



Panorama of actuarial involvement in climate change around the world

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Agenda

01

Introduction

02

TCFD

03

Regulations and guidelines

04

Actuarial Climate Index

05

Where to learn?

06

A deep dive: CRS vs. SCR


07

Get involved!

08

Q&A

Introduction



“There is one issue that will define the contours of this century more dramatically than any other, and that is the **urgent threat of a changing climate.”**

Barack Obama on climate change
Former president of the United States of America

Panorama of initiatives



Davy Dao

Task Force on Climate-Related Financial Disclosures - TCFD

Background

- Established in Dec 2015 by Financial Stability Board (FSB) and G20 and chaired by Michael Bloomberg
- To improve and increase reporting of climate-related financial information

Publications

- Final recommendations and recommended disclosures (June 2017)
- Implementation Guidance
- Guidance on Specific recommendations
- Status reports

Framework

- Climate-related risks and opportunities and potential financial impact
- Four pillars (Governance, Strategy, Risk management, Metrics and Targets)

Insurers disclosures from TCFD Hub report database

- Europe (Aegon, Aviva, AXA, Folksam, Legal & General, Prudential, Zurich)
- Asia (Dai-ichi Life Holdings, Tokio Marine Holdings)
- America (Sun Life Financial)
- Oceania (QBE)

Regulations and guidelines

International

- UN Environment Programme Finance Initiative (UNEP FI)
- IFRS -> IASB and International Sustainability Standards Board (ISSB) which published two exposure drafts in Mar 2022
- European Financial Reporting Advisory Group (EFRAG) -> public consultation on draft European Sustainable Reporting Standards in Apr 2022

Singapore

- MAS: Environmental Risk Management (ENRM) Effective June 2022 (Asset Managers, Banks, Insurers)
- SGX: Amendment to include climate change reporting following TCFD starting FY 2023

Regulators

- Network for Greening the Financial System (NGFS)
- European Insurance And Occupational Pensions Authority (EIOPA) -> climate change materiality assessments and climate change scenarios in ORSA
- UK made TCFD reporting Mandatory from 6 April 2022 for over 1,300 of the largest UK-registered companies.

Actuarial Climate Index - Background

Actuarial Climate Index (ACI)

Developed by North American actuarial bodies and released in November 2016, it is intended to provide a useful monitoring tool - an objective indicator of the frequency of extreme weather and the extent of sea level change.



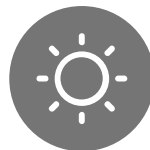
Australian Actuaries Climate Index (AACI)

Inspired by ACI, it has been developed with a similar objective and released in November 2018.



Purpose

Both are designed to provide an easy to interpret and valuable metric for actuaries, policy decision-makers and the general public to refer to when monitoring changes in climate.

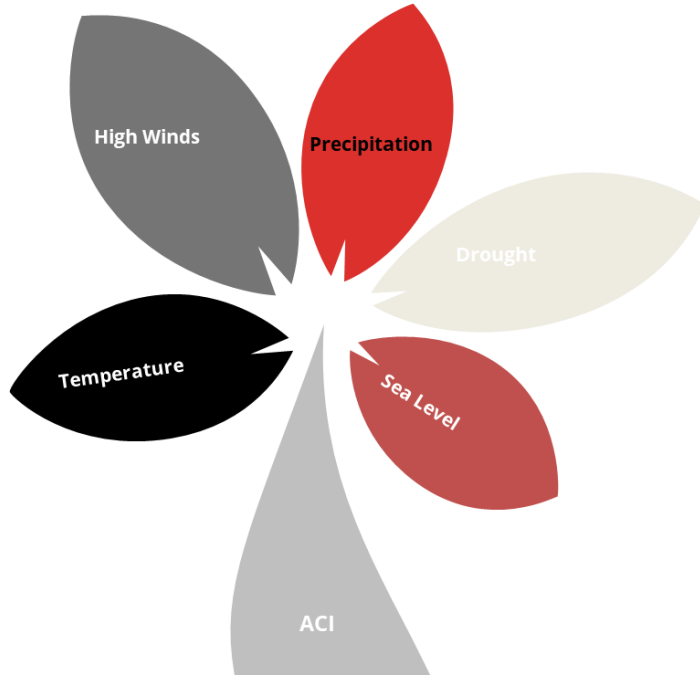


SAS Climate Index

We endeavour to develop a Singapore specific climate index in 2023.



