A typology of loss and damage perspectives

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Loss and Damage (L&D) has been the subject of contentious debate in international climate policy for several decades. Recently, formal mechanisms on L&D have been established, but arguably through unclear language. This ambiguity is politically important, but researchers and practitioners require clearer understandings of L&D. Here we report on the first in-depth empirical study of actor perspectives, including interviews with 38 key stakeholders in research, practice, and policy. We find points of agreement and also important distinctions in terms of: the relationship between L&D and adaptation, the emphasis on avoiding versus addressing L&D, the relevance of anthropogenic climate change, and the role of justice. A typology of four perspectives is identified, with different implications for research priorities and actions to address L&D. This typology enables improved understanding of existing perspectives and so has potential to facilitate more transparent discussion of the options available to address L&D.

The L&D issue has its origins in calls from Small Island Developing States (SIDS) for compensation for climate change impacts, particularly sea level rise[1, 2]. It is often characterised as a highly political, contentious and polarised debate between developed and developing countries[1, 3]. In recent years, however, agreements have been made between parties, and L&D has become a formal part of the United Nations Framework Convention on Climate Change (UNFCCC), with the establishment of the Warsaw International Mechanism (WIM), in 2013[4], and the more recent Paris Agreement[5], which established a separate article on L&D, and ensured the continuation of the WIM. Arguably, these political agreements have been made possible through ambiguous language[6], and it is not clear from UNFCCC decisions exactly what L&D signifies. There is no formal definition of L&D, and there have been no official discussions about what the term means[7].

Now, attention is also being given to implementation. The WIM has an Executive Committee (ExCom), with a mandate to explore implementation of approaches to address L&D[8]; and the science-practice-policy community, including adaptation and disaster risk practitioners, from non-governmental organisations, consultancies, UN agencies, and development banks, are looking for ways to understand and address L&D[9-12]. There has also been a substantial growth in the number of academic papers referring to L&D[13-16] (see supplementary figure 1). All of these emerging actors engaging in L&D discussions may have different perspectives on L&D; and certainly several have highlighted the lack of clarity surrounding L&D[13, 17]. There have been some efforts to develop working definitions[9, 18, 19] and frameworks[20, 21], however these still leave room for different interpretations. For example, one UNFCCC literature review defined L&D as "the actual and/or potential manifestation of impacts associated with climate change in developing countries that negatively affect human and natural systems"[22]. This leaves some important questions about L&D open[7],

including how actions to address L&D might be distinct from existing adaptation, disaster risk reduction (DRR), development and humanitarian work[23, 24].

Therefore, whilst there are good reasons for ambiguity in the political domain[6], moving from negotiations to implementation, greater clarity may prove to be important. This does not imply that all emerging stakeholders must agree on one definition of L&D, but that they may benefit from understanding the range of viewpoints that already exist, and that inform current practice. By making implicit definitions visible, more informed discussion around options to address L&D might be facilitated.

Previous work has characterised party positions on L&D[2, 3, 25], and analysed L&D framings and discourses in UNFCCC documents and discussions[1, 6]. Here we draw on social science and co-production approaches to deliver an empirical, transdisciplinary study of L&D perspectives from a range of stakeholders across science, practice and policy (UNFCCC negotiators and policy-makers, and researchers and practitioners with expertise in adaptation, DRR, law, climate science, philosophy, and economics). The analysis is based on interviews (conducted between April and November 2015) with 38 stakeholders, systematically sampled to represent diverse backgrounds, and promote gender and regional balance (see Methods for details on sampling strategy).

Interviewees were asked about the meaning of L&D, and how it should be addressed. The data were anonymised, and analysed to identify a “typology” of perspectives on L&D that was iteratively refined through analysis of literature, including UNFCCC decision texts, and sustained engagement with core communities working on L&D, including feedback discussions with expert groups, notably at the third meeting of the

ExCom of the WIM (see Methods). We present the typology, and explore the implications for practice, policy and research.

Typology of perspectives

We identify a spectrum of four L&D perspectives (Figure 1a). The perspectives do not necessarily have associated definitions, but represent consistent viewpoints about what L&D means and how to address it. We found that the term “loss and damage” was not used consistently, sometimes being used to refer to impacts, and sometimes to describe a mechanism or debate.

Adaptation and mitigation perspective

Some stakeholders highlight all anthropogenic climate change impacts as potential L&D, and stress that the UNFCCC’s mandate is to avoid dangerous anthropogenic interference, or L&D from climate change, for example stating *“the loss and damage issue triggered the entire convention” (interviewee 14, 2015).* The UNFCCC already has mechanisms for adaptation and mitigation, and this perspective implies that these existing efforts are sufficient to prevent L&D. Stakeholders can express confusion at the call for L&D mechanisms which are separate from adaptation, or suggest that distinctions between adaptation and L&D are false or politically motivated. As noted by one stakeholder: *“it’s hard to argue a differentiation between loss and damage and adaptation or disaster risk management” (interviewee 13, 2015).*

