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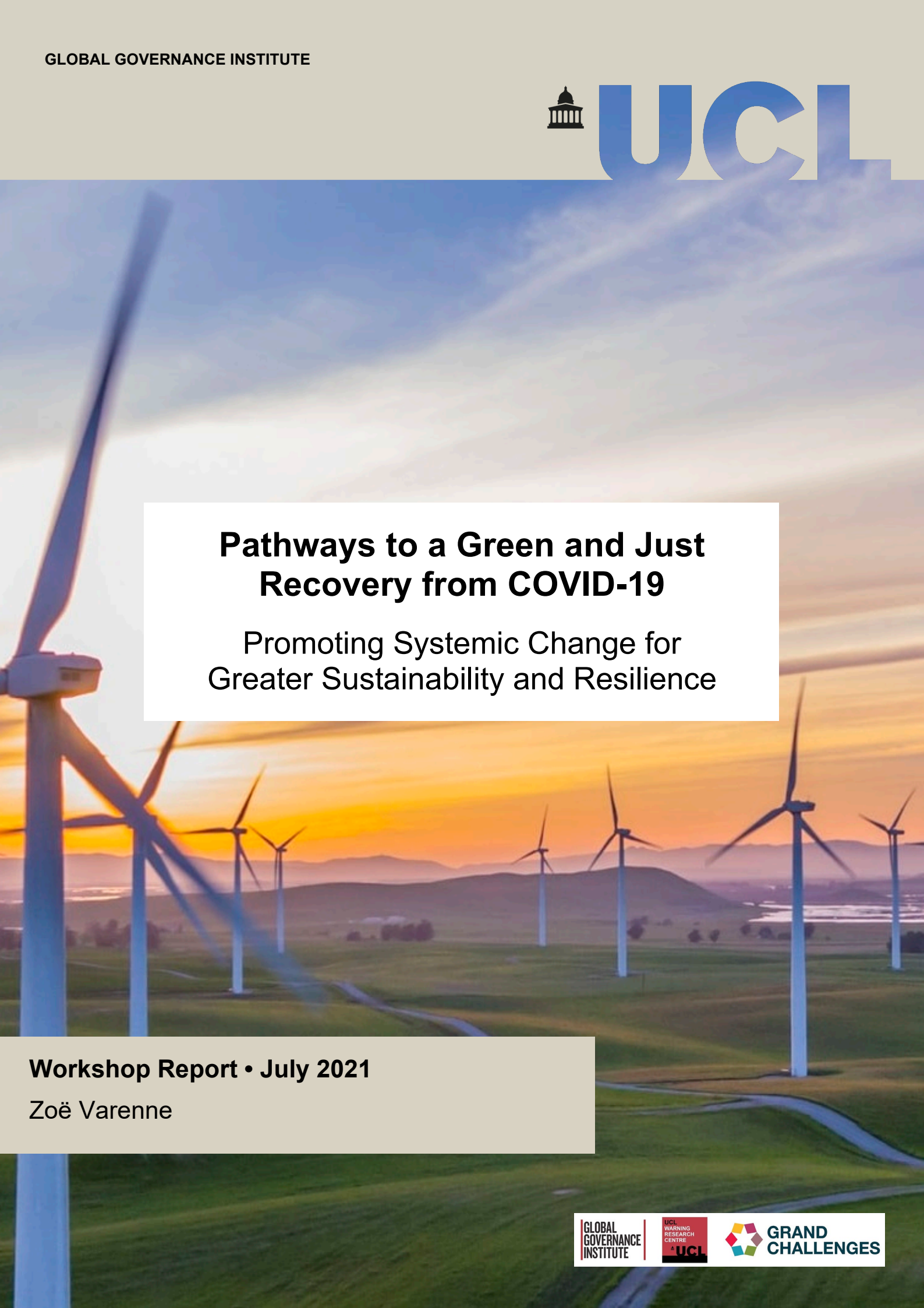

Pathways to a Green and Just Recovery from COVID-19

Promoting Systemic Change for Greater Sustainability and Resilience

Workshop Report • July 2021

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Suggested citation: Varenne, Z. (2021). *Pathways to a Green and Just Recovery from COVID-19: Promoting Systemic Change for Greater Sustainability and Resilience.* Global Governance Institute Policy Brief Series. London: University College London.

Acknowledgements: This report builds upon a workshop, convened on 1 June 2021 by Dr Tom Pegram (UCL Global Governance Institute) and Dr Carina Fearnley (UCL Department of Science and Technology Studies). The workshop was hosted virtually by the UCL Global Governance Institute and the UCL Warning Research Centre, with support from UCL Grand Challenges and the UCL Environment Domain. This report does not necessarily reflect the views of all workshop participants.

Pathways to a Green and Just Recovery from COVID-19

Although unintended, COVID-19 has provided us with an exceptional simulation of a rapid, if short-lived decarbonisation experience. Lockdowns and other measures resulted in a 17% drop in global greenhouse gas emissions in April 2020 compared to April of 2019 (Harvey, 2020) and global CO_2 emissions dropped by 5.8% worldwide in 2020 (IEA, 2021). All of our systems – political, economic, social and technological – and modes of living have been disrupted in ways which have exposed our dependence upon such systems, but also new possibilities for living differently. It is too early to draw conclusions on the legacy impact of the pandemic, but we can identify trends which point in more or less healthy directions. For many observers, the COVID year has underlined the unprecedented achievements of biotechnology, but also information technology, with work, education and social life all shifting rapidly into the virtual sphere (Harari, 2021). On the other hand, the deep undertow of economic contraction will not be easily solved. Unprecedented levels of quantitative easing risk monetary inflation. In the near-term, higher supply chain costs and the repercussions of government restrictions are translating into a collapse in business profitability and as a result job markets are suffering. In the UK, as many as 800,000 payroll jobs have already disappeared, with young people bearing the brunt of the economic pain (Mulgan, 2021).