Actuarial Climate Index – Components and Methodology



Temperature

Frequency of temperatures above 90th percentile and below 10th percentile

Precipitation

Maximum 5 day precipitation

Sea Level

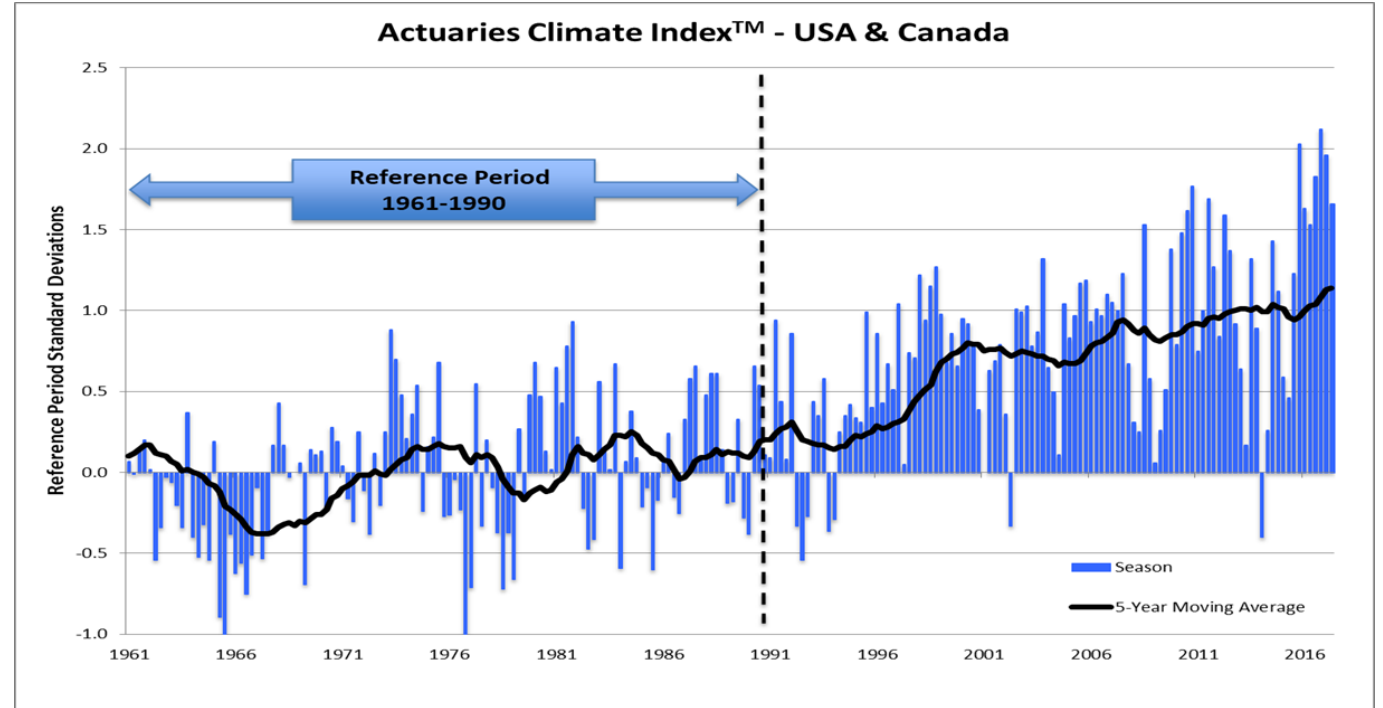
Standardised changes in sea level

High Winds

Frequency of strongest wind power

Drought

