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Making waves in resilience: Drawing lessons from the COVID-19 pandemic for advancing sustainable development

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ABSTRACT

The current COVID-19 pandemic has affected societies across the world while its economic impact has cut deeper than any recession since the Second World War. Climate change is potentially an even more disruptive and complex global challenge. Climate change could cause social and economic damage far larger than that caused by COVID-19. The current pandemic has highlighted the extent to which societies need to prepare for disruptive global environmental crises. Although the dynamics of combating COVID-19 and climate change are different, the priorities for action are the same: behavioral change, international cooperation to manage shared challenges, and technology's role in advancing solutions. For a sustainable recovery from the COVID-19 crisis to be durable and resilient, a return to 'business as usual' and the subsequent often environmentally destructive economic activities must be avoided as they have significantly contributed to climate change. To avoid this, we draw lessons from the experiences of the waves of the COVID-19 pandemic and beyond to advance sustainable development.

1. Introduction

Pandemics have always been part of human development. Despite large advances in sanitation and big gains in medical knowledge and treatments, pandemics still can wreck major social and economic havoc as the current COVID-19 pandemic shows (Bivins et al., 2020; Bhattacharya et al., 2021). Disease outbreaks seem to also become more frequent; since 2000, we have seen among others SARSCoV, Swine Flu, MERS, and now COVID-19 (Baker et al., 2022).

Increasing human population and anthropogenic activities have impacted the environment and have direct linkages with the current and other recent outbreaks of zoonotic diseases (Mishra et al., 2021). Weather is a key factor in the occurrence of infectious diseases – from the bubonic plague (Black Death) in 14th century Europe to the current COVID-19 pandemic. The timing of an epidemic outbreak and the transmission of infectious diseases are influenced by temperature, rainfall, and ocean currents (Zell et al., 2008; Revich et al., 2012; Wu et al., 2016; Carlson et al., 2020). Climate change will affect weather patterns, and as such will likely impact the occurrence of infectious diseases. However, the health impacts of climate change will not be the same throughout the world as demography, technological developments and socio-economic characteristics of the population will affect health outcomes (Wu et al., 2016).

Societies have found themselves since late 2019 on the frontlines of the COVID-19 pandemic. Many academic studies using excess mortality have been published since the pandemic started to exact its toll (Hannah Ritchie et al., 2020; Kontis et al., 2020; Ahmad and Anderson, 2021; Islam et al., 2021; Karlinsky and Kobak, 2021). All these studies show that the actual death toll of the COVID-19 pandemic is significantly higher than the official tally reflects. The Economist (2021) estimates put the excess mortality at between 10 and 20 million by early November 2021, which is about 2–4 times more than the official tally (JHU, 2021). And the pandemic is still ongoing.

The next pandemic, regardless its manifestation, is likely to reveal itself for what it is: yet another symptom of the same underlying root cause – unsustainable human production and consumption (EEA, 2020; IPBES, 2020; UNEP, 2020; IPCC, 2022). The root causes of pandemics and climate change clearly relate to unstainable development, whereas climate change is a contributing factor for the emergence of pandemics (Zell et al., 2008; Revich et al., 2012; Mishra et al., 2021). Unsustainable human production and consumption triggered by population growth, urbanization and higher incomes and subsequently a sharp increase in production to meet the demand for energy, food (especially meat and dairy), and other products and services (including global travel) have resulted in (i) a loss of biodiversity; (ii) unsustainable food production systems; and (iii) an acceleration of GHG emissions. These processes are amplified by the current economic system that overvalues private goods, undervalues the common good, and has not given much thought about what the goals of economic growth should be in times when income, wealth and opportunity inequalities have been increasing rapidly and the effects of climate change become increasingly more visible to see.

The COVID-19 pandemic and climate change are two different societal crises, showing striking resemblances that are related to their very nature and the way in which they manifest themselves in societies, which determine potential strategies for dealing with them (van der Voorn et al., 2021). Firstly, although the time scales of both crises are profoundly different, their disrupting potential has parallels. Just as the pandemic exposes the socioeconomic structures of the countries in which it rages, so does climate change demonstrate how it affects the physical environment on which the socio-economic structures of societies are founded. In this way, both are disruptions that can lead to discontinuities in development pathways (O'Neill et al., 2020).

Secondly, no matter the crisis, it is always those that are the most vulnerable that suffer the most as they do not have the resources to deal

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with such major adverse events (Fraser et al., 2022). As is the case for climate change, local factors cannot be discounted when reviewing the impacts of the COVID-19 pandemic. Thirdly, both crises are wicked problems, which means that there is neither complete knowledge of the problem, while there can be conflict value whereby the solution that works for one group is not a solution for another group (Auld et al., 2021). And the final feature of a wicked problem is its dynamic complexity, as it changes and mutates over time.