The colossal impact of the pandemic on the UK suggests that policymakers were caught out. However, that would not be entirely accurate. The UK's 2017 National Risk Register identified the possibility of a pandemic like COVID-19 as one of the most likely and dangerous threats facing the country (Cabinet Office, 2017: 9). As such, government decision-makers were aware of the threat but had failed to implement appropriate warning systems to respond to an emerging crisis and enable swift and clear actions to mitigate against such a pandemic. The scale of the disruption unleashed by COVID-19 raises a series of questions, not only into resourcing of preparation and planning for such an eventuality, but also for the way in which systemic risk is understood and addressed. The pandemic highlights the complex interdependencies within our globalised civilisation which bind the fate of domestic systems to global dynamics.

Unfortunately, the global response to the pandemic has been slow and fragmented. Supply chains of medicines have broken down and there has been hoarding of drugs and protective equipment by some countries. The responsibilities of nation states in a context of global catastrophic risk, where an

epidemic anywhere can quickly become a pandemic everywhere raises challenging questions about the limits of any one country to contend with such transboundary challenges. It has revitalised discussion on the political challenge surrounding allocating greater authority to global bodies such as the World Health Organisation (WHO), which many believe is the body best placed to coordinate preparedness strategies and a global response to major health emergencies (The Independent Panel, 2021). The catastrophic pandemic would have been preventable if the world had acted faster. The WHO-commissioned report 'COVID-19: Make it the Last Pandemic' determined that "the international alert system does not operate with sufficient speed when faced with a fast-moving respiratory pathogen, and that the legally binding International Health Regulations (IHR) (2005) are a conservative instrument that constrain rather than facilitate rapid action" (Sirleaf and Clark, 2021: 1).

We now have a global civilisation mediated by globalisation that has been exposed as profoundly fragile in the face of systemic risks. COVID-19 has broken down supply chains, impacted food systems and disrupted social fabric within and between countries. In turn, the pandemic has served as a reminder that human health is severely threatened by climate change and environmental degradation, with accelerating biodiversity destruction driving the spread of zoonotic diseases and other health threats. The pandemic has also exacerbated global inequality, undoing years of progress in a matter of months, plunging millions into poverty, and threatening to unleash socio-economic turmoil which is almost guaranteed to spill across borders (World Bank, 2020). Drivers of environmental breakdown, such as intensive farming, the international trade of exotic animals and encroachment into wildlife habitats increase the chances of novel viral transmission across the species barrier (The Lancet, 2021). If the global community fails to do more to protect ecosystem resilience, the world faces the risk of another, potentially much more deadly, pandemic occurring (Brulliard, 2020). A sober reckoning with this predicament demands a paradigmatic shift in how we design and manage current systems both domestically and at a global scale. The search for levers that can propel systems in the direction of greener and more sustainable futures is now an urgent imperative. Agencies such as the newly created UK National Preparedness Commission have an important role to play in this regard, not only in enhancing resilience to future risks, but also ensuring that future catastrophes do not cascade unnecessarily – threatening the viability of longer-term policy imperatives, above all securing our collective future in the face of the climate emergency.

At the micro scale, the negative impact of COVID-19 has been felt most severely by those most vulnerable in society. In the UK, ethnic minorities and those most deprived have suffered higher infection and mortality rates (Johnson, 2020). The Office of National Statistics (2021) estimates that people living in deprived areas died at 2.1 times the rate of those in more affluent areas. The economic consequences of lockdowns and other restrictions have also disproportionally affected lower earners and those in precarious employment. By the end of 2020, 700,000 people in the UK had been pushed into poverty as a result of the pandemic, including 120,000 children (Butler, 2020). The UK has responded with a range of measures through its various COVID support packages including furlough, mortgage freezes and an increase in universal credit (Sheridan, 2021).

Disparities in COVID-19 outcomes across countries, such as case fatality rates, appear to be largely determined by national-level factors, such as the robustness of health systems and, more generally, state capacity, i.e. the ability of a state to effectively raise revenue, implement and enforce laws and policies and provide public goods. There is now an opportunity for lessons to be learnt and pandemic preparedness strategies to be updated and, most importantly, implemented. Serious thought must also go into how best to respond to the second-order medium to long-term socio-economic effects of hasty lockdowns, border closures, and social distancing measures. Governments will have to carefully manage the expectations of diverse constituencies in a post-pandemic context where political conflicts could easily undermine its authority. While the vaccine roll-out will play a huge role, scientific prowess is no substitute for good political leadership.

When faced with a crisis such as COVID-19 governments are expected to step up to the challenge and deploy rapid solutions. Although solutions under conditions of exigency will not be perfect,

massive simultaneous experimentation can open up novel pathways for healthy innovation with the potential for spill over into other domains, taking advantages of lateral lesson-learning and hitherto underappreciated interdependencies. Most pressingly, as countries emerge from the pandemic it is vital that efforts at restabilising systems take into account the twin defining challenges of this decade: embarking on the unprecedented transition required to keep global heating below 1.5°C while also ensuring that this policy imperative does not worsen social inequalities and injustices, which would place in jeopardy the sustainability of such action.

COVID-19 is a national and global catastrophe, but recovery is not in question. What form that recovery will take and what our social systems will look like on the other side remains an open question. Slogans like 'great reset' or 'building back better' sound good, but there is a real risk that the post-pandemic economy in particular will be inhospitable for many people. As the executive director of the International Energy Agency (IEA) recently concluded: "We are not on track for a green recovery, just the opposite. We have seen global emissions higher in December 2020 than in December 2019" (qtd in Harvey, 2021). This reset could become a short-lived and wasted opportunity. Contending with the realities of a post-COVID recovery is going to require the requisite leadership, knowledge and resources, and extraordinary creativity.

This report builds upon a workshop on "Complex Risk Governance for a Green and Sustainable Recovery from COVID-19," hosted virtually on 1 June 2021 by the UCL Global Governance Institute (GGI) and the UCL Warning Research Centre (WRC), with support from UCL Grand Challenges and the UCL Environment Domain. The workshop brought together experts on sustainability governance, complexity and risk from academia, policymaking, research centres, non-governmental organisations and the business and investment communities. This report provides a summary of the discussion, which focused on pathways towards a green transition in the wake of COVID-19 as well as prospects to enhance preparedness and resilience to future complex risks.

