Risk Governance (management) vs. Emergency Management

in the Anthropocene

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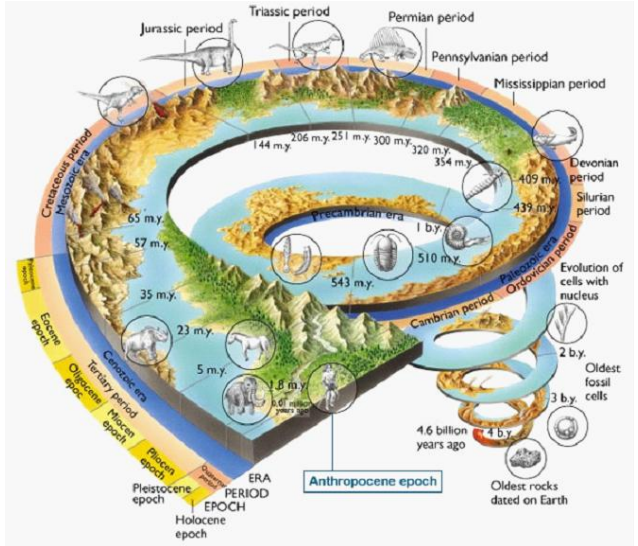
1. Anthropocene

（Proposed in 2000 and approved in 2019）



Earth System Science Partnership
2001

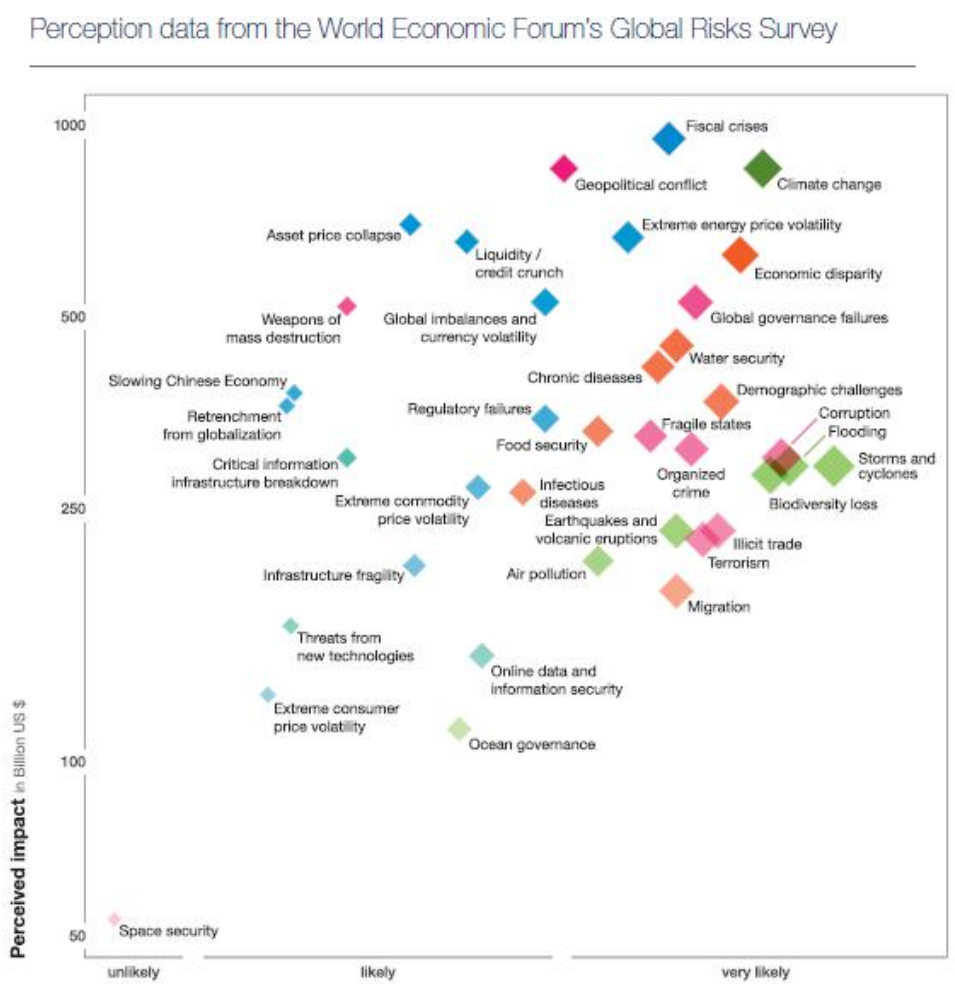
WCRP
World Climate Research Programme
Established
1980

