Problematising loss and damage

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Abstract: In the space of a few short years, the UNFCCC process has given birth to a new policy regime, the Warsaw International Mechanism on Loss and Damage, to prepare for the adverse consequences of climate change to vulnerable societies. The justification for this policy is that a residual domain exists wherein climate change adaptation, disaster risk reduction and public/private risk transfer mechanisms are insufficient for peoples and places overwhelmed by climate impacts. We link this domain conceptually to scientific research on climate change impacts, and specifically to research on limits to adaptation. The normative position of this academic debate is generally oriented toward the need for transformative adaptation. This paper aims to anticipate the challenges that the Warsaw mechanism will encounter achieving transformation in practice. Both policy design (as it is taking shape) and implementation face a set of interrelated conceptual and operational problems that challenge whether resources can and will address adverse consequences among the most vulnerable. In the end, loss and damage policy may suffer from the same limitations as adaptation policy: it is concerned with the reconstitution of vulnerable states of being, rather than their transformation into something more fundamentally conducive of wellbeing and development.

Keywords: climate change; social vulnerability; adaptation; compensation; risk management.

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1 Introduction

Over the last two decades, the manifestation of climate change impacts and scientific advances in their comprehension have led to an evolution in international climate policy. Loss and damage is the latest policy instrument, which aims to negotiate the limits of human society to adapt to climate change. When climate change was initially recognised as a crisis common to mankind, a policy framework was proposed in the United Nations Framework Convention on Climate Change (UNFCCC) in order to mitigate the effects of greenhouse gases in the atmosphere. However, it was soon realised that an additional policy paradigm would be necessary to adapt to the expected impacts (the Cancun adaptation framework or CAF). Now, clear instances have come to the fore in which climate-driven stresses cannot be adapted to, not because of internal deficiencies of vulnerable peoples, but because of the preponderance of the stress entailed in certain slow-onset and extreme effects (UNFCCC COP, 2008; IPCC, 2012). Climate-linked stresses threaten to overwhelm regions such as small island developing states (SIDS), coastal settlements and semi-arid regions. In some of these areas, productive livelihoods and human habitation are reaching limits in the extent to which adaptation is possible (Adger et al., 2009; Dow et al., 2013; IPCC, 2012; Huggel et al., 2013a; Warner and van der Geest, 2013). With this grave apprehension, the UNFCCC initiated a new policy framework in order to prepare for inevitable losses and damages. The primary outcome of the UNFCCC negotiations in November 2013 was the enactment of the Warsaw international mechanism on loss and damage from climate change, thus giving birth in a few short years to a new policy regime aimed at addressing climate change impacts.

While the scientific understanding of climate impacts is not new (and will be explored ahead), this emerging construct of loss and damage from climate change justifies the creation of an additional policy domain. It argues that existing policy mechanisms are not enough to extend limits to adaptation, to prevent private and collective losses and damages, or to ensure human welfare in the face of climate change. It assumes the existence of a residual policy gap between climate change adaptation (CCA), disaster risk reduction (DRR), and current public/private risk transfer tools, wherein climate change may generate conditions that can neither be mitigated, nor adapted to, nor insured against (Dow et al., 2013). Based on recent research documenting losses that cannot be mitigated or adapted to (Marino and Schweizer, 2009; Lazrus, 2009; Warner et al., 2010; Gemenne et al., 2010), the policy asserts that stresses will overwhelm livelihood systems and trigger permanent physical displacement (and resource displacement), migration, and abandonment of systems that no longer afford the necessary inputs for human wellbeing. It implies that DRR tools are inadequate as the changes involved are successive, progressive, accelerating and permanent (from the perspective of human timescales). The assumption is that current insurance instruments will be unable to cover the collective losses entailed, such as those in cultures, languages, indigenous knowledge systems, livelihood practices, social networks, and statehood. Loss and damage implies that for some people climate change will require new life systems, or in other words, transformation.

