



Asian Actuarial Conference 2025 Bangkok

How actuaries can help unveil
the impact of climate change

13 Nov | 11:20-12:00



Kok Ern

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ACTUARIES' ROLE IN CLIMATE ADAPTATION

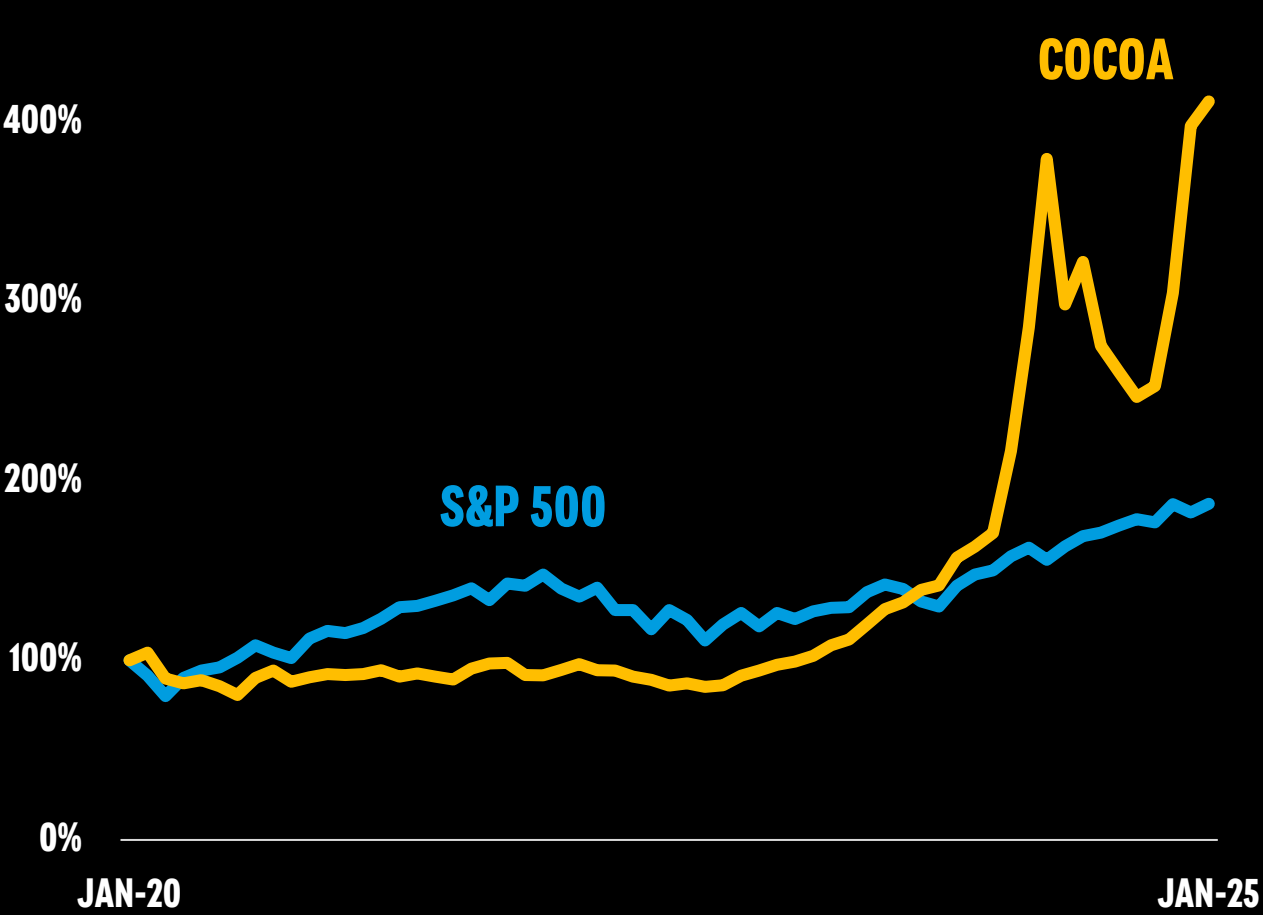
NOVEMBER 2025



Asian Actuarial Conference
2025 Bangkok

THE COCOA CRAZE; HOW COCOA PRICES HAVE SURGED IN THE RECENT YEARS

A BITTER AFTERTASTE...



