

Australian College of Emergency Medicine  
35<sup>th</sup> Annual Scientific Meeting

# **CLIMATE CHANGE – A MEDICAL EMERGENCY**

Professor Kingsley Faulkner  
Chair, Doctors for the Environment Australia

21<sup>st</sup> November 2018

Perth Convention and Exhibition Centre

I declare that I have no  
financial or other conflict  
of interest to disclose



COMMITTED TO  
IMPROVING THE STATE  
OF THE WORLD

Insight Report

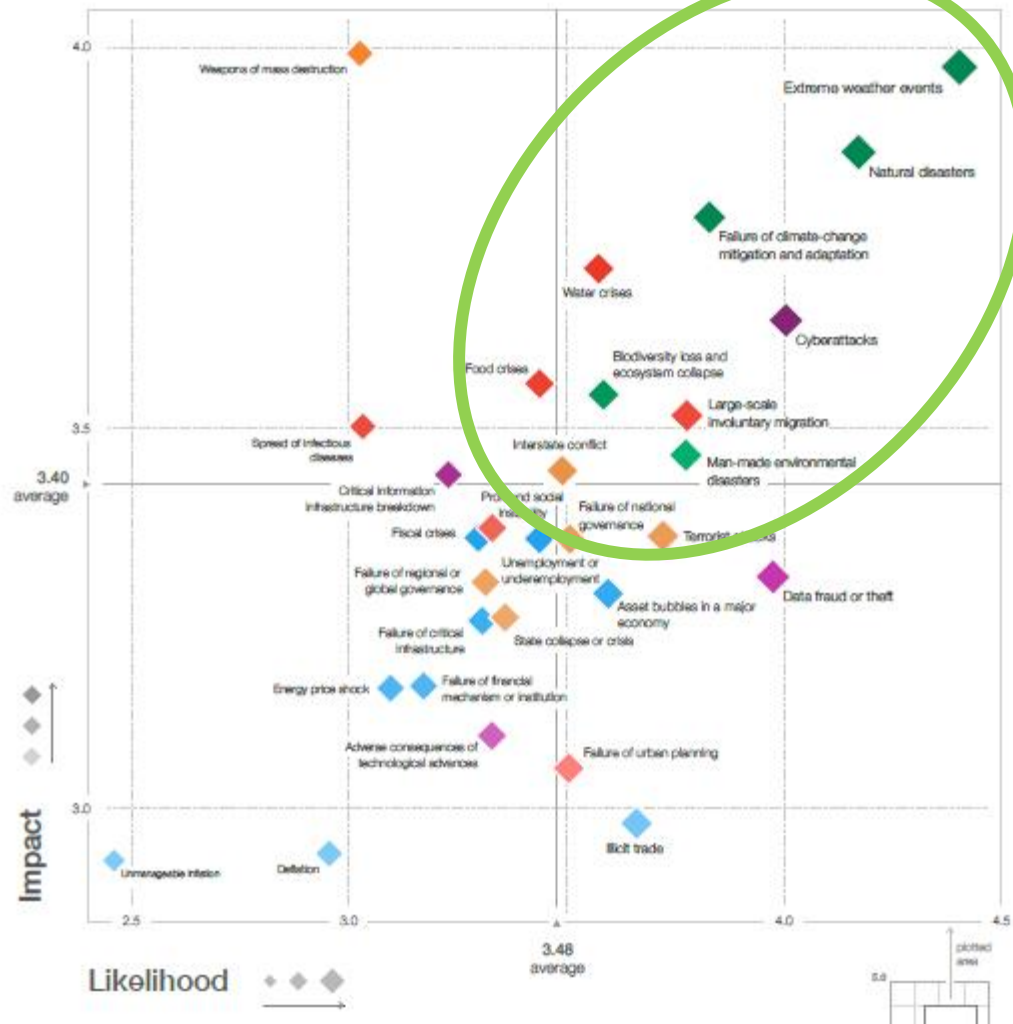
# The Global Risks Report 2018 13th Edition