KEY TAKEAWAYS

- Recovery from COVID-19 must take into account the climate emergency as a driver for future global health risks and social inequality. Climate change, coupled with other environmental stressors, is a driver of multiple potential risk vectors, including the possibility of future zoonotic diseases spreading globally. Decision makers must prioritise action on climate change based on the understanding that our ecological interdependence is now a critical domain of risk (overlapping also into food security and other issues).

- A social backlash is likely if green recovery policies are not perceived to be just. Social inequalities must be addressed through comprehensive policy reforms which anticipate the social costs of the green transition, especially for those most vulnerable in the community. Encouraging widespread public debate and participation is key to identifying opportunities for policy innovation as well as eliciting a sense of ownership and agency.

- Decision-makers should be encouraged to familiarise themselves with complex systems thinking and its implications for interventions targeted at steering systems down healthier evolutionary pathways, as opposed to placing too much emphasis on 'quick fix' solutions. Understanding that problems such as climate change, environmental degradation or pandemics arise out of systems is vital to arriving at an adequate governmental response.

- The UK can learn lessons from models of governance that were more successful in responding to COVID-19 elsewhere. For example, South Korea was able to stage a successful pandemic response because it had invested significantly in state capacity to

respond to future crises. The UK could emulate South Korea by enhancing state capacity, at the local, regional and national levels – in particular, empowering local health authorities – as a means to improving preparedness for future risks and enhancing coordination across typical governmental silos.

- Large-scale social change is a challenging endeavour but one which governments are now tasked with achieving in a context of an unprecedented transition to net-zero. A range of policy tools exist to undertake the transition, from addressing social and environmental aspects of economic policy; adapting interventions to local contexts; encouraging democratic engagement, such as through citizen assemblies; and fostering honest and transparent communication on the political and ethical choices involved in a post-COVID decarbonisation project.

- Early Warning Systems are a vital tool for decision-makers. They play an integral part of disaster risk reduction for a range of hazards including natural, quasi-natural, social, and technological hazards and their combination. While they encompass an early warning component, they are also deployed to provide warning information and advice during ongoing crises. Integration of these systems on national and international level remains challenging and of urgent need to address to make warning systems as efficient and as effective as possible for all stakeholders.

Problems and Systems: Aligning Political, Social and Environmental Realities

This section defines the green recovery, emphasising why considering climate is so crucial to mapping out a recovery from COVID-19 given its profound connection to human wellbeing. It draws attention to how shifts in policy-making need to be accompanied by shifts in paradigmatic thinking, as well as meaningful inclusivity among all interested parties, to better capture the true interconnected nature of the world we exist in today.

Green Recovery: A Definition

A genuinely green recovery challenges 'business-as-usual,' prioritising both environmental sustainability and human wellbeing. As such, it must seek to respond to the urgent need to decarbonise the economy as well as address the social inequalities that COVID-19 has exposed and, in many cases, exacerbated. McGaughey and Lawrence (2020: 6) in their UK Green Recovery Act define a green recovery as "an intervention that seeks to rapidly decarbonise economic activity, democratise decision-making, and fairly wind down the fossil fuel industry while simultaneously scaling up a post-carbon economy of shared prosperity."

The concept of a green recovery has been advanced long before COVID-19, not least in the aftermath of the financial and economic crisis of 2008 (Barbier, 2010). Yet, the recovery from the 2008 crisis was fossil fuel intensive, with emissions quickly rebounding (Birol, 2020). It is important that lessons are being learned from these previous, largely unsuccessful attempts to 'build back better,' otherwise the 1.5°C target may quickly become impossible to attain.

The pandemic presents a formidable challenge in and of itself but it also brings into focus the macro-structural challenge of our age: the need to advance fundamental system-wide transformations across ecological, technological, economic and social domains. While some of these transformations are already underway, the climate emergency continues to accelerate. In the long-term COVID-19 looks likely to have minimal impact on reducing carbon emissions, let alone finally auguring in the elusive 'peak emissions' (Forster, 2021). 2021 has seen a 5% rebound, bringing it near the 2018-2019 peak (IEA, 2021: 10). The increase of CO_2 emissions in 2021 is expected to be the largest increase since the carbon-intensive recovery that occurred after the global financial crisis more than a decade ago (see Table 1).

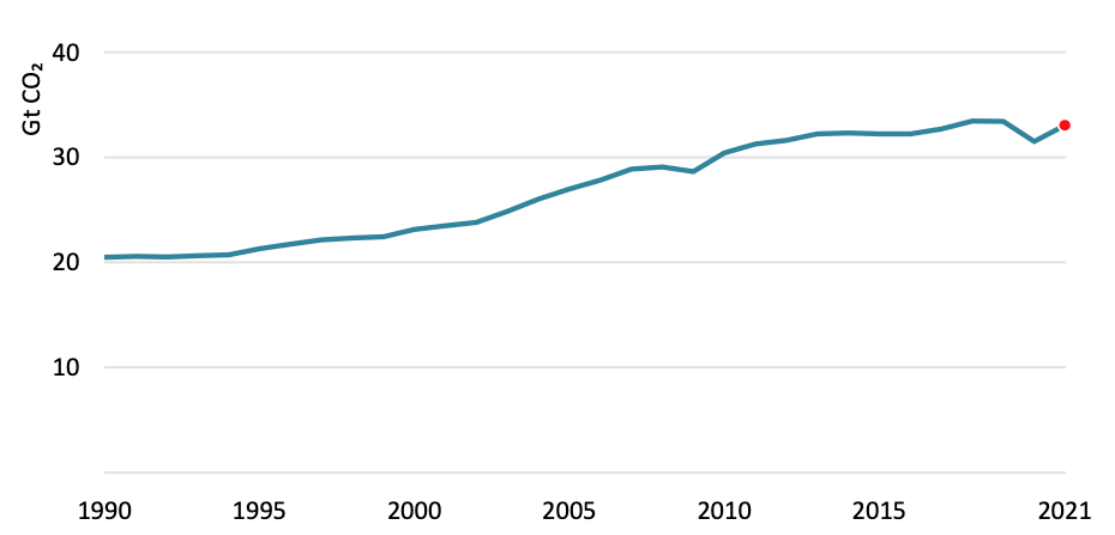

Table 1: Global energy-related CO_2 emissions 1990-2021. Source: International Energy Agency (IEA, 2021: 11).

