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COMMENT



## Framing Loss and Damage from climate change as the failure of Sustainable Development

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### ABSTRACT

Debates around “Loss and Damage” (L&D) from anthropogenic climate change have expanded rapidly since the adoption of the Warsaw International Mechanism (WIM) in 2013. Despite the urgent need for scientific best practice to inform policies to avoid, minimize and address L&D, the nascent research field faces internal disagreements and lacks a coherent conceptual framing, which hinder scientific progress and practical implementation. We suggest that the most coherent, comprehensive and integrative approach to framing and dealing with L&D is by understanding it as resulting from a chain of failures or inability to maintain a *Sustainable Development*. Available theories of Sustainable Development give meaning and orientation to risk reduction efforts to avoid and minimize L&D, as well as to processes of L&D accounting and compensation; in particular clarifying “what should be sustained” when undertaking efforts to avoid, minimize or address residual L&D. However, different theories of Sustainable Development inevitably lead to different metrics to assess L&D and consequently different governance approaches when dealing with L&D, which has implications for future vulnerability and development. Our approach opens up new avenues for research, and has both conceptual and practical repercussions for the Paris Agreement and the global stocktake.

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### 1. Coherent framing missing from Loss and Damage

Debates around “Loss and Damage” (L&D) are generally concerned with those impacts that result from a lack of effective mitigation of and adaptation to anthropogenic climate change (Warner & Van Der Geest, 2013). As an area of research, L&D has expanded rapidly since the adoption of the Warsaw International Mechanism (WIM) in 2013 (Mcnamara & Jackson, 2019). Since then, L&D has gained further legitimacy through its inclusion in Article 8 (2015), and the transparency framework and global stocktake 38 in Article 14 (2018) of the Paris Agreement (Thomas et al., 2020). Some argue L&D has managed to carve out a specialized policy arena and become solidified as the “third pillar” of the international climate change regime alongside mitigation and adaptation (Roberts & Huq, 2015), though no clear consensus has been reached among the many actors with a stake in the L&D debate (Calliari et al., 2020). Indeed, the nascent field faces many challenges associated with disagreements and conflicting concepts, both in academic (Boda, 2019) and policy circles (Boyd et al., 2017; Calliari et al., 2020). In research circles, L&D has been suggested to be both avoidable and unavoidable (Verheyen, 2012), economic and non-economic (Roberts et al., 2017; Serdeczny, 2019), tangible and intangible (Tschakert et al., 2019), to name a few. Although this conceptual ambiguity is widely noted, some have argued that the lack of conceptual clarity represented by existing dichotomies has created confusion that prevents L&D research from advancing

theoretically (Doktycz & Abkowitz, 2019; Preston, 2017) (e.g. how to conceptualize and catalog “tangible” and “intangible” L&D in a consistent way?), while also stalling the development of comprehensive, effective policies for addressing L&D in practice (Roberts et al., 2017) (e.g. how “economic” and “non-economic” L&D can be coherently integrated under a common compensation framework?). In light of the outcomes of the recent review of WIM at COP25, which emphasize the urgent need for improved understanding and more effective application of the best available science to L&D policy and practice, the need to bring conceptual, methodological and practical clarity to L&D scholarship has never been more pressing.

In this perspective, we argue that the conceptual ambiguity of L&D, and the problems it creates for both research and practice, can be consistently handled if L&D is understood to result from a chain of failures or inability to maintain a *Sustainable Development* (SD), which we argue encompasses the risk-reducing activities of climate change mitigation and adaptation. Here, SD is understood à la the Brundtland Commission as the *strategy* for prioritizing options when faced with tensions between economic development and environmental conservation in the pursuit of meeting human needs, now and in the future (Brundtland Commission, 1987). Our claim is twofold. First, we note that there is a *hierarchical* sequence of processes that lead to L&D from anthropogenic climate change. This sequence begins with the historic and highly uneven development at the global level failing to