Strategic Partner of the Report

 MARSH  GUY CARPENTER  MERCER  OLIVER WYMAN

Figure I: The Global Risks Landscape 2018





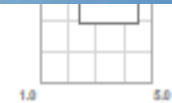
# ACEM 35<sup>th</sup> ASM

## Top 10 risks in terms of Likelihood

- 1 Extreme weather events
- 2 Natural disasters
- 3 Cyberattacks
- 4 Data fraud or theft
- 5 Failure of climate-change mitigation and adaptation
- 6 Large-scale involuntary migration
- 7 Man-made environmental disasters
- 8 Terrorist attacks
- 9 Illicit trade
- 10 Asset bubbles in a major economy

## Top 10 risks in terms of Impact

- 1 Weapons of mass destruction
- 2 Extreme weather events
- 3 Natural disasters
- 4 Failure of climate-change mitigation and adaptation
- 5 Water crises
- 6 Cyberattacks
- 7 Food crises
- 8 Biodiversity loss and ecosystem collapse
- 9 Large-scale involuntary migration
- 10 Spread of infectious diseases



## Categories

- ◆ Economic
- ◆ Environmental
- ◆ Geopolitical
- ◆ Societal
- ◆ Technological

Source: World Economic Forum Global Risks Perception Survey 2017–2018.

Note: Survey respondents were asked to assess the likelihood of the individual global risk on a scale of 1 to 5, 1 representing a risk that is very unlikely to happen and 5 a risk that is very likely to occur. They also assess the impact on each global risk on a scale of 1 to 5 (1: minimal impact, 2: minor impact, 3: moderate impact, 4: severe impact and 5: catastrophic impact). See Appendix B for more details. To ensure legibility, the names of the global risks are abbreviated; see Appendix A for the full name and description.

# Global warming of 1.5°C

IPCC Special Report 8<sup>th</sup> October 2018

Evidence base: 6,000 scientific  
reference

91 authors from 40 countries

Global response to:

- Threats of climate change
- Sustainable development
- Efforts to eradicate poverty

# Established Facts

- ▶ CO<sub>2</sub> levels highest for at least 800,000 years
- ▶ Record average global temperature higher during first two decades of 21<sup>st</sup> century
- ▶ Rising sea levels
- ▶ More severe extreme weather events

## Difference between 1.5°C and 2.0°C:

	1.5°C	2.0°C
Coral reef declines	70-90%	>99%
No Arctic sea ice in summer	Once per century	Once per decade
Ecosystem losses (long lasting or irreversible)	Lower rate	Higher rate



# Limiting warming to 1.5°C

- ▶ Possible within the laws of physics and chemistry
- ▶ Will require unprecedented changes

Dr Jim Skea, Co-chair IPCC Working Group III



# Limiting global warming to 1.5°C

- ▶ Will require rapid transition in:
  - ▶ Land use including agriculture and forestry
  - ▶ Energy production
  - ▶ Industry
  - ▶ Buildings
  - ▶ Transport
  - ▶ Cities

# Global net human caused CO<sub>2</sub> emissions need:

- ▶ 45% fall from 2010 levels by 2030
- ▶ Net 0% by around 2050
- ▶ **Major contributors:**
  - ▶ Coal
  - ▶ Gas (including fugitive methane)
  - ▶ Petroleum products
  - ▶ Agriculture
- ▶ Large scale carbon capture – very unlikely





# HEATWAVES

- ▶ More deaths in Australia (last 100 years)
- ▶ 18 of last 20 years have been hottest on record
- ▶ Days over 35°C will rise in all capital cities



# HEAT EFFECTS – PROLONGED EXPOSURE

- ▶ Dehydration
- ▶ Heat Exhaustion
- ▶ Heat Stroke
- ▶ Aggravation of heart conditions
- ▶ Worsening kidney disease
- ▶ Death

Metrication of Template:HeatTable

		temperature (°C)																
		27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Relative Humidity (%)	40	27	28	29	30	31	32	34	35	37	39	41	43	46	48	51	54	57
	45	27	28	29	30	32	33	35	37	39	41	43	46	49	51	54	57	
	50	27	28	30	31	33	34	36	38	41	43	46	49	52	55	58		
	55	28	29	30	32	34	36	38	40	43	46	48	52	55	59			
	60	28	29	31	33	35	37	40	42	45	48	51	55	59				
	65	28	30	32	34	36	39	41	44	48	51	55	59					
	70	29	31	33	35	38	40	43	47	50	54	58						
	75	29	31	34	36	39	42	46	49	53	58							
	80	30	32	35	38	41	44	48	52	57								
	85	30	33	36	39	43	47	51	55									
	90	31	34	37	41	45	49	54										
	95	31	35	38	42	47	51	57										
	100	32	36	40	44	49	54											

