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The Risk of Climate Change and Extreme Weather

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5 The risk of climate change and extreme weather

5.1 Introduction

The Earth's climate is changing again. The difference this time is that it is happening relatively quickly and that one species is mostly responsible for it. The prevailing consensus is that we need to keep the increase to 1.5 degrees Celsius or less, a figure we could pass early in the 2030s or even as soon as 2024 (McKibben, 2021). The coronavirus pandemic was largely beneficial insofar as it slowed economic activity and bought us some time. But the result could very well be negative since we have not been using that time wisely. We could also experience a post-pandemic boom that could push the planet past its breaking point.

No plans have been proposed much less implemented to meet this emergency – even the much-heralded Paris Agreement of 2016 falls short of what is needed and lacks any enforcement mechanism. Although we are uncertain about how significant the increase in global average temperatures will be and how that increase will manifest itself, it is very likely that the impact will hit poor and indigenous peoples soonest and strongest. And since we have already begun to see the effect of climate change in the form of extreme weather, the future we have been dreading is already here.

The reasons why we have gotten to this point are numerous but also obvious. Economists have been negligent to an astonishing degree in excluding environmental costs from their models and forecasts. Even though it favors the pursuit of wealth as a normative goal, the discipline is too focused on a narrow cost-benefit analysis, which has come to dominate environmental policymaking (Heinzerling, 2018). Relatedly, business leaders are too focused on profit margins to think about the long-term viability of their industries and seem to be banking on their ability to move assets to safer locations to shield themselves from any consequences.

Political institutions also incentivize short-term thinking over sustainability and stewardship. Politicians are rewarded at the ballot box for what they can deliver in the present, not for the future harms they can avoid. Climate is not simply a free-rider problem, with some benefiting from their inaction, or a tragedy of the commons, where commonly held lands are neglected. It is a distributive-conflict problem, in that large coalitions have emerged to oppose actions they fear will harm their interests (Meyer, 2021). In that sense, the outsized influenced that economic elites have in democratic politics has warped the accountability structure for elected officials.

Scientists too have, albeit inadvertently, aided to the problem, in that they have devoted a great deal of time and attention to predictive modeling, attempting to

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discern the exact magnitude of development on the climate, rather than building a broad consensus around information that is actionable. In so doing, they have set the standard for information and knowledge too high, which has permitted skepticism and confusion about the nature of the problem and what needs to be done about it (Sutton, 2019).

The pandemic, which exacerbated the problem of inequality, also revealed serious gaps in the infrastructure related to public health and social services and the willingness of elected officials to do what is necessary in favor of what is popular or perceived to be popular in response to a crisis. In the United States in particular, masks and vaccines have become as politicized as climate science has been in previous decades. The pandemic also pulled the curtain down on the prevailing wisdom for some of our inaction – namely, that the human brain was to a certain extent unable or unwilling to graph the magnitude of the problem. For the psychologist Daniel Kahneman, climate change is the perfect threat since it is distant and uncertain but requires clear and immediate sacrifices (Marshall, 2014). Yet the pandemic has shown that humans can also be incapable of appropriately responding to immediate and clear threats, even when the sacrifices are minimal and temporary. This is especially true in 'loose cultures', which tend to favor openness and individual creativity over order and coordination (Rose, 2021).

The numbers related to managing climate risk bear this out. A recent survey from Ipsos of people from thirty markets from around the world found that only four percent knew that the previous six years had been the hottest on record, with incorrect answers underestimating the impact of climate change. This is also true for strategies. The survey identified recycling as the most-mentioned individual-level action to combat climate change, with 59 percent of people identifying that as a top option. In fact, only 11 percent named having one fewer child (the most effective action) in their top three, while 17 percent named not having a car, and 21 percent named avoiding one long-distance air travel, the second and third most-effective measures. Only respondents in Belgium, Germany, the Netherlands, and Sweden were more likely than average to identify long-distance travel as an effective measure (Perils, 2021). Clearly, we need to get better at managing climate-related disasters and extreme weather events, but the public first needs to more fully comprehend the scope and magnitude of the issue.

