KINTSUGI

Improving resilience capacities in a hazard-scape
otsuchi, japan

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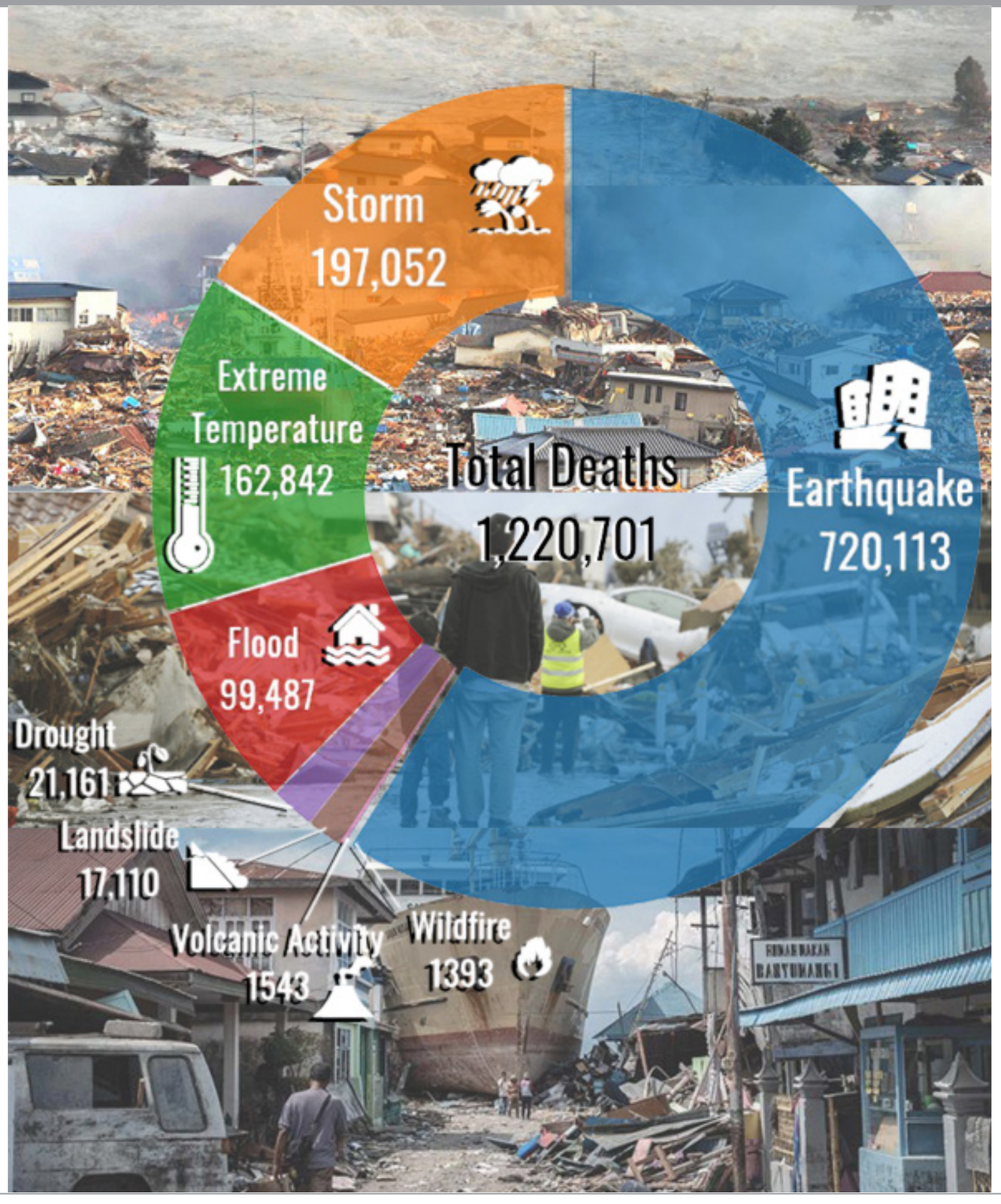
P5 Presentation