Risk management perspective

For other stakeholders, new initiatives and discussions around L&D represent an opportunity to work towards comprehensive risk management by building on existing efforts under DRR, climate change adaptation, and humanitarian work. In the words of one stakeholder: *"we need to take a holistic approach, linking these ongoing initiatives together with sustainable development and DRR and climate change resilience building" (interviewee 33, 2015)*. Managing L&D could include approaches to risk reduction, risk retention, and risk transfer, including those which go beyond the national level, and address high level risks (consistent with ref[26]). The perspective focuses on a techno-pragmatic problem approach. Separating L&D which can and cannot be adapted to is perceived as unhelpful, for example: *"if you start to have policy processes at the national level, which treat L&D and adaptation as separate, you lose the opportunity to manage it properly" (interviewee 35, 2015).*

Limits to adaptation perspective

This perspective on L&D is centred around the limits to adaptation, and residual L&D beyond mitigation and adaptation. L&D generally applies to impacts of any climate-related event, rather than just those that can be attributed to climate change[9, 18]. The focus is on vulnerability, and on the most vulnerable who are already perceived to be suffering L&D. As one stakeholder explained: *"let's say there's a [crop] failure and we don't have enough to eat…Households are not passive, they react… cutting the corners on calories, typically mothers will eat less. Over the long term, 900 calories a day is not sustainable for the human body… Those little gaps at some point start looking like L&D" (interviewee 18, 2015).* This perspective draws on existing literature on Limits to Adaptation, which, although contentious, has become mainstream within

adaptation discussions[27], including in the Intergovernmental Panel on Climate Change (IPCC) Working Group II report[28].

Existential perspective

For some, L&D represents a means to highlight the importance of addressing the inevitable harm which climate change will impose on vulnerable countries, populations, cultures, and ecosystems: *"harm is occurring, something needs to be done about it" (interviewee 30, 2015).* This perspective is "existential" in the sense that climate change represents unavoidable transformation for some communities and systems. There is an emphasis on irreversible loss, non-economic losses (NELs), justice and responsibility. There is a sense of urgency to provide options for those who are most vulnerable, for example through migration facilities; and there is also discussion of compensation, whether monetary or non-monetary: "*It has … an element of compensation whether it's financial or other" (interviewee 30, 2015).*

Points of agreement and distinction

Stakeholders agreed that L&D mechanisms should refer to both slow onset events and extreme events[22], consistent with UNFCCC policy documents[4, 5, 29] and scientific literature[13, 17]. There was also some commonality across the interviews in terms of whether L&D mechanisms should be "ex-ante" or "ex-post". When asked whether L&D mechanisms should aim to prevent "potential L&D" or address "actual L&D", most stakeholders agreed that both were important, however there was a difference in terms of emphasis.

Within each perspective, distinct words and phrases (see Table 1) were found to be frequently used or emphasised by interviewees when describing L&D (see Methods). There is some inevitable overlap in terminology, but there is sufficient distinction in key words to provide an important illustration of the divergence of understandings of L&D. For example, some stakeholders speak more about “preventing” “potential L&D”, or ex-ante measures, and some highlight the need for approaches to address actual, “unavoidable”, L&D, or “ex-post” measures.

In Figure 1b, the ex-ante to ex-post axis (blue arrow) is displayed alongside an axis illustrating the distance from adaptation and existing mechanisms (black arrow). Current UNFCCC architecture is arguably focused on ex-ante measures, and the Adaptation and Mitigation perspective would imply that these are sufficient to address L&D; whereas the Existential perspective highlights the need for additional, ex-post actions. This contrast can be observed between a quote from one stakeholder when referring to the WIM: *“A huge part of what we are supposed to be doing is figuring out how to reverse and revert L&D” (interviewee 31, 2015),* and another: *“L&D policy responses are not about preventing these impacts, they are not about trying to make the risk of negative impacts small” (interviewee 19, 2015).* The other perspectives lie somewhere between, with Risk Management, for example, placing value on comprehensive approaches which consider ex-ante and ex-post action together.

There are also differences in the spatial scale at which losses and damages are described, represented by the purple arrow. Risk Management largely focuses on global or national level analysis of risk, whereas Limits to Adaptation highlights impacts at the local or community scale. The blue shading indicates differences in the relevance of climate change. For the Adaptation and Mitigation and Existential perspectives, L&D is about anthropogenic climate change, whereas Limits to

Adaptation and Risk Management highlight the importance of dealing with all climate-related risks, for example: *"the more urgent issue is… actually… responding to or adapting to extreme weather events, whether it's caused by people or not" (interviewee 34, 2015).*

The grey dashed contours refer to the emphasis on justice. For the Existential perspective, questions of justice and responsibility are emphasised, and for some central. For example one stakeholder describes the goal of the L&D mechanisms as *"to get some sort of equity between different nations and generations" (interviewee 29, 2015),* and another said *"it's about recognition that we have responsibility" (interviewee 30, 2015).* They view L&D as a way *"to address the uneven power balance that currently exists under the current negotiations" (interviewee 30, 2015).* Several are quite specific that it is a "polluter pays" issue. This does not imply that the other perspectives are not based on principles of justice: there is some explicit mention of distributive justice in connection with risk management approaches[20] and different ethical framings for L&D have been discussed[30, 31]. However, during the interviews there was generally little discussion of justice in connection with the other perspectives.

Action, research and finance for loss and damage

Stakeholders were asked what kind of practical actions and scientific research would be needed to address L&D. We analysed the logical implications of each perspective for action, science, and financing; making inferences about appropriate tools for each perspective (Table 2).

