

Report

Risk-informed development

From crisis to resilience

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May 2019



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Acknowledgements

UNDP would like to thank the many individuals who reviewed and commented on earlier drafts of this paper: Krishna Vatsa, Sanny Jegillos, Rajesh Sharma, Shairi Mathur, Kevin Petrini, Moortaza Jiwanji, Jo Scheuer, Ruben Vargas, Armen Grigoryan, Rajeev Issar and Angelika Planitz.

Paul Sayers, Roger Street, Emily Wilkinson and John Twigg also provided helpful comments. Thanks to Matthew Foley for editing, Steven Dickie for design and layout and Hannah Bass for support with production. Finally, thanks to Katy Harris and Merryn Lagaida for communications assistance.

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Acronyms

CCA	climate change adaptation
DRR	disaster risk reduction
EU	European Union
FfD	financing for development
GDP	gross domestic product
GPN	global production and distribution systems
GVC	global value chains
IDA	International Development Association
M&E	monitoring and evaluation
NGO	non-governmental organisation
OECD	Organisation for Economic Cooperation and Development
RID	risk-informed development
SDGs	Sustainable Development Goals
STR	Sendai Science and Technology Roadmap
TNCs	transnational corporations
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change

Executive summary

Over the past decade, there has been important progress on poverty reduction, disease control and access to healthcare, education and services, including in some of the world's poorest countries. However, these gains are fragile, and are undermined by threats, shocks and hazards. The damage triggered by shocks, stressors, natural hazards and threat events such as terrorism are not just due to the severity or nature of the event: they are also determined by social, political, economic and environmental development decisions, within countries and globally. Development choices and trajectories can, and often do, increase inequality, poverty and environmental degradation, and vulnerability and exposure to harm when threats occur.

Throughout history, the world has faced changing threats, risks and upheavals. The challenge facing today's policy-makers, businesses and community leaders is that the rate, frequency, intensity, nature and geographical spread of threats and subsequent risks is changing. Human systems are more connected than ever before, with unprecedented impacts upon and interactions with the natural world. Previous socioeconomic development trends are interacting with existing and new development dynamics and emerging global threats, giving rise to risks that transcend borders. New and emerging threats – climate change, economic and financial instability, antibiotic resistance, transnational criminal networks and terrorism, cyber fragility, geopolitical volatility and conflict – simultaneously interact with development policies and actions to undermine gains. These threats share a number of distinct characteristics: they are interconnected, they cross national borders, they have both transitional and transformative impacts and they are occurring simultaneously. This is creating complex risks to development decisions, and unsustainable

development decisions feed back to multiply these new and emerging threats and risks.

Despite increasing understanding of some complex risks among risk reduction practitioners, global commitments to deliver the Sustainable Development Goals (SDGs) and previously the Millennium Development Goals, development planning and programming still do not adequately consider or act upon these risks. Current approaches to global threat and risk management within development often look only at one threat at a time (usually a natural hazard), rather than acknowledging multiple, concurrent threats or emerging global threats. This does not constitute risk management, fails to understand emerging complex risks and ignores the role of development decisions and pathways in risk creation. It also fails to harness the potential benefits of sharing experience between different communities of policy and practice, and misses opportunities for coordinated implementation of development objectives that could deliver resilience to a wider range of threats and risks.

Growing awareness of these challenges is leading to calls by governments, the international development community and donors for an approach to development that takes account of these complex risks: that is, in other words, *risk-informed*. Most critically, risk-informed development is a *risk-based decision process* that enables understanding of multiple concurrent threats and complex risks to and arising from development decisions and acting on that knowledge. Risk-informed development cannot be only understanding; it also requires action. It pushes development decision-makers to understand and acknowledge that *all* development choices involve trade-offs. It also requires learning from the past and building upon experience, while transparently and effectively communicating lessons arising throughout assessment, implementation and

monitoring of the development option. Risk-informed decision-making needs to be integrated into all levels of planning and delivery, from development NGO programming to government plans and the policies of international donor agencies in order to reduce multiple risks and avoid risk creation in development.

Global frameworks such as the Sendai Framework for Disaster Risk Reduction 2015–2030 call for risks related to human and natural threats to become an integral part of development planning and action. The Paris Agreement under the UN Framework Convention on Climate Change (UNFCCC) focuses specifically on climate change risk reduction through legally binding mitigation and adaptation targets. These two global frameworks, alongside the experience of development, conflict and peace practitioners, demonstrate a number of actions needed to move towards making risk-informed, sustainable development normative practice. These actions include:

- Strengthen capacity and expertise in risk-informed decision-making within both the international development community and governments.
- Deepen understanding of the resources, constraints, legal mandates and risk tolerances that shape development objectives, alongside a greater appreciation of the trade-offs of decisions for different groups of people.
- Build capacities to understand the limitations of tools and methods for assessing complex threats and risks and appraising development options, and to judge when to use particular methods and tools.
- Strengthen data collection to improve the evidence base and reduce the risk that development decisions or actions will heighten risks or be undermined by threats.
- Strengthen monitoring and evaluation and communication systems as critical components of risk-informed development, and establish these systems early in the risk-based decision process.
- Integrate considerations of multiple, concurrent threats and trade-offs into all aspects of development and across the full range of development actors, including NGOs, international donors, multinational development banks and national and subnational governments.
- Encourage new financing mechanisms for risk-informed development that are designed to reduce vulnerability, exposure and risk creation, and help countries cope and recover better when crises occur.
- Integrate global initiatives and framework agreements into development, including Agenda 2030 for Sustainable Development, the Sendai Framework, the Paris Agreement and the World Humanitarian Summit, alongside recent declarations and policy processes on refugees and migrants and urbanisation and urban crises.

Risk-informed development allows for development to become a vehicle to reduce risk, avoid creating risks and build resilience. Only resilient development can become sustainable development; sustainable development initiatives will fail unless they are risk-informed. Risk, resilience and sustainability knowledge and actions need to go hand-in-hand.

1 Introduction

Over the past decade, the world has seen significant progress on poverty reduction, disease control and access to healthcare, education and services such as sanitation and power, including in some of the poorest countries. The proportion of workers earning less than \$1.90 a day decreased from 26% in 2000 to 9% in 2017 (UNDP, 2018a). The mortality rate for children under five declined by more than half globally, and maternal mortality rates in sub-Saharan Africa have fallen by more than 35% since 2000 (ibid.). Primary education enrolment rates in sub-Saharan Africa increased by 20 percentage points between 2000 and 2015 (UNDESA, 2015).

These gains are fragile: existing *sources* of risk – inequality, conflict, gender disparity, uneven growth and environmental degradation – persist, and crises, shocks and natural hazards are still having widespread negative impacts. These negative impacts are not only due to the severity or nature of the

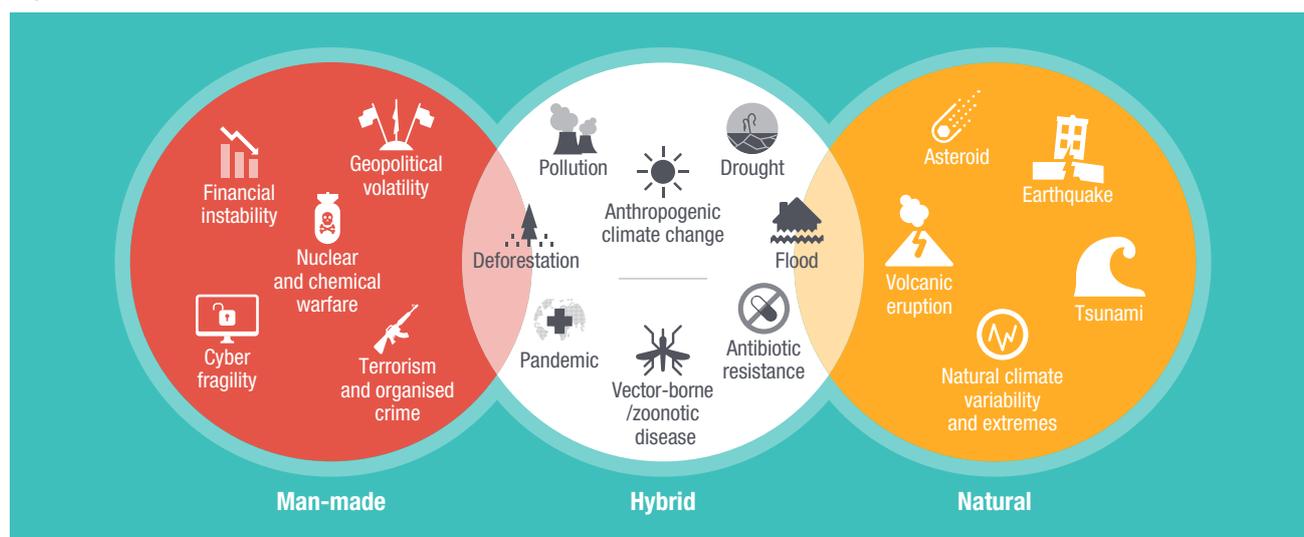
triggering hazard or threat event: they are also determined by social, political, economic and environmental conditions and trends, within countries and globally, caused by unequal, non-resilient and unsustainable development. While no development can be entirely risk-free, socioeconomic development choices and trajectories can, and often do, increase the vulnerability and exposure to harm of natural and human systems when threats occur. Rather than enhancing resilience, socioeconomic development choices and trajectories can reduce people’s ability to take advantage of the opportunities arising as societies, technologies, economies and the environment change. Most critically, they have also given rise to new threats such as climate change; in other words, ‘risks are generated inside development’ (UNISDR, 2015: xv).

Recognising and responding to this reality, in 2015 UN Member States adopted *Transforming our world: the 2030 Agenda for Sustainable*

Box 1 A word on development, sustainability and resilience

There are multiple definitions and concepts of development (Sumner and Tribe, 2008). In the broadest sense of the term, development can be thought of as past and present social, economic, political, cultural and technological pathways and trends, and how these change processes create, interact with and are shaped by environmental change. In this paper, we use the term broadly, encompassing government policies and activities related to socioeconomic planning, land use policy and infrastructure construction, non-governmental organisation (NGO) and community group activities and donor and international assistance strategies and funding allocations. Development, under this rubric, may or may not be sustainable or risk-informed. Sustainable development is defined as ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (UNGA, 1987: 43). Resilient development enables people, socioeconomic and environmental systems to ‘cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation’ (IPCC, 2014a: 1,772). Development needs to include both; it cannot be sustainable if it is not resilient.

Figure 1 Human-made, natural and hybrid threats



Source: © Nadin and Opitz-Stapleton.

Development and its 17 Sustainable Development Goals (SDGs),¹ the Sendai Framework for Disaster Risk Reduction and the Paris Agreement within the United Nations Framework Convention on Climate Change (UNFCCC). The critical challenge facing policy-makers, politicians, business leaders, donors, NGOs and community leaders committed to delivering on the SDGs and Agenda 2030 is that *threats and subsequent risks are more complex than ever before*. Human systems are more interconnected and interdependent, and their interactions with the natural world are leading to complex risks that transcend borders. Societies have to deal with *new threats* that are known, such as climate change or cybercrime, and be prepared to deal with *emerging threats* – those that are completely unknown and may manifest with little or no warning.

World Economic Forum (WEF) and Organisation for Economic Cooperation and Development (OECD) reviews have identified a number of threats as posing ‘the most strategically significant risk [to development] as a result of (i) probability or likelihood and of (ii) the national significance of their disruptive consequences’ (OECD, 2014: 3). Threats deemed to pose the most risks include global economic and financial instability; transnational organised crime and

terrorism; severe environmental change including climate and oceanic change and natural hazards; cyber fragility and technological disruption; geopolitical volatility; and growing antibiotic resistance and pandemics (see Figure 1). These global threats present complex risks and opportunities, and each can multiply the risks posed by the other.

Many sustainable development actions, including the SDGs, *are not necessarily accounting for multiple, complex threats and dynamic trends*, and are not resilient to them. In fact, these threats and complex risk interactions have the potential to undermine development gains and the achievement of the SDGs (UN, 2015: 2.30) unless development is made *risk-informed* and acts upon that knowledge. While six out of the 17 SDGs directly address the need to ‘promote resilience and disaster risk reduction’ (2030 Agenda preamble para. 33), the overwhelming focus is on disaster risk reduction in the context of natural hazards, climate change and health threats. Other global threats such as cyber fragility and technological disruption, or global economic and financial instability and illicit financial flows, are not well addressed within the SDGs. Growing awareness of these challenges is leading to calls

1 Agenda 2030 is designed as a unifying framework for sustainable development encompassing economic, social and environmental dimensions. The SDGs articulate a global ambition to address ‘inequalities, economic growth, decent jobs, cities and human settlements, industrialization, oceans, ecosystems, energy, climate change, sustainable consumption and production, peace and justice’ (UNGA, 2015).

by governments, the international development community and donors for an approach to development that takes account of multiple threats and complex risks: that is, in other words, *risk-informed* (Issar, 2018).