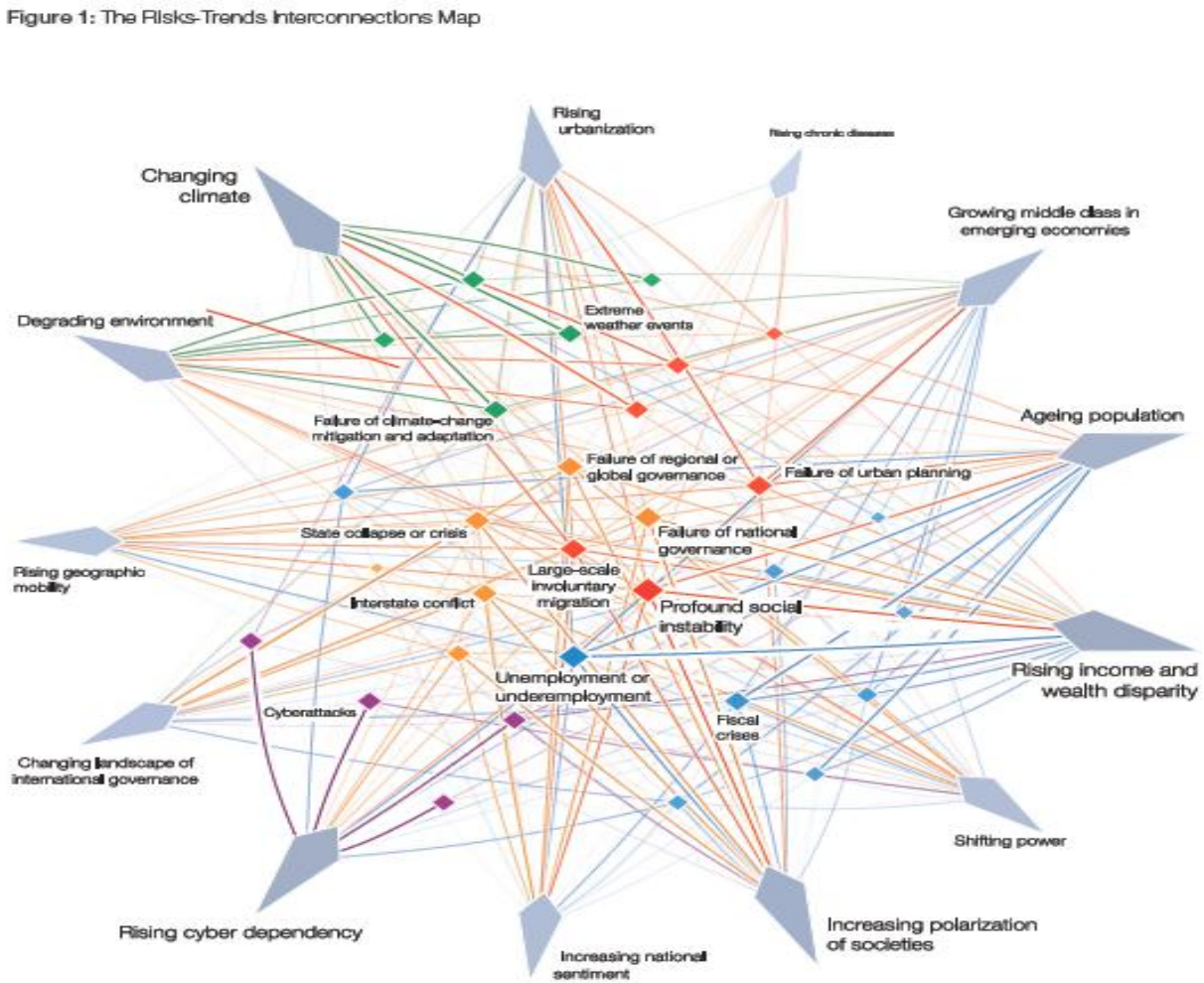
GLOBAL CHANGE
IGBP
International Geosphere-Biosphere Programme
1987