While climate change may indeed be driving human systems to their limits and demanding societal transformations, the Warsaw mechanism as a policy construct is far from self-explanatory and requires scrutiny and interrogation. The purpose of this paper is not to reject or to undermine a potentially important policy paradigm for addressing the

harm that vulnerable people experience, but to clarify its meaning, to warn of possible misinterpretations, and to raise conceptual and practical concerns. The paper begins by tracing the conceptual development of climate impacts, and approaches for managing environmental impacts. Following this, it outlines important operational and conceptual challenges to applying the concept to the specific question of climate change impacts. The paper then lays out some of the general implications of the suggested approaches for addressing loss and damage, such as those applied by the insurance industry, by disaster responders, and development institutions. Finally, it concludes with some general guidelines for policy makers to craft the Warsaw mechanism into a workable policy, which would afford a manner of recompense and a means of rehabilitation to those nations and peoples, who despite being the least liable for climate change, are the most exposed to its impacts (UNFCCC COP, 2013).

2 Problematising loss and damage

This new policy paradigm entails two principal sets of challenges, the first of which deals with conceptualising climate impacts. Since the CAF, when loss and damage policy was inaugurated, the same language, 'adverse effects', has been consistently invoked. The aim of policy is to "understand and reduce loss and damage associated with the adverse effects of climate change", where loss and damage refers to the "actual or potential manifestations of climate change impacts that negatively affect human and natural systems" [UNFCCC SBI, (2012a), p.4]. The text of the CAF elaborates that 'adverse effects' may include impacts from either extreme weather or slow onset events including sea level rise, increasing temperatures, ocean acidification, glacial retreat and related impacts, salinisation, land and forest degradation, loss of biodiversity and desertification. This exceptionally broad definition seems to encompass the major scientific understandings of climate change impacts, wherein climate forcing exceeds thresholds for adaptation (Adger et al., 2009; Rockström et al., 2009).

From the mid-1990s, two parallel strains of research on climate impacts emerged from this fundamental understanding of thresholds. The first focused on the economic toll of specific climate related shocks like hurricanes and droughts (see for example Richard, 1995; Tol, 2002), and the other on anticipated losses of essential ecosystem services like water and food provisioning (Costanza et al., 1997; Parmesean and Yohe, 2003; Wilby et al., 2002). The former studies projected lost assets, changing agricultural production functions, and interrupted supply chains (Stern, 2006) and these assessments relied heavily on methods and perspectives associated with disaster risk reduction, predisposing tools used for assessing losses from discrete, one-off hazards (Tol et al., 1998; Weitzmann, 2009). However, as the latter studies showed, climate change and its negative consequences cannot be considered a standalone shock or even a series, but rather an intensifying, cumulative, and compounding set of disturbances that feeds back through both ecological (see Thomas et al., 2004) and human systems (see Baer and Mastrandrea, 2006). Implicit in this perspective is the notion that primary climate impacts (such as the potential collapse of fisheries) would drive secondary and tertiary impacts in social systems, including the loss of livelihoods, homelands, cultures, and self-determination (Harley et al., 2006; Turner et al., 2008). Non-economic, cultural and cascading losses defy quantification and comparability (this specific area of concern was raised in Morrissey and Oliver-Smith, 2013; see also Oliver-Smith, 1991). Moreover, it

was apprehended that the primary adverse effects of climate change would fold into other ongoing societal transformations unrelated to climate change, such as demographic transition, political instability, and conflict (Black et al., 2011; Röckstrom et al., 2009; Barnosky et al., 2011). With the fifth Intergovernmental Panel on Climate Change (IPCC) assessment report, the human dimensions of 'dangerous' climate change take centre stage, with the acknowledgement that the impacts of climate change could entail feedbacks that are perhaps centuries in the making (Smith et al., 2009).

This latter approach forms a perspective on climate change impacts that accounts for the diverse inputs to adaptation (Adger et al., 2005). Adaptation is generally defined as "adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits beneficial opportunities" [McCarthy et al., (2001), p.982]. Impacts from climate change are widely understood to result when extremes overwhelm particular systems despite the mobilisation of adaptation measures. But recent research highlights the extent to which adaptive capacity is also contingent on social values about what we deem important in society and how we ought to allocate resources (Adger et al., 2009). Values are hence translated into action through rules and institutions for governing risk (Adger et al., 2005; O'Brien, 2009; Dow et al., 2013). The limits to adaptation and the impacts that result by exceeding them are therefore 'endogenous', emerging from within society, and reflect human priorities (or the lack thereof) around risk management (Adger et al., 2009; Dow et al., 2013; Huggel et al., 2013a). While UNFCCC policy on loss and damage, appears to acknowledge this scientific formulation of limits to adaptation, it risks retreating to the safer domain of one-off economic impacts. In the pages that follow, the paper will address this conceptual challenge further.