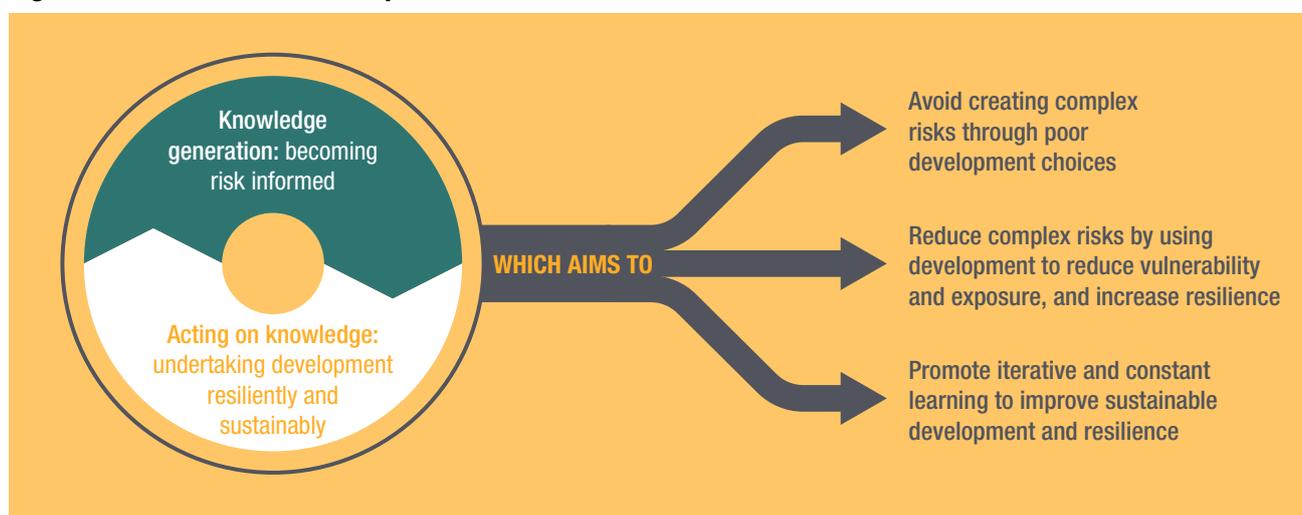
We believe risk-informed development (RID) should be seen as a risk-based decision process that enables development to become more sustainable and resilient to this evolving and complex threat and risk landscape. An RID process uses risk-based decision frameworks to help guide assessments of complex threats and risks, opportunities, uncertainties and options when making a development decision. Most critically, it pushes development decision-makers to understand and acknowledge that all development choices involve trade-offs – the creation of uncertain risks and opportunities. RID allows the systematic assessment and management of multiple threats to development objectives, and the trade-offs that will arise from choosing particular actions, using transparent decision criteria (even if simple). It presents a clear framework articulating who has responsibility to act upon what, with what resources, by when, and how those actions are to be monitored. RID requires development decision-makers to act on that knowledge in order to deliver development action that can have multiple benefits and synergies in an informed and responsible manner.

By integrating risk-based decision-making in development planning and action through

a framework of continuous learning and improvement, RID allows for sustainable development to become a vehicle to reduce risk, avoid creating risks and build resilience. Risk-based development decision-making embodies three core inter-related aims, as set out in Figure 2.

Risk-based decision management methodologies and frameworks are available from a number of disciplines and fields, including financial risk management, disaster risk reduction and climate change adaptation, conflict and peace-building. New methodologies and frameworks are not necessarily needed; instead, the development community needs to begin applying, modifying and practicing approaches that already exist. For example, global frameworks such as the Sendai Framework for Disaster Risk Reduction 2015–2030 call for risks related to human and natural threats to be ‘factored into planning and development at all levels across all sectors as well as in disaster preparedness, recovery and reconstruction ... in order to prevent new and reduce existing risk’ (UNISDR, 2016: 1). The Paris Agreement under the UNFCCC process augments the Sendai Framework. Its focus is specifically on climate change risk reduction through the integration of mitigation and adaptation activities into development planning, and considering the particular impacts these activities can have on poverty eradication, food security and sustainable development. While greater sharing of knowledge and experience between communities is needed,

Figure 2 Risk-informed development and its core aims



Source: © Nadin and Opitz-Stapleton.

these existing approaches can be built upon when devising development objectives, policies, programmes and actions for risk-informed, resilient and sustainable development.

Our rapidly changing world requires decision-making under increasing uncertainty. As a result, this report aims to articulate why being *risk-informed is essential* for national policy- and decision-makers responsible for crafting development objectives and delivering global frameworks, including Agenda 2030, the Paris Agreement, the Addis Ababa Action Agenda, the Sendai Framework, the Grand Bargain and the New Urban Agenda (Habitat III).

Of particular relevance to international aid agencies, humanitarian organisations and NGOs,

this report highlights the immediate need to assist developing countries to consider risks associated with multiple and diverse threats that are occurring simultaneously, such as cyber fragility, conflict, severe environmental degradation and financial instability, when formulating and implementing national and sub-national development strategies. This rapidly changing context also highlights the need to acknowledge, assess and address the social, environmental, economic and political trade-offs inherent in development decisions and plans, and when designing development programming to ensure that development gains are protected as much as possible from complex risks, and avoid creating new ones.

2 Understanding risk in a rapidly changing world: why development choices matter

2.1 Risk and development: our role in risk creation

Human development creates rapidly changing social, political, cultural and technological trends. The direction and evolution of social and economic trends, such as urbanisation, human mobility, wealth disparity, population growth and demographic transition, resource scarcity, disruptive technologies and automation, are shaping political discourses and transforming societies and economies. These development dynamics are also shaping people’s vulnerability and exposure to, and capacity to deal with,

complex threats and risks at subnational, national and international scales.

Demographic change is a key human development trend. The UN Department of Economic and Social Affairs (UNDESA) estimates that the world’s population will reach 8.6 billion by 2030, 9.8 billion by 2050 and 11.2 billion by 2100. The bulk of this growth is expected to be in Africa and Asia, which will add around 750 million people between 2017 and 2050 (UNDESA, 2017: 3). In Africa, 41% of the population is under 15 years of age, while other regions are experiencing significant growth in ageing populations. Globally, the number of

Table 1 Examples of dynamic development trends

	Trend
Demographics	Median population projections: 8.6 billion (2030); 9.8 billion (2050). Africa accounts for 50% of population growth. Some regions have youth bulges, others large ageing populations.
Urbanisation	55% of the population lives in cities, projected to be 68% by 2050. Asia, particularly China and India, and Africa (particularly Nigeria) will account for 35% of projected urban growth.
Wellbeing, income and wealth	Globally, rural education rates lag behind urban areas, affecting job prospects and wealth and income differentials between rural and urban areas. The top 10% of the world’s wealthiest hold 85% of the world’s assets, and each year wealth disparities increase. Health discrepancies also affect wellbeing and livelihood inequality, including along gendered lines. Sub-Saharan Africa and South Asia account for 86% of maternal deaths.
Water scarcity	2.1 billion people lack safe drinking water, and 4.5 billion lack safely managed sanitation. Water scarcity is expected to increase due to mismanagement and increasing climate variability, and will have knock-on implications for food and energy security.
Technology	Rapid technological innovation and change can enable development and lead to loss of jobs from automation. Large digital divides between and within countries persist.

Sources: UNDESA, 2017; 2018; World Bank, 2016; 2017; Credit Suisse, 2018; Wentrup et al., 2016.

people aged 80 or over is projected to increase from 137 million in 2017 to 425 million in 2050 (ibid.: 13). These demographic trends have huge implications for labour productivity, employment, mobility, education and healthcare.

The world is also rapidly urbanising. As of 2017, more than 55% of the world's population were living in urban areas (UNDESA, 2018). By 2030, the UN estimates that there will be 43 megacities (cities with more than 10 million people), most of them in developing regions. Sustainable and planned

urbanisation can stimulate investment and expand access to basic amenities. If managed unsustainably, urbanisation can result in slums and ghettos, increasing communicable diseases and poverty and possibly leading to violence (UKMOD, 2017).

Expanding trade is another key trend with important developmental implications. In the health sector, for instance, Indian firms are supplying medicines, medical equipment and technology services to countries across Africa. Communication and transport costs have fallen,

Box 2 A word on risk

A risk is not the same as a threat, hazard, impact or disaster: it is a description of potential outcomes if a threat were to occur, not the threat or disaster event itself. As noted by Renn (1998: 50): 'All risk concepts have one element in common, however: the distinction between reality and possibility'.

The UN Office for Disaster Risk Reduction (UNISDR) defines (disaster) risk as:

The potential loss of life, injury, or destroyed or damaged assets which could occur to a system, society or a community in a specific period of time, determined probabilistically as a function of hazard, exposure, vulnerability and capacity. Hazards may be natural, anthropogenic or socionatural in origin (UNISDR, 2017).

The Intergovernmental Panel on Climate Change (IPCC) defines risk generally as:

The potential for consequences where something of value is at stake and where the outcome is uncertain, recognizing the diversity of values. Risk is often represented as probability of occurrence of hazardous events or trends multiplied by the impacts if these events or trends occur. Risk results from the interaction of vulnerability, exposure, and hazard (IPCC, 2014b).

The Global Conflict Risk Index defines (conflict) risk as:

The probability and intensity of violent conflict in a country, linked to social, economic, security, political and geophysical/environmental conditions (JRC and CPPMID, 2018).

In financial settings, (financial) risk might be defined as:

To expose oneself to the potential for loss ... to undertake an uncertain enterprise or venture (Moles, 2016: 1/16) or the quantifiable likelihood of loss or less-than-expected returns (InvestorWords, n.d.).

The World Health Organisation (WHO) defines (health) risk as:

a factor that raises the probability of adverse health outcomes (WHO, 2009: v).

Although applied to risks associated with different threats, all of these definitions are similar, and articulate that risk results from the interaction between threats and underlying conditions. We acknowledge that these concepts and definitions may be different for different cultures and languages.

and preferential trade agreements have become increasingly common, particularly among developing countries (WTO, 2011). Between 1980 and 2010, developing countries increased their share of world merchandise trade from 25% to 47%, and their share of world output from 33% to 45%. Developing regions have also strengthened links with each other: South–South trade more than tripled over 1980–2011, while North–North trade declined (UNDP, 2013).

Despite some remarkable gains, inequalities persist, and development progress has been uneven. The average out-of-school rate in rural areas is twice as high as urban areas (16%, according 2012 estimates, against 8%), and disability is a major impediment to accessing education and employment. Maternal deaths in sub-Saharan Africa and South Asia account for 86% of the global total (2013 estimates), and labour income losses from deaths due to air pollution exceed 1% of gross domestic product (GDP) in these regions (2015 estimates; World Bank, 2017). Wealth inequality is also rising. According to the *2018 Global Wealth Report*, 64% of the adult population holds only 1.9% of global wealth, whereas the top 10% of adults population holds 85% of global assets (Credit Suisse, 2018).

These major trends matter because, over time, they shape individuals' and nations' vulnerabilities and exposure to multiple threats, and their resilience. Together, these dynamics also act as drivers and multipliers of existing threats, including conflict, terrorism and cybercrime and severe environmental change. They also create new threats and 'drive and alter a wide range of risks, as well as the context in which such risks are managed' (OECD, 2003). Risks *in* development are those that arise from a particular development decision or action and lead to worse outcomes, such as a socioeconomic plan that increases income inequality. Risks *to* development arise from threats external to development action, such as cybercrime or an earthquake affecting infrastructure.

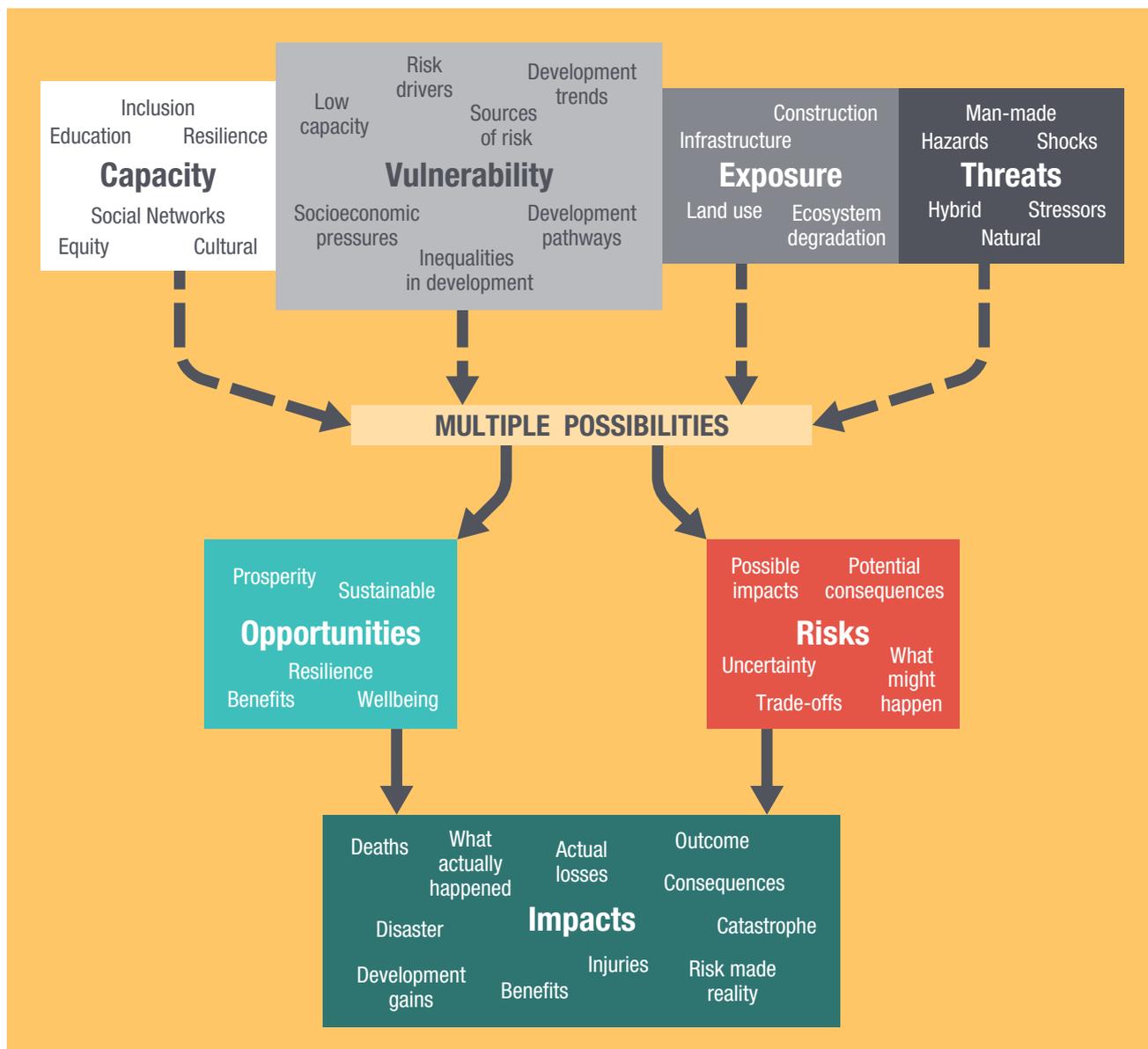
Agenda 2030's focus on the need to realise all three dimensions of sustainable development – economic, social and environmental – is a recognition that the historical focus on economic development only, particularly national-level

income and debt accounting, has been problematic. Previous development pathways have not adequately considered development trade-offs or incorporated human development – i.e. wellbeing, prosperity, peace and poverty reduction – or environmental sustainability – the wise use of natural resources and ecosystems. These development pathways have also led to severe inequality, poverty, vulnerability and exposure to multiple threats, including natural hazards, and have contributed to development trends that are embedding resource scarcity, environmental degradation and inequality into a wide range of policies and investment decisions. The result is an unprecedented global creation of risks, often due to previous socioeconomic development trends interacting with existing and new development dynamics and emerging global threats (Beck, 1999; OECD, 2003).