Action

The Adaptation and Mitigation perspective suggests that L&D should be dealt with through existing mechanisms, and therefore does not imply distinct actions to address L&D. The Risk Management perspective emphasizes a whole suite of risk management tools. The Limits to Adaptation perspective typically highlights participation, and favours actions associated with development interventions such as informal social protection mechanisms, micro insurance, innovations in livelihood, and early warning systems. The Existential perspective places more emphasis on ex-post measures, including, more controversially, compensation and in some cases litigation, but also other measures including resettlement.

There are some tools which are referred to by many stakeholders with different views about L&D, for example insurance. However, there may be distinctions in what is meant by this; as one stakeholder highlights: *"when I say insurance, there's going to be a payout around 6-9 months in the season after you pay your premium… when other people talk about insurance, [they are asking] "where am I going to move my 25000 island population to resettle" (interviewee 34, 2015)*. Mace and Verheyen (2016) suggest that in the UNFCCC context "insurance" has been used by AOSIS for decades, "somewhat euphemistically", to refer to mechanisms that might provide compensation, whereas developed countries prefer to highlight more traditional forms of insurance. Further work is needed to establish what kinds of insurance are relevant, how they combine with other actions to address L&D, and to identify cases where insurance is not a suitable solution[32].

For practitioners, the ambiguity surrounding L&D may be challenging for implementation, as highlighted by one stakeholder: *"We can talk about L&D in conceptual or theoretical level, but when it boils down to operations, it is quite challenging with no definition" (interviewee 33, 2015).* Without agreement on how to define L&D, it might prove difficult to measure the effectiveness of projects, programmes and activities on the ground.

Research

When asked about science relevant to support L&D mechanisms, almost every interviewee had a different answer, highlighting both the large number of research gaps in this field and the diversity of views. Many stakeholders mentioned attribution science at least partly due to their awareness of our own previous work on extreme event attribution[7, 33, 34]. There was variation between interviewees in terms of their understanding of this science: some referred to specific forms of attribution science or even specific academic papers, whereas others were broadly referring to the concept of attributing causality. There was also variation in opinion about whether attribution is useful for L&D, consistent with previous findings[14]. The most common comment was to express caution about uncertainties in attributing specific losses to anthropogenic climate change and/or the controversy of such findings, and an emphasis that this should not delay action to support vulnerable people, for example: *"We should worry about how to deal with this, let's not worry about whether it's caused by humans" (interviewee 28, 2015).* This kind of emphasis was quite consistent across the perspectives.

The Adaptation and Mitigation perspective does not imply new research questions to understand L&D, additional to those which inform adaptation and mitigation. The Risk

Management perspective highlights understanding how climate change influences existing risk, as one stakeholder explained: *"L&D is what happens as a result of the combination of existing vulnerability plus changing risk profile that climate change brings" (interviewee 35, 2015).* Analysis is needed to evaluate whether existing disaster risk assessments can address this evolving risk from climate change, and to identify gaps in risk management approaches. The Limits to Adaptation perspective highlights the importance of gathering empirical evidence from vulnerable people to understand their experiences of barriers to implementing adaptation and limits to its effectiveness. The emphasis on adaptation limits implies that adaptation monitoring and evaluation (M&E) is also important. The Existential perspective places specific emphasis on permanent losses, which have received limited research attention to date. Relevant aspects may include new questions about NELs such as loss of homeland, livelihood, sovereignty, youthfulness, mental health and wellbeing, including *"how loss is perceived and understood" (interviewee 30, 2015)* (as also highlighted in recent academic papers[35, 36]*).*

Science questions are not necessarily inconsistent across perspectives. For example, even if stakeholders argue that L&D should be dealt with through adaptation and mitigation, they would likely still see the benefit of M&E, which could identify areas where adaptation measures can be improved. Therefore, scientific progress is not inhibited by contrasting perspectives on L&D. However, there are many potential research questions surrounding L&D (only partly covered by Table 2) and it is unlikely that all can be answered. If science is to support policy, research-policy dialogue on L&D is a necessary step to prioritise research needs.

Finance

The interviewees were deliberately not asked about finance related to L&D to judge the extent to which this featured in their perception of the issue. Several interviewees highlighted that there are others for whom financial support is key, for example: *“there are countries… who... see… that loss and damage is about attribution of blame and taking compensation…” (interviewee 13, 2015*), and “*in the end it’s about who pays for what” (interviewee 25, 2015).* This impression seems to be a key driver of L&D discussions, with fear of paying compensation perhaps the reason that many associated terms are off-limits. One interviewee explained how a developed country government was *"not prepared to talk about climate change that causes permanent losses” (interviewee 17, 2015*).

Interestingly, none of the interviewees described their own position on L&D in this way. There were some who made the case for monetary compensation, associated with the Existential perspective, but these stakeholders also highlighted that this was not the only, or even the most important issue, for example: *“The ultimate goal for countries like St Lucia, can’t be simply to get money for lost lives, that would be terrible to say there’s nothing we can do so let’s just collect a premium for the thousand people who just died” (interviewee 30, 2015).* This is consistent with statements made by developing country negotiators[37].