TU Delft Urbanism DIMI Delft Infrastructures & Mobility Initiative

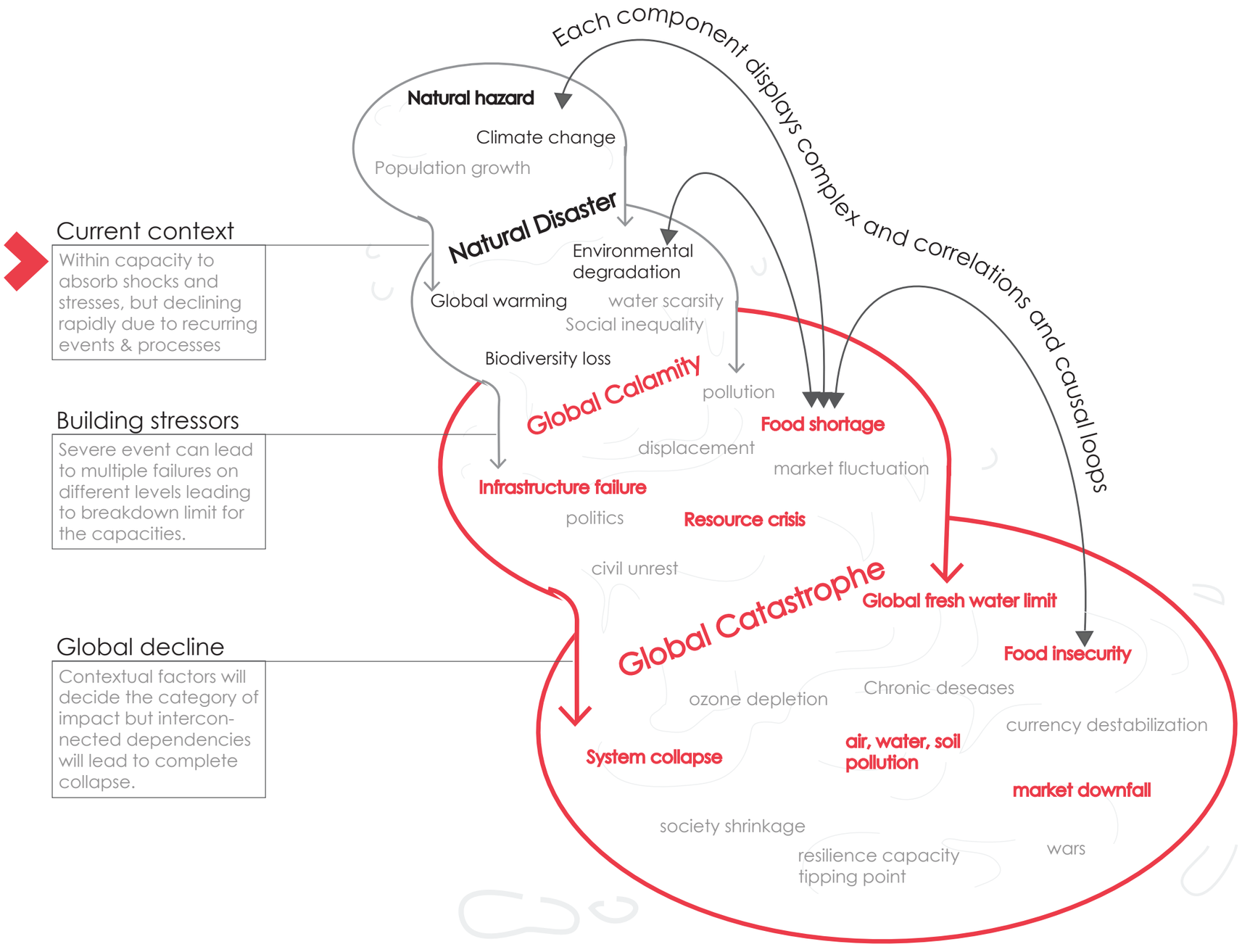
Motivation

- Frequency
- Intensify
- Human loss
- Resource losses
- Chronic illness



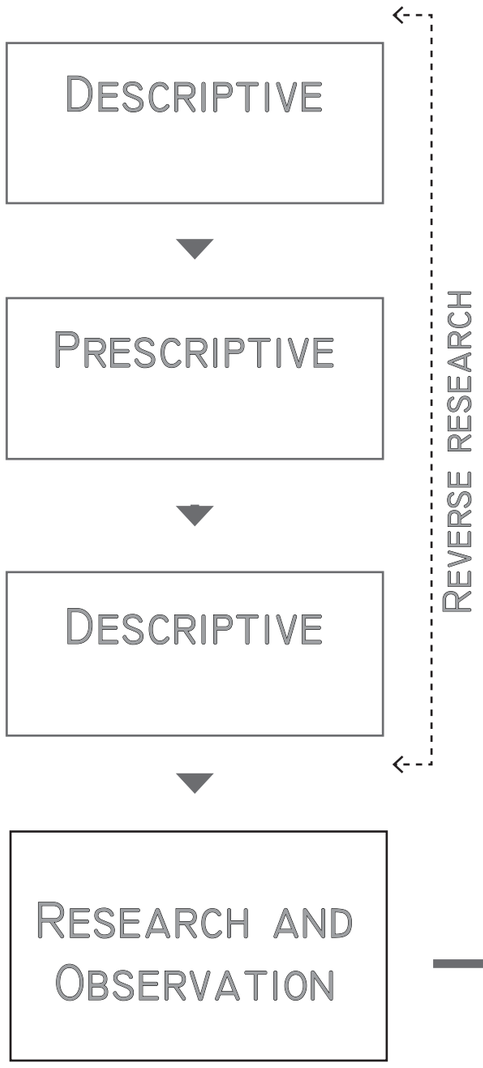
EM-DAT, CRED, 1998-2017
FAOSTAT, 2003–2013