Exposure and vulnerability, as well as hazard itself (through climate change and environmental degradation) are socially constructed through underlying risk drivers, including globalized economic development, poverty and inequality, badly planned and managed urban development, environmental degradation and climate change (UNISDR, 2015: 33).

It is not possible to eliminate all risks inherent to or arising from development, or to ensure that every development policy, plan, action or programme will bring benefits and opportunities to all. Some risks are well known, but may not be easily managed; others are more uncertain, and still others are completely unknown and unanticipated. All development involves trade-offs, both risks and opportunities, for different groups of people and for the environment. Many development pathways will bring benefits to some people (but not all), such as better access to financial markets or healthcare. They will also bring trade-offs to ecosystems and ecosystem services. Agricultural practices, such as the crops planted, water consumption and soil and ecosystem management, will have trade-offs for food and water security, food markets and overall ecosystem health (Lal et al., 2003). For example, planting a water-intensive crop in

Figure 3 Vulnerability, exposure and threats interact to create risks



Source: © Nadin and Opitz-Stapleton, derived from multiple disciplines including disaster risk reduction (DRR), climate change adaptation (CCA), gender, peace and conflict.

an arid area might make sense economically over the short term, but lead to long-term environmental degradation and water insecurity and ultimately be financially non-remunerative. Similarly, a government might wish to legally formalise economic activities through the establishment of property rights, work permits and labour regulations for economic reasons, but how such processes are conducted may marginalise people who depend on informal markets (Jobbins et al., 2016). Even threats like climate change may present some opportunities in a few locations, with people in some more northern latitudes potentially enjoying longer

cropping seasons or growing more crops in a year. There are always trade-offs. Decision-makers need to understand both the short- and long-term implications of development decisions.

From decades of research, policy and practice, we know that development done sustainably and equitably can often prevent threat events from becoming disasters (UNISDR, 2015; ODI Resilience Scans). The original concept of sustainable development as articulated in the 1987 report *Our common future* called for risk management in relation to natural disasters and technical and environmental threats such as nuclear accidents (WCED, 1987). However,

development intended to be sustainable will not necessarily reduce risks, avoid risk creation or enhance resilience (White et al., 2004). The SDGs do not explicitly acknowledge the trade-offs in risk creation and reduction that could arise from some of the actions undertaken to achieve specific goals. At the same time, activities to manage some risks, such as mitigation and adaptation actions to deal with risks associated with climate change, might not be feasible or desirable because of trade-offs with the SDGs (IPCC, 2018; Nilsson, Griggs and Visbeck, 2016).

Towards this end, actions around the SDGs need to be informed by the other global frameworks, such as the Sendai Framework, which calls for development to be risk-informed in relation to multiple threats in order to be resilient. In essence, development – from construction of infrastructure to community health programmes and government socioeconomic planning – that considers complex risks and short- and long-term trade-offs can

create multiple opportunities and benefits for people. As the *World development report 2014* (p. 3) summarises:

As the world changes, a host of opportunities arise constantly. With them, however, appear old and new risks ... if ignored, these risks can turn into crises that reverse hard-won gains and endanger the social and economic reforms that produced these gains. The solution is not to reject change in order to avoid risk but to prepare for the opportunities and risks that change entails.

The first step is for national and subnational policy-makers and international donors, investors and businesses to openly acknowledge that these trade-offs exist. Development priorities, policies, plans and investments can either increase vulnerability, exposure and risks, or build capacities, opportunities and resilience. There is a choice to be made.

Box 3 Development trade-offs: short-term economic gains from fossil fuel development versus long-term climate and environmental risks

Alongside a stated commitment to environmental conservation, the government in Canada has also continued to develop the country's tar sands deposits, as well as building oil and natural gas pipelines to the United States and to the country's coastal ports to enable rapid export to Asian markets (Austen, 2016; Trudeau, 2017). The oil and gas industry is a major part of the Canadian economy, contributing 5–8% of GDP annually (Allen, 2017; CCAP, 2018). It is also an important employer.

Angola is another country heavily dependent on oil revenues. Following the end of 30 years of conflict in 2002, the post-war economy has boomed thanks to Angola's rich energy resources, with annual GDP growth peaking at 23% in 2008. Activities related to oil production and export account for about half of the country's GDP and 92% of exports. In the long term, however, the country will need to diversify its economy as oil reserves dry up: at current extraction rates, proven crude oil reserves could be exhausted in less than two decades, and sooner if plans to increase output are seen through.

While the short-term economic gains for countries such as Canada and Angola are clear, continuing fossil fuel development is likely to lead to severe and costly climate change (IPCC, 2018). More sustainable, low-carbon and affordable energy choices are needed globally to reduce climate change risks. The transition will be difficult; businesses associated with fossil fuels will lose revenues. Yet other sectors will grow or need to be developed and could offset job losses in fossil fuel industries. It is essential that development pathways consider and manage transition risks from fossil fuel dependence to a risk-informed, low-carbon world.

Sources: Allen, 2017; Austen, 2016; CCAP, 2018; IPCC, 2014b; OPEC, 2018; Razzouk, 2018.

2.2 Risk tolerance and development

When making choices about development planning, policy-makers must identify the potential risks to their decisions and determine their significance to objectives. This allows policy-makers to compare and prioritise risks and impacts in order to identify vulnerabilities and exposure (the entry points for risk reduction), focus resources and build capacities to deal with different risks and implement more resilient choices. However, what is considered a risk or opportunity, to whom and how it should be appraised and treated is a value-laden judgement. An individual's culture, life experiences, background and education all influence what they consider risky, and their ability to tolerate, reduce or transfer perceived risks (Slovic et al., 1973; Sjöberg et al., 2004). Decision-makers, businesses and individuals accept a certain degree of risk on the assumption that the decision will bring significant benefits (such as approving urban development in a flood-prone area because of the perceived economic benefits, or an individual choosing to move in pursuit of work). In other instances, risks in and to development may not be systematically assessed or understood, or are ignored.

What is perceived as risky cannot be separated from the political, psychological, cultural and financial context in which decisions are made. Politicians prioritise or de-emphasise certain risks, or may even withdraw support for risk management programmes² adopted by their predecessors (OECD, 2018a). Investors and lenders often want to know the risks to their market position and bottom line, and look to governments for clear signals on how risks are being understood, prioritised and managed. Development actors may focus on climate risk reduction, but ignore simultaneous threats like cybercrime. For example, expansion of mobile phone banking as a way of building resilience exposes people to asset loss through cyber fraud if they are not also educated about cyber protection measures. The general public's perceptions of and tolerance for risks – particularly risks with potentially catastrophic outcomes, including for future generations – may

be different again. As such, deciding what constitutes an 'acceptable' level of risk involves not only scientific and technological risk assessments of potential impacts that will be unequally distributed, but also cost-benefit analyses and ethical and political considerations, such as acceptability to the public. This is a challenging task; politics can be partisan and public opinion can be easily swayed.

In short, risk perception and tolerance are subjective and value-laden, influencing determinations of what is considered a risk and the amount of uncertainty involved in that judgement. People's risk tolerances determine what they deem to be acceptable or unacceptable risks, and how severe they think those risks might be. As a result, decision-making, behaviour and choices are often a function of perceptions and tolerances of risk, and strongly influence what actions are taken. This is true for governments, international donors, investors and businesses, as well as NGOs and community groups. The objectives these development stakeholders set and the decisions they are willing to take may or may not undermine resilient and sustainable development goals.

2.3 Managing complex risks in development

Despite increasing understanding of the complex risks and trade-offs in development, decades of research and policy and global commitments to deliver the SDGs (and previously the Millennium Development Goals), development planning and programming still does not adequately consider the wide range of existing threats, associated risks and underlying vulnerabilities. Current approaches to risk management within development often look only at one threat at a time (usually a natural hazard), rather than acknowledging the existence of multiple threats concurrently. Another challenge is that many governments and some development organisations continue to focus on disaster management. This does not constitute risk management, as its focus is on dealing with disasters after they have occurred, rather than seeking to reduce risks to prevent disasters from happening in

2 As with the United States' communication in 2017 of its intention to withdraw from the Paris Agreement.

Box 4 Managing risks in conflict-affected regions

Risk-informed development needs to be tailored to the context, based on resource constraints, capacities and realities on the ground. The more stable and prosperous a country is, the more likely it is that NGOs and international donors will be able to support good governance, tackle complex risks across sectors and account for trade-offs in major investments. In more fragile and conflict-affected contexts, the development system might initially focus on identifying the drivers and threats that exacerbate the risk of conflict and violence, before turning to other complex threats and risks.

Conflict and insecurity can make reducing complex risks in development difficult, particularly when there is no stable government partner for aid organisations or international donors. In such situations, a more graduated approach might be necessary, in which not all of the global threats discussed previously can be immediately addressed in all steps of development planning. Likewise, in small-scale development projects such as community-based health programmes, not all global threats need to be considered.

the first place. This historical focus on disaster management also fails to understand emerging complex risks and ignores development's role in risk creation. Equally important, it misses the potential benefits of sharing experience between different communities of policy and practice, and opportunities for coordinated implementation of agreed development objectives that could deliver resilience to a wider range of threats and risks.

Other challenges arise from the siloed management of threats, risks and disaster events by governments, NGOs, international investors and businesses (OECD, 2018a; Humphries, 2013). Poor risk governance, including communication between development actors, has also historically limited risk management. Government ministries and departments frequently have a mandate to manage only one set of threats and risks: a health ministry may focus on health risks, for example, but not technological threats to healthcare such as the hacking of medical records and hospital systems. Coordination between agencies on risk reduction – for example between a disaster management agency, a ministry of urban affairs and a ministry of water around flood risk reduction – is frequently poor. Multiple organisations might respond to disaster relief and recovery needs, but with little or no coordination with one another or with long-term development NGOs, despite the strong overlaps in their work.

Risk-informed development will also require investing in data, tools and methods for assessing risk, determining what sources of risk can be addressed, and what is possible or relevant given available resources and capacities. For example, it is only relatively recently (around 2009) that many OECD countries have begun to adopt and mandate that national risk assessments be conducted (OECD, 2018a). However, many such assessments are still confined to individual threats, such as hurricanes or terrorist attacks; rarely are multiple threats and complex risks considered simultaneously (*ibid.*). Even less common are assessments of how particular development objectives may create or contribute to risks in other areas.

It is clear that *how* development is conducted is critical to managing risks to people, livelihoods and assets, infrastructure and the ecosystems upon which they depend. Yet development cannot be made resilient or sustainable without considering a broader range of threats – beyond just natural hazards – and how these threats *together* pose complex risks and opportunities to development. Other global threats, such as international crime and cyber fragilities,³ simultaneously pose serious socioeconomic risks that could undermine resources and capacities for managing risks associated with natural hazards, as will be discussed in Chapter 3.

3 In this report, cyber fragility refers to financial loss, disruption or damage to property including critical infrastructure, damage to the integrity of political systems and reputation suffered by public and private sector actors due to failure of its information technology systems.

3 Complex and interconnected risks

Throughout human history, the world has gone through periods of volatility, changing risks and upheaval, but the challenge now facing policy-makers, politicians, business and community leaders is that the rate, frequency, intensity, nature (e.g. digital versus natural world) and geographical location of threats and subsequent risks is changing. New, evolving and emerging threats, such as economic and financial instability, cyber fragility, transnational criminal networks and terrorism, geopolitical volatility, conflict,⁴ antibiotic resistance and pandemics and severe environmental change are creating complex risks that could undermine development gains; impacts reducing those gains are already being felt. They can also influence the trade-offs – the opportunities and risks – that various development actions will bring about.

These new, evolving and emerging threats all share a number of *distinct characteristics* (see Table 2): they are interconnected, transboundary, have both transitional and transformative impacts and are occurring simultaneously. In addition, the rate, duration and frequency of the threats have a strong influence on the temporal aspects of associated risks. Some of the risks arising from these threats could be inter-generational and accumulative (such as climate change risks); others may be short-term and intense, may arise rapidly and may have severe consequences (such as some cyber threats and financial instability).

The following sections draw out the rationale, based on these threat characteristics, for simultaneous consideration of these multiple threats and their implications when devising development strategies, plans or actions.

3.1 Economic and financial instability

The global economic and financial order is growing more interconnected and volatile. Economic development is increasingly complex and now extends beyond national borders through globalised, transboundary and often highly leveraged financial, economic and market systems. Processes of production and distribution have been transformed.

