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UN Office for Disaster Risk Reduction

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نشست تخصصی تازه های مدیریت بحران : با تاکید بر گزارش جهانی GAR

GAR
Global Assessment Report on Disaster Risk Reduction

کنفرانس علمی یک روزه

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An Introduction to Systems Resilience in Disasters

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Summer 2023

Rewiring systems for a resilient future

- **Disaster risk** was increasing globally, even before the advent of the coronavirus disease (COVID-19) pandemic.

- More people were killed or affected by disasters in the last 5 years than in the previous 5 years.

- Recent large-scale disasters – including the COVID-19 pandemic and major weather events that **caused supply chain disruptions** – have led many to conclude that something new is happening.

Rewiring systems for a resilient future

- To change course, new approaches are needed. It is possible to manage the risks of the future more effectively, but only if action is taken now to rework **local**, **national** and **globalized** systems to **prevent** and **respond** to systemic risk.

- Despite commitments to **build resilience**, tackle climate change and create sustainable development pathways, current societal, political and economic choices are doing the reverse.

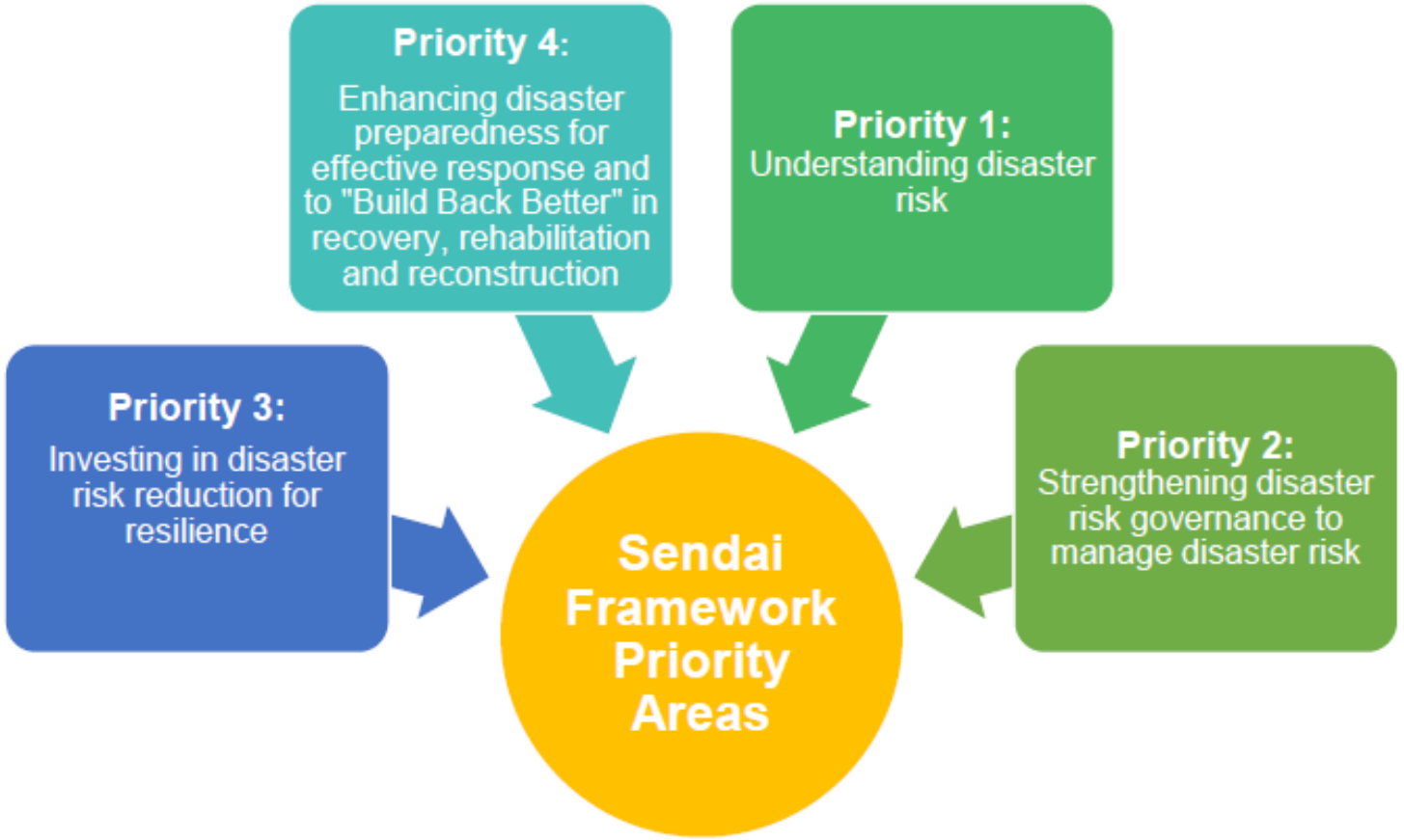
Risk reduction in the global agreements:

The Sendai Framework on Disaster Risk Reduction 2015–2030 (Sendai Framework):

Focuses on the adoption of measures that **address all dimensions of disaster risk** – hazard, exposure, vulnerability and coping capacity – **to**

- **prevent the creation of new risk**,
- **reduce existing risk** and **increase resilience**.

Sendai Framework



Risk reduction in the global agreements

Transforming our World: the 2030 Agenda for Sustainable Development (2030 Agenda):

Sets out 17 Sustainable Development Goals (SDGs) and provides a comprehensive global policy framework towards ending all forms of poverty, hunger, inequalities among and within countries (based on gender and other socioeconomic status), and tackling environmental degradation and climate change.

Risk reduction in the global agreements:

The Paris Agreement:

Steers action towards global climate change adaptation and the **mitigation** goal of **limiting global warming** to well below **2°C** above pre-industrial levels, and preferably to **1.5°C**.

Disasters, Hazards and Vulnerability

Disasters:

serious disruption of the functioning of a community or a society at any scale **due to hazardous events** interacting **with conditions of exposure**, **vulnerability** and **capacity**, leading to one or more of the following:

Human,

Material,

Economic,

and environmental **losses** and **impacts**.

Disasters, Hazards and Vulnerability

Hazard:

is a "**process**, **phenomenon** or **human activity** that may cause

loss of life,

injury or other health impacts,

property damage,

social and economic disruption

or environmental degradation.

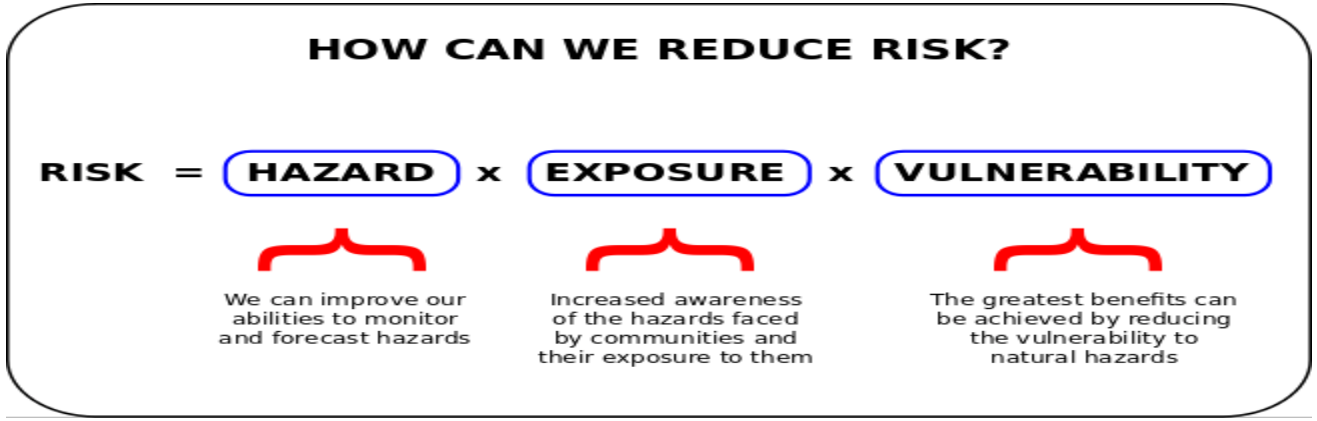
Disasters, Hazards and Vulnerability

Vulnerability:

describes "the conditions determined by **physical**, **social**, **economic** and **environmental factors** or **processes**

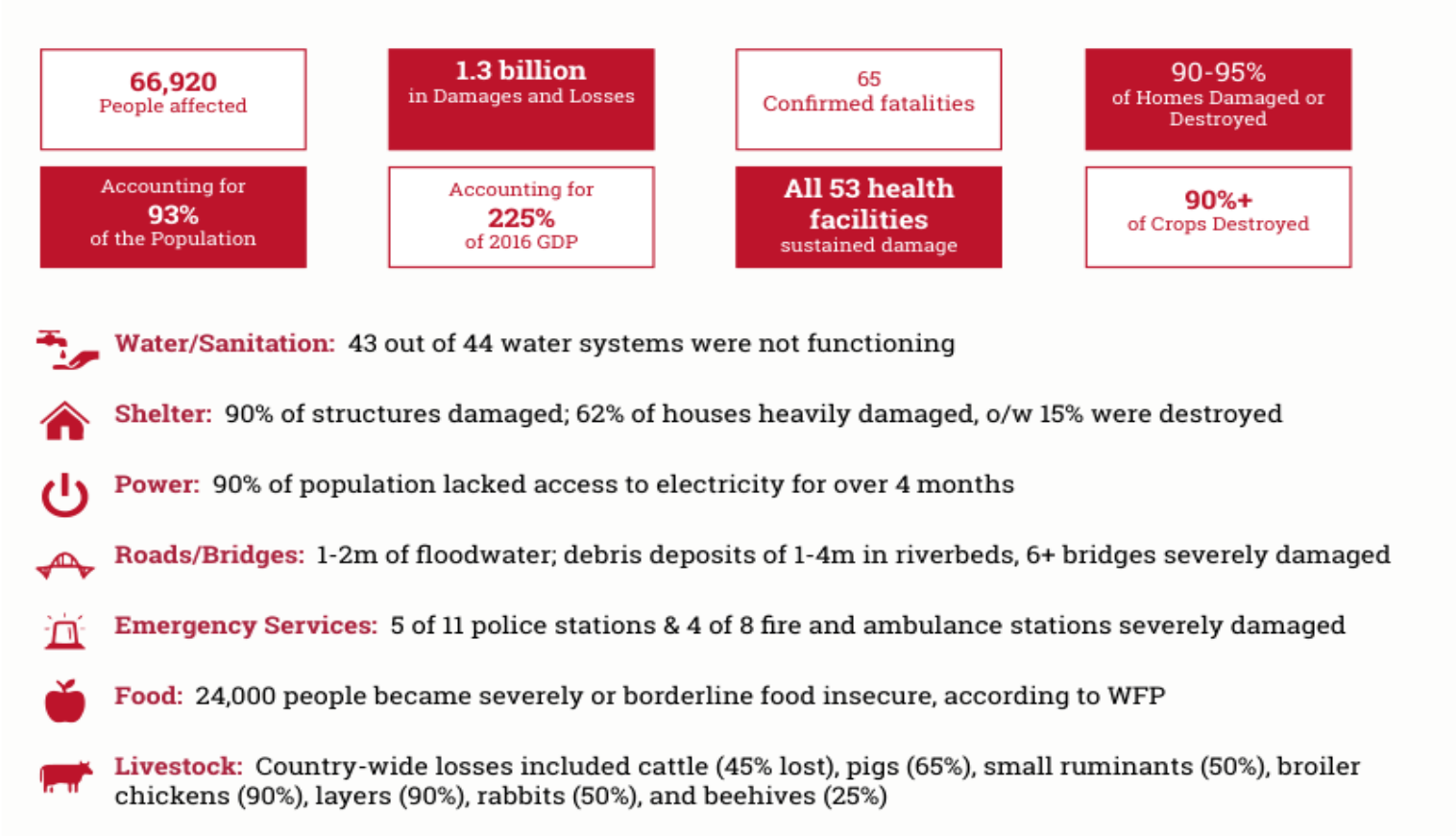
which

increase the susceptibility of an **individual**, **community**, **assets or systems** to the impacts of hazards.



Disasters, Hazards and Vulnerability

Figure 1.1. Impact of Hurricane *Maria* on Dominica



Resilience

Resiliency:

The ability of a **system**, **community** or **society** exposed to hazards to

resist,

absorb,

accommodate,

adapt to,

transform and recover from

the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions.

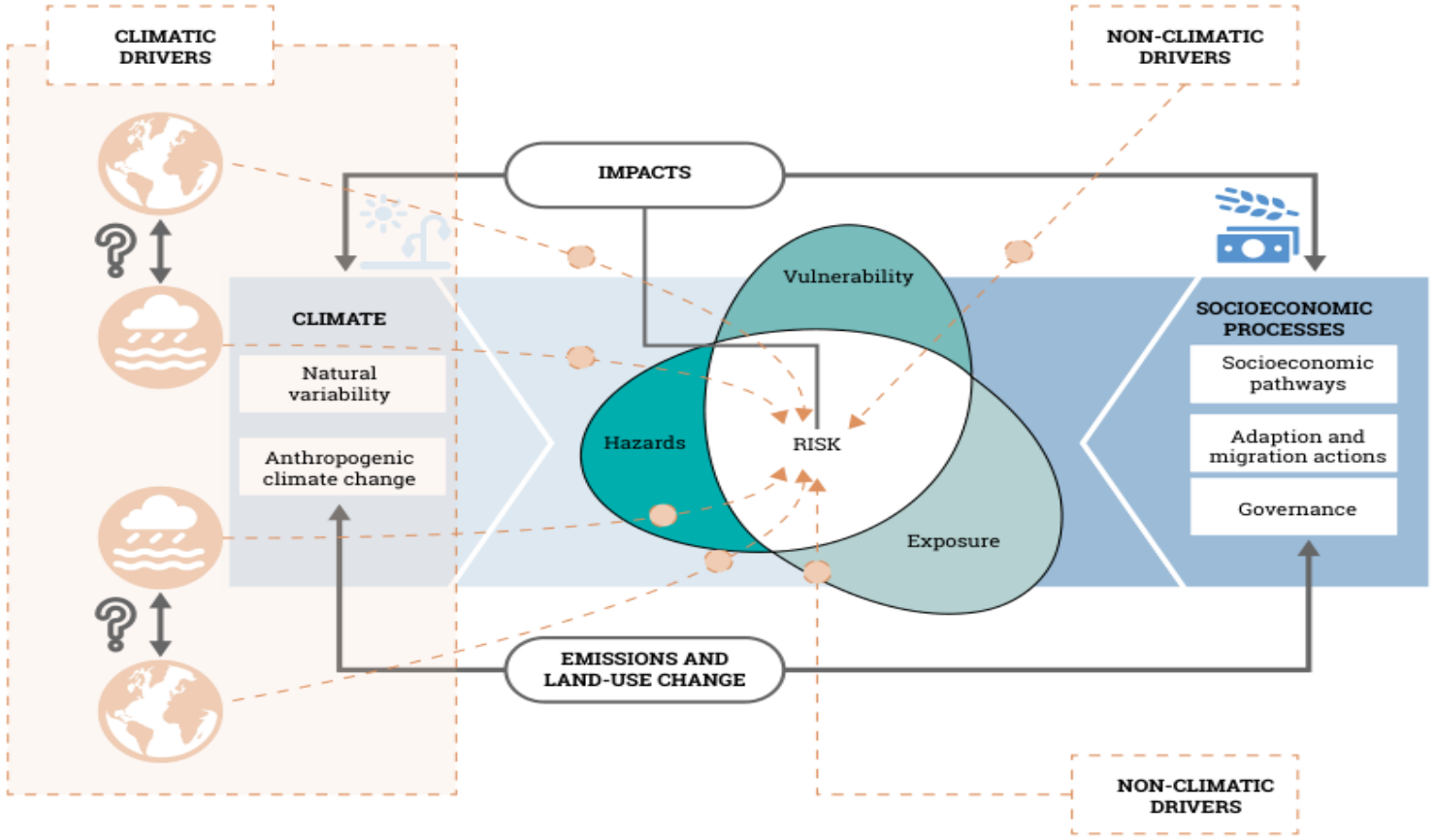
Systemic Risk

The concept of systemic risk is based on the notion that the risk of an adverse outcome of a policy, action or hazard event can depend on **how the elements of the affected systems interact with each other**.

This can either aggravate or reduce the overall effect of the constituent parts.

Risk Framework

Figure 1.3. Extended risk framework



Key Principles for Building Resilience in Systems

The chapter outlines four key principles for building resilience in systems:

1. Anticipate and prepare for multiple risks: This involves **identifying potential risks** and **vulnerabilities**, and **developing plans and strategies** to address them.

2. Accept complexity and diversity: Resilient systems should be able to adapt to changing circumstances and diverse environments, taking into account the different needs and perspectives of stakeholders.

Key Principles for Building Resilience in Systems

3. Build robustness and redundancy: Resilient systems should have **built-in redundancies and backups**, such as **backup power sources** or **redundant communication systems**, **to ensure continuity of operations**.

4. Learn and innovate: Resilient systems should be able to **learn from past experiences** and adapt to new challenges, using innovative approaches and technologies.

Key Principles for Building Resilience in Systems

5. Collaboration and cooperation among stakeholders in building resilient systems. This includes **partnerships between public and private sectors**, as well as **international cooperation to address global risks**.

6. Risk communication

Failing to communicate effectively about risk – indeed, failing to communicate at all – **can fuel rumor**, **erode trust**, **hamper solutions** and **increase risk**.

Key Principles for Building Resilience in Systems

7. Data is essential for understanding systemic risk:

Without data, disaster decision-making is blind.

In conclusion, building resilience requires a comprehensive and integrate approach that involves multiple sectors, stakeholders, and levels of governance.

Our world at risk

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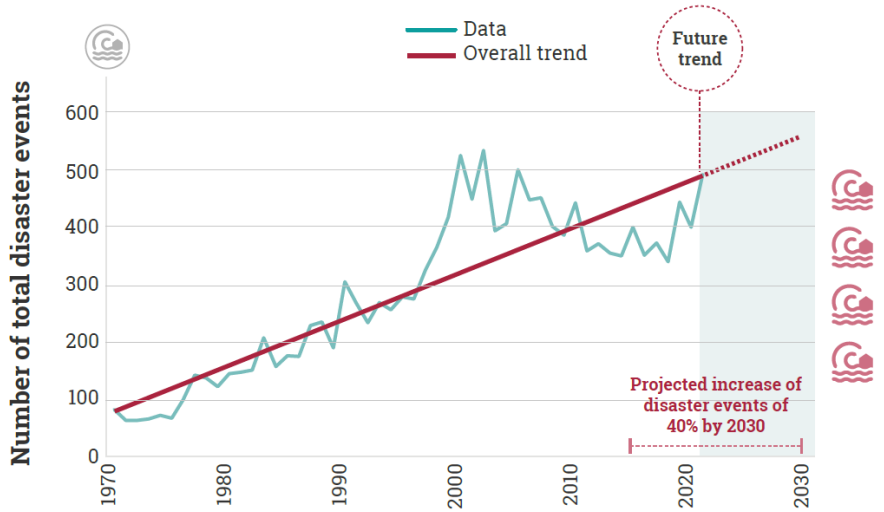
- Population growth and expanded settlements put more people and infrastructure in the path of existing hazards

Climate change:

- It increases the likelihood, frequency and intensity of climatic hazard events
- Affecting vulnerability to all hazards due to long-term **socioeconomic stresses**
- impacts such as displacement, and altering exposure patterns

as climatic conditions change and hazards emerge in new localities.