Countries around the world have now committed to advancing a green recovery but promising rhetoric is yet to be matched by concrete policy proposals on the scale required. President Biden's announcement of a $3 trillion recovery plan fund is to be welcomed. However, how it will fare in a highly polarised US Congress is uncertain (Tankersley, 2021). In the meantime, the US is still committed to invest $72.35 billion in fossil fuels (Energy Policy Tracker, 2021). The EU is also planning to spend upwards of €2 trillion, with 50% earmarked for innovation, resilience and the Just Transition and 30% directed at fighting climate change; "the highest share ever – from the largest EU budget ever" (European Commission, 2021: 11). However, despite the European Investment Bank (EIB) president declaring 'gas is over', according to NGOs, the EIB has invested €890 million in gas projects since it pledged to phase out investments into fossil fuels by 2022 (Taylor, 2021).

An increasing number of sub- and non-state actors are also putting forward more ambitious climate targets and have started experimenting with novel stimulus strategies. Amsterdam, for example, has formally embraced a recovery strategy that emphasises both planetary and social needs (Boffey, 2020). We also see major movement in the corporate sector, with diverse car manufacturers bringing forward decommission dates for petrol-powered cars. At the same time, the fossil fuel industry continues to enjoy privileged access to policymakers (InfluenceMap, 2021). In sum, the direction of travel may be positive but there is significant inertia within and across diverse systems implicated in decarbonisation. As Bill McKibben famously opined, "winning slowly is the same as losing" when it comes to climate change.

The UK has recently set in law an ambitious climate change target, namely to cut emissions by 78% by 2035. DEFRA (2020) has announced a series of ambitious measures in its 'Ten Point Plan for a Green Industrial Revolution' which aims to mobilise £12 billion of government investment, and create and support up to 250,000 green jobs, planting 30,000 hectares of trees by 2025 and rewilding 30,000 football pitches of countryside. At the regional level, ambitious targets regarding carbon capture and storage, as well as hydrogen, such as the ambitious Net Zero Teesside project have been announced (Whittell, 2021). However, these projects are yet to materialise and make strange bedfellows with other developments, including the new controversial West Cumbria mining project (Harrabin, 2021). Moreover, these plans do not take into account the 'invisible' side of Britain's carbon footprint. While UK domestic CO_2 production emissions fell by 27% between 1990 and 2014, more than half of that reduction is offset by imported emissions from other countries (Hausfather, 2017).

To avoid potentially catastrophic levels of global heating, "rapid, far-reaching and unprecedented changes in all aspects of society" are now needed (IPCC, 2018). Crucially, to break out of carbon lock-in, governance interventions must catalyse transformations across sectors and at multiple levels simultaneously (Bernstein and Hoffmann, 2019). Yet, while there is growing recognition that change must be systemic, rather than incremental and siloed, legacy governance structures are largely failing to respond effectively and rapidly to climate change and other global complex risks (Kreienkamp and Pegram, 2020).

New conceptual frameworks could improve our understanding of the dependencies and interactions between different types of complex systems. Davelaar (2021) calls for a shift in thinking about systems, from a view that treats systems as largely separate entities, co-existing side by side and only partially overlapping, to one that appreciates the way in which different systems are nested and interconnected, much like an onion. This conceptual shift, she argues, can help us identify 'deep' leverage points – interventions in the system that have the greatest potential for catalysing transformative change (see Figure 1). Building on the work of Donella Meadows (2008), Davelaar (2021) maintains that the most effective leverage point towards greater sustainability would be a paradigmatic shift in mindset, towards recognition that humans are an integral part of nature. This view is now also making inroads in policy circles. The recent Dasgupta Review on the Economics of Biodiversity, commissioned by the UK Government, highlights the need to "recognise that we are embedded in Nature. To detach Nature from economics is to imply that we consider ourselves to be external to Her. The fault is not in economics; it lies in the way we have chosen to practise it" (Dasgupta, 2021: 310). As the review further documents, this shift in perspective opens up concrete possibilities to 'mainstream' nature into policy planning, for example, by supplementing Gross Domestic Product (GDP) with more inclusive indicators of wealth and economic performance that take into account the central importance of healthy ecosystems for human wellbeing.

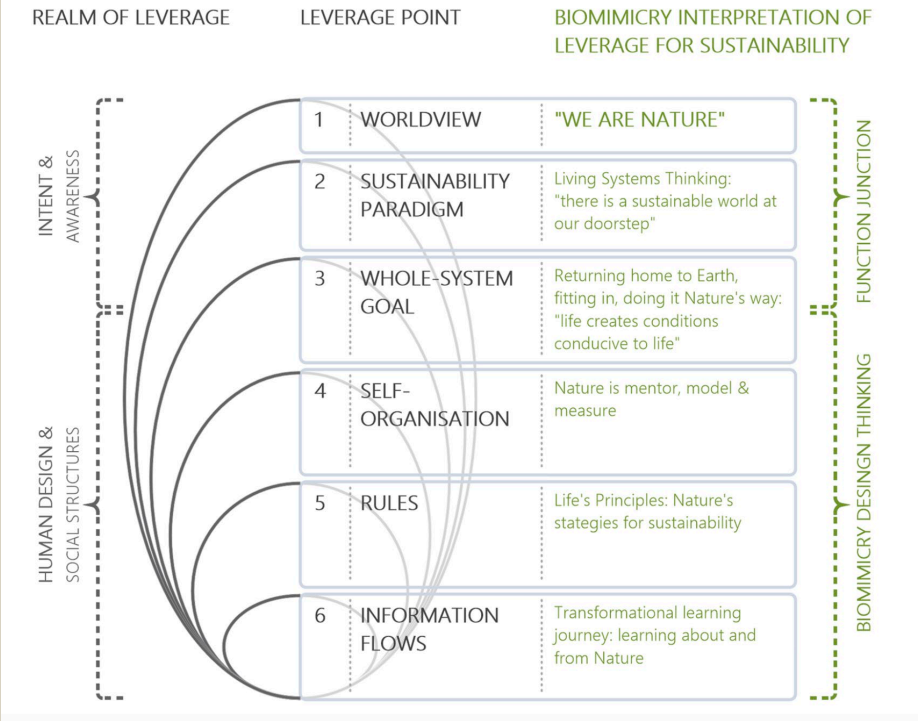

Figure 1: Different leverage points for a nature inspired sustainability paradigm. Source: Davelaar, 2021: 743.