DIVERSITAS
1991

IHDP
International Human Dimensions Programme on Global Environmental Change
1996

In Anthropocene: *Complexity and High Connetivity*

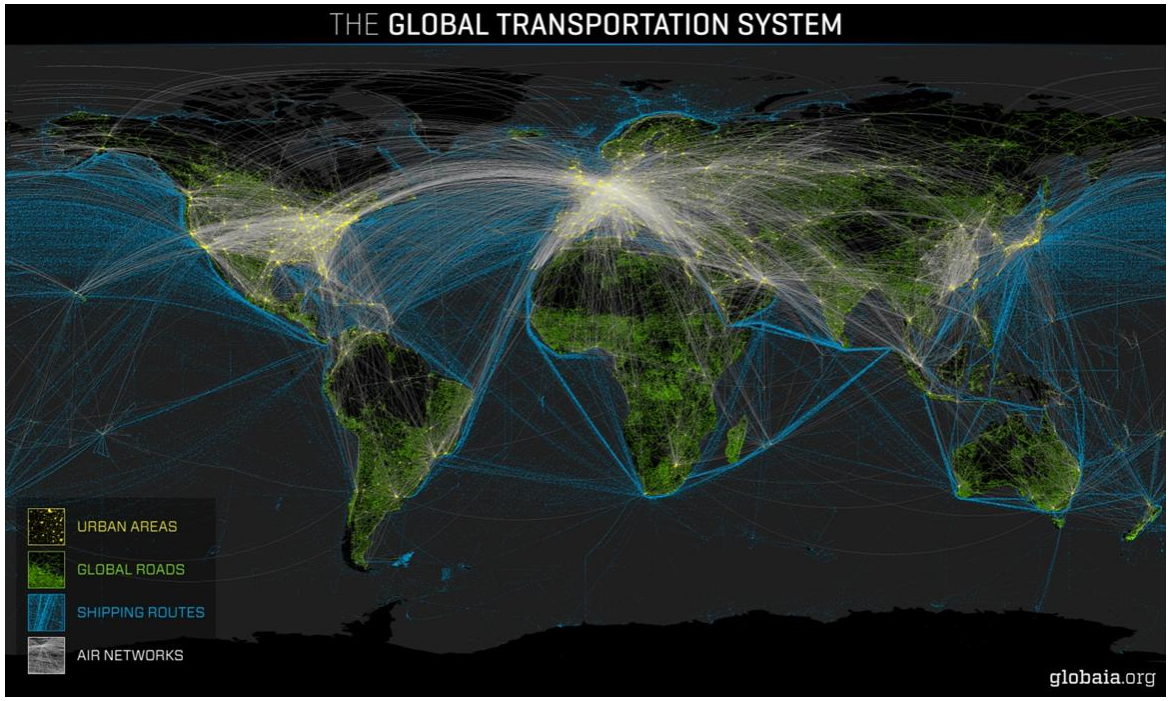




World Economic Forum

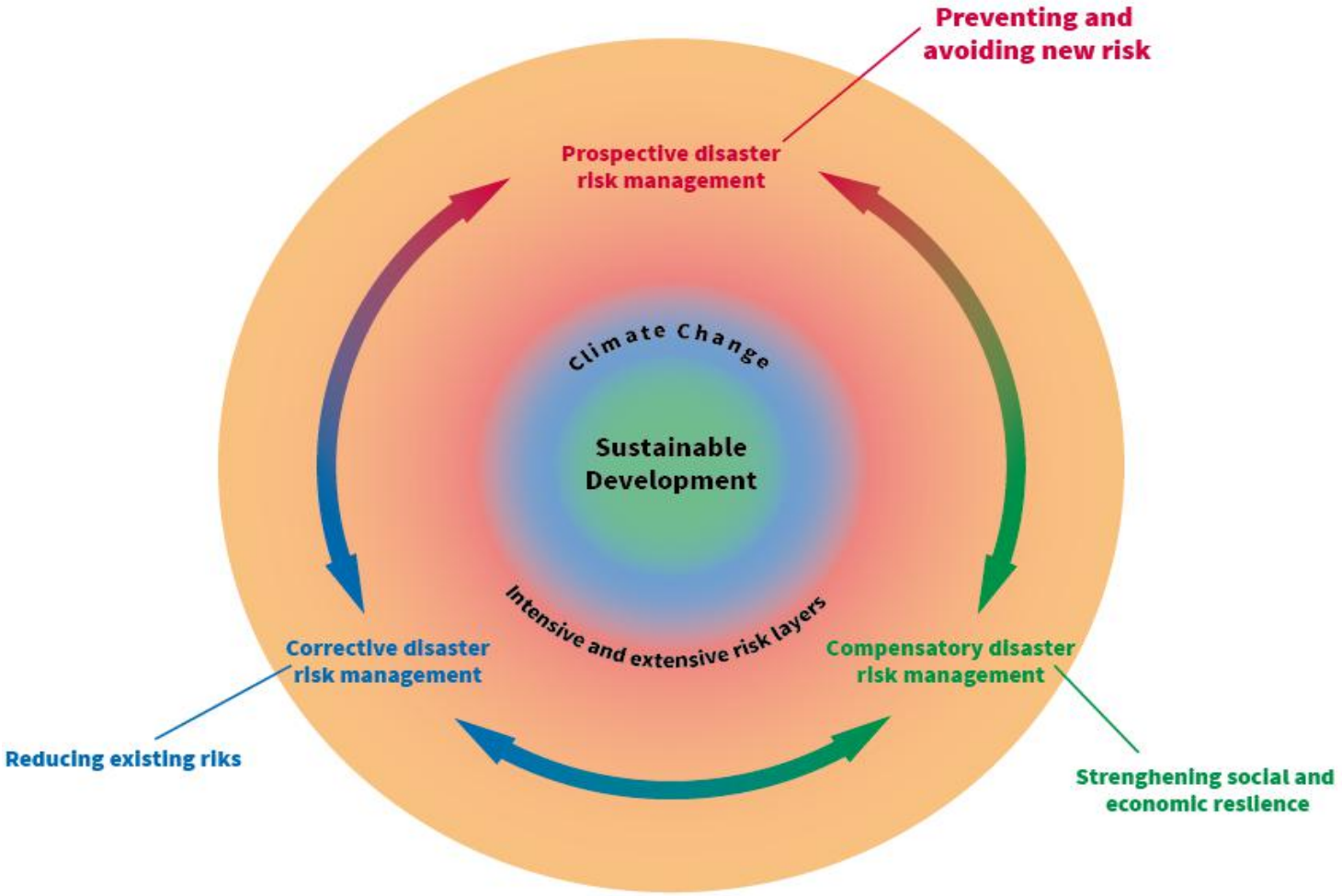
In Anthropocene

New Technology



Smart City
Digital City
...