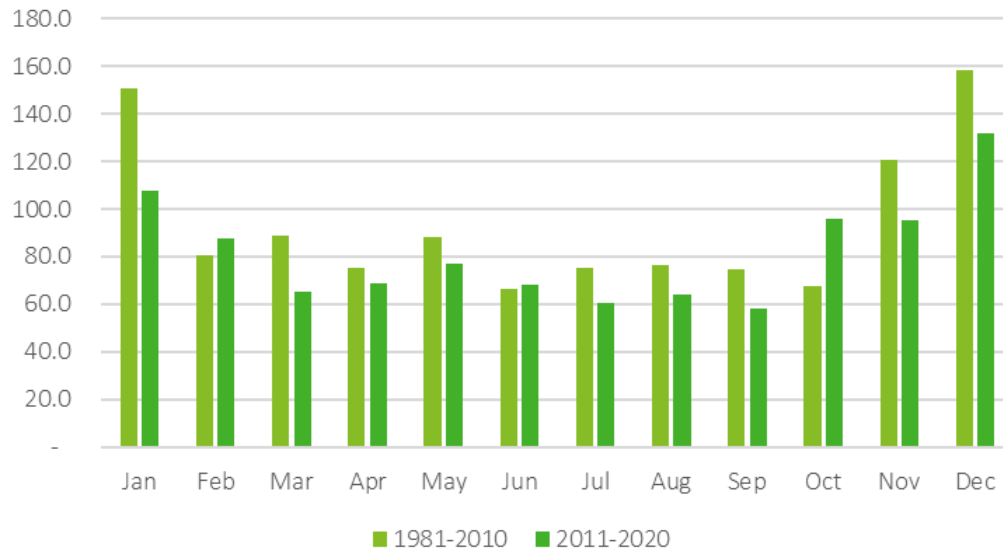
Maximum consecutive dry days (< 1mm)



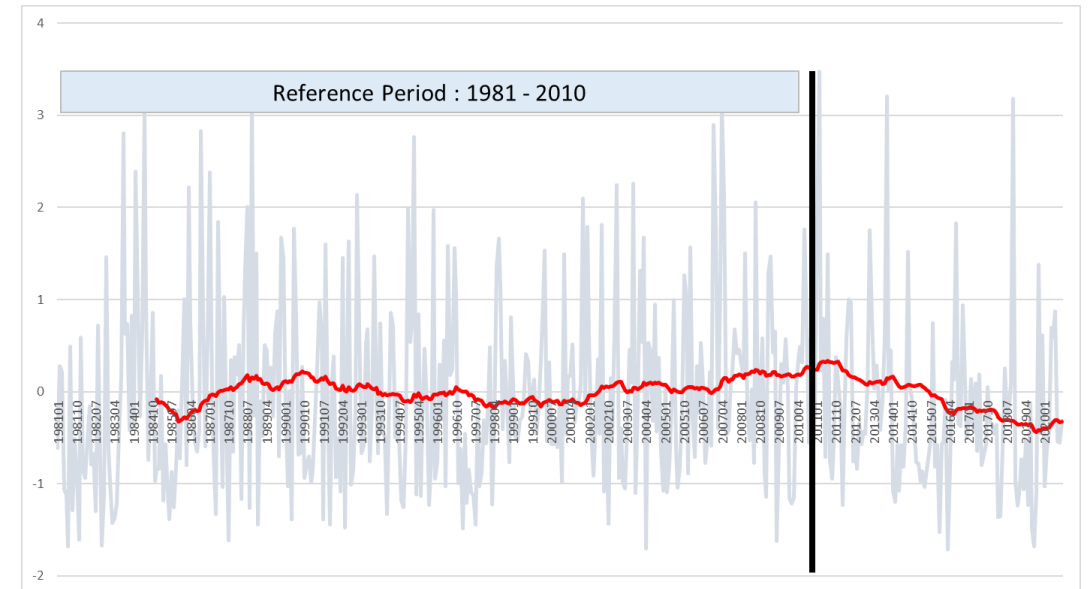
- ACI is defined as the average standardised anomalies of the following components:
 - $ACI = \text{mean}(T_{90_{std}} - T_{10_{std}} + P_{std} + D_{std} + W_{std} + S_{std})$
- Standardisation is with respect to the reference data 1961-1990

