United Nations University – Institute for Environment and Human Security (UNU-EHS) and the UN Office for Disaster Risk Reduction (UNDRR)

Rethinking risks in times of COVID-19

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Executive Summary

The COVID-19 pandemic has been tremendously difficult for many people across the globe. What was initially viewed as a health crisis affected societies to their core, many of which were already grappling with the devastating effects of climate change, as well as other challenges such as political instability and conflict.

While each of these crises has its own identifiable causes, the increasingly interconnected nature of our world means that these shocks or hazards — and the knock-on effects from them — cannot be viewed in isolation.

Indeed, the number of record-breaking disasters witnessed over the past years and their cascading effects across sectors and borders have illuminated those interconnections as never before. Similarly, interconnections became very visible when COVID-19 started to spread around the globe. The unfolding pandemic prompted a range of policy measures to limit the spread of the virus and avoid health systems becoming overwhelmed. Yet the effects of these measures, including stay-at-home orders and shutdown of public life, while highly important to prevent health system collapse and reduce COVID-19 fatalities, hit the most vulnerable the hardest. Underlying vulnerabilities such as poverty, precarious jobs in the informal economy, lack of access to education and, structural gender biases were exacerbated by the pandemic.
This report sheds light on the complexity of risks in a highly interconnected world, and present lessons for risk management. Focusing on COVID-19, it shows how, through the interconnectedness of societies and the underlying vulnerabilities within them, the direct and indirect impacts of the pandemic have revealed the systemic nature of risk. Through a case study approach, it demonstrates how the pandemic triggered a multitude of impacts far beyond the direct health crisis, including joblessness, debt, civil and domestic violence and the derailment of their children's education, among many others. In many locations, women suffered disproportionately, whether as a result of bias in employment patterns or other pre-existing gender biases in society. Drawing on insights from different case studies across the world, this report also offers lessons from the pandemic for understanding risk more systemically, and presents recommendations for risk management moving forward.

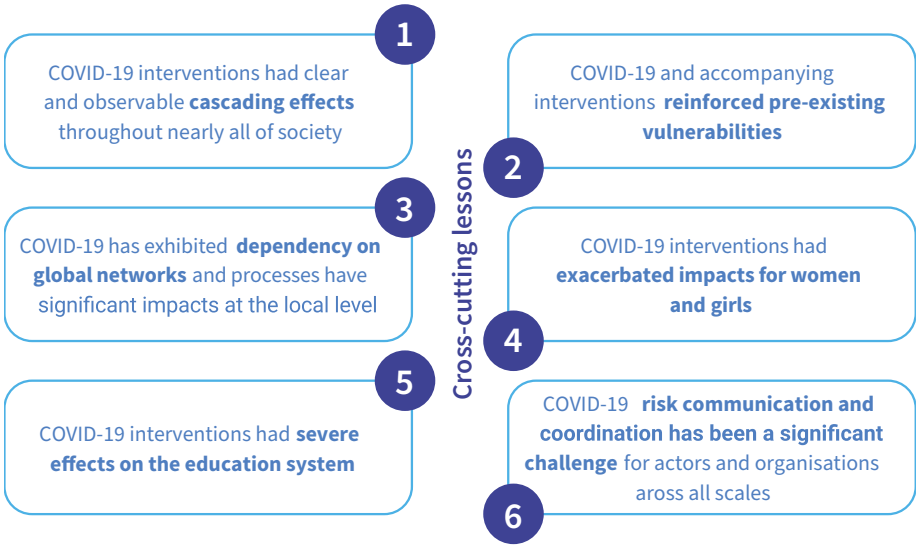

Figure 01:
Cross-cutting lessons from the five case studies

Figure 02: Location of case studies

Five locations, six cross-cutting lessons

Locations in Bangladesh, Ecuador, India, Indonesia and Togo were selected to learn about the many different effects of COVID-19 in different geographic and societal contexts. In all cases, the research revealed clear domino effects that cascaded through communities, sectors and systems, exacerbating pre-existing risks and creating new ones.
The research in Guayaquil, Ecuador, provides insights into how COVID-19 overwhelmed a densely populated, overcrowded urban area. It also shows how a location's dependence on global trade creates and reinforces vulnerabilities. In the Sundarbans, India, the concurrence of COVID-19 and a tropical cyclone created cascading risks that lead up to worrying long-term effects. In Cox's Bazar, in neighbouring Bangladesh, pre-existing social inequity in a highly fragile setting is the backdrop to understanding the pandemic's effects in the world's largest refugee camp. The research in the Maritime region of Togo highlights the rural-urban and national-international interlinkages of COVID-19 in a regional Sub-Saharan context with high levels of poverty. And in Indonesia, COVID-19 led to interconnected challenges on multiple fronts: collapsing health systems, grave impacts on the economy and associated ripple effects on debt, poverty and inequalities, as well as on emergency response to other hazards that occurred amidst the pandemic.
The research in these locations allowed for the identification of a number of cross-cutting lessons:

1. COVID-19 and the measures to combat the pandemic have cascading effects throughout societies

Nearly all the measures implemented to address COVID-19 have had a domino, or cascading, effect through societies and economies, impacting livelihoods, gender, education, and political and social dimensions.

2. COVID-19 reinforces pre-existing vulnerabilities

COVID-19 has made life even more difficult for people already facing challenging circumstances, such as those living in poverty, working in unsecure jobs and children who experience abuse or neglect at home. It worsens inequality and injustice throughout society.

3. Dependence on global networks has a big impact at the local level

In a world that has steadily globalized in recent decades, many locations are highly dependent on global networks. For example, port cities dependent on global trade, particularly those in developing economies that heavily rely on the income they generate, ground to a halt during COVID-19, resulting in widespread impacts on livelihoods and unemployment at local levels.

4. Measures to combat the pandemic have disparate effects on women and girls

Increased exposure to COVID-19 through work settings, widening gender pay gaps, an increase in domestic violence and increased instances of child marriages: all of these have been experienced by women and girls in our case studies.

5. Access to and quality of education was severely affected and the full extent may only become apparent over time

Education is another aspect of daily life that has suffered significantly as a result of COVID-19 restrictions. The pandemic has had particularly severe effects on educational opportunities of children in lower income settings.

6. Risk communication and coordination have been a significant challenge for authorities, which has resulted in less effective risk management

Dealing with a global pandemic requires effective coordination and communication among actors, from national governments and multilateral non-governmental organizations down to local authorities.

As societies were faced with a highly dynamic and unprecedented situation, decision makers across the spectrum at times struggled with communicating the risks, as well as with co-

New ways to approach risk

Many parts of the world are still grappling with COVID-19 and the human tragedy of its effects is still, unfortunately, playing out. Yet, lessons from the pandemic can already be taken away to strengthen risk management in the future.

COVID-19, and the systemic nature of risks revealed throughout the pandemic, have expanded our understanding of risk by drawing attention to the reality that hazards can emerge from outside as well as within the system. In addition, exposure can be indirect, meaning that effects can be felt in places that are not directly affected by the hazard, but could end up being impacted as a result of interdependency and interconnectedness. Finally, the vulnerability of one system can also turn into a hazard or shock for other systems.

Some key lessons stand out for developing a new approach to risk management, taking into account a "whole of society" view of systemic risk.

Zooming in on interconnections

One is to join the dots on interconnections. Understanding how things are connected with each other in systems deserves more attention. The cascading effects originating from COVID-19 made it possible to spot the interconnections that exist in many such systems and to assess whether a system is functioning as intended.

Understanding cascading effects

A second point is the possibility to identify the trade-offs implicit in policy measures. We have seen that several measures to combat COVID-19, such as school closures, stay-at-home orders or travel restrictions, have had widespread cascading effects. This highlights the need to assess and evaluate possible trade-offs and cascading effects involved in introducing such measures, because they can have unexpected repercussions and can exacerbate existing societal vulnerabilities.

