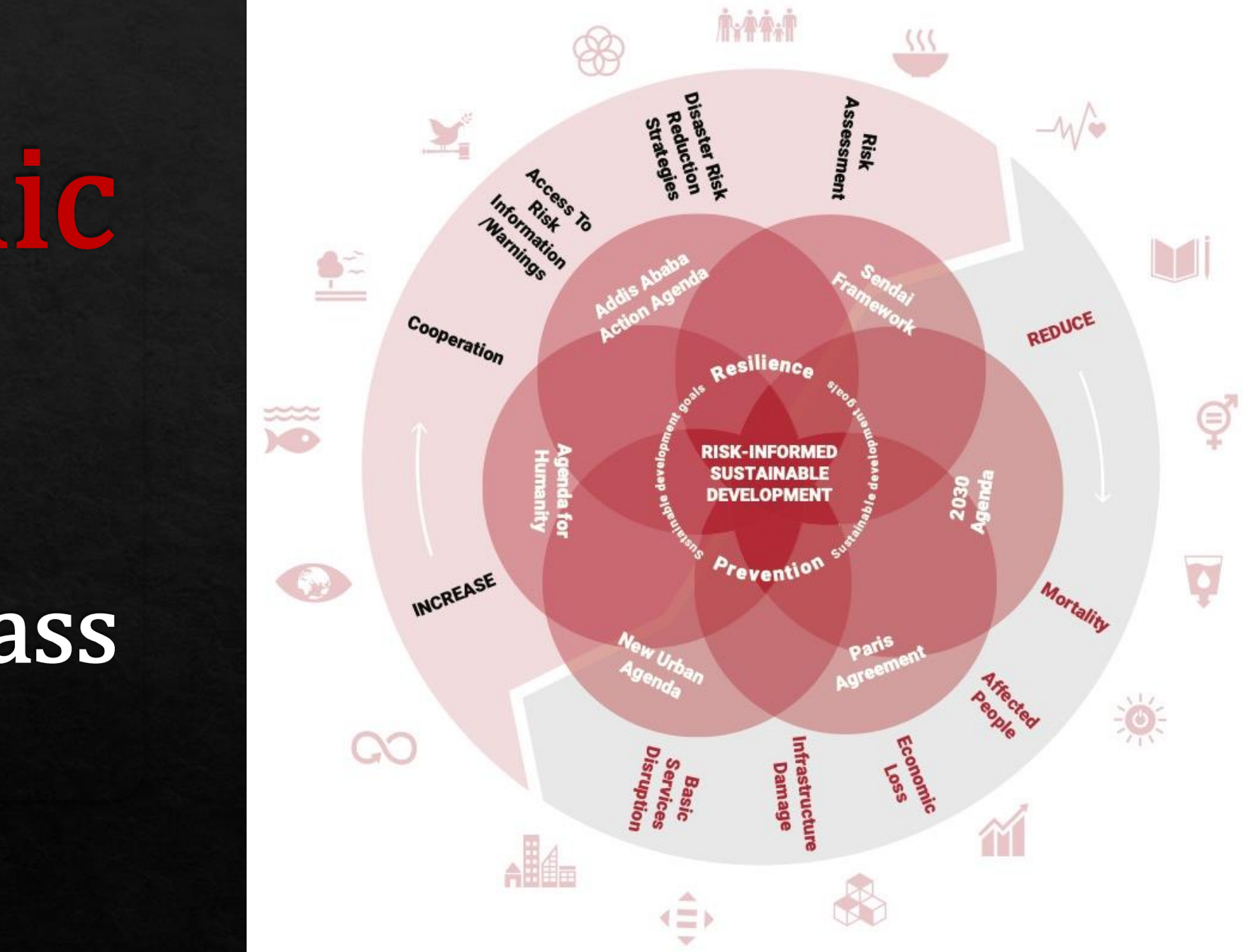
# Systemic Risk

## Master Class

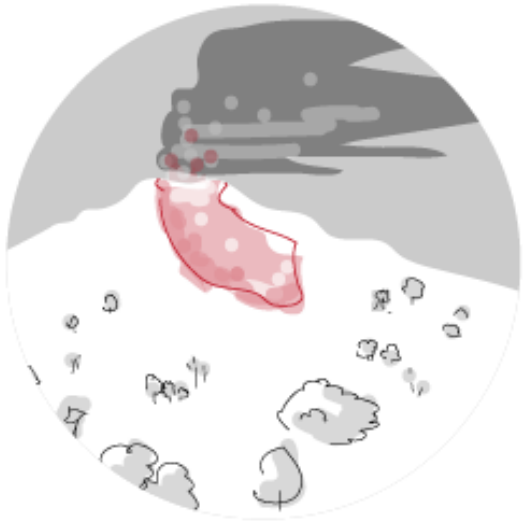
*Scott Williams*

*@scott42195*



“With the certainty of near-term, non-linear changes the critical assumption of the relationship between past and future risk must be revisited”


Let it go. Let it out.
Let it all unravel.
Let it free and it can be
A path on which to travel.



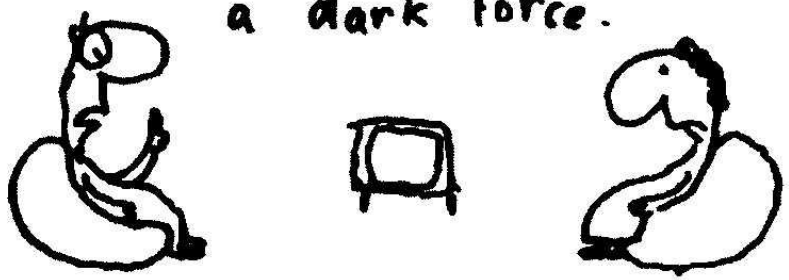
There is no such thing as a **natural disaster**, only **natural hazards**

We make **choices** as to where we inhabit, how we build and what research we do

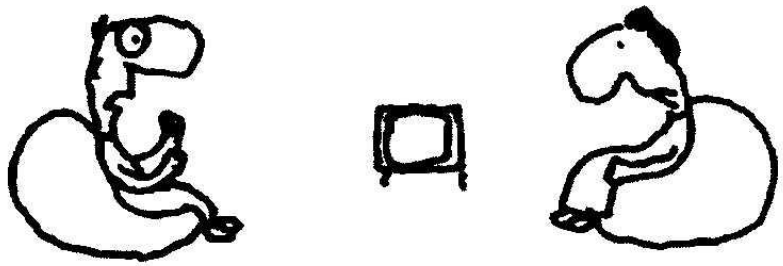
Risk is the combination of **hazard**, **exposure** and **vulnerability**

**Death**, **loss** and **damage** is the function of the context of hazard, exposure and vulnerability

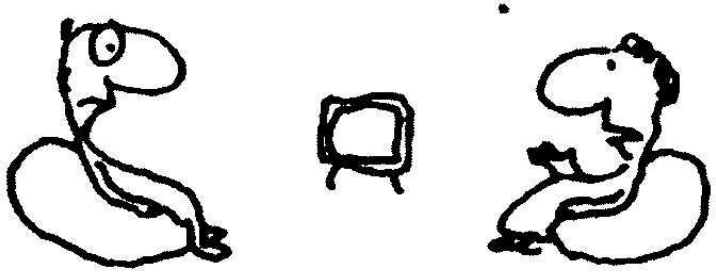
our way of life is being threatened by a dark force.



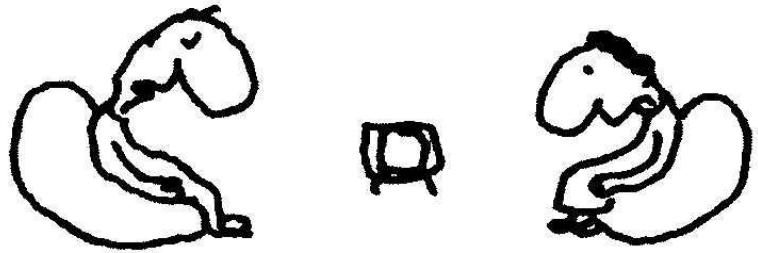
we must defend our way of life.



WHAT IS THIS DARK FORCE WHICH THREATENS OUR WAY OF LIFE?



it's our way of life...