Other interviewees did not say much about finance, perhaps due to the controversial nature of this issue. In connection with Risk Management, there was some emphasis on private sector funding, but otherwise little discussion about who would pay for the actions to address L&D. Financial instruments for L&D do feature in the WIM ExCom’s initial two-year workplan, and were also the subject of a recent forum of the Standing Committee on Finance[38]. However, this matter is largely unresolved, as

illustrated in the indicative framework for the five-year rolling workplan of the ExCom, which currently has a "placeholder for finance-related topics"[8].

Implications for policy

For researchers and practitioners, characterising a spectrum of different perspectives on L&D has potential to help identify the real options available for addressing L&D. For UNFCCC policy-makers, however, there is an imperative for agreement and convergence, and clarifying different perspectives could reopen discussions and stall negotiations. So what does the typology of perspectives mean for progress in international policy? What kind of stakeholders is each perspective associated with and how do they relate to political positions and groupings? How far are the different perspectives already represented in UNFCCC agreements?

Stakeholder groups were identified and mapped onto the typology in Figure 1c (see Methods). One important finding is that there is not a simple polarization between political actors from developed and developing countries, and stakeholders do not neatly divide between the four perspectives. Many individuals express views which encompass more than one perspective, and there are a few whose ideas about L&D did not resonate with any of them (largely those who focused on the lack of clarity around L&D, or who were highly skeptical of UNFCCC processes). In general, the Adaptation and Mitigation perspective was associated with developed country negotiators, and this is keeping with the proposals of Annex I countries during the negotiations, specifically to have no separate article on L&D in the Paris Agreement. This is in contrast to the SIDS and Least Developed Country (LDC) positions[25]. We interviewed several stakeholders who represent or advise these groups and their

340 views encompassed elements of the Existential, Limits to Adaptation and Risk
341 Management perspectives. The clearest expressions of the Existential, Limits to
342 Adaptation, and Risk Management perspectives were from climate justice
343 campaigners, adaptation practitioners, and disaster risk reduction experts,
344 respectively.
345
346 The WIM and Paris Agreement texts were also analysed, and mapped onto the
347 typology in Figure 1c. The WIM text[4] is ambiguous and all encompassing. For
348 example, the WIM is part of the Cancun Adaptation Framework and thus could be
349 regarded as consistent with the Adaptation and Mitigation perspective. However, the
350 WIM is also sufficiently vague that it does not rule out specific measures, and the
351 workplan includes terminology which is associated with each of the perspectives
352 (Table 1), for example “comprehensive risk management”, “non-economic losses”,
353 and “particularly vulnerable”[39].
354
355 In the Paris Agreement and decision text[5], the notion of L&D is a little more tightly
356 constrained. For the first time L&D is separated from adaptation in a separate article
357 (Article 8), which conflicts with some core aspects of the Adaptation and Mitigation
358 perspective. Conversely, the Paris decision text explicitly states (in paragraph 51)
359 that Article 8 does not involve liability and compensation, which implies that some
360 aspects of the Existential perspective are excluded. However, permanent and
361 irreversible losses are mentioned, which form a key component of the Existential
362 perspective. Vanhala and Hastbaek[6] also find increasing precision in the Paris text
363 relative to the WIM.
364
365 The WIM and Paris Agreement represent success in reaching consensus, and in
366 incorporating language which spans much of the typology of perspectives. So does

this signal political convergence in terms of how to manage L&D? Mace and Verheyen[2] argue that, from a legal perspective, the Paris text leaves "all options open" for L&D. They highlight that the structure, mandate, and effectiveness of the WIM is currently quite limited: it is not a legal entity and does not have technical advisory or financial functions. Therefore even if key words from each perspective are referred to in the texts of the WIM and the Paris Agreement this does not guarantee that sufficient actions will be implemented to address L&D as conceived under each perspective. Important questions remain about what actions will be prioritised and who will be responsible for their implementation and financing.

Therefore, despite the imperative for convergence, characterizing the range of perspectives might still be useful for policy-making. The typology reveals a complex but rich array of knowledge, expertise and aspirations for L&D, and could be useful in three key ways. First, while it may not be desirable to openly acknowledge points of disagreement within political negotiations, it is important that policy-makers are aware of different perspectives. If different perspectives are not reflected in the actions which are implemented to address L&D, negotiations could re-emerge. The typology might therefore be useful background information for policy-makers, particularly those who are new to the L&D discussions. Second, the typology demonstrates some points of agreement and overlaps between stakeholder groups (see Figure 1c). Whilst there are disagreements, we do not find evidence for a simple polarization between those who seek compensation and those who wish to avoid paying compensation. This finding implies potential for some aspects of the debate to be nuanced and depoliticised. The typology could be used to develop frameworks for conceptualising L&D, which incorporate priorities from multiple stakeholders and identify a policy space for L&D which is acceptable for different parties (and there have been recent efforts to develop such a framework).[20]

Finally, the typology could facilitate more transparent and informed discussion outside, or on the fringes of, the policy sphere, about the span of options available for research and actions to address L&D. These discussions might lead to research findings and practical solutions which can later inform or be supported by UNFCCC policy. For example, the typology could be used to identify research questions associated with each perspective (informed by Table 2) as a basis for dialogue between the ExCom and the IPCC on areas of science relevant to L&D for assessment in its upcoming reports.