Disaster events reported per year have increased significantly in the last two decades



Source: UNDRR analysis based on EM-DAT (CRED, 2021)

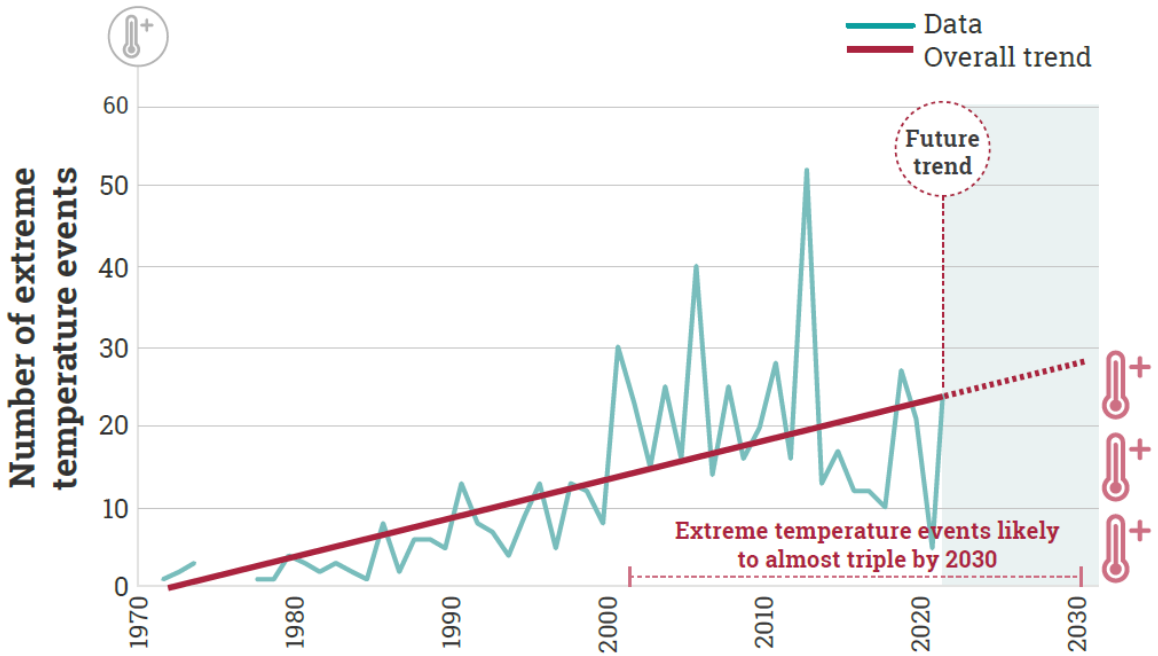
Between 1970 and 2000, 90-100 per year medium- and large-scale disasters

between 2001 and 2020, events increased to 350–500 per year

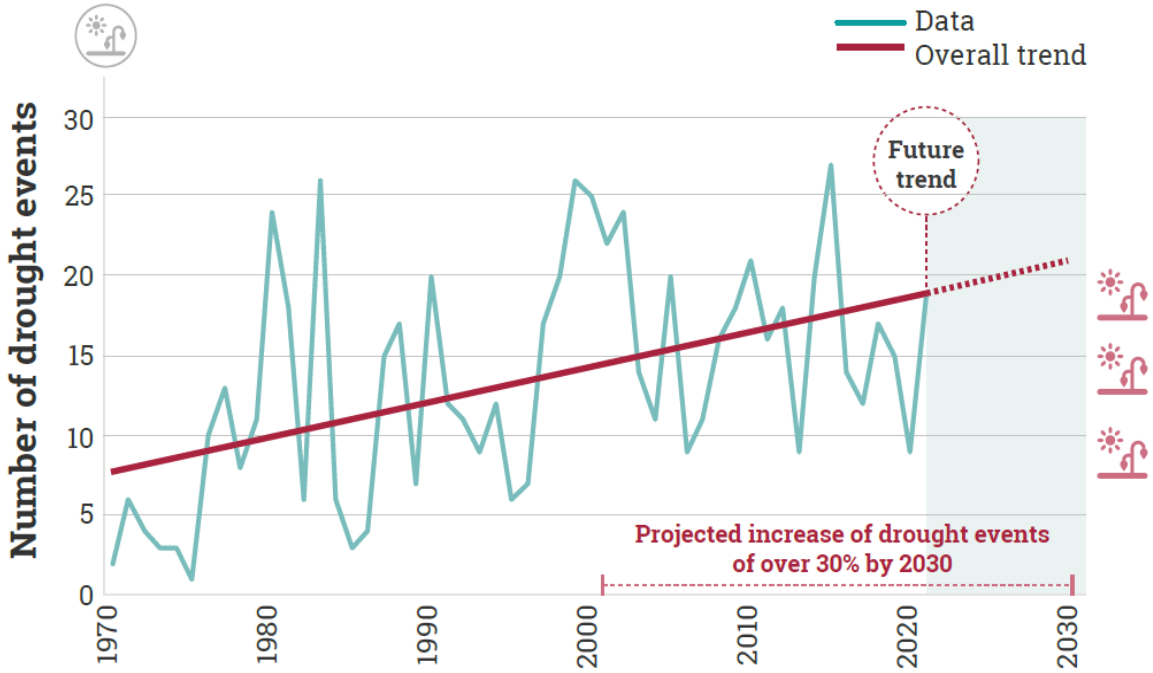
If current trends continue, the number of disasters per year globally may increase from around 400 in 2015 to 560 per year by 2030

1.5°C global average maximum temperature increase by the early 2030s

from an average of 16 drought events per year during 2001–2010 to 21 per year by 2030



Source: UNDRR analysis based on EM-DAT (CRED, 2021)

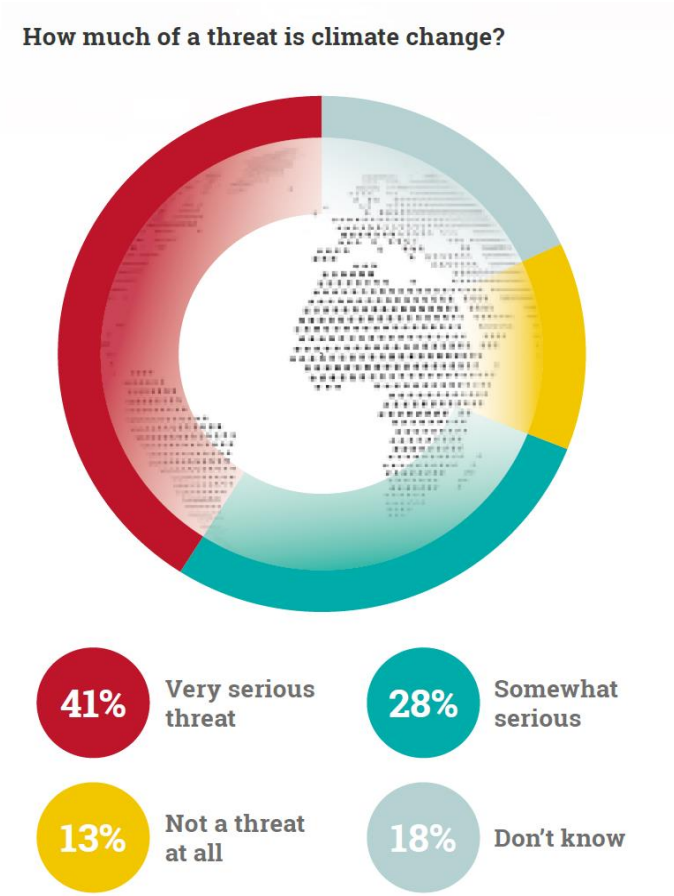


Source: UNDRR analysis based on EM-DAT (CRED, 2021)

Reality check – risk versus perceived risk

Risk perceptions

- The prevailing perception of risk – in particular long-term threats – is one of optimism, underestimation and invincibility
- Opinions may be changing, particularly in areas that have recently experienced significant disasters
- Personal experience is only one of many factors that affect people's risk perception
- Risk perception is a crucial factor in how people prepare, reduce and respond to hazards



Source: Lloyd's Register Foundation (2020a)

Disaster loss and poverty

- Hazards like drought are the most closely associated with poverty

- All hazards that lead to disasters curtail sustainable development

- The poorest and the most vulnerable people :
  - endure the worst of disaster losses
  - to be exposed and therefore affected by hazards
  - to depend on fragile infrastructure and housing
  - lose a much greater proportion of their income and assets than non-poor people

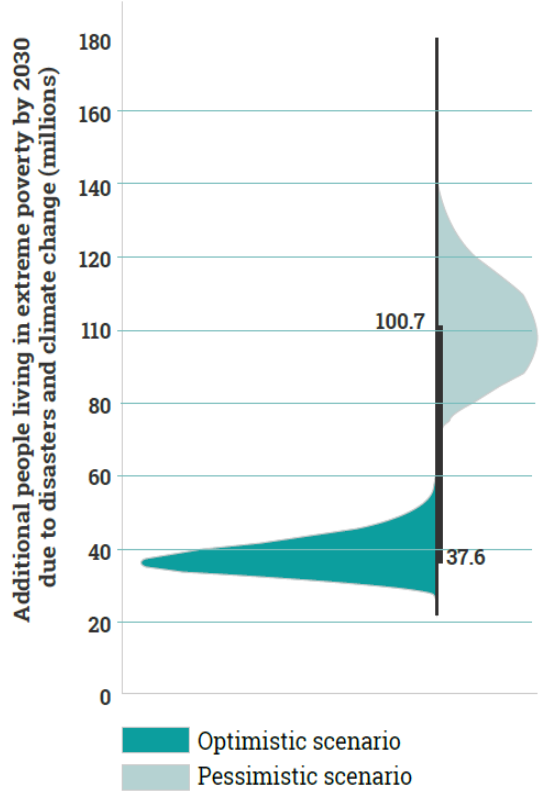
Source: UNDRR analysis based on Global Sustainable Development Goal Indicators Database, SDG indicator 1.1.1 (UN DESA, 2021)

- The share of the world's population living in extreme poverty declined from 15.7% to 10.0% between 2010 and 2015, but had decreased only by a further 1.8 percentage points to 8.2% in 2019 (COVID19)

- Pandemic had set back poverty eradication targets by 6–7 years

- 37.6 million people will be living in conditions of extreme poverty due to the impacts of climate change by 2030

Number of additional people (in millions) being pushed into poverty due to climate change, 2020 projections through to 2030

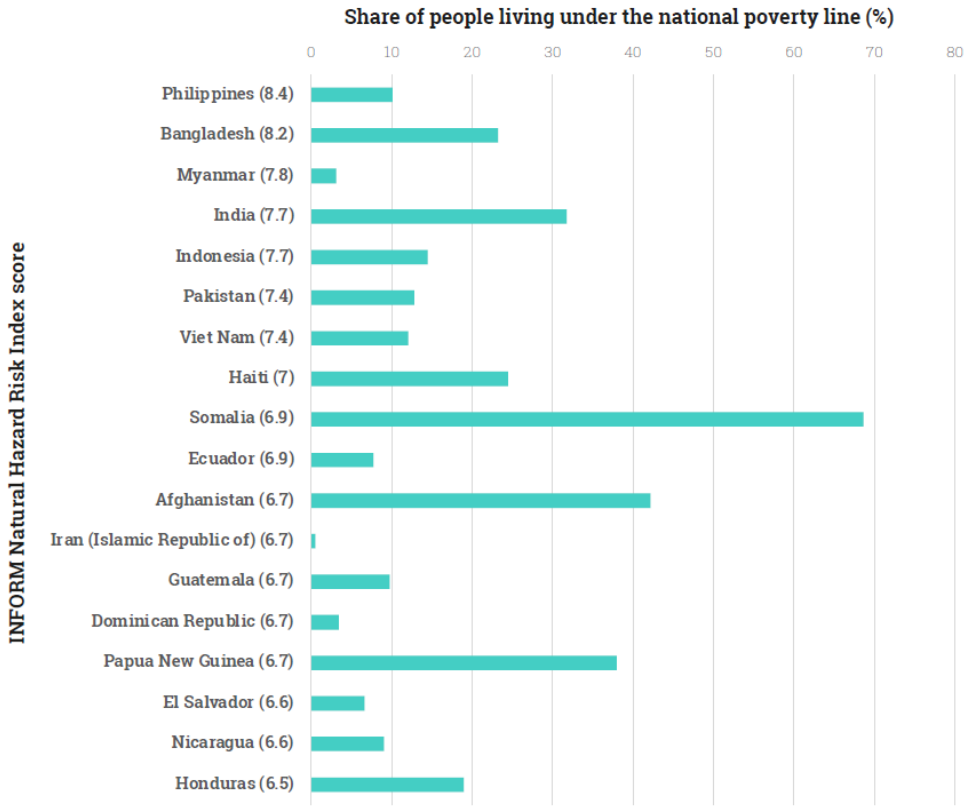


Source: Jafino et al. (2020)

- Most of the countries that face high disaster risk are also those with a high share of population living under the national poverty line.

- Among the top 20 countries with an average inform natural hazard risk index of 6.6 or above, 90% are middle- and lower-income countries with an average national poverty rate of 34%

Top countries with highest levels of the INFORM Natural Hazard Risk Index and their shares of population under the national poverty line, 2021



Source: UNDRR analysis based on INFORM Natural Hazard Risk Index (European Commission, 2021) and Global Sustainable Development Goal Indicators Database (UN DESA, 2021)

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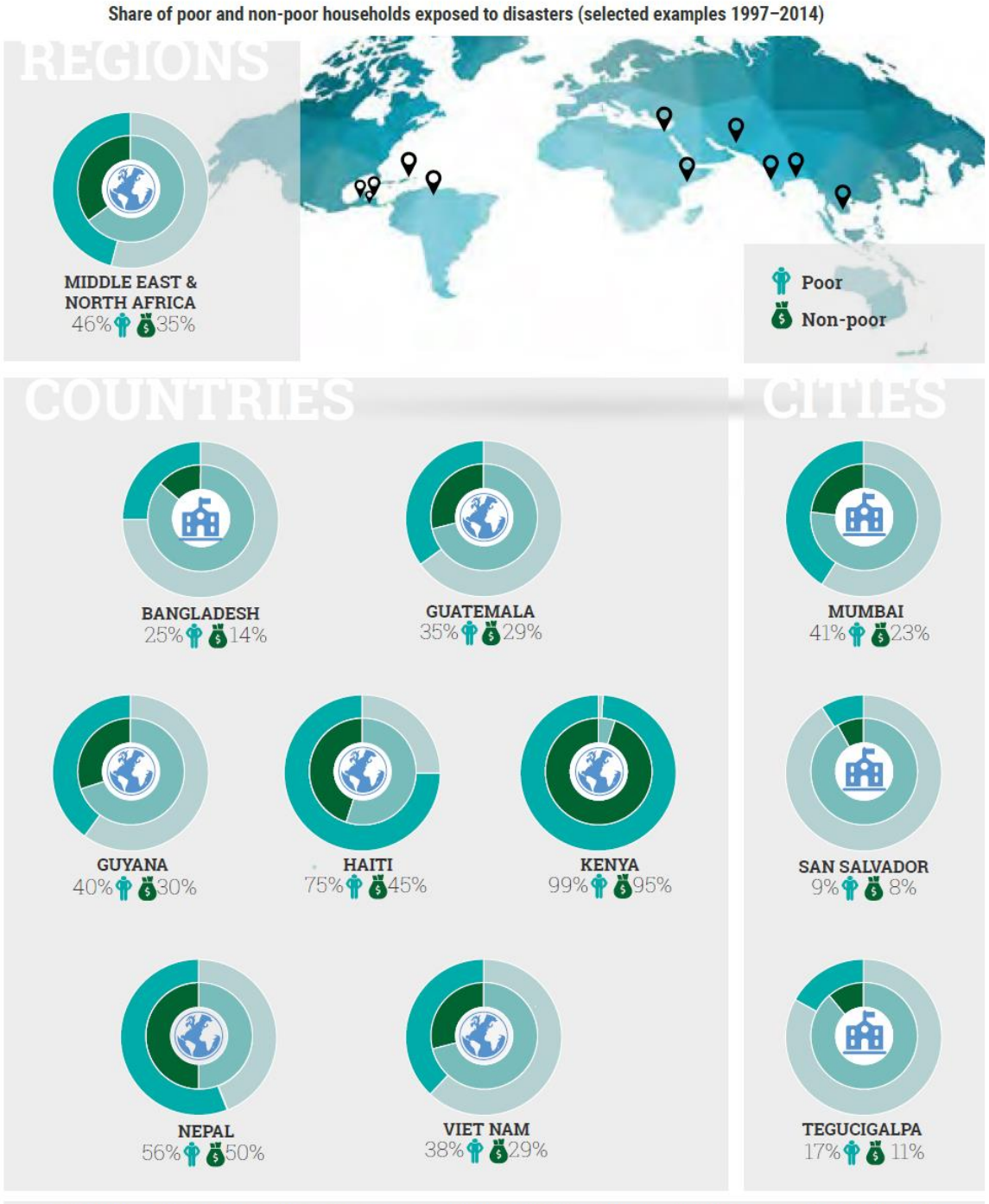
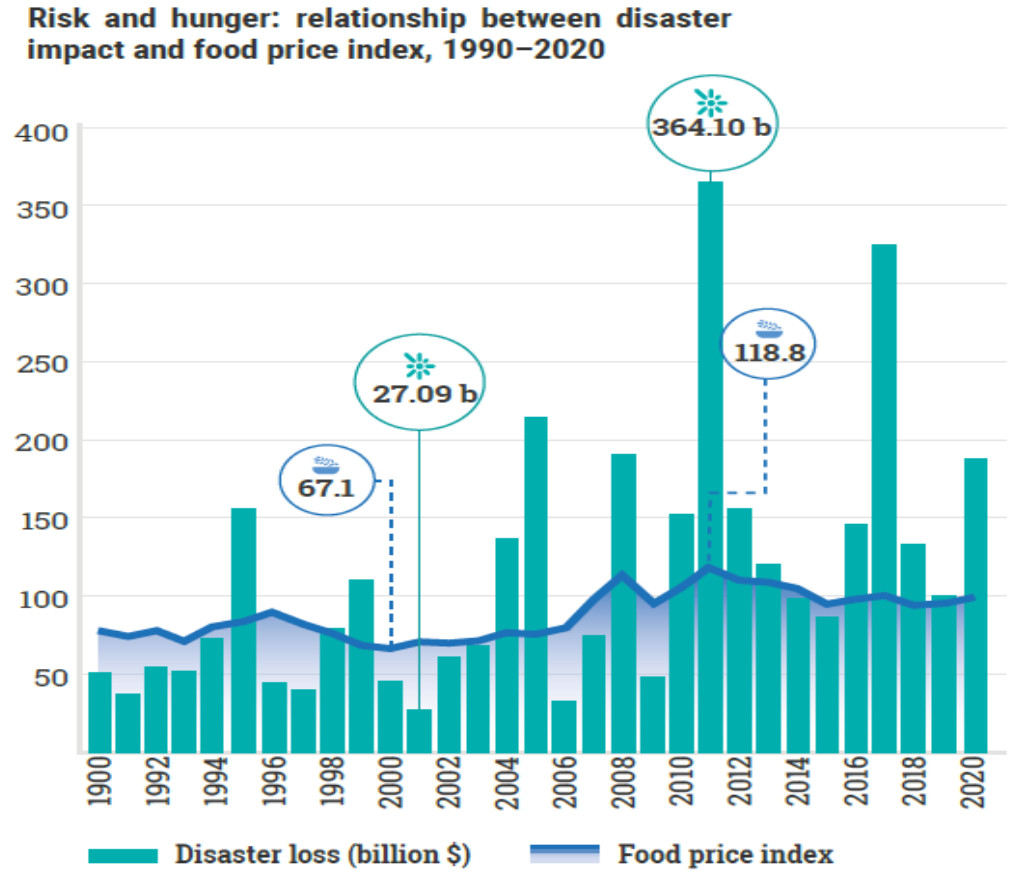
- Within high-risk countries, a higher percentage of poor households are exposed to disasters compared with non-poor households

- The lack of access to social protection measures and risk-sharing tools like insurance means people in poverty are often forced to use their already limited assets to buffer disaster losses, which drives them into further poverty



Disaster loss and hunger

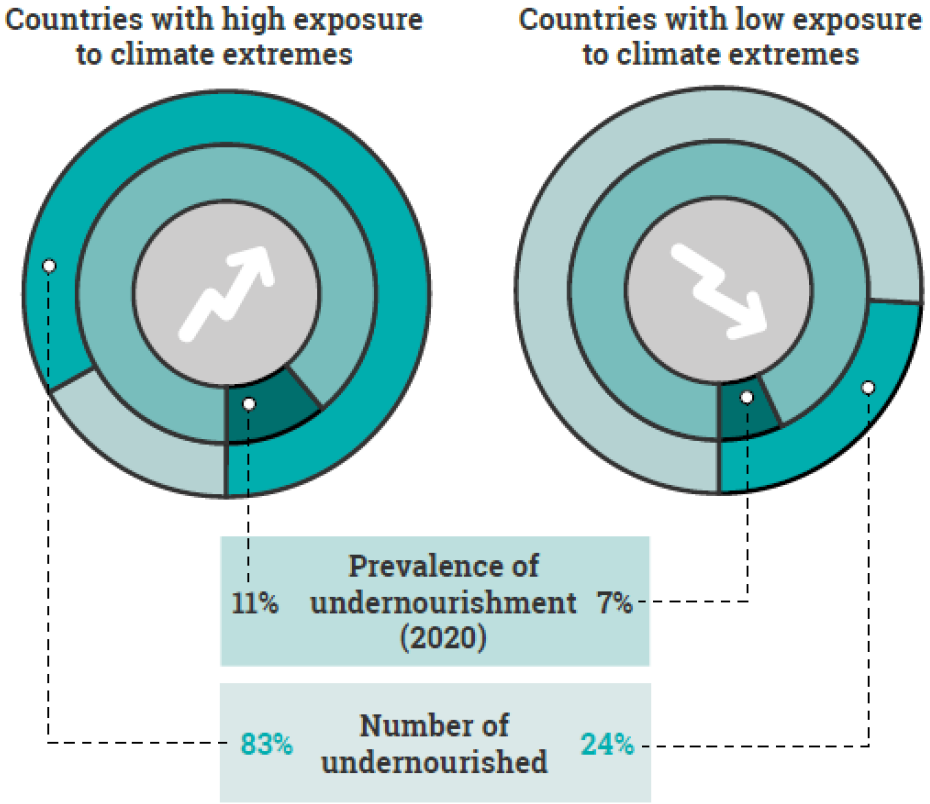
- Disasters and food security are linked in numerous ways
- At the local level, disasters directly damage crops, livestock and livelihoods
- Nationally or internationally, they have systemic impacts on supply chains and international trade.