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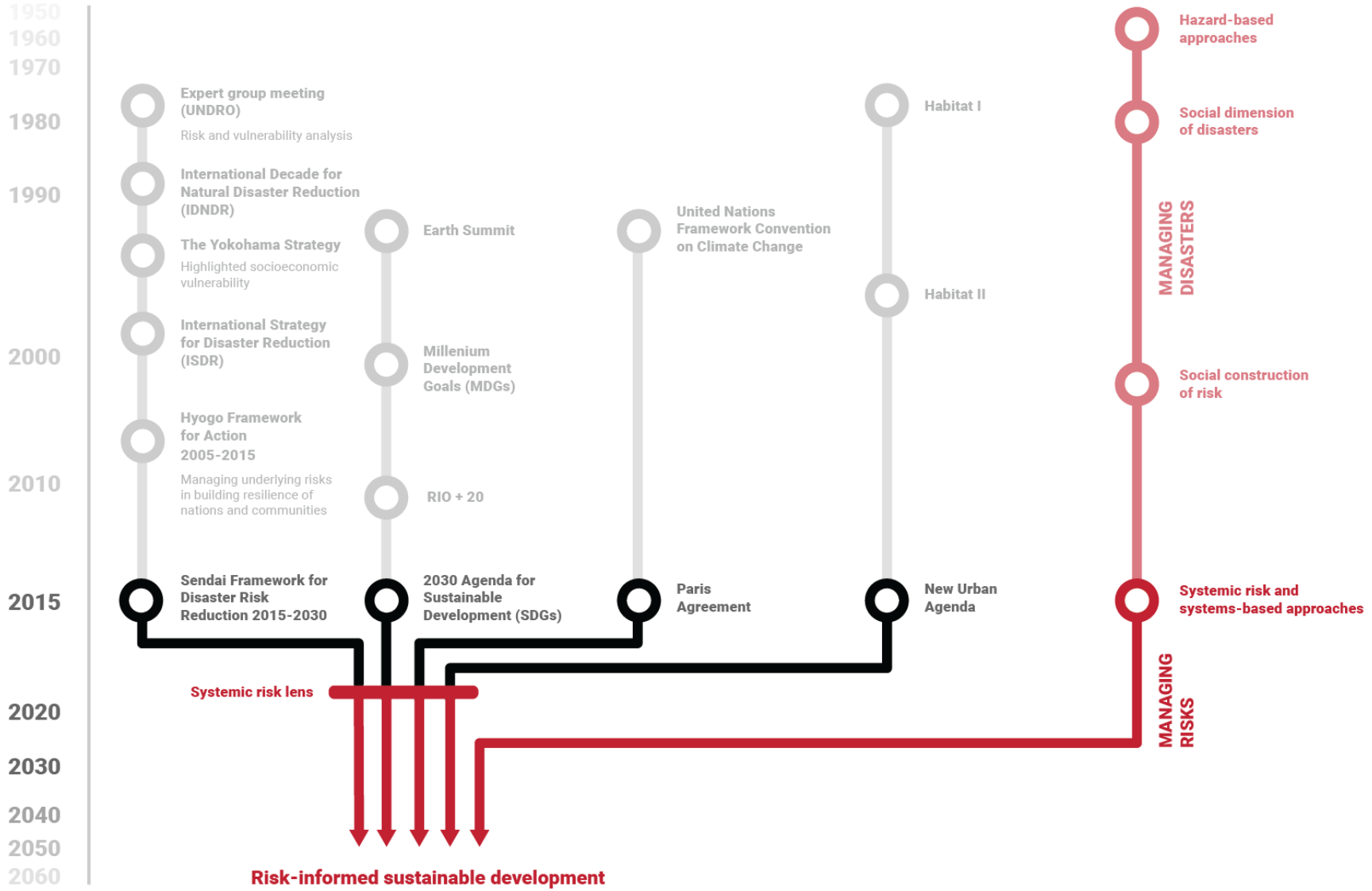
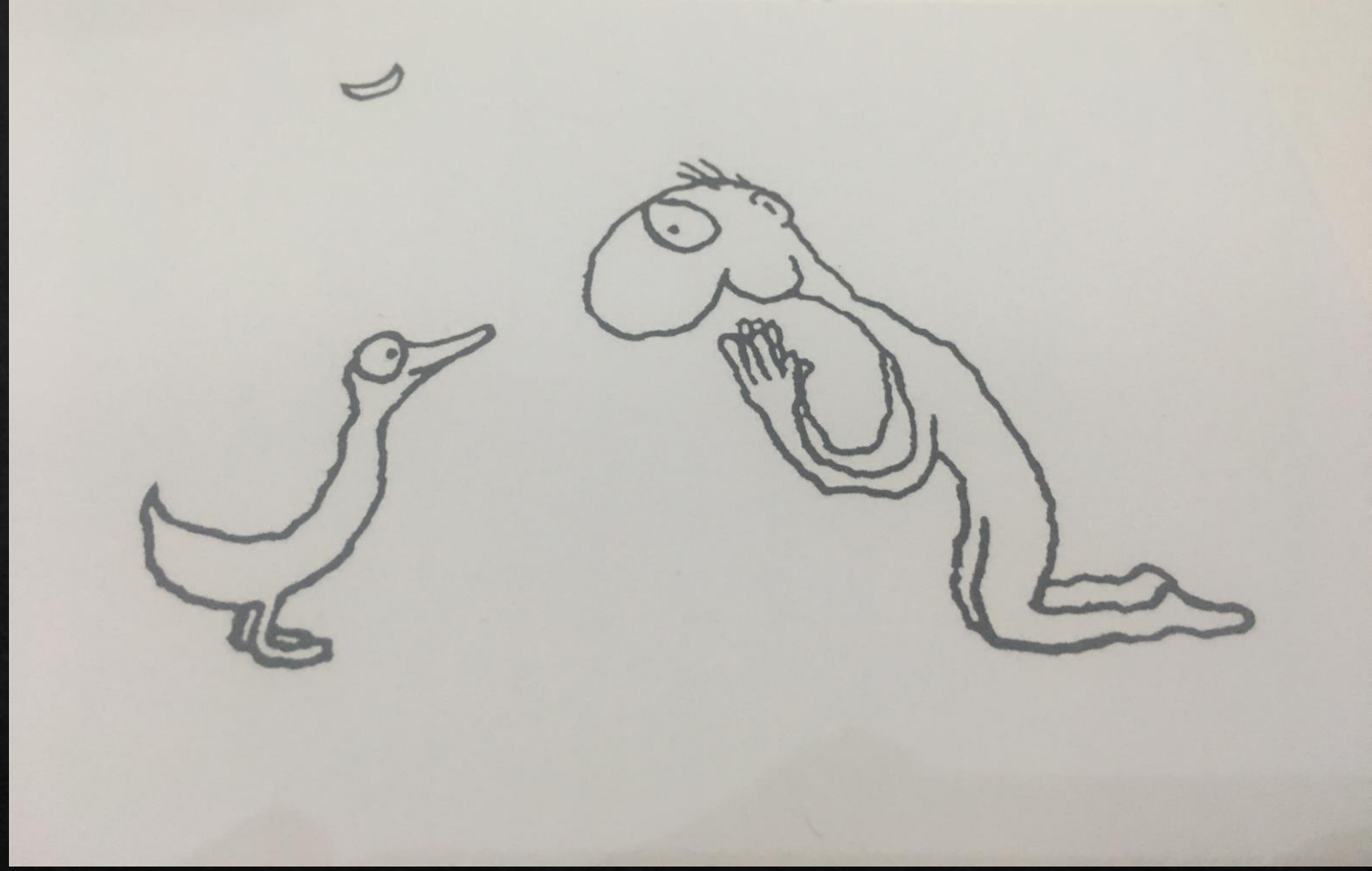
# Sendai Framework for Disaster Risk Reduction
# Paragraph 15





# Master Class

## Learning outcomes

A sense of “rigorous humility of confusion” (and hugging multiplicity, ambiguity & uncertainty)

How to think about, talk about and get “intentional” on **Systemic Risk**

How to contribute to and become a user of the **Global Risk Assessment Framework**

[Experimenting with the **Core Elements Approach** in practical contexts]


# EXPERIMENTAL

EM SPACE

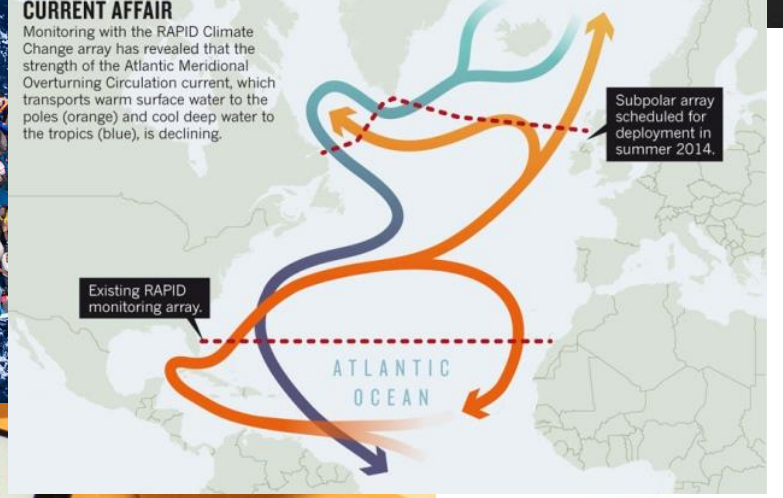
Introducing

# Systemic Risk

# Systemic risk is…

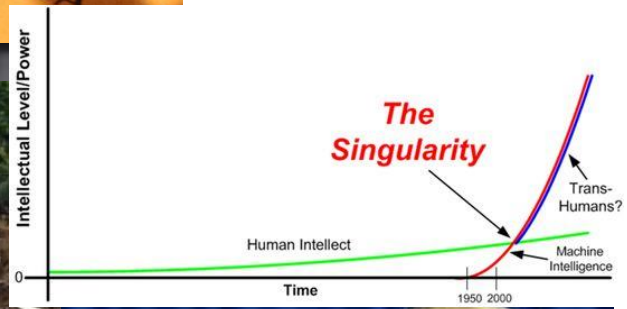
# Systemic risk is…

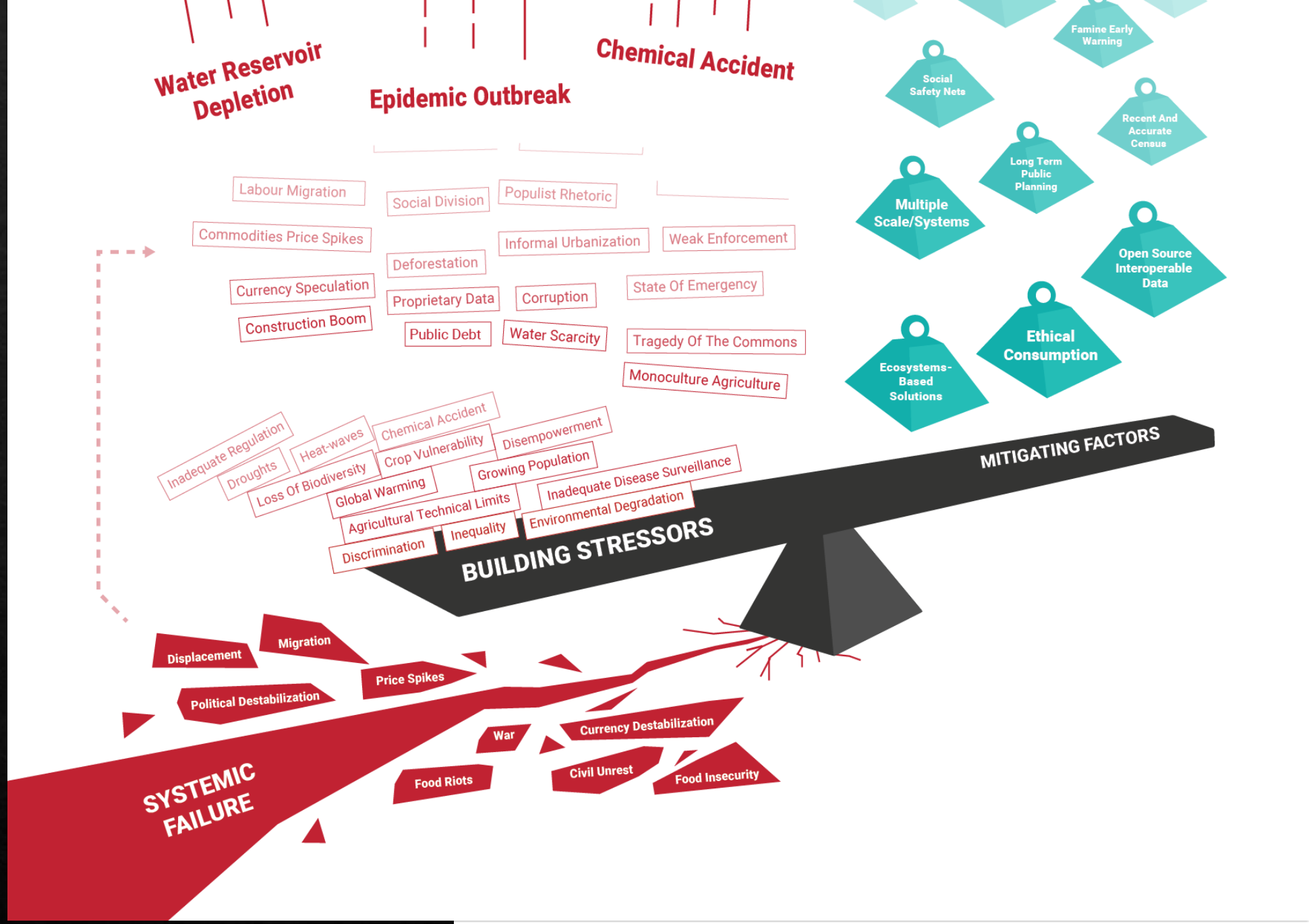
risk that is endogenous to, or embedded in, a system that is not itself considered to be a risk and is therefore not tracked or managed, but which is understood through systems analysis to have a latent or cumulative risk potential to negatively impact overall system performance when some characteristics of the system change


CURRENT AFFAIR
Monitoring with the RAPID Climate Change array has revealed that the strength of the Atlantic Meridional Overturning Circulation current, which transports warm surface water to the poles (orange) and cool deep water to the tropics (blue), is declining.
Subpolar array scheduled for deployment in summer 2014.
Existing RAPID monitoring array.
ATLANTIC OCEAN


PANAMA
Papers
MOSSACK
FONSECA

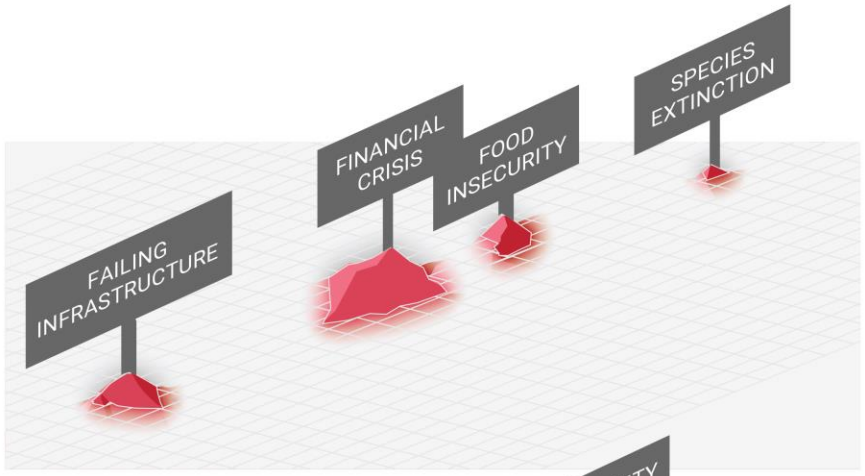

TIME
The Real Cost of Cheap Food


Intellectual Level/Power
The Singularity
Trans-Humans?
Human Intellect
Machine Intelligence
0
Time
1950 2000