The short answer to the question of climate is sustainable development. In its landmark 1987 report, Our Common Future, the World Commission on Environment and Development defined sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission, 1987). As the Commission notes, we have not only the ability but also the responsibility to do what needs to be done. And we are quickly discovering that we have no other option. The more the risk has been ignored, the fewer options we will have and the more aggressive responses must become.

The purpose of this chapter is to explain how to manage risk related to climate change and extreme weather by transforming economic development, planning, and social policies. As Bahadur et al. put it, 'Transformation is a not a capacity but rather an approach to holistically and fundamentally build, reshape and enhance people's capacity to adapt to, anticipate and absorb shocks and stresses' (2015). While the risk can never be eliminated completely, it can be greatly reduced and much more must be done if we are to avoid the worst of its effects.

To organize possible strategies, we will follow Bahadur et al. (2015) and break down resilience of social systems into three types of responses – adaptive, anticipatory, and absorptive, capacity. Since how we categorize responses might vary according to community context, especially one facing an immediate threat, the categories are not mutually exclusive and indeed build on one another. Indeed, the categories are more complementary than hierarchical, with each community and country needing an appropriate combination of short-term responses and long-term planning and investment.

5.2 Adaptive capacity

Adaptive capacity is the extent to which social systems are altered to meet the various risks related to climate change and extreme weather, including making adjustments after events. It also involves actions designed to minimize the likelihood that hazards will occur and mitigating negative outcomes when they do. Government officials, for example, could use data related to changing rainfall patters to modify drainage systems. The same data could be used by farmers to change the crops they produce (Bahadur, et al. 2015). Moreover, adaption involves learning from repeated events to rebuild in a manner that is less vulnerable and more resilient (Manyena et al., 2011) to avoid getting trapped in a cycle of vulnerability (Becchetti and Castriota, 2011). This type of resilience requires deliberation and planning, especially after conditions change, and is more often and perhaps best practiced during non-emergencies.

One essential area of focus is the food system, which as currently constructed is unsustainable in several ways. The United Nations Food Programme estimates there are 931 million tons wasted ever year, with 61 percent of that resulting from households (Food Waste). If this waste were a country, it would rank third, behind China and the United States, in greenhouse gas emissions (Promoting Sustainable Lifestyles). In sum, about 8–10 percent of greenhouse gases are the consequence of wasted food (Mbow et al., 2019). One recent study found that the average person wastes a total of 727 calories per day, which is roughly 25 percent of the calories humans have available for consumption (Verma, et al., 2020). Perhaps the most staggering revelation from the study is that we are wasting more food than we used

to – a 38.2 percent increase since 2003. Unsurprisingly, food waste is largely a product of affluence, which in part explains some of the trend, and unless this pattern changes, lesser developed countries will adopt the same wasteful practices as the more-developed parts of the world. Loss related to transportation is especially pronounced in developing countries and will require infrastructure to correct. But given that households are responsible for such a large portion of the loss, consumer awareness is also a key component in making the necessary corrections.

How we choose to eat also affects the climate. Perhaps the most impactful change will be a reduced reliance on animal-based protein, which is terribly inefficient. Although it is well-known issue, world-wide meat consumption has been increasing, especially in lesser-developed countries, which have come to see meat as an important measure of status or class. Many people are simply unwilling to go without meat, even when better alternatives exist and even though people in well-off countries continue to eat enough protein for daily requirements even after animal-based protein is removed from their diets. The loss of micronutrients is of greater concern than protein-deficiency for vegetarian diets and should be given more attention. We also need to educate and incentive against food and beverages like coffee, tea, soda, alcohol, and chocolate, which can require a significant amount of cropland but produce little or no nutritional content (Macdiarmid and Whybrow, 2019). To that end, we need to stop feeding food to our food be smarter about what we produce and consume.