balance economic growth with environmental conservation (i.e. greenhouse gas (GHG) emissions) as per SD, with resultant risks from anthropogenic climate change threatening to undermine the ability to meet current and future human needs, disproportionately in the least developed regions of the world. Concerns for risk reduction follow, through climate change mitigation and adaptation, which attempt to avoid or minimize L&D that may occur. Finally, soft and hard limits to adaptation lead to unavoided and/or unavoidable L&D and questions of insurance, safety nets, rehabilitation and compensation (AOSIS, 2008; Roberts & Pelling, 2018). Second, we argue that available theories of SD give meaning and orientation to such risk reduction efforts as well as processes of accounting and dealing with L&D, in particular clarifying “what should be sustained” when undertaking efforts to avoid, minimize or address L&D. We note that most existing L&D research is implicitly but unwittingly framed within a particular theoretical approach to SD (Boda et al., 2020), so these frames of L&D should be more explicit and coherent in order to fully understand their implications for how L&D is conceptualized and ultimately addressed. In framing L&D within SD, we open up new avenues for research, and discuss important repercussions for the Paris Agreement and the global stocktake (Article 14).

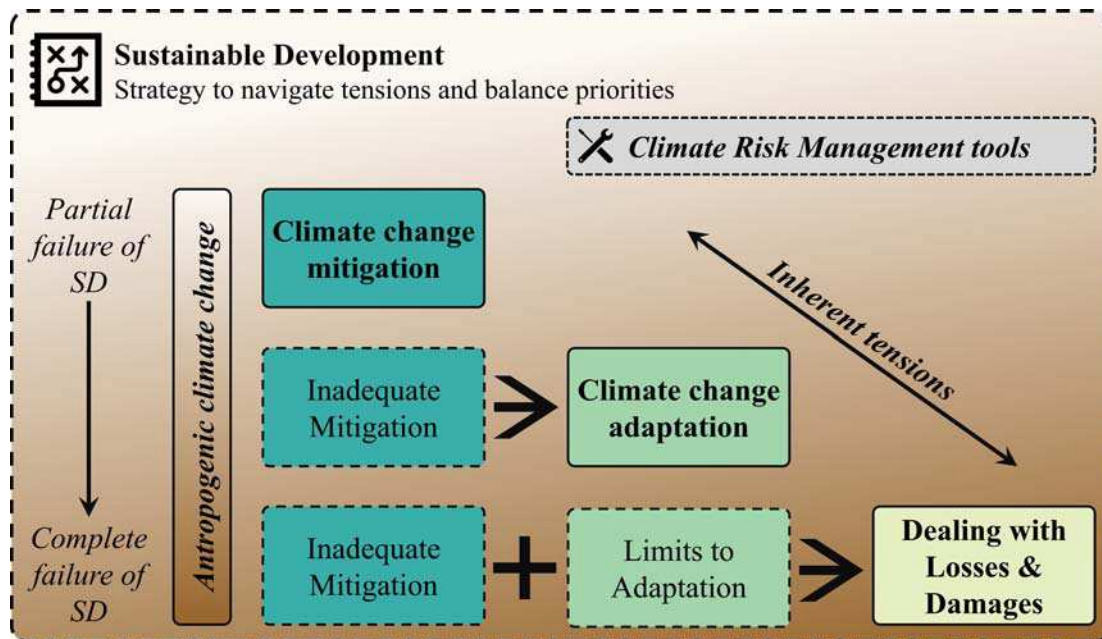
### 1.1. Sustainable development or climate risk management?

While the UNFCCC has never adopted a formal definition of L&D, an early working definition described L&D as “actual or potential manifestations of climate change impacts that negatively affect human and natural systems” (UNFCCC SBI, 2012). It is not, however, immediately clear from this description *why* these impacts occur. For example, is it the *extremeness* of the event itself that leads to L&D, or are other determining factors relevant? While the burgeoning field of event attribution science (Achuta Rao & Otto, 2019; Harrington & Otto, 2019; Otto, 2017; Otto et al., 2020; Vautard et al., 2020; p. 80) is important for understanding whether anthropogenic climate change has exacerbated the frequency or intensity of a certain event, it seems clear that, when the same degree of extreme event leads to divergent experiences of L&D in different places, we have to turn to the social context for a complete explanation. Indeed, the importance of social context has become increasingly present in subsequent L&D related decisions by the UNFCCC (e.g. decisions 2/CP.19 or 3/CP.18), where emphasis is placed on developing countries that are “particularly vulnerable”. How latent social conditions and resulting vulnerability relate to broader processes of and strategies for development, however, remains largely unexplored. It is our claim that different theories of SD can provide the means for framing both the role of anthropogenic climate change and the social context that together contribute to L&D in a broader normative context of development strategies and priorities. It does so by clarifying “what should be sustained” when undertaking efforts to avoid, minimize or address L&D, including what is considered to be substantially vulnerable to climate change in the first place.