Actuarial Climate Index – Precipitation – Changi Airport

Monthly reference values – Precipitation



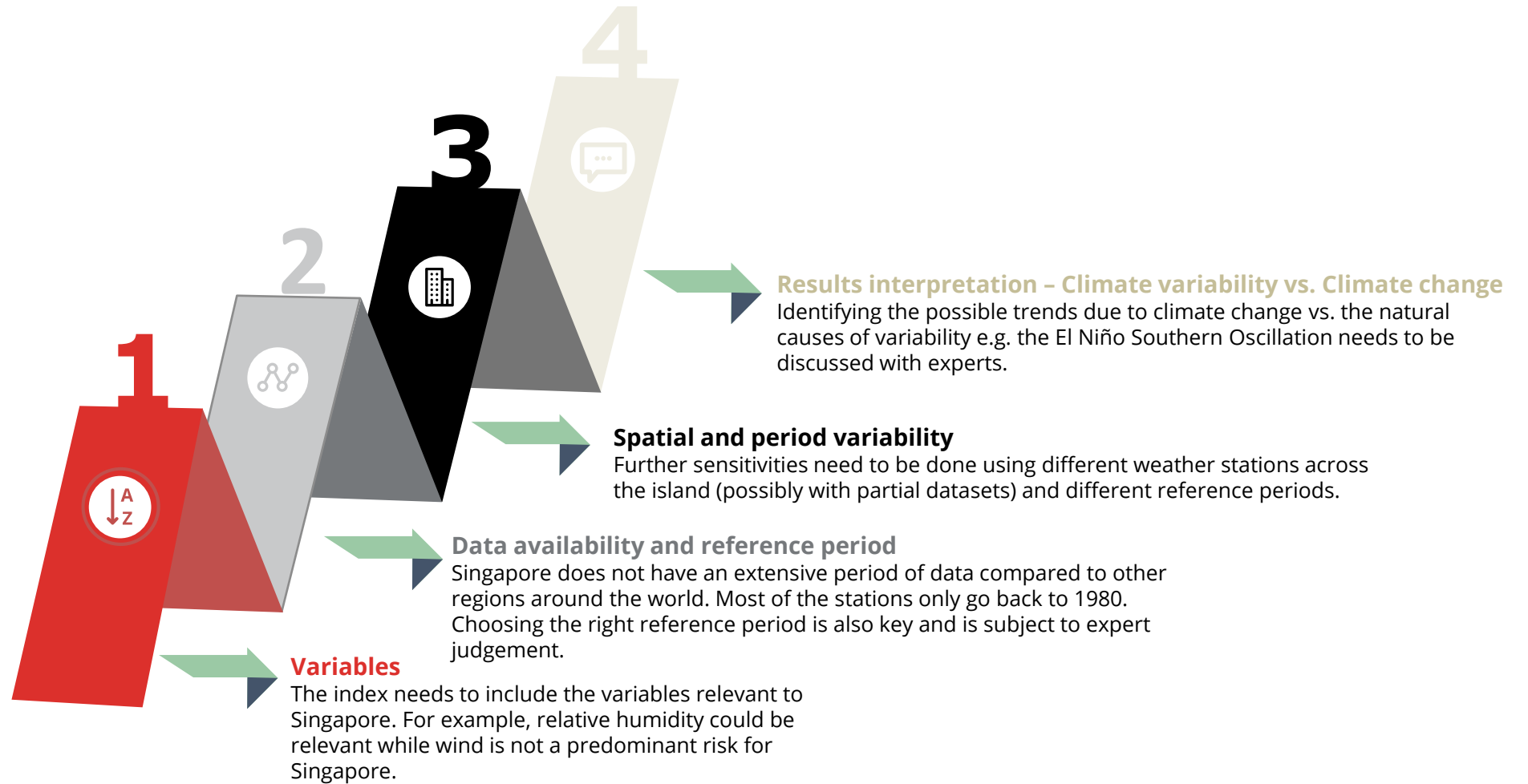
Standardised Anomalies – Precipitation



Reference period data provides the monthly reference values i.e. mean and standard deviation for the precipitation measure

Measure of the extent of deviation of current frequency of extreme events in terms of the parameters of the reference data distribution

Actuarial Climate Index – Key points and challenges



Learn and get involved

Joey Zhou

Certificate holder of Climate Risk and Sustainability from IFoA

Certificate holder of Sustainability and Climate Risks from GARP

Where to learn?