Systemic recovery

A third is to focus on processes for systemic recovery while leaving no one behind. The interconnected nature of systems presents an opportunity for positive turning points, by creating positive – as opposed to negative - cascading effects. For example, some policy measures designed to reduce COVID-19-related risks produced additional positive outcomes on top of reducing the direct health risk. More attention should be paid to such policy measures in risk management, which can include job creation following the provision of financial assistance from governments, charities and NGOs, or advances in digitalization following stay at home orders.

Today's interconnected world is an evolving system, and disastrous events are often the results of systemic failures. The findings presented in this report point towards a deeper understanding of systemic risks, how they trigger other hazards and shocks, often in unpredictable ways. Managing these risks needs to be properly embedded in how policymakers, planners and other stakeholders approach risk management. This will create more resilient, equitable and prosperous communities and societies globally.

Chapter 1

Introduction

A. Understanding systemic risks

Before the COVID-19 pandemic, the interconnectedness of risks in our world may not have been immediately obvious in our daily lives. Nor was the systemic nature of these risks, meaning how they affected, or can potentially affect, whole societies beyond the initial problem.

For one thing, we have tended to think about systemic risks in relation to what happened as a result of the 2008 financial crash, where the failure of big banks rippled across the global economy, leaving millions out of work and sparking a global economic recession.

Other examples can be seen in how climate change, natural hazards and more recently the global consequences of the war in Ukraine have brought home how our world relies on a complex, often fragile, web of interdependent factors that, if destabilized, can have devastating effects on whole societies. For example, Ukraine and Russia are both key global cereal and fertilizer producers. One of the ripple effects of the war can be seen in rising global food prices, resulting in higher costs of living for those who can afford it and pushing those who cannot deeper into food insecurity.

But it has been the emergence of COVID-19 that's really forcing a broadening of perspective on systemic risks. Put simply, the pandemic produced a domino effect when it hit, starkly illustrating that our world is interconnected through systems, which come with associated, volatile risks that have revealed, and reinforced, vulnerabilities across society.

While some of these risks are undoubtedly negative effects of the pandemic, we can learn from them because they have expanded our understanding of risk.

First, we can now see more clearly that hazards and shocks can emerge from inside and outside the system. By "system," we mean the way our societal processes, such as government, supply chains, education and health care are designed, organized and function, and how they are in constant interaction with one another. A system could be, for example, a city's critical infrastructure, national scale health care, education or international trade. Systems are made up of different subsystems, that have specific components, elements and stakeholders. The boundaries of the system depend on, for example, the decision-making or governance context. By considering events from the perspective of systems, it helps to reduce complexity and understand how things are interconnected. To illustrate this in the context of COVID-19, though for many countries the disease initially emerged from "outside" of the system via international travel, it quickly spread throughout populations and communities within national borders due to an initial lack of containment measures. Many of the government measures to protect at-risk groups or prevent the collapse of health systems have led to widespread effects on society, leading to so-called cascading effects, such as school closures, disruption of supply chains, unemployment and increases in domestic violence. We can think of these as "secondary," and even "tertiary," hazards.

Second, the pandemic has also shown that exposure to these risks is not only a matter of being located in a hazard-prone area (e.g. a hotspot area with very high numbers of daily infections) but can also be through experiencing something indirect. One example is the small island nations, such as Samoa, Tonga and the Cook Islands, that were largely COVID-19 free until late 2021 but, nonetheless, due to their dependence on tourism, have been severely affected by the global travel restrictions that continue to be part and parcel of governments' responses.
Third, we saw how vulnerabilities that characte-

rize parts of the system can in themselves be the origin of new hazards or shocks that "cascade" into the broader system. The best way to illustrate this is how governments, in protecting vulnerable people and unprepared health systems from collapse, introduced lockdowns, which then triggered other types of hazards, such as disruption of education due to the closure of schools. Lastly, COVID-19 has shown that it makes sense to move beyond an approach to analysing risk from one that looks at each hazard (e.g. COVID-19, floods, storms, droughts, etc.) individually to a more holistic approach that considers risks in a comprehensive manner.

Lastly, COVID-19 has shown that it makes sense to move beyond an approach to analysing risk from one that looks at each hazard (e.g. COVID-19, floods, storms, droughts, etc.) individually to a more holistic approach that considers risks in a comprehensive manner.

B. Five locations, seven determinants of systemic risk

In the five locations around the world where we conducted research, systemic risk emerged from the interconnectedness and interdependence of systems and actors within a system, as well as from the interactions among individual risks, resulting in cascades of failures and impacts. We have zeroed in on seven key characteristics that determine the risks associated with COVID-19: (i) interdependence, interconnectedness and cascading effects; (ii) non-linear relationships; (iii) feedback loops; (iv) tipping points; (v) risks under the radar; (vi) uncertainty; and (vii) dynamics.

Combined, these characteristics confirm the systemic nature of risks associated with the disease. The findings from this report illustrate how the COVID-19 crisis has caused ripple effects that move us from the domain of health risks towards the economic, social and political domains that must now occupy policymakers, practitioners, researchers and citizens like us as we think about safeguarding society from future hazards.

1. Interdependence, interconnectedness and cascading effects

Since it was first detected in Wuhan, China, COVID-19 has rapidly spread across countries through international travel, resulting in a sharp rise in infections globally and direct physical health impacts for millions of people. The immediate response of most countries was to protect at-risk groups, like the elderly and those with pre-existing health conditions, and to prevent the collapse of health systems. This included restrictions on public gatherings, stay-at-home orders, closure of schools and businesses, and restrictions on domestic and international travel. Yet, though these measures helped and undoubtedly saved millions of lives, they also led to further cascading effects on interconnected social, economic, financial and governance systems.

We can see this in various ways. Geographically remote countries, such as Cook Islands, Samoa, Tonga and Tuvalu, have had very little direct exposure to the disease. However, their economies and populations have suffered greatly due to their very high dependence on tourism, which has been hammered by the international travel restrictions triggered by COVID-19.

Food chains have been similarly disrupted in indirect ways, revealing the fragility of connections between local food producers and the global food system. Between May and June 2020, the pandemic triggered disruptions in the production and delivery of fertilizers, as well as reductions in labour forces and increased demand as a result of panic buying, all of which led to food shortages in many regions around the world. These disruptions were disproportionately felt in low- and middle-income countries, particularly among small-scale food producers and vendors (Béné, 2020). These examples resonate with findings from recent studies on the systemic nature of risk, which highlight the notion of interdependence.

2. Non-linear relationships

Things don't necessarily move in a straight line, and cause and effect isn't always correlated in the way we assume. Those two takeaways are important to understanding why so-called feedback loops and tipping points can happen, and have happened, during the pandemic. For example, the spread of viruses is not linear, and we've seen many countries unexpectedly experience multiple waves of the disease. In one of our case studies, for the Maritime region of Togo, the cumulative confirmed deaths per million people has been far lower than the global average. However, the cascading effects triggered by the pandemic meant that, even with a low level of infections in the country, global interconnections has resulted in a series of large-scale negative consequences for large swathes of the population.

3. Feedback loops

One effect can lead to another effect, often with undesirable results that worsen the original situation. That's the essence of feedback loops, which have been very noticeable during the pandemic as existing vulnerabilities in society have been revealed, one after another. For example, increasing hospitalizations have led to overwhelmed health systems, in turn increasing the risk of health systems collapsing. As we now know, once health systems are unable to reduce the spread of the disease as a result of being overwhelmed, COVID-19 continues to spread through the population, leading to a rising number of infections, which can be observed in most case studies. In the Maritime region of Togo, the pandemic has exacerbated economic challenges for the rural population, resulting in increasing levels of poverty. This has led to an intensification of a trend that had been underway for decades: young people migrating to urban areas to find work. The resulting depletion of the agricultural workforce had a negative effect on rural livelihoods, thereby feeding the migratory loop even further.

