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Regulating and reforming the insurance industry to combat climate change and accelerate implementation of the 2030 Agenda for Sustainable Development

Note by the Secretariat

The Secretariat has the honour to transmit to the Committee of Experts on Public Administration the paper prepared by Committee members Linda Bilmes and Mauricio Rodas in collaboration with Soonae Park, Devon Rowe, Aminata Touré and Lan Xue.

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Regulating and reforming the insurance industry to combat climate change and accelerate implementation of the 2030 Agenda for Sustainable Development

Summary

The insurance industry plays a critical role in partnering with Governments to mitigate the impact of climate risks. The public sector frequently relies on it to help assess new and emerging risks and to provide coverage to limit individual and public sector liability for damage.

However, several years of large catastrophe losses owing to more frequent and severe climate-related weather events have caused global reinsurers and primary insurers to reprice and reduce risk coverage, with devastating impacts for Governments and individuals, especially vulnerable groups. The authors, therefore, call for accelerated regulation and reform of the insurance industry to better mitigate the risks of climate change and accelerate implementation of the 2030 Agenda for Sustainable Development.

The authors elaborate on the impact of the climate crisis on the insurance industry, which has increased the protection gap in many countries and regions, negatively affecting Governments and vulnerable groups. They also highlight the specific challenges city and other subnational governments face in accessing climate insurance coverage, despite being increasingly vulnerable to the impacts of climate change.

The authors emphasize that Governments play a crucial role in promoting climate-resilient insurance by developing and enforcing regulations that incentivize sustainable practices within the insurance industry. This will require Governments to streamline regulations, foster international coordination and promote regulatory innovation to adapt to the evolving nature of climate risks.

In closing, the authors describe good practice examples of innovative approaches to climate-related insurance and recommend steps that should be followed to improve the effectiveness of the insurance industry and maintain its important role in mitigating the risks of climate change.

I. Background

1. Climate change remains one of the major global challenges worldwide, with progress towards achieving Sustainable Development Goal 13 (climate action) stagnating or deteriorating across all regions of the world. This poor performance can be attributed to a large degree to institutional factors, such as the fragmentation of responsibility for combating climate change and for the sustainable management, protection and restoration of natural resources in many countries. Recognizing that climate change mitigation and adaptation call for technical and programmatic shifts, as well as reform of institutional structures, cultures and capacities, the Committee of Experts on Public Administration has been studying the institutional challenges and opportunities related to climate action and the protection of natural resources, both on land and under water, since its twenty-first session.

2. The present paper builds on previous work undertaken by the Committee and focuses on the insurance industry, given its critical role in partnering with Governments to mitigate the impact of climate risks. According to Statista, the global insurance market was worth almost \$6 trillion in 2022.¹ The public sector frequently relies on it to help assess new and emerging risks and to provide coverage to limit individual and public sector liability for damage due to natural calamities (e.g. earthquakes, floods and wildfires) as well as man-made disasters (e.g. oil spills and cyberattacks).

3. A number of United Nations organizations have called attention to the central role of the insurance industry and related components of the financial services sector. The Intergovernmental Panel on Climate Change, in its third assessment report,² for example, highlights the insurance industry because it represents a valuable mechanism through which risk events are priced and spread across the financial system by means of a sophisticated global network.

4. The insurance industry comprises institutions that offer commercial insurance, reinsurance, brokerage services as well as disaster preparedness and recovery assistance, all of which lie at the epicentre of institutional capacity to support climate mitigation and adaptation worldwide. Although the insurance industry is structured differently across countries and regions, its fundamental risk-sharing function is achieved by pooling risks across large groups of individuals or organizations. The global insurance market is highly sophisticated and tightly interconnected.

5. Life, health, property and casualty insurance is sold to customers in a specific country or region by commercial insurance carriers (so-called “primary insurers”), who distribute those policies either directly online or through a network of retail insurance brokers. These carriers bundle up the risks from such policies, keeping some on their own balance sheets and selling the excess to wholesale insurance companies known as reinsurers. Reinsurers do not deal with the public directly, but rather are specialized insurance risk managers who back-stop the insurance industry with large pools of capital raised from institutional investors worldwide. Consequently, reinsurers are the ultimate price-setters for global climate risks. Major reinsurance firms are based, for example, in Canada, China, France, Germany, India, Japan, the Republic of Korea, Switzerland, the United Kingdom of Great Britain and Northern Ireland, the United States of America and Bermuda.

¹ Statista, Global insurance industry – statistics and facts. Available at <https://www.statista.com/topics/6529/global-insurance-industry/#topicOverview> (accessed on 1 February 2024).

² *Climate Change 2001* (Cambridge, United Kingdom of Great Britain and Northern Ireland, Cambridge University Press, July 2001 and March 2002), four volumes.