The challenge of addressing L&D begins with the disproportionate contribution of high emitting countries, through largely fossil-fuel based economic growth, to anthropogenic climate change. This historically uneven economic growth has come at the expense of global degradation of non-substitutable natural systems (e.g. carbon cycle) which (to varying degrees) threatens to undermine society’s ability to meet human needs now and in the future (Neumayer, 1999, 2007). In this way, the urgent need for mitigation of anthropogenic climate change reflects a partial failure to navigate the tension at the heart of SD (Figure 1). Acknowledging that mitigation alone will not suffice in preventing the impacts of climate change due to historic levels of emissions, adaptation is also required. However, adaptation has its limits in terms of the amount of change communities (or ecosystems) can handle (Dow et al., 2013). These limits may be “hard” and unmalleable, such as biophysical thresholds in certain species and ecosystems, or “soft” and adjustable (i.e. through development and/or political processes), such as socio-economic conditions or legal constraints (Adger et al., 2009; Boda & Jerneck, 2019). The failure of effective global mitigation, combined with a breaching of hard and/or soft limits to local adaptation, reflect a complete failure to maintain a SD, leading to L&D (Figure 1).

Social context not only plays a role in vulnerability, but also in both processes of mitigation and adaptation (Adger et al., 2013), a realization that is widespread but often implicit in L&D scholarship (Birkmann & Welle, 2015). For example, it is generally recognized that certain potentially harmful impacts from climate-related extreme events may not be adequately addressed due to insufficient resources available to vulnerable countries or communities with limited adaptive capacities (Mace & Verheyen, 2016). Researchers point to latent, poor socio-economic conditions and “development deficits” (Preston et al., 2013) as important factors in the manifestation of negative impacts from climate change (Ourbak & Magnan, 2018). Indeed, the different adaptive capacities of different countries or communities is parametrized in some simulation models of climate impact, which assume countries with lower GDP will, for example, build lower seawalls due to their cost and thus incur higher levels of L&D than would have occurred had higher, more expensive sea walls been constructed (Hinkel et al., 2014). From the perspective of SD, resolving the tension between the necessities of significantly reducing global GHG emissions while also allowing, at least in some places, for more development as means to overcome existing limits to adaptive capacity is fundamentally a question of development strategy and prioritization, both at the national and international level.

We have thus far argued that a more precise explanation of how latent social conditions and resulting vulnerabilities relate to broader processes of development, and how this influences the manifestation of and strategies for addressing L&D, has remained largely beyond the purview of L&D scholarship to date. Instead, some have argued that established disaster risk reduction and climate change adaptation practices “can be an effective entry point for aligning [L&D] perspectives and debates, if framed comprehensively” (Mechler et al., 2019, p. 4; see also Roberts & Pelling, 2018). Such a “climate risk management” (CRM) approach (Schinko & Mechler, 2017)



**Figure 1.** Loss and Damage (L&D) arises at the end of a chain of failures or inability to maintain a Sustainable Development (SD) strategy through mitigation of and/or adaptation to anthropogenic climate change. Climate Risk Management, which has been lauded as a leading approach for addressing L&D, is a necessary toolbox but alone is not sufficient for fully conceptualizing the causes of L&D and navigating tensions and balancing priorities across climate change mitigation and adaptation, nor while addressing L&D.