With minimal costs

- [Intergovernmental Panel on Climate Change \(IPCC\) reports](#)
- [IAA's papers on climate change](#)
- [IFoA's Sustainable Finance Community](#)
- [IFoA's Climate Change library](#)
- [SOA's Catastrophe & Climate Resources](#)
- [Australian Actuaries Institute's Climate Risk Resource Centre](#)
- [CAS' Climate Change Resource Library](#)
- [United Nations System Staff College \(UNSSC\) Free courses](#)
- Sustainability/ climate-related publications: [TCFD](#), [NGFS](#), companies' reports
- [Singapore Green Pulse Podcast](#)

certifications/ executive education/ postgraduate studies

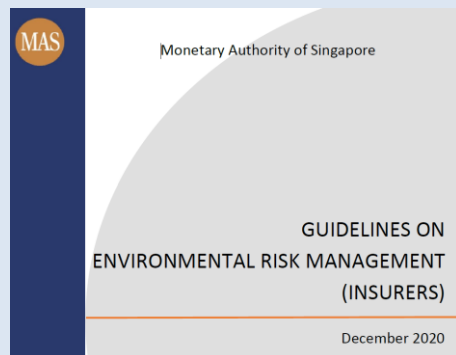
- [IFOA's Climate Risk and Sustainability Course](#)
- [GARP's Sustainability and Climate Risk Certificate](#)
- [CFA's Certificate in ESG investing](#)
- [CFA UK Institute's Certificate in Climate and Investing \(CCI\)](#)
- [CISI's Certificate in Climate Risk](#)
- [Yale Executive Online Education program on Sustainable Finance and Investment](#)
- [MSc in Climate Change, Management & Finance by Imperial College Business School](#)

Intergovernmental Panel on Climate Change (IPCC) reports

- IPCC is the United Nation body for assessing the science related to climate change
- It published reports that influence many countries' policies

Example: MAS guidelines making reference to IPCC's report

- The guidance made reference to IPCC's Summary for Policymaker 2018
- Encourage insurers to consider scenarios aligned with IPCC's climate change pathways



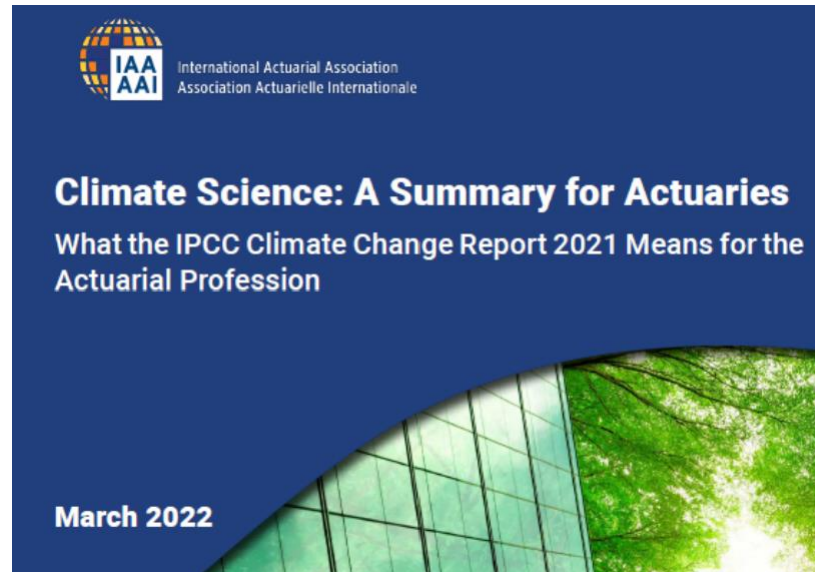
Examples of useful reports



- Provide a comprehensive assessment of the current evidence on the physical science of climate change
- Full report is very long! Guess how many pages?
- Published last week
- Up-to-date assessment of the climate crisis: how it's affecting the world and its systems and human attempts to mitigate disasters and adapt to those that are now unavoidable