The second set of challenges deal with the fitness of the policy mechanisms and the proposed instruments for addressing climate change impacts, as they are understood. The most salient question is whether the expenditure of resources is commensurate to the challenge. The central irony of policy on climate impacts is that many of the systems where historical livelihood systems and modes of life are most threatened have minimal responsibility for the production of GHGs (Tsosie, 2007). And yet for addressing climate change impacts, the 'polluter pays principle', the standard for dealing with environmental impacts in other contexts, is unlikely to apply. Since the bulk of GHGs that are causing climate change were emitted prior to our understanding of basic atmospheric chemistry, and since reliable attribution of specific stressors to climate change still eludes science (see Huggel et al., 2013b), establishing liability in order to trigger compensation is both politically untenable and practically implausible at the present (UNFCCC SBI, 2012b). Barring any assignment of responsibility that may trigger compensatory action, the Warsaw mechanism is perplexed by the same financial obstacles as international adaptation policy: it depends on voluntary donor contributions (Grasso, 2010; Klein et al., 2009). Moreover, losses and damages from climate change will occur amidst sustained efforts and investments to mitigate and adapt, and thus, the Warsaw mechanism introduces the possibility of trade-offs and synergies for other plans and activities (UNFCCC SBI, 2012a; UNFCCC TP, 2012; UNFCCC EM, 2012). Of concern, donor countries may decide paying for one-time losses and damages, as it is easier and more cost effective than financing a country's sustained effort to adapt.

Even assuming finance structures can be adequately arranged, the shape of policy tools must be commensurate to the stressor. At present, the picture of the mechanism,

based on recent dialogues and consultations, will likely be a composite of existing adaptation, disaster response and insurance models (i.e., risk reduction, risk retention, risk transfer, and post disaster assistance) (UNFCCC SBI, 2012a; UNFCCC TP, 2012). This hazards-oriented tool kit has uses in many contexts of environmental stress as a method for safeguarding assets, assigning responsibility for impacts and recouping investments, where risks can be clearly identified and measured (O'Brien et al., 2006). The general concern is that climate change is unlike the environmental threats to which these tools are best suited for dealing with loss and damage in other contexts (Schipper and Pelling, 2006). As such, the Warsaw mechanism could, as other policies, merely and clumsily aim at reconstituting pre-stress conditions at specific scales, instead of targeting the long-term structural conditions that produce social vulnerability vis-à-vis climate risk, and inhibit human development to begin with (Adger et al., 2009). Together these issues raise the alarm, voiced by vulnerable countries, that the Warsaw mechanism will be neither adequate nor sustained through time in order to rehabilitate and protect against future risks as they continue to unfold (CPRD, 2013).

The discussion that follows further expands on these conceptual and operational concerns that should be raised in managing climate related disasters and ongoing, cumulative climate change impacts. We recognise the substantial overlap between conceptual and operational problems, the complexity of the issues, and the impossibility of precisely distinguishing between the two. Nevertheless, broadly speaking, the *conceptual concerns* aim at the basic suitability of the policy orientation to the specific challenges of climate change. The *operational concerns* deal with making certain that policy implementation can achieve the societal goal of arresting adverse impacts of climate change, and accommodating and rehabilitating those affected. Operational problems are primarily concerned with implementation in areas such as valuation and assessment, delivery and distribution and impacts of loss, damage and assistance in internally differentiated communities.

3 Conceptual concerns

The essential conceptual problem deals with the unique nature of climate change as a source of environmental stress. Climate change impacts are cumulative and compounding, incremental, unstable and dynamic through relatively long historical time scales over large spatial scales (IPCC, 2012). Impacts occur abruptly, nonlinearly and manifest at local scales (Alley et al., 2003). As climate change is a process, it is extremely problematic establishing starting points and ending points and thus assigning attribution in realised impacts is virtually impossible in many cases (Huggel et al., 2013b). There is a higher degree of certainty about what will be lost and damaged in the near term, but substantial uncertainty about what must be protected in the decades and centuries to come (Weitzman, 2009).