CLIMATE CHANGE IMPACTS

HEAT
STRESS



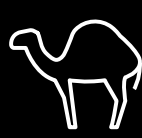
ERRATIC
RAINFALL



SOIL
DEPLETION



SEVERE
DROUGHTS



THE DIRECT IMPACTS OF CLIMATE PHENOMENA ARE HUGE...



TROPICAL STORMS



SEA LEVEL RISE



FLOODS



HEAT WAVES

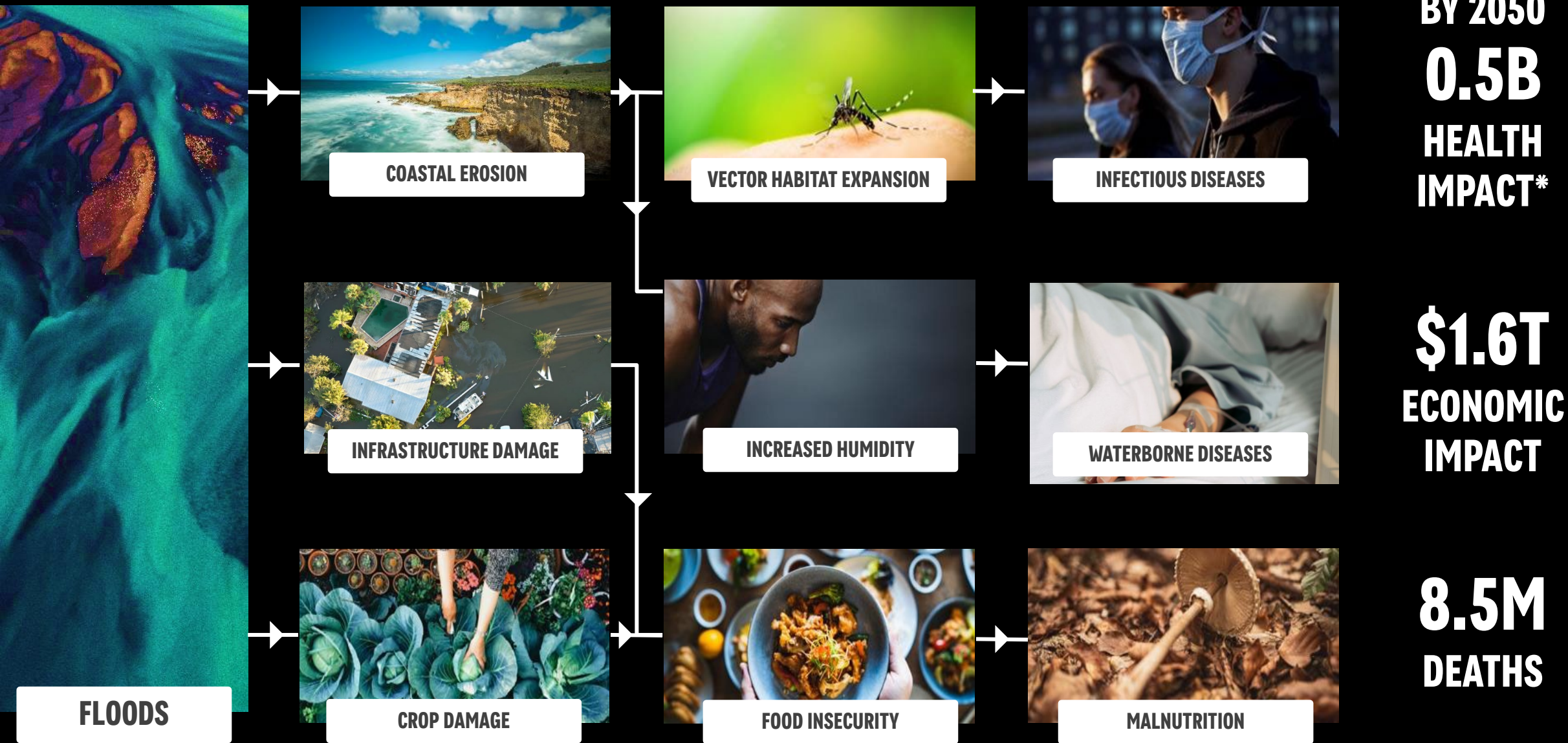


DROUGHTS



WILDFIRES