Motivation

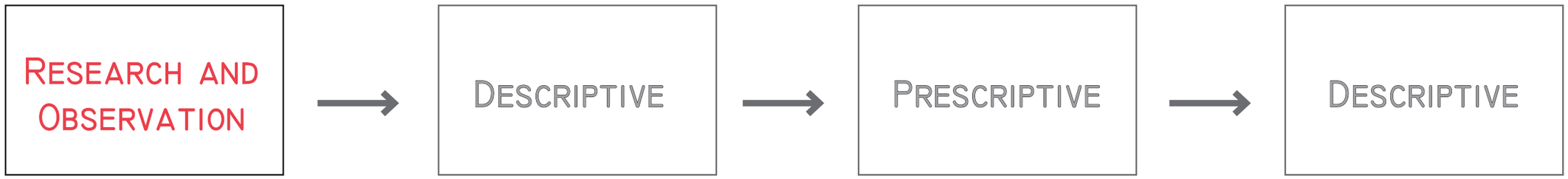

Each component displays complex and correlations and causal loops
Natural hazard
Climate change
Population growth
Natural Disaster
Environmental degradation
Global warming
water scarsity
Social inequality
Biodiversity loss
Global Calamity
pollution
Food shortage
displacement
market fluctuation
Infrastructure failure
politics
Resource crisis
civil unrest
Global Catastrophe
Global fresh water limit
Food insecurity
Chronic deseases
ozone depletion
currency destabilization
air, water, soil pollution
System collapse
market downfall
society shrinkage
wars
resilience capacity tipping point
Current context
Within capacity to absorb shocks and stresses, but declining rapidly due to recurring events & processes
Building stressors
Severe event can lead to multiple failures on different levels leading to breakdown limit for the capacities.
Global decline
Contextual factors will decide the category of impact but interconnected dependencies will lead to complete collapse.

DISASTERS are phenomenon that affect the core principles of SUSTAINABLE DEVELOPMENT

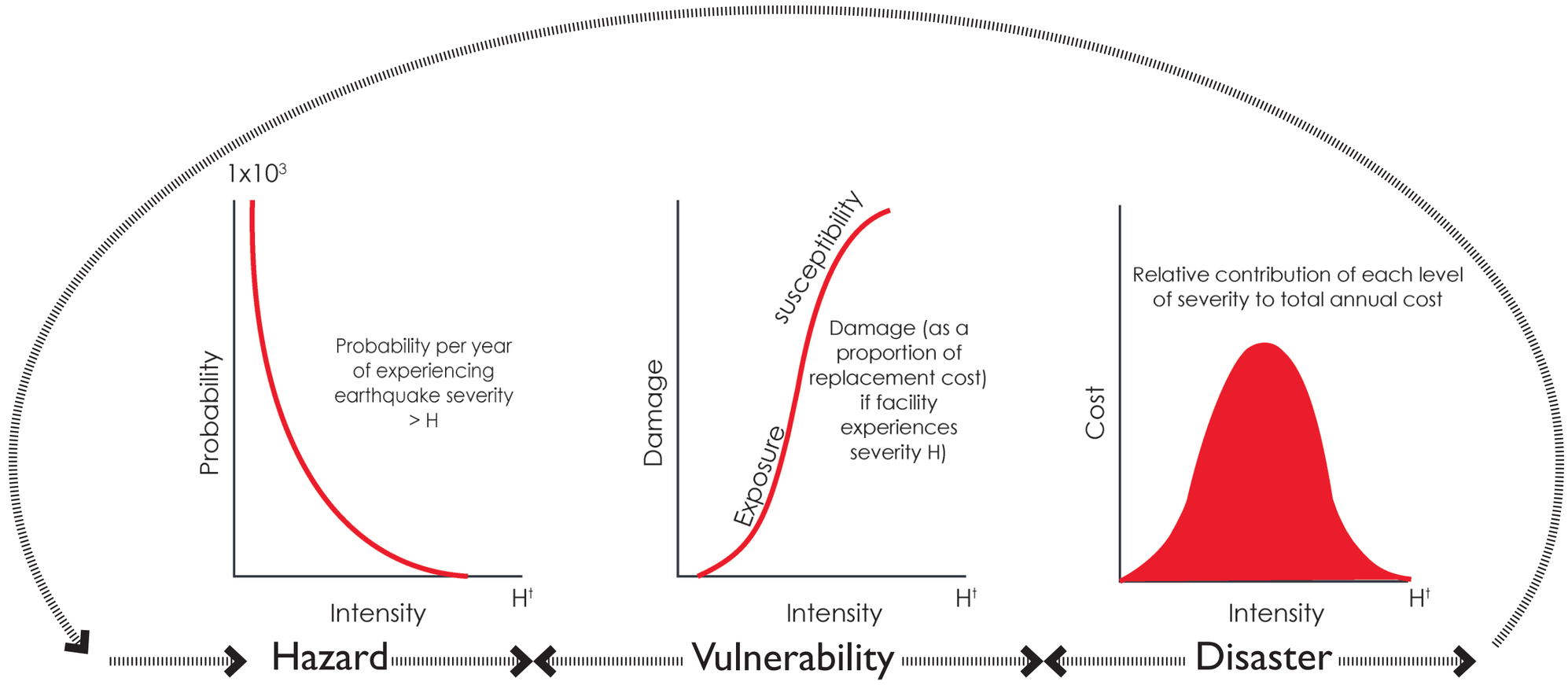
PEOPLE | PLANET | PROSPERITY | PLACE



DRM – a design research methodology
(Blessing & Chakrabarti, 2009)