IAA's papers on Climate Change

Example: 2022 March Paper



A serial of IAA reports

- 2018 Sep, Decarbonization: A Briefing for Actuaries
- 2019 Jun, Flood Risk
- 2019 Oct, Climate Change, Insurance and Vulnerable Populations
- 2020 Nov, Risks to Water Resources
- 2020 Dec, Pension Fund ESG Risk Disclosures: Developing Global Practice
- 2020 Sep, Importance of Climate-Related Risks for Actuaries
- 2021 Feb, Introduction to Climate-Related Scenarios
- 2021 Aug, Climate-Related Scenarios Applied to Insurers and Other Financial Institutions
- 2022 Mar, Climate Science: A Summary for Actuaries – What the IPCC Climate Change Report 2021 means for the Actuarial Profession**
- 2022 Apr, Application of Climate-Related Risk Scenarios to Asset Portfolios
- 2022 Oct, Climate-Related Disclosures and Risk Management: Standards and Learning Practices
- 2023 TBC, The Climate Change Adaptation Gap: An Actuarial Perspective**

- Summarises the IPCC's report for the actuarial communities
- Providing insights into what the IPCC report means for the Actuarial profession
- 60 pages

IFoA's Sustainable Finance Community

- Weekly newsletter with news, reports and webinars. Every Friday night!
- Suitable for actuaries with an interest in climate change and how these issues interact with finance and business
- Sign up [here](#)

Hello Joey, here are your weekly updates at a glance:

24/3/23

In the spotlight

- [IPCC report: Here's how we can defuse the 'ticking time bomb' of climate change](#)

In the news

- [From finance to adaptation: Five ways the IPCC report could impact businesses](#)
- [Only 1 in 10 Companies Are Prioritizing Sustainable Travel](#)
- [IMPACTS AT 1.5 AND 2 DEGREES OF WARMING](#)

Tune in

- [Five Times Faster - The invisible infrastructure of climate change](#)

What we are reading

- [Five graphics show UN Climate report in brutal detail](#)

Opinion

- [In conversation with: Nigel Topping on climate action](#)

IPCC report: Here's how we can defuse the 'ticking time bomb' of climate change

At the launch of the latest [Intergovernmental Panel on Climate Change \(IPCC\)](#) report, Hoesung Lee, IPCC Chair said "If we act now, we can still secure a liveable, sustainable future for all". It is believed that there are ample solutions available to reduce greenhouse gas (GHG) emissions, despite the unprecedented scale of the challenge. However, in last 5 years, pace and scale to tackle climate change has been insufficient.

Moreover, the vulnerable nations and ecosystems are getting impacted more than higher contributing nations (on grounds of emission). Hence, with increasing size of damage and losses in last 10 years there is immediate need for adaptation strategies especially for most vulnerable nations. As well need for international cooperation, partnership to unite as one world on information and finance distribution where needed to solve for adverse climate change.

Where to learn?

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IFoA's CRS vs GARP's SCR

IFoA CRS

Actuaries who are professional

- With limited have a limited understanding of climate risks
- Climate Change may impact their work

- Understand the concepts of climate risk and sustainability that are relevant to actuaries
- Understand how those concepts are relevant to actuaries' work and How to apply these concepts

Target Audience

Man Objective

GARP's SCR

- Business professionals to broaden their knowledge about climate risks and make it to their existing risk management practices
- Public Administration Professionals who want to enhance their work about Climate Risk in financial, regulatory, and policymaking

- Provides knowledge about sustainability and climate change risk assessment, management and reporting
- The holders help organisations follow through on pledges to lower carbon emissions, invest sustainably, and improve climate risk reporting

IFoA's CRS vs GARP's SCR, Cts

IFoA CRS

- 3 months
- Self-study materials with Online assessment questions for each topic/section
- 2 x half-day seminars with group projects and presentations

- Interaction with actuaries in other parts of the world
- Application of theories to the real world problems via seminar discussions