4. Tipping points

Going beyond the point of no return is another feature of systemic risks. We have witnessed many moments during the pandemic when these tipping points were reached and systems were pushed past their limits of functioning, such as the collapse of health systems as a result of surges in confirmed cases and hospitalizations over short periods of time. We saw this in two of our case studies, in Guayaquil, Ecuador, in March 2020 and Indonesia in July 2021.

5. Risks under the radar

Another characteristic of the systemic nature of risks is that they often build up over time, hidden and unnoticed. For example, pathologists have been cautioning about the potential for pandemics from emerging infectious diseases for decades, and warning signs were there with epidemics such as SARS, swine flu and Ebola. However, despite these signals, most countries were unprepared and did not invest enough in preventing future outbreaks and pandemics or in their preparedness for such events. There are other kinds of arguably less obvious risks that creep up unnoticed. In our case study on Guayaquil, Ecuador, it emerged that a lot of popular frustration had been building as a result of government austerity policies. Then COVID-19 hit, resulting in the collapse of an underfunded health-care system, fuelling societal anger and distrust, culminating in a tipping point that saw widespread protest and civil disobedience. A similar dynamic played out in Cox's Bazar, Bangladesh, where rumours and misinformation affected people's trust in official announcements, gravely undermining effective prevention of contagion.

6. Uncertainty

Uncertainty is closely tied to the systemic nature of risks and has run throughout the ongoing pandemic, everywhere in the world. Uncertainty about the spread of COVID-19 started with the first confirmed case of an "unknown pneumonia" circulating in Chinese media before it was picked up by World Health Organization (WHO) in December 2019, and then picked up by individual countries within weeks. As is typical with an emerging infectious disease, the spread of information about COVID-19 came with a very high level of uncertainty about when and how it would spread, and this has persisted as we have seen new variants emerge.

7. Dynamics

One big takeaway from the pandemic has been the need to better understand how some or all of the above elements interact with each other over time, with the resulting potential for delayed, long-term ripple effects. Some of our case studies show that educational inequality has been exacerbated as a result of the closure of schools due to COVID-19 containment measures, and the resulting generational loss of learning will have repercussions for those who were already disadvantaged. It's also clear that disruptions in education could further increase gender inequalities over time, as has been seen in the increase in child marriages in Cox's Bazar, Bangladesh, and the Sundarbans, India, which has resulted in a consequent loss of opportunities for girls. These examples show the delayed cause and effect nature of systemic risk as these consequences will become more apparent over the years.

Chapter 2

Six cross-cutting lessons of the systemic nature of risk linked to the COVID-19 crisis

From the mangroves of West Bengal to the vast archipelago that makes up Indonesia, and from the bustling port city of Guayaquil, Ecuador, to the tropical shores of southern Togo, systemic risks from the COVID-19 pandemic have been exposed in stark human terms.

Millions of people who were already struggling to make ends meet, often working in the informal economy in agriculture, many also surviving below the poverty line, had to contend with a cascade of new risks that they could not possibly have foreseen as a result of COVID-19: joblessness, debt, civil and domestic violence, their children's education derailed, and opportunities in general severely diminished. In many locations, women suffered disproportionately due to pre-existing gender biases in society, whether in employment patterns or in other ways.

Taken together, the human experiences in the five case studies that inform this report show what can be learned from places in the world that are not often in the headlines. Some of them may also be far from the majority of the most developed economies and population centres. They bring into sharp focus a very real challenge: how to better understand and manage the cascading, systemic risks that resulted from COVID-19 as it spread across boundaries and borders, touching almost everyone, globally.

The five locations, with their communities, were selected to provide a representation of the interconnected risks and COVID-19 impacts in various different settings. Our case study work in the Maritime region of Togo highlights the rural-urban and national-international interlinkages of COVID-19 in a regional Sub-Saharan context with high levels of poverty. The work in Guayaquil, Ecuador, provides insights into how COVID-19 overwhelmed a densely populated, overcrowded urban area. It also shows how a location's dependence on global trade links creates and reinforces vulnerabilities. In the Sundarbans, India, we see how the concurrence of COVID-19 and natural hazards (in this case, a cyclone) creates cascading and systemic risks, as well as pointing to some worrying long-term effects. At Cox's Bazar, in neighbouring Bangladesh, pre-existing social inequity in a fragile setting is the backdrop to understanding the pandemic's effects on the world's largest refugee camp, highlighting characteristics of highly dependent systems. Indonesia is the only one of our studies done on a national scale and highlights how COVID-19 led to interconnected challenges on multiple fronts: collapsing health systems, grave impacts on the economy and associated ripple effects on debt, poverty and inequalities, as well as on emergency response to other hazards that occurred amidst the pandemic.

Six cross-cutting lessons that surfaced in all five locations may help to frame a response to the challenges thrown up in these and other locations.

A. Measures to combat COVID-19 have had cascading effects throughout society

One of the big cross-cutting themes emerging from the case studies is that nearly all the measures implemented to deal with COVID-19 had a domino, or cascading, effect through society and economies, impacting livelihoods, gender, education and political and social outcomes. Many of them led to further such effects. Stay-at-home orders and social isolation resulted in sharp increases in mental health problems for many people. A general unwillingness to adhere to interventions led to widespread protests in Guayaquil, the Ecuadorian port city of 3 million inhabitants that experienced a devastating first wave of COVID-19. The reluctance of people to follow test and trace rules in Indonesia and Cox's Bazar, Bangladesh, resulted in higher numbers of cases and a further weakening or even collapse of health-care systems.

Although the measures put in place to deal with the pandemic were obviously necessary to protect at-risk groups and avoid health systems becoming overwhelmed, the cascading effects of lockdowns made life much worse for many people. Take Togo, a sub-Saharan country with a large rural population and a significant informal economy. The Maritime region, located in the south, combines a large, remote and rural population with the country's largest city and capital, Lomé. The arrival of COVID-19 in March 2020 prompted the government to implement lockdowns and curfews in cities to prevent Togo's relatively weak health-care system becoming overwhelmed. While a catastrophic spread of the disease was averted in Togo, the consequences of the restrictions caused cascading effects in commerce, education and rural livelihoods. In Lomé, both the formal and informal economic sectors were badly hit, with widespread adverse effects on employment and livelihoods. Curfews were especially hard for people in the informal economy as a lot of trading occurs at night. The local experts consulted indicated that this had led to an increase in poverty across the region, affecting those most dependent on the informal economy.

Similar cascading effects were seen in South-East Asia's most populous country, Indonesia. Government restrictions designed to tackle COVID-19 led to an immediate fall in economic growth, and as early as 2020, the government estimated that this could affect the Indonesian economy for at least the following decade. In response, the government introduced a massive fiscal stimulus package, mobilizing financial resources in part through cuts in state and regional budgets. As a result, multiple development projects, especially infrastructure and public facilities, had to be postponed. The need for additional funds to fight the impacts of the pandemic has also led to a further increase in foreign debt and forced a revision of national development targets. The experts we consulted also confirmed that there was severe disruption to most economic sectors in Indonesia, notably in labour-intensive manufacturing of garments, leather and shoes, as well as in trade and service sectors. The biggest impact has been felt by small- and medium-sized enterprises and low value-added "micro businesses." One year after the pandemic began, these enterprises' revenues had halved, compared with a decline of about 30 per cent for large companies, government figures show (BAPPENAS, 2021). According to experts consulted in workshops, this has led to further cascading impacts on livelihoods, employment, income and, in turn, poverty and household vulnerability. Unemployment hit 60 per cent, with higher rates in cities than in rural areas and for women compared to men. Bali's tourism sector was particularly badly affected.