Systems thinking also sheds new light on the relationship between local, national and global scales of governance. Although complexity defies control and linear global-to-local policy transmission, it opens up new possibilities of 'steering' systems into a more sustainable direction, including through the encouragement of bottom-up experimentation (Kreienkamp and Pegram, 2020). On the national level, better coordination between local and centralised government is key to increasing adaptive capacity to future complex risks (Thomas and Clyne, 2021). In nested and interconnected systems, local-level action has the potential to effect global-level change via ripple effects. For example, Hayhoe (2018) argues that making climate change part of everyday conversations can be a powerful driver of mindset change and, ultimately, policy innovation. As such, community-level engagement with sustainability issues is key to facilitating paradigmatic shifts (Thornhill, 2021).

Mechanisms to encourage such engagement must enable broad and equitable representation. As Banerjee (2011) points out, the "voices of the governed" remain systematically excluded from global governance structures that cater to international markets, meaning that marginalised rural populations and indigenous peoples in particular have no leverage over policies that directly impact them. Yet, he also highlights possibilities for resistance and bottom-up change through 'translocal' coalition building. Making room for local responses to global issues is not only a question of justice but also opens up possibilities to "overcome a collective failure of the imagination," inviting us start asking different questions instead of "seeking more answers to the same questions" (Banerjee, 2011: 343).

National-level mechanisms such as citizen's assemblies can generate valuable insights regarding opportunities to address global issues such as climate change on a local scale. Examples include the Citizens' Convention for Climate in France which emerged in response to the 'gilets jaunes' protests (Thornhill, 2021) as well as the recent series of citizens' climate juries held by the cross-party IPPR Environmental Justice Commission in four locations across the UK: Aberdeenshire,

Tees Valley and County Durham, Thurrock and the South Wales Valley (IPPR, 2021). The upshot of the citizens' juries was that a successful transition to net-zero must be inclusive of local communities and empower them both with knowledge and the capacity to tangibly contribute to and influence relevant policies. Currently, only 1 in 4 individuals in the UK feel they can influence decisions affecting their local areas (Department for Digital, Culture, Media & Sport, 2021). As Abram et al. (2020) conclude, decarbonisation pathways are unlikely to be successful if they are not perceived as fair, just and locally adaptable. Meaningful participation of local communities – rather than a 'one size fits all' approach – ensures that people feel heard and that policies are adapted to meeting their needs, improving their quality of life whilst also protecting and promoting a greener way of living that benefits the planet. Inclusive and transparent decision-making is particularly important when it comes to transitioning those working in carbon-intensive industries such as oil and gas. This is reflected in findings of the IPPR citizen's jury in Aberdeen. Aberdeen is considered the oil capital of Europe and 10% of its residents are employed in the oil and gas industry (IPPR, 2021). While the vast majority of workers in these industries is ready to consider transitioning to low-carbon sectors, the IPPR citizen's jury found that there is concern about the level of government support available to help them successfully retrain and join the ranks of the 1.7 million potential jobs in the Green Economy that could be created between now and 2035 (ibid). The insights gathered by the citizen's juries reflect the importance of directly engaging local communities in transitional policy-making, highlighting the merits of democratic decision-making models that are based not merely on representation but active participation. As Hélène Landemore (2012) argues, combining majority rule with meaningful and inclusive deliberation mechanisms can actually help us make smarter decisions. Given the scale of the challenge the climate crisis poses and the collective effort necessary to overcome it, diversity of thought will be critical to imagining more sustainable futures.

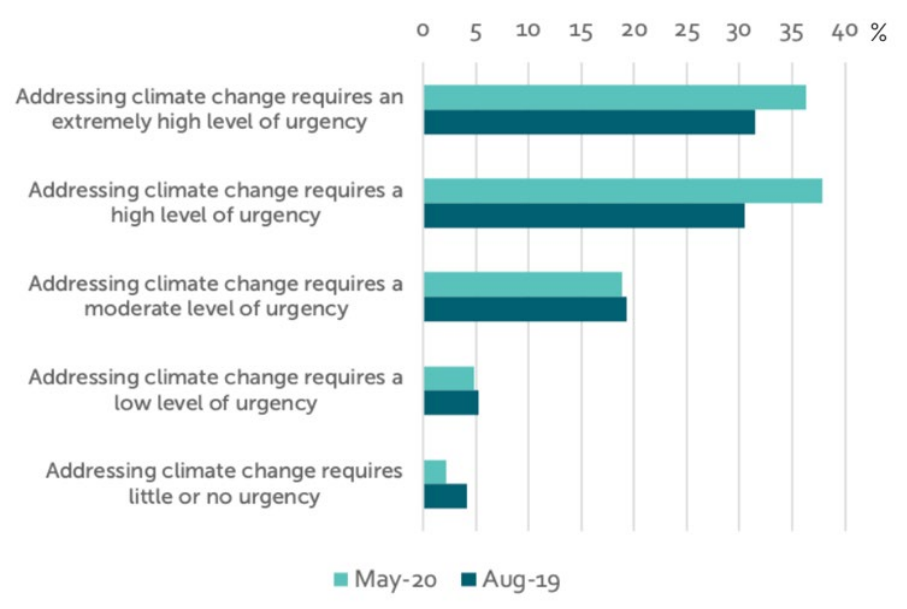

Figure 2: Perceived climate change urgency. Source: Centre for Climate Change and Social Transformations (CAST, 2020: 15).