Course Structure

GARP's SCR

- Self-study materials (100-130h)
- 3-hour exams
- 2 times exams a year (April and October)

- More internationally focused: Case studies in North America, Europe and Asia
- Rich material on green finance
- More depth on climate science

Highlights

Option 1

Join SAS' Research Working Group on Climate Change

- Setup in Dec 2022
- To collaborate with international actuarial communities on climate risk papers
- Contribute to the Actuaries Climate Index

Current Members: Joey Zhou, Davy Dao, Adrian Goh, Jaren Kueh, Riada Djebbar

Option 2

2023 Sustainability Conference

- End of June
- 2 Half days virtually
- Speakers internationally

Option 3

International Involvement

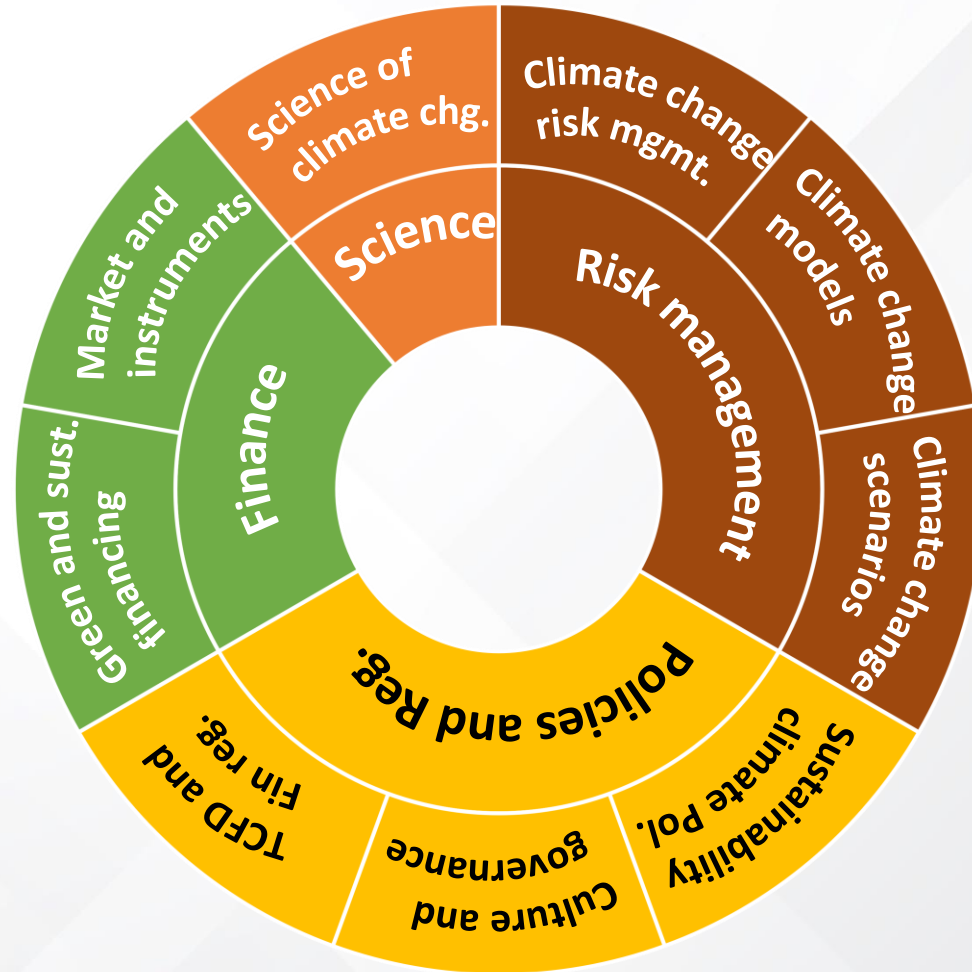
E.g., IFoA's Sustainability Working Party

- Net Zero Investment
- Climate assumptions and scenario modelling
- Demographics – mortality and morbidity
- Role of governments
- Climate change disclosures
- Effect on long-term interest
- Asset management

Q&A



Climate risk and sustainability require interdisciplinary knowledge and skills



Climate risks and conventional risks