BOX 1: Cascading effects: Two lessons from education in Germany

1. Socioeconomic background matters to educational outcomes

Systemic and cascading risks are not only an issue in low- and middle-income countries. Germany is one of the most economically developed countries in the world. That means it ought to have been able to cope relatively better than other countries in dealing with the impacts of COVID-19, given its significant financial resources and good health infrastructure.

However, a different, more mixed, picture emerges when we look at educational outcomes as a result of the impact of the pandemic, which has forced most education online and much of the population into "homeschooling" mode. Certain groups of children and parents have been at a disadvantage.

The quality of a home-learning environment depends to a large extent on the educational support given by parents, which is linked to their socioeconomic backgrounds. Yet, research found that parents with lower levels of education, as well as migrational backgrounds, have faced greater difficulty supporting their children in homeschooling (Wolters and others, 2020; Rude, 2020). In low-income groups, parents were often less able to work from home and, to avoid financial losses, were more likely to leave their children unsupervised (Zoch and others, 2020).

In addition, children from families with lower incomes, migrational and non-academic backgrounds have experienced fewer joint learning formats, such as video conferences, providing direct contact between teachers and children, which was seen to be important to facilitate the learning-from-home process (Blaeschke & Freitag, 2021; Huebener and others, 2020; Langmeyer and others, 2020). Lower-performing children were more likely to be in a less advantageous home learning environment (Geis-Thöne, 2020; Huebener & Schmitz, 2020).

These results suggest that the structural shift to online learning has had a reinforcing feedback effect for underperforming children that performance gaps may well widen over time as a result of the pandemic. Worse, if the educational losses experienced by these groups are not compensated for, there is a risk that children who were already disadvantaged because of their socioeconomic background end up having fewer educational opportunities and, therefore, fewer opportunities in the labour market.

Looking at what happened in Germany, the sudden closure of schools as part of lockdowns could thus lead to long-term consequences that only become apparent after some time. It may be that existing social inequalities in education and income in Germany will therefore persist, or even increase, over time as a result of COVID-19.

2. Women have been disproportionately disadvantaged

Women have been in key respects more affected than men by the pandemic.

Working parents have been confronted with the sudden challenge of organizing childcare or homeschooling and their work at the same time. Yet their ability to deal with this has depended on their professional situations, as well as on family arrangements. Couples that could divide family responsibilities have been less affected than single parents, who have experienced both a greater organizational challenge and more of a psychological burden.

Single parent households have found this particularly challenging. But so did women, who have been disproportionately affected by the challenges thrown up by school closures. Due

to the pre-existing gender pay gap in Germany, women have more likely to compensate in their work for homeschooling duties. This situation was exacerbated by the fact that women were more likely to work in essential services jobs, many of which do not offer the possibility of working remotely to facilitate childcare duties (Kohlrausch & Zucco, 2020; Wersig, 2020).

The combination of fewer working hours and economic slowdown points to a risk that the gender pay gap may worsen in the long term, and there is a risk that women face the possibility that they may not be able to automatically return to pre-pandemic working patterns. This and other factors mean that women have been, and are likely in the future to be, confronted with more financial difficulties, further reinforcing underlying inequalities and highlighting the importance of protecting the education system in times of crisis.

From the mangroves of West Bengal to the vast archipelago that makes up Indonesia, and from the bustling port city of Guayaquil, Ecuador, to the tropical shores of southern Togo, systemic risks from the COVID-19 pandemic have been exposed in stark human terms.

B. COVID-19 has reinforced pre-existing vulnerabilities in society

A second cross-cutting theme is that COVID-19 reinforces pre-existing vulnerabilities; that is, it makes life even more difficult for people already facing challenging circumstances. This worsens inequality and injustice throughout society. As we saw in the Maritime region of Togo, the closure of night markets and the reduction in demand for food products saw a loss of income for those already living in poverty.

We can also see this effect in Guayaquil, Ecuador, where families already living in overcrowded housing suffered more from stay-at-home orders than those in more favourable living situations. The city's healthcare system reached a tipping point in a matter of weeks after the first case was detected in February 2020, resulting in a high number of corpses being left unattended in hospitals and care homes, as well as on the streets. The images of bodies accumulating in the streets that circulated in the global media were among the first to show what happened when COVID-19 arrived in densely populated urban areas. By March, the city had an excess mortality rate five times that of the same month in 2019 (Cabrera and Kurmanaev, 2020) and the highest COVID-19 mortality rate of any Latin American city (WHO, 2021). Not only had many people been working in the informal economy in significant poverty, already vulnerable, but as was noted in the workshops, many had to deal with the added problem of living in overcrowded housing. Indeed, Guayaquil has the most overcrowded housing of any city in Ecuador. Space constraints made social distancing over weeks and months all but impossible for many.

Pre-existing vulnerabilities were reinforced in other ways. Returning to the case of Togo, agricultural production was also severely compromised during the crisis. Pandemic restrictions resulted in an uptick in migration from rural to urban areas, involving young people moving to Lomé in particular. Not only did this add to pre-existing labour shortages in agricultural regions, but it was also unhelpful given that the soil in these areas was already suffering from decades-long overexploitation and was therefore struggling to produce enough to sustain the region's growing population. Our workshops revealed that this resulted in a reinforcing feedback loop of reduced agricultural production, in turn leading to price inflation, ultimately worsening food insecurity for poor households. This, combined with certain restrictions on cross-border commerce, even contributed to a rise in illegal smuggling across the border with neighbouring Benin.

Finally, the experience of the elderly and people with disabilities in the largest refugee camp in the world, at Cox's Bazar in the southernmost district of Bangladesh, highlighted the reinforcement of pre-existing vulnerabilities in still further ways. Cox's Bazar is home to almost 900,000 Rohingya people from about 190,000 families (UNHCR, 2021). Due to the centralization of services at the camps and other factors, food packages were distributed only at specific locations on a monthly basis, which in turn made packages heavier. This disproportionately affected people with disabilities and the elderly, who struggled to receive such food aid and could not afford to pay others to deliver them.

C. Dependence on global networks has had a big impact at the local level

In a world that has steadily globalized in recent decades, it is no surprise to find that certain locations are highly dependent on global networks. Port cities such as Rotterdam, Singapore and Karachi are good examples. Another is our case study of Guayaquil, Ecuador, which vividly illustrates what happens when global economic dependency is disrupted by a pandemic. Other case studies highlight the impact that is felt when disruption to global trade filters through to the informal sector in a local economy, such as in Lomé, Togo, where many people worked in night markets and had little job security. In the Sundarbans, India, disruption in global and national supply chains and networks resulted in the sudden collapse of tourism-based livelihoods and a lack of markets for local products (particularly seafood).

Global trade has significant effects at the local level, as was evident in the city of Guayaquil. The city's port handles almost all of Ecuador's imports and half of its exports, making it the country's

main trade centre. The sharp slowdown in global trade that was sparked by COVID-19 devastated the city's economy, causing widespread job losses, pushing many further into poverty.

International collaboration and support are of course vital for effective risk management, especially at times of disaster. This is where another aspect of Guayaquil's — and Ecuador's — dependence on global networks emerged as an issue. In the workshops, health experts pointed out that state and municipal authorities were heavily reliant on the flow of information from global sources for how policy should be applied at the local level. However, in the initial phases of the pandemic, even international bodies like WHO were unable to provide clear guidance, resulting in the issuance of unclear information, which in turn resulted in slower uptake of health policy measures and ambiguous communication from the Ecuadorian government, particularly on mask usage. This was one factor that contributed to the spread of misinformation throughout digital social networks.