Research and Observation
Descriptive
Prescriptive
Descriptive

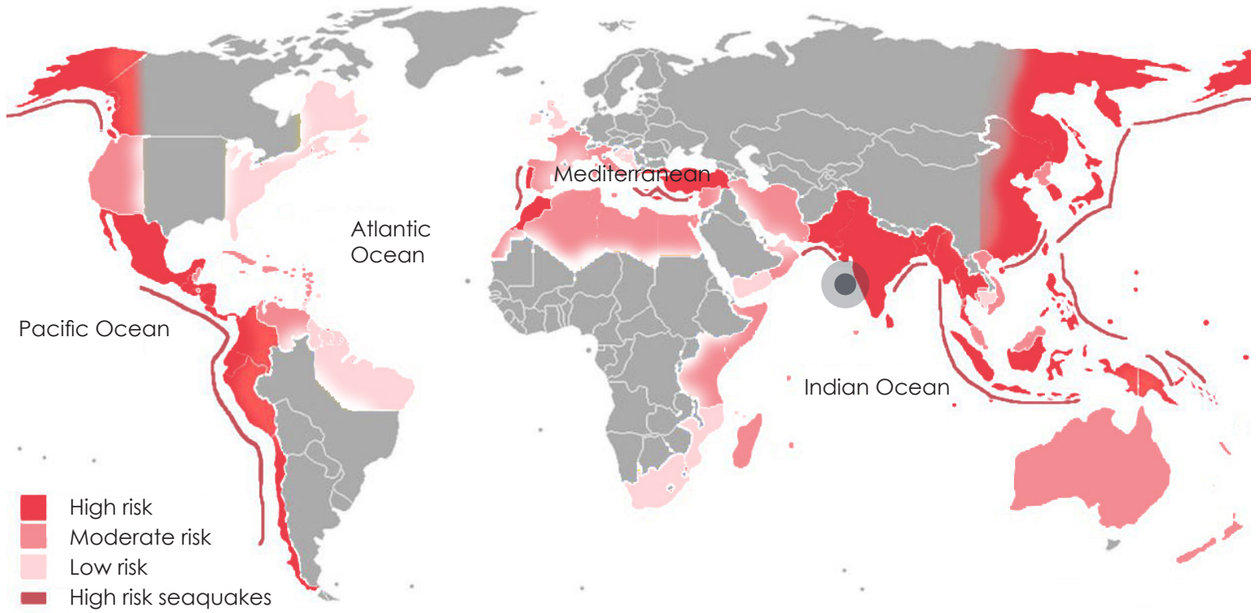
Hazard-scape



Exposure Susceptibility

"A dynamic scape, which reflects the physical susceptibility of a place and vulnerability of human life and assets to various hazards in a given human ecological system. It portrays the human and environment relationship in an ecosystem, where it operates and changes through time. Process, place and people are three essential elements of hazardscape, which interact and give shape to its three resultant characteristics i.e. hazards, physical susceptibility and human vulnerability. (Khan, 2009)