3.1 Abrupt and slow-onset impacts

With climate change, the experience of loss and damage is not exclusively tied to disasters or 'events', but rather it will occur slowly with respect to human timescales, over decades (Huggel et al., 2013b). Numerous cases have been catalogued in which there is no apparent crisis, such as the loss of water supplies due to glacier recession

(Baraer et al., 2012) thus providing time for adjustment. The problem is that in cases like these, the incremental losses and damages that are experienced as livelihood systems exceed thresholds can be adapted to in some measure. One example presents the case of ocean acidification, which results in a gradual thinning of clam shells and a reduction in keystone clam populations (Gaylord et al., 2011). This effect, in turn, could threaten the livelihoods of a sliver of the coastal population, but these losses and damages would certainly not qualify as disaster. Nevertheless, certain losses (or adaptation pathways), like the abandonment of livelihood activities could have second order implications for cultural practices, ethnic identity and self-determination over relatively long timescales, which while tolerable to some, may be utterly unacceptable to others (Oliver-Smith, 1996). In the end, it is extremely difficult to differentiate between adaptation and the experience of loss and damage, when not tied to a specific abrupt change. Should then the Warsaw mechanism only apply to circumstances where systems are suddenly rendered uninhabitable and unproductive? This poses a challenge for policy. These ambiguities have been addressed to some extent in the policy, namely the need to account for non-economic and cultural losses (UNFCCC COP, 2013).

3.2 Environmental degradation as an amplifier

Attributing single events to climate change has proven intractable (see Rosenzweig et al., 2008; Huggel et al., 2013a for a discussion), and this challenge will not be elaborated here, with one qualification. Climate change as a source of environmental stress cannot always be precisely separated from concurrent environmental degradation (Warner et al., 2010). In fact impacts often manifest only because of local environmental practices, as in the case of deforestation, intense tropical rainfall and catastrophic flooding. For example, climate models of Central America predict a future characterised by increased frequency and intensity of tropical rainfall (Knutson et al., 2010; Bender et al., 2010). Some of these storms, such as Hurricane Mitch in 1998, which displaced a quarter of the population of Honduras, have been absolutely devastating. But although modelled futures predict a stormier future, which storms can be attributed to climate change and which cannot? Even if we can determine attribution, which specific flooding events are attributable to climate change and which to deforestation? This is a significant challenge.

3.3 Reconstituting vulnerable states

Over the last 40 years, research on vulnerability has broadened the temporal and spatial scales of analysis of disasters to include deeply embedded social characteristics of risk, as well as the social processes that produce exposure, susceptibility and impact (Sen, 1981; Wisner et al., 2004; Turner et al., 2003). A broad body of work is concerned with states of marginality, enfranchisement and empowerment that create ongoing crises, which environmental stress merely transform into disaster (see for example Watts and Bohle, 1993). A focus on disasters (or environmental crises) as outcomes returns risk management to an outdated approach, which overlooks the social root drivers of vulnerability (Cutter, 1996). While climate change stress may reveal itself in ‘crises’, vulnerability is a latent social condition, and the historical nature of vulnerability is that some had already experienced loss and damage through the process of colonisation and development in the 20th century (O’Brien and Leichenko, 2000; Pelling, 2003). The

suggested policy tools for addressing loss and damage (UNFCCC SBI, 2012a; UNFCCC TP, 2012) focus largely on biophysical hazards but contain no inherent imperative for transformational structural change. They do not implicitly entail any strategy or alternate development model that foregrounds poverty reduction, social protection and environmental security ahead of business-as-usual economic growth (Pelling, 2010). The danger is that policy focuses on restoring, rehabilitating, and reconstituting the dysfunctional, inequitable structures that produce impoverishment and vulnerability to begin with, instead of dealing with basic structural issues around equitable climate-resilient development. While there is not space here for the lengthy debate on models of development, the Warsaw mechanism by itself does not advance a transformative alternative.

4 Operational problems

These conceptual issues have an operational dimension that leads inevitably to concrete practical problems that if not resolved will pose serious obstacles for the efficient and effective implementation of the Warsaw mechanism. Operational problems are primarily concerned with implementation in areas such as valuation and assessment, delivery and distribution of assistance in internally differentiated communities.

