International Actuarial Association
Association Actuarielle Internationale

Climate Change, Insurance, and Vulnerable Populations

Resource and Environment Working Group Webcast

23 June 2020

Presenters

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Moderator

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Panelist

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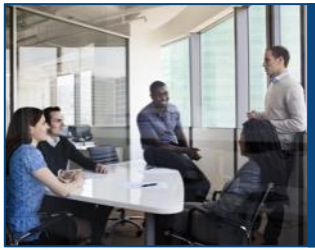
The IAA – An association of associations

Represents
70,000+ actuaries in
115+ countries

Numerous practice, professionalism and member development **committees**

7 Sections
5,000+ Section members

Formed in **Switzerland**
Based in **Canada**



800+ volunteers

Latest Full Member:
Nigeria

REWG's Work

- **Purpose:** To serve as a working group within the IAA devoted to resource and environment issues that have relevance to and/or affect the work of actuaries in their various areas of practice, are relevant to the subject of actuarial science, or to which the actuarial profession may be able to contribute
- **Past Papers:**
  - Flood risks (2019)
  - Decarbonization (2018)
  - Climate change and mortality (2017)
- **Works in progress:**
  - Water quality risks
  - Climate change adaptation
  - Disclosure for pension plans
  - Climate Change Risks – a chapter for the IAA Risk Book

This webcast is based on an REWG paper

- Based on the REWG paper entitled “Climate Change, Insurance and Vulnerable Populations”
- Why are we addressing this topic
  - It is important for actuaries to understand the risks underlying climate change
    - Especially as they affect vulnerable population segments
  - Several approaches are available to help address these risks
    - Actuarial and insurance approaches can help their financial impact and can enhance the long-term well-being of those in most need
  - We wish to encourage actuaries to work in areas involving the public interest
- Can be accessed on IAA Website (www.actuaries.org)
  Select: Publications → Papers

Chapters of paper

1. Introduction
2. Climate change
3. Vulnerable populations
4. Risk management and insurance
5. Useful insurance approaches
6. Other approaches
7. Roles for actuaries

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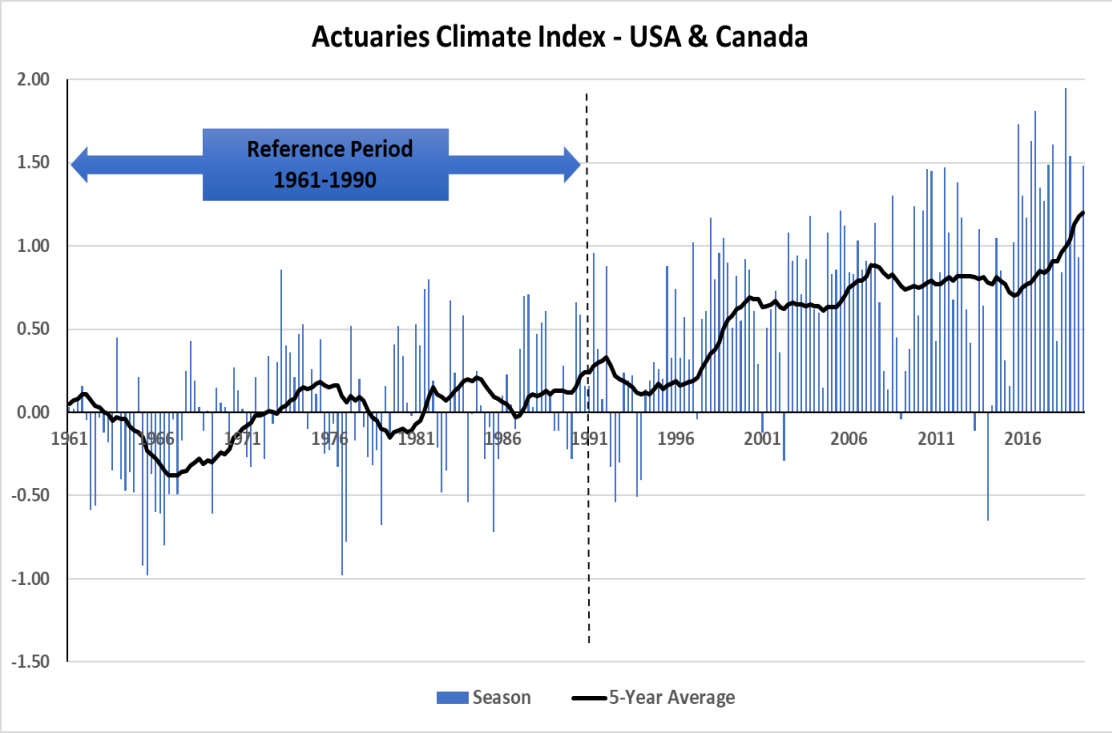
Climate change - 1