Source: UNDRR analysis based on EM-DAT (CRED, 2021), Food Price Index (FAO, 2021a) and Sendai Framework Monitor (SFM) (UNDRR, 2021c)

- COVID-19 has escalated a previously rising trend of global food prices, making nutritious food unaffordable for millions of families
- Hunger and malnutrition are significantly worse in countries with agrifood systems highly sensitive to rainfall, temperature variability and severe drought, and where the livelihood of a high proportion of the population depends on agriculture.

Number of undernourished people and prevalence of undernourishment in countries, 2020



Source: UNDRR analysis based on EM-DAT (CRED, 2021) and FAOSTAT (FAO, 2021a)

Disaster loss and gender inequality

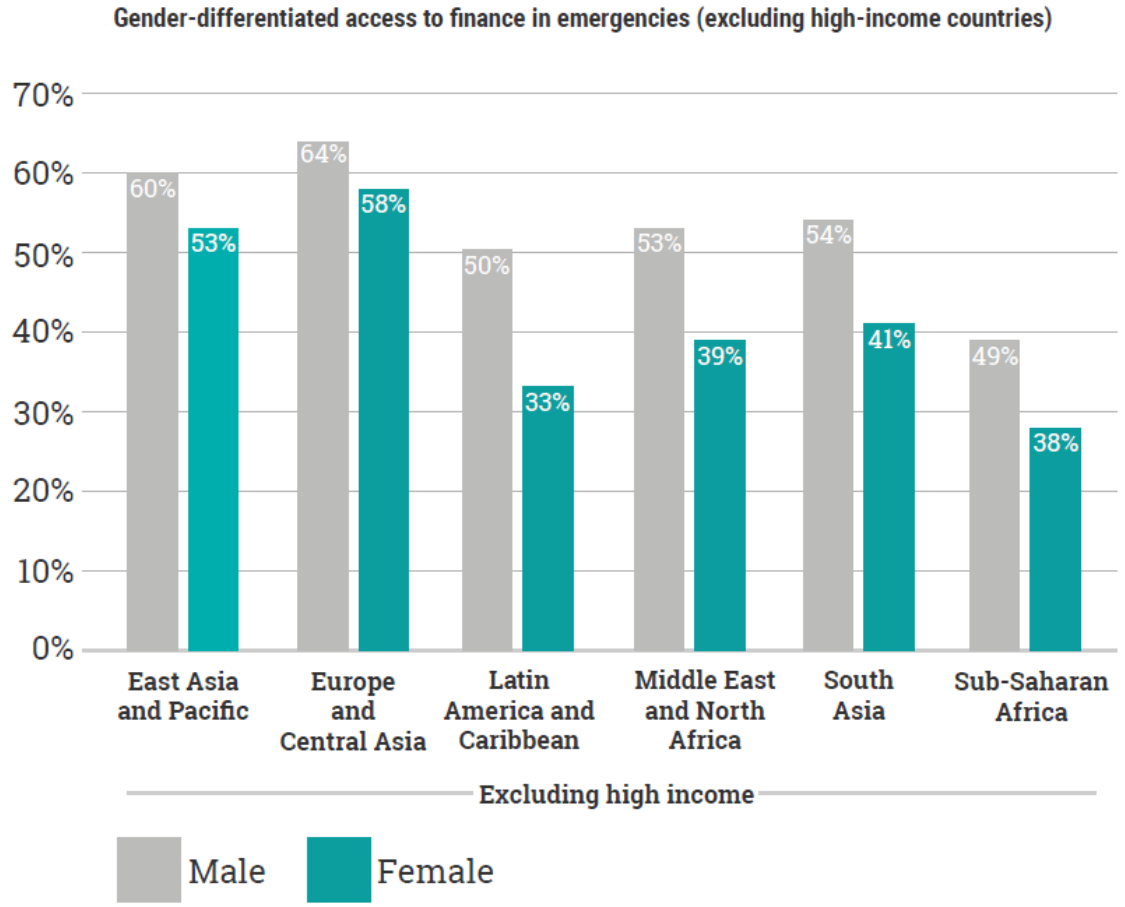
Disaster loss and gender inequality

Reducing poverty :

- increases disaster resilience
- removing gender-based inequalities

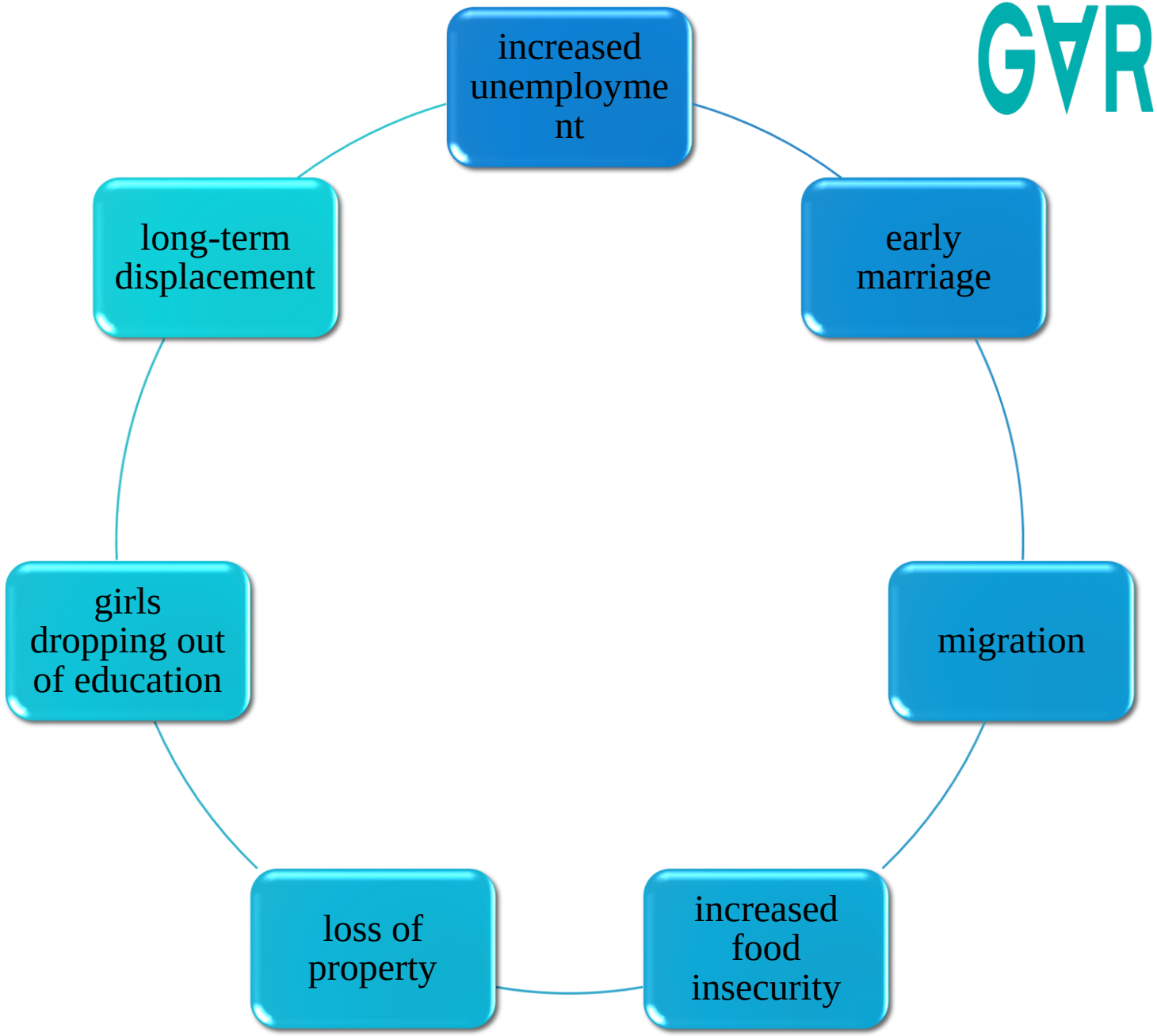
Women as a group are not innately more vulnerable than men, but gender inequalities contribute to their disproportionate risk

The gender pay gap remains a key global challenge



Gender-differentiated impacts of disasters and the social responses to them can exacerbate gender inequality:

- Less Access to Economic Resources
- Leading to Greater Impoverishment
- Less Resilience to Future disasters

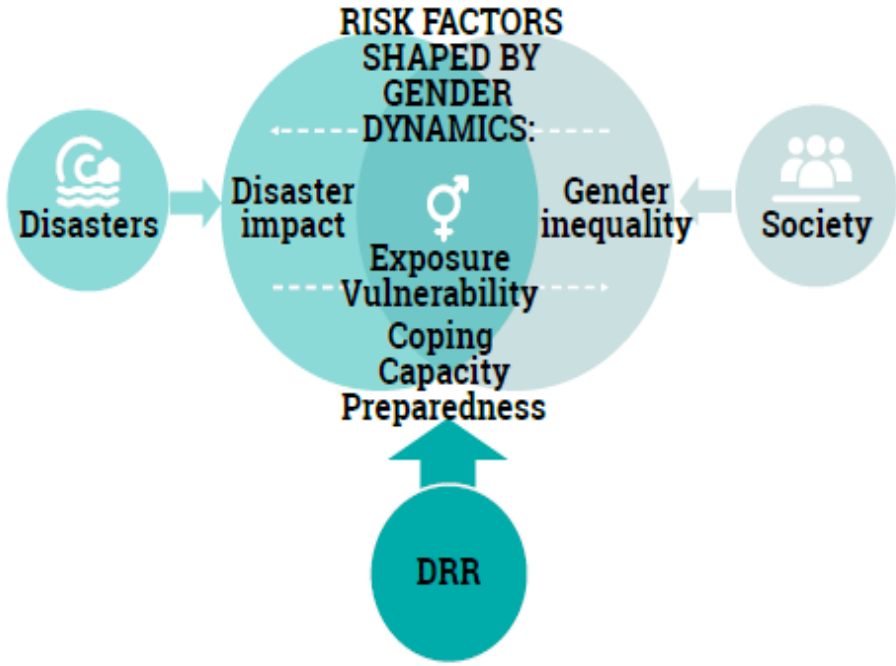


- Increases in gender-based violence during emergencies, disaster displacement and slow-onset disasters is also a key concern

- Covid-19 lockdowns : violence within the home, depression and anxiety, affecting women

- Pre-existing gender inequalities and different gender roles in societies affect exposure, vulnerability, coping capacity and preparedness in relation to disasters

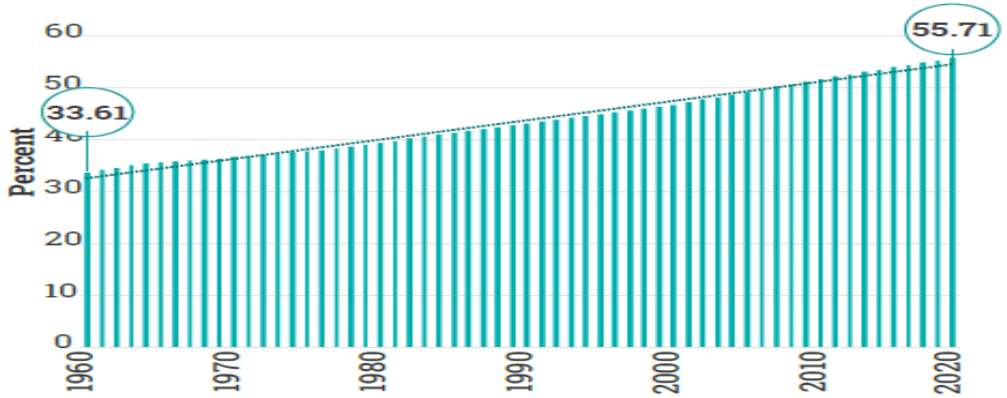
- Women play a crucial role in scaling up disaster preparedness, bringing a wealth of knowledge, capacities and needs-based approaches to decision-making



Risk and urbanization

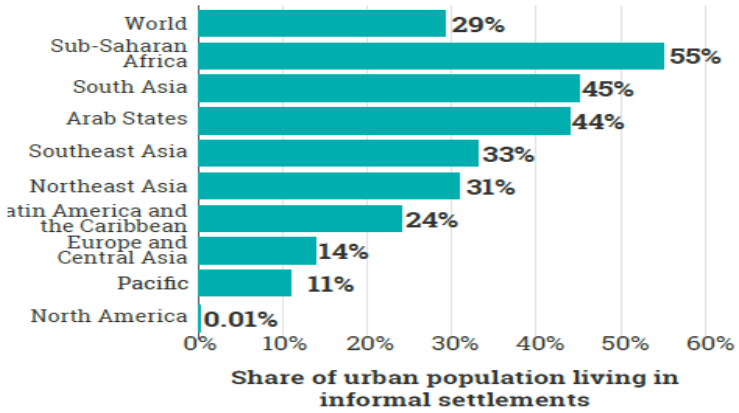
Risk and urbanization

- The relationship between poverty and risk is compounded by rapid urbanization globally.
- By 2017, over half of the world's population (56%) was living in urban areas – increasingly in highly dense cities



Source: UNDRR analysis based on World Bank (2022) and United Nations Population Division (2018)

- A quarter of the world's urban population lives in informal settlements
- 1 billion people in developing countries are vulnerable to disasters because they live in congested, poorly built houses with high levels of exposure and without adequate emergency services or coping capacities



Source: UNDRR analysis based on World Bank (2021b)

Risk and urbanization

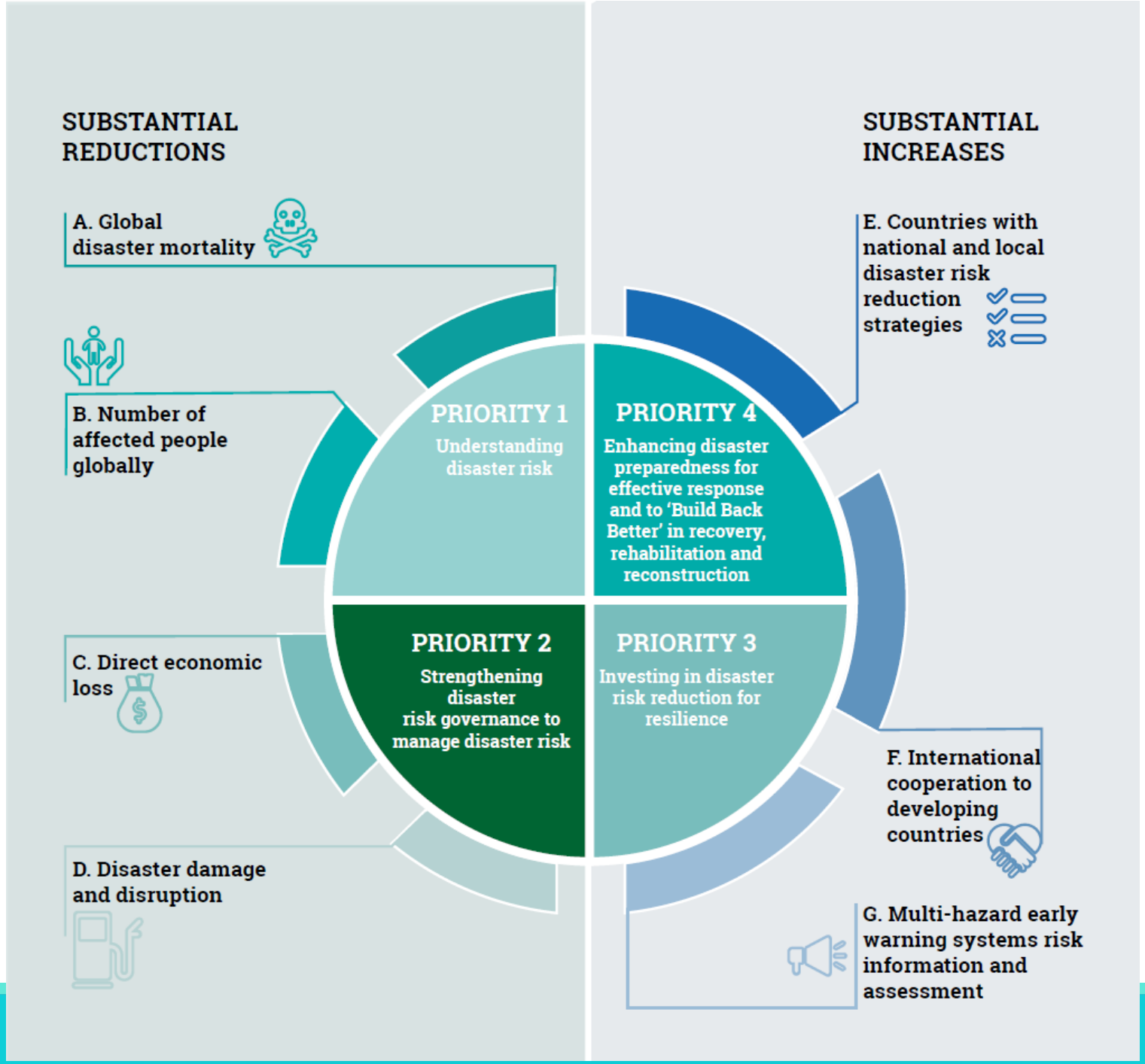
- Rapid urbanization is making people more vulnerable to the impacts of climate change
- the Concentration of large cities in coastal areas subject to the impacts of sea-level rise.
- Sea levels rose on average 1.3 mm per year between 1901 and 1971, but since 2006, that rate has increased to 3.7 mm per year
- It is projected that by 2100, 200 million people in the world will be affected by sea-level rise, with most of those in Asia, in particular China (43 million), Bangladesh (32 million) and India (27 million)