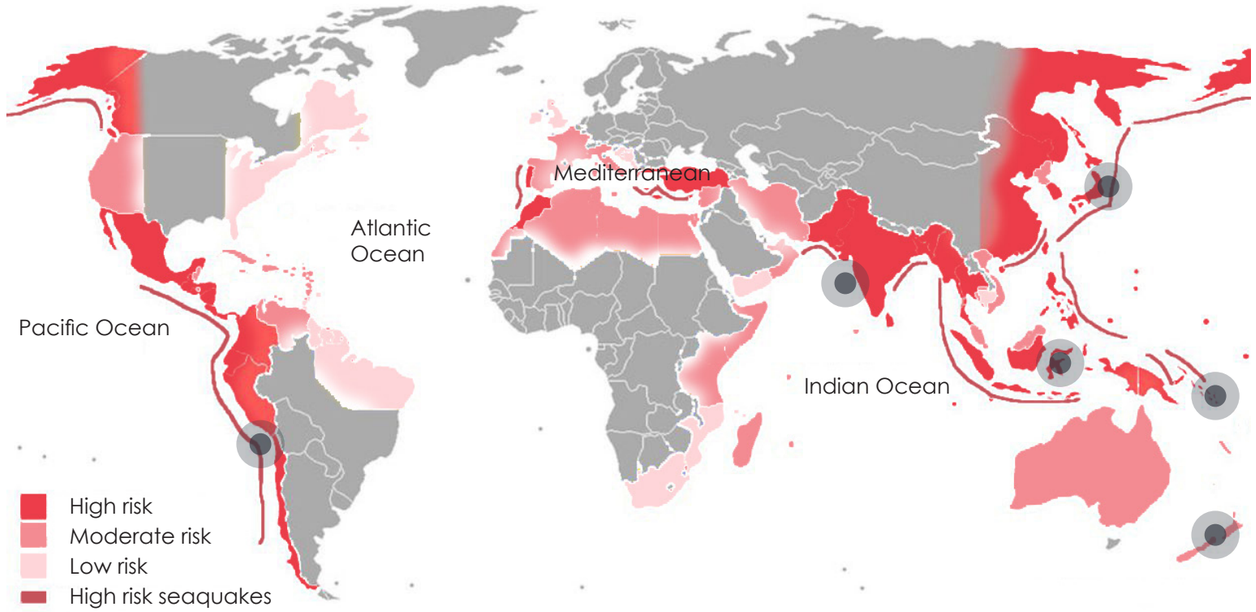
Tsunami-scapes



2004 Indian Ocean Tsunami

Tsunami-scapes

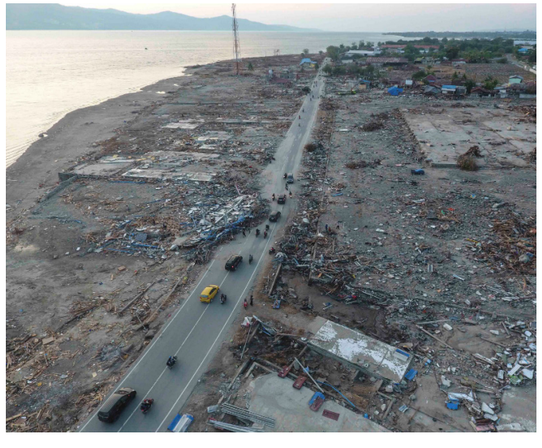
2010 Chile Tsunami



2011 Japan Tsunami

2004 Indian Ocean Tsunami

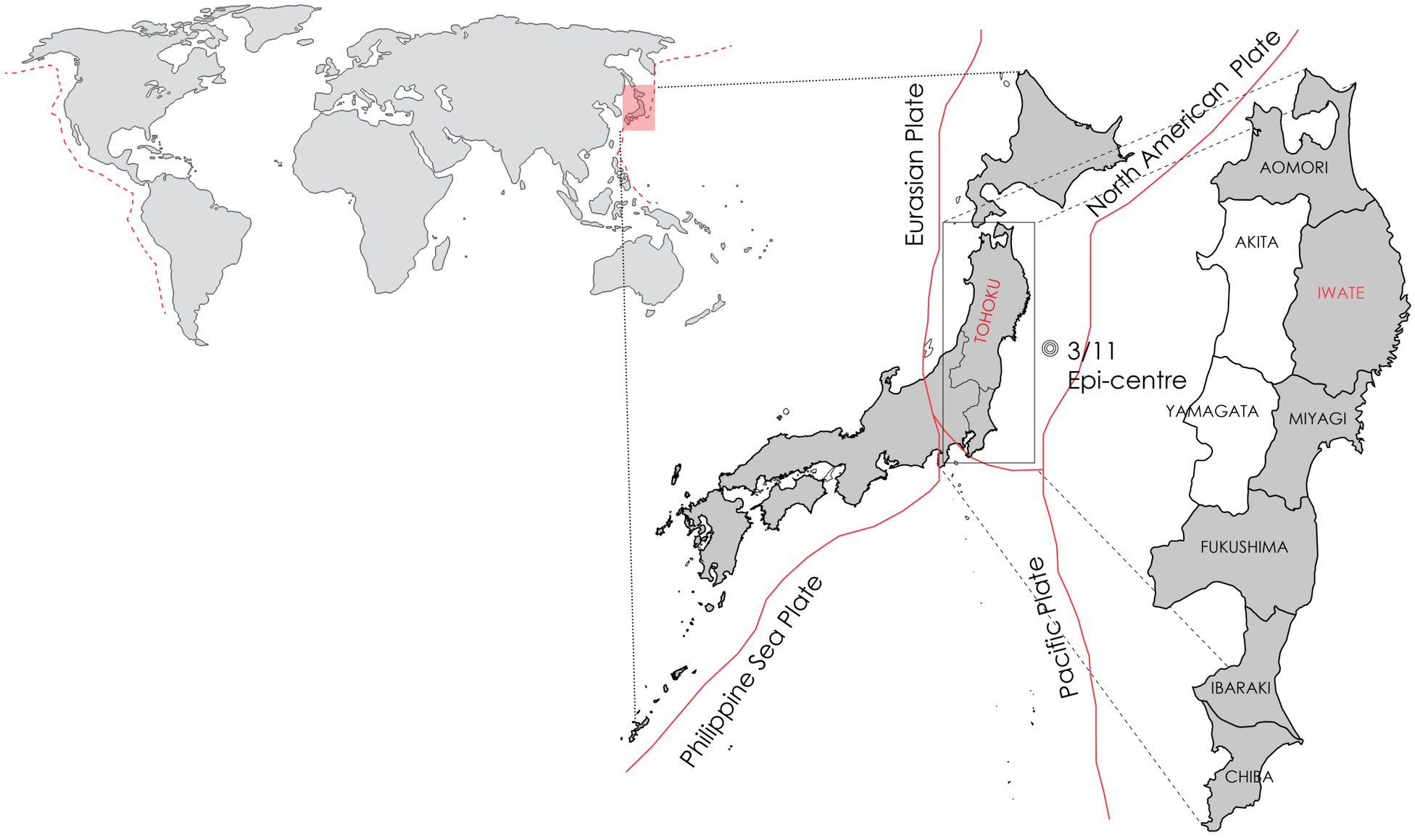
2018 Indonesia Tsunami



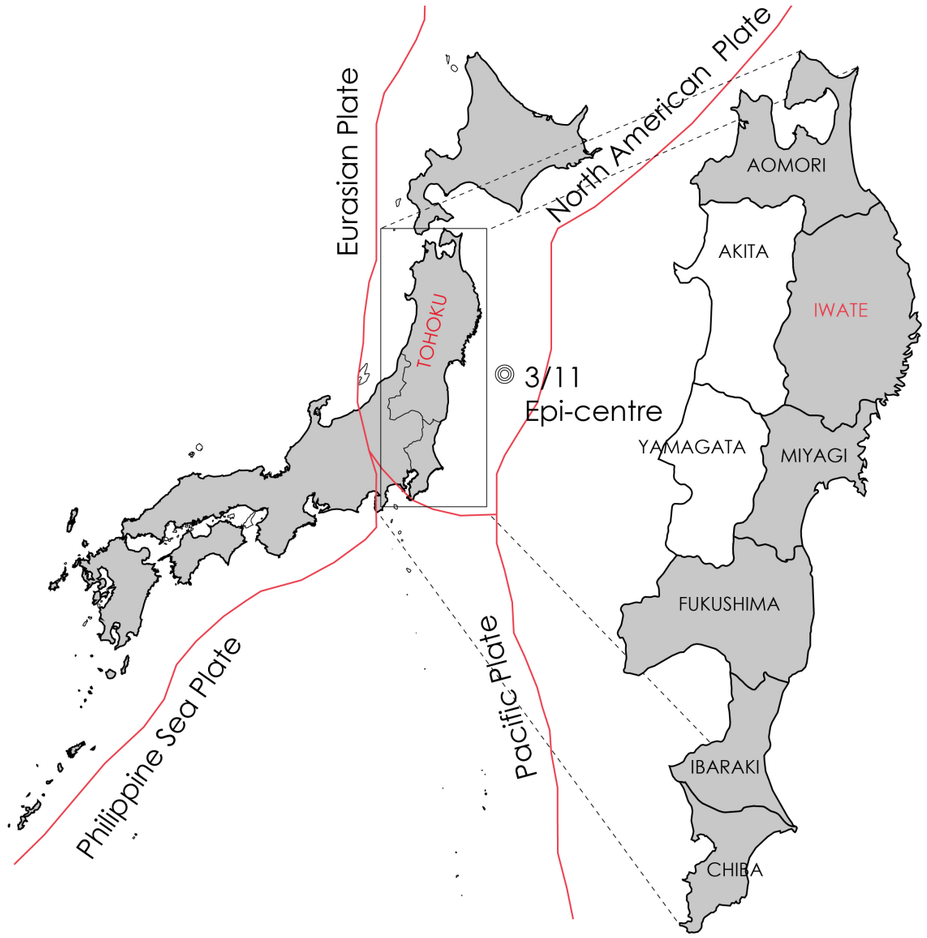
2007 Solomon Island Tsunami

2016 New Zealand Tsunami

Japan hazardscape



Exposure and vulnerability

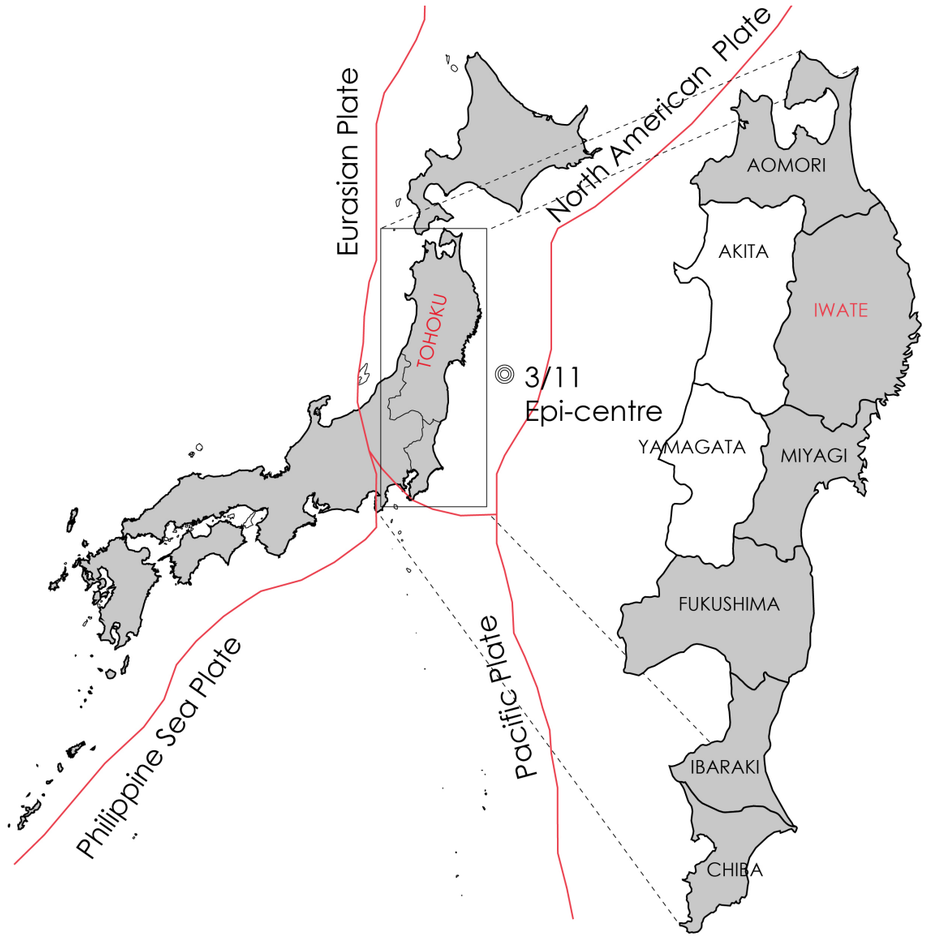


