate a single extreme event with a specific cause such as increasing greenhouse gases because a wide range of extreme events could occur even in an unchanging climate, and because extreme events are usually caused by a combination of factors". However, attribution statement for specific weather event can be made. One illustration is the European hot summer. In 2003 a weather pattern probability is estimated to have increased by 200% due to climate change[19].

Attribution is complicated by the fact that extreme events result from a combination of factors. Despite this, climate models can, under certain conditions, identify whether individual factors are changing the likelihood of occurrence of extreme events.

However, in the long term it is feasible to determine whether a trend in extreme events is likely to have resulted from anthropogenic climate change[20].
In the context of attribution, one should also note that substantial pieces of work on attribution of extreme events have been published past the cut-off date of the SREX to consider in its literature review[21].

Thresholds and Tipping Points: Impacts that will exceed adaptation

In chapter 8.5 of the SREX, authors discuss the potential implications of large scale, system-level regime shifts as a result of climate change. The SREX makes the point that in ecological and social-ecological systems regime changes occur once thresholds or tipping points are

[18] See Pielke, R. (2011): http://rogerpielkejr.blogspot.de/-2012/03/handy-bullshit-button-on-disasters-and.html
[19] IPCC 2012b, FAQ 3.2, p.127
[20] IPCC 2012b, FAQ 3.2 p.127
[21] For example: Rahmstorf & Coumou (2011): "Increase of Extreme Events in a Warming World". PNAS

crossed. Parallels exist with socio-cultural systems, where even gradual shifts in ecological determinants result in the possibility of multiple future outcomes determined by the crossing of critical thresholds[22].

Changes in social and ecological systems can be abrupt and persistent in nature. They might be difficult and sometimes impossible to reverse. This means that these changes can have substantial impacts on human livelihoods. System-level regime shifts take place at a multitude of scales. Examples include a regime-shift of the Amazon rainforest to savannah ecosystem and achange in the Indian summer monsoon[23].

Interestingly, the concept of "tipping points" (i.e. thresholds where the system changes from one state to another) can also be applied to disaster events. Disasters themselves are a manifest of overwhelmed communities and peoples. Critical social thresholds may be crossed as disaster impacts spread across society[24].

As a result of the notion of nonlinearity, scientists and practitioners look more at the extreme ends of the impact probability density function (e.g. low-probability high impact events). Likewise, in disaster research the emphasis is now moving from major disasters to small and local disasters, that provide the understanding of how disaster impact development[25].

The management of the risk of tipping points in natural and human systems alike needs to build on the mitigation of greenhouse gases. System changes are more likely to occur with severe and rapid climate change. Adaptation must build on the understanding of nonlinear functions of hazard as well as vulnerability. Adaptation capacity might well be exceeded by non-linear changes. Stated examples in the SREX include the disappearance of glaciers and the subsequent impact on urban and agriculture water supplies. Responses to such disasters include the provision of relevant information to decision-makers that provide warning for an imminent system collapse[26].

The obvious answer, provided by the SREX, to the non-linear relationships of human and ecological systems, is that both adaptation as well as risk management are likely to require transformative approaches and changes in systems and institutions. The SREX defines transformation as "a change in paradigm and may include shifts in perception and meaning, changes in underlying norms and values, reconfiguration of social networks and patterns of interaction, changes in power structures, and the introduction of new institutional arrangements and regulatory frameworks"[27].
The SREX acknowledges that though transformational policies can be elaborated as a strategy to respond to disasters, it takes a "focusing event" to trigger such policies. Lessons of the engineering of deliberate change and change management can be taken from the business community. It is important to note, that initiating change creates uncertainty and disequilibria. Vested interests often hamper transformation, particularly when there is much to lose from change. Helping entities to manage disequilibria is therefore an essential part of successful transformation[28].

Reduction of uncertainties is the starting point for traditional management approaches. The SREX notes, that, future projections of climate variables and extremes will contain uncertainty. This calls for adaptive and robust management approaches that work despite large and irreducible uncertainties. This is an essential lesson learnt for the L&D programme, too.

Conclusions

The SREX is highly relevant for the L&D debate under the UNFCCC. However, it must be emphasized that the SREX should provide the starting point for action, but must not be an end-point. The SREX SPM does not provide a broad enough picture to support choices regarding mitigation actions as it does not compare the impact levels against mitigation choices (the "avoided damage"). Since the level of mitigation ultimately will drive the extent of loss and damage, this is a considerable gap.

Though the SREX does not move forward the issue of attribution of extreme events to climate change, it makes clear that polluters have a moral responsibility to act on loss & damage. However, this moral imperative still has to translate in political priorities.

The SREX provides many valuable entry points on how to address loss and damage at the national level. The narrative of the SREX leads to an important realization:

[22] IPCC, 2012b: p.458
[23] IPCC, 2012b: p.458
[24] IPCC, 2012b: p.459
[25] IPCC, 2012b: p.459
[26] IPCC, 2012b: p.459
[27] IPCC 2012b, p.465
[28] IPCC 2012b, p.466

It is necessary to better integrate DRR with adaptation policies to achieve resilient societies in the longer run. However, the starting point to drive this action especially in the vulnerable countries should not blur responsibilities. Even if vulnerabilities are the major underlying driver of losses today, which to some extent is a national responsibility in the countries impacted, the narrative of L&D from climate change is profoundly different. To the extent possible, actions addressing existing L&D should be internationally facilitated and supported, as for example laid out in the Cancun Adaptation Framework.

One issue that has not been within the scope of the SREX is the issue of slow-onset climate impacts. This is an important, but largely missing component in the overall discourse on L&D. However, the concepts of ecological and societal tipping elements - thresholds after which drastic regime changes occur – could be applied to slow onset impacts. The SREX identifies the need for paradigm changes and transformational policies and approaches as a response to non-linear relationsships of climate and human systems. However, international transformation, for instance through the UNFCCC, to resilience in a carbon and climate constrained world is right now difficult to imagine. The authors hope, therefore, that Parties takes some inspiration from the SREX, so that the work programme on L&D contributes to a transformational shift of mitigation and adaptation actions.

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The Loss and Damage in Vulnerable Country Initiative

Accepting the reality of unmitigated climate change, the UNFCCC negotiations have raised the profile of the issue of loss & damage to adverse climate impacts. At COP-16, Parties created a Work Programme on Loss and Damage under the Subsidiary Body on Implementation (SBI). The goal of this work programme is to increase awareness among delegates, assess the exposure of countries to loss and damage, explore a range of activities that may be appropriate to address loss and damage in vulnerable countries, and identify ways that the UNFCCC process might play in helping countries avoid and reduce loss and damage associated with climate change. COP-18, in December 2012, will mark the next milestone in furthering the international response to this issue.

The "Loss and Damage in Vulnerable Countries Initiative" supports the Government of Bangladesh and the Least Developed Countries to call for action of the international community.

The Initiative is supplied by a consortium of organisations including:

Germanwatch

Munich Climate Insurance Initiative

United Nations University – Institute for Human and Environment Security

International Centre for Climate Change and Development

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