Many of the questions over the meaning of L&D are reminiscent of the long-standing debate among adaptation scholars and practitioners of the need for clarity in what adaptation means to effectively measure and implement adaptation[40]. The challenge of reaching specificity in a contested policy space is not a new one, but, in identifying a typology of perspectives of L&D, we hope to fast track progress at an early stage of L&D policy development.

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Author contributions

E.B., R.A.J and R.G.J. designed the research project, conducted interviews, analysed interview data, and wrote and revised the text. H.R.P. conducted interviews,

contributed to data handling and developed of codes for analysis, and contributed to the draft text. F.E.L.O. contributed by providing feedback on analysis, and contributed to the draft text.

Competing financial interests

The authors declare no competing financial interests.

Figure Legends

Figure 1 The typology of four perspectives on loss and damage, (a) arranged along an axis in terms of their characterisation of L&D, and how far suggested approaches to address L&D are distinct from, or go beyond, existing adaptation mechanisms (b) illustrating points of distinction between perspectives, and (c) illustrating the extent to which each perspective in the typology is articulated by stakeholder groups, and the extent to which UNFCCC mechanisms or agreements encompass the perspectives.

Tables

Table 1 Illustrative words and phrases associated with each perspective, extracted from interview transcripts (see methods for further detail).

Perspective	Keywords
Adaptation and Mitigation	prevent, avoid, proactive, reducing and reversing L&D, reducing and minimising, averting and reducing, minimising risks, potential L&D, potential impact, L&D is under adaptation, humanitarian response, unfortunate
Risk Management	climate risk management, comprehensive climate management, holistic, total risk, risk layering, high level losses, changing risk profile, evolving risk, socioeconomic thresholds, extreme events,

	downside risks, risk financing, financial instruments, private sector, private sector engagement, risk management tools, objective data driven solutions, operational solutions, early intervention, risk reduction, early warning systems, risk pooling, regional risk pool, contingency planning, post-disaster recovery, resilience
Limits to Adaptation	limits to adaptation, adaptation limits, adaptation constraints, physical limits, social limits, beyond adaptation, residual loss & damage, residual impacts, migration, saline intrusion, agriculture, non-economic losses, climate-related stressors, community-based, values, livelihoods, resilience, vulnerable, poor and marginalised, developing countries, micro insurance
Existential	residual harm, permanent, irreversible, irreplaceable, gone forever, reality, it's happening, undeniable, unavoidable, nonmarket L&D, non-economic losses, values, sea level rise, islands, displacement, refugees, loss of homeland, resettlement, reconstruction, rehabilitation, restoration, compensation, ex-post, responsibility, anthropogenic climate change, justice, liability, equity, human rights, increase mitigation, more serious about mitigation

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551 **Table 2** Actions, research, and financing appropriate under each perspective, based
552 on suggestions by interviewees and inference from their characterisation of L&D
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Perspective	**Implications for practice: How to address L&D through action?**	**Implications for research: How to improve understanding of L&D?**	**Implications for finance: How to resource L&D?**
Adaptation and Mitigation	Mitigation and adaptation.	All climate change impacts are potential L&D, therefore continuing research efforts to understand climate change impacts (e.g. climate change risk assessments for adaptation, climate services) are most relevant.	L&D does not require additional funding beyond existing climate finance.
Risk Management	Comprehensive risk management. Suggestions from interviewees include: insurance, insurance pools, catastrophe bonds, life insurance, DRR, sovereign disaster risk rating, climate services and early warning, engineering, capacity building.	Integration of disaster risk assessment with climate change risk assessment. Analysis of risk management tools to identify gaps.	Emphasis on insurance schemes and private sector finance.
Limits to Adaptation	Focus on options or contingency plans for vulnerable people. Emphasis from interviewees on: risk transfer, social safety nets, micro insurance, innovations in livelihoods (early warning), and participation.	Analysis of what is beyond adaptation. Research with vulnerable people to identify limits, monitoring and evaluation (M&E) for adaptation, climate change risk assessment with estimate of adaptation pathways and limits.	Emphasis is not generally on finance.
Existential	Focus on mitigation to avoid L&D, and ex-post measures to address loss, including: compensation, migration facilities, homeland resettlement, acknowledgement, official apologies, memorial, historical	Analysis of probability of, and vulnerability to, permanent, irreversible, long term, unavoidable changes. Assessment of L&D, which has already occurred. Research with vulnerable people to understand and anticipate loss,	Associated with calls for compensation, but emphasis that this is not the only or even most important aspect of addressing L&D.

	preservation, international litigation.	particularly non-economic loss (e.g. post traumatic stresses induced by events, loss of identity or sense of place).	

Methods

Summary

This is an empirical and impact-focused science-policy study of stakeholder perspectives on L&D, produced by a transdisciplinary team of researchers with physical and social science expertise; emerging from a collaboration on a NERC funded project about the attribution of extreme weather events in Africa (ACE-Africa). The empirical results are based on 36 stakeholder interviews with 38 key stakeholders, carried out in April-November 2015 by the co-authors. The primary interview data have been triangulated with academic and grey literature, policy documents, and participatory observations of meetings; and the results have been refined through workshop engagement and feedback from key stakeholder groups, and research project meetings. This research process involved sustained engagement with core communities working on L&D, also generating wider impact through dialogue, building networks, and documenting the process to co-produce new insights on this critical and controversial topic between 2015 and 2017. The study has been designed to be politically impartial, but it is important to highlight this kind of analysis cannot be completely objective or replicable, as is common in social sciences[41].