Water is another essential area for adaptive resilience, some of which is related to food production. We need to increase the availability and reliability of water by developing new techniques for collection, storing, and dispensing through dams, farm ponds, and public tanks in agricultural areas (Sikka et al., 2017). Also essential to transforming water systems is drainage and more efficient irrigation systems (Naresh et al., 2017). This could include drip irrigation, hydroponic or other low-use systems, especially for urban agriculture.

The twenty-first century will very much be 'the century of cities' (Yigitcanlar and Inkinen, 2019), which in addition to agricultural areas, are also an important element of risk management and sustainable development. Cities are responsible for 78 percent of the world's energy use and 60 percent of greenhouse gases, even though they cover only 2 percent of the surface of the planet. By 2050 another 2.5 billion people will be living in cities, making city planning essential to any sustainable development strategy (Cities and Population, 2021).

Unfortunately, the concept of a 'smart city' has too infrequently placed environmental concerns at the forefront, focusing instead of matters of good governance, infrastructure modernization, and digital technologies, among other innovations. Songdo, South Korea is widely touted as the smartest city in the world, but, apart from social concerns, it has also been highly criticized for its environmental standards (Townsend, 2013). Although there are some exceptions (e.g., Vancouver, Copenhagen, Vienna), 'the environment is afforded a rather more marginal role in the smart city than one

would expect from comparable sustainable city concepts and initiatives' (Joss, et al., 2019). To reduce the impact of cities on the climate, UN-Habitat, UNEP, the World Bank, and Cities Alliance have established the Joint Work Programme to bring environmental-conscious development more fully into city planning processes. In Hangzhou, China, for example, this led to a bike-sharing system, which significantly alleviated road traffic and improved air quality. And in Jamaica, this meant a communications initiative for residents. Moving forward, 'smart' must mean sustainable much more so than it has to this point.

Cities run the risk of congestion, pollution, and terrible inefficiencies with regard to how people get around. But areas with dense populations also bring with them the opportunity for great advancements. One recent study of Australia's four largest cities found that cities had policies and standards for access, but there was great variation among the goals and how that access was measured. And given the disparity, it was not possible to assess the relative effectiveness of each system. It is also essential that access is mapped to discern any spatial inequities, which will direct areas of future investment and development (Arundel, et al., 2017). The goal should be to increase the percent of the population with easy access to public transportation, especially for the elderly and people with disabilities.

A systems-level look at climate will also focus more extensively on the treatment of women and girls. For example, around three billion people use fires or kerosene, biomass, or coal stoves, which, in addition to climate change, are serious health hazards that disproportionately affect this part of the population. As the group responsible for a large portion of domestic work, women and girls also suffer from exposure to household pollution, resulting in 1.8 million premature deaths in 2016 (Progress, 2020). Yet, as deputy secretary-general of the UN, Amina J. Mohammed noted at the Climate and Development Ministerial Meeting in March 2021, women and girls, who make up 80 percent of those who are displaced by climate disasters, are often shut out from the processes that could prevent future crises. Giving proper attention to the education and treatment of women, in addition to being the just and equitable thing to do, has important spillover effects in terms of adaptive capacity.

Some have suggested a carbon-pricing solution to alter the current incentive structure and make the changes necessary to eliminate the severest of consequences related to the climate. But as Rosenbloom et al. (2020) detail, the focus should be on transforming the system, not correcting for a market inefficiency. Moreover, the urgency of the situation demands rapid progress, which the rigidity of current economic structures make exceedingly difficult. There is also the political question of how such a regime can be implemented in a manner that is effective. To that end, Rosenbloom and his coauthors suggest a 'sustainability transition policy' as a more viable alternative. The focus here is not on the market, but on technical and sociological solutions related to energy, inequity, food, and industry. Carbon pricing might be part of the mix, but a transition policy is a comprehensive solution that is more focused on replacing inefficient technologies and infrastructure, increased support for innovation,

reforming planning processed and the rules of the market, to create new social norms and practices. As a result, this approach would be able to quickly reduce emissions, transform systems in a fundamental way, develop responses that are context appropriate, and navigate sometimes-murky political waters.