Bleischwitz (2020) also makes a series of instructive suggestions for kickstarting the green recovery, emphasising the relationship between social policy and ecology, as well as the importance of popular support for recovery policies if they are to be successful. As Abram et al. (2020) flag, the

cost of the transition towards a decarbonised economy must be shared out fairly and account for the variation in experiences felt by different segments of society. They conclude that the transition to net-zero must be aimed at achieving both environmental and social sustainability. This could involve deployment of several 'just transition' policy tools, from agile state interventions, such as job creation, retraining and redeployment schemes, to local-level solutions, such as community energy initiatives. Communicating openly and engaging those most affected by decarbonisation policies will be key avoiding social backlash and other unintended consequences. Citizen assemblies and initiatives such as the 'Camden Think and Do' pop-up in 2019 (Camden Council, 2019) might serve as models for promoting social inclusion among those most directly affected and encouraging their participation in formulating local solutions. On a salutary note, decision-makers may find fertile ground here with polls indicating that COVID-19 has substantially impacted attitudes and behaviour towards climate change, with people being more inclined to adopt low-carbon habits (CAST, 2020).

Enhancing Preparedness and Resilience for Future Complex Risks

COVID-19 will not be the last large-scale emergency facing the global community. Human activities are putting increasing pressure on planetary boundaries (Rockström et al., 2009) as well as social systems (Raworth, 2017), with potentially catastrophic consequences for human health and wellbeing. As we are rapidly approaching critical tipping points in Earth systems (Rockström, 2020), it is imperative that we enhance preparedness for, and resilience to, future complex risks, from climate change to future pandemics. This section will focus on the weaknesses of existing response mechanisms, infrastructures and toolkits that COVID-19 has brought to light and how these could be redesigned to enhance the adaptive capacity of systems at global, national and local levels.

What is Resilience?

> "The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions."
>
> *Sendai Framework for Disaster Risk Reduction 2015-2030*

The pandemic has brought to the fore the fragility of our socio-economic systems, internationally and locally. "[M]ore and more parts of our lives depend on fewer and fewer, more integrated networks" (Letwin qtd in Anthony, 2020) in ways that are often difficult to disentangle. These highly interconnected networks are particularly vulnerable to sudden shocks, with ripple effects that are becoming more far-reaching and unpredictable than ever before. For example, COVID-19 has exposed the fragility of highly optimised just-in-time supply chains, with particular implications for food security (Garnett et al., 2020). In the UK, this was reflected in the frenzy in supermarkets following initial border closures. Elsewhere, the pandemic has caused acute and serious food shortages (World Bank, 2021), fuelling the hunger crisis in the Global South (Dahir, 2020). PPE shortages in the early stages of the pandemic (WHO, 2020), including in the UK (BBC, 2020), further demonstrate the dangers of prioritising efficiency over resilience in supply chain systems.

In a context of growing complexity and interconnectedness, many of our socio-economic systems are only as strong as their weakest link, highlighting the need for cooperation and high-level steering. On the global level, effective responses to COVID-19 have been undermined by a retreat into nationalism and protectionism. The failure of powerful states to coordinate and finance joint pandemic strategies has left key global institutions such as the World Health Organization (WHO) with few effective intervention tools (Pegram, 2020). The highly unequal distribution of vaccines and critical medical supplies is not just morally indefensible but also increases the risk of virus mutations, threatening recovery efforts across the world (Eaton, 2021). It also further exacerbates the inequalities laid bare by COVID-19, thus undermining efforts to achieve the Sustainable Development Goals (SDGs) (Guterres qtd. in IANS, 2021). In turn, failure to achieve the SDGs is likely to greatly diminish our collective resilience to future systemic risks.

On the national level, a lack of investment in equitable support mechanisms similarly threatens effective responses. In the UK, a lack of 'give' in government spending resulted in just-in-time solutions rather than just-in-case ones, exacerbating the negative impact of COVID-19 (National Preparedness Commission, 2021a; 2021b). Years of austerity meant that critical health indicators – such as improvements to life expectancy and health equity – were deteriorating in the UK, even before COVID-19 reached the country (Marmot et al., 2020). Severe cuts to the budgets of local authorities in the years prior to the pandemic reduced their ability to mobilise and administer rapid relief efforts, in particular in the most deprived areas. Also, in contrast to other European countries, such as Germany or France, the UK had no well-tested furlough system in place to support workers and employees during a crisis (Plummer, 2020). Reinvesting power and money in public institutions, with a priority focus on societal wellbeing and socio-economic equality, could significantly increase the UK's response capacity to future disasters and emergencies (Jones and Hameiri, 2021; Thomas and Clyne, 2021).

Additionally, it is vital to consider what changes are required to the institutions and processes that equip us – and especially the younger generations – with the tools and knowledge to navigate a world where legacy assumptions and heuristics are being tested like never before. The education sector in particular has emerged as a priority concern, struggling to give young people the concepts, tools and categories that they need to find effective and creative solutions to challenges that are becoming increasingly urgent (Fazey et al., 2020). The inertia that we encounter in our carbon-based industrial economy is refracted through repetitive conversations in boardrooms, lecture halls and classrooms where there is a need to change the nature of debate to explore novel solutions to novels crises. There are gaps in research, knowledge and reflexivity that knowledge systems should be addressing. According to Fazey et al. (2020), knowledge systems are failing at stimulating enough progress to encourage rapid change. Rather than accumulating knowledge for the sake of accumulation, it is perhaps time to shift from *knowing-what* to *knowing-how*: to cultivate a form of wisdom education (Maxwell, 2014). In a post-Covid world, research universities will also have a crucial role to play in creating a wider world and to serve as bulwarks against catastrophic risks.