To address the COVID-19 pandemic in the broader context of the 'Great Change for sustainability' and the UN Sustainable Development Goals, current social, environmental and economic practices must change across different levels and aspects of society: the way we live our lives and the way we eat, move and power societies cannot remain the same (Fiscus, 2019; Werikhe, 2022).

The inability and/or unwillingness to value the externalities of production or consumption results in pollution of natural resources (such as air, water, soil) and a further loss of biodiversity because of over-use of common resources. This is not a new problem and has already been discussed by many authors including Ostrom (1990). The short-term focus of the current economic system is unsuited to deal with long-problems like climate change and have in recent decades resulted in a heavy reliance on governance systems that put too much emphasis on short-term goals (profit maximization for shareholders) and relentless cost-cutting policies. This is reflected in the complex, longer and increasingly concentrated global supply chains affecting overall resilience - as was amply shown during the COVID-19 pandemic when shortages arose from everything from protective gear for health care workers to face masks, computer chips and toilet paper (Rozhkov et al., 2022). In addition, the world today depends on innovative technologies and policies as a quick fix to solve problems, often without considering the unintended consequences of the adoption of such technologies and policies. Examples abound, such as social media platforms that connect people but also exacerbate polarization and undermine democracy. Electric vehicles that reduce CO2 emissions when driving but which may also create its own set of challenges. An electric car may not produce CO2 emissions assuming the electricity that is used is clean, but what about the manufacturing of the vehicles and what happens to the batteries once the car becomes obsolete.

Scientists and international organizations have been warning about the likely occurrence of a global pandemic and the devastating impacts of climate change for years. (Cheng et al., 2007; WHO, 2011; IPBES, 2020; UNEP, 2020; Mishra et al., 2021; IPCC, 2022) As the last two years have shown, very few countries were prepared to manage the risks that the COVID-19 pandemic posed and still poses. And our preparedness to manage the risks of climate change is so far mainly limited to dealing with the aftermath of its effects (IPCC, 2022). In neither case, the world was or is readily prepared to deal with the consequences of either the COVID-19 pandemic or climate change. Yet, the pandemic and climate change are different as they pose different societal challenges in terms of causes and consequences, and in terms of human behavioral biases towards them (van der Voorn and de Jong, 2021; van der Voorn et al., 2021; Latkin et al., 2022). The COVID-19 pandemic has an urgent immediacy that many global environmental crises caused by climate change do not have. Moreover, unlike the pandemic, the impacts of climate change are likely to be much more diffuse, and to vary widely dependent on time and place. Climate change is very likely to cause much higher social and economic costs than COVID-19 will (van der Voorn et al., 2021). As policymakers around the world want the recovery from the COVID-19 pandemic to be durable and resilient, a return to the business practices of the pre-COVID-19 era characterized by environmentally destructive investment patterns and economic activities is undesirable (Laskurain-Iturbe et al., 2021). To avoid this scenario, recovery strategies should be designed to build back better (UN, 2015; OECD, 2020) and smarter to improve societies' resilience (Rosenbloom and Markard, 2020).

Ideally, recovery strategies should support societies not only to get quickly back on their feet, but also to do so in a sustainable manner. Therefore, recovery strategies need to trigger investments and behavioral changes that will reduce the likelihood of future shocks and increase society's resilience to them when they do occur. Central to this recovery approach is a focus on resilience, which is a central concept in ecosystem ecology (Holling, 1973). The concept of resilience originally emerged from dynamic systems theory (Talubo et al., 2022), after which it has evolved along with various fields in which it was used or defined e.g., disaster risk management (Cutter et al., 2008), economics, health (Mallak, 1998) and organizational (Horne and Orr, 1998) science. We here define resilience from a social-ecological perspective: the ability of a system ability to ensure the provision of the system functions in the face of increasingly complex and accumulating economic, social, environmental and institutional shocks and stresses, through capacities of robustness, adaptability and transformability, which are grounded in the literature on adaptive cycles and adaptive governance (Fath et al., 2015; Kharrazi et al., 2016; Auad et al., 2018; Meuwissen et al., 2019). This definition differs from much of the social-ecological resilience literature in its focus on output (i.e., production functions, see (Ge et al., 2016) and in considering a socially determined flexibility in this output, i.e. the set of desired functions (Meuwissen et al., 2019).

Other key aspects for assessing whether recovery strategies can build back better and smarter include an alignment with long-term emission reduction goals, factoring in resilience to climate change impacts, reducing biodiversity loss and increasing the circularity of supply chains (Obergassel et al., 2020). Well-designed recovery strategies may include several of these aspects all taking place at once. Recovery policies, for instance, catalysing the transition to accessibility-based mobility systems, while investing in low-carbon and decentralized electricity systems.