	Caution
	Extreme Caution
	Danger
	Extreme Danger



# HEATWAVES

- ▶ Impact upon Emergency Departments
- ▶ Impact upon health systems
- ▶ Black Saturday Victoria 7<sup>th</sup> Feb 2009
  - 173 deaths from bushfires
  - Estimate 384 deaths from heat wave
  - 414 presentations to ED in 72 hours

# HEATWAVES – VULNERABLE GROUPS

- ▶ Children
  - Dehydration
  - Infectious disease
  - Asthma
- ▶ Elderly
- ▶ Disabled

# HEATWAVES

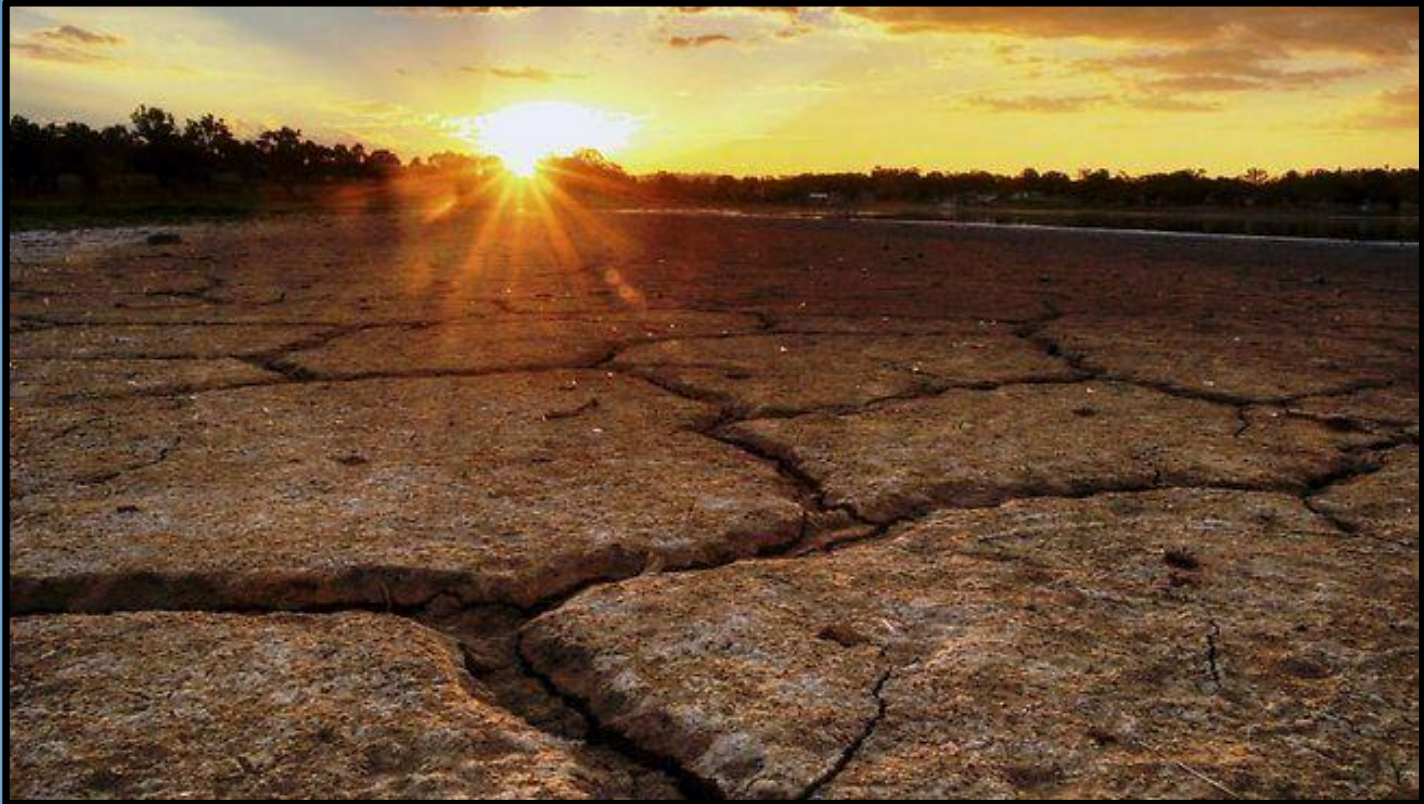
- ▶ Outdoor Workers
- ▶ Farmers
- ▶ Construction Workers
- ▶ Emergency – Essential Services
- ▶ Lost Productivity
- ▶ Sports
- ▶ School Children