Risk and urbanization

The Sendai Framework at the halfway point: Getting it right towards 2030

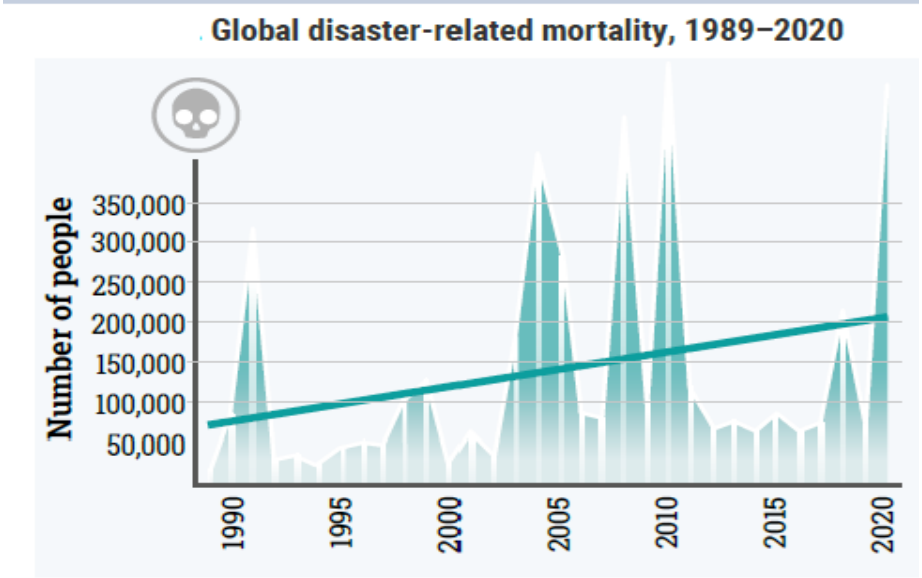
- The sendai framework includes four priorities and seven targets
- To define and measure progress towards its overall goal to increase resilience by reducing risk
- The year 2022 is the halfway point of the agreement's 15 year life.
- The sendai framework targets are the basis for states' voluntary reporting
- the first four targets are to substantially reduce disaster impacts: mortality, people affected, economic loss, and damage to critical infrastructure and disruption of basic services
- The other three targets are to substantially increase the adoption of national and local DRR strategies, international cooperation to developing countries and access to multi-hazard early wanting systems
- there are now 155 countries reporting on at least one of the seven targets, and new trends are emerging across the various indicators

The Sendai Framework outlines seven global targets to be achieved



Fragile progress in reducing the human cost of disasters

- A large year-on-year variability exists in mortality trends
- Largescale events and mega disasters can overwhelm countries' capacities to prepare, respond and recover.
- While global disaster-related mortality, in the long term, has seen an overall increasing trend
- There has been a perceptible decline from over 104,000 deaths per year in the 2000s to an average of 81,000 per year in the 2010s.
- Significant challenges remain in reducing global disaster mortality by 2030 (Sendai framework target a), especially in light of the covid-19 impact, which pushed up the overall mortality from 2020 onwards.



Note: The mortality rate for 2020 includes deaths related to COVID-19; however, due to incomplete reporting, this figure does not reflect the complete impact of COVID-19 in terms of mortality.

Source: UNDRR analysis based on DesInventar (UNDRR, 2021d), EM-DAT (CRED, 2021) and SFM (UNDRR, 2021c)

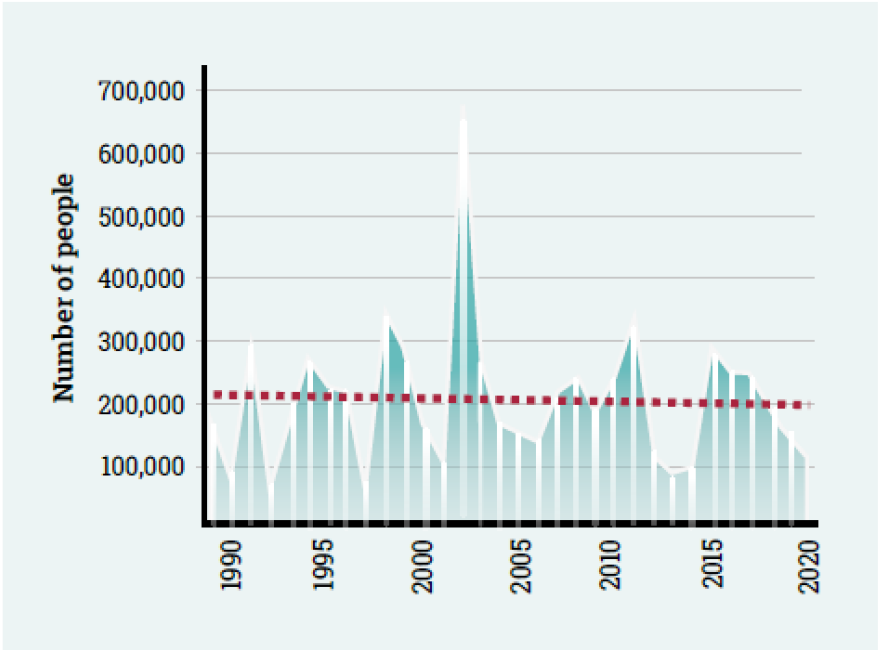
Fragile progress in reducing the human cost of disasters

- The preparation of DRR strategies as a means of saving lives and alleviating disaster impacts.

- The number of countries with local governments that adopt tailored national DRR strategies is strongly and positively correlated with a reducing disaster mortality rate over time

- The overall number of people affected by disasters (is on a moderate downward trend Over the past 20 years, the average number of people affected has decreased from 228 million in the 2000s to just under 200 million in the 2010s.

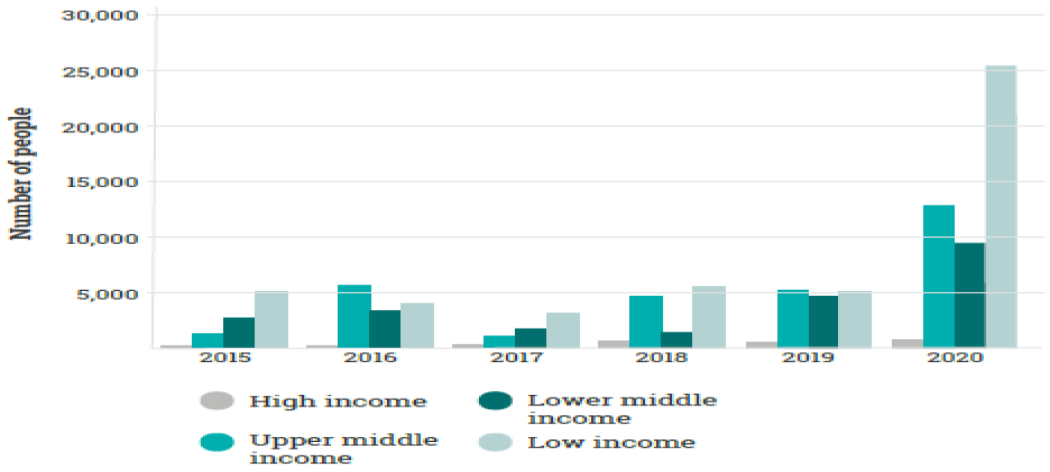
Number of people affected by disasters globally, 1989–2020



Source: UNDRR analysis based on DesInventar (UNDRR, 2021d), EM-DAT (CRED, 2021) and SFM (UNDRR, 2021c)

- Low-income countries were the hardest hit in 2020 by disasters including the pandemic and other hazards, with one in four people being directly affected

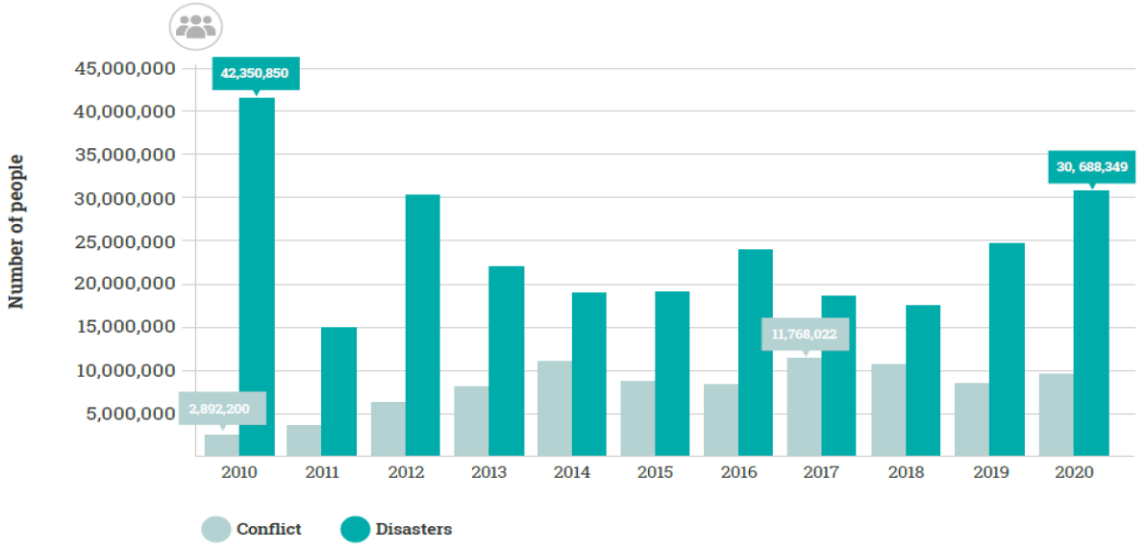
Number of people affected by disasters per 100,000 population by country income group (Sendai Framework Target B), 2015–2020



Source: UNDRR analysis based on DesInventar (UNDRR, 2021d) and SFM (UNDRR, 2021c)

- Ensuring post-pandemic recovery and building back and forward better will be essential to future resilience.
- Over the past decade, disasters have also forced over a quarter of a billion people into internal displacement, resulting in three times more internal displacements than those due to conflict and war each year on average

Number of displaced people due to conflict and disasters, 2010–2020



Source: UNDRR analysis based on Global Internal Displacement Database (IDMC, 2021)

Fragile progress in reducing the human cost of disasters

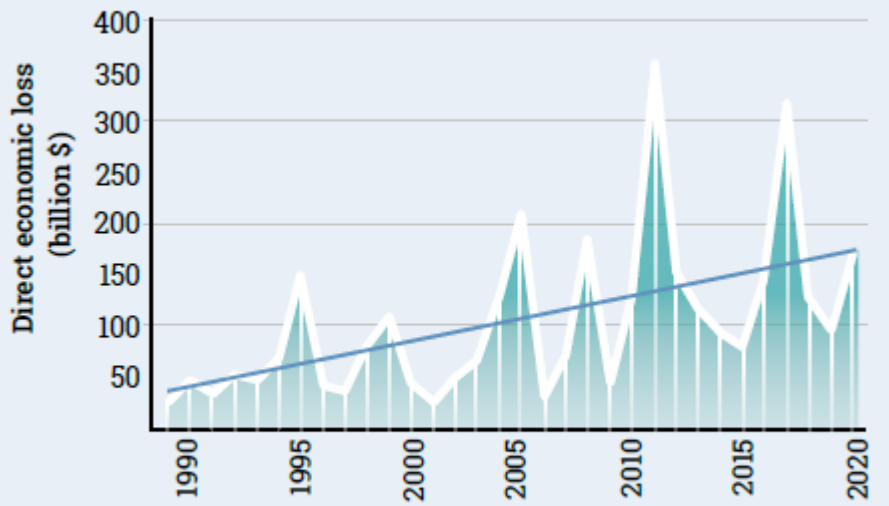
- Some regions were hit hard by climatic disasters during 2020, which caused large-scale displacement
- Many internally displaced people – including those fleeing from conflict and war – are also living in climate change "hotspots" subject to increased drought, extreme temperatures, floods and sea-level rise that exacerbate their vulnerability and exposure, adding systemic disaster risk for groups already in vulnerable situations.
- In Central and South America, the 2020 Atlantic hurricane season was the most active on record, with 30 major storms forcing millions of people to leave their homes.
- In November 2020, Hurricanes Eta and Iota caused chaos and flooding in 12 Central American and Caribbean countries. Four million people were internally displaced in Honduras alone. South and East Asia and the Pacific countries faced intense cyclone seasons.
- Cyclone Amphan triggered nearly 5 million evacuations across Bangladesh, Bhutan, India and Myanmar. Across the Middle East and sub-Saharan Africa, extended rainy seasons also uprooted millions of people

Alarming trends – growing economic cost of disasters

Disasters are claiming fewer lives annually, they are also costing more and increasing poverty

- On a global level, all disasters has averaged approximately $170 billion per year over the past decade, with peaks in 2011 and 2017 when losses soared to over $300 billion

Direct economic loss from disasters (billion $), 1989–2020



Source: UNDRR analysis based on EM-DAT (CRED, 2021)

Alarming trends – growing economic cost of disasters

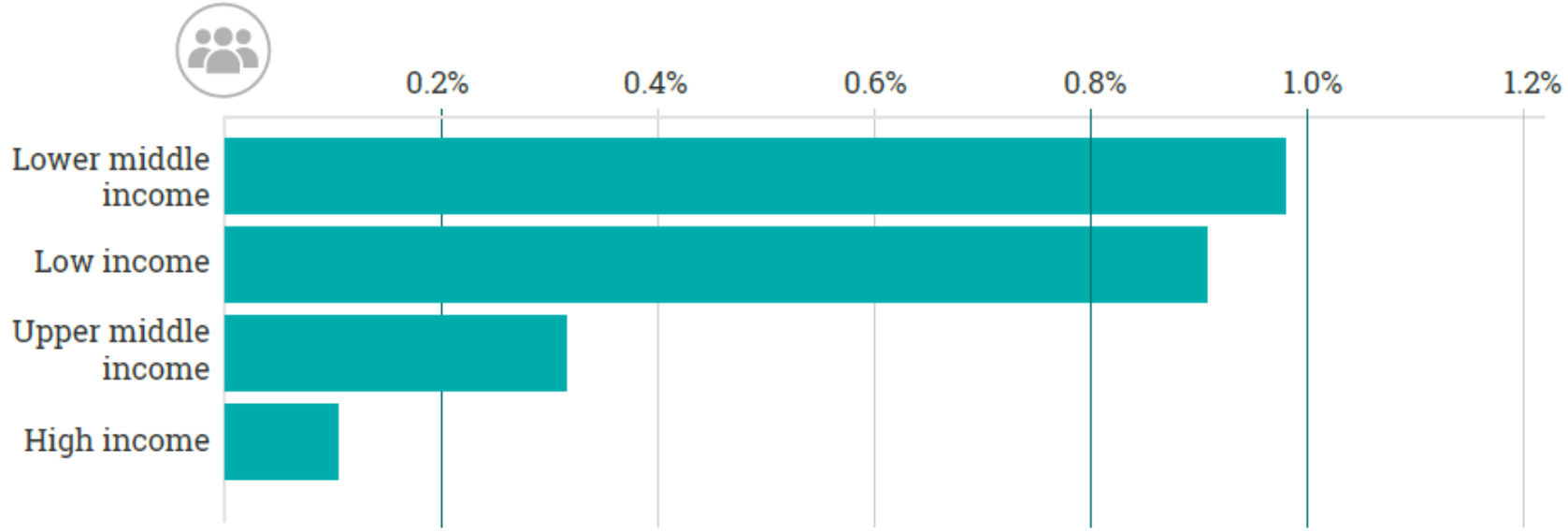
- In 2011, the high losses were mainly due to the Tōhoku earthquake in Japan and floods in Thailand, both of which became complex and systemic disasters with cascading impacts across national, regional and international economies.

- While the economic impact of geophysical disasters has remained stable over recent decades, annual economic loss from climate- and weather-related events has risen significantly since the 2000s, in line with their amplified intensity and frequency.

This is presenting a new challenge for meeting Sendai Framework Target C to reduce economic loss in relation to GDP.

Alarming trends – growing economic cost of disasters

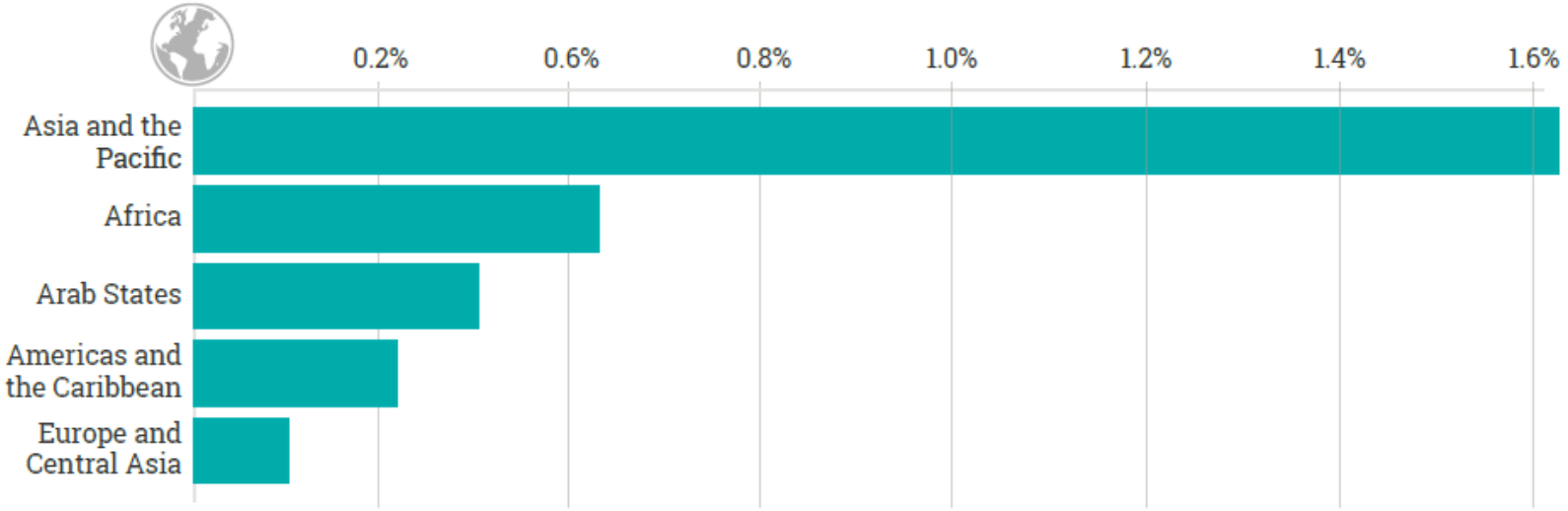
Low-income and lower middle-income countries lose on average 0.8–1% of their national GDP to disasters per year, compared to 0.1% and 0.3% in high-income and upper middle-income countries



Source: UNDRR analysis based on DesInventar (UNDRR, 2021d) and SFM (UNDRR, 2021c)

Alarming trends – growing economic cost of disasters

At regional level, the highest share of economic loss is borne within Asia and the Pacific, where countries lose on average 1.6% of GDP to disasters. Africa is the second most affected region, with an average disaster-related economic loss of 0.6% of GDP

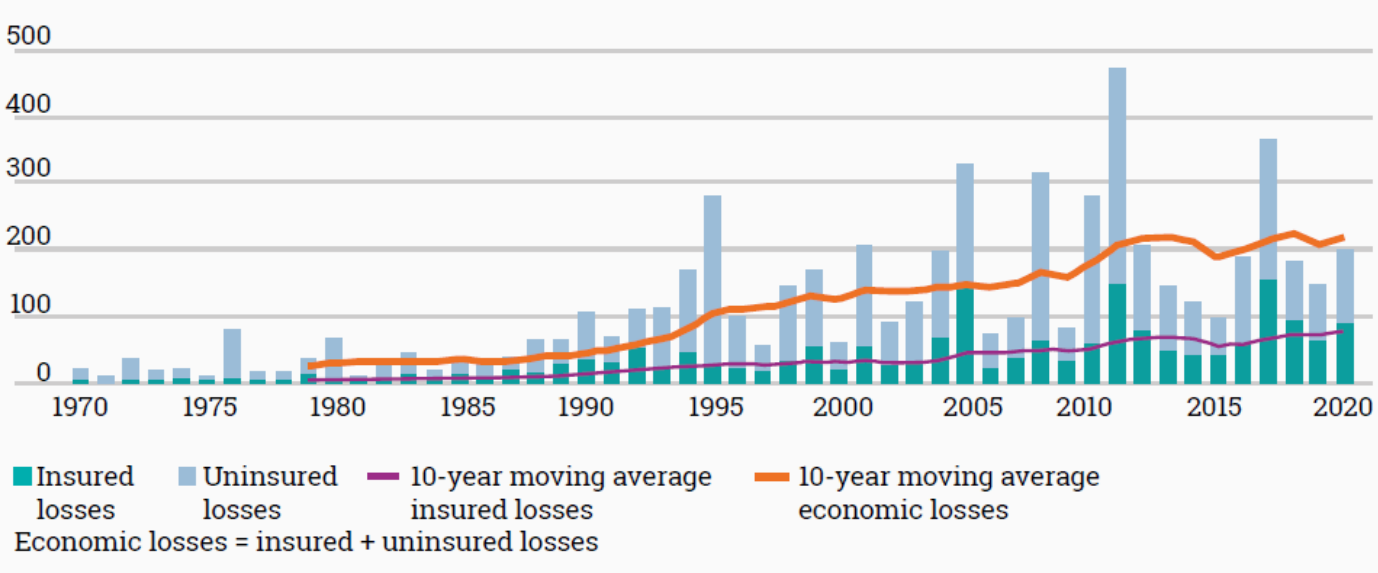


Source: UNDRR analysis based on DesInventar (UNDRR, 2021d) and SFM (UNDRR, 2021c)

Alarming trends – growing economic cost of disasters

Less than half of disaster-related losses at a global level in 2020 were insured (approximately $89 billion of an estimated $202 billion).