2. From Managing Disasters to Managing Risks



UNISDR
The United Nations Office for Disaster Risk Reduction

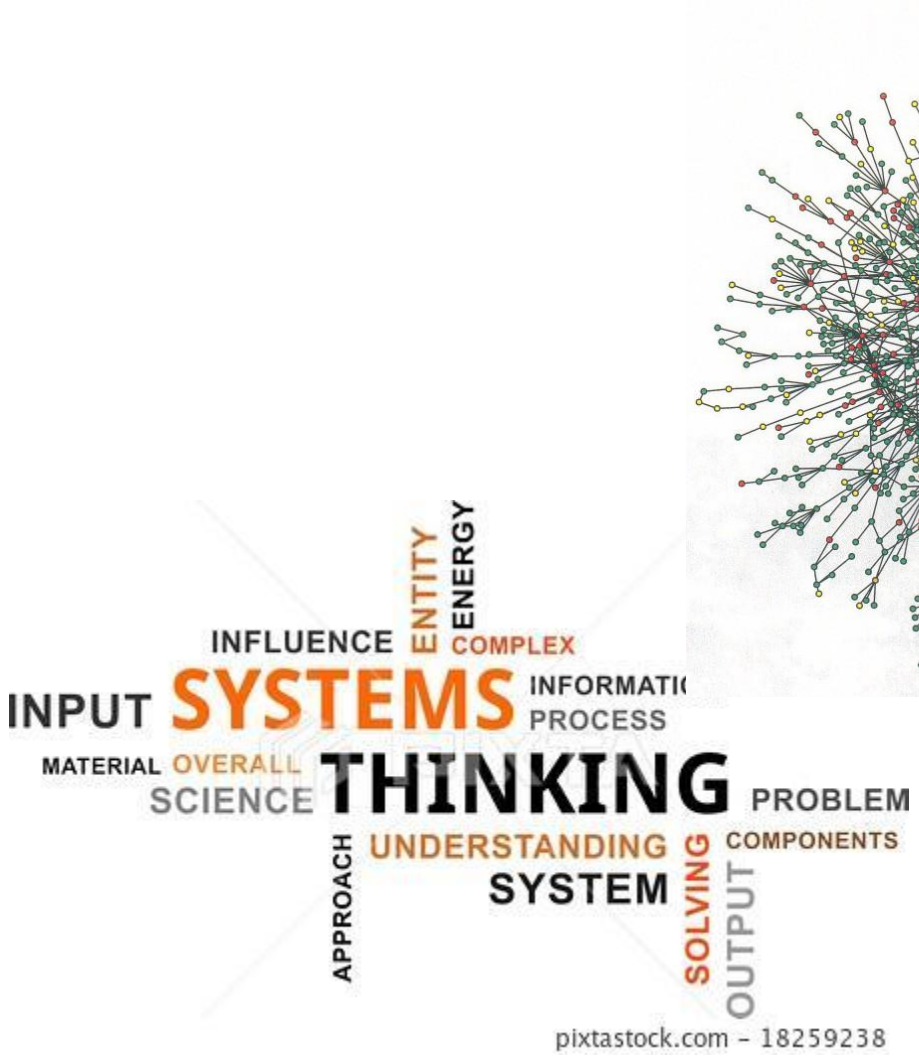
Understand and better deal with Emerging Risks:
Disaster Chains

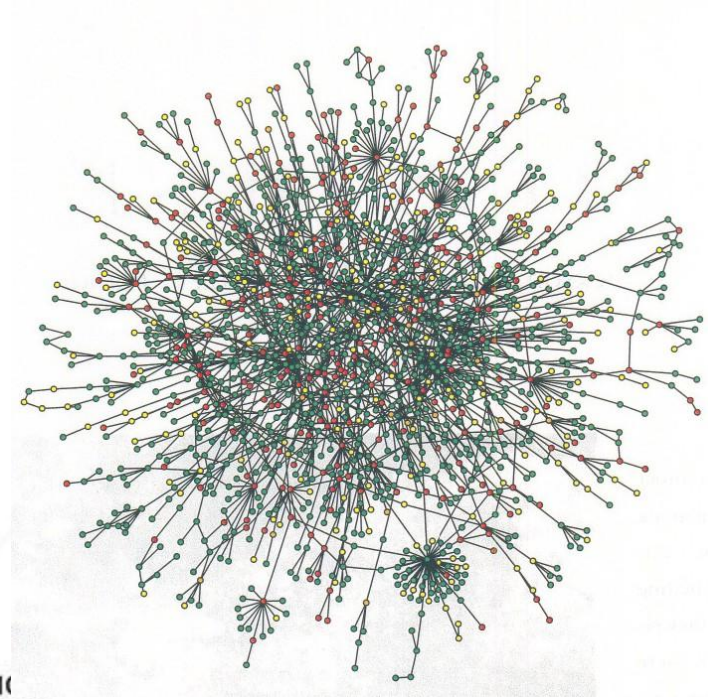
311 Triple Disaster

EM: EW..