In her speech at the Ministerial Meeting, Mohammed also observed that, although resilience and adaptation as a 'moral, economic and social imperative', only one fifth of climate finance is dedicated to it. She went on to offer five practical actions to address the climate emergency, which she wanted to see put in place by the end of the year: (1) a doubling of the public finance devoted to climate action from 2021–2025 and also a 50 percent increase from development banks; (2) more efficient and simpler access to climate support; (3) an increase in existing disaster-related financial instruments, in addition to new ones designed to increase resilience; (4) developing countries must have access to the tools and instruments they will need to incorporate climate risk management into planning and other processes; and (5) greater support for local and regional adaptation projects in the most vulnerable locations (Mohammed, 2021).

Put most simply, development that is not sustainable is not really development. Progressives and environmentalists have focused too much on the negative risk, without sufficient attention to positive risk. Indeed, most mitigation efforts are also goods unto themselves. It is not just that we are avoiding negative consequences, but getting development and energy right means the economy is becoming more sustainable, and we would also get to enjoy the benefits of cleaner, healthier, and more equitable living as a result.

5.3 Anticipatory capacity

Unlike adaptive capacity, which focuses on ever-changing risks and long-term planning, anticipatory capacity deals with specific and more immediate threats. This form of resiliency involves planning and preparedness to predict and minimize the impact of specific hazards related to climate change and extreme weather. This is also contrasted with absorptive capacity and the reactive behaviors that occur after an event (Bahadur, et al. 2015). The goal is to protect lives and limit the social, economic, and physical consequences of weather events.

Anticipatory capacity, for example, could involve using early-warning systems for droughts or cyclones or geospatial data for preemptive measures to reduce the impact of disturbances (Fankhauser et al., 1999). This would include emergency planning and preparedness exercises, for example moving goods and services or putting in place or plans to assist the most vulnerable in the population before such events (Kellett and Peters, 2014). In the case of flood risk, this could involve making

public evacuation routes and sharing flood management plans that include responsibilities for designated individuals (Asian Development Bank, 2009).

Increasing temperatures, the change in precipitation patterns, and the increase of extreme events related to climate change already begun to affect food security, especially in parts of the Mediterranean that have seen warming and drying. At the same time, harvest yields in higher latitudes have seen an increase in crop yield in recent decades (Mbow et al., 2019). Even where availability is not affected, prices will almost certainly increase. To prepare, agriculture practices need to improve erosion control and increase organic matter in soil, better land management, and genetic modifications for drought and heat. Food systems should also be diversified to include integrated production and a more heterogeneous diet.

Many risks related to climate are overlapping, especially in food and water, which can require bolder interventions but can also limit anticipatory planning options. This is especially true given the estimates surrounding food production, which will need to increase by about 50 percent by 2050 to meet the growing population (The Future of Food and Agriculture, 2018). As a remedy, some have pointed to 'sustainable intensification' that is, using technology and new approaches to increase the productive capacity of agricultural areas. Some techniques have the added benefit of carbon sequestration (Jat el al., 2016). While not prescriptive with regard to the particular innovation, it does require that an ecosystem is preserved and that all aspects of food production are sustainable. Governments needing farmers to adopt agroecological practices should also make available low-cost loans or micro financing, insurance, or contingency funds (Mbow et al., 2019).