- Climatic factors
  - Temperature, precipitation, humidity, …
  - Level and volatility
- Actuaries Climate Index
  - Chart through summer 2019
  - Values compared with the reference period of 1961-1990
  - Also now available for Australia



Climate change - 2

- Timing of hazards
  - Sudden
  - Slow-onset
- Types of risks/costs
  - Physical
  - Transition
  - Litigation
  - Indirect - economic
- Types of methods used to combat the effects of climate change
  - Mitigation – reduction in greenhouse gases
  - Adaptation – for example, resilient buildings, sea walls

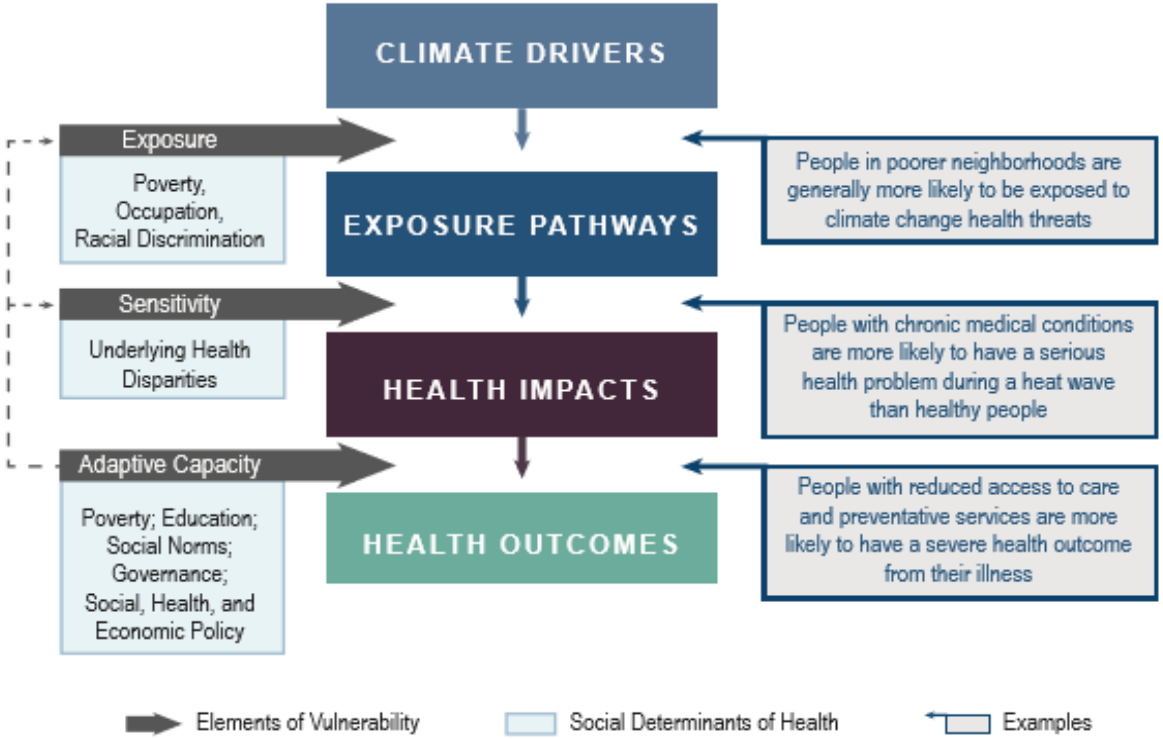
Climate change - 3

- Types of change and affects
  - Higher and more extreme temperatures
  - Extreme precipitation
  - Extreme storms
  - Vector-borne and other diseases
  - Air and water quality
  - Rising sea levels
  - Food safety and food security
  - Psychological stress and health effects
- Impact can differ widely by region or at local level
  - Will differ by vulnerability and sensitivity of people/businesses and property
- Changes can in some cases have favorable effects

Vulnerable populations

- Definition: those people who tend to be adversely affected by climate-related changes more than the average individual
- Key elements
  - Exposure
  - Sensitivity
  - Adaptive capacity