6. After several years of large catastrophe losses due to more frequent and severe climate-related weather events, global reinsurers have cut back on the coverage they provide against medium-sized natural catastrophe risks (secondary peril events) owing to pressure from investors. The result is a tightening in terms and conditions to limit their aggregate exposure, which in turn leaves primary insurers much less protected against secondary peril events. As a consequence, primary insurers have started cutting back coverage of climate-vulnerable areas and regions, excluding protection from certain weather events and raising monthly premiums and deductibles, with devastating impacts for Governments and individuals, especially vulnerable groups.³

7. A key consideration is that insurers have different time perspectives on climate risk than Governments or other economic sectors. Insurance contracts are typically written with a 12-month duration. Consequently, insurers are free to reduce, reprice or withdraw coverage as their perception of risk changes. For Governments, however, climate change represents a long-term and fundamental shift in risk that needs to be managed over a multi-year horizon. Going forward, therefore, it will be important for Governments to engage with the insurance industry to ensure that climate risk pricing and the regulatory structure are designed to ensure that the industry continues to provide risk transfer for climate-related disasters and helps protect vulnerable groups and regions.

II. Leaving no one behind: meaning and significance

8. The global insurance industry has long played a role in mitigating risks for Governments and society, such as those related to innovation, the safety of electric grids, air travel or automobiles. Mitigating the risks of climate change may, however, be its biggest challenge to date. To assess risks, the insurance industry maintains large historical databases, which it uses to create actuarial models to predict the likelihood of disasters and to calculate insurance premiums and payouts. However, not only are the risks increasing, but changing weather patterns also mean that traditional backward-looking actuarial risk models are no longer adequate for predicting future risks from natural catastrophes.

9. The increased frequency, severity and geographic dispersal of natural disasters related to climate change threaten the functioning of the insurance industry in several ways.⁴ Insurance companies are, for example, adjusting consumer premiums to compensate for heightened climate-related risks. In some parts of the United States, for example, insurers are asking state regulators to approve sharp premium increases for home insurance of over 40 per cent. Simultaneously, some insurers are limiting or denying coverage in high-risk areas, leading to reduced availability and affordability for policyholders. There are already so called “insurance deserts” in some high-risk areas and regions, where private insurers no longer sell home insurance at any price. Regions that were previously considered safe – ranging from the Appalachian Mountains in Tennessee to the mountainous areas between Salt Lake City and Denver – are now being categorized as too risky. To help curtail risks in these regions, insurers may require co-insurance and Government guarantees.⁵ In 2022, direct economic losses resulting from natural disasters globally were estimated to be over

³ See, for example, FitchRatings, “Global reinsurers pull back from natural catastrophe cover”, Fitch Wire, 24 August 2023; and Jacob Bogage, “Home insurers cut natural disasters from policies as climate risks grow”, *The Washington Post*, 3 September 2023.

⁴ See Renee Cho, “With climate impacts growing, insurance companies face big challenges”, Columbia Climate School, State of the Planet, 3 November 2022.

⁵ See Jean Eaglesham, “Home insurers are charging more and insuring less”, *The Wall Street Journal*, 30 July 2023.

\$313 billion, of which only \$132 billion were covered by insurance, leading to a “protection gap” of nearly 60 per cent.⁶

10. Maintaining a robust insurance industry is of critical importance not only to policyholders but also to banks, corporations and financial institutions, highlighting the interconnectedness of climate risks with broader economic stability. The withdrawal of insurance coverage has significant implications for the public sector. Local and national governments are suddenly facing huge costs to step in where the private sector is failing. They can do so with Government-provided insurance (e.g. the National Flood Insurance Program in the United States), which is costly to set up and administer and often requires skillsets that are not native to the public sector. Failing this, Governments are frequently left as the provider of disaster relief of last resort once natural disasters occur. Such relief is slower and significantly more costly for taxpayers than insurance.

11. The insurance industry also has a direct impact on other parts of the financial system, particularly banks and other lenders, who rely on insurers to lay off part of their risk. For example, insurers will provide protection for banks during the construction phase of new buildings or coverage against damage from fires and floods that enables them to finance new mortgages. Rising insurance premiums translate into higher lending costs or reduced availability of investment capital.

Consequences for vulnerable groups and regions

12. Issues with the insurance industry are present in both developed and developing countries. In most developed countries in Asia, Europe and North America, functioning insurance and reinsurance markets exist, working in partnership with various public and private institutions. Climate change is, however, threatening these models and putting pressure on the less advantaged residents and vulnerable population groups of these countries.

13. In developing countries and regions, there is only limited access to insurance, with less than 3 per cent of the population having access in the poorest countries.⁷ The result is a large and growing protection gap in such countries and regions, namely, the difference between the economic loss of a catastrophe and the amount that is covered by insurance. Such a protection gap can, for example, include the costs of clean-up, uninsured property damage, damaged infrastructure, emergency relief and foregone revenue.⁸ In developing countries, the damages and losses due to climate-related extreme weather events have a significant effect on the resources of Governments, diverting resources away from development towards recovery. Under such conditions, the ability of subnational governments to invest in needed adaptation is severely reduced, causing more vulnerability.

14. Consequently, economic shocks and extreme weather events are becoming an increasing financial burden in developing countries and regions owing to their increasing severity and more frequent occurrence and low insurance participation rates in the population. Vulnerable population groups are particularly affected, as they have limited financial coping possibilities and often depend on humanitarian aid. There are several reasons for low insurance penetration, such as low levels of financial education and income within target populations, as well as dependency and

⁶ See Aon, 2023 *Weather, Climate and Catastrophe Insight*.