Broken sea walls

Broken dikes

Destroyed coastal forests

Exposure and vulnerability



Critical Infra paralysed

Cities destroyed

Critical supplies exhausted

Otsuchi workshop

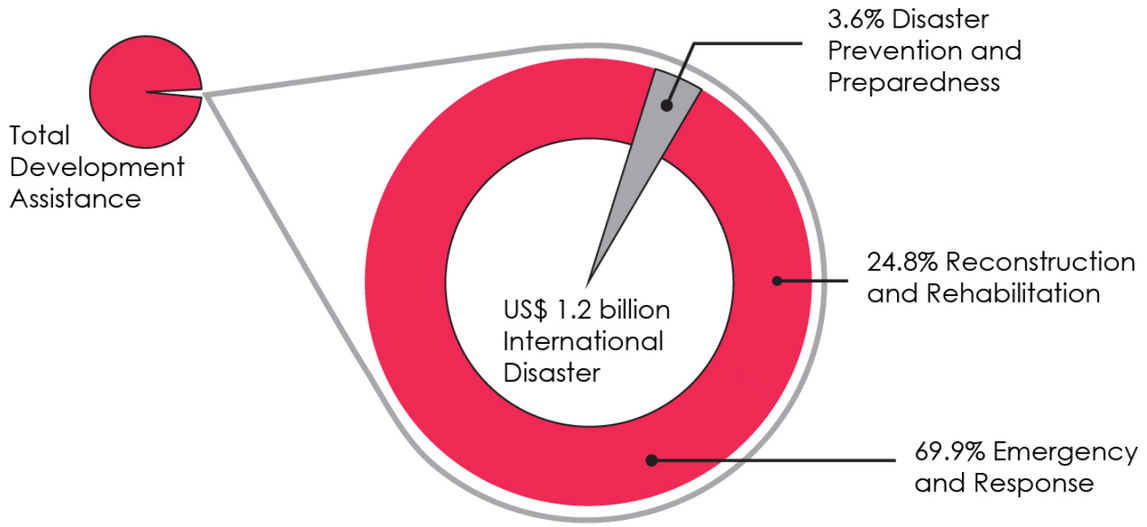
- Multidisciplinary workshop; faculty of architecture and built environment, civil engineering, social sciences
- Scoping exercises based on 4th bottom line principles of sustainability
- Charette methodology

Otsuchi workshop