4.1 Valuation

It will clearly be necessary to construct and effectively deploy some means of establishing the nature of the losses and addressing the needs created by those losses (Gall et al., 2009). But how should specific losses and damages be recognised and addressed within a formal policy framework? From a quantitative perspective, in circumstances in which market values reign, where most things enter the market as goods and services to be exchanged in money at the price arrived at through the intersection of supply and demand, counting loss and damage is a fairly straightforward process, though not without its occasional complexities. The global market-oriented value system assumes the detachability of persons and things.

The counting of value inherently assumes the exclusivity and alienability of property essentially assuming that all property value is quantifiable, that property is fungible that all forms of property are inherently convertible into other forms of property. Methodologically, quantification is an economic knowledge paradigm that allows us to convert material value into money, and vice versa. While this may be appropriate for stocks and flows of commodities like rice, even in a market society, the affective attachment that people assign to singularly unique things and places cannot be entirely eroded. Counting and compensation also normatively suggest that environmental, personal and cultural goods and services can be subsumed into a liberal conception of property rights, with rights of exclusivity and alienability. But things, both material and non-material, that do not enter a price-making marketplace cannot always be quantified and compensated in the same fashion. In this understanding land is a commodity that can be exchanged for money in the market. But if that is not the case, as in many indigenous and traditional societies, where land is held under traditional forms of tenure, how will that compensation be arrived at? Here the issue of quantification and the desired

reduction to a common *numéraire*, so central to global economic metrics, becomes challenging.

4.2 Quantifying the qualitative

There are various economic methods through which quantitative measures can be assigned to qualitative forms of loss. Originating from economics, the calculus known as cost-benefit analysis (CBA) measures the costs and benefits associated (usually) with a development project and then adds them up to identify whether the costs or the benefits are larger, which then serves as a guide for decision-making [Adams, (1996), p.2]. CBA requires some common standard of measurement for the appropriate calculation to yield the quantitative objective result. There has to be a single property possessed by all things, conditions or states of affairs that is considered to be the source of their value [O'Neill, (1996), p.98].

Money is generally the most convenient means of representing the relative values that society places on different resources and practices. Money values or prices are usually arrived at by the modified or unmodified intersection of supply and demand in a marketplace. Therefore, for non-market losses a method known as contingent valuation is used to access how people would monetarily value non-market items. In contingent valuation, people are asked how much they would be 'willing to pay' (WTP) for the things the analyst is seeking to value if they were for sale [Adams, (1996), p.2]. WTP works best when people are asked about benefits. However, in cases where people have experienced loss and damage, the question revolves more frequently around how much money would a person be willing to pay to prevent losses or willing to accept (WTA) as compensation for losses. These questions are not simply inversions of each other. They elicit manifestly different responses. On the one hand, asking a person how much they would be WTP to prevent a loss is constrained by that person's ability to pay. One the other hand, asking a person how much they would be willing to accept as compensation for a loss elicits what economists have characterised as 'unrealistically high answers' (Adams, 1996). WTP is generally preferred, for reasons of sound economy.

4.3 Compensating the invaluable

CBA thus has proved inadequate for assessing costs that are real, but impossible for quantifying costs such as the losses experienced in the breakdown of a community or the loss of cultural or spiritual resources. Other critics of CBA (Adams, 1996; O'Neill and Spash, 2000; Espeland, 1998) contend that CBA distorts the values that people attach to both natural and cultural resources. However, it is by no means a simple matter to ascertain where and in what aspect of their lives people lose resources and become materially impoverished. Indeed, a simplistic approach toward this issue is largely responsible for much economic injustice and impoverishment. In addition, people generally are not compensated for less tangible assets than land such as access to markets, communal property resources and social networks [Fisher, (1995), p.32]. The loss of jobs or livelihoods is more than the loss of the means to make a living that can be replaced by another means. For many people, the loss of livelihood is the loss of a way of life and a way of defining the self. Simply assuming that people who have spent their lives defined by a form of livelihood can easily shift to another is to reduce human life to

mere labour power, something that is quite facile conceptually in economic theory, but proves to be quite traumatic in real life.