⁷ See, for example, Jennifer Rudden, “Life and non-life insurance penetration in selected countries and territories worldwide from 2020 to 2022”, Statista, 30 November 2023; and Mamadou Bah and Nelson Abila, “Institutional determinants of insurance penetration in Africa”, *The Geneva Papers on Risk and Insurance – Issues and Practice*, vol. 49, No. 1 (2024).

⁸ See Liz Henderson, “De-risking cities and countries: protection gap – the role of insurance in building resilience”, Aon, 2024.

inflation.⁹ Moreover, the protection gap can be associated with a lack of availability or affordability of insurance products owing to several factors, including insufficient reinsurance capacity for high-risk areas, leading insurance companies to increase premiums to reflect a high risk of disasters.

15. Disadvantaged and low-income areas, communities and neighbourhoods are also frequently disproportionately exposed to climate change. This occurs through a combination of location and vulnerability of critical infrastructure, such as roads, bridges, tunnels, and water and sewage systems. In the United Nations Environment Programme (UNEP) Finance Initiative Principles for Sustainable Insurance, the importance of addressing rising premiums and decreasing affordability in vulnerable areas and communities is emphasized and the need for sustainable practices in the insurance industry is underscored.

16. According to the Global Commission on Adaptation, countries with high insurance coverage recover faster from disasters, and Governments are increasingly recognizing the role and benefits of insurance in transferring risk from disasters.¹⁰ Insurance can be a key tool for increasing a Government's ability to recover from climate disasters, enhancing resilience and reducing vulnerability, while providing the capital needed to recuperate and support citizens and infrastructure. When insurance is inadequate or unavailable, Governments, citizens and aid organizations are obliged to cover all the losses, which has a big impact on often already reduced Government budgets, and can lead to social and economic shocks in vulnerable and affected areas and communities.

III. Challenges faced by subnational governments in accessing climate insurance

17. City and other subnational governments worldwide face increasing vulnerability to the impacts of climate change, such as extreme weather events and rising sea levels. To effectively cope with these risks, collaboration with financial sector institutions, in particular the insurance industry, is crucial. The insurance industry provides a valuable tool for subnational governments in mitigating and transferring climate-related risks, enabling them to develop comprehensive risk management strategies. Collaboration with the insurance industry is essential for safeguarding against potential financial losses arising from climate-related incidents.

18. Subnational governments often face budgetary constraints, and climate-related events can impose substantial, unforeseen costs. Engaging with insurers allows them to integrate climate risks into their long-term financial planning. Insurance solutions thus become a crucial mechanism for predictable budgeting, enabling subnational governments to allocate funds proactively for potential future climate-related expenses. In addition, the insurance industry possesses the advanced data and risk assessment tools crucial for evaluating and pricing climate-related risks. By working with insurers, subnational governments can gain access to expertise in risk modelling and data analytics, enhancing their ability to assess and respond effectively to climate risks.

19. Furthermore, partnerships with the insurance industry can incentivize subnational governments to implement resilience measures. Insurers may, for

⁹ See, for example, Odunayo Olarewaju and Thabiso Msomi, "Determinants of insurance penetration in West African countries: a panel auto regressive distributed lag approach", *Journal of Risk and Financial Management* (July 2021).

¹⁰ See Paula Jarzabkowski and others, "Insurance for climate adaptation: opportunities and limitations", background paper commissioned by the Global Commission on Adaptation, 2019.

example, offer more favourable terms to cities that invest in infrastructure and policies aimed at reducing vulnerability to climate-related risks. Such collaboration, therefore, not only provides financial incentives but also contributes to the overall preparedness of city and other subnational governments in the face of climate change-related challenges.

20. Lastly, working with insurers can help subnational governments adhere to global standards and best practices in climate risk management, as insurers can offer specialized knowledge and experience, facilitating the development of effective climate adaptation strategies. This collaborative effort between subnational governments and the financial sector represents a proactive and strategic approach to building resilience and ensuring sustainable urban development amid the uncertainties associated with a changing climate.

Challenges faced by city and other subnational governments

21. City and other subnational governments are in a unique position to protect government assets, urban dwellers, small and medium-sized businesses, and large corporations from the impacts of climate hazards. According to a recent study by McKinsey, not only can cities build resilience to climate change-related physical risks, they can also reduce climate-related losses, reduce the risk of credit rating downgrades and even reduce the cost of borrowing.¹¹ The achievement of all of these benefits is, however, being hampered by a myriad of challenges and barriers that city and other subnational governments face worldwide in accessing adequate insurance coverage, especially if the city is small or medium-sized and in a developing country.

Limited budget and fiscal autonomy

22. Subnational governments often have limited budgets and competing priorities, rendering it politically and financially difficult for authorities to make the case for investing in insurance coverage. Subnational governments in low- and middle-income countries, for example, often have limited autonomy regarding the use of their funds owing to the centralized nature of their governance systems. This limits the possibility of investing in insurance coverage, especially if their national Governments are themselves not investing in climate-resilient insurance products. Ideally, in order to protect vulnerable population groups, subnational governments should directly sponsor insurance programmes to expand their coverage, undertake resilience measures to reduce insurance premiums for policyholders, or collaborate with insurance providers to develop innovative and affordable products.¹² Currently, there may not be enough insurance and reinsurance capital to provide in full for the global effects of climate change, even if subnational governments could afford the premiums.¹³ Therefore, insurance should be combined with local adaptation to climate change, policy dialogues and development agendas, which can make local responses more effective.

