

RESILIENCE

in IRGC concepts and recommendations

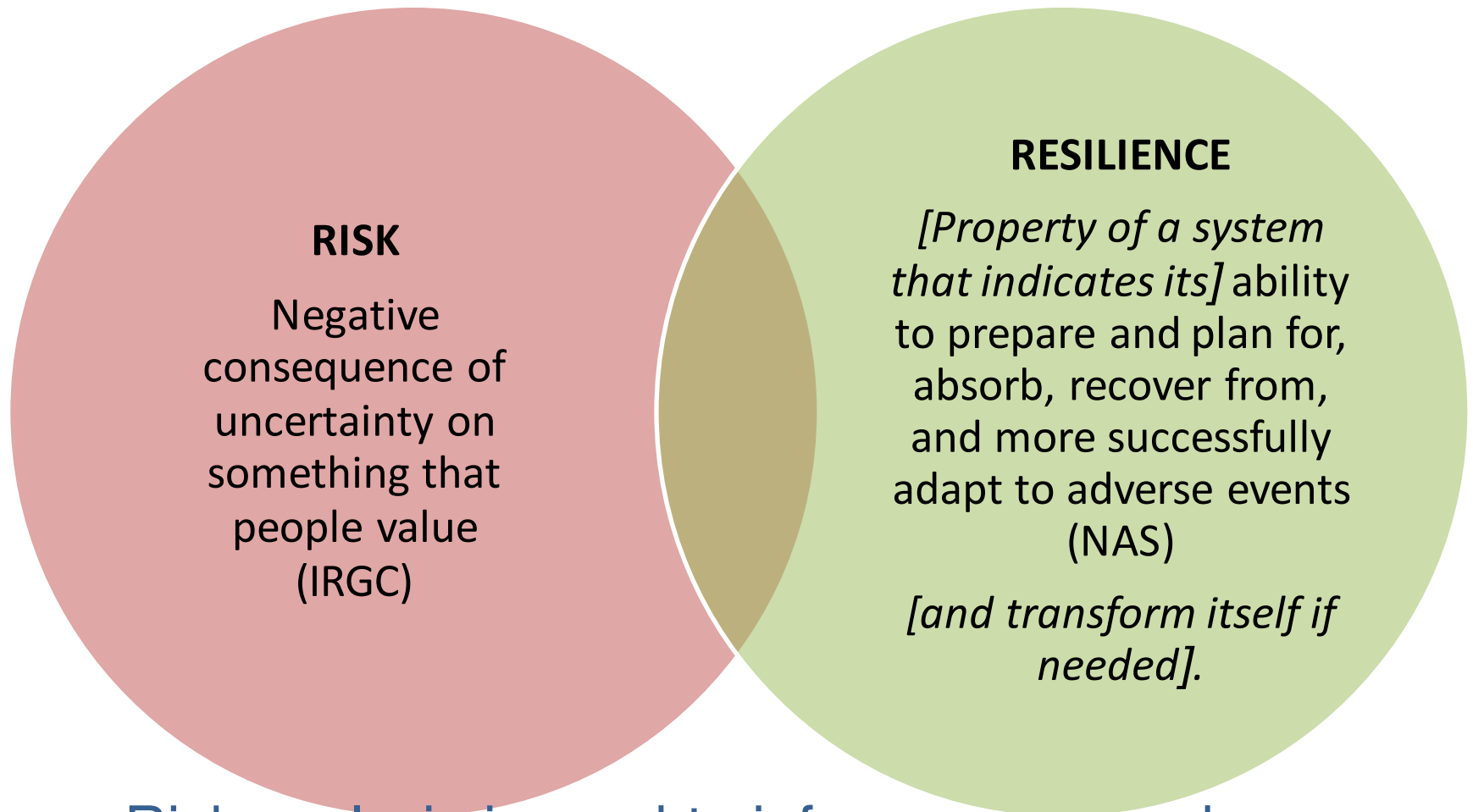
*Articulating risk and resilience management
from the perspective of a risk manager*

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www.irgc.org

In the world of risk

In the world of resilience



Risk analysis is used to inform a process by
which resilience is built, when and as needed

Characterizing the knowledge we have about the risk

Complexity

Refers to the difficulty of **identifying and quantifying causal links** between a multitude of potential causal agent and specific observed effects

Large infrastructure network, e.g. electricity grid, internet

Uncertainty

A state of knowledge in which, although the factors influencing the issues are identified, the likelihood of any adverse effect or the effects themselves **cannot be precisely described.**

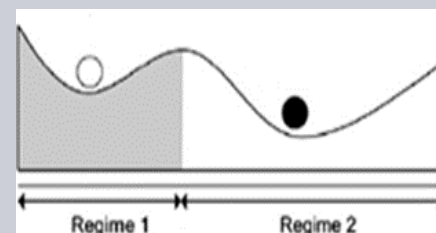
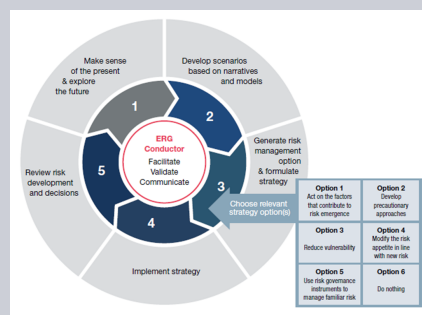
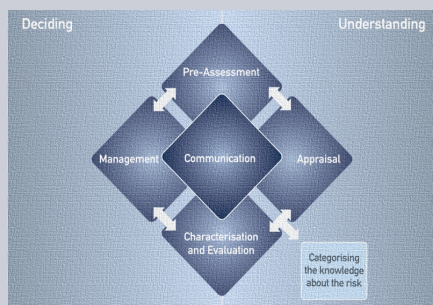
E.g. climate change, biodiversity loss