Migration and conflict are other specific threats, which is often related to food insecurity. We have already seen an uptick in international migration (International Migration Outlook, 2017). Changing patterns of precipitation has already been linked to food security in eight countries (Warner et al., 2012) and migration, permanent and seasonal, has already been linked to droughts and land degradation (Gray, 2011). Floods and droughts can affect the availability of food and water, which can cause families to flee a region. But becoming displaced is itself a cause of food insecurity, especially when migration-related conflict occurs. This too disproportionately affects the poor, in particular women and children. Already fractured regions, like Central Asia and North and Central Africa, are especially vulnerable (Buhaug, 2016).

Just as women and girls have a strong role to play in absorptive capacity and the creation of food infrastructure, food insecurity will also disproportionately affect poorer communities and will disproportionately affect women, another reason why gender equity needs to be at the forefront of any risk management plan. Women, not surprisingly, are less likely to have access to land and other essential elements of food production (Thompson, 2018). Women are also more likely to be affected by spikes in prices, especially in regions where cultural norms expect women to reduce consumption when other family members are in need (Vellakkal

et al., 2015). Women need to be at the table to set the standards for what sustainable development and food security looks like.

Many anticipatory activities have additional positive risks. Irrigation ditches created to withstand storm surges, for instance, can also increase farm production and reduce deforestation and soil erosion (Tanner et. al., 2015). More generally, these activities have the added benefit of increasing a community's independence and ability to coordinate it activities. Moreover, climate change and extreme weather can affect the quality and the quantity of food available for consumption, especially staple crops, which is a serious concern for lesser-developed regions. Importing food from far away means that communities are too reliant on certain sources, which can be detrimental in the wake of a weather emergency, whereas eating locally grown food reduces the environmental cost of transporting food long distances. This is especially true in areas that have insufficient transportation infrastructure. This is especially true in areas that have insufficient transportation infrastructure.

To help us to better determine where our attention and investments should be and prioritize our action plans, we also need better data. For example, the 17 Sustainable Development Goals (SDG), established by the United Nations' Department of Economic and Social Affairs in 2015, outlines the need for developed and developing countries to partner in a comprehensive plan to end poverty and increase economic growth, while protecting the environment and addressing climate change. Yet the related SDG indicators outline an action plan for cities focused on sustainable development and health, many of which are inconsistent with the SDGs and are insufficiently focused on the structural and policies changes required to bring about the stated outcomes.

Similarly, a framework set by UN Habitat included indicators related to interventionist policies but failed to consider important health indicators (Giles-Corti, Lowe, and Arundel, 2020). Plans must include not only comprehensive goals, but adequate tracking of outcomes. As Mohammed (2021) puts it, 'Risk information is the critical first step for risk reduction, transfer and management'. At the same time, planners and public officials need to be mindful when gathering and analyzing the data needed to build or renovate infrastructure and related practices that they are modest in their standards. They should not, for instance, make the same mistake as many climate scientists have made in demanding and working toward perfect knowledge (Sutton, 2019). Data will always be incomplete and imprecise, but at some point it needs to be actionable.

Relatedly, there also needs to be more integrated studies related to the nexus of food, energy, and water that would focus on local and regional monitoring and modeling (Van Gaelen et al., 2017) and public and private partnerships, especially among industry, government, and the academy to gather data and form policy (Scanlon et al., 2017). Such an approach would need to be founded on the notion

that demand for resources could still be greater than what sustainable methods can produce (Benton et al., 2018).

If addressing the issues of food and water is foremost a problem for science and technology, migration and conflict require multilateral diplomatic and economic solutions, if only to protect and support for the millions who will find themselves needing to flee their homes to survive. Both will require a substantial increase in financial support and collaboration and will include additional political risks.

5.4 Absorptive capacity

Building anticipatory capacity is largely a product of adaptive capacity falling short. If we had done what needed to be done in the 1970s and 1980s, we would not need to speak about anticipatory capacity or absorptive capacity, except in the case of natural disasters and accidents. Similarly, the more our anticipatory measures fall short, the more we will require reactive and costly absorptive measures. In that sense, we will come to rely more and more on what should be our last line of defense against climate change and extreme weather events.