Sampling strategy

Potential interviewees were identified through stakeholder mapping to identify influential and important actors in relation to L&D. The core research team constructed a list of researchers, practitioners, and policy-makers who were known to meet at least one of the following criteria: they were involved in L&D negotiations or other L&D activities under the UNFCCC including members of the ExCom; they had attended UNFCCC L&D meetings as observers; they had written papers of other documents about L&D; they were part of a L&D network, including the L&D network[42], or Asia Pacific Forum on Loss and Damage[43]; they were senior experts in adaptation, disaster risk management, or UNFCCC processes. An effort was made to ensure that this included experts from different types of institution (academic, non-governmental organisations, international organisations, development banks, consultancies, national government departments). Each interviewee was also asked to recommend other interviewees following a snowball sampling technique[44].This technique allowed the study to limit bias by capturing the range of actors involved in the issues but with different views[45].This resulted in a list of over 100 potential interviewees. Stakeholders from this list were prioritised using a carefully designed set of criteria to encourage a balance of gender, expertise, and geographical area; although the final sample of interviewees was also partly determined by availability and willingness to interview. This resulted in a relatively large number of interviewees from Europe, due in part to the location of the research team, and a relatively small number of negotiators, possibly due to busy schedules and/or hesistancy to be interviewed about this contentious topic.

The 38 interviewees included 23 men (60.5%) and 15 women (39.5%): and, based on their current region, 63% from Europe, 13% from North America, 11% from Oceania, 8% from Africa, and 5% from Asia (although it is worth highlighting that many of the relevant stakeholders travel frequently and may have affiliations or

residences in more than one location). To give an insight into the type of stakeholders interviewed, they were classified as primarily researchers (50%), practitioners (29%), or negotiators (21%), although many of those interviewed have hybrid careers, with many researchers also being practitioners in adaptation, development or DRR, and many negotiators also working as civil servants or practitioners when they are not at UNFCCC meetings. Many of those classified as researchers were interviewed in part due to their work supporting negotiators. A subjective assessment of expertise of interviewees suggests that 71% had prior expertise in L&D, 55% in adaptation, and 62% in UNFCCC processes (many obviously had expertise in all three of these key areas). Two of the interviewees selected brought a colleague to the interview to help answer questions (bringing the total to 38 interviewees and 36 interviews).

Interview procedure

The interviews were semi-structured, using a protocol interview guide (see supplementary information), which included an opportunity for the interviewee to ask questions and provide informed consent, and an assurance of confidentiality, following ethical guidelines and approval from the University of Oxford Central University Research Ethics Committee. Interviewees were asked about how they would define L&D, whether they had come across other perspectives on L&D, the distinction between adaptation and L&D mechanisms, what actions should be taken to address L&D, scientific research which might be needed to support L&D mechanisms, and the importance of defining L&D. Interviewees with prior experience of UNFCCC negotiations were also asked about the emergence of L&D within the negotiations. The questions were tested and refined through two pilot interviews. Interviews were conducted by one or two members of our team, in person, on skype, or via telephone, and lasted between 15 and 90 minutes, depending on the

availability of the interviewee, and the length of their answers. Where consent was granted, interviewees were recorded, and transcribed by one of two research assistants. Two of the interviews were not recorded, and instead the interviewer wrote notes based on the interviewees responses. Following each interview, the interviewer wrote some brief notes to comment on the tone of the interview and inform consideration of reflexivity.

Data analysis and development of the typology

The interview transcripts were analysed using NVIVO, a qualitative data analysis software. Coding was used to identify quotes under nine key themes, including the distinction between adaptation and L&D mechanisms, the relevance of climate change, ex-ante and ex-post actions, finance, and justice (see supplementary information). These themes were identified from the literature, and from observations at L&D discussions, as potential points of agreement and distinction in what signifies L&D. Some of the themes link directly to questions which were asked to participants (for example they were asked several questions about the distinction between L&D and adaptation), and some of the themes were specifically not asked about in order to gauge whether the interviewees would bring these issues up in discussion, and therefore the amount of emphasis these themes had in their conceptualization of L&D (including finance and justice). The coding was conducted by reading the key interview questions which were associated with the theme, and/or searching for key words associated with that theme. Following the coding, the quotes identified under each code and theme were used to determine the extent to which this theme represented a point of distinction or agreement across the stakeholders.

Then, in order to begin developing a typology of perspectives, each interview transcript was considered in turn and the perspective of this interviewee was summarised in line with the nine themes. After developing this summary for each interviewee, it was possible to identify commonalities between some interviewees, and to start to develop groupings of interviewees with similar perspectives. This was not a simple process, and not all of the interviewees fit into these clusters. Some interviewees had perspectives which seemed to span across multiple groups. Some did not fit into any of the groupings, particularly those who didn't want to offer a definition of L&D, because they were highly skeptical of UNFCCC processes, because they didn't feel they understood L&D well enough to define it, or because were aware of a lack of common understanding, many different perspectives, or conflicting views, and therefore did not want to adopt any one definition themselves. Nevertheless there were some interviewees with quite consistent perspectives that were shared by a number of other stakeholders, making it possible to identify four emerging clusters.