From the Great Depression of the 1930s, the recession in the 1990s and the financial crisis in 2007–2008, economic growth has been inherently volatile. Underlying such cyclical trends, there have been longer-term structural changes too, notably towards a more multi-polar economy. Emerging markets such as China have led the world in economic growth, despite the slowdown since 2013. For centuries, the world made exchanges through commerce, but economic links are now intensifying and becoming more complex. According to UNCTAD (2013), transnational corporations (TNCs) account for up to 80% of the world's exports of goods and services, of which a significant share is intra-firm trade. This creates new instabilities as some countries realise huge trade surpluses, whereas others accumulate enormous deficits.

The nature of that economic 'interconnectedness' is also changing. Global value chains (GVCs) and global production and distribution systems (GPNs) are bringing together diverse groups through complicated regimes of corporate governance, widespread outsourcing and offshoring of production and

⁴ Each year, the World Economic Forum surveys government and business leaders in a perception study on what they think are some of the most pressing threats and related risks (see the *Global risks report 2018*, for example).

Table 2 Threat characteristics

Characteristic	Significance to generation of risks
Interconnected	Threats are often linked and lead to cascading risks and layering of risks in and to development objectives.
Transboundary	Threats and associated risks do not respect geopolitical or physical borders. Furthermore, risk management actions taken by one country or group – e.g. building reservoirs against drought on a multi-country river or moving away from coal imports – will affect the risk management options of other countries and groups.
Transitional	These threats are shifting socioeconomic, technological and environmental systems as we respond and adapt to them. This creates transitional risks where some groups or economic sectors benefit less during the shifts – such as the stranded assets of fossil fuel companies in the transition to a low-carbon economy.
Transformational	Threats have the potential to generate transformational change within societies and alter the status quo. Some threats may transform or redefine established narratives of universal norms, legitimacy, equity and legality at national, regional and international levels.
Intensity, duration, frequency and rate	The magnitude of a threat (e.g. a localised economic disturbance versus a global depression) and its temporal aspects (duration, frequency and rate of transmission) influence the severity of risks, in combination with vulnerability and exposure contexts.
Simultaneous	Multiple threats with significant socioeconomic impacts are occurring or could occur at the same time, in a single country or across multiple countries. For instance, cybercrime and illicit financial flows are simultaneous threats that reduce government revenues, including funds for disaster response and recovery.

Source: Opitz-Stapleton and Nadin, drawing on OECD, 2013; 2018; WEF reports.

new international divisions of labour (Neilson et al., 2014). For developing countries, GVCs and GPNs can offer a number of development opportunities by helping them to upgrade and leapfrog sectors such as manufacturing and technologies. Financial interconnectedness can contribute to economic growth, with value-added trade⁵ contributing on average 28% to developing countries' GDP (UNCTAD, 2013). Multiple opportunities have been created by connecting countries' markets and allowing more people globally to access goods and services than ever before.

Interconnectedness also increases the exposure of economies to threats and subsequent risks. The 2011 floods in Thailand, for example, had a significant impact on the global automotive and electronics industries, and ultimately national economies, by disrupting supply chains; Toyota alone reported the closure or slowdown of production in factories in Indonesia, Japan, Malaysia, North

America, Pakistan, the Philippines, South Africa and Vietnam, as a result of the Thai flooding (Haraguchi and Lall, 2015). This increasing interconnectedness of products and services has caused a major shift in the risk exposure of national and local economies.

There have also been dramatic changes in the operation of financial markets, notably the unprecedented speed at which money is moved around the global financial system. This change has 'massive repercussions for national and local economies' (Dicken, 2015). As demonstrated by the 2007–2008 financial crash, a crisis in one financial market (in this case the US sub-prime housing market) can spread extremely quickly and impact developing countries (Lin, 2008). This volatility emphasises the need for early warning systems, stress-testing and risk analysis of financial systems and behavioural economic approaches, including potentially rethinking existing financial regulations, in order to be better prepared for emerging risks.

5 Standard trade balances are based on the gross commercial value of the goods and services as they depart and enter the country, but do not capture the complex nature of the global economic relationships of international trade. Goods and services often move across multiple national borders in order to produce a final product that is then exported. For instance, Japan exports goods to South Korea that are then exported to the United States, meaning that Japan is exporting to the US via South Korea. The US–South Korea trade balance would not consider the role of Japanese inputs, which in value-added terms are Japanese exports to the US. For this reason, recent work undertaken by UNCTAD (as well as other organisations, such as the WTO and OECD) focuses on calculations of value-added trade.

3.2 Cyber and technological fragilities

The rate of technological change and the volume of information are rapidly increasing. Technological advances in telecommunications, computer processing, block chain, artificial intelligence and robotic manufacturing, along with the enormous growth in mobile and social media, are having a major impact on economies around the world. Technological innovations can significantly enable development, but they can also increase inequality. It is estimated that artificial intelligence and other new technologies will benefit higher-skilled workers, whereas low- and medium-skilled workers in manual jobs are expected to face further pressures from automation (UNDESA,

2017). Women also face unique barriers and challenges in accessing new technologies. As with other development trends, technological advances present trade-offs for particular groups of people.

Mobile phone penetration is growing exponentially, but access to communication technologies is uneven and many developing economies lack sufficient and affordable network services and devices. In sub-Saharan Africa, for example, internet penetration varies widely: the Seychelles and South Africa have a diffusion level of over 50%, while Liberia's is below 5% (Wentrup et al., 2016). Within countries, women often have less access to mobile technologies than men.

The rapid growth in internet and mobile phone penetration means that the world is

Box 5 Escalating risks and transboundary contagion: the global financial crisis

The global financial crisis of 2007–2008 was caused by a sequence of escalating risks stemming from the collapse of the sub-prime mortgage market in the United States. House prices soared as banks lent more than their customers were able to repay in the context of an incentive structure that encouraged risky loans by paying brokers a commission on every mortgage sold. Meanwhile, weak regulation allowed investment banks to pay handsome fees to ratings agencies to obtain preferable ratings for these risky products, which quickly circulated through stock markets. When the lending bubble finally burst, banks faced a liquidity crisis. Investor confidence collapsed and stock markets around the globe crashed, spreading the contagion. Many developing country markets were particularly harmed by financial instability.

Box 6 Gendered inequality in a digital world

Women and girls face unique, complex risks arising from dynamic development trends and new and emerging threats. This gendered differential is evident in the specific impacts women and girls face from natural hazard threats, and the higher risk of sexual violence in conflict. It is also evident in the different cyber risks that women and girls experience. Women are at higher risk of cyber stalking, harassment and financial fraud loss than men. Digital divides are often gendered and women's participation in cyber technologies is much lower than men's. Women in developing countries with inadequate legal protection may face higher cyber risks than women in Western countries, and may have less recourse to legal protection against online harassment and overcoming digital divides. The gendered digital divide also has consequences for women's and girls' disaster risk reduction in an age where mobile phone and computer technologies are increasingly being used for hazard early warning. Women may not have equal access to early warning information because they do not participate as much in cyber technologies.

Sources: Bradshaw et al., 2013; Enarson and Chakrabarti, 2009; Saha and Srivastava, 2014.

Box 7 The financial cost of cybercrime in developing countries

Microsoft estimates that cybercrime affects 400 million people each year, costing \$113 billion. In 12 countries in Africa, more than half of the IT infrastructure is infected. In 2016, cybercrime cost the South African economy \$150 million, Nigeria \$550 million and Kenya \$175 million (see also Figure 4). This has implications for development programmes that promote greater access to financial services through mobile banking (such as the popular M-Pesa system across Africa) for farmers and pastoralists as a way to build resilience against natural hazards. If farmers and pastoralists are not simultaneously educated about cyber fraud and security, they risk losing their investments and savings to cybercrime and become less resilient to other threats, such as droughts.

Sources: Serianu, 2016; Symantec, 2016.

becoming both increasingly connected and more cyber-dependent. The vast array of devices connected to the internet brings issues of data privacy and cyber security.⁶ Government services such as health and education, commerce and financial transactions are all increasingly brokered and delivered through cyberspace. Digital ties are, however, fragile: anonymous distributed denial of service attacks and cyber breaches are happening on a near-hourly basis, requiring governments and businesses to invest significant resources in security measures and to deal with the financial and data consequences of a breach. Both state and non-state actors have sophisticated and advanced surveillance and communication capabilities that were ‘once only the preserve of just a few states’ (UKMOD, 2017: 1). For example, social media data from users can be extracted to support authoritarian regimes and human rights oppression around the world at the click of a mouse (Pearce and Kendzior, 2012).

The volume and speed of information sharing is unprecedented in human history. The types of information being shared digitally, its ease of spread and manipulation, and cultural and legal failures to keep up with the pace of change has potential consequences for governance and political stability, and issues of personal

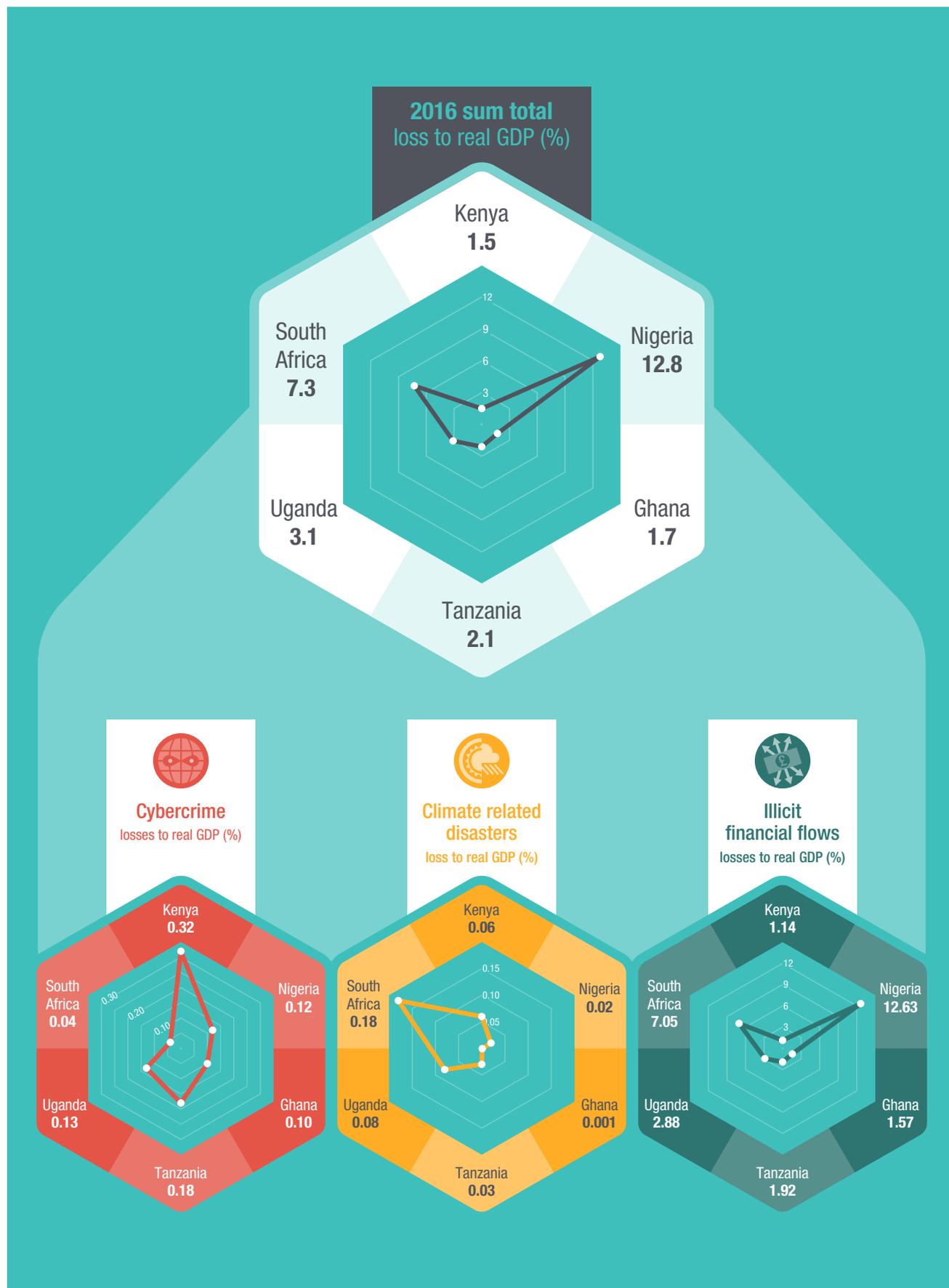
privacy. Recent examples include investigations around Cambridge Analytica and Facebook, and questions of psychological manipulation to influence voting outcomes (Cadwalladr and Graham-Harrison, 2018).

Information technology also presents opportunities. Social media is being used as a disaster risk communication tool with the potential to save thousands of lives (Alexander, 2014). For example, more than 110 million mobile phone users now have direct access to information on approaching hydro-meteorological disasters (UNDP, n.d.). The spread of mobile phone coverage can also enable lifesaving medical interventions, such as the mMitra programme in India, which provides pregnant women and new mothers with twice-weekly calls giving dietary and hygiene tips, recommendations on vaccines and healthcare and advice on health complications to look for in efforts to reduce maternal and infant mortality rates (Yadavar, 2018).

The evolution, management and impact of digital technologies on cultures and governance cannot be discounted or ignored: technological changes present both risks and opportunities to sustainable development; how these trade-offs are managed will be determined in part by development decisions.

⁶ As a proxy indicator, the number of smartphones is expected to almost double from 1.57 billion to 2.87 billion between 2014 and 2020 (www.statista.com/statistics/330695/number-of-smartphone-users-worldwide/).

Figure 4 Interconnected, simultaneous threats and impacts in Africa



Sources: Opitz-Stapleton and Nadin, derived from Eckstein et al. (2017); HLPIFF (2018); OECD (2018b); Serianu (2016) and Symantec (2016).