4.4 Shared value

Cultural resources prove to be particularly problematic because they embody a plurality of values. What is the value, as opposed to the price, of the burial grounds of the ancestors lost through submergence by sea level rise? The outrage that frequently results from such a query represents an intractable problem, known as constitutive incommensurability that increasingly confronts the discourse of CBA (O'Neill and Spash, 2000). That is, there are some objects, places, conditions or states of affairs that are constituted by certain shared understandings that are incompatible with market relations on moral or ethical grounds (O'Neill and Spash, 2000). The problem resides in the fact that price is constructed in the intersection of supply and demand in a market and value is a reflection of the importance of things for the role they play in human relations.

Recent work carried out in relation to development forced displacement points to the need for reparations for people whose losses have never been appropriately compensated (Johnston, 2010). However, people are often offended that anyone would suggest that they would surrender the burial grounds of their ancestors, their sacred forests, their holy river, or other such features for a compensatory payment. On the other hand, in the case in which the damage has already been done; the sacred forest and the hallowed graveyard inundated, the holy river drowned, a compensation payment may not be appropriate since it places a monetary metric on an element that has enormous cultural value that cannot be expressed in a price. Can money payments ever come close to addressing, much less making good the true nature of the loss? It can be argued that reparations simply unburden the offenders of their guilt by converting the loss into a form that can be addressed by a payment that then relieves those responsible of all further obligations.

4.5 Modes of distribution

The delivery and distribution of assistance is a challenging task in any context in which it is undertaken. Post-disaster aid and aid in development forced resettlement projects have been consistently plagued by problems of duplication, inefficiency, inappropriateness, and corruption (McDowell, 1996; de Wet, 2006; Oliver-Smith, 2009a, 2009b). In addition, not only are prior economic valuations and social, cultural and environmental assessments required, but the determination of appropriate forms of assistance for the kinds of loss and damage that have occurred as well as the mechanisms of delivery and distribution must be in place before any actual forms of aid are transferred. These problems are very often rooted in attempts to employ and impose uniform standards of both loss and damage and generalised templates for delivery/distribution across administrative units, countries and regions without regard for cultural and social particularities or levels of development (Oliver-Smith, 2005; Scudder, 2009). Moreover, decisions on delivery and distribution must take into account present and future projections about various societal and environmental trajectories including greenhouse gas emissions, demographic change, migration trends, infra-structural development, mitigation strategies, adaptive capacities, vulnerabilities and patterns of economic change must also figure in our calculations in all the possible ways they will play out within the political, economic and sociocultural frameworks of national governments, international

organisations and general populations (Nakicenovic and Swart, 2000; Nicholls and Tol, 2006). The complexity of interaction of these factors illustrates and underlies the challenge that will be faced by decision makers in crafting delivery and distribution mechanisms for aid for loss and damage from climate change.

The loss and damage mechanism must also deal with the differential impact of aid on the recipient community or society. This is an old problem. At the current level of conceptualisation, there appears to be an unwarranted assumption of homogeneity among potential recipient communities. One recurrent theme in disaster and displacement loss is the issue of relative loss and deprivation, often coupled with accusations of unfairness and dishonesty in the representation of individual loss. Loss will be distributed unequally in a community just as vulnerability is differentially constructed, often along class or ethnic lines. In effect, aid donation and reception are viewed from subjective perspectives. Donors and administrators of aid most often see the purpose of their efforts to restore everybody in the affected community to a minimum level of self-sufficiency. Certain groups may see the purpose of aid as the replacement of losses. The mechanism will need to be especially sensitive to the 'need versus loss' issue because it holds serious potential for exacerbating or creating serious social tensions within the recipient community. There is also the danger that programs may adopt standards that favour one group over another. For example, a consistent problem is development forced displacement and resettlement is compensation only for formal land title holders, leaving renters, sharecroppers, and other forms of traditional tenure without access to necessary resources, strengthening the already strong and weakening the already weak (Cernea and McDowell, 2000).