- Can be categorized by socio-economic group and geographical location
- Where located
  - Many in least developed and developing countries
  - But also in populations and areas in developed countries

Intersection of Social Determinants of Health and Vulnerability



Source: Crimmins, A., et al., eds. (2016). *"The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment"*. U.S. Global Change Research Program, Washington, DC. dx.doi.org/10.7930/J0R49NQX

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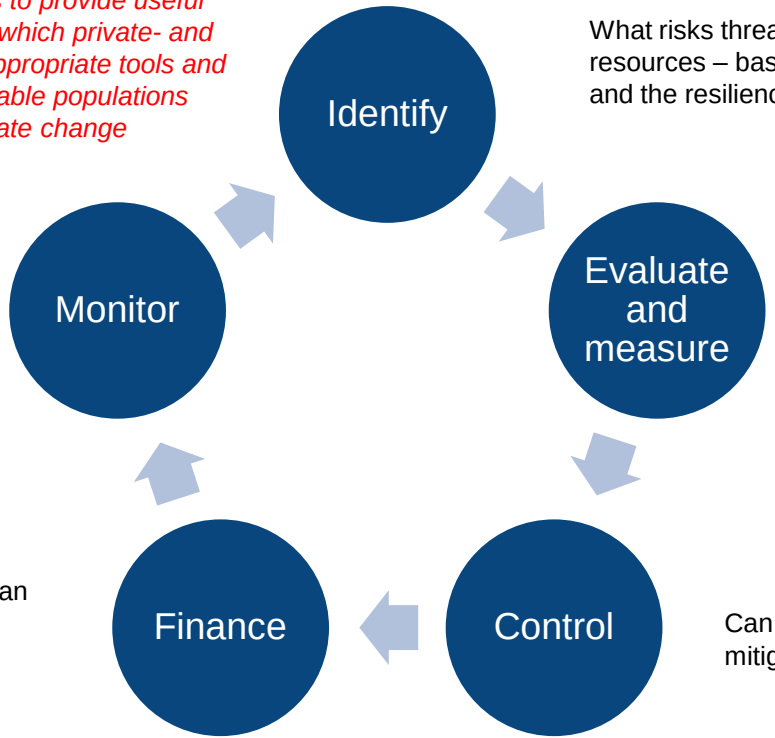
The risk management process

The primary objective of this paper is to provide useful information concerning the extent to which private- and public-sector insurance can, using appropriate tools and models, address the needs of vulnerable populations regarding the adverse effects of climate change



What risks threaten health, life, income, or other resources – based on such factors as location and the resilience of resources

What are the range of risk probabilities and the severity of consequential damages – how much of a concern is it (high/medium/low) – and can one afford such damages?

Can risks be avoided, mitigated, or adapted to?

If risks cannot be avoided, how can losses be financed? Insurance? Government aid? Borrowing?