AP / FIRE AND RESCUE NSW / WYOMING FIRE STATION
FIRE + RESCUE

**Realization of risk**




**Context**


**Driven by**


# Surprise is the new normal


Understanding risk is more than just understanding hazards


Linking an understanding of multiple hazards, plus exposure and vulnerability gives a clearer picture of risk

Interconnecting all our knowledge is complex, but the better linked the data, the better the interconnected nature of risk is explained

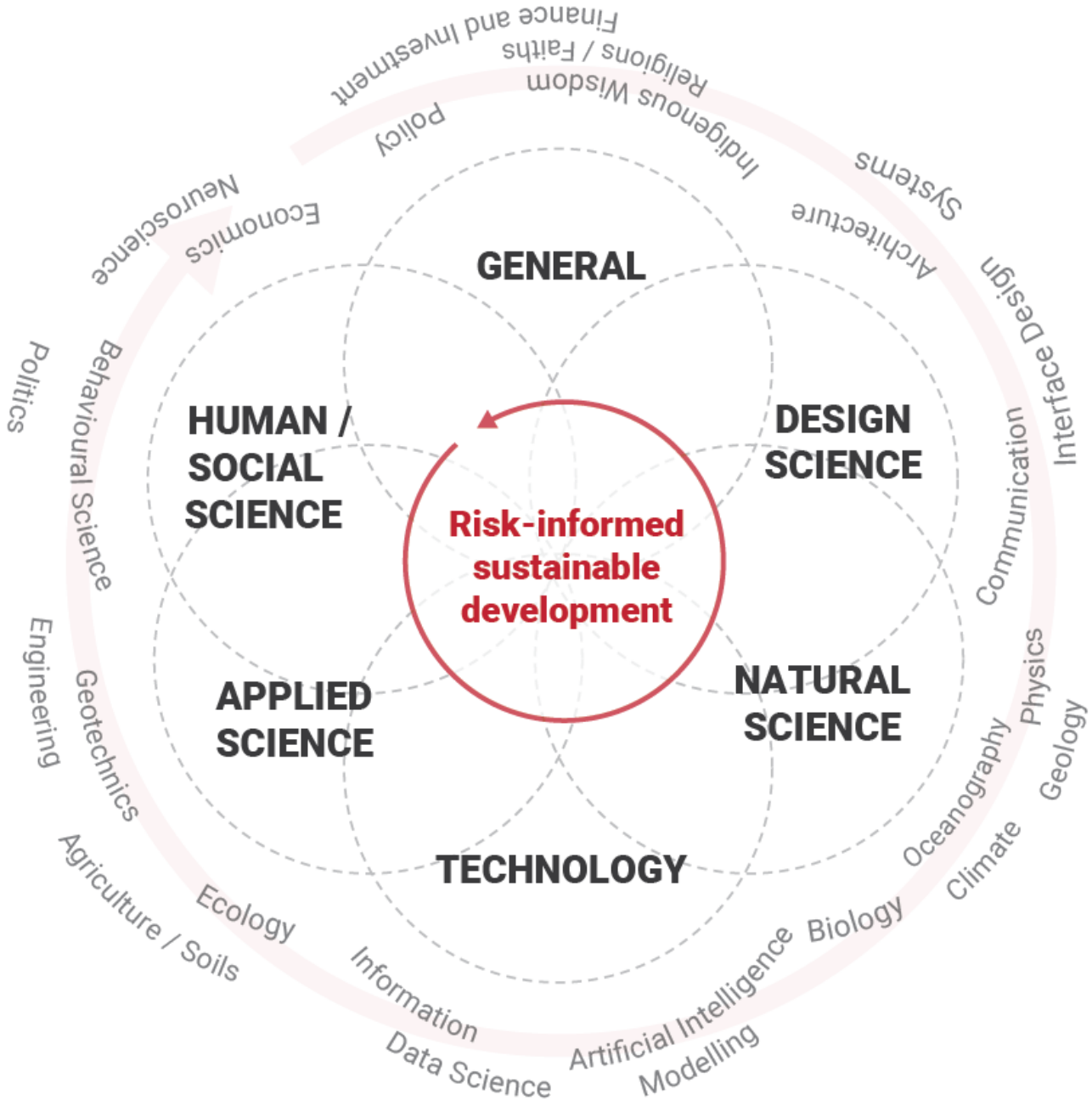
# It’s complex – let’s deal with it

Understanding risk means understanding what we know, what we don’t know, and even trying to tackle what we don’t know we don’t know.

**Risk is complex, so….**

How can we understand how to deal with it without resorting to reductive measures that isolate and ignore the systemic nature of risk?

How can we adopt pragmatic, pluralistic approaches that study risk phenomena across a range of interdependent dimensions?



# Lots of data, but not much wisdom… not yet

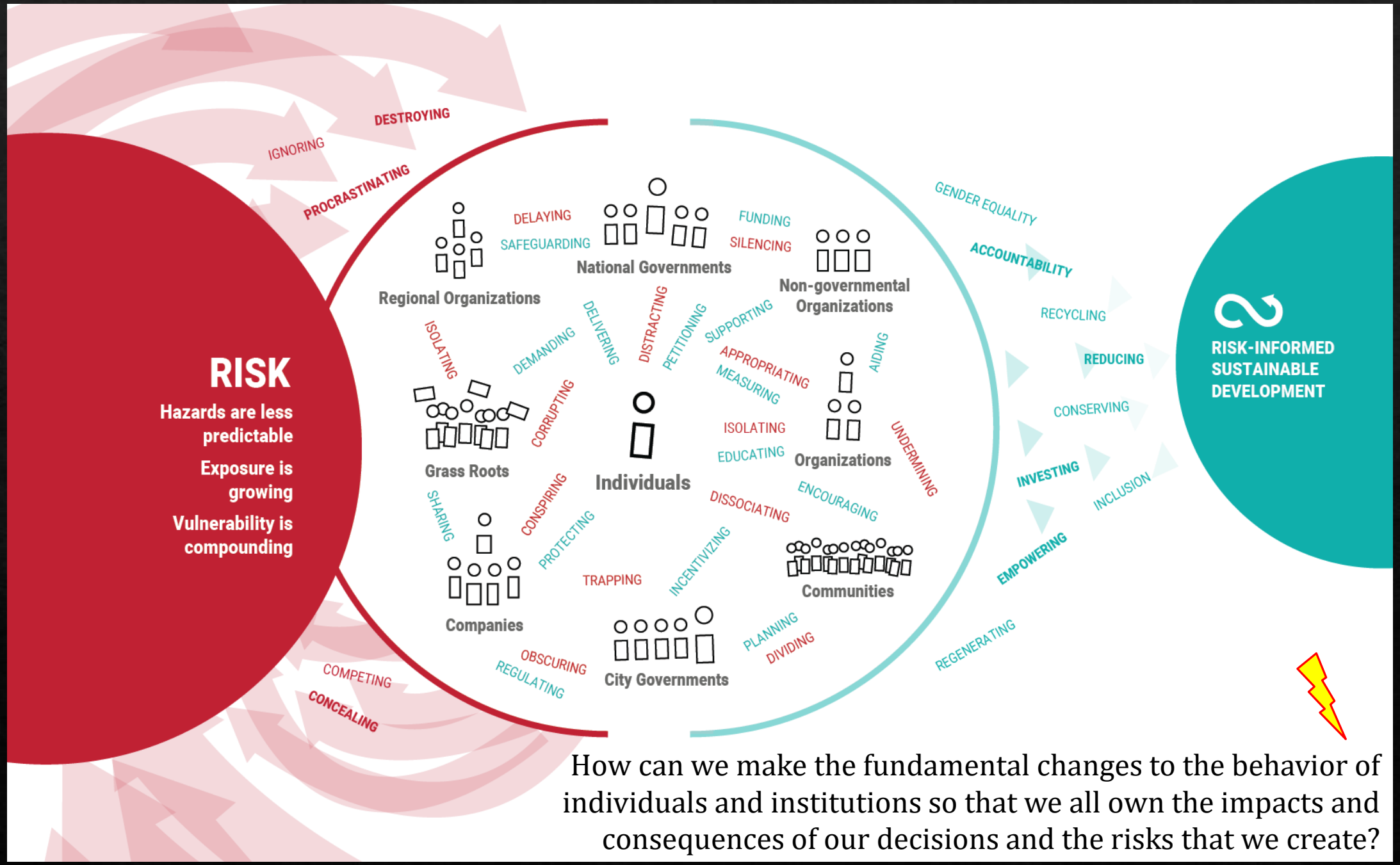
We need a sense of urgency translated into political action, sustained funding and commitment for risk-informed policies.

We cannot expect good plans in the absence of good data.

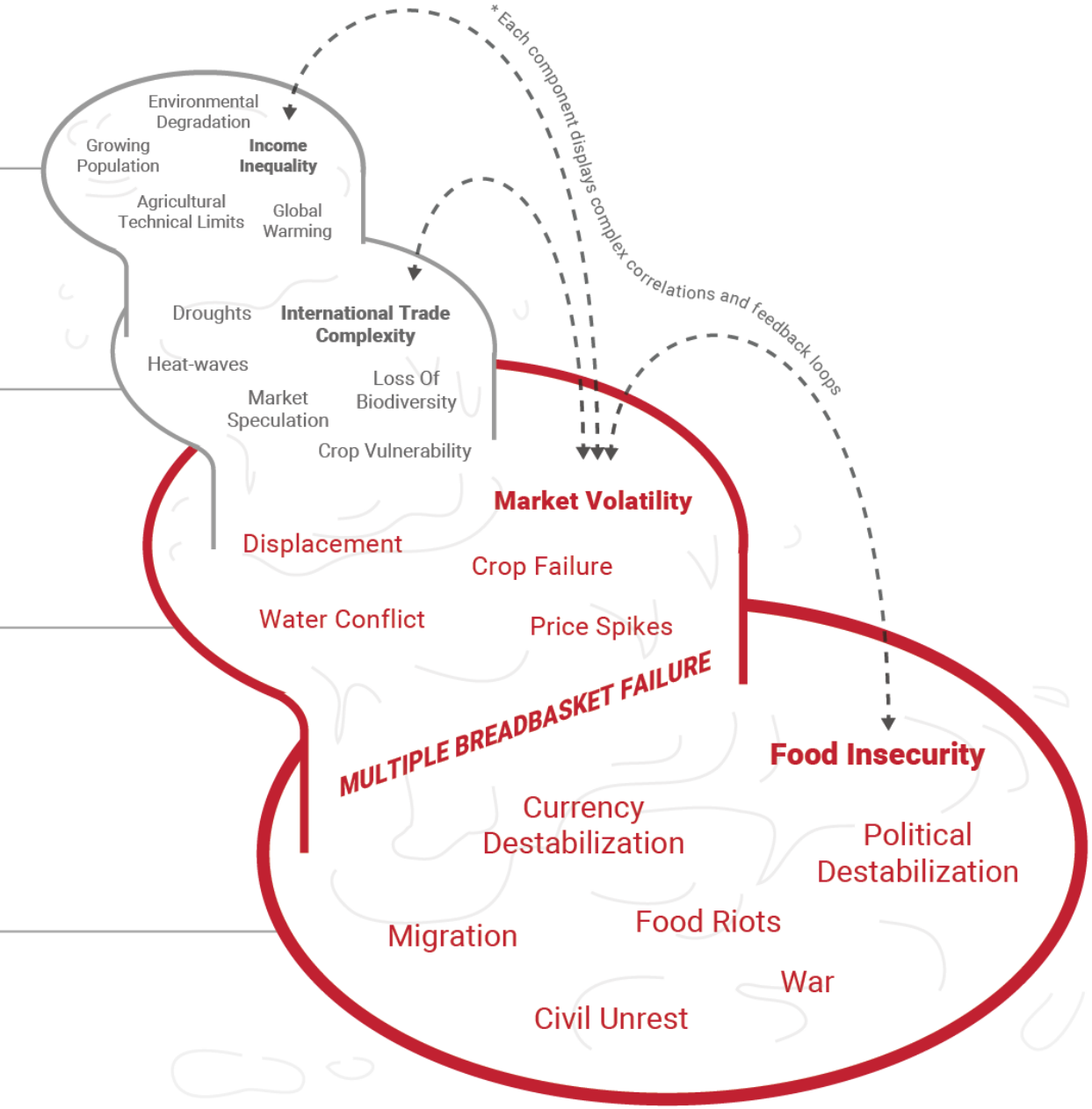
Without accurate, timely evidence of where WE currently stand,
we cannot confidently chart our path forward. Context matters.