The grouping and clustering was conducted through iterative analysis, critical reflection, and discussion amongst the core research team in a series of half-day workshops. The coding themes were divided between two members of the team to do analysis using NVIVO, and then results shared and discussed. Then the summaries for each interview were written by one member of the team, these were then discussed and refined through discussion. The groupings then emerged from further discussion, which led to the drafting of a typology of four perspectives. There were some remaining questions about these perspectives, which were then used to check the coded quotes again and characterize how each perspective dealt with each point of distinction and agreement (ultimately leading to Figure 1b). Following this iterative analysis a typology of four perspectives had been developed, and each

interviewee was categorised as either representing one perspective well, or spanning multiple perspectives, or not fitting into any of the perspectives (but also not really expressing clear or strong opinions about what L&D signifies).

The typology was then reviewed based on an analysis of L&D literature, including UNFCCC texts, as well as reflections and observations from participation in approximately 20 conferences, workshops, and meetings which included a focus on L&D.

In the social sciences typologies are a well-established analytical tool[46]. They are used to form and refine concepts, draw out new dimensions, and create classification types. Based on rigorous qualitative work typologies have potential conceptual power to provide new insight into underlying dimensions of concepts[46]. There is, of course, a certain amount of subjectivity involved in this analysis, and a different research group might have developed a different typology of perspectives. The typology was influenced by our own prior understandings and sustained engagement with communities working on L&D. We nevertheless endeavoured to accurately represent the perspectives of the stakeholders we interviewed, and also checked our findings with key experts to check whether our interpretation resonated with their own experiences.

Stakeholder engagement to refine results

The initial typology was presented and tested in dialogue with ExCom members and observers at the third meeting of the ExCom in April 2016, at the Adaptation Futures conference in May 2016, and with scientific experts and practitioners working on Loss and Damage at the Resilience Academy in September 2016. Experts were

asked whether the typology resonated with their own perspectives and experience of others' perspectives, whether we had missed anything, and whether they found the typology helpful. These dialogues resulted in feedback which confirmed the relevance of the typologies, and was used to refine their description, resulting in a set of co-produced understandings, which have evolved through several iterations of a policy brief[47, 48], and are presented here for the first time with evidence from interviews and analysis of implications for research and policy.

Identification of keywords

The analysis of words and their associated meaning is a common tool in social sciences. To identify the words and phrases in Table 1 we focused on stakeholder interviews which resonated most strongly with each perspective, and then revisited the transcripts and codes for these interviews to identify words which were used frequently or emphasised.

Mapping stakeholders and political decisions onto the typology

After developing the typology of perspectives, and identifying whether each interviewee represented one perspective well, or spanned multiple perspectives; we then revisited the information we had collected about who these interviewees were: what was their role, expertise, and affiliation. This is not straightforward as many of the interviewees have somewhat hybrid roles. After gathering this information and discussing it in another meeting of the core research team, we identified several key stakeholder groups, including parties and observers to the UNFCCC for which we could identify a stakeholder group, and the extent to which it adopted one or several of the perspectives. This was supported by an analysis of literature, for example including policy briefs by non-governmental organisations, which confirmed that

climate justice campaigners were demonstrating an “Existential” perspective, and submissions by parties to the UNFCCC, which confirm elements from range of the perspectives are evident in the recent LDC and SIDS positions.

To map the WIM and Paris Agreement onto the typology, we analysed the relevant decision texts to identify whether keywords from each perspective were present, what was included and not included, and whether they were organised under adaptation or not.

Data Availability

The interview data analysed in this study are confidential and therefore not publically available. Some anonymised metadata, including statistics relating to regional and gender balance of the interviewees, can be obtained from the corresponding author on reasonable request.

Ethics statement

This work has been approved by the University of Oxford Central University Research Ethics Committee. All interviewees provided informed consent. Interviewees were assured that interview data would remain confidential, and interviewees would remain anonymous.

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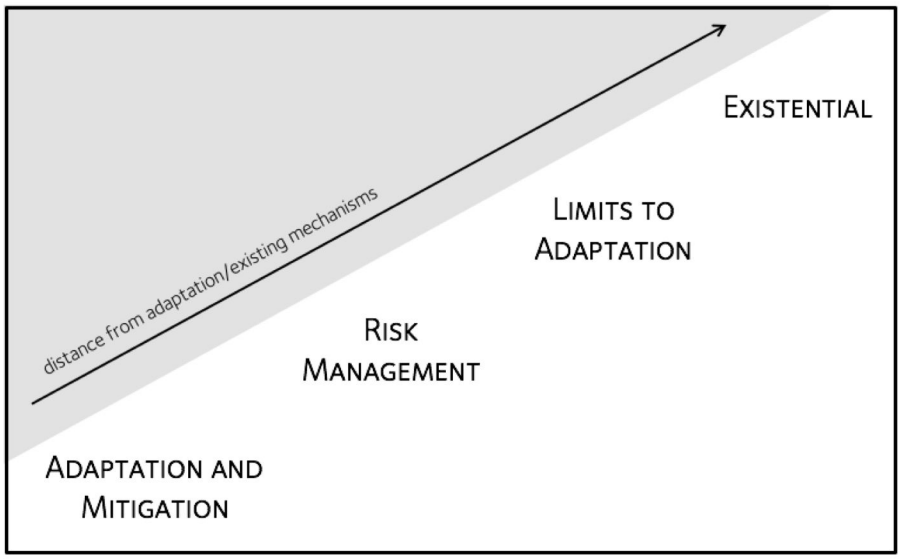