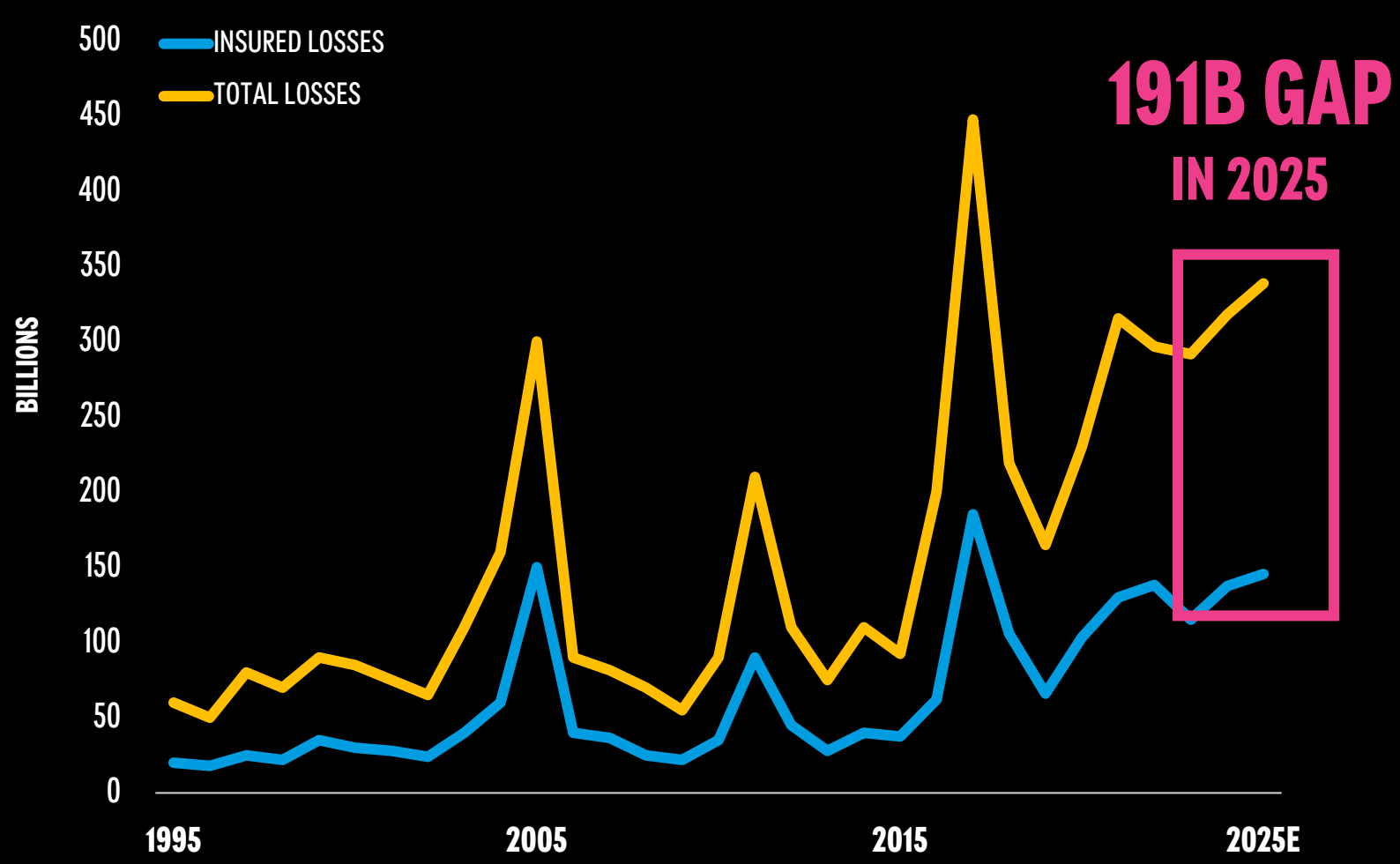
...AND ARE AMPLIFIED BY SECONDARY IMPACTS ON HEALTH AND ECONOMIES



Source: : Quantifying the impact of climate change on human health, World Economic Forum and Oliver Wyman (2024). *based on Disability Adjusted Life Years. Impact quoted are cumulative, based on SSP2 "middle of road" and RCP6 scenarios by IPCC.