Insufficient data

23. The availability of data on existing climate risks in subnational governments is frequently limited or non-existent. Even where data are available, it is difficult for local officials to interpret them and incorporate them into their decision-making processes. Consequently, it is often hard for subnational governments to make informed decisions and prioritize spending to maximize climate protection and build

¹¹ See McKinsey Sustainability and C40, “Focused adaptation: a strategic approach to climate adaptation in cities”, 2021.

¹² See United Nations Development Programme, “Affordable climate insurance is needed in the poorest and most vulnerable communities”, 17 November 2022.

¹³ See Paula Jarzabkowski and others, “Insurance for climate adaptation”.

resilience. They can, for example, have a hard time deciding whether it would be more effective to build a flood barrier or to increase spending on insurance. Incorporating future climate change risks into catastrophe models is expensive and requires good data and specialized knowledge that only a handful of subnational governments possess. Even with better forward-looking climate forecasting, it is challenging for subnational governments and insurers alike to quantify the total cost of risk for a given climate event. Thus, many insurers end up shying away from these new markets. Solving this problem will require new types of products, such as large-scale group insurance plans that can provide basic coverage for highly vulnerable areas.¹⁴

24. Given the increased frequency of climate-related disasters, accurate data on exposures is essential for effective regulatory oversight, government planning and partnerships with the insurance industry. The gathering of reliable, standardized data on climate risks, and the analysis thereof, remain, however, major challenges for regulators in subnational governments, especially given the need to collect fairly consistent and uniform data on climate-related exposures in order to assess the insurance industry's vulnerability to climate change.

25. In India, for example, the insurance industry is expanding rapidly,¹⁵ increasing the need for comprehensive data on climate risks. However, the lack of standardized data reporting hinders regulators in developing effective risk oversight mechanisms.¹⁶ Similarly, Pakistan faces challenges in gathering comprehensive climate risk data. Going forward, regulatory bodies in India and Pakistan could encourage insurers to standardize their climate risk data reporting. For instance, the Insurance Regulatory and Development Authority of India could introduce guidelines that mandate specific data reporting standards. The regulatory authorities could also collaborate with international organizations, such as the International Association of Insurance Supervisors, and use the UNEP Finance Initiative Principles for Sustainable Insurance, a global framework for the insurance industry, to address environmental, social and governance risks and opportunities and work towards greater uniformity in climate risk regulation.

Risk literacy

26. Risk assessments are vital for insurance markets, both in providing financing solutions and in conducting better risk management. The ability to track and assess evolving risks is crucial for the development of climate-resilient public policies and redirecting investments. Subnational governments, however, often have limited capacities to identify risks and manage them accordingly. In many countries, risk assessment programmes are therefore outsourced and not integrated into government processes, further impeding capacity-building opportunities within public institutions. This also means that there is no specific subnational entity responsible for the implementation of risk assessments and the design of follow-up actions.

Call for effective coordination and partnerships

27. Climate-related risks will become more frequent and severe and will continue to affect communities, especially the most vulnerable population groups. In order to tackle these threats, effective collaboration and strong partnerships within the public sector and between the public sector and the insurance industry are required to address

¹⁴ See Cities Climate Finance Leadership Alliance, Climate Policy Initiative and Atlantic Council, "Building climate resilience in cities through insurance", September 2021.

¹⁵ See United States, Department of Commerce, International Trade Administration, "Market intelligence: India insurance sector", April 2023.

¹⁶ See WTW, "Lack of climate risk expertise and data seen as main obstacles for climate-related financial disclosure in India", press release, 6 December 2022.

protection gaps and ensure affordable coverage. Subnational governments often lack a shared analysis and open dialogue around managing climate-related risks, attributable mainly to political issues and many differing interests, institutional competition and administrative bureaucracies, which can impede coordination efforts.

28. Over the past few years, several multilateral organizations and banks have taken steps to develop new financial schemes for coping with natural disasters in developing countries, but these are still weak and insufficient. According to McKinsey, partnerships with infrastructure funds, private-equity funds and other institutional investors can diversify the risks of insurers while allowing access to data and technical expertise. Such partnerships may also give insurers access to the technical data and expertise of asset owners.¹⁷

IV. Regulating and reforming the insurance industry

Regulating the insurance industry

29. Regulatory bodies play a crucial role in promoting climate-resilient insurance by developing and enforcing regulations that incentivize sustainable practices within the insurance industry. In this context, those bodies should consider how the transition risks associated with climate change, such as the financial implications of moving to a low-carbon economy and diversifying energy sources, will affect the insurance industry.

30. Insurance administration and financing models vary globally, with countries adopting diverse approaches based on their unique economic, social and environmental contexts. The complexity of adapting existing regulations to accommodate climate-related insurance reforms is a significant challenge owing to the rapidly changing nature of climate risks.