views the wider social context as a factor contributing to vulnerability which, through interactions with particular hazards, generates more or less tolerable risk of L&D. Such an approach, however, also recognizes that what is considered at risk and whether the risk is tolerable is “strongly determined by social, cultural, and economic determinants and often requires joint subjective and expert deliberation” (Mechler & Schinko, 2016, p. 290). What this shows is that, while the tools of CRM are indispensable to managing L&D, CRM itself must fall back on a higher-level prescriptive theory of what exactly it is that should be sustained through risk reduction efforts—that is, a theoretical framing that enables stakeholders to decide which of the social, environmental and economic components at risk should be prioritized and sustained. Suggestions that CRM is in itself sufficient to allow policy makers to navigate the issue of L&D (cf. Schinko & Mechler, 2017) fall short of providing an answer to the question of what is to be prioritized in decision making in the first place. It is widely acknowledged that, in the context of climate change, such prioritization should be informed by the best available science, which draws on coherent and consistent theories to diagnose problems and suggest appropriate operational tools and policy advice (Pachauri et al., 2014). Thus, CRM efforts that seek to promote mitigation and/or adaptation with the ambition to avoid, minimize and address L&D are themselves in need of orientation, which theories of SD can provide. In other words, CRM can be seen as a set of tools or measures (e.g. sea walls, salt-tolerant crops, insurance), whereas SD is a normative strategy for prioritizing and balancing tensions (i.e. consider interconnections and trade-offs among goals) while implementing those tools (Figure 1).

We have argued above that climate change and its deleterious impacts (i.e. L&D) are a clear manifestation of

unsustainable development (Masson-Delmotte et al., 2018). From this perspective, the question is not whether there are real tensions and even trade-offs between raising living standards for those who need it and reducing the major drivers of climate change, but what strategy should guide decision making when such tensions arise. The tensions involved in SD are of course quite different for those countries capable of effective mitigation at a global level and those forced to adapt and reduce risk at national and local levels (Roberts & Pelling, 2018). These are, however, intertwined, as the more SD in the form of mitigation fails at the global level, the more SD in the form of adaptation is needed at the national and local level, notwithstanding the possibility for “synergistic” mitigative adaptation (Kongsager, 2018). Thus, addressing L&D almost by definition is part of a (both national and international) strategy of SD (Figure 1), or more precisely, what has to be done in places that SD efforts, including those aimed at reducing risk through mitigation and adaptation, drastically fall short, to the point of discontinuing society’s ability to meet human needs. In this way, L&D is an indicator of the lack of sufficient SD across all of these levels. At the same time, SD provides a broader development strategy that the L&D research community could reconnect with when discussing how to address L&D, namely what should be prioritized and sustained when attempting to restore SD at the local, national and international level.

## 2. Sustainable development in L&D research

To date, SD has remained conspicuously neglected in the discourse of the L&D research communities. The relationship between SD and L&D has been vaguely articulated and almost

entirely implicit, if not completely absent from L&D discussions. For example, through a comprehensive review of 145 peer-reviewed L&D publications, Boda et al. (2020) found that 66% of existing L&D research makes no mention of SD in any way, no matter how banal. The remaining 34% that does mention SD, either mention it generically, or refer specifically to the United Nations' Sustainable Development Goals (SDGs) as a related policy initiative; not a single article reviewed explicitly employed a definition or theory of SD. Instead, L&D scholarship has been largely dominated by the disaster risk and climate change adaptation communities (Birkmann & Welle, 2015), at most seen as “overlapping” with the concept of sustainability (Roberts et al., 2015). The limited research into the links between L&D and SD tend to emphasize conceptual framings aimed at generating synergies between WIM and other parallel policy initiatives, in particular the Sendai framework and the SDGs (Roberts et al., 2015).

Our claim is quite different than those that emphasize the discursive overlap between L&D and SD. We have argued that there is a *hierarchy* of concepts and practices associated with L&D from anthropogenic climate change, starting with the over-arching SD strategy for handling tensions and identifying priorities, which then informs efforts aimed at mitigation, adaptation and addressing L&D. For example, whereas Roberts and Pelling (2018) place SD within the middle of their Venn diagram of avoiding/minimizing L&D and addressing residual L&D, we argue that SD encompasses L&D, its causes, and CRM measures to address it (Figure 1). The relationship between SD and L&D is captured in the Paris agreement (Article 8) where “the role of sustainable development in reducing the risk of loss and damage” is formally, if vaguely, recognized (Sindico, 2016). There is, however, a need to be precise, and clarify *how* SD, climate risk and L&D are related, if confusion in L&D scholarship is to be overcome and results effectively operationalized.