Old system	Future system
Fragmented & disconnected	Interconnected & inter-related
Globalised knowledge	Local & globalised knowledge
Narrowly informed	Widely informed
Avoids ethics and aesthetics	Encompasses ethics & aesthetics
Elitist, exploitative and exclusive	Egalitarian, equitable & inclusive
Self-referential & uncritical	Reflexive & responsible
Competitive	Collaborative
Fear	Trust
Observant & abstracted	Engaged & grounded
Low creativity	High creativity
Incremental	Transformational
Outcomes for a few	Outcomes for everybody
Science for science	Science for all
Knowledge focussed	Wisdom focused

Table 2: Contrast between the emergent properties of old and future knowledge systems, building on the identified challenges of old and the vision of future systems. Source: Fazey et al., 2020: 13).

However, this evolution of knowledge systems should not be limited to universities and spheres of higher education to which only a limited number of people have access. Rather we may want to reimagine education as a collective "responsibility for and participation in an evolving process of social maturation that reimagines culture, technology, institutions and policies for the greater good" (Rowson, 2019: 2). Zak Stein (2019) invites us to think about education as a communal and ongoing project, a part of the human condition rather a specialised activity delegated entirely to formal institutions. Education, then, is not simply about absorbing knowledge but it has a transformative agenda, aimed at making sense of and addressing the converging planetary crises we are now facing.

Equal access is essential if education is to help us build resilience to future complex risks. COVID-19 has highlighted the importance of virtual infrastructures in delivering education in times of crisis, also opening up opportunities to improve access to education in the future (Stein in Lumanlan, 2020). The experience of Uruguay, where the pandemic did not cause massive disruptions to education due to prior investments in equitable digital access, suggests that we should not just look to high-income countries for models of transformative education initiatives (Abé, 2021). Diversifying delivery mechanisms for education will make the sector more adaptive to future shocks and it might also help forestall further attempts at commodifying education as a market-orientated service rather than a social project, aimed at promoting thoughtfulness and creativity in the face of shared challenges (Stein in Lumanlan, 2020).

Importantly, COVID-19 was not a "black swan" event. The risk of a viral outbreak with pandemic potential was widely acknowledged, including by the UK government (Cabinet Office, 2017). As such, many of the failures in responding effectively to COVID-19 reflect a lack of preparedness rather than the impossibility of foresight. In the UK, serious gaps in preparedness had been highlighted by a 2016 simulation, entitled 'Exercise Cygnus', which used the scenario of a major flu outbreak to test the viability of the national preparedness plan. The Cygnus report found that the UK was insufficiently prepared to cope with a future pandemic. Concerns have been raised over whether the report's recommendations have been implemented in full (Pegg, 2020; Nuki and

Gardner, 2020). For example, although Exercise Cygnus revealed serious gaps in “surge capacity”, hospital beds were subsequently cut further, leading to a record low in capacity just as the pandemic hit (Campbell, 2019).

Efforts to assess and compare national pandemic preparedness have proven largely unreliable. The Global Health Security Index (GHSI), for example, ranked the UK second for pandemic preparedness in 2019 – an assessment belied by the country’s performance during COVID-19, with the death rate in the UK among the highest worldwide (Johns Hopkins University, 2021). Asian countries such as Vietnam, Singapore and South Korea fared much better when dealing with the pandemic, partly because they could build on experiences with previous epidemics. A critique levied at the UK government was its lack of coordinated oversight and joint tactical level plans (Pegg, 2020). South Korea, on the other hand, widely lauded as a success story, had made significant investments into building up state capacity and strengthening the centrally coordinated public infrastructures (Jones and Hameiri, 2021). More in-depth and impartial reviews of national crisis preparedness in the UK – including an honest reflection on lessons learned at home and from other countries – could be a key first step towards building greater resilience. In this context, the establishment of a National Preparedness Commission is particularly significant.

Rank	Country	Index Score ▼	Region	Population	Income
1	United States	83.5	Northern America	100m+	High income
2	United Kingdom	77.9	Europe	50-100m	High income
3	Netherlands	75.6	Europe	10-50m	High income
4	Australia	75.5	Oceania	10-50m	High income
5	Canada	75.3	Northern America	10-50m	High income
6	Thailand	73.2	Southeastern Asia	50-100m	Upper middle income
7	Sweden	72.1	Europe	1-10m	High income
8	Denmark	70.4	Europe	1-10m	High income
9	South Korea	70.2	Eastern Asia	50-100m	High income
10	Finland	68.7	Europe	1-10m	High income

Table 3: The 10 most prepared countries for pandemics and epidemics, overall. Source: Global Health Security Index (GHSI 2019).