Unlike anticipatory capacity, which deals with preparedness, absorptive capacity refers to the period during and after disasters and weather events (Bahadur, et al., 2015). The most visible form of resilience, it focuses on the ability of communities to use existing resources and skills to effectively manage the impact of such events. The goal here is to increase the ability of social and economic systems to serve as a buffer and to withstand weather disturbances.

In practice, this means deploying tangible and intangible resources to help communities survive and preserve their quality of life. Financial resources, which are essential to maintaining essential functions and rebuilding infrastructure in the aftermath of an event, are especially useful. This can take many forms, including governments having in place social programs or issuing insurance payments. These mechanisms are most effective when preset triggers have been put in place to release collective loans and other savings programs (Bastagli and Harman, 2015). On the private side, donor networks, especially international networks and other support services, are essential in times of crises.

We will need large-scale financial incentives build resilience through urban planning, architecture, forest management, seawalls, and other projects that increase absorptive capacity, rather than just trying to make the future less bad. We need to think beyond tax breaks to more psychological or emotional incentives – guilt can work, but pride would be better – that can be part of our everyday lives and might have more of an impact on some people (Met, 2021). Half-measures designed to limit the impact on the environment need to give way to measures designed to build resilience for the more-distant future.

The financial costs of disasters and weather events on households especially impacts children (Becchetti and Castriota, 2011), so having created mechanisms for easy credit will ease the impact of families and children when the stresses and shocks arrive. Micro-credit and other forms of disaster relief are valuable tools that can help with absorptive capacity (Doocy et al., 2005). Diversity in assets also increases a community's resilience. Business leaders will need to look past the profit motive and immediate self-interest and do what the emergency requires.

This will also be a test of the integrity and competence and responsiveness of public officials. Since the market is not made for crises, governments and other relief agencies need to monitor the disbursement of funds to protect against corruption, theft, and price gouging. As we witnessed time and time again with the COVID-19 pandemic, elected officials are quick to shirk their responsibility and good sense when their leadership is met with resistance. We have also seen instances where that resistance is more than just rhetorical, with the attempted kidnapping of the governor of Michigan, in response to her aggressive but sensible management of the health crisis. To be effective, public officials need to rely on and defer to scientists and public health officials to assess the scope of the situation and determine the best path forward, especially when it is unpopular.

The lack of absorptive capacity can have long-term implications for a community's ability for development, including anticipatory or adaptive planning. From a risk management perspective, absorptive capacity is the easiest to estimate because the extent of the risk is mostly known. On the other hand, since the crisis has already come, it is too late to initiate any preventative or mitigation measures. The goal should be to become resilient without the need of a disaster.

What is more, building back better cannot mean building back the same, regardless of the strong cultural and political incentives to do so. Rebuilding is an opportunity for more sustainability, not an excuse for repeating the same mistakes. If we do not sufficiently attend to matters of adaptive capacity, the more we will find ourselves lurching from one crisis to the next, always reacting and never doing what is needed to develop in a way that provides for and prepares future generations.

5.5 Conclusion

The impact of human development and behavior is more than merely a matter of quality of life, although that will be readily apparent. We are running the risk of fundamentally altering the living patterns of large parts of the planet and displacing millions, especially the poor and ingenious peoples. There is also likely to be an increase in political strife and violence, as states vie for territory and resources.

Although the situation is serious, all is not lost. It is a risk we are capable of managing, even if we are decades behind. Perhaps the most important thing we can

do is to stop focusing on the costs of whatever adaptive measures we deploy or consider. Resilience can be costly, but the cost of doing nothing is far greater. A recent study of sea-levels and flood maps showed that $8 billion of the $70 billion total cost from 2012's Hurricane Sandy, which walloped the East Coast of the United States, could be attributed to human impact (Strauss, et al. 2021). Similar results were found related to the 2019–2020 brush fires in Australia, which were exacerbated by climate change by 30 percent or more (Oldenborgh, et al., 2021). There is much more of this to come.