Identify new risks and risk appetite, and report on the effectiveness of measures in place and actual costs. Did the insurance solution indemnify the loss? Was aid sufficient?

Climate risk – lines of defense

- **Mitigation** - mitigating the climate change process, such as by controlling the amount of greenhouse gases emitted.
- **Loss prevention** - avoiding the risk altogether, such as moving locations or building resilient structures, where possible, is a preferred approach; may not be practical
- **Loss control** - taking steps to reduce the expected damage; adapt the environment or behavior to reduce the expected adverse effects
- **Risk management** - financing the adaptation of the environment or the adverse effects, especially on the vulnerable individuals, through such approaches as insurance and risk management

Public vs. private insurance

- Sometimes the conditions for insurability are not met and private systems cannot deliver sufficient coverage at prices deemed to be affordable
  - Extreme event risk
  - Inability of insured population to pay required premiums
  - Limited ability to distribute and service insurance products
  - Inadequate mitigation (e.g. building codes not strong enough)
  - Shift in risk (technology, climate)
- Public systems (or public-private partnerships) can help overcome issues:
  - Sovereign power to compel payment and cross subsidies
  - Capability to spread losses over time in addition to space
  - Ability to pair insurance with other public initiatives, such as loss prevention infrastructure, building codes, land use policies, social service networks, etc.

Climate considerations for vulnerable populations

- Climate change has increased risk for many, though not all, locations
  - Frequency and severity
  - Variability
- This makes using historical information more challenging, which is compounds issues with sparse data in many developing countries
- Most risk assessment tools were created for insured assets in developed countries; limited research on vulnerable populations overall and in developing countries
  - Complex socio-economic challenges
  - Inadequate data
  - Significant protection gaps/uninsured risk
- Seldom explicit inclusion of the additional impact of climate change to any insurance solutions currently available to vulnerable populations

Effect of development

- Development shifts the type of loss experienced
  - Less developed populations have fewer physical assets, less protection, and thus have higher risk of mortality and morbidity from events
  - More developed populations tend to have stronger protection of life safety and higher assets, and thus experience less death/injury but more economic loss
- Agriculture is a more important source of employment in most developing countries
- Urbanization can create issues:
  - Risk concentration
  - Flood risk (Bangkok, Jakarta)
  - High population density in poorly constructed buildings

Technology can make a huge difference

In 1999 Cyclone Odisha hit NE India with 160 mph winds killing 10,405. In 2019 Cyclone Fani hit almost the same area with 155 mph winds killing 56. Reasons for fewer fatalities: improved storm prediction, 2.6 million text massages to affected residents, and 1.2 million people evacuated to shelters.

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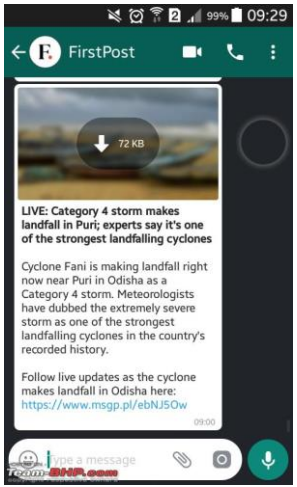


Vulnerable populations and insurance - challenges

- Low and volatile disposable income
- Low levels of education or literacy
- Certain cultural and religious attitudes
- Lack of trust in financial institutions; limited appetite to buy insurance
- High exposure to natural hazards, even in the absence of climate risk
- Weak community health and social services
- Limited access to traditional insurance and financial services
- Small sums insured and low premiums
- Need for low administrative expenses to make premiums affordable

Vulnerable populations and insurance - solutions

- Insurance products can help stabilize incomes and protect vulnerable people from falling deeply into debt after disasters
  - Support other objectives such as education and investment in health
  - Create an environment where people can take moderate risks
- Technology is enabling insurance
  - Identification
  - Banking services
  - Delivery (mobile phones)
  - Economies of scale, control of administrative costs
  - Contributing to loss control