To build back better, the following lessons can be drawn from the experiences of the waves of COVID-19 pandemic and beyond:

1. The COVID-19 pandemic has taught us that "prevention is still better than the cure". Although prevention is not always possible and we are running out of time to deal with climate change (IPCC, 2022), being prepared to deal with disasters is key. Building resilience depends on the ability and willingness to learn from the past. The way early warnings of environmental and human hazards emerge, and how they are dealt with, provides us with many lessons (EEA, 2001; EEA, 2013). These lessons can help pave the way towards more resilient and better-prepared societies, which do not emerge overnight. Preparedness will help to make more informed trade-offs to get more optimal solutions. In the spirit of the EU's ambitious Green Deal, the world needs a bold recovery strategy from the 'pandemicene' recognizing the crucial link between various types of resilience (e.g., social, economic, ecological), social and natural capital and social inclusion.

2. Although preparedness is a first step, it is not enough to deal with climate change. Building back better will require a whole array of measures as there is no silver bullet that will fix the problem; a holistic approach to dealing with climate change is needed (Fiscus, 2019). The pandemic showed that a large range of measures is needed to deal with such a problem, including behavioral change (including mask wearing, social distancing, lockdown), technological innovations (including vaccines, anti-viral medicines, coronavirus trackers, on-line education and work) and cooperation (scientists across the world working to race to find solutions). At the same time, societies had to take a set of socio-economic measures to help their people, businesses and communities to survive (including financial support to scientists, people, businesses and communities, eviction moratoriums). To combat climate change, we will also need a wide range of measures that not only directly aim to mitigate the causes of climate change, but also deal with the impact these measures will have on the resilience of people and economies (IPCC,

2022). The COVID-19 crisis is just a further complication, as it draws attention away from climate change because of the urgent character of the pandemic and the large uncertainty surrounding short-term recovery rates and their long-term implications (O'Neill et al., 2020). The UN Sustainable Development Goals can serve as a compass to shape the direction of pandemic recovery strategies (Werikhe, 2022).

3. The pandemic has shown that dealing with the fallout of the pandemic requires political will and courage to shift the political equilibrium (Phillips et al., 2020; Leal Filho et al., 2021). During the pandemic, long-held convictions about government spending and public debt were discarded (Makin and Layton, 2021; Romer, 2021), while there is a renewed focus on a green, resilient and inclusive recovery. A similar approach is needed to deal with climate change. Adapting to a new climate reality, including a move to a circular economy, just energy transitions and biodiversity protection will not come about if the underlying challenges in the global economic system are not addressed (de León et al., 2021). There is a need for "identifying' current niche developments that could dominate in an alternative future (O'Neill et al., 2020).

4. The pandemic has resulted in a serious rethinking of what matters, as shown in the Great Resignation in the US, discussing the 5-day workweek or hybrid work policies, and in reassessing the role of government in society. Yet, rethinking what matters is essentially requiring a rethinking of valuing what matters, and how to value what matters (Suárez-Eiroa et al., 2021). The current GDP calculation, which is highly influential in guiding policies, is highly deficient in valuing what matters (Sen et al., 2010). Many of the heroes of this pandemic are among the most lowly paid in society. It also requires valuing natural resources properly unlike what is happening nowadays in most places. Habitat destruction disrupts the natural balance in ways that can fuel pandemics like COVID-19 (Lawler et al., 2021; Platto et al., 2021). It is imperative to reduce the risk of future pandemics by controlling deforestation and curbing the wildlife trade, which would directly reduce habitat destruction, benefit biodiversity and reduce health risks (Tollefson, 2020). If we want to move to a thriving circular economy, we will require more local solutions and resources (Suárez-Eiroa et al., 2021). This is likely to have a direct adverse impact on global supply chains as they would reduce in size and scope. However, such a transition will require a structural rethinking of our current mindset about growth, abundance, and affluence (Bauwens, 2021). It is more about behavioral change than it is about investments. This behavioral change is not only about what to value, but also about how we think about technology (Laskurain-Iturbe et al., 2021). Too often we embark on technology without looking into the unintended consequences of such technologies. Obviously, there are always risks but to better map these out, and assess the trade-offs that we need to make is something that needs to be done much more diligently than is currently the case, especially as many of these new technologies are (partially) funded by taxpayers' money (Hartley et al., 2020).

5. The pandemic has resulted in (at least temporary) changing perspectives and policies. Because of the long-term damage that climate change is and will be inflicting on the world, it is likely to require even more transformation than the pandemic required. Business practices will need to change if a circular economy is to take place in which the main element of such a system is sustainability and resilience, not a single-minded focus on profit maximization. Efficiency, sustainability and resilience often will require significant trade-offs (Geissdoerfer et al., 2017; Fanning et al., 2020). A system that is efficient is not necessarily a system that is resilient as the COVID-19 pandemic has amply demonstrated.

6. Building back better also requires a just transition to a greener, fairer and more sustainable global economy and society, which overcomes the negative externalities of current unsustainable consumption and production practices, but also injustice to the poor and vulnerable, who are disproportionately impacted by climate change, the current and future pandemics (de León et al., 2021). This requires inclusive resilience building through empowerment and capacity building of marginalized groups in the global north and south (Penkler et al., 2020; Phillips et al., 2020).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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