# HEATWAVES

Other Potential Indirect Health Impacts:

- ▶ Power Outages
- ▶ Air Conditioning Failures
  - ▶ Food Spoilage – increased infection risk
  - ▶ Blood Storage
  - ▶ Medicine and Vaccines





# HEATWAVES

- ▶ Exacerbate droughts
- ▶ Increase urban ozone / air pollution
- ▶ Increase bushfire risk
- ▶ Disrupt transport services
- ▶ Urban heat island



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# BUSHFIRES

## ▶ Predisposing Factors:

- ▶ Increasing average temperatures
- ▶ More frequent and severe heat waves
- ▶ Declining rainfall
- ▶ Declining flow – creeks and rivers
- ▶ Declining water storage



# **BUSHFIRES – RISKS TO HEALTH**

- ▶ Radiant Heat
- ▶ Burns
- ▶ Dehydration
- ▶ Smoke Inhalation
- ▶ MVA
- ▶ Electrocution

# BUSHFIRES – DAMAGE

- ▶ Live stock / fencing / hay and grain reserves
- ▶ Infrastructure
- ▶ Machinery
- ▶ Transportation
- ▶ Power and water supplies

# BUSHFIRES –IMPACTS

- ▶ Solastalgia
- ▶ Mental health
- ▶ Children – traumatized
- ▶ Green House Gas (GHG) emissions

**Combined Effects – Great demand  
on ED and health care**



# FLOODS & STORM SURGES

- ▶ Expected Direct Health Effects:
  - ▶ Drowning
  - ▶ Injuries
  - ▶ Hypothermia
  - ▶ Mental health – effects still years later





## 2011 Queensland Floods

- 33 Deaths  
(+3 missing)
- Billion dollar damage







# FLOODS & STORM SURGES

- ▶ Infrastructure Damage
  - Sewerage
  - Drinking Water
- ▶ Spread of bacterial and viral disease
- ▶ Stagnant Water: mosquitos etc..
- ▶ Damp Conditions: asthma and other allergies