WE CAN DO BETTER TO PROTECT MORE PEOPLE

THE ESTIMATED PROTECTION GAP FROM NATURAL CATASTROPHE LOSSES ARE **MORE THAN 50% IN 2025**



BARRIERS TO ADAPTATION

| | |
|------------------------------|----------------------------------|
| DATA CAPABILITIES | REGULATORY CONSTRAINT |
| LACK OF AWARENESS | UNAFFORDABLE COVERAGE |

Source: sigma 1/2025: Natural catastrophes: insured losses on trend to USD 145 billion in 2025, Swiss Re Sigma (2025), Oliver Wyman Analysis

NEW PARTNERSHIPS AND INNOVATIONS HELP DRIVE THE RESILIENCE AGENDA



DEVELOPING COMMUNITY-BASED CATASTROPHE INSURANCE (CBCI) FOR FLOOD COVERAGE IN **NEW YORK CITY**



PROVIDING RAINFALL-INDEXED PARAMETRIC DROUGHT COVERAGE TO COFFEE FARMERS IN **COLOMBIA**

Blue Marble ✕ NESPRESSO



UNLOCKING FINANCE FOR CLIMATE-RESILIENCE INITIATIVES - LIVESTOCK INSURANCE IN **KENYA**



PROVIDING PHILANTHROPIC CAPITAL AND PARTNERING TOGETHER TO STRENGTHEN CLIMATE RISK RESILIENCE THROUGHOUT **ASIA**



QBE

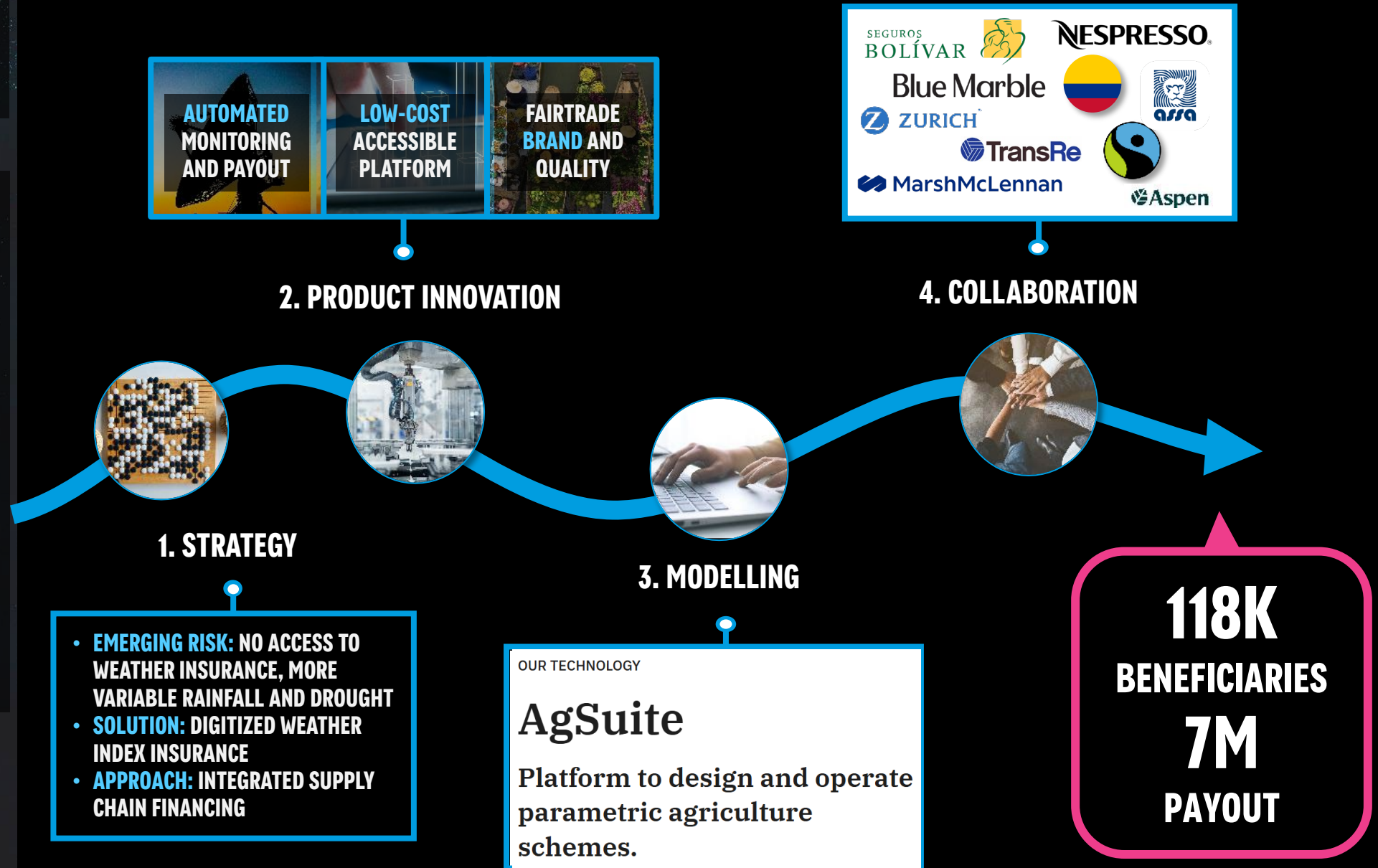


Humanity Insured

CASE STUDY: CAFÉ SEGURO

“CAFÉ SEGURO IS A SAFETY NET THAT ALLOWS US TO CULTIVATE COFFEE WITH MORE PEACE OF MIND.”

- LUZ MARLENE BETANCOURT GALLIANO,
COLOMBIAN SMALLHOLDER COFFEE FARMER



RISK



LARGE PHYSICAL AND
SOCIOECONOMIC
TIPPING POINTS CAN
CAUSE EXPONENTIAL
GLOBAL IMPACTS

SOLUTION

$E(X)$, $VAR(X)$, $AR(1)$



ACTUARIES CAN LEARN AND
IDENTIFY INSURABILITY
REGIME SHIFTS / IMPACT
PATHWAYS



WE CAN EXPLORE
INNOVATIVE RISK
TRANSFERS, NEW
PRODUCTS AND NEW
MARKETS

FUTURE



IMPROVED
OUTCOMES FROM A
PEOPLE, PLANET
AND PROFIT (3P)
PERSPECTIVE

TIPPING POINTS: WHY ACTUARIES SHOULD CARE

WE ARE UNIQUELY POSITIONED TO CONTRIBUTE TO INSURERS' CAPACITY IN MEETING REGULATORY REQUIREMENTS ON CLIMATE RISK



CLIMATE STRATEGY & GOVERNANCE

- Establish Board level ownership and ESG committee
- Integrate climate risk into ERM and Board governance



SCENARIO ANALYSIS & STRESS TESTING

- Develop baseline and customized climate scenarios
- Conduct climate stress testing (mandatory or strongly encouraged)



INTEGRATED RISK DISCLOSURES

- Implement climate-related disclosures aligned with TCFD¹ recommendations (mandatory or strongly encouraged)
- Encourage incorporation of climate risks into ORSA report










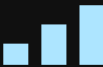








CLIMATE RISK INSURANCE