People must be put at the centre of data generation and collection*.

* … so that information collected is contextual and improves our understanding of how people experience risk and loss, thereby improving relevance and effectiveness of policy, investment and action




How can we make the fundamental changes to the behavior of individuals and institutions so that we all own the impacts and consequences of our decisions and the risks that we create?






# Growing risk in a shrinking world

**Hazard-by-hazard era is over, we need…**

To identify precursor signals and correlations

Transdisciplinary, integrated multisectoral risk assessments and decision-making

Understanding of the fundamental characteristics of systemic risk

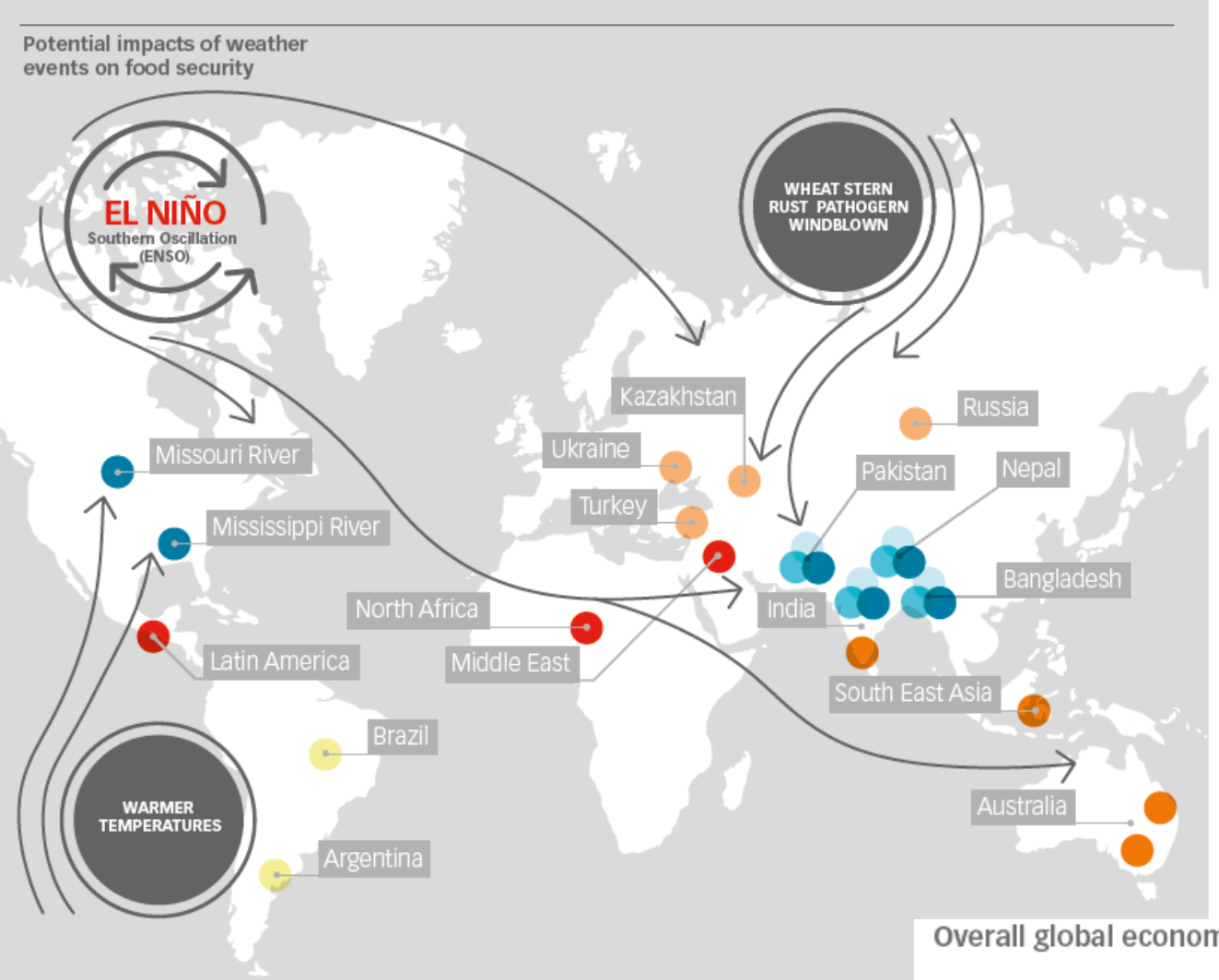
To reduce duplication of effort, improve understanding…. connect collective action

**What else?**

Emerging Risk Report – 2015
*Innovation Series*

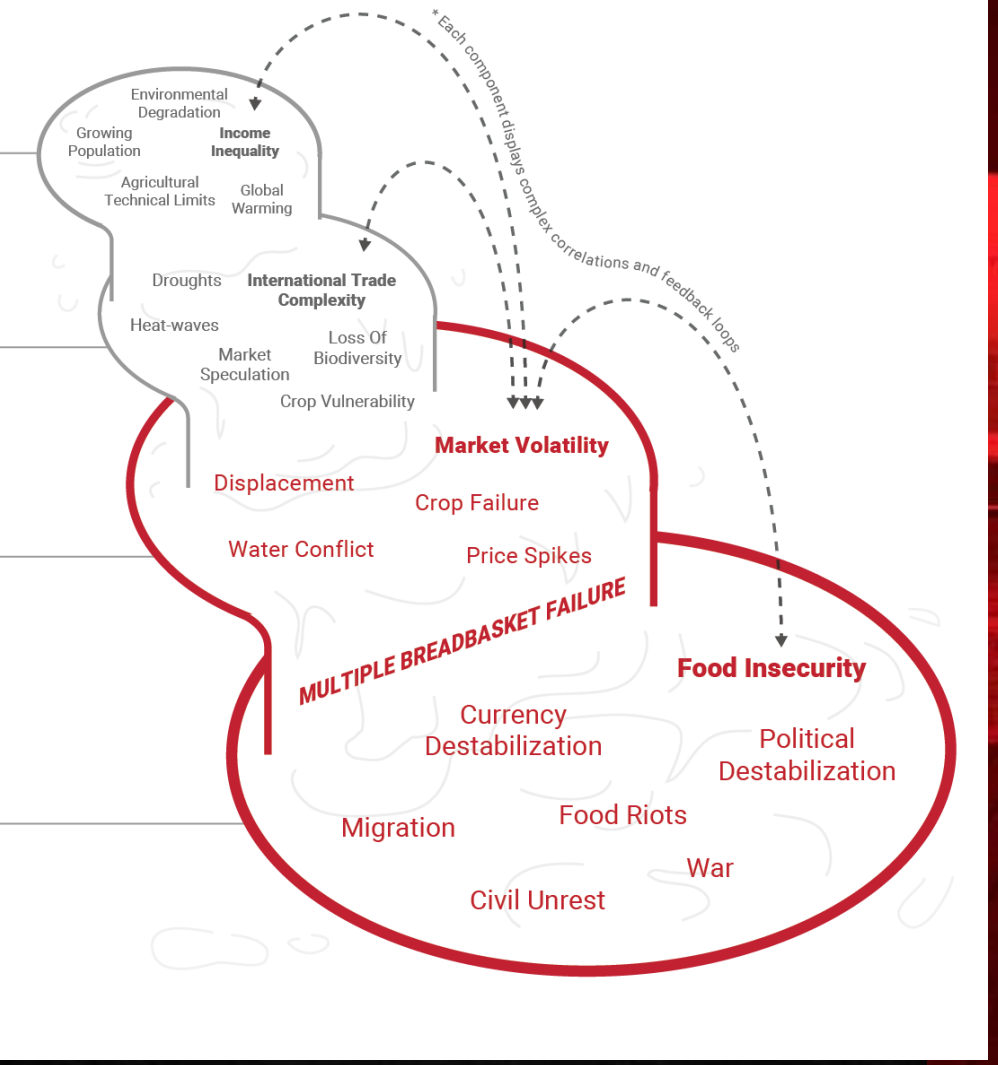
SOCIETY & SECURITY

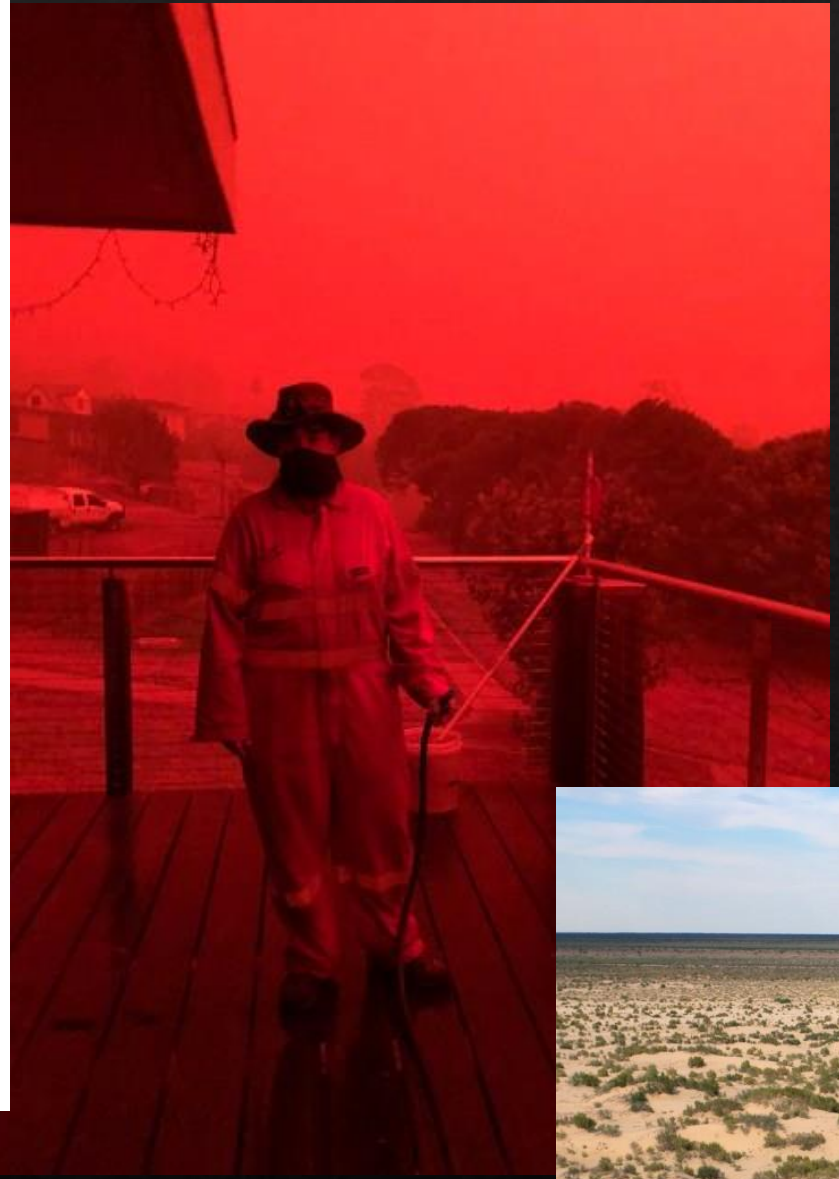
# Food System Shock




Overall global economic impact:

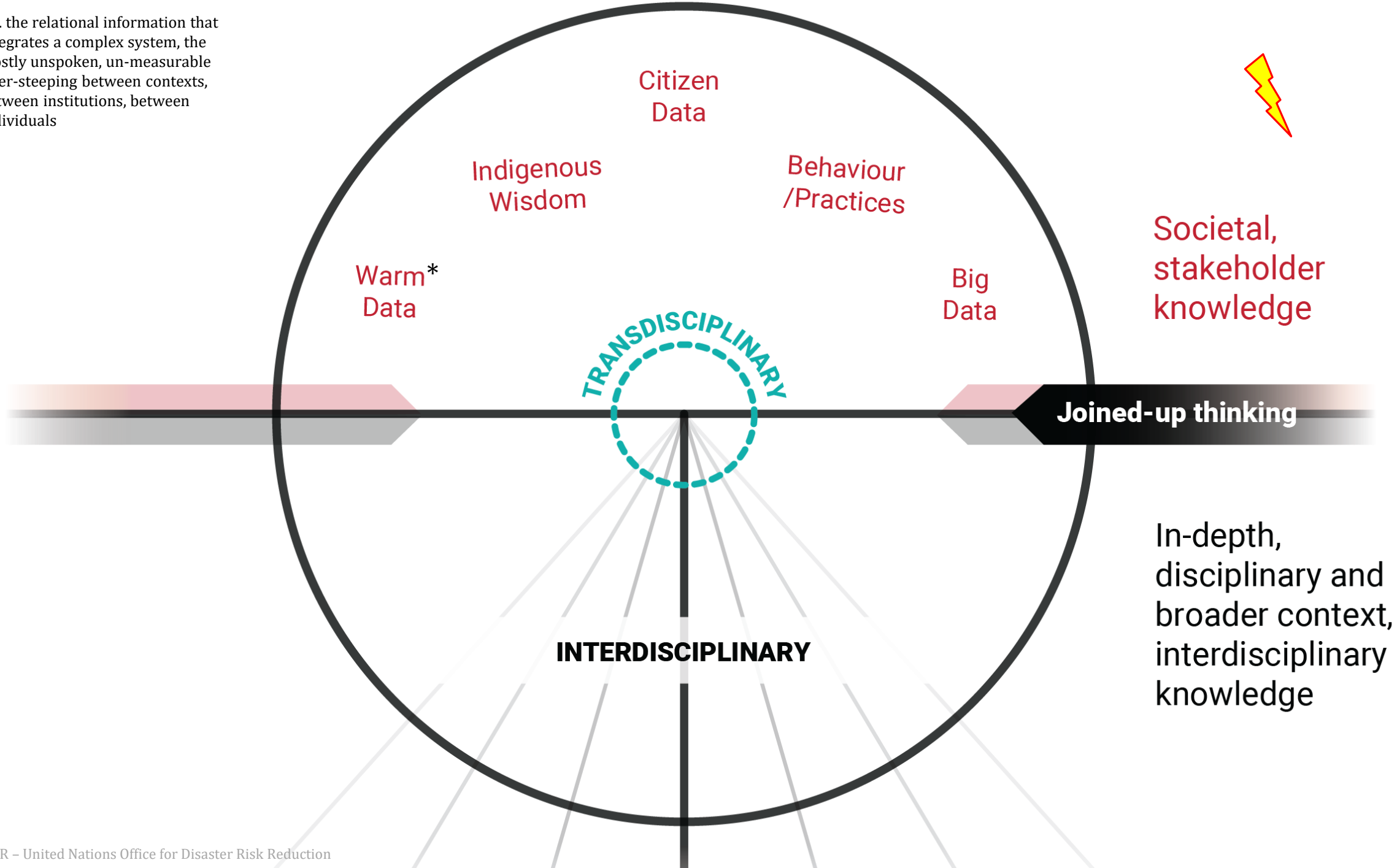
| -5% | -10% | -7% | -10% | -11% | +500% |
|---|---|---|---|---|---|
| US stocks lose 5% of value | EU stocks lose 10% of value | Global rice production falls by 7% | Global maize production falls by 10% | Global soybean production falls by 11% | Rice prices increase by 500% |



# Three possible (bits of) contexts

* … the relational information that integrates a complex system, the mostly unspoken, un-measurable inter-steeping between contexts, between institutions, between individuals



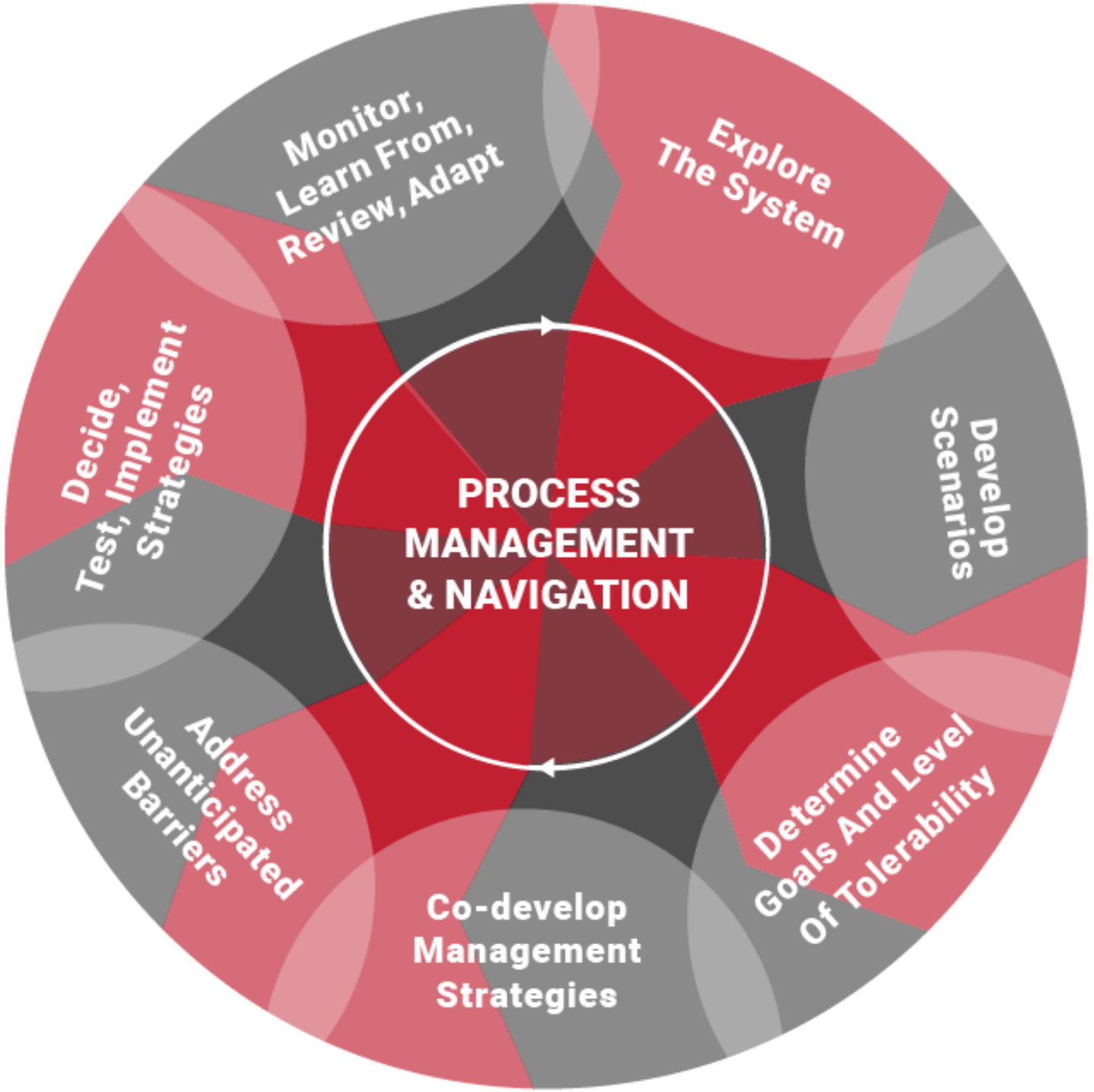
# Systemic risk governance

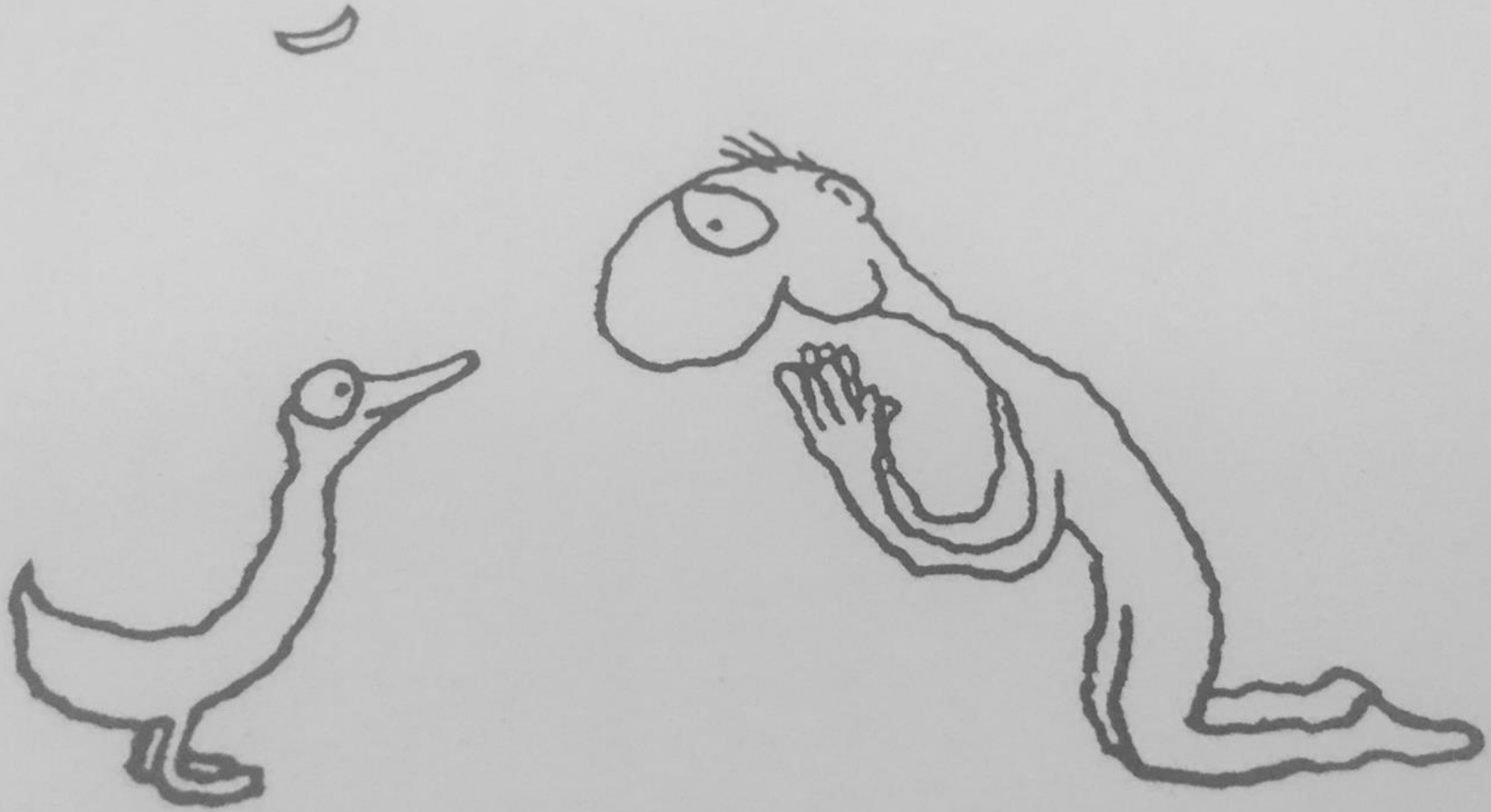
Systemic risk cannot be measured by separately quantifying contributing parts

Consider interconnected elements and interdependencies

Is there a willingness to adapt or revise current governance for non-linear, non-sequential processes?