3.3 Transboundary crime and terrorism networks

Interconnectivity and globalisation have transformed logistical, financial and communication networks, facilitating economic growth, the faster delivery of goods and services and greater employment opportunities. However, these changes also enable transboundary crime, including illicit financial flows. Transboundary and trade-based money laundering, international bribery and tax evasion by both organised crime groups and legitimate corporations cause significant development damage; Africa is estimated to lose more than \$50 billion each year (HLPPIFF, 2018). ‘These illicit financial

flows strip resources from developing countries that could be used to finance much-needed public services ... such as health and education’ (OECD, 2014: 15). Transboundary crimes have the potential to undermine development gains by fuelling corruption, eroding the rule of law, diverting significant revenue from potential development efforts and deterring legitimate private sector investment.

These changes are also allowing transnational organised crime groups to grow and ‘diversify and expand their activities’ (UNODC, 2016). Highly organised networks supply and market ‘illicit drugs, weapons, wildlife and other natural resources and human beings across regional and international borders’ (UNODC,

Box 8 Threat layering and complex risks: environmental crime and threat finance

Growing at a rate of 5–7% annually (three times the rate of the global economy), environmental crime is a major threat to sustainable development, reducing government revenues, eroding livelihoods, contributing to climate change and environmental degradation and fuelling insecurity and conflict in some of the world’s poorest places. Globally, it is estimated to be worth \$258 billion annually. Activities include illegal fishing (estimates range from \$23 billion to \$30 billion per year), timber (\$30–\$100 billion) and minerals (\$12–48 billion). Illegal dumping of chemicals and waste generates an estimated at \$10–12 billion for criminal networks, while the illegal charcoal trade is estimated to cost African economies \$1.9 billion a year. Other forms of environmental crime include e-waste and carbon credit fraud.

Environmental crime may also involve poor and marginalised people and communities with few livelihood alternatives. Criminal activities are often linked to informal economies that support people’s livelihoods, such as poppy seed cultivation or exotic animal trapping. These activities contribute significantly to trade and growth, especially in relatively marginalised border regions.

In reality, who the ‘environmental criminals’ in these informal economies actually are is hard to define. Non-state armed groups, transnational criminal networks and terrorism are increasingly involved in environmental crime. These groups use threat finance – means or activities that fund illicit operations – and illicit financial flows as part of their environmental criminal activities. Transboundary crime and illicit financial flows enable organised criminal groups to grow in power and dominance, and spread environmental criminal activities across borders. Recent recommendations to focus on international criminal networks rather than those engaged in localised activities such as poaching for bushmeat consumption will be critical to tackling the problem through a sustainable development lens.

Environmental crime that drives illicit supply chains deprives fragile states of essential revenue and development opportunities. Yet environmental crime is not currently a major priority for development donors. As more aid is channelled to fragile states, investigating the role of environmental crimes in fuelling – and exploiting – state fragility should be higher on the development agenda.

Sources: Gosling, 2014; Neilemann et al., 2016; UN Office on Drugs and Crime.

2016: 32), often providing ‘threat finance’ to fund terrorism and other criminal activities. Terrorist groups such as Islamic State and Al-Shabaab are also using social media for propaganda purposes, and are increasingly demonstrating technological sophistication and the ability to sustain operations through criminal activity including ‘counterfeiting, smuggling, and credit-card fraud’ (Jasper and Moreland, 2014).

3.4 Geopolitical volatility

Throughout history, geopolitics have defined the global power structure through interstate economic and ideological rivalry and competition. A nation’s socioeconomic vulnerabilities are not the only catalyst driving internal instability; wider geopolitical shifts and volatility play a significant role (Freedman, 2017).

Geopolitical volatility covers a range of threats, including the North Korean nuclear crisis, tensions and conflict in the Middle East, territorial disputes in the South China Sea and Crimea, the fight against global terrorism, unpredictable and increasingly nationalistic government policies, increasing populism and nationalism globally and cyber warfare. It encompasses threats, whether real or perceived, to the rules-based international order and the Western political and economic values represented by the Bretton Woods institutions, the UN system and international governmental and non-governmental organisations and laws. Geopolitical volatility increases as established norms change and the existing international order comes under threat, both from states – including from unlikely sources, such as the ‘America First’ policies being pursued by the United States – and from non-state actors such as Islamic State and other terrorist groups. Remarks by UN Secretary-General Antonio Guterres to the General Assembly in September 2018 capture this sense of volatility and threat well:

Our world is suffering from a bad case of ‘Trust Deficit Disorder’ ... Trust is at a breaking point. Trust in national institutions. Trust among states. Trust in the rules-based global order ... Today, world order is increasingly chaotic. Power relations are less clear. Universal values are being eroded ... Today, with shifts in the balance of power, the risk of confrontation may increase.

This volatility acts as a driver of uncertainty, not only in the stock, bond and currency markets and across global supply chains, but also in the political appetite for responding to global threats such as climate change or meeting existing commitments for development assistance. The immediate impacts on markets and investor confidence might in many cases be short term, but the consequences, such as driving states towards protectionist policies and a decline in risk tolerance for costly and long-term humanitarian assistance programmes and investment in development initiatives, can be substantially longer-term.

3.5 Conflict

Armed conflict is one of the greatest development challenges, and is a significant threat to the achievement of the SDGs. Armed conflict takes many forms, including inter-state and intra-state conflict and violence. Like geopolitical volatility, the nature of conflict is changing in its nature and complexity including the proliferation of non-state actors, the growing prominence of transnational organised crime groups (see above), new uses of technology, such as drones, as well as the increasing globalisation of countering/preventing violent extremism polices (Romaniuk, 2015: v).

Since the end of the Second World War, the majority of armed conflicts have been intra-state (civil wars) rather than international conflicts between states (SIPRI, 2017; UN and

World Bank, 2016). According to data from the Uppsala Conflict Data Program (UCDP), of the 49 conflicts identified in 2017 only one was inter-state, between India and Pakistan (Pettersson and Eck, 2018). Intra-state conflict is also becoming more protracted, lasting on average 19 years in 1990, compared to 37 years in 2013 (Bennett et al., 2016). As intra-state conflicts become more complex and protracted, it leaves little space for economic growth or development. According to one estimate, the most recent civil war in South Sudan has potentially incurred economic costs as high as \$158 billion, with an additional cost to nearby countries of \$57 billion (Frontier Economics, 2015). Conflict-affected economies are estimated to lose between 2% and 8.4% in annual growth (UN and World Bank, 2018). The human costs of conflict extend beyond loss of life, often crippling governments and basic services, destroying critical infrastructure, decimating livelihoods and societal bonds, fuelling war economies (see Box 9) and undermining the hope and dignity of affected people. How the nature of conflict is evolving needs to be better understood across the development sector in order to build resilience to pre- and post-conflict shocks.

UCDP data also shows that intra-state conflicts are becoming increasingly internationalised: of the 48 intra-state conflicts

identified in 2017, 40% could be classified as internationalised conflicts (external states providing troops and training to one or both sides (Pettersson and Eck, 2018)). For example, the United States has forces in seven internationalised intra-state conflicts and is 'involved in more conflicts as a secondary warring party than any other country in 2017' (ibid.: 536). The war in Syria has witnessed proxy involvement by Iran, Russia, the US, Turkey and China, with little sign of resolution.⁷ Pettersson and Eck (ibid.) argue that it is this 'internationalisation' of intra-state wars that is leading to longer conflict durations. In the post-9/11 era, rising geopolitical tensions and the emergence of norms such 'stabilisation over democracy' and 'non-negotiation with terrorists' have signified a return to the 'zero-sum', one side victory outcomes of the Cold War era (Howard and Stark, 2018) and a shift away from negotiated settlements such as the 1995 Dayton Accords, favoured by the superpowers in the period 1990–2000.

The majority of intra-state conflicts are being fought in the Middle East, Asia or Africa, where the proliferation of non-state actors such as Islamic State (IS) and Al-Shabaab continue to evolve, spread their influence and recruit to their cause. In 2017, according to UCDP, IS was involved in 15 conflicts across the world. There

Box 9 Mali's war economy: internationalised conflict, trafficking and trans-Saharan migration

Instability in Mali, particularly in the north of the country, is being fuelled by a war economy underpinned by arms-trafficking, drugs, cigarette smuggling and migration networks (Raineri and Strazzari, 2015). Although not a producer of high-value drugs such as cocaine, northern Mali has become an important transit zone on the Sahara–Sahel route. In 2013, the UN estimated that the region is a corridor for \$1.25 billion of cocaine (UN, 2013) as drug cartels seek alternative trafficking routes to Europe (Raineri and Strazzari, 2015).

Meanwhile, regional arms-trafficking networks are supplying parties to conflict, not only in Mali, but also in neighbouring Algeria and Niger (Lacher, 2012). The collapse of the Gaddafi regime in Libya in 2011 has significantly increased the availability of arms across the region, including in Mali (UNSC, 2013). Instability in Libya has also facilitated trans-Saharan migration to Europe (Molenaar and van Damme, 2017). Tackling the war economy in Mali will require more than a security-led approach in a context where involvement in such activities is a way of life.

⁷ In 2016, Xinhua reported that China had reached an agreement with Russia to step up personnel training and humanitarian assistance to the Assad regime (www.xinhuanet.com/world/2016-08/16/c_1119396907.htm)

Box 10 Pandemic and financial instability in West Africa

The Ebola outbreak in West Africa in 2014–16 highlights the complex underlying development conditions fuelling pandemic risks. The outbreak led to 11,310 deaths and had a fatality rate of about 70%. The impacts of the outbreak extended far beyond mortality and morbidity. The World Bank estimated the total financial cost to the countries involved at \$2.8 billion, with the outbreak affecting investment, production, consumption, commodity prices, household income and labour markets (World Bank, 2015). The disease killed teachers, and parents kept their children at home for months. People avoided health facilities: in Sierra Leone, the number of women giving birth in hospitals dropped by 30% in a single month in 2015 (UNDG, 2015). Poor development conditions prior to the outbreak helped turn it into a catastrophe. The three most affected countries, Sierra Leone, Guinea and Liberia, had all recently emerged from civil war, with related issues of poor services and infrastructure, weak governance, lack of preparedness in the health system and little knowledge of the disease, cultural practices that prevented people from seeking care and a general lack of education and knowledge (ibid.).

has also been an increase in the use of armed force between non-state actors. In 2017, there were a recorded 82 active non-state conflicts (Pettersson and Eck, 2018: 538), including examples such as escalating violence in the Democratic Republic of Congo (DRC) and the Central African Republic and fighting between nomadic and agriculturalist groups in Nigeria (ibid.: 535).

This changing nature and complexity means that the threat *characteristic* (see Table 2) of conflict is interconnected, transboundary, has both transitional and transformative impacts and is inter-generational and accumulative. As such, it intersects with other core threats, including environmental change and natural hazards, geopolitical volatility and transboundary crime and terrorism networks.

3.6 Global health: antibiotic resistance and pandemics

Global health has improved dramatically: between 2000 and 2015, average life expectancy increased by five years, maternal mortality fell by 44% in the 25 years up to 2015 (WHO, 2015) and infant mortality halved in the 25 years before 2016. Yet improving overall global health prospects mask some major health risks. Growing trade and international travel facilitate the spread of disease; settlement expansion into forested areas brings humans into contact with new disease reservoirs; shifting temperature and precipitation patterns stemming from climate

change encourage the spread of disease vectors; and antibiotic resistance is increasing due to overuse in humans and livestock (CDDEP, 2015; Smith et al., 2014; Wiethoelter et al., 2015).

3.7 Severe environmental change and natural hazards

Severe environmental change, including climate change, ecosystem collapse and ocean acidification and disruption of ocean currents pose significant risks to sustainable development. Many forms of environmental change are hybrid threats arising from natural and human interactions (IPCC, 2014b; Ceballos et al., 2017). Climate change is making some areas less habitable due to rapid-onset climate hazards (storms, floods, heatwaves) and slow-onset change, while others are seeing shifts that may support new economic activities, such as extended growing seasons for some crops or new tourism opportunities (IPCC, 2014b).

Water scarcity fuelled by the mismanagement of water resources, destruction of watersheds and ecosystems, climate variability and human-induced climate change is another environmental trend going in the wrong direction. According to the World Bank, 4.5 billion people lack safe sanitation, and 2.1 billion people access to safe drinking water. Population growth and rapid urbanisation will see ‘demand for water rising exponentially, while supply becomes more erratic and

uncertain' (World Bank, 2016). Current projections indicate that scarcity will increase in the Middle East and the Sahel, with implications for other sectors such as agriculture and energy generation, and knock-on risks for financial and political stability. Water scarcity and slow-onset events such as droughts can also have a significant impact on food prices and food security (ibid.).

While it is not possible to discuss in detail all the risks associated with severe environmental change, a considerable body of research collated by the IPCC and under national risk assessments indicates that environmental threats pose significant socioeconomic and political risks. These risks are transboundary in nature, and may be multiplied by other global threats and development trends.

Box 11 Interconnected threats: conflict, fragility and natural hazards

Threats such as conflict and natural hazards routinely occur in the same geographical location, jointly creating complex risks that are undermining development progress (OECD, 2018c; Peters, 2018). Trends in climate extremes and non-climate hazards are disrupting social, economic and political systems, causing widespread economic impacts both where they occur and more widely. In Asia, 55% of climate-related disaster deaths between 1997 and 2016 were in just four countries, all of which rank highly in the Fund for Peace's Fragile States Index: Afghanistan, Pakistan, Myanmar and Bangladesh (Peters, 2018). Globally, 58% of disaster deaths in the decade from 2004 occurred in the top 30 fragile and conflict-affected states (Peters and Budimir, 2016).

However, the relationship between changing patterns of conflict and natural hazards – both independently and in relation to one another – is under-researched, and by extension is not properly considered in policy, financial and operational frameworks (Peters, 2017). Climate change is complicating this picture, with the IPCC warning that, unless addressed, extreme climate events and shifting seasons will affect socioeconomic and political systems, and patterns of security and conflict (Adger et al., 2014).