- Encourage insurers to develop climate risk related insurance coverage
- Identify sectors with high environmental risks in underwriting

1. Task Force on Climate-related Financial Disclosures (TCFD) was established by Financial Stability Board (FSB) in 2015 to help public companies and other organizations more effectively disclose climate-related risks and opportunities.


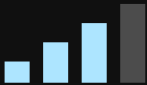



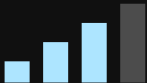



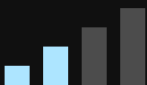










EXAMPLES OF CLIMATE RISK REGULATIONS FOR INSURERS IN ASIA

| | ERM INTEGRATION | SCENARIO ANALYSIS & STRESS TESTING | INTEGRATED RISK DISCLOSURES | REGULATORY PUBLICATIONS |
|---|--|--|--|--|
| Thailand  |  Developing | Mandatory  Under OIC stress test 2025 |  Mandatory for listed insurers to disclose climate related information | <ul style="list-style-type: none"> • OIC - ERM and ORSA of Non-life Insurance Companies, B.E. 2562 (2019) • OIC - ERM and ORSA of Life Insurance Companies, B.E. 2562 (2019) • OIC Stress Test 2025 (2025) • Thailand SEC Form 56-1 One Report |
| Malaysia  |  Mandatory | Mandatory  with prescribed environmental scenarios |  Mandatory for all insurers to be aligned with TCFD ¹ recommendations | <ul style="list-style-type: none"> • BNM – Climate Risk Management and Scenario Analysis (2025) • BNM - 2024 Climate Risk Stress Testing Exercise Methodology Paper (2024) |
| Singapore  |  Mandatory | Mandatory  without prescribed environmental scenarios |  Mandatory for all insurers to be aligned with well-regarded international reporting frameworks | <ul style="list-style-type: none"> • MAS - Guidance on environmental risk management (insurers) (2020) • MAS - Notice 126 Enterprise Risk Management for Insurers (2022) |
| Hong Kong  |  Developing | Encouraged  with own-developed scenarios |  Mandatory for listed insurers to disclose climate risk information | <ul style="list-style-type: none"> • HKIA - GL 21: Guidelines on Enterprise Risk Management • HKEX – Exchange publishes conclusions on climate disclosure requirements (2024) |

1. Task Force on Climate-related Financial Disclosures (TCFD) was established by Financial Stability Board (FSB) in 2015 to help public companies and other organizations more effectively disclose climate-related risks and opportunities.