31. A key challenge is the lack of cross-border regulatory frameworks, even though many climate threats affect different countries and regions at the same time. Different regions have different approaches to insurance, and few consolidated systems exist. Inconsistent regulatory standards across borders hinder the development of global insurance solutions, drawing attention to the need for international coordination in effective climate risk regulation and management. In order to overcome regulatory hurdles, countries will need to streamline regulations, standardize reporting and disclosure rules, and promote regulatory innovation to adapt to the evolving nature of climate risks.

32. Governments should also aim to improve data access and quality as well as foster the development of digital solutions. These are essential for enhancing risk assessment capabilities and enabling the development of innovative insurance products that respond effectively to changing climate-related risks.

33. Given the increasing threats to private insurance capacity, more formal and informal collaboration between Governments, insurance companies and international organizations is needed.¹⁸ Such collaboration necessitates effective regulations to govern insurance entities and ensure coordinated responses to climate-related risks, including by asking them for greater transparency and disclosure of coverage details. The education of consumers about the benefits of climate-related insurance will be crucial for encouraging participation and fostering resilience. Governments often play

¹⁷ McKinsey & Company, “Capturing the climate opportunity in insurance”, 14 September 2022.

¹⁸ See Organisation for Economic Co-operation and Development (OECD), “Enhancing the insurance sector’s contribution to climate adaptation”, Business and Finance Policy Papers (Paris, OECD, 2023).

a significant role in addressing natural disaster risks through public awareness campaigns and policy support.

Selected existing regulatory frameworks

34. *Africa*. The insurance industry in Africa is emerging, with a focus on microinsurance and innovative approaches to reach underserved populations. This emergence is, however, not equally distributed in the continent, with 91 per cent of premiums concentrated in just 10 countries. Nevertheless, regulatory reform with private-public collaboration could be critical to unlocking greater growth of insurance penetration.¹⁹

35. *Asia*. The insurance industry in Asia is growing very rapidly, with a mix of private and public insurers. In some Asian countries, insurance is administered through Government programmes to address natural catastrophe risks. Rising climate threats in Asia are placing a greater burden on many countries, surpassing insurance industry capacity.

36. *Europe*. European countries have well-established insurance markets, often regulated by national authorities. The regulatory framework of the European Union, including Solvency II, a regime for insurance and reinsurance undertakings in the European Union, sets standards for risk management and capital requirements.

37. *Latin America*. Latin America is the fastest-growing regional insurance market globally. The Latin American insurance industry is primarily administered by private insurance companies, with a mix of public and private entities, depending on the country. The insurance industry is adapting in order to try to address specific regional challenges, in particular enhancing financial inclusion and adapting to climate vulnerability.²⁰

38. *United States*. Insurance is provided through a mix of private insurers and Government-backed programmes, such as the National Flood Insurance Program. State governments are primarily responsible for insurance regulation, making for varying and often inconsistent policies across the country.

Reforming the insurance industry

39. There is a need to accelerate insurance industry reform to better combat climate change and accelerate implementation of the 2030 Agenda. Countries are already experimenting with numerous innovative approaches to reform insurance in response to climate risks. Salient emerging trends in insurance innovations include parametric insurance practices, risk pooling, microinsurance and climate-reactive insurance approaches.

40. *Parametric insurance*. Many countries, particularly those with high exposure to natural disasters, are experimenting with parametric insurance. Claims are paid based on the occurrence of a specific, quantifiable and verifiable event (e.g. rainfall of more than a certain amount in a certain location over a defined period). Parameters are often set by analysing key data points that correlate with observed losses in past

¹⁹ See McKinsey & Company, “Africa’s insurance market is set for take-off: five strategic considerations to help guide insurance companies on their journey to success in Africa”, 16 December 2020.

²⁰ See Francisco Navarro and Pablo Wahren, “El sector asegurador en América Latina”, Community of Latin American and Caribbean States, 27 September 2017; McKinsey & Company, “Global insurance report 2023: capturing growth in Latin America”, 22 September 2023; and OECD, *Enhancing Social Inclusion in Latin America: Key Issues and the Role of Social Protection Systems*, 2016.

disasters (e.g. the windspeed of a tornado or the magnitude of an earthquake).²¹ The claim has a fixed amount and is paid regardless of the actual economic damage suffered. This dispenses with the traditional process of loss adjustment whereby claims are paid only after verifying the actual economic loss sustained. As a consequence, administrative costs are substantially reduced, and claims can be paid within a short period of time after the event, putting money in the hands of the insured at a time when they most need it.

41. *Microinsurance.* Microinsurance is a specialized form of insurance which is designed to provide affordable coverage to very low-income individuals or communities. It focuses on smaller, more localized risks that may disproportionately affect vulnerable population groups. Microinsurance approaches have also been used to minimize adverse climate effects on the extreme poor.

42. *Risk pooling.* Some emerging economies have set up their own insurance risk pools rather than relying on private market participants. For example, the Kenya Reinsurance Corporation, which is 60 per cent owned by the Government of Kenya, is the oldest reinsurer in Eastern and Central Africa. The firm provides life and general reinsurance products to insurance companies across Africa, Asia and the Middle East.²²

43. *Other innovations.* In response to changing climate risks, new products are being designed specifically to address emerging challenges. One example is the creation of insurance products tailored to mitigating the threats posed by extreme heat. This adaptive approach ensures that insurance offerings remain effective and responsive to the shifting landscape of environmental challenges.