- Multidisciplinary workshop; faculty of architecture and built environment, civil engineering, social sciences
- Scoping exercises based on 4th bottom line principles of sustainability
- Charette methodology

Is evacuation enough for such tsunami-scapes?

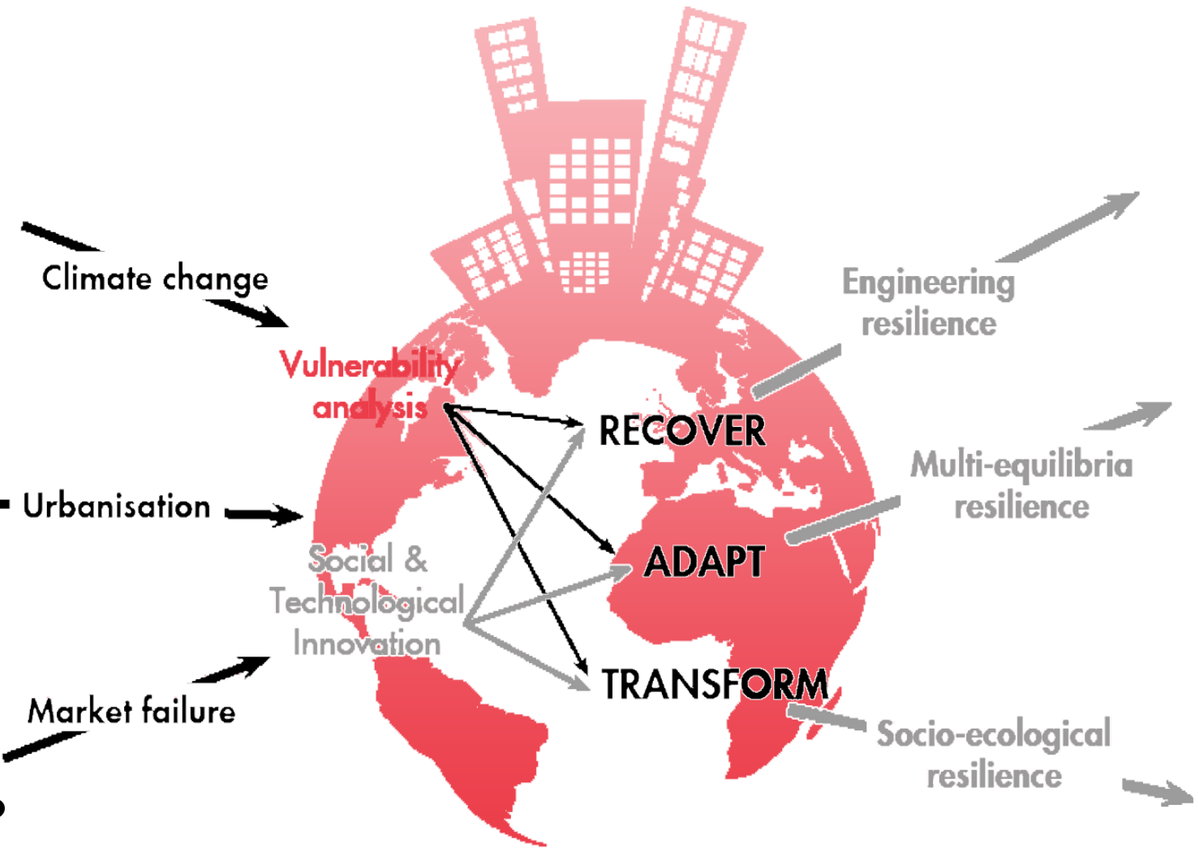
Why is physical infrastructure considered foremost in the phases of the disaster cycle i.e. preparation, protection, mitigation and reduction from disasters?