IMPLICATIONS ON CAPITAL REQUIREMENTS

Regulatory regimes are looking into ways to incentivise climate action through adjustment in capital requirements

| REGULATORY REGIME | CLIMATE RISK INTEGRATION | HIGHER RISK CHARGES FOR FOSSIL FUEL ASSETS | CAPITAL RELIEF FOR GREEN INVESTMENTS | NOTES |
|---|---|--|---|---|
| <div>Hong Kong RBC</div> <div></div> | <div></div> <div>Moderate</div> | <div></div> | <div></div> | <ul style="list-style-type: none">A factor of 0.9 is multiplied to the credit spread stress factor¹ in the case of a recognized green bond |
| <div>Singapore RBC</div> <div></div> | <div></div> <div>Moderate</div> | <div></div> | <div></div> <div>Pilot program</div> | <ul style="list-style-type: none">MAS is piloting² a differentiated risk capital treatment for sustainable infrastructure investments |
| <div>EIOPA Solvency II</div> <div></div> | <div></div> <div>Emerging</div> | <div></div> <div>Recommendation</div> | <div></div> | <ul style="list-style-type: none">Recommends capital surcharges³ on fossil fuel-related stocks (+17%) and on fossil fuel-related bonds (up to 40%) |
| <div>IAIS ICS</div> <div></div> | <div></div> <div>Emerging</div> | <div></div> | <div></div> | <ul style="list-style-type: none">2025 Application Paper focused on governance, risk management, and scenario analysis for climate risk |
| <div>US NAIC RBC</div> <div></div> | <div></div> <div>Limited</div> | <div></div> | <div></div> | <ul style="list-style-type: none">Focus on TCFD-aligned Climate Risk Survey and climate-conditioned catastrophe exposure disclosures |

1. Source: Hong Kong Cap. 41R Insurance (Valuation and Capital) Rules
2. Source: Monetary Authority of Singapore (Oct 2024), Consultation Paper on Proposed Capital Treatment for Structured Products and Infrastructure Investments for insurers
3. Source: European Insurance and Occupational Pensions Authority (Nov 2024), Final Report on the Prudential Treatment of Sustainability Risks for Insurers

UNDERSTANDING ACTUARIES' CONTRIBUTION TO ADDRESSING CLIMATE CHANGE..