What are the barriers to overcome to establish the principle of collective responsibility?





Introducing the

# Global Risk Assessment Framework

“Realising the systemic nature of risks, and the opportunities afforded by new approaches and new concepts of risk, will be the central challenge of the first half of the twenty-first century”

## FROM THE HYOGO FRAMEWORK 2005

Global Risk Model Metrics =


| HAZARD | X | EXPOSURE | X | VULNER-ABILITY | SCALE |
|---|---|---|---|---|---|
| Earthquake<br>Tsunami<br>Riverine Flood<br>Cyclonic Wind<br>Storm Surge | | Structural | | Economic | Global<br>National |

## THROUGH THE SENDAI FRAMEWORK 2015

| HAZARD | EXPOSURE | VULNER-ABILITY | SCALE | SYSTEMS |
|---|---|---|---|---|
| Earthquake<br>Volcano<br>Tsunami<br>Flooding<br>Fire<br>Biological<br>Technological | Structural<br>Agriculture<br>Basic Services | Economic<br>Social<br>Environ-mental | Global<br>National<br>Local | Human<br>Ecological<br>Economic |

# Shifting the paradigm

The goal of GRAF is to improve the understanding of current and future risks, at all spatial and temporal scales.

GRAF will stimulate transdisciplinary systems behaviours to support transformative action and increase the resilience of societies and systems.

## TO THE GLOBAL RISK ASSESSMENT FRAMEWORK – GRAF 2020+

# The Global Risk Assessment Framework (GRAF) Expert Meeting (Nov. 2017) - Recommendations

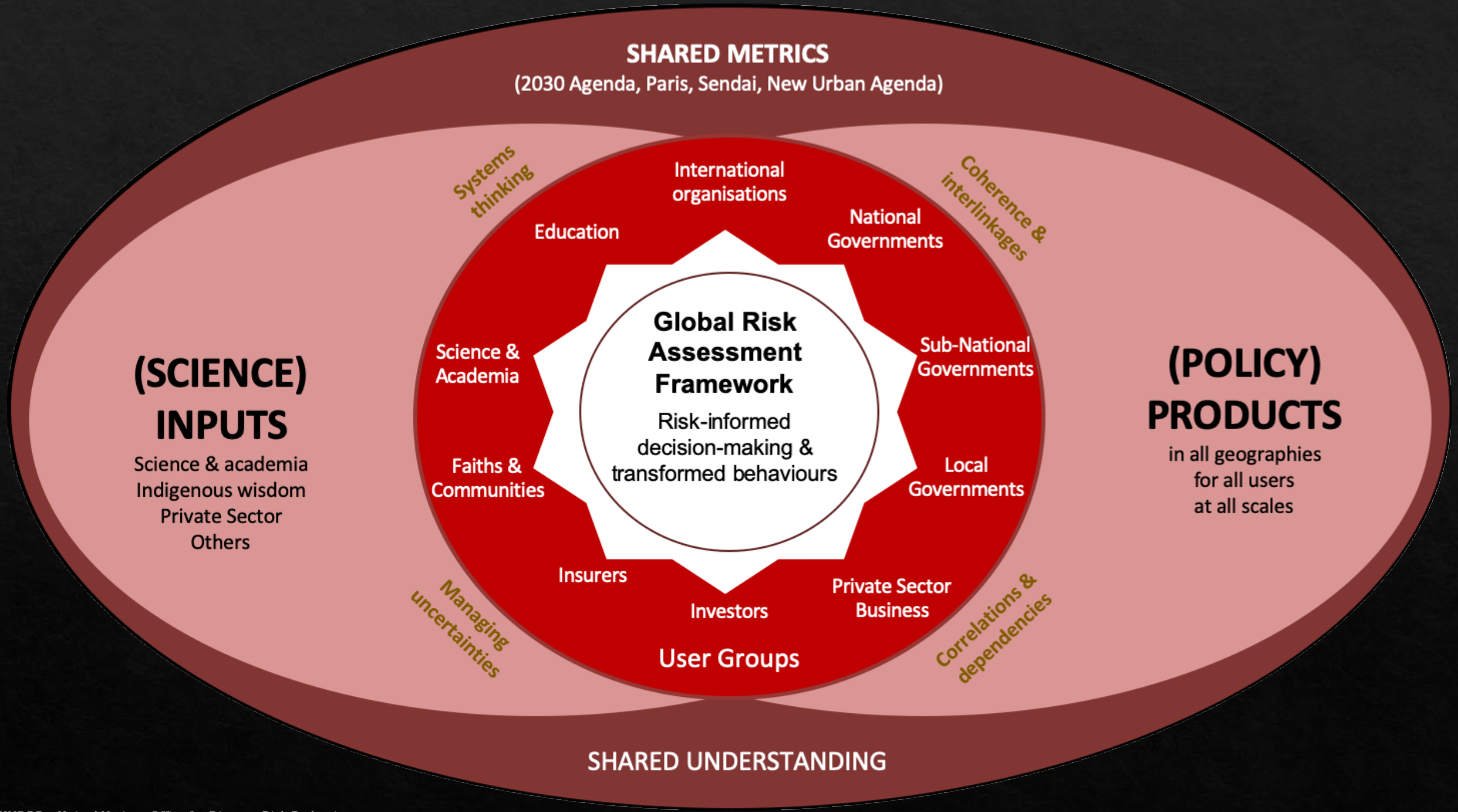
UNDRR to lead establishment of a Global Risk Assessment Framework

- utilising existing data / models / assessment, connecting systems, revealing interdependencies, collectively identifying solutions at scale
- underpinned by robust practices and standards
- emphasise / improve understanding of vulnerability, exposure & impact
- develop common list of hazards, data standards and risk metrics
- convert and translate risk modelling outputs into usable and applicable information
- meet demand for openly accessible data, products & services
- establish Expert Group to guide design and iterative development