Box 12 Piracy: a logical consequence of interconnected, transboundary global threats and development trends

Somali pirates have attracted significant international media and policy attention, including from international bodies including the UN, the European Union, the African Union and NATO. The underlying factors contributing to the rise of piracy in the region are complex, and highlight how risks can arise from the interaction of development trends and multiple global threats.

The western Indian Ocean is facing significant environmental threats, including transboundary environmental crime: overfishing and illegal fishing, often by European and Asian vessels; illegal chemical dumping (primarily of European origin, and involving organised crime); a lack of local wastewater and solid waste management; and climate change. As of 2015, the EU imported around half of the fish its people consumed, including a strong demand for tuna from the western Indian Ocean. Increasing sea surface temperatures and monsoon variability due to climate change shape the distribution of yellowfin tuna and contribute to lower fish stocks. These global environmental threats, in combination with low local capacity for deeper ocean fishing, have increased economic and food insecurity as local fishermen lose their livelihoods. As a result, piracy has become far more remunerative to many fishermen than fishing, with the potential for large profits from ransom payments.

Sources: Cheung et al., 2013; DeGeorges et al., 2010; EUMOFA, 2017; Kellerman, 2011; Lan et al., 2013.

3.8 Understanding complex risks

Clearly, there is a pressing need to understand the connections between different kinds of threats, and the risks and opportunities they present. But understanding complex risk involves much more than systems or network analysis. Yes, it requires the ability to map links, but it also offers alternative entry points for mitigating and managing risks. In many instances, the trade-offs between risks and opportunities are evolving because of changes in the trajectories of development trends, altering the vulnerability, capacity and exposure of populations and assets – not necessarily because of changes in the nature of threats and hazards.

Policy-makers, businesses, international donors and financiers, NGOs and community groups and citizens all need answers to such questions as: How do we transition to a low carbon development pathway in a just and equitable way? How can countries simultaneously manage issues such as youth

unemployment, climate change and the spread of organised crime? What are the opportunities and trade-offs across a range of existing economic sectors in developing a digital or knowledge economy? What potential outcomes might cyber fragility and crime have as it interacts with markets, economies, political institutions and critical infrastructure, for example? The potential outcomes and impacts are dependent on how sensitive our markets and economies are to these risks, how forward-thinking our education systems are to the needs of future jobs, how robust and flexible infrastructure is at withstanding and accommodating extreme weather, and so on. Answering and addressing these challenges calls for a more systematic approach to acknowledging the complex threats, risks and opportunities facing and resulting from development. If Agenda 2030, the Paris Agreement, the Sendai Framework and the New Deal are to be successfully implemented, a more risk-informed approach to development is required.

4 A development imperative: becoming and acting risk-informed

4.1 Making uncertainty and risk central to development

Unsustainable and unequal development has the potential to create threats and complex risks and trade-offs, while exacerbating existing ones. Likewise, development cannot be considered sustainable or resilient unless it accounts for multiple threats and associated risks. Actions to reduce those risks and avoid risk creation need to be integrated into multiple levels of planning and delivery, from NGO and community-based programmes to government plans and the policies of international donor agencies.

Merely analysing and understanding multiple threats and complex risks and opportunities through assessments will not, on its own, lead to risk-informed development. Risk-informed development must be a risk-based decision process that integrates knowledge of and actions to address complex risks, opportunities and trade-offs into development plans, policies, programmes and actions in order to ensure they are sustainable and resilient. Specifically, development policy-makers and practitioners need to:

1. Explicitly acknowledge the interactions between complex global threats such as organised crime and terrorism, pandemics, economic instability, cybercrime, natural hazards and climate change, and the complex risks and opportunities they present for development at local to international levels.
2. Explicitly acknowledge the role of unsustainable development in creating risk.
3. Act on complex risks and opportunities and their associated uncertainties in an informed manner to promote more sustainable and resilient development that prevents new risks and reduces existing ones.

4.2 Risk-informed development as a process: the steps

Development inherently requires decision-making: a women's group looking to secure microcredit for its members; an NGO deciding the types of resources to deploy in a conflict situation; a government deciding what kind of low-carbon economic activities to pursue; or an international finance group deciding whether to provide funding for a large-scale infrastructure programme. Understanding the complex trade-offs posed by multiple threats, or by the decisions themselves, when making development choices requires the development community, community-based groups and NGOs, national governments and international donors to treat development *as a risk-informed decision process*. This process involves generating knowledge about development trends and changing threats, risks and opportunities, acting on that knowledge and monitoring and learning from it for future development.

Treating risk-informed development as a process can be challenging for those not used to considering multiple threats or complex risks in development decisions, or where there is a belief that, once a decision has been made or a development objective achieved, risk management is complete. Bureaucracies and ministries can be particularly challenged by this as some may be more comfortable with acting on single-issue themes. This is where risk-based decision frameworks can assist decision- and policy-makers (whether from community-based groups, NGOs or governments), donors and the international investment community. These frameworks are roadmaps to guide decision- and policy-makers in understanding multiple threats and complex risks and opportunities to and arising from development decisions, and then acting on that information to avoid creating new risks, reduce existing risks and seize the opportunities available. The frameworks help

with selecting and evaluating the appropriate datasets, tools and methods for risk assessments, and they assist in keeping such assessments and actions in line with resource, risk tolerance and capacity constraints. They provide guidance on the steps needed to evaluate a development decision or objective(s) before, during and after it is implemented, to ensure that it is risk-informed, resilient and sustainable.

Multiple risk-based decision frameworks are available to help decision-makers, international donors and investors. They all generally share the good practice principles (see Table 3) that have emerged from decades of work in natural hazard risk reduction, climate adaptation, conflict resolution and gender (Street et al., 2016; Willows and Connell, 2003; Nobel et al., 2014). These good practice lessons arose from earlier efforts around understanding and managing risks in engineering and financial settings (Renn, 1998; G20/OECD, 2012).

Table 3 Good practice principles in risk-informed development

Good practice principle	Importance
Inclusive and transparent	What is considered risky in a proposed development plan or programme is a value judgement. Not everyone has the same risk tolerances or perceptions. Multiple stakeholders need to be involved in the decision process to ensure that the most marginalised people or critical ecosystems on which livelihoods depend are adequately represented. Lack of transparent information, data and decision-making, as well as poor participation, can contribute to unsustainable development and create risks.
Phased and iterative	Generating knowledge about risks and acting upon it involves several phases, from risk assessment and understanding risk tolerances to implementation and monitoring and evaluation. This allows for reflection and review of information emerging from each phase, and adjusting the development objective(s) accordingly.
Flexible and adaptable	Each development context is different, and different countries, donors and international investors have different priorities. Capacities and resources for taking action, and deciding which development plans and programmes to implement, also vary. Risk-informed development allows for flexibility in identifying and addressing threats and risks according to priorities, resources and capacities.
Continuous learning and reflection	Development pathways, threats and risks, and knowledge about them, are constantly changing. Risk-informed development is not an end-point. Risk analyses, evaluations of risk tolerances and so on have to be repeated as conditions change. We have to learn from past disasters and understand the lessons of development failures. This can assist in avoiding repeating the same mistakes, and reduce vulnerability and exposure to emerging threats.

Sources: G20/OECD, 2012; Street et al., 2016; Nobel et al., 2014; Renn, 1998; Willows and Connell, 2003.

Table 4 Examples of risk-based decision frameworks

Framework	Summary
IRGC Risk Governance Framework (IRGC, 2017 – shown in a modified version in Figure 5)	A comprehensive framework for systematically understanding multiple threats and complex risks and crafting development decisions that avoid risk creation (where possible) and enable risk reduction. This framework puts as strong an emphasis on understanding risk tolerances, capacities, resources and contexts for action as it does on understanding risks, with the recognition that both facets are necessary to lead to action.
UKCIP Risk Framework (Willows and Connell, 2003)	This framework was originally developed for evaluating climate risks to development decisions or objectives, including adaptation actions. The framework’s principles and steps can be adapted to examine multiple threats and complex risks beyond those associated with climate change or natural hazards. The framework grew out of risk management practices in other sectors, and draws on a rich history of risk management.
Foundations for Decision Making (Jones et al., 2014) and Adaptation Needs and Options (Noble et al., 2014) of the IPCC Fifth Assessment Report	The good practice principles and guidance presented here are similar to those in the UKCIP Risk Framework, and are primarily about managing climate risks to development. However, they acknowledge that the principles, methods and tools were adapted from risk management practices in other fields, such as engineering and finance. The guidance can be modified to consider multiple threats and complex risks to development beyond those posed by climate change.
G20/OECD Disaster Risk Assessment and Risk Financing Methodological Framework (2012)	This framework is designed to help finance ministries in national governments develop risk-informed financial and fiscal management strategies, and socioeconomic planning to deal with a wide range of human-caused and natural threats.
ISO 31000:2018 Risk Management Guidelines (2018)	This is a comprehensive set of principles and guidelines to assist decision-makers of all types – businesses, financial institutions and governments – in managing complex, interconnected risks and opportunities arising from the interaction between decisions and threats.
SDC Climate, Environment, and Disaster Risk Reduction Integration Guidance (CEDRIG)	CEDRIG is a user-friendly risk and impact assessment tool for systematically integrating risks related to climate change, environmental degradation and natural hazards into strategic development planning. www.cedrig.org

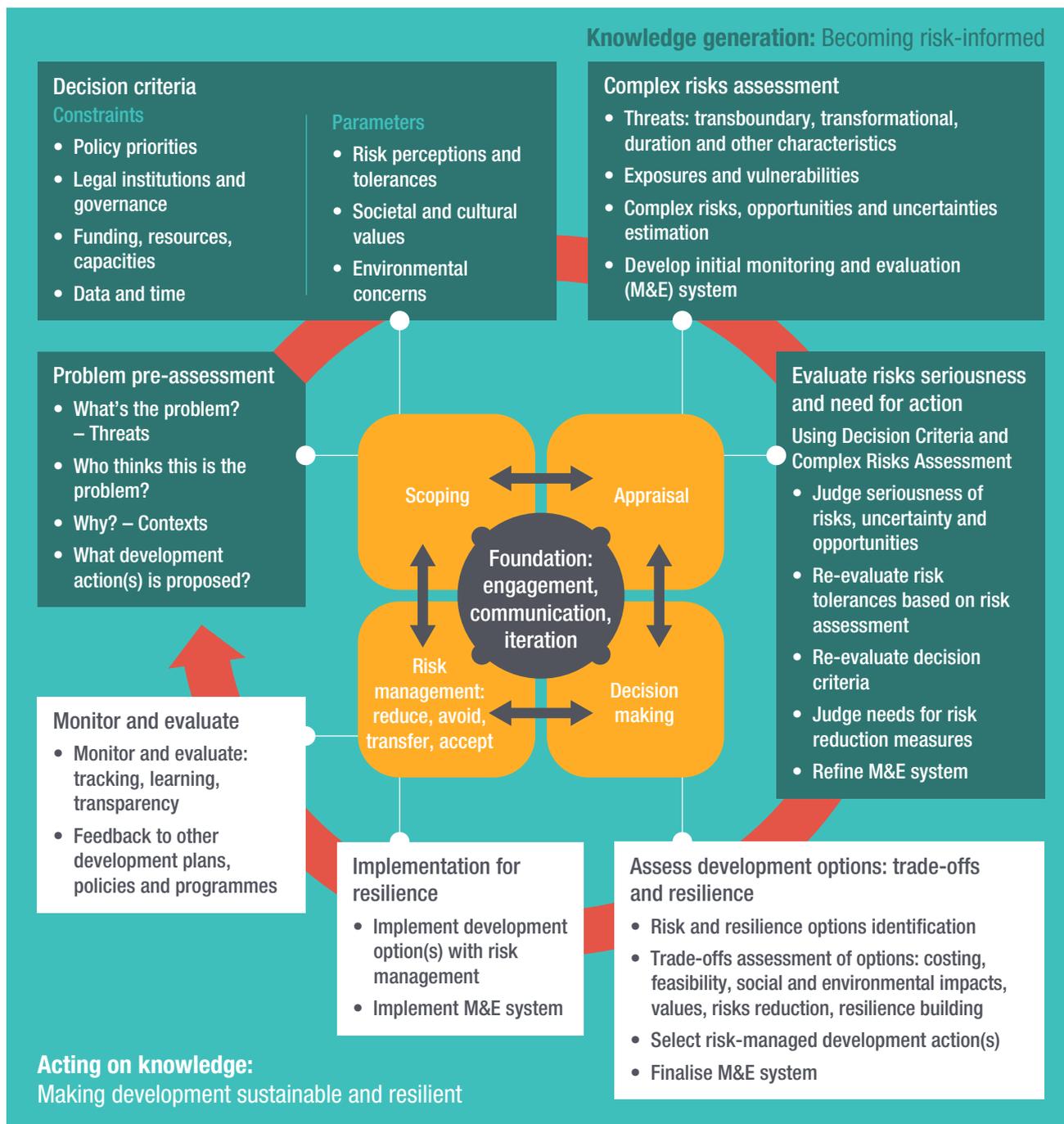
Sources: G20/OECD, 2012; Street et al., 2016; Nobel et al., 2014; Renn, 1998; Willows and Connell, 2003; IRGC, 2017.

These frameworks involve steps for integrating knowledge of complex risks, risk tolerances and considerations of capacities, resources and policy priorities into development planning, policies and objectives. Notable examples that could be used by the development community and governments are listed in Table 4. Some were designed to help decision-makers evaluate the potential risks and opportunities associated with a particular threat (e.g. climate change or natural hazards); others were developed to assist with assessing

multiple threats to a decision and evaluating possible actions to reduce risks and capture opportunities.

These frameworks help in prioritising and understanding multiple threats and complex trade-offs in the context of the development decision(s) to be made, and then deciding what actions to take to reduce risks. Depending on the development decision, conditions on the ground and available knowledge and evidence, various activities might be carried out simultaneously, or may not precisely follow the progression laid

Figure 5 Risk-based decision frameworks for risk-informed development



Source: Adapted from the IRGC Risk Governance Framework.

out in the chosen decision framework. This is not a concern as the frameworks are meant only to guide development decisions, not be prescriptive.