5 Discussions: loss and damage policy alternatives

The clear directive that guides loss and damage policy is built around the term 'adverse effects', which was first employed at the 1992 Earth Summit (the Rio Declaration on Environment and Development). Here, at the genesis of policy discussions of climate change impacts, this terminology was invoked in principles 13 and 16 (the so-called polluter pays principle), in which signers agreed that "states shall also cooperate in an expeditious and more determined manner to develop further international law regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction" (Kovar, 1993). An important shift occurred between this policy approach and the current Warsaw mechanism from a liability and compensation model that prioritises responsibility for impacts toward a hazards approach that aims to manage the mechanics of environmental stress (Kelman and Gaillard, 2010). This shift introduces the raft of conceptual and operational challenges that this paper has identified. This section briefly discusses the implications of these two models for loss and damage.

5.1 Compensation versus hazards models

Undoubtedly policy mechanisms based on a 'polluter pays' versus 'hazards' models would include distinct features. If history is any guide, a 'polluter pays' loss and damage policy model would establish an adjudication body, which would judge liability, award

compensation, and establish a stream of precedents wherein the carbon emitters paid for losses and damages. Several well-known precedents exist in the environmental justice literature illustrating this orientation when industrial activities have resulted in environmental contamination and have resulted in negative social impacts (see for example Nash, 2000). The most famous cases include the illegal dumping of polychlorinated biphenyls (PCBs) that differentially exposed African American communities to health risks (Bullard, 1994, 2000; Checker, 2005); petrochemical extraction and transport catastrophes such as the Exxon-Valdez oil spill in Alaska, and the BP oil spill in the Gulf of Mexico (Carson et al., 2003); and criminal negligence of Union Carbide which resulted in the deadly gas disaster in Bhopal, India (Shrivastava, 1987). In these and numerous other cases, polluters are discrete entities, their legal negligence is well-documented, and losses and damages can be clearly attributed to wrongdoing. In contrast, due to the complex relationship between industrialisation, the production of GHGs and climate impacts, the establishment of a judicial body on climate impacts is neither practical, nor is this model politically feasible in UNFCCC or international decision-making bodies in general.

Even when carefully managed and implemented, the compensation model has failed to function effectively (Boutté, 2002; Brooks, 1999). In development forced displacement and resettlement (DFDR) compensation is considered to be a failed strategy (Cernea and Mathur, 2008). In the best of circumstances, it generally fails to establish previous levels of well-being and leaves people impoverished. Consequently, the shift in DFDR has moved away from compensation toward a model focusing on social investment and development. Indeed, whereas DFDR compensation can be carefully managed to engage with the conditions of impoverishment and inequality (by prioritising poverty reduction, health, education and empowerment) (Cernea, 1997), compensating in the context of climate change is much more problematic. Similarly, over historical timescales development strategies have produced social structures that order specific conditions of poverty and at the same time vulnerability to climate change. So exactly what is being compensated? The assets lost in discrete biophysical processes or the systematic arrangement of poverty and vulnerability over historical timescales? Although fully recognised in the research literature (e.g., O'Brien and Leichenko, 2000, Pelling and Manuel-Navarrete, 2011), this point is not generally integrated in the climate change policy frameworks. A compensation-based mechanism may yet to have a role in addressing loss and damage outside of UNFCCC, and the approach is treated in depth in elsewhere (Bronen, 2011), but will not be explored further here.

5.2 A more likely approach: managing hazards

Setting compensation aside, the policy mechanism much more likely to be adopted given discussions and input to this point will be based in the hazards approach, oriented around risk reduction, risk retention, risk transfer, and post-disaster assistance (UNFCCC SBI, 2012a, 2012b, 2012c, 2012d; UNFCCC TP, 2012). The likelihood of adoption became stronger in the 2011 UNFCC discussions at Durban, where a working group was tasked with studying the risks that countries will experience loss and damage, building expertise for addressing loss and damage, and anticipating the range of policy instruments available to the UNFCCC (Warner et al., 2012b). The task was to determine which range of approaches were possible to establish that loss and damage have occurred and to address those losses and damages, given the current institutional landscape (UNFCCC

SBI, 2012a, 2012c). Climate change negotiations in Doha in 2012 centred on the character of potential institutional mechanisms that would be nominated for Warsaw 2013. The character of these discussions focused on existing tools for dealing with environmental impacts that foreclose adaptation (Warner et al., 2012a). In general proposed approaches are envisioned as synergistic complementarities that treat loss and damage internally, respecting sovereignty and diverse national approaches, rather than as a matter of compensation from externally imposed stress for which liability can be assigned (UNFCCC SBI, 2012a; UNFCCC TP, 2012). The focus on risk reduction, risk retention, risk transfer, and post-disaster assistance relies on DRR approaches.