This was above the previous 10 year annual average of $71 billion of insured loss



Source: Swiss Re Institute (2021)

Alarming trends – growing economic cost of disasters

- The insurance coverage rate in most developing and emerging economies is well below 10% and sometimes almost zero
- Private insurance products are often not available or affordable for people with low-value assets and low incomes
- Economic loss of such proportions can have serious future implications for poverty alleviation

Beyond direct loss

- Direct disaster loss calculations do not capture the full human, social and economic implications of disasters

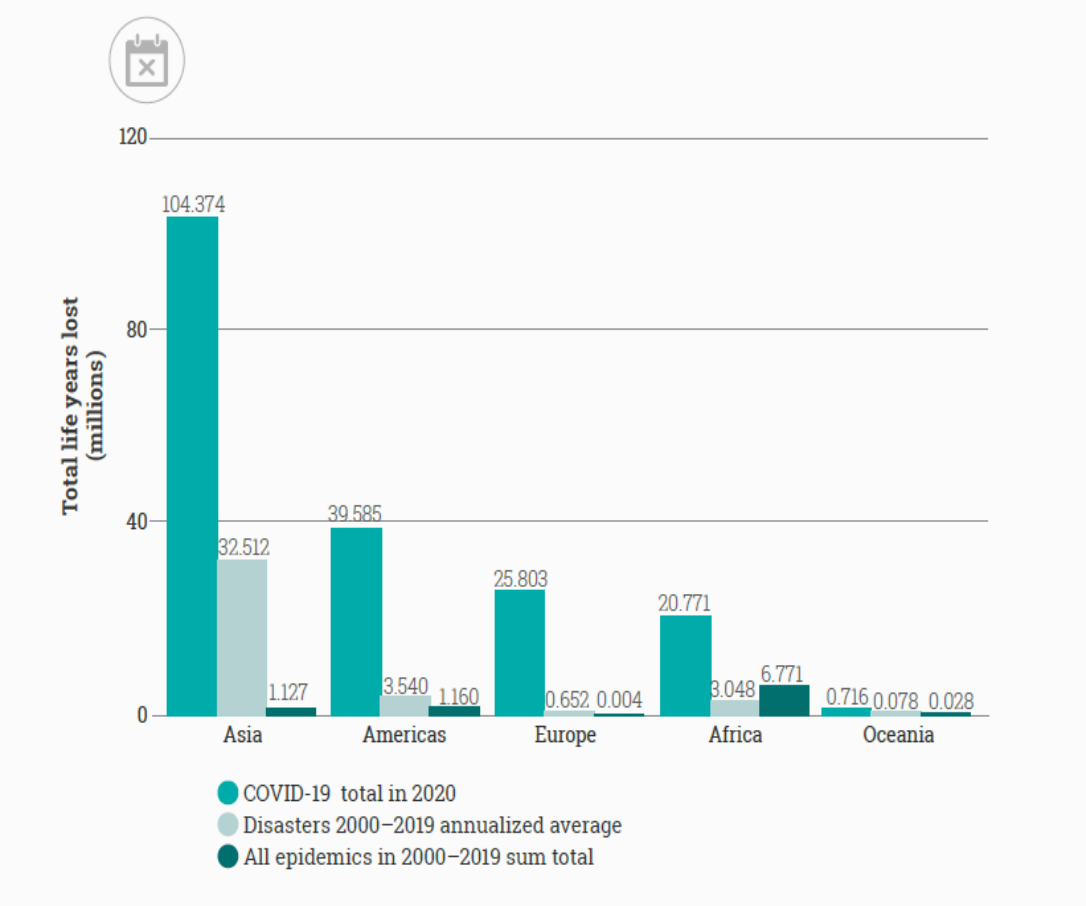
Life years lost: a metric developed for the global assessment report on disaster risk reduction 2015

- Rather than using only the four dimensions of fatalities, injuries, dislocations and the financial damage that they wreak, **life years lost is a way to describe the time required to produce economic development and social progress**

Beyond direct loss

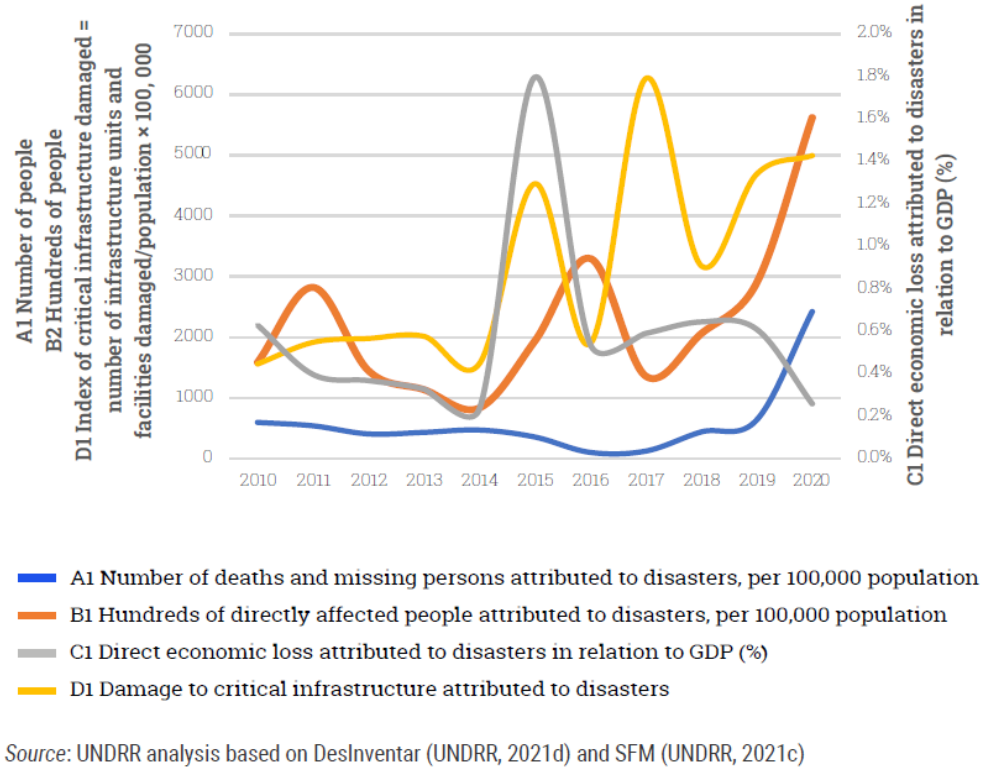
- Costs of the pandemic in terms of life years lost, measured for 2020, far outweigh the annual average costs associated with other disasters across all regions

- The life years lost from COVID-19 in 2020 were more than three times the annual average from other disasters in Asia, americas, africa, europe and oceania, although in the pacific



The Sendai Framework's "substantially reduce" targets

- The global community is off target to reach the goal of the Sendai Framework by 2030
- On the contrary, direct economic loss and damage to critical infrastructure have increased substantially over the past decade
- The climate emergency, the far-reaching repercussions of the COVID-19 pandemic and multiple other risk drivers further threaten progress towards the achievement of global DRR commitments

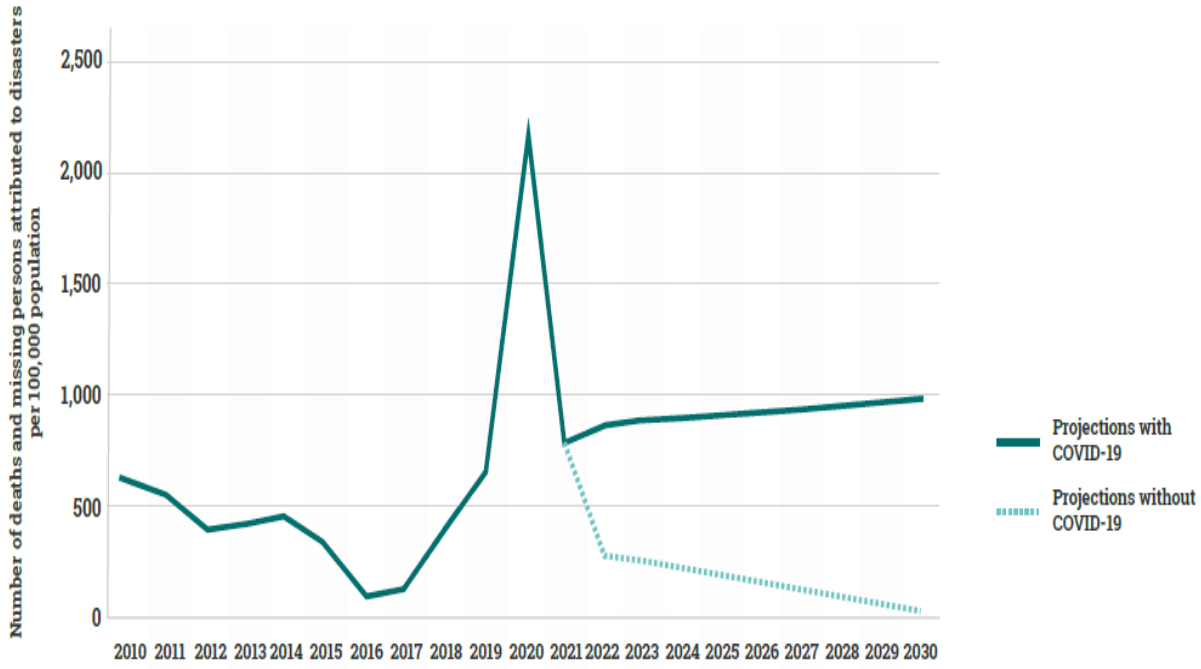


Source: UNDRR analysis based on DesInventar (UNDRR, 2021d) and SFM (UNDRR, 2021c)

The Sendai Framework's "substantially reduce" targets

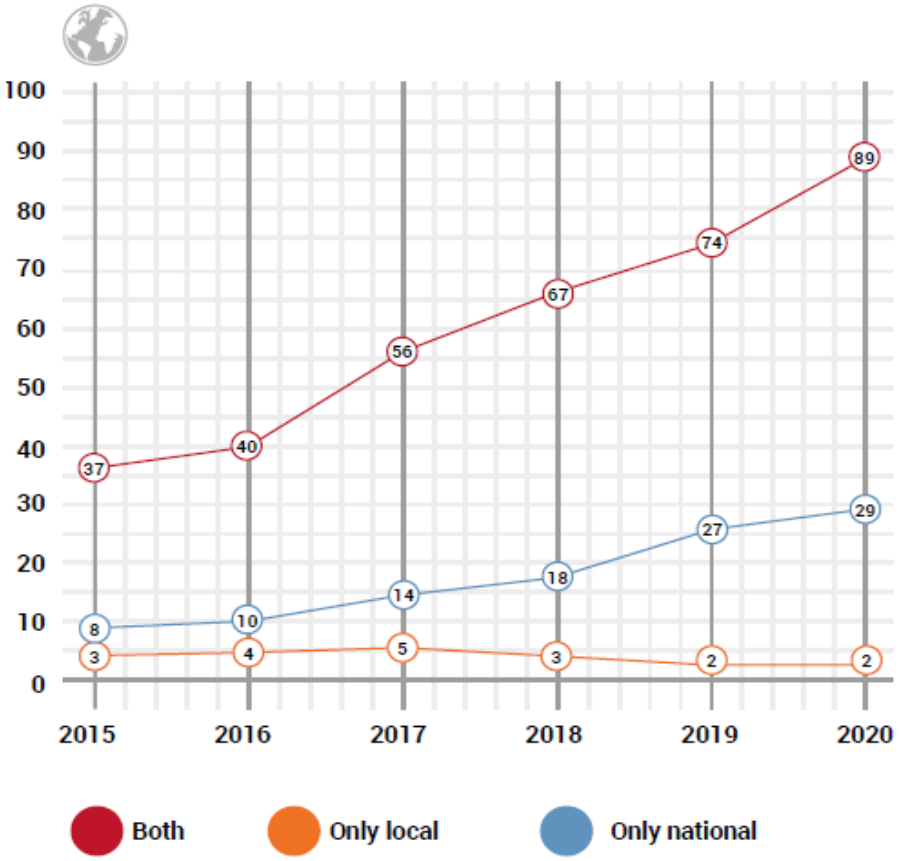
- Projection scenarios for reducing disaster-related mortality and people affected by disasters reveal just how much the Sendai Framework goal has been **reversed** by the pandemic.

- In the scenario that considers the short-term effects of the COVID-19 pandemic, slow vaccination rates in the Global South and various indirect impacts on human health, the global mortality rate may increase by 2030



Source: UNDRR analysis based on DesInventar (UNDRR, 2021d) and SFM (UNDRR, 2021c)

In the first 6 years of implementation of the Sendai Framework, there was a 1.5-fold increase in the number of countries with national and/or local DRR strategies



Source: UNDRR analysis based on SFM (UNDRR, 2021c)

- The national strategies adopted by countries show an increasing level of comprehensive alignment with the sendai framework according to country self-assessment

- Include a stronger focus than previous strategies on preventing the creation and accumulation of new risk, reducing existing risk, building the resilience of sectors, recovery, building back better and promoting policy coherence

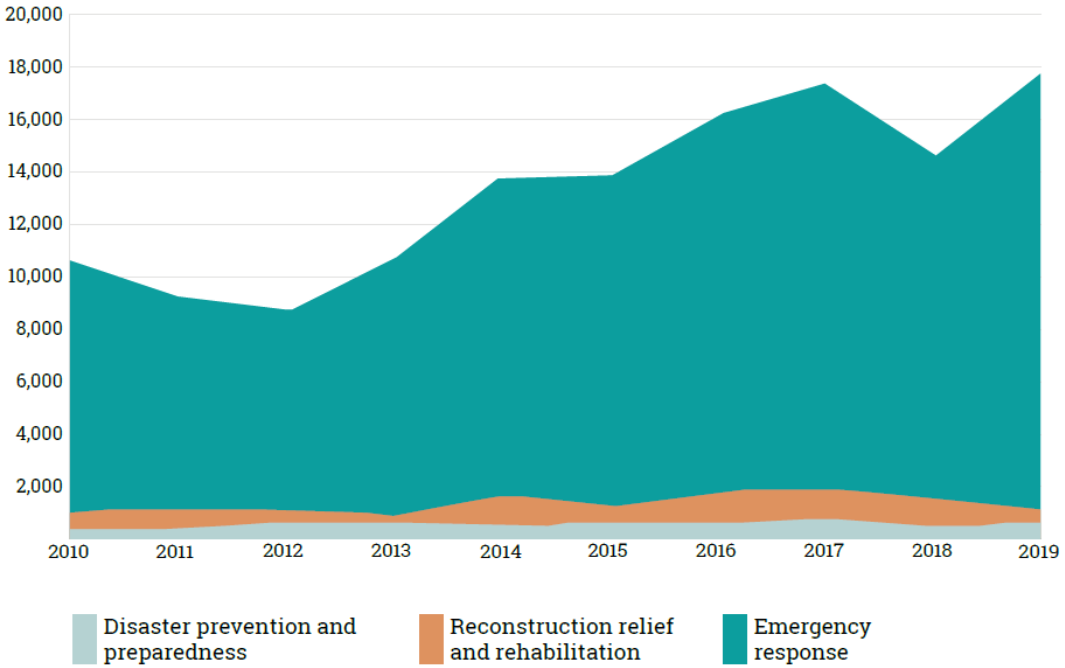
Year	Total number of countries with national and/ or local DRR strategies	Average score of Sendai Framework alignment (for national strategies)
2020	120	0.68
2019	103	0.66
2018	88	0.55
2017	75	0.47
2016	54	0.43
2015	48	0.41

Source: UNDRR analysis based on SFM (UNDRR, 2021c)

- Strengthening resilience, supporting ex ante risk prevention, restoring livelihoods, and rebuilding economic and social infrastructure requires **substantial financial resources**

- The Sendai Framework aims to substantially enhance international cooperation to developing countries

- Disaster-related financing has increased since 2010, most of the resources have supported activities to respond to and recover from disasters



Source: UNDRR analysis based on OECD.Stat (OECD, 2021a)