While different frameworks contain different steps and associated activities, all share common phases. These include:

Scoping: understanding the decision context and framing the development decision(s) under consideration. During this phase, critical stakeholders that will be making, implementing

and monitoring the development decision, or that will be impacted by it, are ideally involved to keep the process inclusive. Initial threats of concern are identified, and risk tolerances around those threats explored. This phase also seeks to map out the decision context – policy priorities, legal and institutional frameworks, capacities and resources – in which the development decision is supposed to occur. Scoping also helps to identify who

has the mandates and capacities to carry out specific steps – risk appraisal, implementation, monitoring and evaluation – and when to start another round of risk-based planning.

One example of scoping activities in development projects is the UN Development Group (UNDG)'s *Conflict and development analysis* tool for intelligence-gathering, structuring analysis and supporting evidence-based decision-making across a range of issues, including elections, violence and governmental change (UNDG, 2017).

Risk appraisal – also known as risk assessment or risk screening: involves examining who and what (sectors such as water, agriculture and energy) will be influenced by the potential development policy, plan or programme, and understanding their interconnected vulnerabilities, the multiple threats facing the development objective and its intended recipients, and the trade-offs and uncertainties involved in taking particular courses of action. Information from the appraisal is used to inform and perhaps alter the development decision and craft an initial monitoring and evaluation system drawing on the metrics of vulnerability, capacity, exposure and risk uncovered during the assessment. There are multiple tools and methods, ranging from qualitative techniques to quantitative models for complex risk appraisal. The method selected depends on development objectives, capacities, resources and data.

Practical examples of risk appraisals in development include stress-testing for infrastructure investment and using probabilistic risk in coastal development and urban planning or public expenditures. All International Development Association (IDA) loans and grants are now assessed for potential environmental impacts, for example, and UNDP ensures that its projects and programmes conform to social and environmental standards (UNDP, 2018b).

Options appraisals and implementation: development choices are evaluated according to the results of the risk appraisal and the development goal(s), and in light of risk tolerances and the resources and capacities needed to implement the plan, policy or

programme. Questions to ask include: how does the development option need to be adjusted to avoid and reduce risk creation, and to capture potential benefits? What are the costs and benefits – monetary, social, cultural and environmental impacts, etc. – of the proposed development choice(s)? Are the risks to implementation clearly understood, and do the options address those risks? Have the necessary resources and legal frameworks been put in place to enable implementation? Ideally, the development plan, policy or action will then be implemented appropriately, using the information gleaned through the risk and options appraisals.

Monitoring and evaluation: once a development choice or set of choices has been implemented, performance must be monitored to identify what is working well and what needs to be modified, and why. Is the development choice sustainable? Is it actually reducing risks for the intended recipients (people, sectors and/or infrastructure), as demonstrated by its performance during a threat event? Monitoring and evaluation systems need to be planned in prior phases so that they are in place by the time a development option is implemented. These systems enable development decision-makers to determine whether they have chosen an optimal set of plans, policies or actions, and whether these are being implemented effectively and are delivering the expected benefits.

Communication and iteration: each phase is connected and builds off the activities in other phases, including through effective communication between stakeholders. Transparency and regular communication among multiple stakeholders in the development decision process is necessary in order to keep them informed whatever development option is being considered and implemented. In addition, as has been noted, some iteration between steps might be necessary. For example, during the appraisal of development options more information may be needed about potential risks and opportunities, and elements of the risk appraisal will need to be expanded. These findings will need to be communicated to the other stakeholders involved in the planning and implementation process.

5 Moving forward: next steps to enabling risk-informed decision approaches for resilient and sustainable development

As discussed earlier, the SDGs on their own do not sufficiently support risk-informed, resilient development and their achievement has the potential to be undermined by multiple threats. The other global frameworks, particularly the implementation of the Sendai and the Paris Agreement, are critical for providing the foundational risk reduction and management processes to enable risk informed in development.

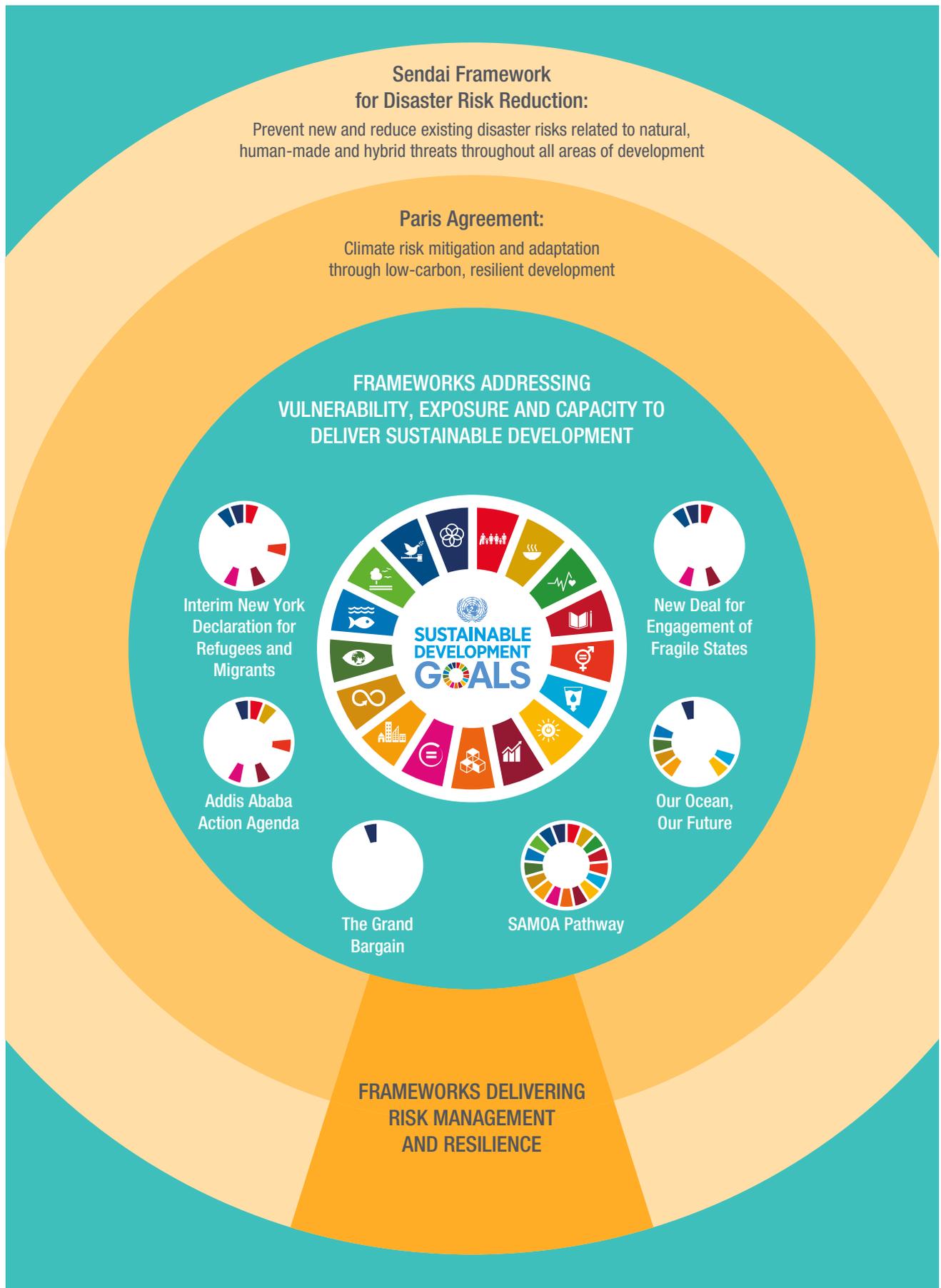
While some argue that Sendai focuses only on risk reduction in relation to natural hazards, it actually calls on decision-makers to integrate and act upon knowledge of multiple threats (called ‘hazards’ in the framework) ‘including natural or man-made hazards as well as related environmental, technological and biological hazards’ that contribute to the ‘risk of small-scale and large-scale, frequent and infrequent, sudden- and slow-onset disasters’ (UNISDR, 2016: 11). Risk information should be integrated ‘into planning and development at all levels across all sectors as well as in disaster preparedness, recovery and reconstruction’ (ibid.). The Sendai Framework is, in essence, a call for risk-informed development in order

to support achievement of the SDGs and other frameworks and ensure they are resilient, and its supporting Science and Technology Roadmap (STR) highlights priority risk management needs. The applications to development listed in Table 5 are elaborated further throughout the remainder of Section 5. Taken together, the priority actions of the Sendai Framework and the Paris Agreement can serve as the foundation, in conjunction with the vulnerability reduction efforts of the other global agreements, to enable risk-informed, resilient and sustainable development.

A number of other global initiatives and framework agreements should jointly factor into development planning and implementation, as appropriate, in order to achieve resilient and sustainable development (see Figure 6). These include:

- the Grand Bargain;
- the New York Declaration for Refugees and Migrants;
- the Addis Ababa Action Agenda; and
- the New Urban Agenda (Habitat III).

Figure 6 Integrating global frameworks for sustainable, risk-informed development



Source: © The authors, drawing from the frameworks.

Table 5 Sendai Framework priorities for action and expected outcomes mapped to requirements for achieving risk-informed, sustainable development

Sendai Framework Priority for Action and Science and Technology Expected Outcomes	Application to development to make it more risk-informed and resilient
<p>1. Understanding disaster risk</p> <p>1.1 Assess and update the current state of data, scientific and local and indigenous knowledge and technical expertise availability on disasters risks reduction and fill these gaps with new knowledge.</p> <p>1.2 Synthesise, produce and disseminate scientific evidence in a timely and accessible manner that responds to the knowledge needs of policy-makers and practitioners.</p> <p>1.3 Ensure that scientific data and information support are used in monitoring and reviewing progress toward disaster risk reduction and resilience building.</p> <p>1.4 Build capacity to ensure that all sectors and countries have access to, understand and can use scientific information for better informed decision-making.</p>	<p>1. Supporting capacity building for understanding and acting on risks in development by:</p> <p>1.1 Evaluating risk tolerances and other decision criteria when working with policy makers and other types of development decision makers</p> <p>1.2 Understanding and using a broad array of available tools and methods appropriate for the context for evaluating multiple threats, uncertainty, complex risks and opportunities and feasibility of actions</p> <p>1.3 Strengthening data collection, maintenance, appropriate use and transparency.</p> <p>1.4 Strengthen monitoring and evaluation systems to test the effectiveness of development measures and objectives at risk reduction and sustainability, and be transparent about the performance of measures over time to acknowledge and redress emerging weaknesses and gaps.</p>
<p>2. Strengthening Disaster Risk Governance to Manage Disaster Risk</p> <p>2.1 Support for a stronger involvement and use of science to inform policy- and decision-making within and across all sectors at all levels</p>	<p>2. Promoting cultures of risk governance and risk communication in development</p> <p>2.1 Donors, investment financiers and NGOs need to work with governments and community groups to require not only risk assessments of proposed development objectives, but also honest reviews of resources and abilities to undertake them within policy priorities. This requires a greater focus on risk tolerances and risk communication in development decisions and objectives.</p>
<p>3. Investing in Disaster Risk Reduction for Resilience</p> <p>3.1 Provide scientific evidence to enable decision-making of policy options for investment and development planning.</p>	<p>3. Innovation in financing mechanisms for RID</p> <p>3.1 Increase innovation in financing mechanisms to incentivise risk-informed, sustainable development. Such mechanisms may include risk transfer and penalisation of excessively risky development projects. Donors and financial investors should reject financing projects that do not adequately consider multiple threats and complex risks, or create excessive risks, particularly for marginalised groups or sensitive ecosystems.</p>
<p>4. Enhancing Disaster Preparedness for Effective Response, and to 'Build Back Better' in Recovery, Rehabilitation and Reconstruction</p> <p>4.1 Identify and respond to the needs of policy- and decision-makers at all levels for scientific data and information to strengthen preparedness, response and to 'Build Back Better' in Recovery, Rehabilitation and Reconstruction to reduce losses and impact on the most vulnerable communities and locations.</p>	<p>4. Integration of global framework agreements into development</p> <p>4.1 Recognise the mutually supportive knowledge and roles of DRR, CCA, conflict management and gender efforts in promoting and delivering sustainable development.</p>

Sources: UNISDR, 2016; Murray et al., 2017.

Each of these global frameworks and initiatives is mutually supportive. Coordinating actions under each framework or initiative can assist in reducing duplication of effort, maximising gains and managing the trade-offs associated with trying to deal with multiple threats and complex risks in and to development objectives (Peters et al., 2016). Many of these frameworks acknowledge the need for greater coherence and momentum is gathering to enable this, and to align actions to build more resilient, sustainable development.

Moving forward, the development community needs to do more to strengthen coherent action and find common supporting mechanisms through finance, capacity-building and risk transfer (e.g. insurance or resilient infrastructure bonds). This will require greater communication, shared learning and coherence between the development, climate change adaptation and disaster risk reduction, conflict management and peace-building and gender communities, among others.

5.1 Building capacities and expertise to deliver risk-informed decisions

Risk-informed development cannot happen unless the development community strengthens its own capacity and expertise in order to more effectively work with governments, and governments in turn have the capacities to become risk-informed and act on such knowledge when devising policies, plans and programmes. Funding and time need to be allocated to build the capacity of various development stakeholders, including humanitarian and conflict management groups, to work with the disaster risk reduction and climate change adaptation communities, and national risk management and disaster management agencies (where they exist).