D. Measures to combat the pandemic have had distinct effects on women and girls

Increased exposure to COVID-19 through work; more manual and domestic labour; an increase in domestic violence; and even involvement in child marriages: all of these were experienced by women and girls in many of the locations in our case studies. This reinforces how gender is a key factor in risks associated with crises and how their impacts are felt disproportionately by women and girls (for more, see Women hold up half the sky yet have suffered disproportionately from risks, Box 1, p. 12).

The plight of women and girls in the Sundarbans, a vast mangrove delta in India's West Bengal, is a case in point. This archipelago of islands is part of the largest contiguous mangrove forest in the world, home to millions of people, where 43.5 per cent of households live below the poverty line and more than 87 per cent experience food shortages (Ghosh, 2012; HDRCC Development & Planning Department Government of West Bengal, 2009; 2010).

To contain the spread of COVID-19, the government in New Delhi implemented a countrywide lockdown in March 2020. Barely a month later, a severe cyclone named Amphan made landfall in the region.

The impact of two hazards occurring simultaneously was a double burden for people in the Sundarbans, India, many of whom depend on natural resources for livelihoods generated from fishing, crab harvesting, beekeeping and other agricultural pursuits. COVID-19 restrictions naturally made it hard for people to carry on accessing these natural resources to serve a market that had all but collapsed in any case. One result of the economic distress this caused was an increase in the incidence of forced marriage among underage girls, including the sale of daughters by parents, in the aftermath of the cyclone in the case study area. In addition, many women had to work extra hours in the fields as a result of having to fill in for hired workers who were laid off due to the effects of COVID-19 on the labour market. The full impact of this may only become apparent in the longer term, experts in the consultation workshops argued. Making matters worse for women, the cyclone caused flooding and damage to infrastructure, restricting access to safe drinking water. This forced many women to travel further to work and in some cases go through "neck-deep water" to fetch safe drinking water (Chattopadhyay, 2020).

Women were disproportionately affected by the cascading effects of COVID-19 elsewhere, too. In the Maritime region of Togo and in Indonesia, women were more exposed to loss of livelihood and economic opportunities given that they were more likely to be working in areas involving relatively higher interaction with other people — and thus greater exposure to the virus — such as markets, hair salons and restaurants. And in Guayaquil, Ecuador, the Sundarbans, India, and Cox's Bazar, Bangladesh, experts consulted during workshops noted that women and girls tended to work more than usual in manual labour throughout the pandemic to compensate for family financial losses.

In all cases there were increased instances reported of domestic and gender-based violence. In Cox's Bazar, Bangladesh, and Guayaquil, Ecuador, it was

noted in workshops that this is likely to be due to a combination of lost livelihood opportunities and stay-at-home orders. On top of this, women were found to be taking the lead in homeschooling, further widening a gender pay-and-time gap. In Indonesia, it was noted that the focus on COVID-19 reduced provision of maternal health-care facilities, resulting in an increase in deaths during childbirth.

BOX 2: Women hold up half the sky yet have been disproportionately affected by pandemic-related risks

Disasters amplify pre-existing inequalities. This also holds true for gender inequalities. Women, girls and gender-diverse people have experienced disproportionate indirect health impacts, as well as a multitude of cascading effects. Those who face intersectional inequalities due to their income, race, geographic location, age, disability, migration or health status have been particularly affected. These impacts have challenged the equitable and effective distribution of health and social care, restricted mobility, deepened inequalities and shifted the priorities of public and private institutions.

Much of this was brought into stark relief in our case studies. Increases in gender-based and domestic violence were documented in all of the cases.

For example, an overburdened health-care system in Indonesia has resulted in a lack of access to maternal and reproductive services. In Cox's Bazar, Bangladesh, opportunities that girls had for education decreased due to school closures, contributing to, among other factors, increased incidences of child marriage.

Moreover, social protection schemes rolled out to protect against the adverse effects of COVID-19 have been implemented insensitively when it comes to gender. Only 23 per cent of all social protection measures introduced have either targeted women's economic security specifically or accounted for unpaid child and elder care (UNDP & UN Women, 2000). Women and girls in communities already reeling from institutionalized poverty, racism and other forms of discrimination are particularly at risk.

Why do we see these impacts? In part because women are far more likely to be working in front-line sectors affected by the pandemic. As much as 70 per cent of the global health-care workforce is staffed by women. This figure rises to 90 per cent if social care is included. Women are more likely to work in key service sectors — supermarkets, pharmacies, cleaning — that have been essential to maintaining daily life throughout the pandemic (Lotta and others, 2021). However, throughout the pandemic there have also been countless instances of exemplary public and private leadership, innovation and mobilization led by women, girls and gender-diverse people. Furthermore, many female heads of government have been recognized globally for their effectiveness in managing the pandemic.

Examples from our case studies include the female volunteer groups in Cox's Bazar, Bangladesh, that have been providing advice on responsible hygiene, social distancing and medical treatment. Similarly, in the Maritime region of Togo, the spreading of information about hygiene practices to reduce contagion was supported by the Club des Mères (mothers' clubs). Established and supported

by Togolese Red Cross and active since 2012, these groups of local women, particularly in remote areas, receive training on appropriate hygiene practices with a mandate to raise awareness about good hygiene and health practices and take this knowledge back to their remote communities. In the Sundarbans in India, women's self-help groups and female-led cooperatives have provided employment and loans that have helped women to repair cyclone-damaged houses.

It has been noted that the leadership styles of women have been more collective, collaborative and integrated multiple perspectives (UN Women, 2021), which has been necessary when responding to a highly dynamic and uncertain disaster. This trend can also be seen from female leaders at more local levels, as witnessed in some of our case studies.

All of this serves to underscore the importance of the role of diversity, equality and social justice in response to and recovery from the pandemic, as well as for disaster risk reduction. It also points to the need for gender-specific measures to offset the widening gender-equality gap that the pandemic has intensified.

E. Education suffered, and the full effects may only become apparent over time

Education was another aspect of daily life that suffered as a result of COVID-19 restrictions, as many children and parents will know. Yet the pandemic had particularly severe effects on the educational opportunities of children in many of our six case study locations. While these effects are likely to have reinforced underlying inequalities and exacerbated pre-existing vulnerabilities, many of them will only fully emerge in the future, demonstrating the delayed cause-effect nature of cascading and systemic risks.

In particular, the movement to online learning was an issue in the Maritime region of Togo, the Sundarbans, India, and Cox's Bazar, Bangladesh, due to limited digital infrastructure in these locations. There was a distinct "digital gap" in all cases, meaning that people either could not access the Internet, or did not have the equipment required to access online learning. In Cox's Bazar in particular, this meant that there was no alternative to in-person schooling, resulting in a complete shutdown of educational facilities. Additionally, in the Sundarbans, unstable Internet connectivity in remote regions compounded poverty in preventing families from paying for tools to access online education. When this was combined with the effects of Cyclone Amphan, the disruption to education became conspicuous. The cyclone also had long-term effects, particularly for girls, with a spike in child marriage reported by the workshops and consultations.

Instances of children dropping out of school increased significantly across the board in the case studies, leading in turn to an increase in reported cases of child labour in Guayaquil, Ecuador, the Sundarbans, India, and Cox's Bazar, Bangladesh. (For further insights on COVID-19 and its effects on the education system generally see Cascading effects: Two lessons from education in Germany, Box 2, p. 17)

F. Risk communication and coordination were significant challenges for authorities at all levels

Dealing with a global pandemic obviously requires effective coordination and communication among key actors, from national governments and multilateral non-governmental organizations (NGOs) down to local authorities. However, in all our case studies, decision makers across the spectrum dropped the ball at certain times when it came to communication of the risks involved, as well as in coordinating responses to the pandemic. This was particularly evident in the early stages of the pandemic due to the reality that COVID-19 was a novel, highly uncertain and highly dynamic hazard. As we saw earlier, slow

uptake of health policy measures by the Ecuadorian government was in part due to patchy messaging from WHO. Consultations with experts in the Cox's Bazar, Bangladesh, case underlined the importance of involving religious or community leaders in effective risk communication to prevent the spread of misinformation. In the Sundarbans, India, government health measures resulted in the mass movement to rural areas of migrant workers from densely populated areas with high case numbers.