V. Good practice examples of innovative climate-related insurance

Parametric insurance in Medellín, Colombia

44. A public-private partnership developed a parametric risk product to cover flooding, landslides and earthquakes in Medellín, Colombia. The so-called “Medellín project” is an innovative initiative to enhance urban resilience in Medellín through insurance protection for climate risks and natural disasters. It covers not only Medellín itself, but also its 16 communes and 5 districts, and has the potential to benefit more than 4 million residents. The project’s foundation was parametric insurance, a flexible system by which preset triggers (e.g. specific rainfall levels) immediately prompt financial aid without the need for lengthy damage assessments.²³

Parametric insurance in Quintana Roo, Mexico

45. The government of Quintana Roo, in collaboration with partners, established the Mexican Reef Protection Programme in 2018 as the world’s first insurance product to blend nature-based solutions and parametric insurance in an effort to protect and restore coral reefs. The Programme provides the funds for rapid post-disaster restoration and helps mitigate the impact on the local economy. Its goal is to

²¹ See, for example, United Nations Office for Disaster Risk Reduction, “Developing new parametric insurance models for Caribbean and Central American countries”, PreventionWeb, 29 March 2023.

²² See <https://kenyare.co.ke/>.

²³ See Race to Resilience and Race to Zero, “The Medellín project: a climate insurance success story”, 21 September 2023; and Insurance Development Forum, “Implementation progress update: Medellín flood, landslide and earthquake protection”, 13 September 2023.

ensure payment of a fixed amount to support rapid restoration of a key section of the Mesoamerican Reef following a tropical cyclone event.²⁴

Microinsurance in Gujarat, India

46. Extreme heat claims more lives than any other climate-driven hazard and disproportionately affects women living in poverty. In the informal labour market of India, women are exposed to prolonged periods of time working in extremely hot and life-threatening temperatures, which can cause severe health issues. In February 2023, the world's first extreme heat microinsurance was created by the Adrienne Arsht-Rockefeller Foundation Resilience Center, in collaboration with partners, to help women in India recover wages lost due to climate-driven extreme heat events. Payments are made when temperatures reach a specific threshold. With the extreme heat income insurance, women no longer have to choose between protecting their health and securing their family's financial security.²⁵

Insurance for extreme heat in Japan

47. In April 2022, an insurance company in Japan launched the first specialized insurance for heat strokes, allowing policyholders to determine the insurance period themselves, with a premium of 100 yen per day. Since then, there has been an increase in insurance products related to heat strokes, including coverage of expenses related to hospitalizations, intravenous drips and other treatments.²⁶ Another insurance company, for example, expanded its coverage of heat stroke-related hospitalizations and death, which was previously only available for those under the age of 23, to all age groups. In June 2023, two companies partnered to launch the first smart wearable wristband device in Japan, through which insurance benefits and medical support can be obtained in the case of hospitalization due to heat stroke. In June 2022, owing to a sudden rise in temperatures, more than 6,000 contracts for heat stroke insurance were concluded over three consecutive days.

Risk pooling through the African Risk Capacity Insurance Company

48. The African Risk Capacity Insurance Company is a hybrid mutual insurer and the commercial affiliate of the African Risk Capacity Group founded in 2014. It is a pooled insurance system designed to provide African countries with financial assistance to be able to respond to extreme weather events. According to some studies, the Company has effectively reduced the financial burden on African nations during climate disasters and enhanced their adaptive capacity.²⁷

Risk pooling through the Caribbean Catastrophe Risk Insurance Facility

49. The Caribbean Catastrophe Risk Insurance Facility is a multi-country insurance pool, the aim of which is to provide rapid financial relief to countries in the Caribbean and Central America in the aftermath of natural disasters. It seeks to limit the financial

²⁴ See Swiss Re, "Designing a new type of insurance to protect the coral reefs, economies and the planet", 17 May 2022; Green Finance Institute, "Quintana Roo reef protection (parametric insurance)", 2024; and Global Parametrics, "Mexican Reef Protection Programme blending parametric insurance and nature-based solutions", *InsuResilience Global Partnership Annual Report 2020*.

²⁵ See Adrienne Arsht-Rockefeller Foundation Resilience Center, "The scorching divide: how extreme heat inflames gender inequalities in health and income", 26 July 2023.

²⁶ See, for example, Ryoko Takahashi, "Insurance firms unveil heatstroke policies amid hotter summers", *The Asahi Shimbun*, 2 August 2022; and Leo Lewis "Japan's heatstroke insurance boom carries a warning for the rest of us", *Financial Times*, 3 August 2022.

²⁷ World Economic Forum, "How anticipatory insurance can help Africa better prepare and respond to natural disasters", 1 November 2022.

impact of catastrophic weather events, such as hurricanes, earthquakes and excessive rainfall, by quickly providing short-term liquidity when a parametric insurance policy is triggered. The Facility has supported the financial recovery of many countries and encouraged disaster preparedness.