1

STRATEGY

- Identify climate strategy
- Setting values, beliefs and missions



2

RISK MANAGEMENT

- Identifying / measuring risks
- Expansion of data collection methods



3

PRODUCT INNOVATION

- Leverage data and analytics to improve or innovate on insurance products



4

MODELLING

- Climate scenario modelling
- quantification of financial impact



5

PUBLIC COLLABORATION

- Social insurance partnerships
- Analyzing policy decision impacts



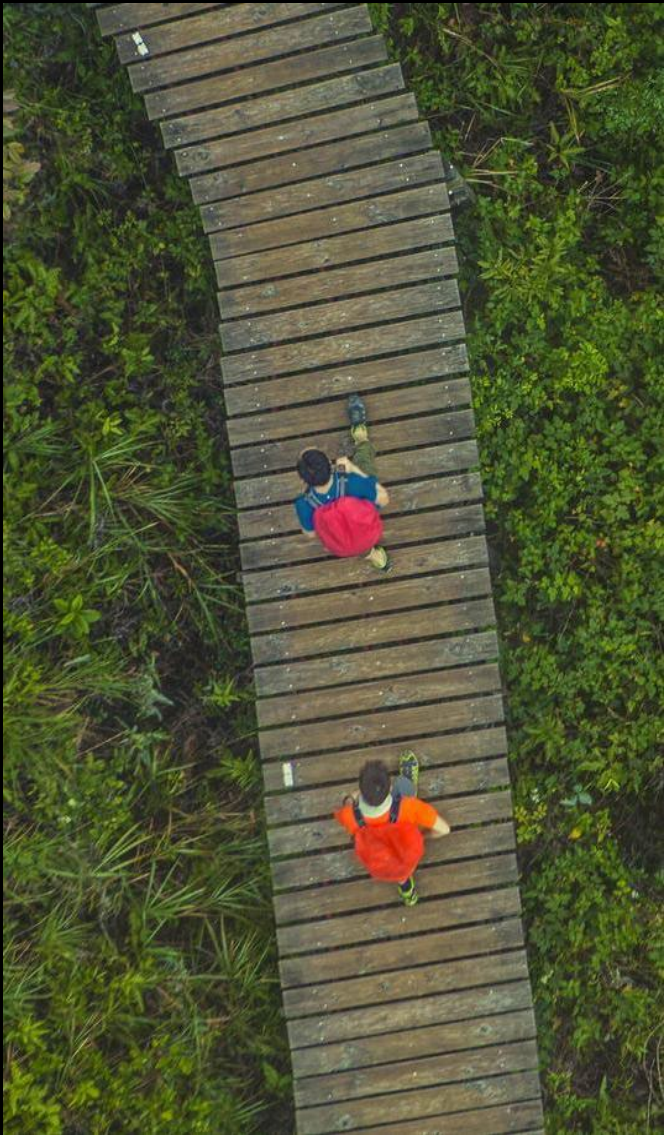
6

SELF AND COMMUNITY

- Personal advocacy for change
- Working together to implement change



A CALL TO ACTION: PRACTICAL NEXT STEPS FOR ACTUARIES



| | TO-DO | EXAMPLE |
|-------------|---|--|
| ENGAGE | Be proactive in communicating to others about climate change and associated risks to spark interest. | Hold lunch and learn sessions on climate risk and their impact on the work you are doing |
| COLLABORATE | Work as an interdisciplinary team to consistently place climate change on the agenda in meetings | Discuss with colleagues from underwriting team sustainability about climate-related items regularly |
| RESEARCH | Research where accountability for CSR and climate change risk reside within your organization and contribute | Identify teams responsible for sustainability initiatives and provide actuarial insights etc. to support them |
| MONITOR | Investigate which climate change issues are relevant for your firm and add these to risk frameworks for monitoring | Suggest adding climate factors such as catastrophe frequency or sea level to risk monitoring framework |
| QUANTIFY | Help others to improve understanding using tools to quantify climate risks | Incorporate NGFS scenario modelling to quantify impact of climate risk |



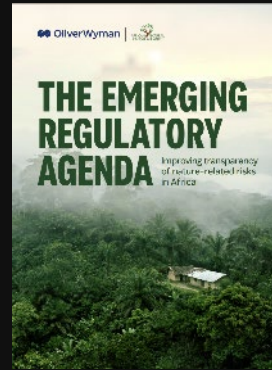
OUR THOUGHT LEADERSHIP ON CLIMATE RISK, ADAPTATION, AND RESILIENCE



Insurance and Sustainability Trends – 10 priorities for insurers to consider in 2025



Biodiversity and Infrastructure Investing – How infrastructure investors are factoring biodiversity impacts into decision-making



The Emerging Regulatory Agenda: Improving transparency of nature-related risks in Africa



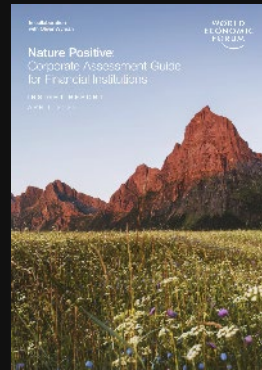
Building Momentum – Flood and Coast: Innovative financing for climate adaptation



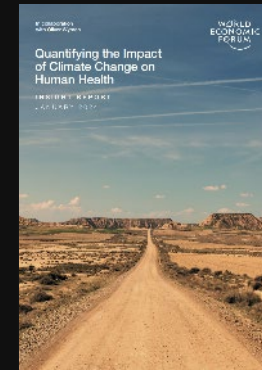
Healthcare in a Changing Climate: Investing in resilient solutions



Restoring Nature In Australia: Priority actions for financial institutions



Nature Positive: Corporate assessment guide for institutions



Quantifying the Impact of Climate Change on Human Health



KOK ERN
Principal



CALVIN KHA
Senior Manager



CHADWICK CHEUNG
Senior Manager



SEYRENCE LEE
Consultant



WINNIE CHEN
Analyst