The importance of untangling causality in L&D cannot be overstated, particularly in a research field that is supposed to contribute to the implementation of policies for avoiding, minimizing and addressing the multi-dimensional harms from anthropogenic climate change (Mechler et al., 2019). Clarifying causality is important because it helps in the diagnosis of the problem, which in turn suggests an appropriate treatment (Boda, 2017; Lakoff, 2010). In the context of L&D, this

generally implies that what needs to be *protected, insured, rehabilitated or compensated* is directly linked to what needs to be *sustained* in the first place. Thus, understanding the causes of L&D within the context of SD has policy implications for how we seek to avoid, minimize or address L&D.

## 2.1. Different approaches to SD, different appraisals of L&D

The upshot to understanding L&D within SD is significant. Put simply, a consistent approach to avoiding, minimizing or addressing L&D depends on how one initially understood the aims of SD; that is, what exactly is to be sustained in the long run. In other words, the relation between SD and L&D means that different conceptions of SD lead to different appraisals, hence different strategies for addressing L&D. We here consider two of the major competing approaches in the area of SD, namely the Capital Theory approach (CTA) and the Human Development approach (HDA) (see Boda & Faran, 2018; Faran, 2010), to illustrate this relationship between SD and L&D. These two broad strategies offer coherent yet disparate approaches to conceptualizing, measuring and governing L&D (Table 1).

### 2.1.1. The capital theory approach

**2.1.1.1. Concepts.** The main focus of CTA, which builds on the work of Nobel laureate economist Robert Solow and subsequent developments by other economists, is a society's generalized capacity to maintain a certain level of production and resulting standard-of-living (Stern, 1997). Productive capacity is determined by the total stock of capital present in the society, which is viewed as the driver of economic growth. Thus, within CTA, L&D is related to the lost, damaged or otherwise vulnerable stocks of capital in a given society. Historically, there have been different versions developed within CTA. Early “weak” versions were derived from neo-classical economics and relied on assumptions of near perfect capital substitutability, while subsequent “strong” versions emphasized that some forms of natural capital may be complementary to (rather than substitutable with) manufactured capital stocks, and thus crucial for maintaining productive capacity. Syntheses of the “weak” and “strong” versions of CTA have resulted in the “Critical Capital” synthesis, which accepts

**Table 1.** Typology of approaches to Loss and Damage (L&D) based on different theories of Sustainable Development (SD). Each approach and type of SD leads to a particular set of metrics to assess and evaluate L&D, which in turn influence different governance approaches to dealing with L&D and balancing tensions and priorities.

| Approach to L&D                  | Type of SD strategy   | Concepts                                                                                                       | Metrics used                       | Governance approaches                                                   |
|----------------------------------|-----------------------|----------------------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------------------------------------------------|
| Capital Theory Approach (CTA)    | “Weak”                | Productive capacity<br>Total capital stock<br>Capital substitution                                             | Monetary                           | Economic choice – e.g. cost-benefit analysis, financial risk management |
|                                  | “Strong”              | Productive capacity<br>Natural capital stock<br>Capital complementarity                                        | Ecological                         | Conservation and restoration                                            |
|                                  | “Critical Capital”    | Productive capacity<br>Critical natural capital stock<br>Limited capital substitution                          | Monetary and ecological            | Constrained economic choice                                             |
| Human Development Approach (HDA) | “Capability Approach” | Valued states of being (freedom)<br>Capabilities and functionings<br>Individual agency and social institutions | Dashboard of well-being indicators | Social choice – e.g. capability expansion, focus on least well-off      |

substitutability of capitals in all instances except those where natural capital can be shown to be critically important for productive activities (Boda & Faran, 2018).

**2.1.1.2. Metrics.** As the focus of CTA is on economic production, its measurement and evaluation utilizes monetary information as a utility metric and an indicator of social welfare. The measurement of L&D in monetary terms represents the exchange value of lost or damaged capital. Of course, some important capital stocks are considered “non-economic”, which the UNFCCC define as those goods and services “not frequently traded on markets” (Serdeczny et al., 2018). This includes for example many environmental and cultural assets. Because the CTA requires the use of monetary metrics, established valuational techniques can be applied as means to assign a monetary value to “non-economic” capital stocks, thus rendering them commensurate with economic losses and damages (Dilley & Grasso, 2016). Furthermore, in some instances there may be complementary natural capital stocks that are critical (i.e. non-substitutable) for maintaining economic production, for example fish stocks for a particular fishing industry. Identifying and monitoring these critical natural capital stocks requires the application of ecological knowledge (Brand, 2009), though this area remains woefully under-explored in the context of L&D. The question of which stock of capital should be prioritized when tradeoffs arise, within CTA, is settled through cost-benefit analysis, with the ultimate criteria being the maximization of aggregate social utility as measured in monetary units.