Citizen safety insurance in the Republic of Korea

50. In the Republic of Korea, insurance products addressing natural disasters caused by climate change primarily take the form of insurance policies targeting agriculture, aquaculture and similar sectors. Storm and flood insurance is designed to compensate for damage to homes, greenhouses, small shops and factories caused by certain natural disasters, such as typhoons, tidal waves, snowstorms and earthquakes. National and subnational governments support approximately 70 to 90 per cent of insurance premiums. In addition, wind and water damage riders can be added when purchasing homeowners' insurance. Compensation for damages to crops or livestock can also be obtained through riders on crop, livestock and aquaculture insurance.

51. The citizen safety insurance, introduced by the city of Seoul in January 2000 and upgraded in 2022 and 2023, is a critical example of climate-reactive adaptation of insurance products. Any citizen registered as resident of Seoul (including registered foreigners) is automatically enrolled. Through this programme, residents affected by natural disasters (e.g. typhoons, floods, heavy snow, yellow dust and earthquakes) or accidents (e.g. robberies, building collapses, explosions, fires and traffic accidents) could initially receive up to 10 million won from an insurance company contracted by the city. Since 2022, the coverage amount has been doubled to a maximum of 20 million won (in the case of death).

52. Claims for citizen safety insurance can be submitted within three years from the date of the disaster or accident or the date of diagnosis of after-effects. Victims or legal heirs can submit the insurance claim and required documents to the Korea Local Administration Financial Mutual Aid Association. Insurance money is typically disbursed within four weeks of the date the documents are received, and a notification text message is sent upon document receipt and when insurance payment is decided. In the case of non-payment of insurance benefits, notification is made by phone.

53. This citizen safety insurance model has been replicated in other parts of the country. Although insurance coverage items and amounts vary by local government, recent trends show that many cities, such as Ansan, Gimpo and Seoul, are expanding the coverage of citizen safety insurance. In February 2023, for example, the city of Gimpo added coverage for medical expenses and death related to natural and social disasters. In addition, the city of Ansan expanded coverage to include injury, disability and death benefits for social disasters, natural disasters and crowd-related accidents. In August 2023, owing to successive heat waves, Seoul expanded coverage by introducing disability benefits for heat-related illnesses and heat strokes to establish a social safety net for heatwaves. Within the citizen safety insurance the coverage for after-effects of heat strokes has been newly established with a maximum limit of 5 million won (with the exact amount depending on disability classification), which is added to the existing coverage of 20 million won in maximum benefits (for death).

Risk intelligence in China

54. In order to promote better response by the insurance industry to global climate challenges, the Green Development Institute of China is proposing a resilient and scalable solution by building a framework of "risk intelligence". Based on a wide range of insurance products and services, the essence of risk intelligence is to make

climate-related risks visible, quantifiable, manageable and foreseeable using different software products.

RiskVista (making climate-related risks visible)

55. Risk intelligence can be built upon an open and robust layer of environmental data known as “RiskVista”. By integrating extensive physical and socioeconomic data, RiskVista depicts the historical patterns of environmental change and climate change, risk exposures, vulnerabilities and associated losses, while being able to produce future scenarios and underlying assumptions for future climate changes. It can also show patterns of impact of those changes on different sectors and areas, such as energy and biodiversity, as well as on economic and financial institutions. In addition to data aggregation, RiskVista provides powerful visualization tools to render aggregated historical and real-time data visible on maps and charts (risk maps).

56. In the case of a leading Chinese property and casualty insurer deploying its own RiskVista system, for example, this encompassed an early warning system and a risk inspection and assessment tool. In addition, that RiskVista system integrated a variety of data sources, including Geographic Information System data, risk maps and real-time meteorological data.

RiskQuant (making climate-related risks quantifiable)

57. Based on RiskVista’s aggregation and visualization of climate-related risks, the core of risk intelligence is a suite of models called “RiskQuant”, which aims to quantify the climate-related risks and assess their impacts on financial institutions. To do so, it uses catastrophe risk modelling capabilities, which include, but are not limited to, earthquake, typhoon and flood models. These catastrophe models account for changes in the intensity and frequency of climate change-related natural disasters.

58. The basic framework of RiskQuant can be divided into four individual modules: (a) the event module, which generates a stochastic event set to simulate tens of thousands of possible catastrophic events based on realistic parameters and historical data; (b) the exposure module, which assesses the extent of risk exposure in connection with social wealth across a geographical area; (c) the vulnerability module, which measures the susceptibility of social wealth and calculates the amount of expected damage to the assets at risk; and (d) the loss module, which translates physical damages into financial loss.

59. In addition to physical risk models, RiskQuant also encapsulates transitional risk models, capturing the financial statement impact of policy and technological changes at the institutional level arising from a variety of environmental factors. RiskQuant creates temperature-based and event-based scenarios to quantify the impact of energy transition policies and technology changes, which are subsequently integrated into risk models by financial institutions to assess financial risks on both a portfolio and an individual basis. RiskQuant also handles the interactions between economic variables, energy sector parameters and corporate responses. It uses an integrated assessment model, which merges energy and land-use systems into a macro model, to translate assumptions under different transition scenarios into key economic variables.