Ambiguity

Giving rise to **several meaningful and legitimate interpretations** of accepted risk assessments results

Risks related to genetically modified crops

Resilience in IRGC concepts



Risk Management Strategies

Target

Impact of the risk

- exposure

- vulnerability

Strategies directed at the risk absorbing system

Robustness-focused

/ build stronger

Resilience-focused

/ prepare to cope with surprises

Adaptive management + resilience planning

/ prepare to cope with surprises

Source of the risk

- hazard

Agent based strategies

Risk-informed

/ seek more information

Precaution-based

*/ be prudent
/ do not make irreversible decisions*

Anticipating future triggers for hazards + dealing with the factors contributing to risk

Complexity

Uncertainty

Emerging

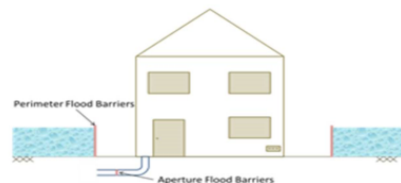
Characteristic of the risk

(adapted from: IRGC risk governance framework, 2005)

Robustness vs. Resilience

Water exclusion strategies:
Building resistance

Water entry strategies :
Building resilience



Description

- Flood barriers are usually installed at some distance from the construction, forming a perimeter.

Types:

- Preinstalled flood barriers
- Demountable perimeter flood barriers
- Temporary perimeter flood barriers

Limitation

- The stability issue not only of the barriers but also of the ground stability
- Logistics

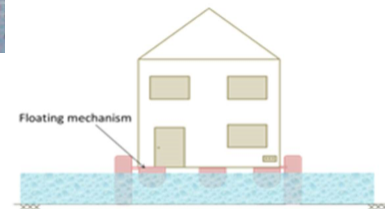
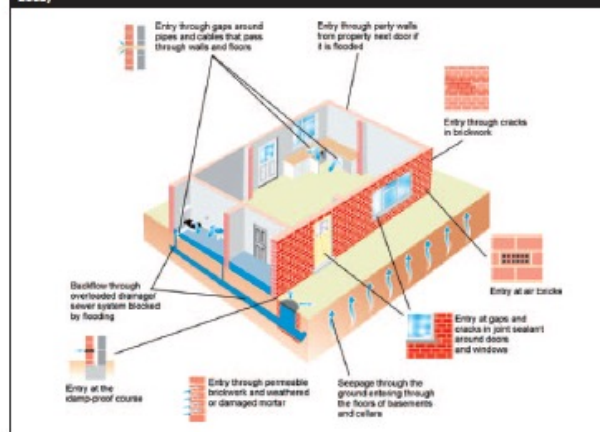
Technologies associated

Building Technologies and Perimeter Technology

- Alarm System (sensors, radars)
- Aperture flood barriers
- Perimeter flood barriers
- Pump & Sump



Figure 2.6 Potential Routes for Entry of Flood Water into a Dwelling (courtesy of CIRIA, after CIRIA 2003)



Description

-The building is not supported by a firm foundation, but floats on water.

-The position of a floating home is permanently fixed in horizontal direction, while it can flexibly follow vertical variations in water level.

Limitation

-The bottom level of the entire construction should be at least 1 meter from the water bottom (water quality conditions)

- It is essential that a floating building never touches firm ground

Technologies associated

Not investigated within the SMARTeST Project

Risk Management Strategies

- Build dykes
- Earthquake-resistant building
- Building codes / land-use planning

- Dig canals to let the water enter cities
- Build floating houses
- Build redundancy
- Transfer risk to insurance

Impact of the risk

- exposure

- vulnerability

Strategies directed at the risk absorbing system

Robustness-focused

/ build stronger

Resilience-focused

/ prepare to cope with surprises

resilience planning

/ prepare to cope with surprises

(work, 2005)

Source of the risk

- hazard

Agent based strategies

Risk-informed

/ seek more information

Precaution-based

/ be prudent

Anticipating triggers for dealing with contributing factors

Planned Adaptive Management

(adapted from: IRGC)

Reduce GHG emissions

Complexity

Uncertainty

characteristic of the risk

- Avoid building cities by the coast
- Exclusion clauses in insurance policies

IRGC White Paper on Risk Governance, 2005: (Risk Governance Framework)

“Resilience is a **protective strategy** to build in defences to the whole system against the impact of the realization of an unknown or highly uncertain risk.”

Instruments for resilience include strengthening the immune system, designing systems with flexible response options, improving emergency management, etc.”

IRGC guidelines for emerging risk governance (2014)

Resilience as a (dynamic, proactive) **strategy for adaptive risk management.**

E.g. Planned Adaptive Regulation (“laws that learn”, EC institutional process for ex-post impact assessment, integrating feedback from experience into the regulation, to include some flexibility in regulation.

Objectives for resilience

1. to guarantee the functional continuity of the system (and the critical services it provides) in case of stress or disaster
2. to limit the extent of impact and losses if the services are discontinued
3. to ensure fast recovery if the provider of the service is unable to continue to provide the needed services

(adapted from Ortwin Renn, International Disaster Reduction Conference, 2012)