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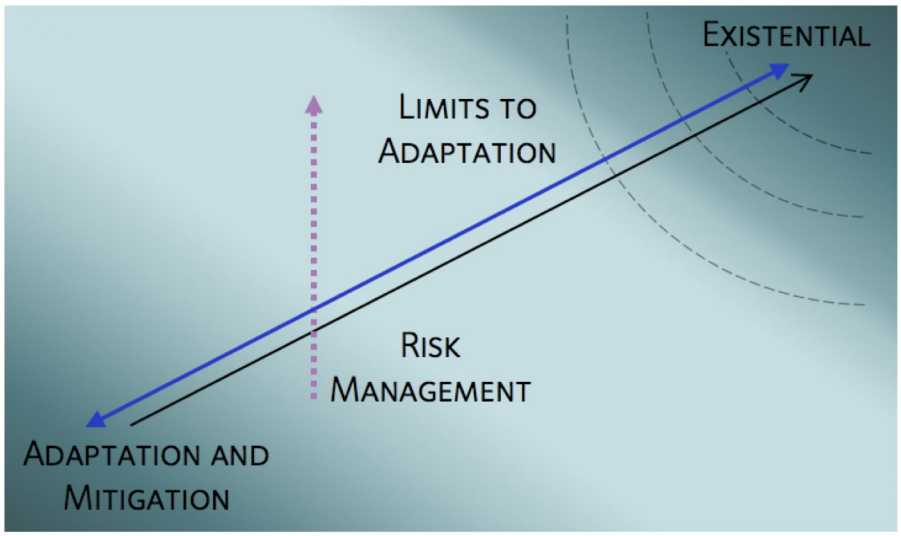

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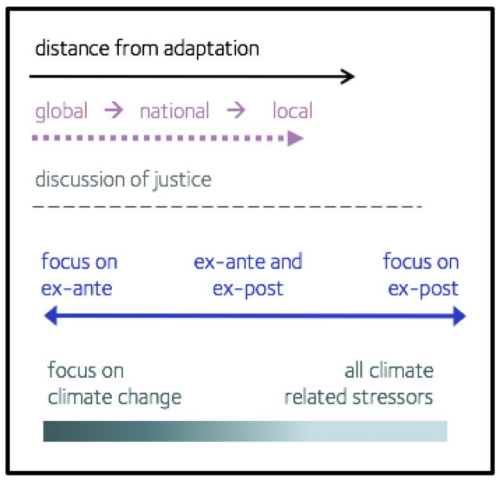

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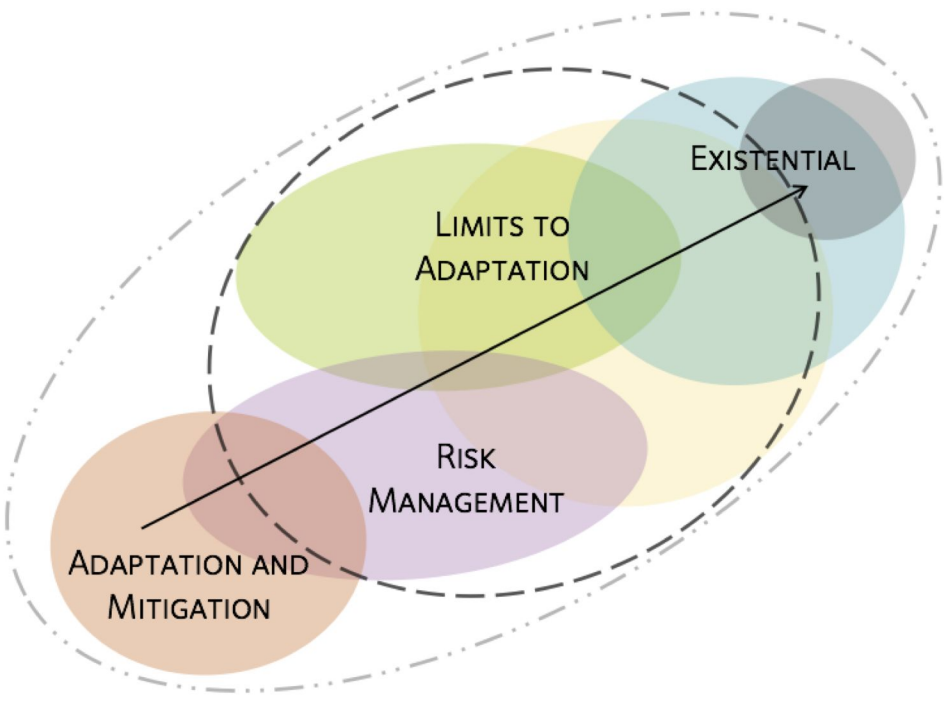

Parties
- developed countries
- SIDS
- LDCs

Observers
- climate justice campaigners
- adaptation experts
- disaster risk reduction experts

WIM

Paris Agreement