**2.1.1.3. Governance.** L&D policy in the strategy of CTA must focus on the protection or restoration of a society’s vulnerable, damaged or lost capital stocks. This can be accomplished by restoring the pre-existing capital stocks. It can also be accomplished by investing in new forms of capital and related production practices that restore the total capital stock back to levels equal to (or greater than) those prior to the impacts of climate change. Insurance schemes, integrative assessment models and all forms of financial risk management and compensation funds come in here as practical tools for handling instances of projected or experienced L&D, all of which have been discussed in L&D negotiation (AOSIS, 2008) and research on L&D finance (e.g. Gewirtzman et al., 2018). When considering critical natural capital, maintaining total stock of capital may require the implementation of targeted regulations to ensure critical natural capital stocks are kept intact (Sharife & Bond, 2013).

## 2.1.2. The human development approach

**2.1.2.1. Concepts.** The main focus of HDA, in particular the capabilities approach advanced by Nobel Laureate Amartya Sen (Sen, 2001), is on the substantive freedoms people have to achieve a certain level of well-being (as opposed to standard-of-living). Valued states of being and doing are a function of a person’s capabilities set, or the substantive opportunities available to the person, for example those related to economic facilities, political freedoms, health and education. The utilization of different parts of a person’s capabilities set produces various functioning states (e.g. a teacher who is also a parent,

athlete and community activist). From this perspective, L&D from climate change pertains to impacts on the capability sets or functioning states of individuals in a given society. An important component of individual capabilities is the necessity of supporting social institutions which provide a context within which individuals can substantively utilize their capabilities. Strong emphasis in HDA is placed on the most vulnerable individuals and communities as the priority in SD, which would suggest the need for a similar focus in L&D research and policy. This is because improving the capabilities of the least-well-off is seen as both the *ends* of HDA (the removal of unfreedoms) and the *means* to HDA (improving one’s capabilities set allows them to more effectively participate in the further removal of societal unfreedoms) (Sen, 2013). This approach is decidedly *not* utilitarian, emphasizing instead measurement of objective deprivations (Sen, 1989a).

**2.1.2.2. Metrics.** The focus of L&D in the tradition of HDA is centered on the notion of wellbeing. As opposed to the singular monetary indicator of standard-of-living, the complexity of wellbeing implies that no single indicator would suffice for measuring L&D from climate change. Instead, a “dashboard of indicators” (Stiglitz et al., 2010) relevant to context-specific well-being is needed. This can include, inter alia, economic performance indicators, achievements in health and education, and environmental quality indicators, as well as indicators of more abstract concerns such as degree of political freedom or transparency guarantees. The question of which well-being factors are to be prioritized will of course arise, which points to the necessity of resolving trade-offs among different capabilities using a participatory “social choice” approach to collective decision making (Sen, 1999). This involves the meaningful participation of the members of a community of interest coming to a reasoned agreement on a set of relevant evaluative weights (selected from the available indicator dashboard) to be used as assessment criteria.

**2.1.2.3. Governance.** L&D policies and programs under HDA would aim at either enhancing, protecting or restoring the capability sets and functioning achievements of affected individuals and communities, including the necessary supporting institutions. This would entail, for example, ensuring impacted communities and individuals maintain basic functionings, including having adequate nutrition, sanitation, and housing, as well as ensuring meaningful participation in the design and implementation of social programs aimed at addressing losses and damages from climate change. Simply putting things back the way they were prior to the experience of L&D, however, would be insufficient if doing so failed to address pre-existing inequalities (Roberts & Pelling, 2019; Wrathall et al., 2015). While the HDA is sensitive to context and value pluralism, it is well-known that some “community values” may very well be negligent of or even oppressive to particular social groups, not least women and girls (Sen, 1989b). Indeed, one of the purported strengths of taking a capabilities approach to impact studies is its ability to disaggregate impacts and bring to light pre-existing social inequalities (Gardoni & Murphy, 2009).