The problem, as we have discussed, is that market capitalism and popular governments include strong incentives for short-term thinking. One significant obstacle to building resilience has been the capitalist ideology and rhetoric surrounding regulation and green planning as somehow at odds with development. As Naomi Klein details in her 2014 book *This Changes Everything*, we need to stop pitting the environment against the economy in a zero-sum game. Sustainability and resilience needs to be the foundation for any development strategy.

At the same time, we need to operate on a scale that matches the problem. The time for incrementalism and kicking the can down the road has long passed. Meeting the moment will require a culture shift in how people, especially people in developed states, imagine their relationship with the natural world. We cannot be so focused on material goods, imagined conveniences, and petty pleasures that we are unwilling to take the actions necessary to avoid climate catastrophe. For too long, many of our conclusions about climate action have fallen into two camps: actions that are too big and therefore impossible or actions that are too small and therefore insignificant. It is true that any one thing will not be enough, but that does not mean that small actions should be disregarded.

Large-scale mobilization is required to elect climate-aware officials and hold them accountable for the laws and the policies they put in place. Democratic institutions must be strong and vigilant enough to control the market and make sure not only that future development is sustainable but that wasteful activities are either ended or drastically scaled back. If a distributive-conflict problem is at the heart of climate inaction, then larger coalitions will need to be created on the other side to tip the balance from short-termism and extractivism in favor of resilience and sustainability. In policy terms, we need a Green New Deal on a global scale.

We also need to be aware of how political borders are either irrelevant or harmful to resilience strategies. Economic actors have used the limits of political reach to exploit natural resources and maximize profits, but the climate does not recognize interstate boundaries. We need governments to act through alliances and international organizations vehicles for risk management and collective action.

Moreover, getting on the right side of climate should be a huge incentive for business leaders who are not motivated by wanting to do the right thing but should want to future-proof their bottom line. Getting out in front will mean they can avoid the most extreme government regulation when or if it happens. Unsustainable

businesses will have the pressure of not being able to recruit and retain the best talent. There is the added incentive of avoiding boycotts and public backlash, especially with high-profile accidents.

We should also be aware of the magnifier effects of equality. The positive risks associated with a sustainable approach to development are consistent with the values of humanitarian and political liberalism. Yet women and girls, as we have seen, suffer the most in the wake of any particular crisis, receive the least attention and support in preparation for climate-related threats, and yet are also the least equipped to influence the direction of sustainable development activities. Getting right with how we treat marginalized and exploited populations, including the poor and indigenous peoples of the world, is the single most important element of managing the risk related to climate change and extreme weather. It is not a stretch to say that if we can do right by them, we can do right by the planet.

Education is an essential precondition for any nation or community to support the regulatory regimes and financial policies required to build adaptive capacity (Bengtsson, Barakat, and Muttarak, 2018). Worldviews matter. The vision of the future might not be precise, but it should focus the public on how climate change might affect them and their families. It should also include what each person could be doing, even when those actions could be considered to be a sacrifice.

'The main challenge', says UN Environment Programme's Tim Christophersen, 'is the lack of human imagination; our inability to see a different future because we're staring down this dystopian path of pandemic, climate change, biodiversity loss. But the collective awareness that we are in this together is a huge opportunity' (Rose, 2021). Too often our creativity is used for innovations that are more wasteful. Think of difficult-to-recycle K-cups that fuel individual coffee makers; synthetic clothing, which releases plastic every time it is washed; and the packaging from processed foods (Good, 2021).

Even so, our plans and the messaging related to them need to be positive. 'We're not going to change humanity by saying, "Everything has to be less"', says Ties Van der Hoeven, the co-founder of the Weather Makers, a firm of Dutch engineers who are implementing an eco-restoration plan for the Sinai peninsula. 'No, we have to do *more* of the *good* things'.

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