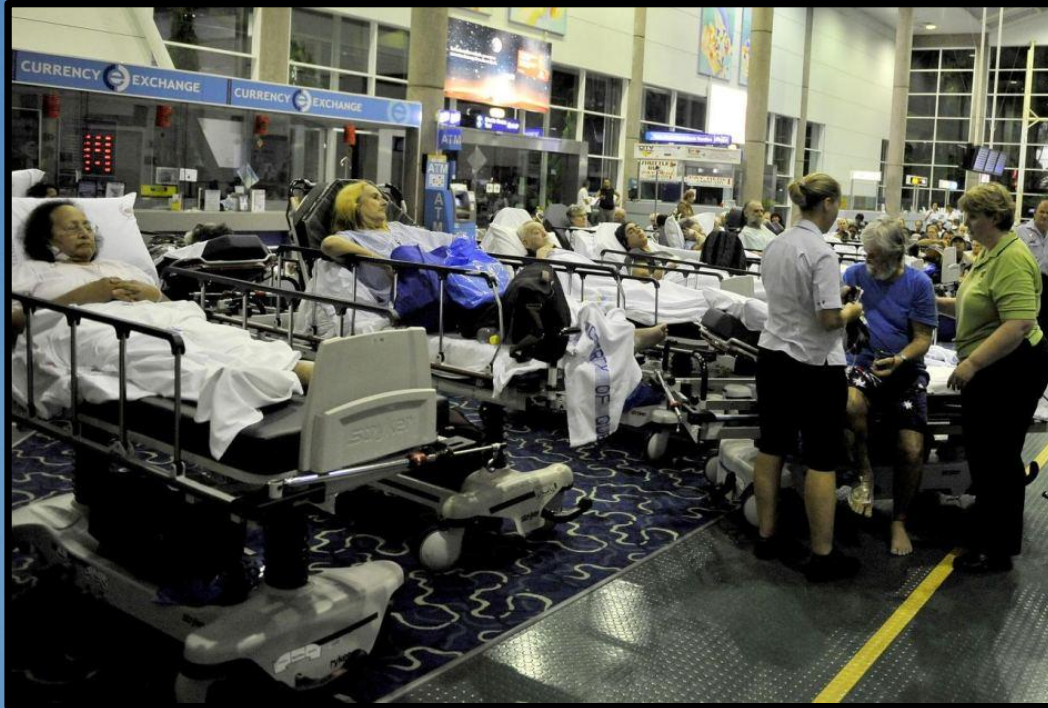






# CYCLONES (TYPHOONS)

- ▶ May become more intense
- ▶ Direct injuries and deaths (like floods)
- ▶ Diarrhoeal diseases increase
- ▶ Acute respiratory infections increase
- ▶ Wound infections increase
- ▶ Disruptions to routine medical care



## Cyclone Yasi February 2011

- Record presentations to Townsville ED
- Evacuation of Cairns Base Hospital
- 356 Patients, staff and relatives airlifted to Brisbane

# FOOD AND NUTRITION

- ▶ Decline in rainfall in southern Australia
- ▶ South West - 17% decline in winter rainfall since 1970
- ▶ South East - 15% decline in late autumn and early winter rainfall since mid 1990's
- ▶ Predicted increase in frequency of severe droughts
- ▶ Impact upon agriculture:
  - Direct
  - Indirect – bush fires etc...
  - Changing patterns of pests and diseases







# INFECTIOUS DISEASES

## ▶ Mosquito Borne:

- Dengue
- Ross River Virus
- Malaria

## ▶ Bacterial

- Campylobacter
- E. Coli

# INFRASTRUCTURE DAMAGE

- ▶ Sewerage management
- ▶ Contaminated Water Supply



# AIR POLLUTION

- ▶ Coal:
  - ▶ PM 2.5
  - ▶ SO<sub>2</sub>
  - ▶ Nitrogen Oxides
  - ▶ Mercury
  - ▶ Cadmium
  - ▶ Arsenic



# AIR POLLUTION

- ▶ Coal:
  - ▶ Black Lung Disease
  - ▶ Lung Cancer
  - ▶ Lung Disease (including Asthma)
  - ▶ Heart Disease
  - ▶ Stroke
  - ▶ Neurological Effect

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# AIR POLLUTION

- ▶ 3000 Deaths per annum (approx.)
  - MVAs: 1209 (2015)
- ▶ Health Costs from burning coal
  - \$2.6 billion per annum

# AIR POLLUTION

## ▶ Coal Mine Fires:

- Toxic Emissions
- Hazelwood Mine Fire (Victoria, 2014) – burned for 45 days

## ▶ PM 2.5 Effects:

- Heart Disease
- Bronchitis
- Lung cancer



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# URBAN SMOG

## ▶ Ground Level Ozone

- Increased on hot sunny days
- Irritates airways
- Aggravates Asthma

## ▶ Ozone Pollution

- Predicted 2 x Sydney by 2050

## ▶ Bushfires

- Particulate matter
- CO<sub>2</sub>

# CLIMATE CHANGE

## ► Impact on Allergies:

- 20% Australians have allergic diseases
- 10% asthma rate

## ► Asthma triggers:

- Plant pollens
- Fungal spores

# CLIMATE CHANGE

- ▶ Warmer temperatures
  - ▶ Elevated CO<sub>2</sub> levels
  - ▶ Changes to wind and rainfall patterns
- Changes to allergen production and distribution



Pressure for Government to act

# **CLIMATE THE BURNING ISSUES FOR DIRECTORS**

## **Global warming concerns put the heat on Canberra**

The Australian Business Review – 25<sup>th</sup> October 2018



# **WA Sustainable Health Review**

## **CLIMATE AND SUSTAINABILITY FORUM**

### **23<sup>RD</sup> JULY 2018**

- Climate change, the projections and potential impacts on the WA Health System
- Sustainable Development Unit, UK NHS: Dr David Pencheon
- Workshop: Developing mitigation and adaptation recommendations