The full range of proposed tools will not be treated here. Each of these approaches is dealt with in extensive respective research literatures and, indeed, they structure and govern the world we live in through public policy and private practice. In the simplest of terms, risk reduction is the host of activities, including early warning, forecasting, and land use planning *inter alia*, that aims to analyse and manage the causality of disaster risk (UNHCR GAR, 2011). Risk retention is somewhat related to risk reduction, and it includes the range of internal policies that countries have for self-insuring to build general social resilience including disaster reserve funds and social insurance mechanisms (Baldry, 1998). The private sector and public-private partnerships can also play a role through risk transfer mechanisms that spread or dilute costs of environmental risk over a wide set of actors. Insurance, for example, is based on the notion that all similarly vulnerable actors will pay an actuarially equivalent price, even though not all will suffer. The benefit of an insurance model over an ad hoc disaster response model is that insured beneficiaries enjoy a guaranteed right to post-disaster compensation, which is tied to contribution into an insurance mechanism. This reduces uncertainty, defines financial responsibilities and establishes resource transfer mechanisms (Warner et al., 2012a). Even after all of these measures are employed, an increasing part of the social contract that governments make with their citizens for dealing with risk includes planning for post-disaster response, and mobilising special funds in states of emergency. When governments cannot meet internal obligations due to resource constraints or other factors, then international organisations and international non-governmental organisations (INGOs) often step in to protect against humanitarian crisis. Negotiations to this point envision a policy regime based on the above mentioned risk management tools. By no means diminishing their significance in dealing with climate risk, it is noteworthy that, UNFCCC discussions have prioritised policy alternatives that put the locus of stress and response *in situ* at the national level.

6 Conclusions: future models

Our conclusion is that current mechanism relies on existing paradigms, and expands a model that has served to safeguard highly industrialised economies and societies from environmental harm. This paper raises questions about what is not considered in this western paradigm for risk management if adopted more widely across the vulnerable developing world in the specific instance of climate change impacts. But, setting aside the policy mechanics, other questions should be asked about these conceptual and operational challenges: who defines and assesses loss and damage? Is it possible to define loss and damage universally? Do assessments take into consideration relevant loss and

damage to specific peoples? Furthermore, we invite deeper critical scholarship to explore this new policy construct. As a new category of knowledge, loss and damage should be subjected to discursive analysis, considering the power implications of proposed governance structures, their assumptions, and their influence over vulnerable people's lives and behaviours.

Ultimately, loss and damage policy is subject to the same persuasion as adaptation policy and hazards approach that preceded it: emphasising maintaining conditions in the face of environmental stress. For the world's poorest, adaptation policy is short on effective tools because policy has largely failed to apprehend and adopt the concept of transformational adaptation (Kates et al., 2012). In the end, for the most vulnerable tiers of society, adaptation (maintaining the same essential conditions) and loss and damage (returning to the previous essential conditions) are ultimately undesirable unless they also work toward a fundamentally transformational change in circumstances (Pelling, 2010).

Have we been creative enough in imagining policy alternatives? The losses and damages we can expect to occur with climate change, including indigenous knowledge systems, cultural assets, and even perhaps languages (Adger et al., 2009; Agrawal, 2010), are significant enough to attempt more. These aspects of human diversity comprise the non-material wealth of our planet's peoples, and the risk of climate change is that humanity may lose these aspects of diversity that afford cultures with their fundamental identities, that tell people who they are, and give human life meaning. Social values cannot be divorced from scientific considerations about limits of human society to adapt to climate change (Dow et al., 2013; Adger et al., 2012), and hence the normative position of research should be arresting the values that impoverish, marginalise and disenfranchise peoples – those most vulnerable to climate change and left behind by development. Our conclusion is that more transformative approaches ought to be considered, and the Warsaw mechanism cannot likely do this alone. However, by linking into other policy processes on the horizon (including the Paris Climate Agreement in 2015, and the post-2015 sustainable development goals), it can become an instrument for building peoples' rights, entitlements, capabilities and thus human development in the face of the inevitable impacts of climate change.

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