In Indonesia, a combination of limited knowledge of the disease, lack of coordinated response and inconsistent policy messages from the national government and regional governments contributed to a low willingness of the population to test and trace. These factors, combined with insufficient preparedness of the health-care system, resulted in the country having the fourth highest fatality rate of health-care staff globally as of mid-September 2020. In the workshops, experts highlighted this as an example of a vicious cycle that created additional challenges in the fight against the pandemic.

Management decisions taken at the local level will invariably depend on what signals and data are being received from authorities at the national and, in turn, global level. This was seen in the city of Guayaquil, Ecuador. Poor coordination from the Ecuadorian national government resulted in siloed communication, which hindered the ability of public institutions to set up early-detection, warning and monitoring systems, such as contact-tracing and testing. In addition, there were not enough laboratories to process tests in Ecuador, resulting in a slow turnaround of test results, which were critically needed in the city of Guayaquil during the first weeks of the pandemic. Another finding stressed by health experts in the workshops concerned the response of the Ecuadorian government being significantly influenced by uncoordinated communication at the global scale. As in many low-income and middle-income settings, international support and guidance are imperative components for comprehensive risk management, especially in times of disaster. Coordination and communication issues from WHO, such as confusing guidance on wearing masks at the start of the pandemic, resulted in the output of unclear information, which prompted a slower uptake of protocols and ambiguous communication from the Ecuadorian government. Workshop participants noted that this was one of the factors that contributed to the spreading of misinformation through social media. Ultimately, the response from the Guayaquil city municipality and the Ecuadorian government's public institutions fell short due in part to lack of an integrated, cross-sectoral response that concerned flows of information from the global to local levels.

BOX 3: How COVID-19 affected progress on UN Sustainable Development Goals (SDGs)

The link between COVID-19 and the SDGs

The pandemic and its consequences are jeopardizing progress towards the achievement of the 2030 Agenda for Sustainable Development, which covers developmental issues such as reducing poverty, tackling food insecurity, homelessness and access to clean water. We have tracked the effects of the pandemic on the SDGs observed in our case studies.

Effects observed in our case studies include:

- No poverty (SDG1): More people were pushed into poverty (Guayaquil, Sundarbans, Indonesia and Maritime region of Togo). People in slums and rural areas (Maritime region of Togo) as well as informal workers (Guayaquil, Indonesia and Maritime region of Togo) were particularly affected.

- Zero hunger (SDG2): The restriction of mobility through border closures and lockdowns limited food supply, raising food prices (Indonesia and Maritime region of Togo). This left people with few means to survive, resulting in widespread food insecurity (Maritime region of Togo).

- Good health and well-being (SDG3): In the Maritime region of Togo, though the fear of infections has prevented people from using health services, the scarcity of health workers contributed to the risk of total collapse of the health system. Stress and mental health became a bigger problem due to increased economic uncertainties (Sundarbans and Guayaquil), and co-morbidity increased in Indonesia due to reduced availability of, and access to, reproductive and maternal health care.

- Quality education (SDG4): Schools were closed for an extended period, leading to school dropouts (Cox's Bazar, Guayaquil and Maritime region of Togo). Poor families were affected by the switch to online learning due to a lack of adequate infrastructure (Sundarbans and Indonesia).

- Gender equality (SDG5): The closure of schools correlated with an increase in forced marriages (Cox's Bazar and Sundarbans) and child labour (Cox's Bazar), and girls were ten times more at risk of dropping out of school than boys due partly to a rise in early marriage (Indonesia).

- Clean water and sanitation (SDG6): Water consumption increased (Indonesia). Floods and landslides contributed to water contamination (Cox's Bazar and Guayaquil).

- Decent work and economic growth (SDG8): Informal workers lost their jobs and incomes (Sundarbans, Indonesia, Maritime region of Togo and Guayaquil). In Togo, employees in the informal sector, as well as vendors, were forced to close due to curfews. The closure of schools contributed to an increase in child labour (Sundurbans) as well as involvement of children in illegal activities (Cox's Bazar).

- Reduced inequalities (SDG10): In India, the return of migrants was accompanied by an increase in inequality due to them being treated differently (Sundarbans). Relief distribution suffered due to corruption (Sundarbans).

- Sustainable cities and communities (SDG11): Urban homelessness increased (Indonesia).

- Peace, justice and strong institutions (SDG16): Insufficient governance has led to increased corruption and conflict (Sundarbans and Guayaquil).

"Building back better" and commitment to the SDGs

As we recover from the pandemic, it is necessary to strengthen the commitment to achieving the SDGs. However, this should be done not just by focusing on reducing possible future hazards but also by acting on people's and societies' vulnerabilities while leaving no one behind. With lower social vulnerability, healthier ecosystems and more resilient economies, the impacts of COVID-19 would have likely been less severe. In addition, more sustainable and equitable city planning would help provide adequate housing and places for quarantine, facilitating social cohesion and trust in local communities. The SDGs are an established, globally applicable framework that can incorporate an interconnected systemic perspective. This makes them a highly suitable framework for systemic recovery from COVID-19 impacts, offering a clear way forward.

Chapter 3

Lessons and recommendations from COVID-19 for understanding and managing risk

A. Our understanding of risk has expanded

Many parts of the world are still grappling with COVID-19, and the human tragedy of its effects are still, unfortunately, playing out. However, we can learn from this tragedy. Throughout the pandemic, we have learned a lot about how cascading effects and the systemic nature of risks can affect whole societies to their core, although this may not have been apparent when the pandemic first appeared.

COVID-19 and the systemic nature of risks associated with the pandemic have expanded our understanding of risk by drawing attention to the fact that hazards and shocks can emerge from outside and within the system. In addition, exposure to them can be indirect, meaning that effects can be felt in places that are not directly affected by the hazard — in this case, COVID-19 — but end up being affected as a result of interconnectedness. Finally, the vulnerability of one system can also turn into a hazard or shock for other interdependent systems.

We have learned about the inherent complexity of crises in our interconnected world. Understanding this complexity is paramount to designing effective measures to enhance society's preparedness and resilience. Yet, in designing those measures, traditional approaches to risk management, while extremely useful in isolated settings, fall short in providing insights to help us tackle risks in more complex settings.

In the case of the COVID-19 pandemic, the conventional understanding of hazard, exposure and vulnerability, the three traditional determinants of climate and disaster risk, needs to be expanded to represent what we have seen happening in countries like Togo, where the incidence of the virus (the "hazard") was mostly contained and yet consequences for the population were still highly disruptive. The understanding of the nature of risk as systemic, rather than just hazard-dependent, sectoral or isolated, offers a more fitting conceptual toolbox. This sheds light on the important systemic features — such as interconnectedness, dynamics and global-to-local linkages, feedbacks and interdependencies — that contribute to the cascading effects that our case studies highlight so vividly.

While it is still too early to evaluate the full consequences of the COVID-19 risk management strategies that are being pursued, our study of systemic risks in the context of COVID-19 places greater emphasis on risk perceptions, risk communication, the cascading effects of policy measures (or interventions) and the understanding of how all relevant elements are interconnected.

COVID-19 and the systemic nature of risks associated with the pandemic have expanded our understanding of risk by drawing attention to the fact that hazards and shocks can emerge from outside and within the system.