# **“NO POLITICAL PARTY SHOULD BE ELECTED WITHOUT A CREDIBLE CLIMATE POLICY”**

- **Dr John Hewson**, Former Leader, Federal Liberal Party before Wentworth By-election

# A CHANGE FOR CLARITY ON CLIMATE

One of our biggest issues is moral as well as  
political

- Alan Kohler, The Australian, 23<sup>rd</sup> October 2018



# CLIMATE TOP ISSUE

Dr Alan Finkel, Australia Chief Scientist

- The Australian, 23<sup>rd</sup> October 2018



# **YOUNG WILL ABANDON US FOR CLIMATE INACTION, LIB WARNS**

- The Australian, 25<sup>th</sup> October 2018

# **MODERATES SEEK \$1b FOR CLIMATE FUND**

Cross benchers, Libs Press PM on Emissions

- Financial Review, 23<sup>rd</sup> October 2018



## **Cream of the Crop**

The rise and rise of  
**Farmers Advocate**  
**Fiona Simson**

Agriculture must be.... “Part of the big debate on energy, climate change, regionalisation, infrastructure, back where we should be”



# **CLIMATE CHANGE COULD THREATEN ENTIRE FINANCIAL SYSTEM**

The risks of climate change were  
“foreseeable, material and  
actionable”

- Geoff Summerhayes, APRA Executive



Supplied: Scott Barker

# RISKS TO INSURANCE INDUSTRY

Australian Actuaries Climate Index  
informed by Bureau of  
Meteorology and CSIRO

Potential loss from coastal erosion  
alone estimated \$88b, excluding  
land value

- Climate Institute 2016

# CURRENT INITIATIVES

**PYL** – Places you Love

Advocating for strong new environmental laws  
and independent environmental protection  
authority

**PEEL** – Australian panel of Environmental Lawyers

**EJA** – Environmental Justice Australia

National Climate and Health Strategy

**NAPS** – National Air Pollution Monitoring  
Standards





Supplied: Flickr - School Strike

# NO TIME FOR GAMES (NTFG)

▶ Protecting Children`s Health in  
Changing Climate

▶ Launch Canberra 27 November 2018



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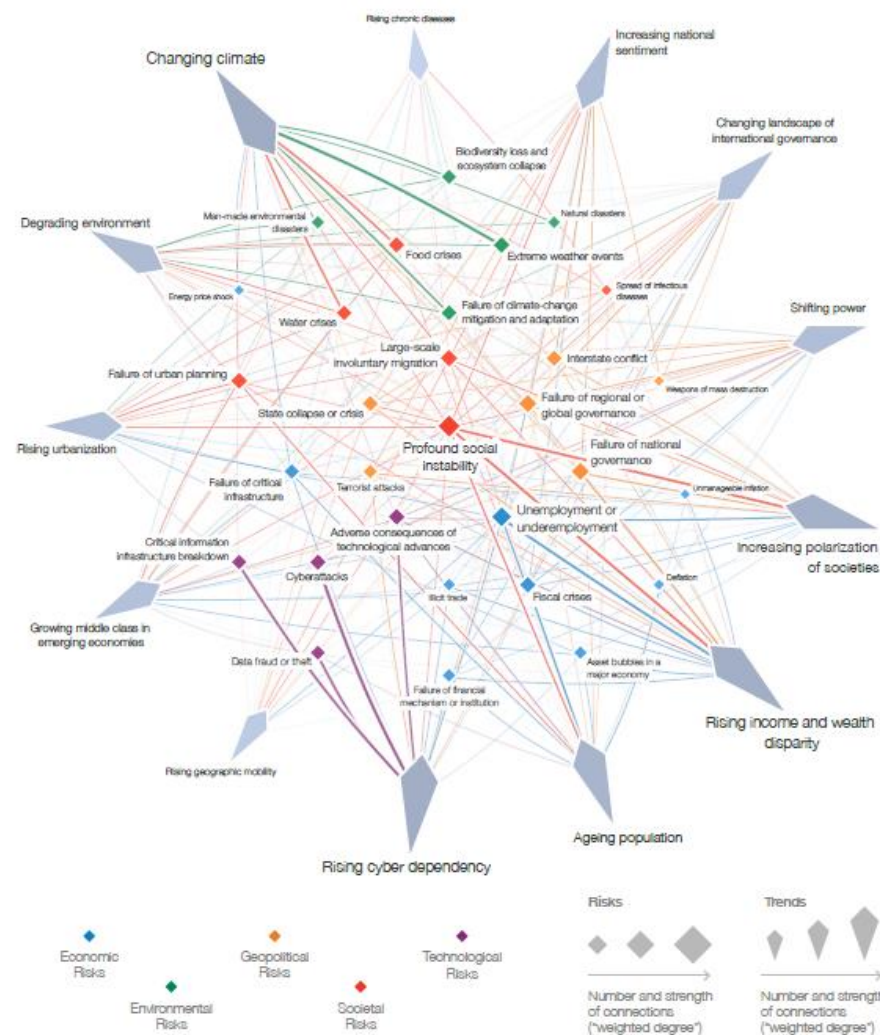