### 3. Pathways forward for research and practice

The fundamental relationship between SD and L&D raises many important questions for furthering the debate around L&D and its practical implications. For example, what types of SD are L&D practitioners already implicitly adopting and how does this translate to certain forms of policy directions, mechanisms and outcomes? More empirical research is needed in this area, but provisionally we can say that different understandings of L&D in the literature, including what metrics and tools are adopted to measure L&D empirically, correspond to different types of SD (see also Boda et al., 2020). As a result, we can hypothesize that implicit SD frames are influencing the conceptualization, measurement and policy suggestions surrounding L&D research and practice, seemingly unbeknownst to the research and policy communities at large. For example, implicit in an economic (as opposed to non-economic, *sensu* Roberts et al., 2017) assessment of L&D is the Capital Theory approach to SD, which leads to governance (e.g. restoration, insurance, compensation) based on economic choice rather than social choice (Table 1). The major implications of this unwitting adoption of particular types of SD (Table 1) are: 1) that knowing the theoretical foundations of metrics and suggested policies is necessary to monitor their effectiveness, learn over time and improve strategy; and 2) that important decisions will be made with embedded assumptions about what matters most (e.g. capital or capabilities), whether or not these assumptions actually correspond to the values held by those promoting or impacted by such policies. Being explicit about the assumptions underlying a guiding strategy, and justifying tools and policy prescriptions in reference to this guiding strategy, is the only way to maintain transparency, clearly motivate policy recommendations and facilitate learning.

A fruitful path forward for L&D research would be to re-engage with theories of SD. There is a clear need to be more explicit about the theories of SD that underly what caused the L&D in the first place and how we go about assessing and addressing it. Unknowingly adopting certain theoretical approaches to L&D will lead to practical and normative implications in addressing L&D. We as L&D researchers also need to compare competing theories directly to identify pros and cons of each and ultimately to determine scientific best practice for L&D.

Clearly, which SD theories correspond to existing approaches to L&D research has important implications for national L&D policy, not least those related to vulnerability and inequality. We have argued that the theoretical diagnosis of a given problem already suggests an appropriate treatment, which in the context of L&D generally implies what *counts* as L&D, and thus what needs to be *protected*, *insured*, *rehabilitated* or *compensated* when L&D occurs. For example, if we conceptualize SD as maintaining productive capacity in the way of CTA, then compensating for L&D will imply restoring this productive capacity. Alternatively, if we see SD as maintaining peoples' capabilities to live valued lives in the way of HDA, then compensation for L&D takes on a very different focus, including yet going beyond factors that contribute to productive capacity and standard of living. Importantly,

neither of these approaches necessitates recreating the exact same conditions that existed prior to the experience of L&D. This leaves intact what some have suggested is the potential for L&D to galvanize support for transformational social change (Roberts & Pelling, 2019).

The implications of different SD approaches to L&D are also relevant at the global policy level for the WIM, Paris Agreement, and global stocktake (Article 14). The WIM promotes addressing L&D in a “coherent, integrative and comprehensive” way, an ambition that was explicitly reaffirmed in the outcomes of the review of WIM at COP 25 in 2019. This ambition is not arbitrary; rather, maintaining coherence from theories through concepts, metrics and policies, is crucial for effective monitoring, assessment, learning and improvement overtime. If L&D researchers and practitioners are to inform effective responses to the impacts of anthropogenic climate change, coherence will be aided by starting from a consistent strategy for SD, and justifying particular suggestions for policy and practice in relation to this guiding strategy and its underlying assumptions. Feeding into the Paris Agreement global stocktake, there is a need for more empirical work (Thomas et al., 2020), which requires clarifying what it is that we are looking for as L&D and why. For example, the Capital Theory approach means focusing on monetary losses to productive capital, whereas the Human Development approach means focusing on loss and damage to capabilities in different contexts. The global stocktake has provision for L&D, and being consistent in how we measure and report L&D will be crucial for developing a global picture of the state of things. Any inventory of L&D for the global stocktake needs to be comprehensive and comparable (Otto et al., 2020); that is, entries in the inventory must be theoretically consistent. In light of these needs for implementation of the WIM and Paris Agreement, we argue that framing L&D within SD will provide a prudent and fruitful path forward for L&D research and practice.

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