Understanding Risks: *From Future Earth to Future World*

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1）Understanding Climate System
International Geophysical Year (1957-1958)

Proposed by the International Council of Scientific Unions (ICSU) in 1952

A comprehensive series of global geophysical activities
Sixty-seven (67) countries involved
The components of Earth’s Climate System

- **Cryosphere:** polar ice-caps, sea-ice, permafrost, seasonal snow cover, mountain glaciers
- **Geosphere:** land
- **Hydrosphere:** oceans, lakes, rivers
- **Biosphere:** ecosystems
- **Atmosphere:** air

Earth System Science
Nobel Peace Price 2007

Intergovernmental Panel on Climate Change (IPCC) and Mr. Gore for their efforts to build up and disseminate greater knowledge about

**man-made climate change**

and to lay the foundations for the measures that are needed to counteract such change.
Nobel Price 2018

The Prize in Economic Sciences 2018 has been awarded to William D. Nordhaus "for integrating climate change into long-run macroeconomic analysis" and Paul M. Romer "for integrating technological innovations into long-run macroeconomic analysis." Their findings have significantly broadened the scope of economic analysis by constructing models that explain how the market economy interacts with nature and knowledge.
2) “Sustainable” Development
Population Growing particularly urban population

Not just total number but also **demographic structure changes**:

- poor vs. rich
- young vs. aging
Total GDP grows but Gap is enlarging among nations and between regions
Technology: Faster and more dramatically

Global Transportation Systems

Global Internet Systems

Global Urban Development
3) UNDRR 30 Years

NUMBER OF “GREAT” & “DEVASTATING” GLOBAL DISASTERS
(AS DEFINED BY MUNICH RE) SINCE 1980 INDICATED BY TYPE OF EVENT

- **GEOPHYSICAL**
  - Earthquake, volcanic eruption

- **METEOROLOGICAL**
  - Severe weather, winter & tropical storms, hail, tornado

- **HYDROLOGICAL**
  - River & flash flood, storm surge, landslide

- **CLIMATOLOGICAL**
  - Heatwave, freeze, wildland fire, drought

TREND
Economic Loss Increasing (Developed Countries)
Affected Population (Developing Countries)

Number of people affected per disaster type 1998-2017

- **Flood**: 45% (2.0 billion)
- **Drought**: 16% (726 million)
- **Storm**: 3% (125 million)
- **Earthquake**: 1% (4.8 million)
- **Extreme temperature**: 2% (97 million)
- **Landslide**, **Wildfire, Volcanic activity, Mass movement (dry)**: 0.1% (6.2 million)

Source: CRED, UNISDR, 2018
A critical juncture for humanity: pace and scale of change exceed safe planetary boundaries
人类世（Anthropocene）
Complexity (Driving Factors)

Perception data from the World Economic Forum’s Global Risks Survey

- Economic Risks
  - Asset price collapse
  - Extreme commodity price volatility
  - Extreme consumer price volatility
  - Extreme energy price volatility
  - Fiscal crises
  - Geopolitical conflict
  - Climate change
- Environmental Risks
  - Air pollution
  - Biodiversity loss
  - Climate change
  - Earthquakes and volcanic eruptions
  - Flooding
  - Ocean governance
  - Storms and cyclones
- Geopolitical Risks
  - Corruption
  - Fragile states
  - Geopolitical conflict
  - Global governance failures
  - Illicit trade
  - Organized crime
  - Space security
  - Terrorism
- Societal Risks
  - Chronic diseases
  - Demographic challenges
  - Economic disparity
  - Food security
  - Infectious diseases
  - Migration
  - Water security
- Technological Risks
  - Critical infrastructure breakdown
  - Energy security
  - Internet infrastructure breakdown
  - Online data and information security
  - Threats from new technologies

- Perceived Impact (in Billion US$)

- Likelihood Scale:
  - unlikely
  - likely
  - very likely
All Risks are Highly Interconnected-Risk Society
Impacts – Disaster Chains

311 Triple Disaster
Now is a time of heightened global urgency, and the need for ambitious collective action to reduce disaster risk, build resilience and achieve sustainable development has never been greater.

Integrating Disaster Risk Reduction, Climate Change Adaptation and Sustainable Development
Future Earth Future World