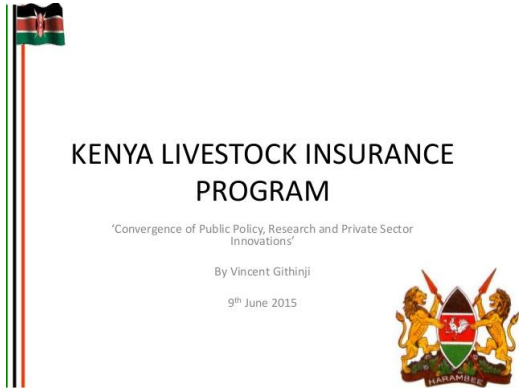
Advantages of and key approaches to providing insurance

- Advantages:
  - Economic development
  - Motivation to reduce risky behavior
  - Spread of risk
- Key approaches:
  - Microinsurance
  - Macro risk-pooling arrangements (government and state level)
  - Community sharing (cooperatives)
  - Index insurance

Examples - microinsurance

BLUE MARBLE MICROINSURANCE

HORN OF AFRICA RISK TRANSFER FOR ADAPTATION - RURAL RESILIENCE INITIATIVE



:mia .micro .insurance .academy

Examples – macro risk pooling

InsuResilience GlobalPartnership

African Risk Capacity
Sovereign Disaster Risk Solutions
A Specialized Agency of the African Union

CCRIF SPC
The Caribbean Catastrophe Risk Insurance Facility

PCRAFI
Pacific Catastrophe Risk Assessment & Financing Initiative

PEF
PANDEMIC EMERGENCY FINANCING FACILITY

Lessons from the pandemic, relevance to climate risk

- Problem is multinational, virus and carbon know no borders
- “Tragedy of the commons” issue, actions of some countries affect everyone
- Global organizations (WHO, UNFCCC, IPCC, etc.) are essential to addressing issues
- Potential economic costs are enormous
- Investments in protection can make a huge difference
- Vulnerable populations are particularly susceptible:
  - Exposure (location, quality of housing, density)
  - Services more limited (hospitals, shelters, infrastructure)
  - Less disposable income to invest in protection

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Other approaches - adaptation

- Many are similar to approaches that can be taken for all populations
  - But especially important for those who are most vulnerable – both frequency and severity
- Examples
  - Enhanced information, appropriately communicated
  - Get community involved
  - Land use rules and building standards
  - Enhanced healthcare and disaster recovery infrastructure
  - Early warning systems
  - Investment in climate-resistant agricultural practice
  - Coastal protection barriers
  - Emigration where necessary
  - Economic growth and provision of safety-nets

Alternative risk transfer and financing mechanisms

- To supplement insurance mechanisms
- Non-insurance financing
  - Green bonds
  - Capital markets
    - Catastrophe bonds, insurance derivatives
  - Post-loss financing
    - Loans or grants
    - From multi-national institutions or philanthropic entities (NGOs)
- Governmental guarantees or backstop programs

Mitigation efforts

- Ultimately can reduce extent of climate change
  - Carbon taxes
  - Emission rights trading
  - Technologies, e.g., carbon capture and sequestration
- Although not focused on the vulnerable
  - Important for them since they may end up bearing most of the consequential damage burden

Role of actuaries

- In developing/maintaining insurance and risk management solutions
- With participants and markets in mind
  - Pricing, benefit design and effectiveness tailored to each type of insured
    - Risk-financing and risk-transfer mechanisms
    - Especially important because of affordability concerns
  - Focus on needs and determining best solutions for each type of risk, especially those with low frequency and high severity
    - With the needs of the vulnerable in mind
- Actuarial research and information
  - Papers and research prepared by IAA working groups and actuarial associations around the world
  - IAA member associations are involved with Actuarial Climate Indices
    - Focus on frequency of extreme conditions

Questions and Answers - Thank you!

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