The international development community also needs to expand its capacities, particularly through collaborations with threat experts in different areas, to consider multiple threats when doing risk analyses of planned initiatives; many still focus narrowly on particular sets of

threats. An unpublished study on the feasibility of developing a global risk platform to link risk assessment and management practices to development found that there are currently no risk-based decision approaches for examining all relevant risks in a given context, and that current approaches remain ‘fractured, out-dated, in-efficient and generally poor at anticipating risks and their multidimensional consequences’ (Hyslop, 2017: 5).

Development policies and programmes – including those geared towards natural hazard-related disaster prevention, response, recovery, rehabilitation and reconstruction – require expertise and capacity to use a risk-based decision framework to guide evaluations of threats and trade-offs to decisions, and methods and tools for risk and options appraisals and monitoring and evaluation. Some action areas are needed to increase capacities to undertake risk-informed development as a process are further highlighted, and correspond with action items 1.1 through 1.4 in Table 5.

5.2 Evaluating risk tolerances and decision criteria

As noted previously, deciding on the ‘acceptable’ level of risk involves not only scientific and technological evaluations, but also ethical, economic cost–benefit analyses and political considerations such as acceptability to the public and the development community. Capacity-building is needed to assist development decision-makers in understanding the resources, constraints, legal mandates and risk tolerances that shape what development objectives can be achieved, how and by whom. Ethical considerations should also be examined with regard to gender, disability, age and ethnic group, political marginalisation and environmental and cultural rights. What are the trade-offs of decisions for various groups of people and the ecosystems on which they depend?

Consideration of risk tolerances in risk-informed development is necessary in order to answer these questions (Renn, 1998: 51) about a development decision, plan, policy or programme:

-
1. What are undesirable outcomes and who determines what are undesirable means?
 2. How can we specify, qualify or quantify the possibilities of undesirable outcomes?
 3. How do we aggregate different classes of undesirable outcomes into a common concept that allows comparisons and the setting of priorities?

5.3 Utilising and modifying tools and methods for risk-informed development

There are many methods and tools for assessing risks and opportunities (synergies, conflicts and trade-offs) that may arise from the interaction between planned development objectives, vulnerabilities and exposures and multiple threats. These methods and tools range from qualitative scenario creation to probabilistic risk modelling. What tools and methods are appropriate for a particular development decision depends heavily on the context, capacities, resources, data and time constraints, which influence how the development decision is made and by whom, and how it is implemented, monitored and evaluated. More work is needed by the development community to build capacities to understand the limitations of tools and methods for assessing complex risks and appraising development options, and to judge when to use particular methods and tools (Benson and Twigg, 2007).

Existing tools and datasets need to be updated to enable more forward-looking risk assessments, as opposed to assuming that the past provides a good guide to the future when assessing risks and responses. In many cities, for example, flood maps are outdated as rainfall patterns and urbanisation change the nature of flooding, as in Houston during Hurricane Maria in 2017 (Harlen, 2018). Tools also need to be updated to allow for simultaneous evaluation of multiple threats and complex risks. There are also many methods and tools for stakeholder engagement, gauging risk tolerances and priorities and communicating evidence to multiple stakeholders, and for developing monitoring and evaluation systems.

In response to these challenges, UNISDR is developing a Global Risk Assessment Framework (GRAF) to assist countries in systematically assessing multiple risks and managing these within development commitments. The framework will also support the integration of the Sendai Framework, the SDGs, the New Urban Agenda and the Paris Agreement. The first iteration of the GRAF will be released in the 2019 Global Assessment Report on Disaster Risk Reduction.

5.4 Strengthening data collection to provide the evidence base

Socioeconomic (including informal trade and financial), climate and hydrological, health and disaster losses and other types of data are needed in conducting risk analysis, whether qualitative, quantitative or a combination. Understanding potential threats to development objectives across a range of sectors requires data about those sectors (their dependencies and interdependencies) and multiple threats in order to stress-test their sensitivities, vulnerabilities and exposures. Failure to consider multiple threats in a systemic fashion due to lack of data increases the possibility that development actions may heighten risks and/or be undermined by threats – ultimately leading to misguided development objectives.

In particular, investment is needed in some developing contexts, especially fragile and conflict-affected areas, to collect and make available data at both national and subnational levels. In the multi-agency work used to advocate for the inclusion of risk and resilience in the Financing for Development process, data was identified as a critical starting point: ‘a key limitation in many sectors, improving data and impact modelling can lead to more responsive investment and planning decisions that choose to reduce, accept or transfer risks, thereby building resilience to shocks’ (Watson and Kellett, 2016: 18).

Significant efforts are under way to strengthen national climate-related data collection through initiatives by the World Meteorological Organization, as well as other types of data, for example under the Sendai Framework and

Box 13 Climate and disaster risk-informed public investment planning in Cambodia, Laos and Myanmar

UNDP and the Asian Development Bank are working to increase the capacity of government and other stakeholders to undertake risk-based planning within public investment projects (PIP) in Cambodia, Laos and Myanmar. A needs assessment was conducted of risk-informed PIP projects included in national budgets and infrastructure investments with long lifespans. The UNDP study found that, while climate and natural hazard data and information and capacities for assessment and information interpretation were limited (but growing), the actual process itself was equally important. ‘The way investment projects are appraised, selected, implemented, monitored and finally operated and maintained are just as important ... this starts with a well-defined and structured PIP process that integrates a number of project planning and management steps, tools and resources to inform the selection, implementation and longer term operation of an investment’ (Galperin and Yan, 2018: 16). The study concludes that risk-informed development is still in the early stages in the three countries, and notes that risk frameworks and assistance in addressing capacity needs could help in integrating risk-informed decisions into infrastructure investments, social and economic plans and land use codes.

Source: Galperin and Yan, 2018.

the PREVIEW Global Risk Data Platform.⁸ Other initiatives are needed to assist national governments in developing, implementing and maintaining data collection, including around socioeconomic issues, health, energy and water and land use. This is necessary not only to improve the quality of risk analysis, but also to enable the proper evaluation of potential development policies, programmes and activities to reduce risks (and capitalise on opportunities) and avoid risk creation. It is also necessary to monitor and evaluate policies, programmes and activities to see if they are working and meeting stated objectives.

5.5 Strengthening monitoring and evaluation systems, and their transparency

Monitoring and evaluation (M&E) are critical components of risk-informed development. M&E systems should be established early in the risk-based development decision process to understand what metrics of vulnerability, exposure, capacity, threat and risk need to be measured. These metrics, among other criteria,

form the basis by which potential and actual development options, policies or programmes are evaluated for their performance in reducing risks and maximising benefits. The M&E system also allows for monitoring changing conditions, and indicates when new development measures might be needed, thus triggering a new round of risk-based development planning. Effective and consistent monitoring and evaluation systems are also necessary to provide the data, information and evidence required for conducting vulnerability and risk assessments, cost analyses, environmental and social impact assessments and other types of assessment necessary for development to be risk-informed.

5.6 Promoting cultures of risk governance and risk communication in development

All government signatories to global agreements including Agenda 2030 have pledged to develop national frameworks and courses of action for the implementation of and progress monitoring of particular targets as articulated in these agreements. Risk governance is challenging in

8 <https://preview.grid.unep.ch/>

many current institutional arrangements due to capacities, existing mandates and risk tolerances, even though many countries are starting to recognise that repeated disaster losses could have been avoided or reduced by incorporating considerations of multiple threats and hazards into development objectives. Many policy-makers, the financial investment and business communities tend to focus on risks that can be quantified, particularly monetarily, and discount or ignore non-quantifiable risks (Power, 2004). Additionally, the policy, programming and financing architecture for risk management is deeply fragmented, as resource allocation and political accountability at the national level lie often lie with sectoral ministries. This ‘siloisation’ inhibits effective risk governance. More support is needed, particularly from donors and investment financiers, to encourage and support national and subnational government departments to facilitate and coordinate understanding of and action on multiple threats and risks across departments.

Across the range of development actors – NGOs, international donors, multinational development banks, national governments – we need to create a culture that values being risk-informed in development. This means that the development community must work with governments to deepen cohesion between countries and the inclusion of the identification, assessment, management and communication of risks within development actions, processes, traditions and institutions (IRGC, 2018). Development actors also need to work more closely with the climate change adaptation, disaster risk reduction, conflict management and gender communities at national and subnational levels.

The international development community must work with national and subnational governments to strengthen laws requiring multi-threat risk assessments, as well as mandating appraisals that consider costs, environmental and societal impacts, risk tolerances, feasibility and the resources needed to achieve the development objective. Legislation and policy might be needed to enable greater collaboration between government ministries, and ensure that adequate resources are dedicated to risk reduction in

development, rather than continuing with unsustainable development paradigms, including a reactive focus on disaster management.

5.7 Innovative financing mechanisms for risk-informed development

Given the complex threats, risks and opportunities facing development, there is renewed interest in financial instruments and innovations designed to reduce vulnerability to risk – and to help countries cope when crises occur. A number of different actors are involved in financing development programmes and projects. These include the public sector (governments and the general public), the private sector (such as businesses, banks and stock exchanges) and the international development sector (such as multilateral development banks and donors).

Certainly, bilateral financial institutions and multilateral development banks have critical roles to play in financing risk-informed development, in particular in promoting approaches that enable complex risks to be accounted for in development policies and in ensuring that country plans factor in uncertainty and sustainability. This was explicitly recognised in the 2017 Financing for Development Forum (FdF) at the UN. Both UNDP and the International Monetary Fund (IMF) are carrying out research on the use of State-Contingent Debt Instruments (SCDIs), i.e. debt contracts that link debt service payments to a country’s ability to pay. These instruments can be linked to a fall in GDP, changes in commodity prices or natural disasters such as hurricanes or earthquakes, so that if one of these events occurs the debt service burden is automatically reduced. Preliminary analyses suggest that SCDIs can increase fiscal space and allow greater policy flexibility in bad times. They can also broaden the investor base, open up opportunities for risk diversification and enhance the resilience of the financial system (IMF, 2017). While these instruments hold promise, they are still not widely used. One exception is the French development agency AFD, which has extended ‘counter-cyclical

loans' to six least developed countries, allowing for a break in debt service of up to five years should a major shock occur.

More broadly, environmental and economic vulnerability should help determine eligibility and appropriate levels of concessionality (the level of lender return on a soft loan). For instance, the International Development Association (IDA) of the World Bank has lending terms set with reference to recipient countries' risk of debt distress, level of GNI per capita and credit-worthiness. Recipients with a high risk of debt distress receive 100% of their assistance in the form of grants, and those with a medium risk 50%. Other recipients can receive IDA credits on regular or blend and hard-terms with 38-year and 25-year maturities respectively. The World Bank, along with UNDP and several other international organisations, has established a joint technical working group to explore how lenders could take into account 'vulnerability' and other metrics (such as domestic resource mobilisation capacities) when deciding on concessional resources for a particular country.

Lenders and borrowers must act more responsibly by reassessing their environmental and social safeguards policies and confirming their compliance with them. For example, UNCTAD has devised a set of lending principles that it is urging countries to sign up to (Principles for Responsible Sovereign Lending and Borrowing: UNCTAD, 2012). The need for responsible lending mechanisms was emphasised at the FfD Forum, as developing countries step up investments in the SDGs and debt levels increase.

Innovative bond instruments such as green bonds can mobilise resources for climate change adaptation, renewables and other environment-friendly projects. Proceeds are invested in projects that generate environmental benefits. SDG-linked bonds aim to raise financing to support projects that contribute to achieving the Goals, including eradicating poverty and boosting shared prosperity. Domestic policy and resource mobilisation play another crucial role in financing risk-informed development. Besides being a direct source of finance, local policy frameworks set the context for private

investment. They should also set appropriate development-related standards and regulations for avoiding, mitigating and adapting to risks, such as limiting building on floodplains. They are responsible for reducing existing vulnerability, exposure and risk, building resilience and promoting forward-looking planning and investments. Such efforts can help avoid losses when disasters strike, stimulate economic activity due to reduced risks and develop co-benefits (Tanner et al., 2015).

Policies on social protection and payment for ecosystem services offer other ways of building household resilience. Such schemes can promote investment in productive activities and human capital by lower-income and vulnerable individuals. They can also enhance the capacity of families and communities to manage risks and protect the environment through extraordinary payments, or by modifying the eligibility requirements for participants. For instance, in Uganda a programme offering forest-owning households annual payments for forest conservation found that the carbon sequestration benefits were more than 2.4 times the total cost of the programme (Jayachandran et al., 2017).

Financial institutions can provide financial services to help economies manage risks. This can be done through the provision of insurance, credit, debt or equity investments, risk-taking capital, public trading of assets and risk pricing (World Bank, 2014). However, offering these additional tools carries risks to the financial system and requires additional layers of risk management. In turn, the role of the government in enforcing a financial regulatory system needs to be considered, especially one that can develop and protect the interests of the public. Governments may also provide an enabling environment to bolster confidence and market stability in the face of uncertain global threats, such as climate disasters and shocks, though this may not be possible in some low-income countries or conflict-afflicted regions.

One solution for transferring risk is offered by insurance (Watson et al., 2015). Insurance can be implemented at multiple scales in a variety of sectors, and can cover household livelihoods and healthcare protection to supporting adaptation

to climate change to provide post-crisis financing. For example, in the Caribbean Catastrophic Risk Insurance Facility insurance payments are triggered by substantial deviations from risk models, rather than in response to reported losses. The Africa Risk Capacity has a similar multi-country risk pool, with payments triggered when a drought is declared.

From these examples, it is clear that financial actors have a number of tools that can be used to promote and support risk-informed development policies and programmes over those that are not, and that could lead to unsustainable

development. Such financial tools need to be deployed more widely and consistently in order to nudge development planning towards being risk-informed and acting to reduce those risks and avoid risk creation.

If we are to move towards more resilient and sustainable development models we must seriously consider the integration of risk-based decision-making in development planning and action. Taking a risk-informed development approach allows for sustainable development to truly become a vehicle to reduce risk, avoid creating risks and build resilience.

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