RiskFolio (making climate-related risks manageable)

60. The third element of risk intelligence is to provide products and services in a bundle, or “RiskFolio”, to make climate-related risks manageable. RiskFolio mainly involves: (a) providing catastrophe insurance products, in particular, index-based products; and (b) issuing catastrophe bonds to the capital markets to further dilute climate-related risks.

RiskInsights (making climate-related risks foreseeable)

61. Under a so-called “RiskInsights” framework, risk intelligence involves the conduct of climate-related scenario analyses and stress testing to form a dataset comprised of the following four dimensions: (a) the climate scenario, which is related to the degree of temperature rise; (b) the risk factor, including typhoons, tsunamis, floods, droughts, extreme heat and extreme cold; (c) the metric (e.g. annual average loss and probable maximum loss); and (d) the time period.

62. In summary, the proposed risk intelligence framework is a resilient, climate-adaptive and scalable solution. Its four-pronged approach allows dynamic, climate-related risks to become visible, quantifiable, manageable and foreseeable to actors within the insurance and reinsurance industries.

VI. Recommendations

63. The insurance industry plays an important role in partnering with Governments to measure, monitor and mitigate the impact of climate risks. Its critical part in supporting climate action makes it important for Governments to foster a robust and thriving insurance market that works for all stakeholders. In order to adapt to the evolving nature of climate risks, cross-border regulatory frameworks based on streamlined regulations, increased international coordination and regulatory innovation are also required. In addition, the growing protection gap in many countries and regions, with its devastating impact for Governments and vulnerable groups and communities, must be urgently addressed.

64. In recognition of the importance of Governments working with the insurance industry to mitigate and respond to climate-related disasters and protect vulnerable groups and regions, the following recommendations are suggested:

(a) Collaborative establishment of reinsurance programmes. Collaboration with the private sector through the establishment of reinsurance programmes is a strategic imperative for Governments. Such programmes involve collaboratively sharing the risk burden with private insurers for climate-related risks, providing a financial backstop for extreme events and ensuring that financial resources are efficiently mobilized to address the economic fallout of climate-related disasters. By engaging in partnerships with the insurance industry, Governments can enhance the overall sustainability of the insurance market and generate additional insurance capacity to support new insurance product initiatives, such as parametric policies, microinsurance and other innovations. The establishment of reinsurance programmes underscores the importance of public-private partnerships in building a resilient financial framework capable of withstanding the impacts of climate change;

(b) Encouragement of innovative financial instruments. Governments should actively encourage the development and use of innovative financial instruments such as catastrophe bonds and insurance-linked securities. These mechanisms provide opportunities to attract capital from a broader pool of non-traditional investors, creating an additional source of financial support for climate risk insurance capacity;

(c) Greater transparency from insurance companies. For public policy to work effectively it is critical to foster a better understanding of the protection gap in climate risk insurance. Regulators should require commercial insurance companies to disclose more information about who is covered against critical

natural hazards (e.g. fires, floods, wind and droughts) and the premiums being charged. This would allow Governments to clearly identify where the gaps are most acute and devise instruments that address market failures, such as publicly purchased insurance for the most vulnerable communities. It could also enable Governments to quantify the impact of public investment in new resilience measures (e.g. flood barriers or storm drainage) on the risk premiums being charged. At present, it is difficult to ensure that reduced climate risk is reflected in lower insurance pricing;

(d) **Increased regulatory disclosure.** Regulators should ensure that insurance companies improve the quality and scope of their routine climate disclosures. Insurance plays a critical role in the operation of many types of carbon-emitting activities, including the fossil-fuel industry itself. Detailed disclosure of the climate impact of insurers' underwriting activities, both directly and indirectly, will help foster a more rapid transition to a low-carbon economy;

(e) **Better climate forecast data for understanding climate risks.** Governments must conduct thorough macrorisk assessments using the latest data and forecasting related to climate change. Such a proactive approach ensures better preparedness, allowing for informed decision-making and the development of targeted risk management strategies. By leveraging advanced climate data, Governments can identify emerging risks, assess vulnerabilities and formulate adaptive measures to mitigate the impacts of climate change. Thorough risk assessments are crucial for developing resilient infrastructure, enhancing early warning systems and implementing effective climate adaptation strategies;

(f) **Encourage product innovation in climate insurance.** The regulatory system for insurance markets often makes it difficult or costly for insurers to experiment with new ways of delivering climate risk protection. Governments can incentivize innovation by establishing regulatory sandboxes where new products can be tested and by providing financial support for initiatives that have the potential to become viable commercial products;

(g) **Increase the use of environmental-economic accounting systems.** The adoption of the System of Environmental-Economic Accounting framework for estimating risks to ecosystems and biodiversity will allow insurance companies to measure the financial benefits of protecting ecosystems and biodiversity, ensuring a comprehensive approach to assessing the environmental impact of their operations and promoting sustainable practices within the industry;

(h) **Foster international collaboration and regional risk pools.** The establishment of regional risk pools is important to foster collaboration among countries facing similar climate risks. This collaborative approach can promote efficient risk-sharing and facilitate coordinated responses to shared challenges. By pooling resources and expertise, countries can collectively address the transnational impacts of climate change. This recommendation highlights the importance of international and regional cooperation in building a collective front against climate-related risks, fostering mutual support and resilience among countries facing common climate challenges.