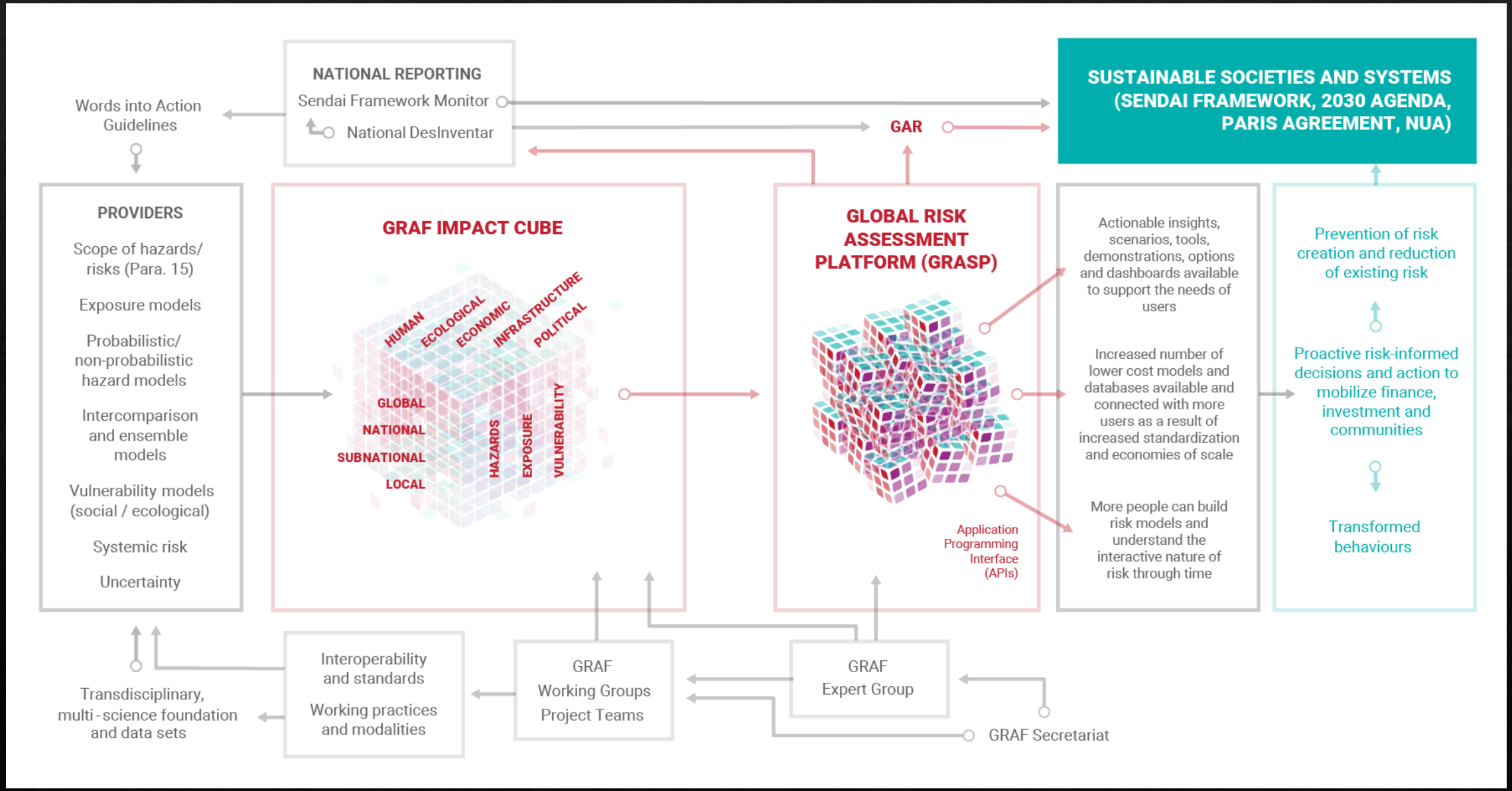
# GRAF Vision & Principles

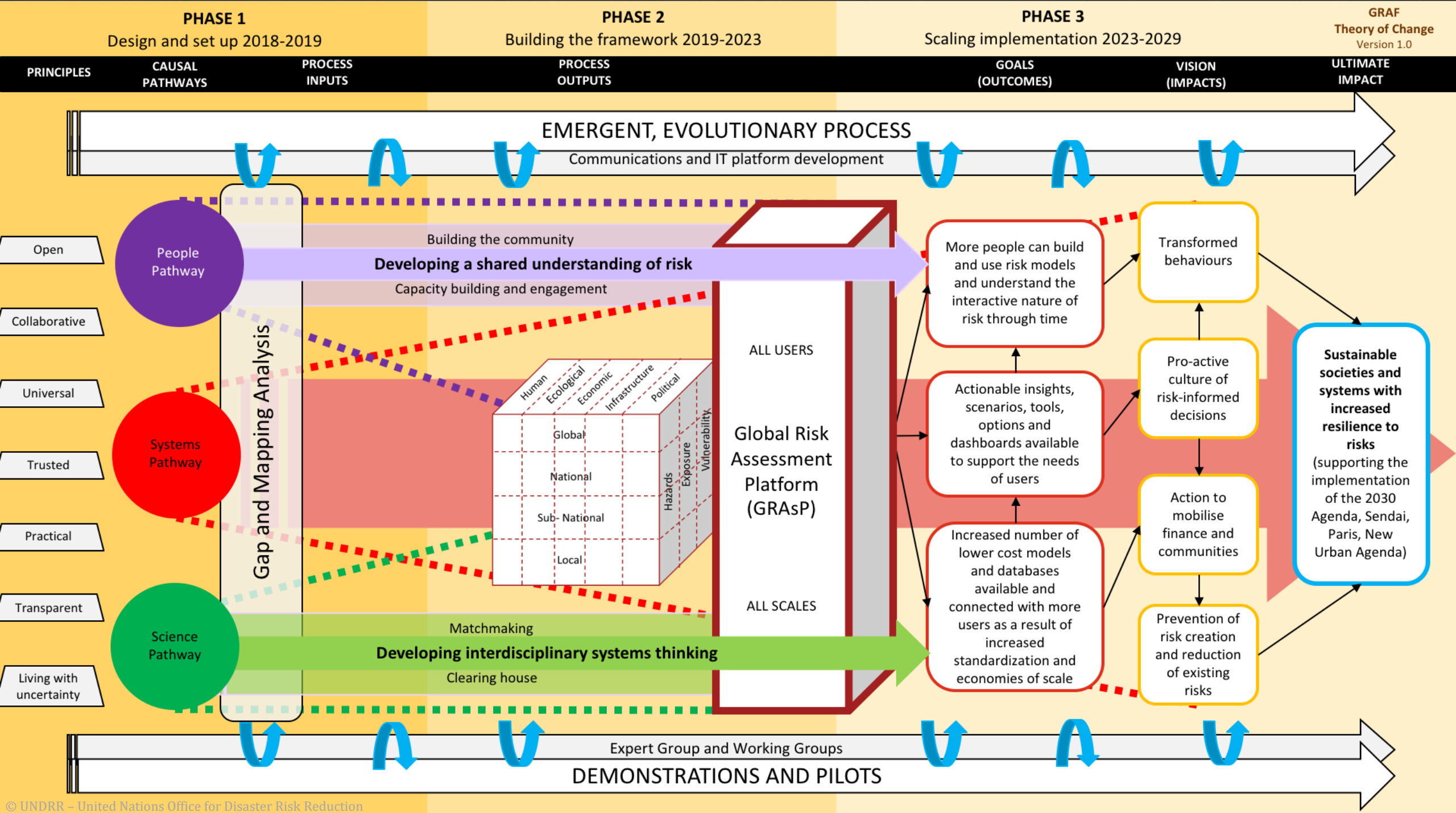
*To improve understanding of complex risk and where relevant and applicable, to transform behaviours and catalyse a proactive decision-making culture by democratizing everyone's understanding of the systemic nature of risk through time*

1. Improve understanding
2. Provide actionable insights
3. Support decision-makers to maximise synergies
4. Build trust in assessments
5. Foster open and collaborative culture
6. Mobilize finance and de-risk investments