EM: EW..

Our Approach: System Thinking





Elements
Relationships
Structures
Dynamic Process
Functions

2. Mathematic Base: Complexity science and *Complex system*

With the understanding of the risk governance systems in Anthropocene, the risk(*R*) is the functions the five components of ISEETS, Institution(*In*), Social(*So*), Economic (*Ec*). Earth(*Ea*), and Technology(*Te*), as follow:

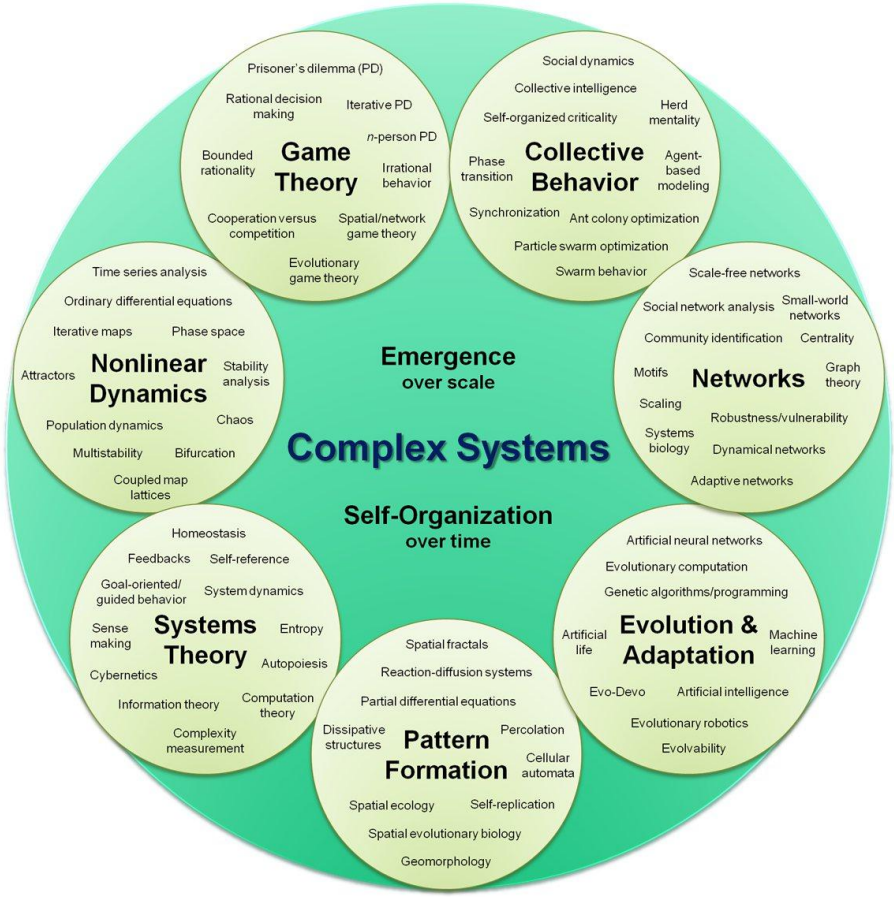
Anthropocene equations:

$$\frac{dR}{dt} = F(In, So, Ec, Ea, Te)_{t,s,l}$$

$$Sys = F(ele, rel, str, pro, fun) \Lambda R$$

$$\text{Set } F ::= \{ele, rel, str, pro, fun | t, s, l\}$$

The attributes of a system could be explained by the four key attributes: elements(ele), relationships (rel), structure (str), process (pro) and function (fun), in the constrain of time(t), space(s), region(l)



The Relation between Risk Gov and Emerency Managment

$$EM = \mathrm{Lim}_{(t \to 0)} RG$$

$$\frac{dR}{dt} = F(In, So, Ec, Ea, Te)_{t,s,l}$$