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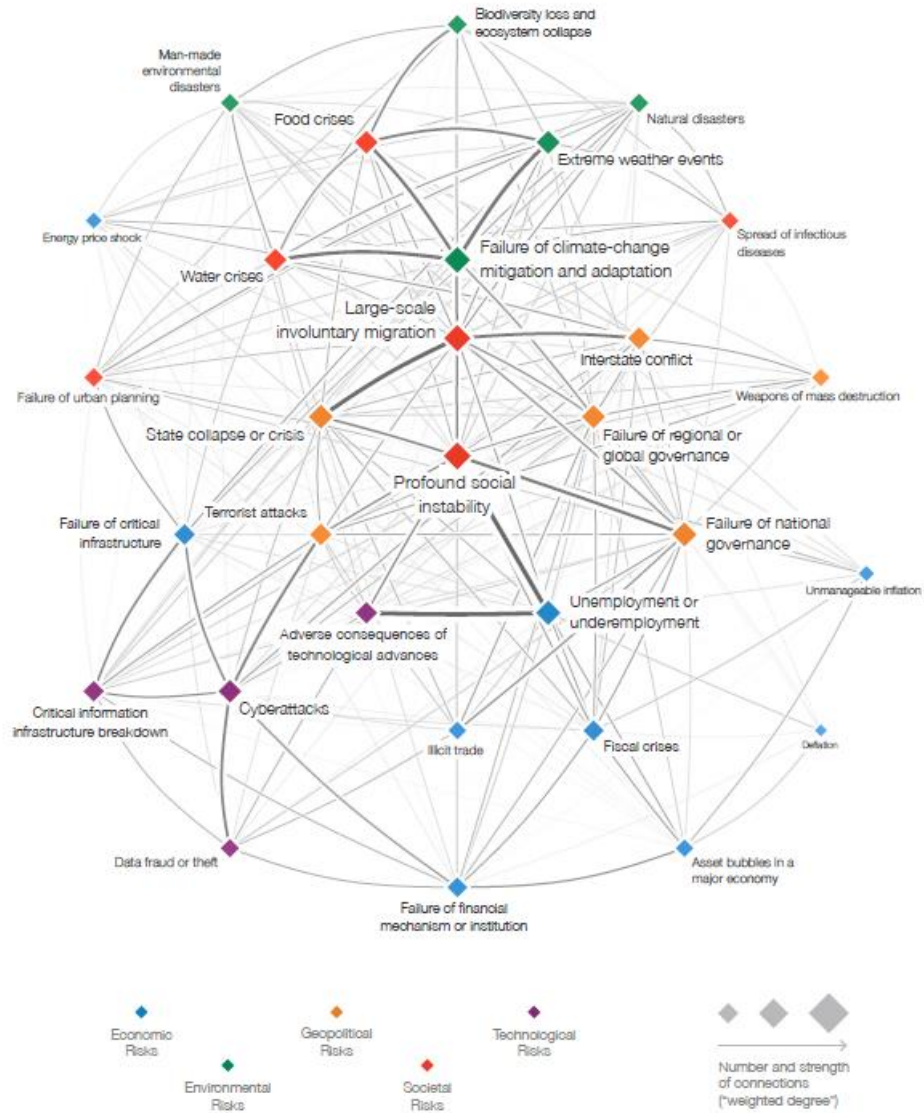
Figure II: The Risks-Trends Interconnections Map 2018



Source: World Economic Forum Global Risk Perception Survey 2017-2018.