# Schematic representation of GRAF

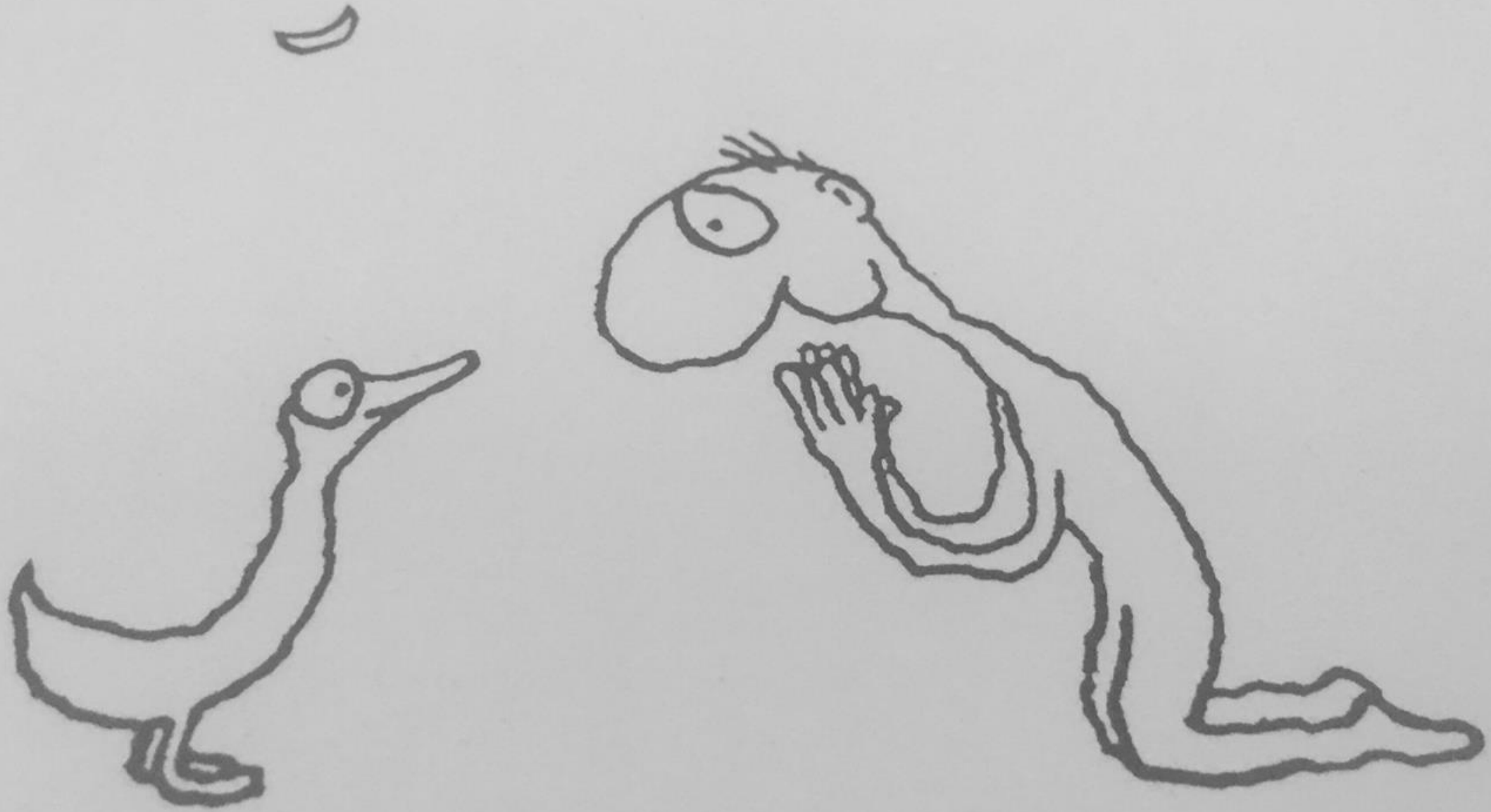





CAUTION
PHILOSOPHER AT WORK
MAJOR THOUGHT UNDER CONSTRUCTION
Leunig

# GRAF should focus on …

1
2
3
4
5



# Introducing the Core Elements Approach


CAUTION
PHILOSOPHER AT WORK
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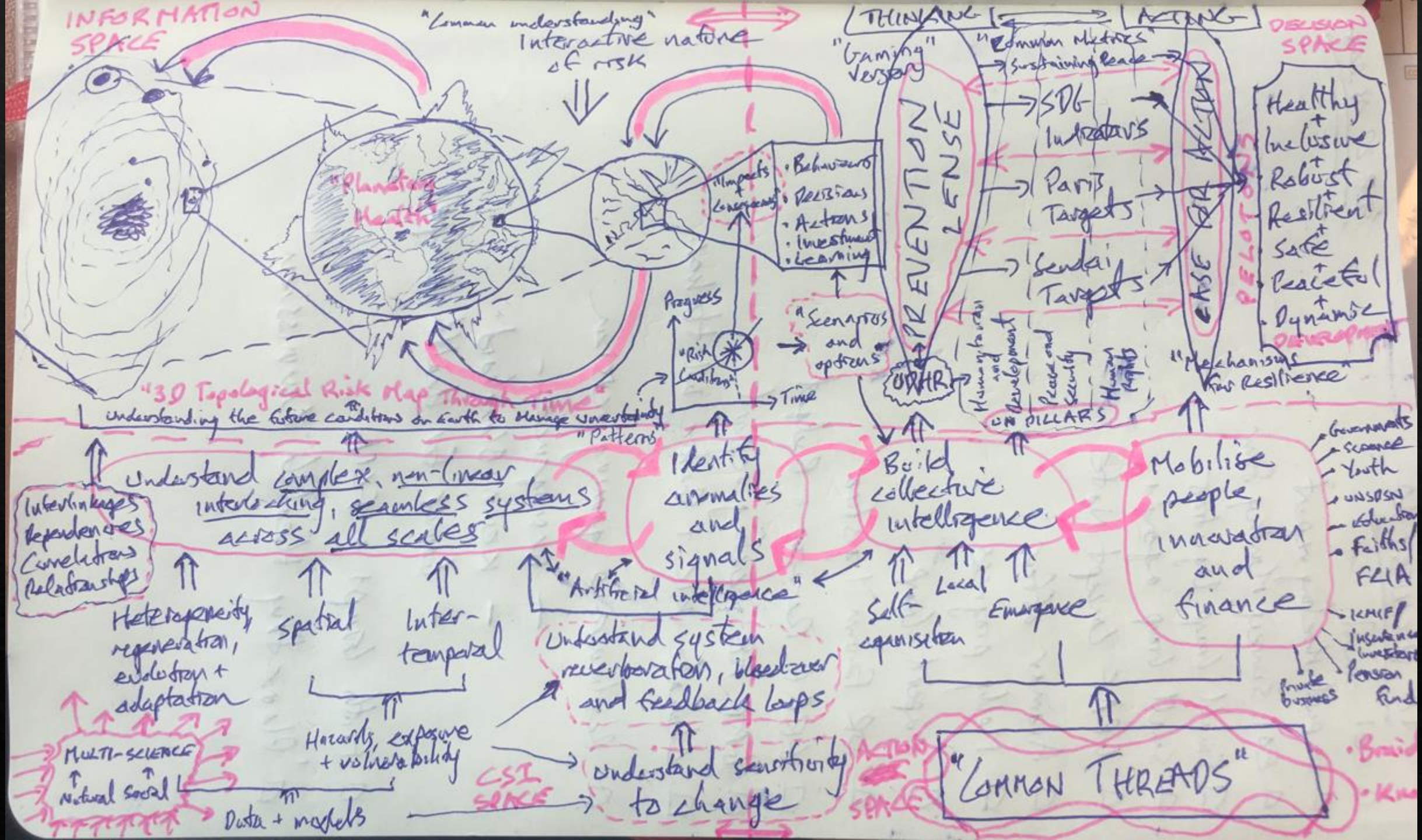
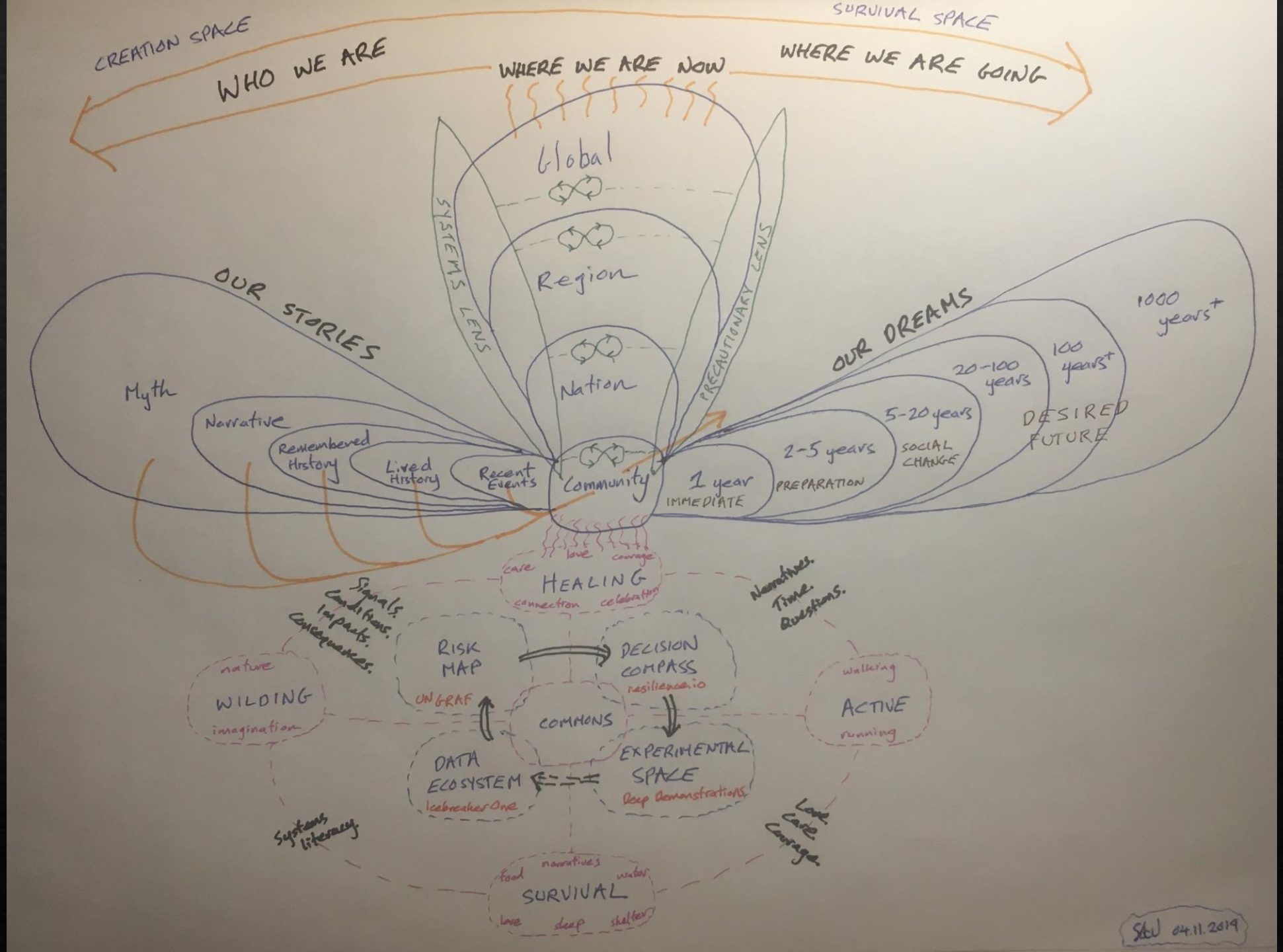
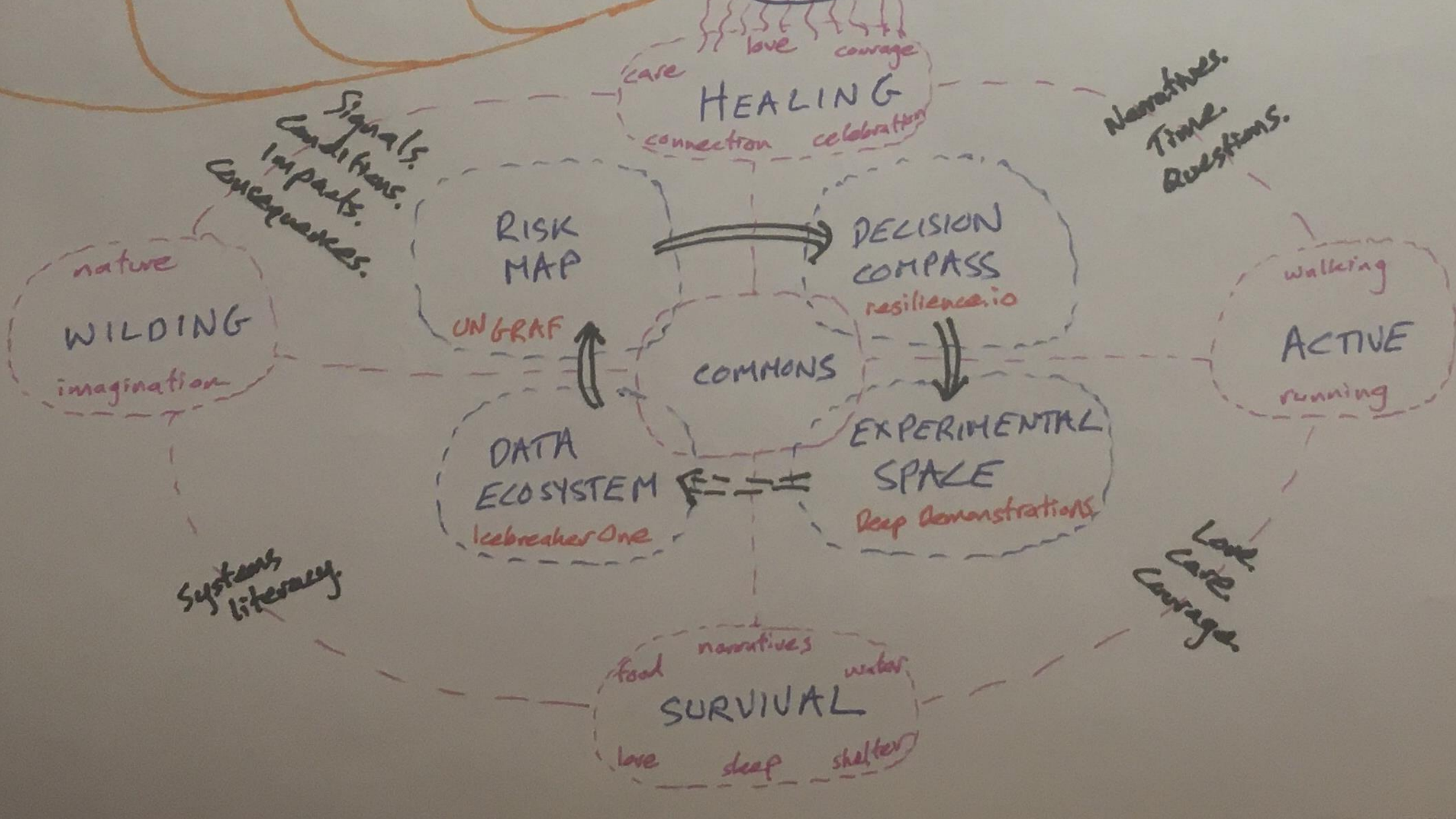

INFORMATION SPACE
"Common understanding"
Interactive nature of risk
"Planetary Health"
Impacts + Emergence
• Behaviours
• Decisions
• Actions
• Investment
• Learning
Progress
"Risk Conditions"
Time
"Scenarios and options"
"3D Topological Risk Map Through Time"
Understanding the future conditions on Earth to Manage uncertainty
"Patterns"
Understand complex, non-linear interacting, seamless systems across all scales
Interlinkages
Dependences
Correlations
Relationships
Identify anomalies and signals
"Artificial intelligence"
Heterogeneity, regeneration, evolution + adaptation
Spatial
Inter-temporal
Understand system reverberation, bleedover and feedback loops
Hazards, exposure + vulnerability
Data + models
MULTI-SCIENCE
Natural Social
CSI SPACE
understand sensitivity to change
THINKING
ACTING
"Gaming Version"
"Common Metrics" sustaining peace
SDG Indicators
Paris Targets
Sendai Targets
PREVENTION LENSE
UNHR
UN PILLARS
Humanitarian and development
Peace and security
Human rights
ACTION LENSE
"Mechanisms for Resilience"
DESIGN SPACE
PILOTS
Healthy + Inclusive + Robust + Resilient + Safe + Peaceful + Dynamic
Governments
Science
Youth
UNSDSN
Education
Faiths
FCIA
ICMIF
Insurance Investors
Pension Fund
Private business
Build
Know
Build collective intelligence
Self-organisation
Local
Emergence
Mobilise people, innovation and finance
ACTION SPACE
"COMMON THREADS"


Let it go. Let it out.
Let it all unravel.
Let it free and it can be
A path on which to travel.


CREATION SPACE
WHO WE ARE
WHERE WE ARE NOW
SURVIVAL SPACE
WHERE WE ARE GOING
Global
Region
Nation
Community
SYSTEMS LENS
PRECAUTIONARY LENS
OUR STORIES
Myth
Narrative
Remembered History
Lived History
Recent Events
OUR DREAMS
1 year
IMMEDIATE
2-5 years
PREPARATION
5-20 years
SOCIAL CHANGE
20-100 years
100 years+
1000 years+
DESIRED FUTURE
care
love
courage
HEALING
connection
celebration
Signals. Conditions. Impacts. Consequences.
Narratives. Time. Questions.
RISK MAP
UNGRAF
DECISION COMPASS
resilience.io
COMMONS
nature
WILDING
imagination
walking
ACTIVE
running
DATA ECOSYSTEM
Icebreaker One
EXPERIMENTAL SPACE
Deep Demonstrations
Systems literacy
Love. Care. Courage.
narratives
food
water
SURVIVAL
love
sleep
shelter
SCW 04.11.2019


love
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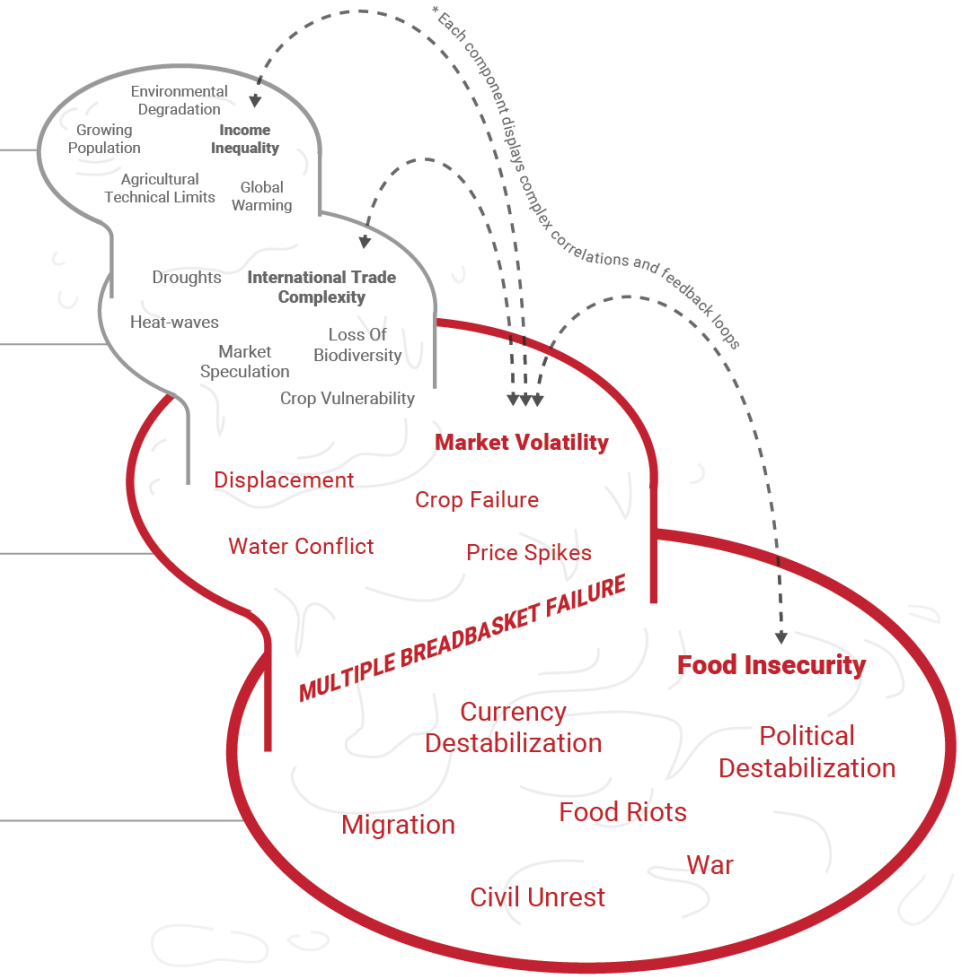


# Three possible (bits of) contexts

# Core Elements Approach

## Data Ecosystem

Example 1

Example 2

Example 3

Example 4

## Risk Map

Example 1

Example 2

Example 3

Example 4

## Decision Compass

Example 1

Example 2

Example 3

Example 4

experimental space