B. Lessons and recommendations for managing the systemic nature of risk

1. Join the dots on interconnections

Understanding how things are connected in systems deserves more attention in risk assessment. The cascading effects originating from COVID-19 have allowed us to spot the interconnections that exist in many systems and, in turn, whether a system is functioning as intended. They have also allowed us to spot cascading effects that are emerging in structural shifts sparked by the pandemic. For example, in many of the case studies, the effect on the education system also triggered multiple cascading impacts that went beyond the closure of schools alone. This matters because schools are not just places where children are educated. As we saw in our case studies, schools are also places where children can access food and clothing, as well as being provided with safety and a sense of security. To help us join the dots in interconnects, thinking in systems is important. In particular, working together with local experts and stakeholders can support the identification of hidden vulnerabilities and complex relationships rather than simple linear cause-effect chains. Governments, practitioners and communities should embrace a systems-thinking mindset to support systemic risk analysis and management.

2. Map risk perceptions

The way one person sees risk may not be the same as how another sees it, because of differing societal norms, values and the overall context within which the individual is living. An example can be seen in our case study of Guayaquil, Ecuador, as public distrust spurred the spread of misinformation, resulting in some segments of the population disregarding policy measures and not following the rules. A similar phenomenon was seen all over the world. To guide risk management, attention should be paid to the perception of people and how they perceive the fairness of decisions. Participation and continuous communication with communities, and identifying and developing solutions together — as well as explaining them — are important in this respect as they all build trust. These activities have to be an integral part of all risk management activities.

3. Invest in monitoring and evaluation

The COVID-19 pandemic revealed how important monitoring and evaluating is. For example, a big part of having the right public health care capacity means having effective early warning systems and enough laboratories for testing in place. It also means having digital monitoring equipment to test and trace, to enable monitoring of hospital capacity and to forecast health care demand. Health institutions in Guayaquil, Ecuador, for instance, struggled to ensure that testing capacity kept pace with the rise in COVID-19 cases. Monitoring and evaluation also have an important role in signalling the possibility of knock-on effects of policy measures and associated cascading risks.

4. Data collection and management

The dynamic, non-linear nature of systemic risk puts new demands on data collection and management. How we collect and interpret data affects decision-making, as was evident during the pandemic, when COVID-19 cases were measured differently, country-by-country. Close-to-real-time data collection results in stronger decision-making in times of disaster and is needed due to the speed with which things can change. The timing and duration of responses are critical management considerations because, as we saw, the duration of lockdowns and their cascading impacts had a profound impact on the proliferation of COVID-19. As such, it is important to regularly evaluate the usefulness and relevance of the indicators we are trying to measure and strengthen transparent and open-access data sharing. Additionally, involving community-based organizations and front-line workers (as was done in the Sundarbans, India) could help in gathering data and building trust.

5. Identify the trade-offs in risk management options and choices

We have seen that measures to combat COVID-19, such as school closures, stay-at-home orders or travel restrictions, had far-reaching and significant cascading effects. This has highlighted a need to assess the trade-offs involved in introducing such measures. In addition, we must answer the question of what level of impact is acceptable and for whom.

This requires us to anticipate possible cascading effects on vulnerable people, sectors and systems. At the same time, it's worth paying more attention to policy measures implemented during the pandemic that were found to trigger positive effects, such as advances in digitalization and strengthening of hygiene practices, which deserve more attention throughout the risk management cycle.

6. Foster collaboration

Addressing risks from a systemic perspective requires formal institutions and informal actors to collaborate across the board. Managing systemic risks is a "whole of society" responsibility, meaning that all societal actors have a role, from government to private businesses, down to the individual. This helps to increase the chance of identifying and managing vulnerabilities across all of society. Lessons can be learned from the management of previous disasters about the expectations of the general public towards leadership in times of crisis. Inspiring examples of the involvement of citizens in risk management practices in the context of the case studies include the Club de Mères in Togo and the female-led self-help groups in the Sundarbans, India. These examples also confirm the importance of supporting and strengthening the ability of communities to self-organize in managing systemic risks. The pandemic has also demonstrated that effective risk management requires a multilevel approach, involving collaboration with and between global, supranational and national institutions, and local communities.

7. Comprehensive risk management

The pandemic has underscored the need for risk management to be holistic; that is, it must encompass disciplines, sectors and institutions at all levels. On top of this, there needs to be more coherence between pandemic risk management, disaster risk management and climate change adaptation, given the interplay between pandemic risks, climate-related extreme events and natural hazards such as floods, storms and earthquakes. The case studies in Indonesia and the Sundarbans, India, illustrate the point: buffeted by the overlapping impacts of the pandemic and multiple climate-related or natural hazards, the experience of communities in these locations shows the need to devise risk management practices that tackle multiple types of hazards and risks in a comprehensive and integrated fashion, covering prevention, response and preparedness, as well as recovery.

8. Communication that translates into effective action

Clear and timely communication results in more effective uptake of policy measures in times of disaster. On the contrary, ambiguous and conflicting communication can result in the spread of misinformation and distrust in risk reduction measures. Both instances were seen in our case studies. In the Maritime region of Togo, the Club de Mères created awareness among the population of the need for proper hygiene, bringing this and other important messages to prevent the spread of COVID-19 to households that were not being reached by conventional communication channels, showcasing how community organizations can communicate effectively in times of disaster. In Cox's Bazar, Bangladesh, however, it was found that the failure to include community leaders from religious organizations in the communication process resulted in less effective uptake of COVID-19 policy measures.

9. Tackling gender inequality in risk

While impacts from the pandemic have affected the whole of society, in many countries women have borne the brunt of it, either by being particularly exposed due to the nature of their work or by seeing their share of household activities increase significantly due to educational disruption, or even because of gender-based violence or an increase in child marriage. Countries should address, head on, the gender inequalities that are the root of such outcomes as part of their efforts to reduce risk. For example, societal awareness must be increased, through education campaigns and other means, to prevent gender-based violence. Unpaid care should be recognized for what it is and tackled so that the societies where it is taking place move towards an inclusive "care economy." In the context of disaster risk reduction, our case studies show that women's groups can play an important role in disseminating good practices.

10. From systemic risk to systemic recovery

The flip side of systemic risk is systemic recovery. This paradigm shift is needed if we are to manage risks and respond to disasters in a manner that considers the needs of future generations and is inclusive for all. Climate change, natural hazards, political instability and the pandemic itself have shown that society is effectively now in a constant recovery mode. Countries competing to purchase vaccines, and the inequality in vaccine distribution that resulted, is a compelling example from the pandemic. However, we saw evidence of how policy measures produce positive outcomes, such as job creation following the provision of financial assistance and advances in digitalization. This points to the potential for systemic recovery that both reduces risk in the present and results in opportunities in the future. It is imperative to consider how systemic recovery is just and inclusive as systems are "built back better." The focus should be co-creating recovery pathways that can help account for uncertainty as the future unfolds.

BOX 4: Social protection

Social protection comprises a wide array of policies aimed at protecting people throughout their lives by reducing poverty, inequality and vulnerability. These policies can generally be broken down into three sub-areas: social insurance, social assistance and labour-market programmes (Sett and others, 2021).

- Social insurance programmes are long-term schemes based on solidarity, transferring the risk from the individual to the general population. Universal health insurance is an example of a social insurance programme of particular relevance during COVID-19.

- Social assistance consists of all forms of cash or in-kind transfers provided by the state or private actors. Stimulus cheques sent by governments to their citizens are an example that has been evident during the pandemic.

- Labour-market programmes aim at reducing unemployment and its negative effects on people. Well-known labour-market programmes include unemployment benefits, but during COVID-19, job-retention schemes in countries such as Italy, Germany and Brazil have also been intensively discussed as a solution to reducing the economic impacts of lockdowns. Considering the overall positive impact and importance of social protection schemes during the pandemic, possibilities to expand the use of this tool to respond to systemic risks should be explored. To maximize the positive effects of social protection in the context of systemic risk, the connection between social protection, disaster risk reduction and climate change adaptation must be strengthened. One concept developed to achieve this is called Adaptive Social Protection, which aims to create links between social protection, disaster risk reduction and climate change adaptation to increase the capacity to prepare for, cope with and adapt to shocks or hazards.