Note: Survey respondents were asked to select the three trends that are the most important in shaping global development in the next 10 years. For each of the three trends identified, respondents were asked to select the risks that are most strongly driven by those trends. See Appendix B for more details. To ensure legibility, the names of the global risks are abbreviated; see Appendix A for the full name and description.

Figure III: The Global Risks Interconnections Map 2018



Source: World Economic Forum Global Risks Perception Survey 2017–2018.

Note: Survey respondents were asked to identify between three and six pairs of global risks they believe to be most interconnected. See Appendix B for more details. To ensure legibility, the names of the global risks are abbreviated; see Appendix A for the full name and description.

Figure IV: The Evolving Risks Landscapes, 2008–2018

## Top 5 Global Risks in Terms of Likelihood

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1st	Asset price collapse	Asset price collapse	Asset price collapse	Storms and cyclones	Severe income disparity	Severe income disparity	Income disparity	Interstate conflict with regional consequences	Large-scale involuntary migration	Extreme weather events	Extreme weather events
2nd	Middle East instability	Slowing Chinese economy (<5%)	Slowing Chinese economy (<5%)	Flooding	Chronic fiscal imbalances	Chronic fiscal imbalances	Extreme weather events	Extreme weather events	Extreme weather events	Large-scale involuntary migration	Natural disasters
3rd	Failed and failing states	Chronic disease	Chronic disease	Corruption	Rising greenhouse gas emissions	Rising greenhouse gas emissions	Unemployment and underemployment	Failure of national governance	Failure of climate-change mitigation and adaptation	Major natural disasters	Cyberattacks
4th	Oil and gas price spike	Global governance gaps	Fiscal crises	Biodiversity loss	Cyber attacks	Water supply crises	Climate change	State collapse or crisis	Interstate conflict with regional consequences	Large-scale terrorist attacks	Data fraud or theft
5th	Chronic disease, developed world	Retrenchment from globalization (emerging)	Global governance gaps	Climate change	Water supply crises	Mismanagement of population ageing	Cyber attacks	High structural unemployment or underemployment	Major natural catastrophes	Massive incident of data fraud/theft	Failure of climate-change mitigation and adaptation

## Top 5 Global Risks in Terms of Impact

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
1st	Asset price collapse	Asset price collapse	Asset price collapse	Fiscal crises	Major systemic financial failure	Major systemic financial failure	Fiscal crises	Water crises	Failure of climate-change mitigation and adaptation	Weapons of mass destruction	Weapons of mass destruction
2nd	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Retrenchment from globalization (developed)	Climate change	Water supply crises	Water supply crises	Climate change	Rapid and massive spread of infectious diseases	Weapons of mass destruction	Extreme weather events	Extreme weather events
3rd	Slowing Chinese economy (<5%)	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food shortage crises	Chronic fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters
4th	Oil and gas price spike	Chronic disease	Chronic disease	Asset price collapse	Chronic fiscal imbalances	Diffusion of weapons of mass destruction	Unemployment and underemployment	Interstate conflict with regional consequences	Large-scale involuntary migration	Major natural disasters	Failure of climate-change mitigation and adaptation
5th	Pandemics	Fiscal crises	Fiscal crises	Extreme energy price volatility	Extreme volatility in energy and agriculture prices	Failure of climate-change mitigation and adaptation	Critical information infrastructure breakdown	Failure of climate-change mitigation and adaptation	Severe energy price shock	Failure of climate-change mitigation and adaptation	Water crises

■ Economic ■ Environmental ■ Geopolitical ■ Societal ■ Technological

Source: World Economic Forum 2008–2018, Global Risks Reports.

Note: Global risks may not be strictly comparable across years, as definitions and the set of global risks have evolved with new issues emerging on the 10-year horizon. For example, cyberattacks, income disparity and unemployment entered the set of global risks in 2012. Some global risks were reclassified: water crises and rising income disparity were re-categorized first as societal risks and then as a trend in the 2015 and 2016 Global Risks Reports, respectively.