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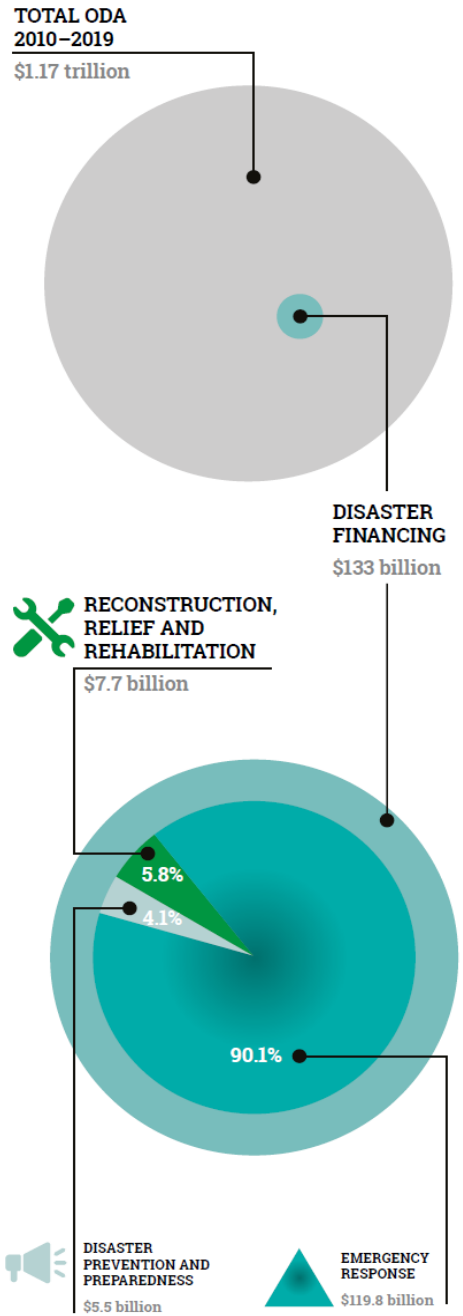
- From a total of $1.17 trillion of overall over the past decade (2010–2019), 11% ($133 billion) was disaster related.
- A smaller fraction still – $5.5 billion – was the share allocated for disaster prevention and preparedness
- $119.8 billion earmarked for emergency/disaster response
- $7.7 billion for reconstruction, relief and rehabilitation.
- Aid financing between 2010 and 2019, only 0.5% of the total amount was spent on risk reduction measures in advance of disaster



Source: UNDRR analysis based on OECD.Stat (OECD, 2021a)

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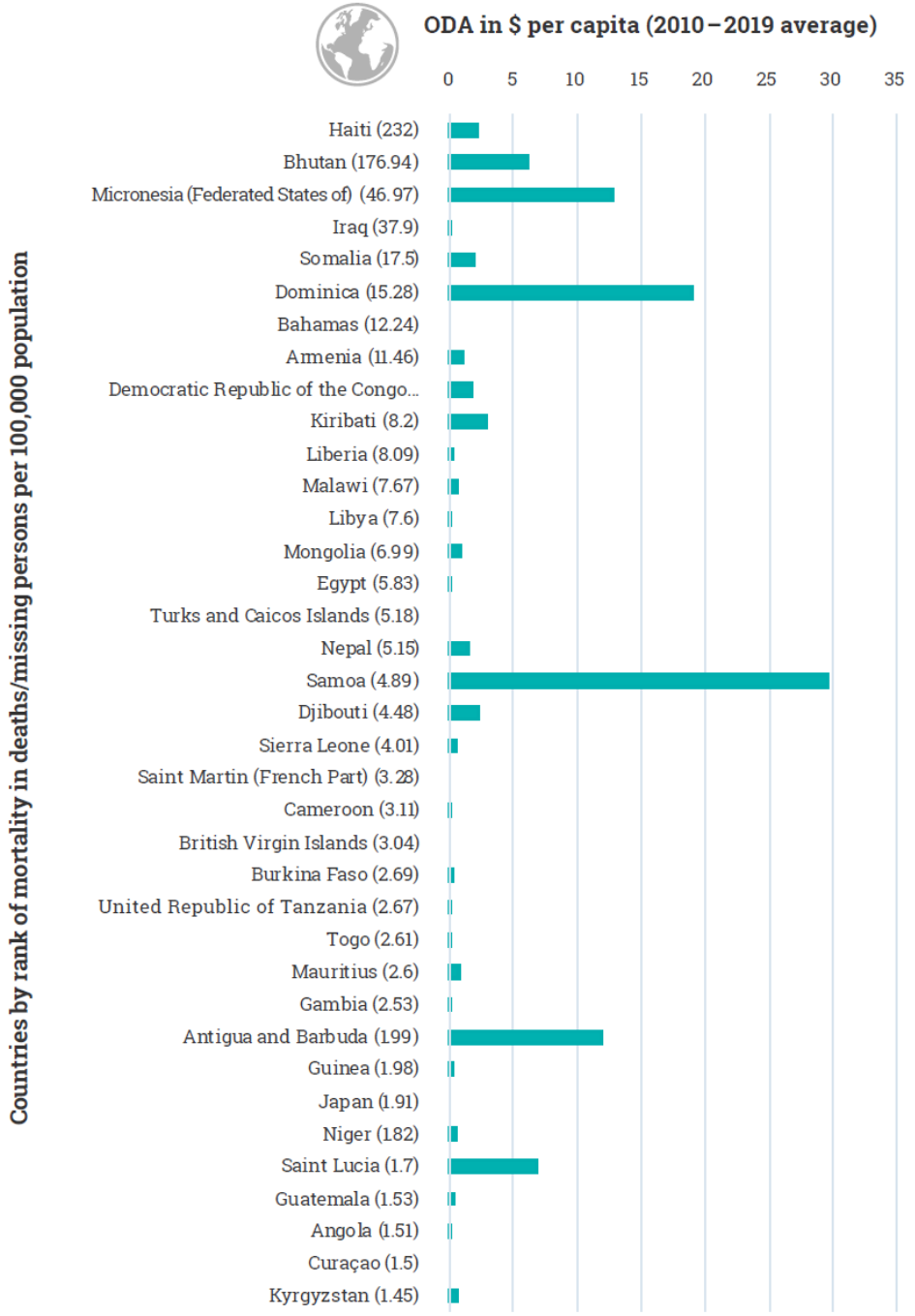
- Countries with the highest disaster-related mortality receive only a negligible share of funding for DRR per capita

- Some of the countries with the highest Natural Hazard Risk Index do receive commensurate levels of prevention and preparedness funding, while most do not



Source: UNDRR analysis based on OECD.Stat (OECD, 2021a) and SFM (UNDRR, 2021c)

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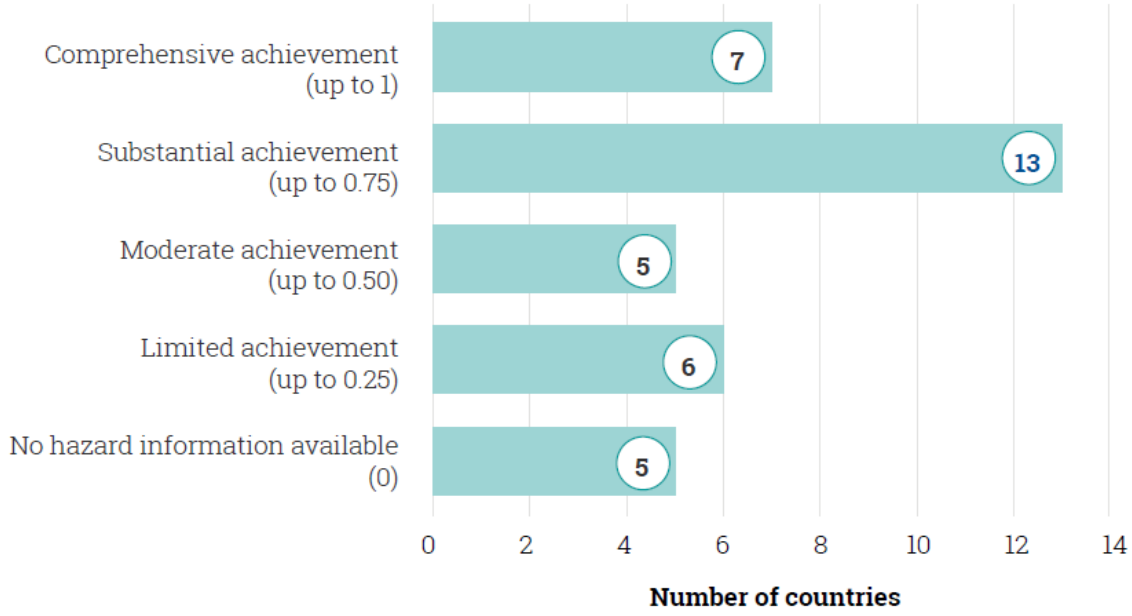
Some of the countries with the highest Natural Hazard Risk Index do receive commensurate levels of prevention and preparedness funding, while most do not

Source: UNDRR analysis based on INFORM Natural Hazard Risk Index (European Commission, 2021) and OECD.Stat (OECD, 2021a)

- The adoption of multi-hazard early warning systems is another critical element of DRR, as reflected under Sendai Framework Target G.
- In 2020, 36 countries reported having a multi-hazard early warning system
- Around 30% of the reported early warning systems have moderate to low coverage and effectiveness.
- Some 50% have moderate and substantial levels of coverage and effectiveness
- 20% are considered as fully effective



Source: UNDRR analysis based on DesInventar (UNDRR, 2021d) and SFM (UNDRR, 2021c)

خطرات سیستماتیک، چالشی پیش روی توسعه پایدار

سوگند ربانی

دانشجوی دکتری آمایش سرزمین و کیفیت محیطی

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Summer 2023

خطر چیست ؟

خطر، یعنی هر منبع یا شرایطی که پتانسیل آسیب رسانی وصدمه به افراد یا تجهیزات را داشته باشد.

مخاطرات سیستماتیک چیست؟

به مجموعه حوادثی که آسایش و امنیت جمعی را به خطر بیاندازد خطر سیستماتیک گفته می شود .

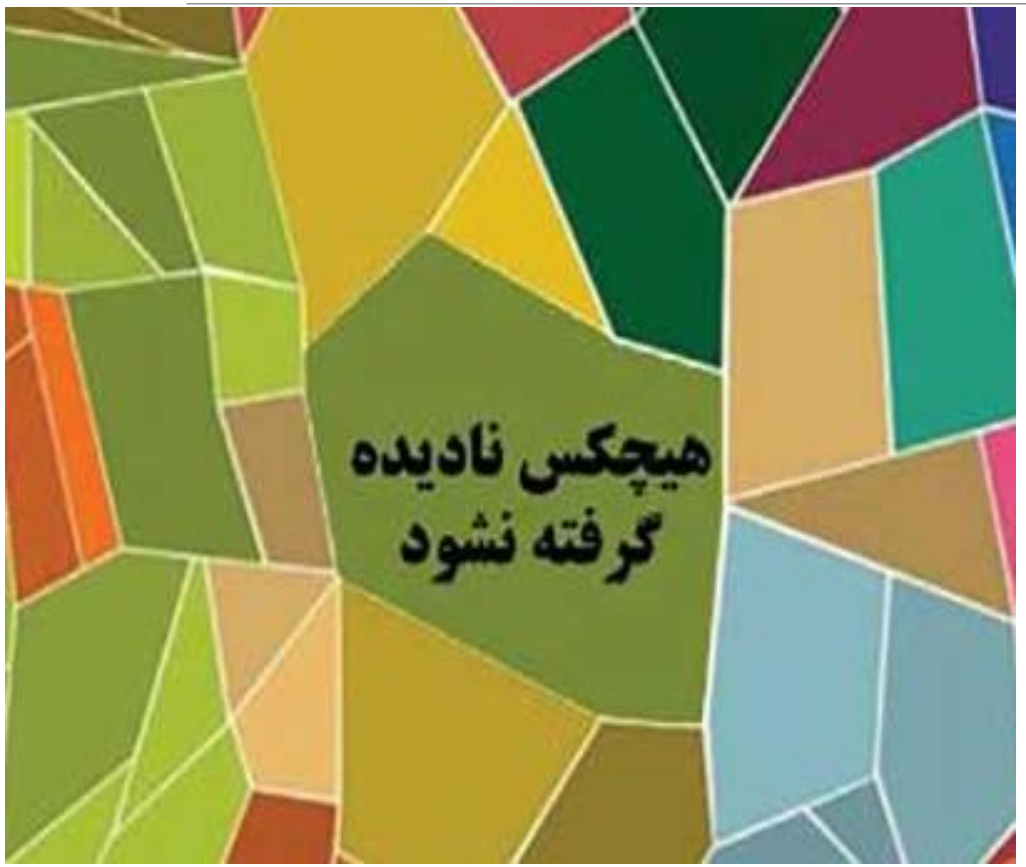
مخاطرات سیستماتیک به دو دسته با منشا انسانی و غیر انسانی تقسیم بندی میشوند .

توسعه پایدار
Sustainable development

توسعهٔ پایدار فرآیندی است که آینده‌ای مطلوب را برای جوامع بشری متصور می‌شود که در آن شرایط زندگی و استفاده از منابع، بدون آسیب رساندن به یکپارچگی، زیبایی و ثبات نظام‌های حیاتی، نیازهای انسان را برطرف می‌سازد.توسعهٔ پایدار راه‌حل‌هایی را برای الگوهای فانی ساختاری، اجتماعی و اقتصادی توسعه ارائه می‌دهد تا بتواند از بروز مسائلی همچون نابودی منابع طبیعی، تخریب سامانه‌های زیستی، آلودگی، تغییرات آب و هوایی، افزایش بی‌رویهٔ جمعیت، بی‌عدالتی و پایین آمدن کیفیت زندگی انسان‌های حال و آین.ده جلوگیری کند.

سند 2030 یونسکو
آخرین تصمیمات توسعه پایدارجهانی

توسعه پایدارو تاب آوری



امروزه فرهنگ در کنار ابعاد اقتصادی اجتماعی و زیست محیطی توسعه پایدار به عنوان بعد چهارم پایداری و حتی بعدمرکزی توسعه پایدارمورد توجه ویژهای قرار گرفته است.

نگاه به بعد فرهنگ و جامعه هدف باعث افزایش و ارتقا تاب آوری خواهد شد. تاب آوری یکی از زیربناهای توسعه پایدار است .

چالشهای پیش رو توسعه پایدار
با تاکید بر مخاطرات

1-تغییر اقلیم

2-بیماری های همه گیر

3- جنگ

4-مخاطرات طبیعی

How systems undervalue key assets and opportunities for learning

Zahra Eskandari
Assistant Professor of Health in Disasters and Emergencies, Department of Medical Emergencies, School of Nursing, Alborz University of Medical Sciences

Summer 2023

Objectives of the meeting

- It argues there is a need to get better at collecting “traditional” data, particularly on vulnerability, exposure and disaster loss and damage
- It is necessary to acknowledge that systems often measure the wrong things, and take a risky short-term, myopic approach
- It highlights that the very concept of cause-and-effect risk assessment needs to be reconsidered, and that systemic risk assessment has much to learn from emerging good practices in management of so-called “wicked” problems that require flexible, curious and participatory management.

Introduction

Risk assessment has traditionally favored quantitative data analysis based on short-term and economics-based approaches.

However, in the context of today's increasingly complex systemic risk, there is often a gap between the information available and accessible and the knowledge that needs to be use.

Shortcomings of incumbent approaches to risk management

Governance systems are not collecting the right data, key assets are being undervalued in decision-making and learning opportunities are being missed.

Measuring value more holistically is essential to reducing and managing risk. This needs to be considered across governance systems and the private sector, not only within DRM authorities.

Cont…

There are three pitfalls with the way in which value is defined in the incumbent approach to risk management:

- Indices measure the wrong things
- They take a short-term approach
- They are myopic in that they fail to take into account cascading impacts and/or trans boundary risks.

All three of these limitations hinder the ability to effectively understand, assess and act on complex and systemic risk.

Measuring the wrong things

- The old adage that "what gets measured gets managed" is highly relevant in the risk management space.
- Factors not measured are excluded from financial balance sheets and governance decision-making.

- The understanding and application of how to account for impacts that cascade into or over one another is limited.

Short-term thinking

- The second pitfall is the time frame over which the destruction and creation of value is considered in risk management.
- Most disaster impact assessments typically take a short-term view.
- This short-termism means little data and insights on indirect or concatenated impacts, or ripple effects, are available for risk managers wanting to

  understand more comprehensively the potential positive and negative consequences of events.

Short-term thinking

- Private sector risk assessments typically consider the value created or lost over 12 months. This is evidenced by the alignment to this time frame of shareholder reporting and incentive schemes such as employee bonuses.
- There is often a lack of experience in to how to integrate systemic risk reduction initiatives with much longer time frames.
- However, there are also some good counter-examples, such as the work of the Economic Commission for Latin America and the Caribbean over the last four decades.

Short-term thinking

- Social and environmental values are often created and lost during financial value creation.

The impact of the short time frame is that, even when they are accounted for, the time frame over which the value of social or environmental assets is lost is considerably shorter than the time taken to repair them.

Cont..

- It is particularly concerning that even where longer-term time frames are considered, the mechanisms for integrating systemic risks, particularly from climate change, are not yet developed.
- This represents a growing and potentially game changing risk to current systems and longer-term investments.
- Reconsidering the choice of discount rate and better accounting for climate change present opportunities to act on investment risk and promote intergenerational equity.

Short-term thinking

There are examples in other sectors and systems that provide sources for learning. Within the insurance industry and some parts of the investment communities, financial returns are routinely assessed over multiple decades, but this thinking is not prevalent in other parts of the financial system.

Similarly, the private sector has developed methods for consideration of safety factors in infrastructure design that look at cascading impacts of design choices. These can provide lessons for other sectors.

Myopia that ignores trans boundary and systemic impacts

- The third pitfall of current systems is that they tend to align with political and geopolitical borders, thereby ignoring systemic and trans boundary risks.

- The impact of a virus or risk to biodiversity from consumptive behaviors in one country may be minimal or even invisible in that country, but devastating for an adjacent, economically and politically separate community.

Myopia that ignores trans boundary and systemic impacts

- Global corporations span political and geographical boundaries, and hold more financial resources than many nations, so the choices they make about which risks to govern and who they regard as their primary stakeholders have the potential for significant positive impacts on systemic risk.

- Improving understanding of the trans boundary nature of risk can also positively reinforce disaster resilience.

Myopia that ignores trans boundary and systemic impacts

- There are few mechanisms measuring trans boundary systemic risks, let alone planning for and providing redress from trans boundary impacts.

- The maturity of models that convert the value of these elements to the common economic unit – money – has increased significantly in recent years, but a gap remains.

Results of measuring the wrong things

- Floods and droughts have significant impacts on poverty, because of their extensive, low-intensity, high-frequency nature. Such recurrent disasters may not be highly visible (and may not even be recorded in the media and usual databases), but nevertheless have a large impact on people's well-being and long-term prospects .
- Earthquakes and tsunamis have lower average impacts on poverty because they are less frequent, but they have massive and acute impacts when they do occur. A single earthquake or tsunami can push millions into poverty overnight.

Results of measuring the wrong things

Consideration of safety factors requires a long-term view, but even in this context, the importance of systemic features is not always recognized.

Furthermore, the understanding and the application of how to account for impacts that cascade into or over one another are limited.

Results of measuring the wrong things

One of the starkest examples of this circular logic or complex interactions is that of disaster poverty traps.

Poverty traps occur when a household or community's response to a disaster reduces their well-being in the longer term and ultimately reinforces their vulnerability to the next disaster event, resulting in a vicious cycle from which it is almost impossible to escape.

A family might get caught in a disaster poverty trap when forced to use erosive coping strategies following losses from a disaster.

Wicked problems and systems-based approaches

In organizational, social and societal settings, the term “wicked problem” is often used to refer to an issue with a high level of complexity without any determinable final point of stability.

Due to highly complex dependencies among many moving elements, the resolution to one aspect of Photography the (wicked) problem may create other problems elsewhere in the complex dynamic system.

Wicked problems display many of the characteristics of systemic risk.

Wicked problems and systems-based approaches

- Wicked domains are situations in which feedback in the form of outcomes of actions or observations is poor, misleading or even missing. In contrast, in “tame” or “kind” domains, feedback links outcomes directly to the appropriate actions or judgments and is accurate and plentiful .
- A wicked environment cannot be reduced to a kind one just because it can be assessed. Yet this is what people often attempt to do, by continuing to use standard tools and processes on these complex areas, even though there are no repeatable patterns in complexity.

Wicked problems and systems-based approaches

- Hence, the ability to deal with wicked problems in social systems requires cross-functional and collective processes induced by supportive values and leadership principles.
- Conventional decision-making models assume reasonable stability around tasks and organizational design parameters, in contrast with situations where decision makers face unprecedented interdependencies of unpredictable factors or forces embedded in complex wicked problems.
- However, there are certain actions policymakers and analysts can take to better understand and devise solutions to managing wicked problems.