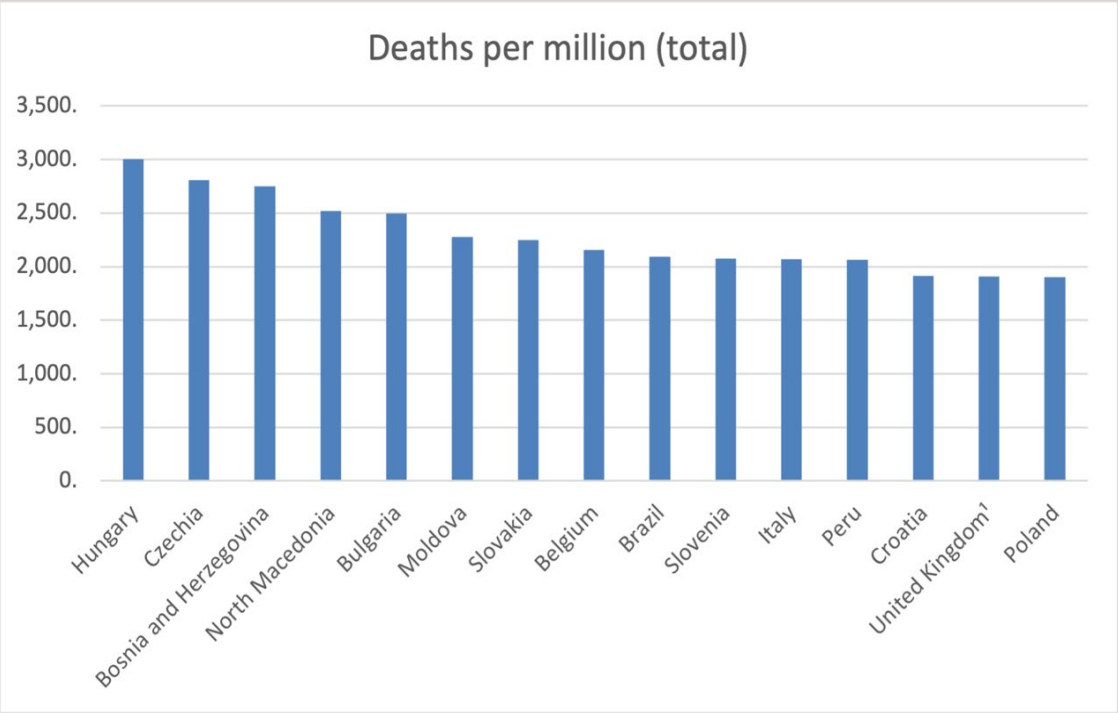

Figure 3: COVID-19 Deaths per million (as of 19 May 2021). Source: Johns Hopkins University (2021)

COVID-19 has also shown that pandemic warning and alert systems are severely underdeveloped around the world (Fearnley and Dixon, 2020). The UK's tier-alert system created confusion and, as a consequence, went largely ignored (Fearnley, 2020). In particular, it failed to transparently reflect the situation on both local and national levels. A purely responsive system, its design had to be continually revised to reflect new developments (ibid). Complex risks such as COVID-19 need a system that is more standardised and yet still locally adaptable, "embedded in an extensive system of observation and communications" (Fearnley and Dixon, 2020).

Above all, alert systems and governance emergency guidance need to be clear, transparent and comprehensible to ensure that people trust and follow government advice. In the UK, such trust was repeatedly undermined by failures to seek parliamentary scrutiny and/or communicate the rationale behind government decisions (Sasse et al., 2020). While the importance of scientific input was rightly emphasised, the government did not always clarify how exactly advice from its Scientific Advisory Group for Emergencies (SAGE) informed policy decisions (ibid). At times, the focus on 'hard' scientific evidence also delayed important precautionary measures. For example, hesitant and inconsistent public messaging concerning face coverings likely contributed to a lack of compliance in the UK (Mills et al, 2020). Equally there was a distinct lack of input from the key stakeholder in managing an emergency, the emergency mangers (Alexander, 2020). While an emergency demands rapid action, it should not be used to undermine open, transparent and, where possible, collaborative policy and decision-making processes (Thomas and Clyne, 2020). Improved transparency is also important to address the risks posed by mis- and disinformation (Fleming, 2020). Misinformation compromises effective risk prevention, preparedness and response. Rebuilding societal trust in an age of 'fake news' – and providing people with the knowledge and tools they need to make informed choices – will therefore be an important part of future risk preparedness and management strategies.

Concluding Thoughts: Towards Systemic Change

Complex risks are not new. Neither are calls for a greener, fairer and more sustainable society. While previous efforts to induce such rapid and wide-reaching societal transformations have been largely unsuccessful, the COVID-19 pandemic has the potential to represent a real tipping point. “COVID has laid bare the vulnerabilities in our society and made bold and innovative policymaking essential and undeferrable. The time to start is now.” (Abrams, 2021). The pandemic has created an opportunity to drastically rethink policymaking, based on the realisation that human and planetary health are inextricably interconnected. A green and sustainable recovery is possible if there is a genuine commitment to learn from past mistakes and design novel systems that support both humans and nature.

Inequality is a huge obstacle to building resilience to future complex risks. More inclusive modes of governance on all scales are urgently required to enable a post-pandemic recovery that is not just green but also just. Meaningful participation is essential not only because it can forestall social backlash to transitional policies but also because diversity of thought and the inclusion of local perspectives is a prerequisite for developing more creative and imaginative responses to planetary challenges. A more holistic vision of education as a shared project of emancipation could be key to equipping society, and in particular younger generations, with the tools needed to adaptively respond to future disruptions. In policy circles, greater familiarity with complex systems thinking could encourage decision-makers to bring more voices into the conversation and challenge established governance models that threaten to undermine both environmental sustainability and human development. COVID-19 has disrupted social, economic, and political systems around the world, with devastating consequences, especially for the most vulnerable. There is a real risk that post-pandemic recovery efforts will be facing backward rather than forward, reinforcing unsustainable trajectories of economic development and deepening existing divisions and power structures. Yet, there are equally real opportunities for systemic change, underpinned by a renewed sense of collective responsibility and possibility.

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Acknowledgements

The workshop convenors and the UCL Global Governance Institute (GGI) and the UCL Warning Research Centre (WRC) would like to thank all panellists, chairs and participants in the 1 June 2021 workshop. This report does not necessarily reflect the views of all participants.

- Zee Aslam, UCL Department of Political Science
- Professor Raimund Bleischwitz, UCL Bartlett School of Environment, Energy and Resources (BSEER); UCL Institute for Sustainable Resources
- Professor Julio D. Davila, UCL Bartlett Development Planning Unit
- Rowan Douglas, CBE, Willis Insurance Risk Management Team
- Dr Carina Fearnley, UCL Warning Research Centre
- Marie-Valentine Florin, International Risk Governance Center (IRGC), Ecole Polytechnique Federale de Lausanne (EPFL)
- Dr Rachel Freeman, UCL Energy Institute
- Lord Toby Harris, UK National Preparedness Commission
- Dr Kyle Herman, UCL Global Governance Institute
- Amanda Janoo, Wellbeing Economy Alliance
- Professor Cassidy Johnson, UCL Bartlett Development Planning Unit
- Professor Ilan Kelman, UCL Institute for Risk and Disaster Reduction
- Julia Kreienkamp, UCL Global Governance Institute
- Dr Julia Leventon, Global Change Research Institute of the Czech Academy of Sciences
- Professor Victor Marchezini, National Institute for Space Research, Brazil
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The conveners are grateful for the support of UCL Grand Challenges and the UCL Environment Domain.