Conclusion

Being able to build resilience to be better prepared for future hazards and shocks is a task for our times. The last two years have demonstrated vividly how, through the systemic nature of risk, COVID-19 has led to cascading effects across all of society, challenging risk management.

This calls for a new approach to risk management that takes into account a granular understanding of how our world is a dynamic system, interconnected across sectors, borders and scales. While these interconnections are not new, they are affecting and accelerating changes in how hazards and shocks play out in increasingly unexpected ways.

The solutions we craft as a global society must confront these systemic issues and allow for interconnected ways in which to solve multiple problems at once. The way we understand and perceive risks influences our ability to respond to them. COVID-19 has shown that the risks posed by hazards and shocks can have far-reaching and cascading effects. But we can, and must, learn from those risks, so we can build solutions and thereby collectively change our systems for the better.

Methodology

The findings presented from this report were produced through a multi-method approach. This included (i) literature review, (ii) expert consultation, as well as (iii) desk study and stakeholder workshops for five case studies in Bangladesh, Ecuador, India, Indonesia and Togo. The case studies were selected to represent a diverse set of contexts, which, taken together, present a comprehensive outlook to better understand systemic risks. For more information on the methodology, see the full scientific report here: http://collections.unu.edu/view/UNU:8756

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References

Béné, Christophe (2020). Resilience of Local Food Systems and Links to Food Security - a Review of Some Important Concepts in the Context of COVID-19 and Other Shocks. In Food security, pp. 1–18. DOI: 10.1007/s12571-020-01076-1

Blaeschke, Frédéric, and Hans-Werner Freitag (2021). Der Sozioökonomische Status der Schülerinnen und Schüler. Bundeszentrale für politische Bildung. Available at https://m.bpb.de/nachschlagen/daten-report-2021/bildung/329670/der-sozioookonomische-status-der-schuelerinnen-und-schueler

Cabrera, José M., and Anatoly Kurmanaev (2020). As Bodies Accumulate, so Do Fears of a High Coronavirus Toll in Ecuador. The New York Times, 14 April. Available at https://www.nytimes.com/2020/04/14/world/americas/coronavirus-Ecuador-guayaquil.html

Chattopadhyay, Aditi (2020). Citizens Wade Through Neck-Deep Water to Get Drinking Water as Cyclone Amphan Leaves Trail of Destruction. The Logical Indian, 28 May. Available at https://thelogicalindian.com/news/cyclone-amphan-drinking-water-bengal-kolkata-21348

Geis-Thöne, Wido (2020). Häusliches Umfeld in der Krise: Ein Teil der Kinder Braucht Mehr Unterstützung. Ergebnisse Einer Auswertung Des Sozio-Oekonomischen Panels (SOEP). IW-Report, No. 15. Available at https://www.iwkoeln.de/studien/wido-geis-thoene-ein-teil-der-kinder-braucht-mehr-unterstuetzung.html

Ghosh, Aditya (2012). Living with Changing Climate: Impact, Vulnerability and Adaptation Challenges in Indian Sundarbans. Centre for Science and Environment. New Delhi. Available at https://cdn.cseindia.org/userfiles/Living%20with%20changing%20climate%20report%20low%20res.pdf

HDRCC Development & Planning Department Government of West Bengal (2009). Human Development Report: South 24 Parganas. Kolkata, India. Available at http://wbpspm.gov.in/SiteFiles/Publications/13_21062017112440.pdf

_____ (2010). District Human Development Report: North 24 Parganas. Kolkata, India. Available at http://www.indiaenvironmentportal.org.in/files/24%20pgs%20north.pdf

Huebener, Mathias, and others (2020). SchülerInnen in Corona-Zeiten: Teils Deutliche Unterschiede im Zugang zu Lernmaterial nach Schultypen und -Trägern. In DIW Wochenbericht, vol. 2020, No. 47, pp. 853–60. DOI: 10.18723/DIW_WB:2020-47-1

Huebener, Mathias, and Laura Schmitz (2020). Corona-Schulschließungen: Verlieren Leistungsschwächere SchülerInnen den Anschluss? DIW aktuell, No. 30. Berlin: DIW Berlin – Deutsches Institut für Wirtschaftsforschung. Available at https://www.diw.de/documents/publikationen/73/diw_01.c.758242.de/diw_aktuell_30.pdf

Kohlrausch, Bettina, and Alina Zucco (2020). Die Corona-Krise Trifft Frauen Doppelt: Weniger Erwerbseinkommen und Mehr Sorgearbeit. Policy Brief WSI, No. 40. Available at https://www.boeckler.de/pdf/p_wsi_pb_40_2020.pdf

Langmeyer, Alexandra, and others (2020). Kind Sein in Zeiten von Corona. Ergebnisbericht zur Situation von Kindern während des Lockdowns im Frühjahr 2020. Available at https://www.dji.de/fileadmin/user_upload/dasdji/themen/Familie/DJI_Kindsein_Corona_Erste_Ergebnisse.pdf

Lotta, Gabriela, and others (2021). Gender, Race, and Health Workers in the COVID-19 Pandemic. In The Lancet, vol. 397, No. 10281, p. 1264. DOI: 10.1016/S0140-6736(21)00530-4

Indonesia, Ministry of National Development Planning / National Development Planning Agency (BAPPENAS), ed. (2021). Perkembangan Pelaksanaan Program Perlindungan Sosial Terkait Dampak Covid 19. Workshop on Dampak Pandemi COVID-19 dan Pembelajaran dari Pelaksanaan Program Perlindungan Sosial: Memahami Cascading dan Systemic Risks. 16.09.2021. Jakarta.

Rude, Britta (2020). Child Refugees and Covid-19: Coronavirus Exacerbates Existing Problems. Munich, Germany: ifo Institut. Available at https://www.ifo.de/en/publikationen/2020/article-journal/child-refugees-and-covid-19-coronavirus-exacerbates-existing

Sett, Dominic, and others (2021). InsuRisk Report 2021: Disaster Risk, Social Protection, and Readiness for Insurance Solutions. Report, No. 27. Available at http://collections.unu.edu/view/UNU:8332

United Nations Development Programme (UNDP), and United Nations Women (UN Women) (2020). COVID-19 Global Gender Response Tracker Fact Sheets. Available at https://www.undp.org/publications/covid-19-global-gender-response-tracker-fact-sheets

United Nations High Commissioner for Refugees (UNHCR) (2021). Joint Government of Bangladesh - UNHCR Population Factsheet - Block Level as of 31 July 2021. UNHCR Operational Data Portal. Available at https://data2.unhcr.org/fr/documents/details/88396

United Nations Women (UN Women) (2021). COVID-19 and Women's Leadership: From an Effective Response to Building Back Better. Available at https://www.unwomen.org/en/digital-library/publications/2020/06/policy-brief-covid-19-and-womens-leadership

Wersig, Maria (2020). Demokratie im Ausnahmezustand: Welche Folgen Hat die Krise für die Gleichstellung von Frauen und Männern? Friedrich Ebert Stiftung. Available at http://library.fes.de/pdf-files/dialog/16413.pdf

Wolter, Ilka, and others (2020). Corona-Bedingte Schulschließungen – …und nun Funktioniert Alles Digital? Leibniz-Institut für Bildungsverläufe e.V. Available at https://www.lifbi.de/Portals/13/Corona/NEPS_Corona-und-Bildung_Bericht_1-Schule.pdf

World Health Organization (WHO) (2021). Ecuador: WHO Coronavirus Disease (COVID-19) Dashboard with Vaccination Data | WHO Coronavirus (COVID-19) Dashboard with Vaccination Data. Available at https://covid19.who.int/region/amro/country/ec

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