Wicked problems and systems-based approaches

- Enable systems thinking and systems approaches
- Integrate diverse knowledge
- Recognize that deep uncertainty is a characteristic of wicked problems
- Use diagnostic approaches
- Use a variation of the “precautionary principle” and “planetary boundaries”

A long-term, holistic and systemic perspective

- In an increasingly interconnected and complex world, where the risks faced are compounding and cascading, the dominant approach to risk management is no longer fit for purpose.

- A systems-based approach is needed to understand contemporary drivers of risk and of impacts when risks are realized.

A long-term, holistic and systemic perspective

- The Group of Twenty (G20) Financial Stability Board created the Task Force on Climate-related Financial Disclosures to improve and increase reporting of climate-related financial information (TFCFD, n.d.).
- As climate change presents financial risk to the global economy, the task force aims to help financial markets access clear, comprehensive, high-quality information on the impacts of climate change.

This includes the risks and opportunities presented by rising temperatures, climate-related policy and emerging technologies in a changing world.

Ways forward

The terms “systemic” and “complex” convey connection and dynamism. This means that every risk, every potential negative outcome, may at the same time be a driver that can potentially cause another negative outcome.

These outcomes may either amplify or dampen one another, thus increasing or decreasing the impacts on the system.

It is important to note this dynamic interconnectedness can also reduce risk and increase resilience; this is what systemic risk governance seeks to achieve.

Ways forward

There are two emerging ways forward for assessing and managing systemic risk:

- The application of systems-based approaches to address the dynamic drivers of risk and
- The mobilization of collective intelligence for these approaches to provide impactful outcomes.

Ways forward

- New ways of combining modelling and data-driven approaches with community consultations are emerging.

- Increasing the value of attributes such as flexibility and the ability to work across traditional sectorial and geographical boundaries are key in the effective management of systemic risk

Ways forward

It is essential that governance systems, not DRM institutions only, engage in risk reduction efforts.

Managing the complex systemic risks of the future will require mobilization of large numbers of people and significant financial resources.

It is cost-effective to invest in a sustainable future, but the investment will be possible only if government as a whole, and the private sector, acknowledge its importance and invest in building resilience.

How Human Choices

Drive Vulnerability Exposure and Disaster Risk

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Summer 2023

Content

- Systemic risk and human actions
  - Inequality, poverty, discrimination and environmental and risk
  - Human choices and severity of both intensive and extensive risk
- Understanding the root causes of vulnerability
  - Understanding vulnerability
- Improving data supports and understanding of vulnerability and exposure
  - Policy choices can accelerate risk reduction
- Ways forward

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GAR

“Disasters are not natural…”

“They occur due to human choices and a lack of risk reduction”

Introduction

- Disasters are not natural! They occur due to human choices and a lack of risk reduction.
  - Cascading effect

- A disaster is not something that should be thought of as an isolated event in a particular moment.

- Risk from hazards is being amplified by human interventions in nature.

- This presentation aim to explore why current risk reduction efforts are insufficient, this chapter looks at the human actions that lead to increased disaster vulnerability and exposure.

Systemic Risk is Increasing Due to Human Actions

Systemic Risk is Increasing Due to Human Actions

- The **exposure of populations and infrastructure to hazards** has increased significantly over recent decades most notably due to
  - Globalization
  - Urbanization and unsustainable development in hazard-prone areas.

  - **Example:** Fuego Volcano in Guatemala 2018
    - 461 deaths
    - 1.7 million affected
      - **Population growth** and **demographic shifts in the urban and peri-urban areas** around the volcano heightened exposure to the eruption

Systemic Risk is Increasing Due to Human Actions

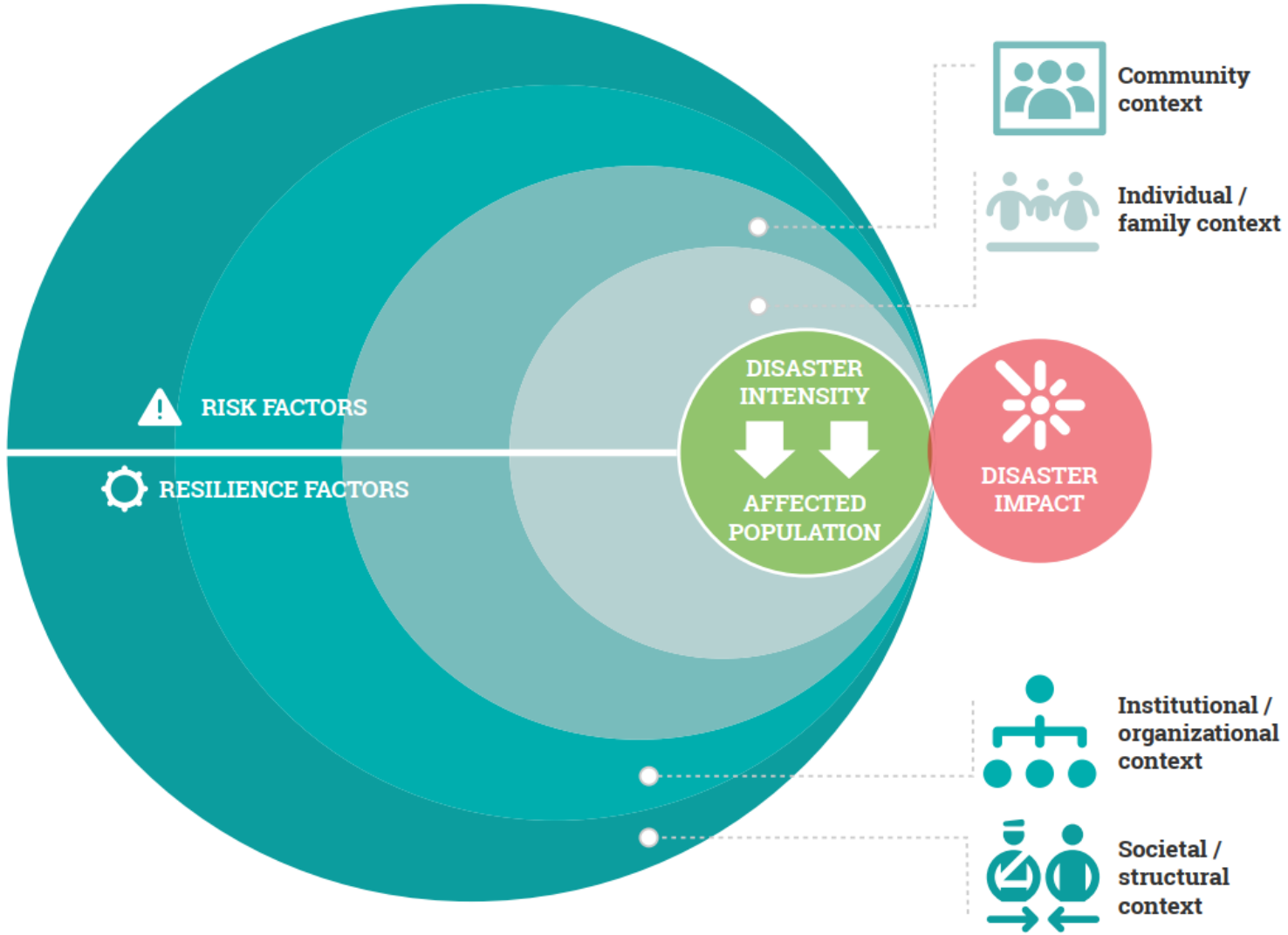
- **Pre-existing risk and resilience factors affect** the initial impacts of disasters and the way these impacts cascade.

RISK FACTORS

- **Hazards**
  - climate change and variability
- **Vulnerability**
  - health, social and psychosocial
- **Exposure**
  - community and individual

RESILIENCE FACTORS

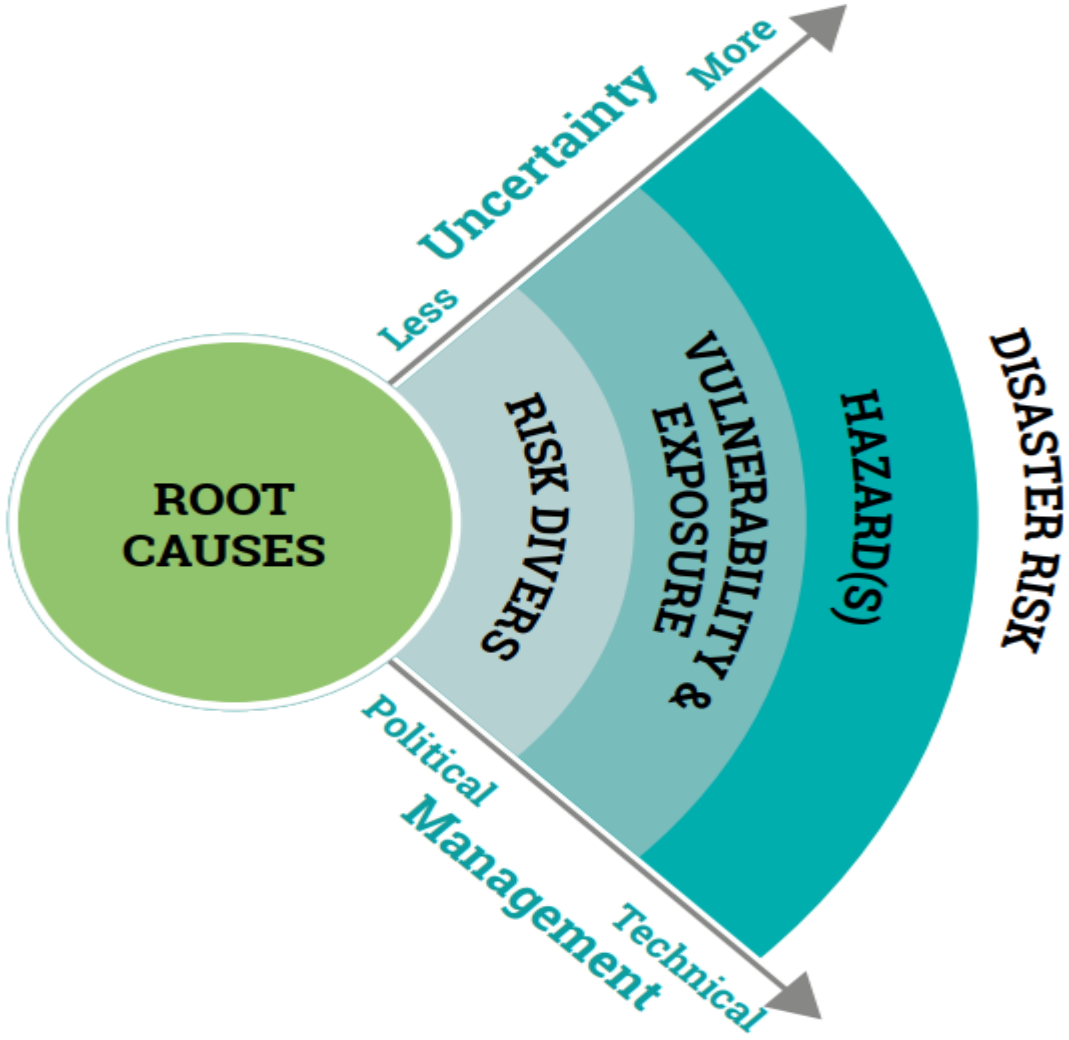
- **Support**
  - social, community, financial
- **Stress management**
  - self-care, coping strategies, proactivity and learning
- **Meaning**
  - communication, engagement and a sense of community



Disaster impact and aftermath cascades are inherently affected by risk and resilience factors

Systemic Risk is Increasing Due to Human Actions

- Hazard events that once might have caused localized impacts can now have cascading and even global impacts.
  - Severe flooding in Thailand (2011)
    - flooded area around Bangkok included industrial estates where production plants were highly concentrated
    - this delta is naturally susceptible to flooding
    - Almost 40% of the country's GDP at that time
    - affecting supply chains as far away as Japan and the United States
    - Systems were not designed to be resilient to shocks.



Levels of uncertainty in disaster risk and its management

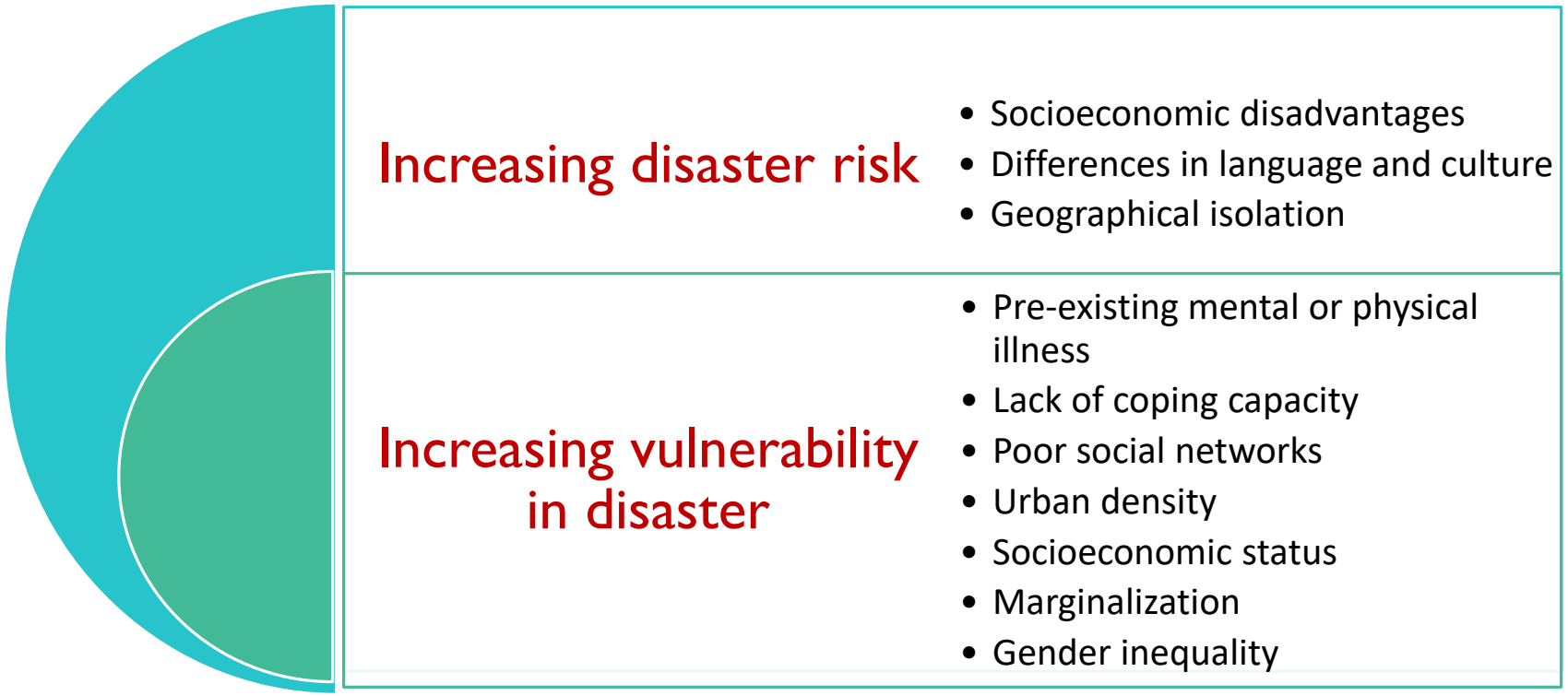
Systemic Risk is Increasing Due to Human Actions

- **Inequality, poverty, discrimination and environmental degradation drive risk**

- **Challenges for disaster risk policy formulation**
  - An individual's **gender role or identity**, **race**, **disability**, **age**, **migration status** and **health conditions** contribute to their unique vulnerability.
  - Roles (parents, workers, …) brings with it capacities and vulnerabilities, and these identities intersect.

Systemic Risk is Increasing Due to Human Actions

- **Inequality, poverty, discrimination and environmental degradation drive risk**



Systemic Risk is Increasing Due to Human Actions

- **Inequality, poverty, discrimination and environmental degradation drive risk**

❖ The longest-lasting detrimental impacts of a disaster may be from indirect consequences

- School closures during COVID-19
  - Lack of access to the internet
- Loss of household income
  - make education unaffordable
  - girls' education
- Drug addiction, domestic violence and suicide

Systemic Risk is Increasing Due to Human Actions

- **Inequality, poverty, discrimination and environmental degradation drive risk**

❖ Vulnerability cannot be fully eliminated, so understanding it is essential for effective policymaking.

❖ Vulnerability should not be seen as a stigma or personal deficit of some people, but instead as an unevenly distributed present in all people.

Policymaking can therefore be seen as granting a fairer distribution of vulnerability as part of more equitable governance

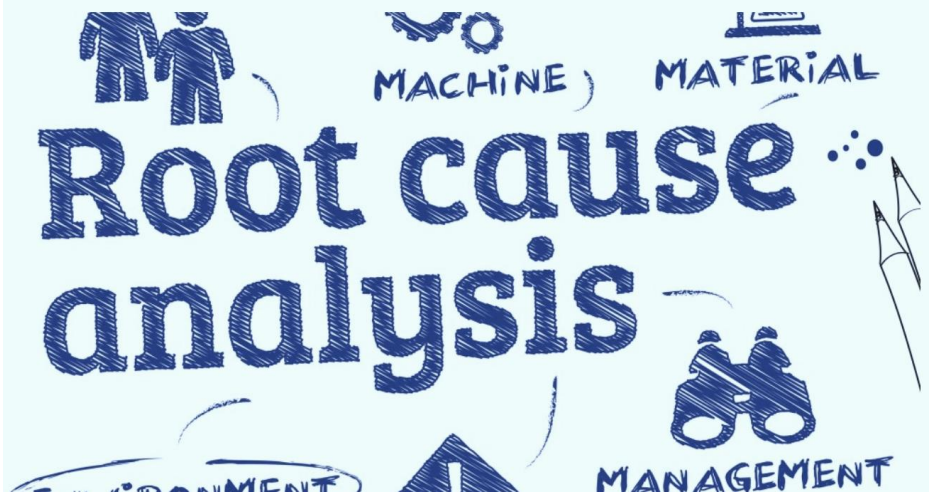
Systemic Risk is Increasing Due to Human Actions

- **Human choices affect the severity of both intensive and extensive risk**

❖ Small, recurring extensive disasters far outnumber intensive disasters, and their cumulative impact can be much higher.

- Seasonal flooding tend to recur in the same localities repeatedly
- Localized flooding as the single most damaging phenomenon, across 50 countries.
- Skewed development priorities, climate change, fragile governance and environmental degradation are extending the footprint of extensive disaster risk.
- Loss of species and habitats, and trade in wildlife
  - shaped emergent hazards such as zoonotic diseases(COVID-19)

Understanding the Root Causes of Vulnerability is Essential



Understanding the Root Causes of Vulnerability is Essential

- Taking a forensic approach to look at the root causes and drivers of riskcan help identify and understand how best it can be addressed.

- Forensic approach to examine
  - What proportion of the damage and human loss was avoidable
  - What were the inherent consequences
    - For example in Fuego Volcano disaster
      - Wrong human choices
      - Governance systems and socioeconomically driven settlement patterns

Understanding the Root Causes of Vulnerability is Essential

- Four key elements were identified that contributed to the severity of the impact related to the social construction of risk
  1. The socioeconomic reasons why people had continued to settle in the area of high exposure
  2. Poor risk communication strategies and lack of coordination between the early warning, response and evacuation procedures
  3. Lack of hazard knowledge (monitoring and support to scientific institutions)
  4. Deficient and fragmented information and communication among relevant DRR institutions, local authorities, leaders and the population

Understanding the Root Causes of Vulnerability is Essential

- **Understanding vulnerability requires looking across sectors**
  - **Risk management is more efficient if**

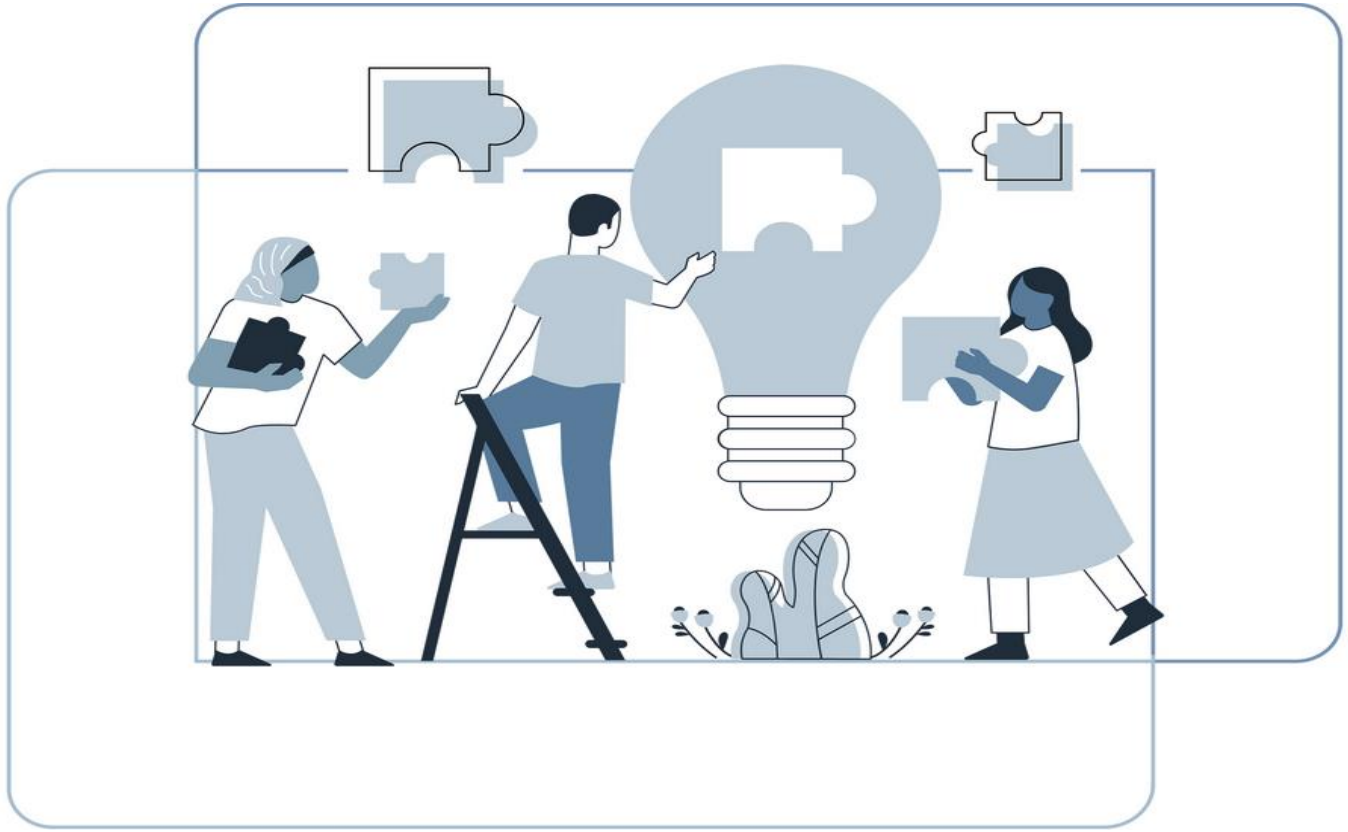
❖ Working from single disciplines and separate perspectives **Vs.** Transdisciplinary approaches

>> co-production of knowledge and co-management of disaster risk

- Integrate knowledge from different disciplines & non-academic stakeholder communities.
- Better understanding of the social dimension of the systemic nature of risk
- Require working in partnership with multiple actors (including people affected by DRR and DRM decisions)

Understanding the Root Causes of Vulnerability is Essential

paradigm shift in research practice, requiring mutual learning, collaboration and exchange within academia, and also effective engagement of non-academic stakeholders



Understanding the Root Causes of Vulnerability is Essential

- Forensic approaches combine
  - retrospective longitudinal analysis,
  - disaster scenarios,
  - comparative case analysis
  - meta-analysis research,

  along with enhanced involvement of development stakeholders.

This gives a holistic understanding of particular events and ways to accelerate future risk reduction

Improving Data Supports A Better Understanding of Vulnerability and Exposure

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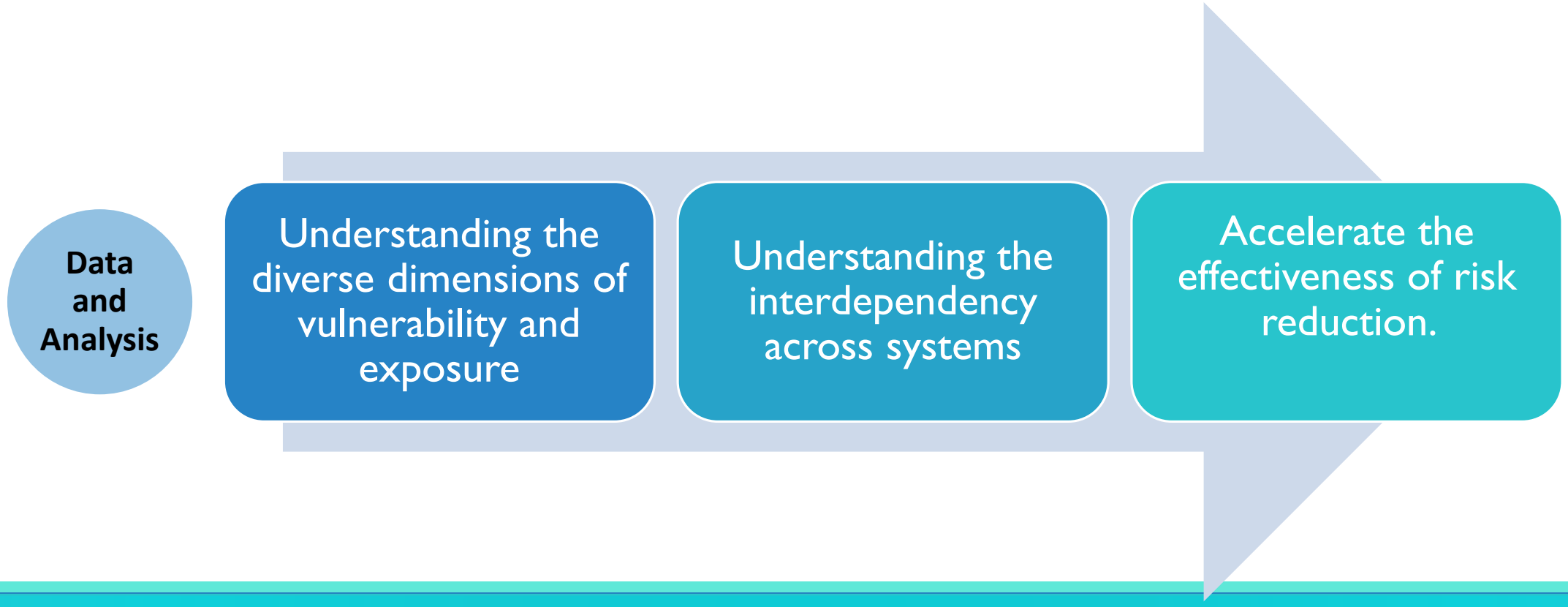


Improving Data Supports A Better Understanding of Vulnerability and Exposure

- **DATA**
  - **National level**
  - **Global level**
    - **EM-DAT**
    - DesInventar
    - World Bank
- **Silent disasters**
  - small-scale extensive disasters such as localized flooding
  - **often missed due to under-reporting at national level and thresholds applied in global databases**

Improving Data Supports A Better Understanding of Vulnerability and Exposure

- The need to involve national statistical offices in the production of geographic and temporally comparable disaster-related statistical series and indicators is increasingly being recognized.

- Achieving this requires:
  - (a) inter-agency training and technical assistance capacity;
  - (b) institution building expressed through political will; and
  - (c) sufficient resources for the development of a national system of statistics related to the environment, climate change and disasters

Improving Data Supports A Better Understanding of Vulnerability and Exposure

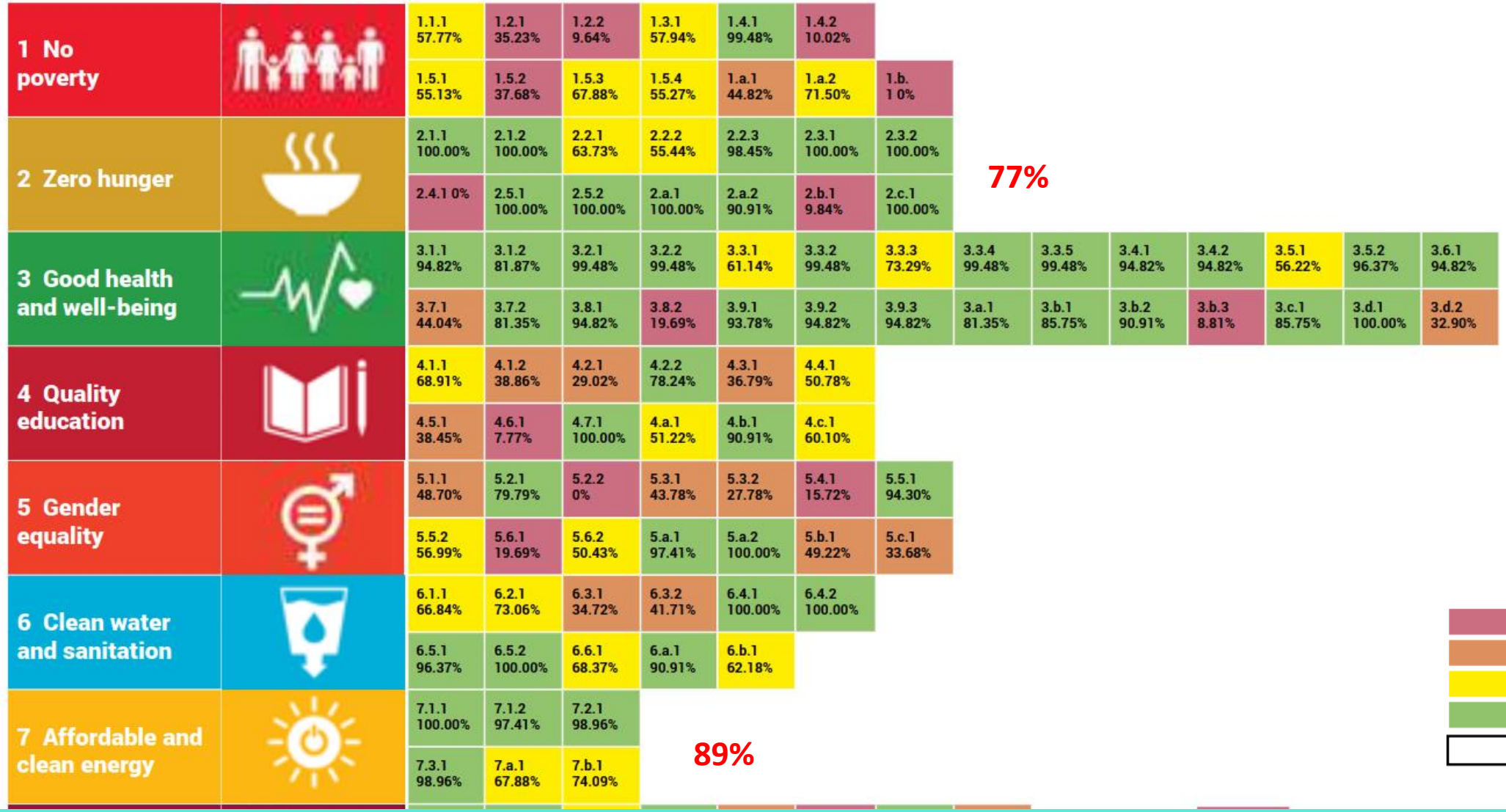
The wealth of vulnerability data collected as part of tracking the SDGs represents an often untapped resource for accelerating development, and also for increasing disaster risk understanding.

Reporting under the 2030 Agenda (including the Sendai Framework targets) is key to the measurement and monitoring of progress on reducing risk and social vulnerability

UNDRR
UN Office for Disaster Risk Reduction

GAR

Percentage availability of SDG indicator data with at least 2 years of data since 2015



Improving Data Supports A Better Understanding of Vulnerability and Exposure

Where data is available, forensic analysis of risk can also be helpful in supporting policymakers and communities to consider potential future pathways for risk reduction.

Improving Data Supports A Better Understanding of Vulnerability and Exposure

- National policies need to draw on specific information on marginalized and excluded groups, and on data on communities most affected by conflict and insecurity, disabilities and intrahousehold disparities.

- They should avoid using prevalence estimates and national averages, which do not give sufficient granularity

Improving Data Supports A Better Understanding of Vulnerability and Exposure

- **Policy choices can accelerate risk reduction**

❖Policy choices can promote resilience building, or can become root causes, drivers and amplifiers of disaster risk.

- Housing evictions of low-income residents
- The dismantling of environmental laws
- Top-down reconstruction and social protection approaches
- Absence of grass-roots

Improving Data Supports A Better Understanding of Vulnerability and Exposure

- **Policy choices can accelerate risk reduction**

  - Well-designed adaptive social protection efforts can reduce vulnerability and exposure (e.g. geographic, social and economic) and build community resilience.

  - Better joint planning across sectors can increase the efficient use of scarce resources and reduce the underlying causes of risk.

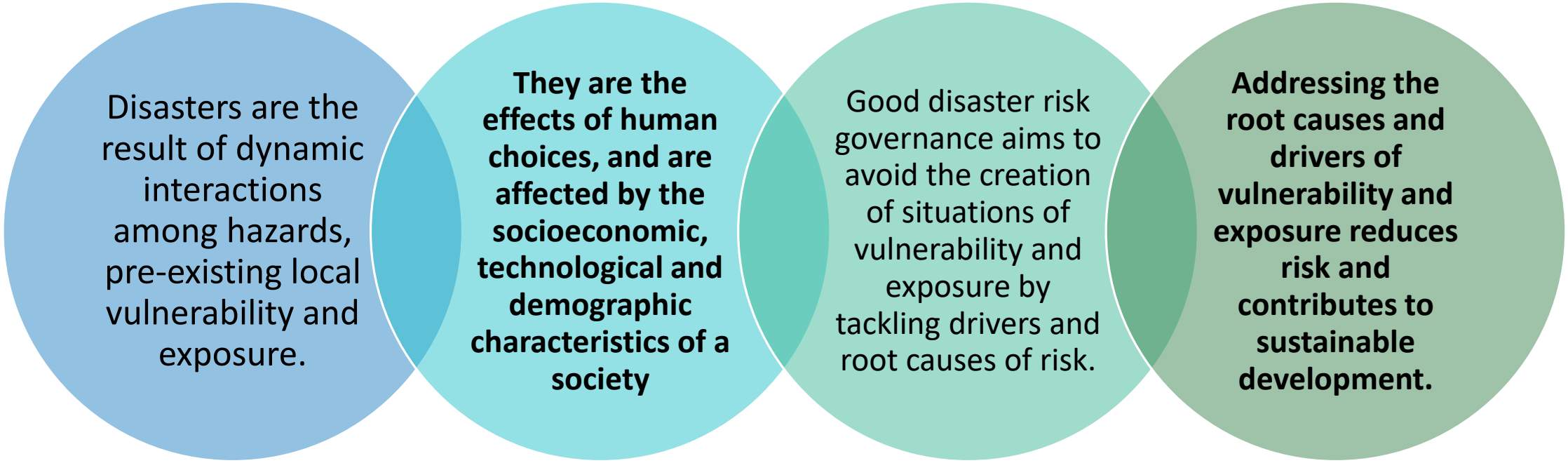
  - Cooperative cross sectoral planning can also help create governance approaches that are clearer and easier to implement thus reducing the administrative burden of local governments.

Improving Data Supports A Better Understanding of Vulnerability and Exposure

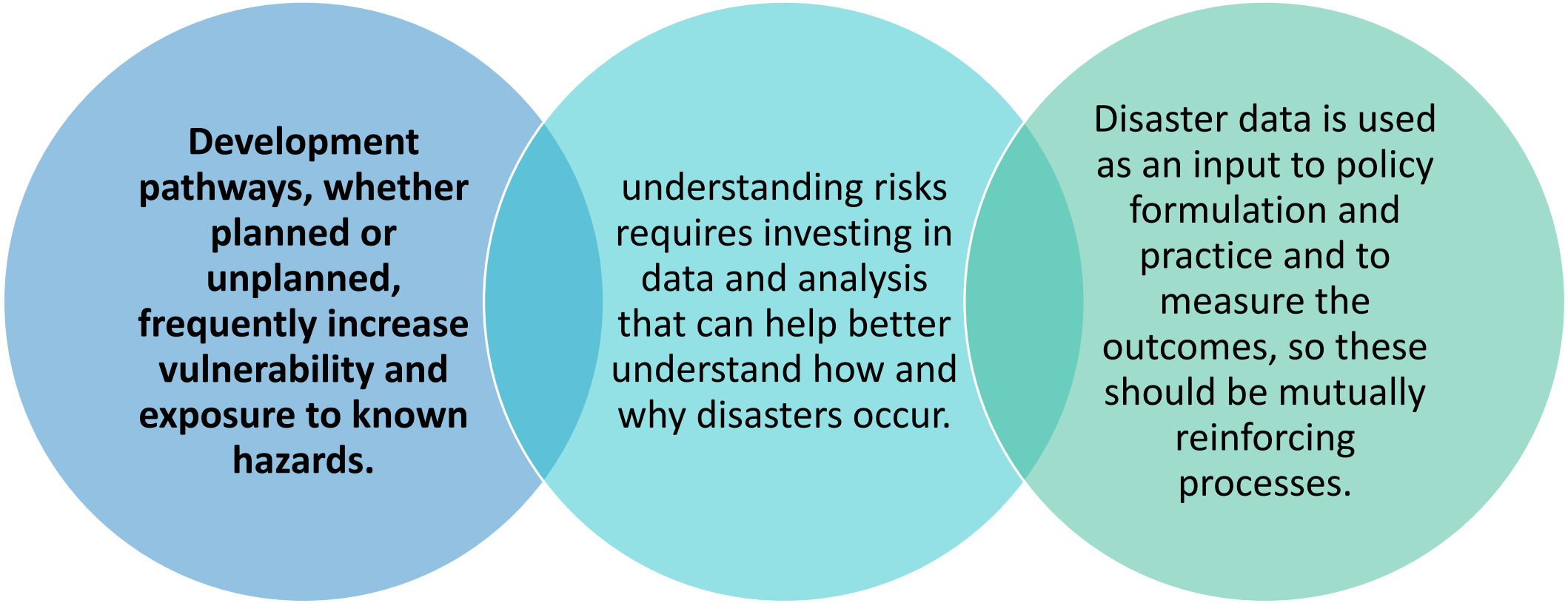
- **Policy choices can accelerate risk reduction**

Efforts to reduce the root causes of vulnerability and exposure can be particularly effective during a post-disaster recovery and reconstruction period.

Ways Forward



Ways Forward



Ways Forward

- Addressing the root causes of disasters requires a political and social commitment to sociocultural change

- Disaster risk governance should be backed by open and transparent collective action, vertical and horizontal cooperation and coordination among actors, and different ways of defining and reaching consensus regarding sectoral policies with positive impact in a geographic region.
  - It implies multichannel governance, with horizontal relations among actors and their territories


Thanks