Share of development aid allocated to disaster prevention and preparedness, GFDRR, 2012b

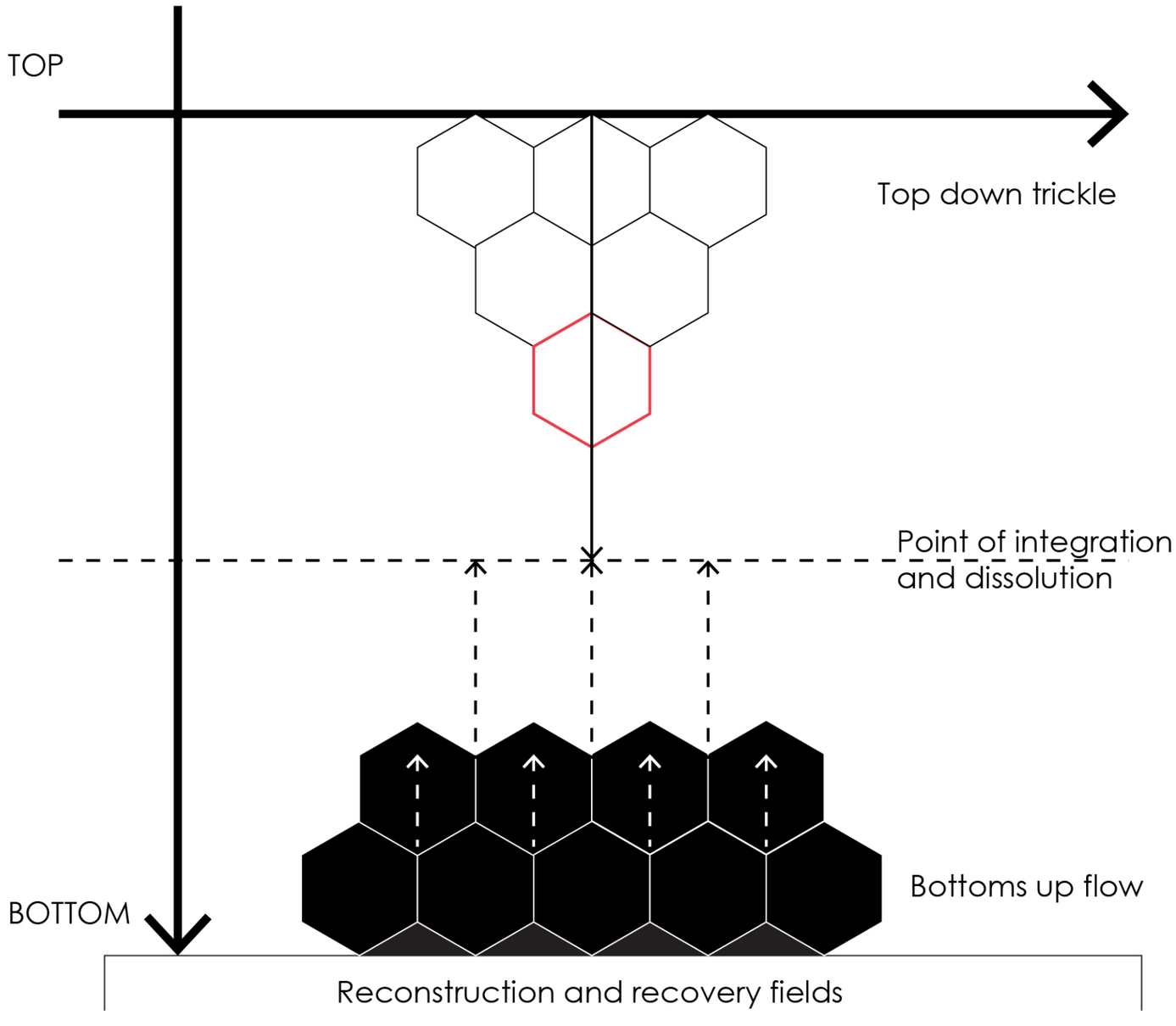
What kind and level of reconstruction is required for a complete recovery from the disasters?

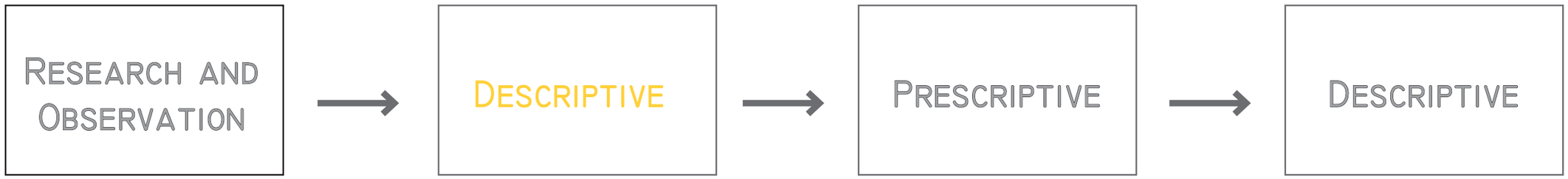
Is this the way ?



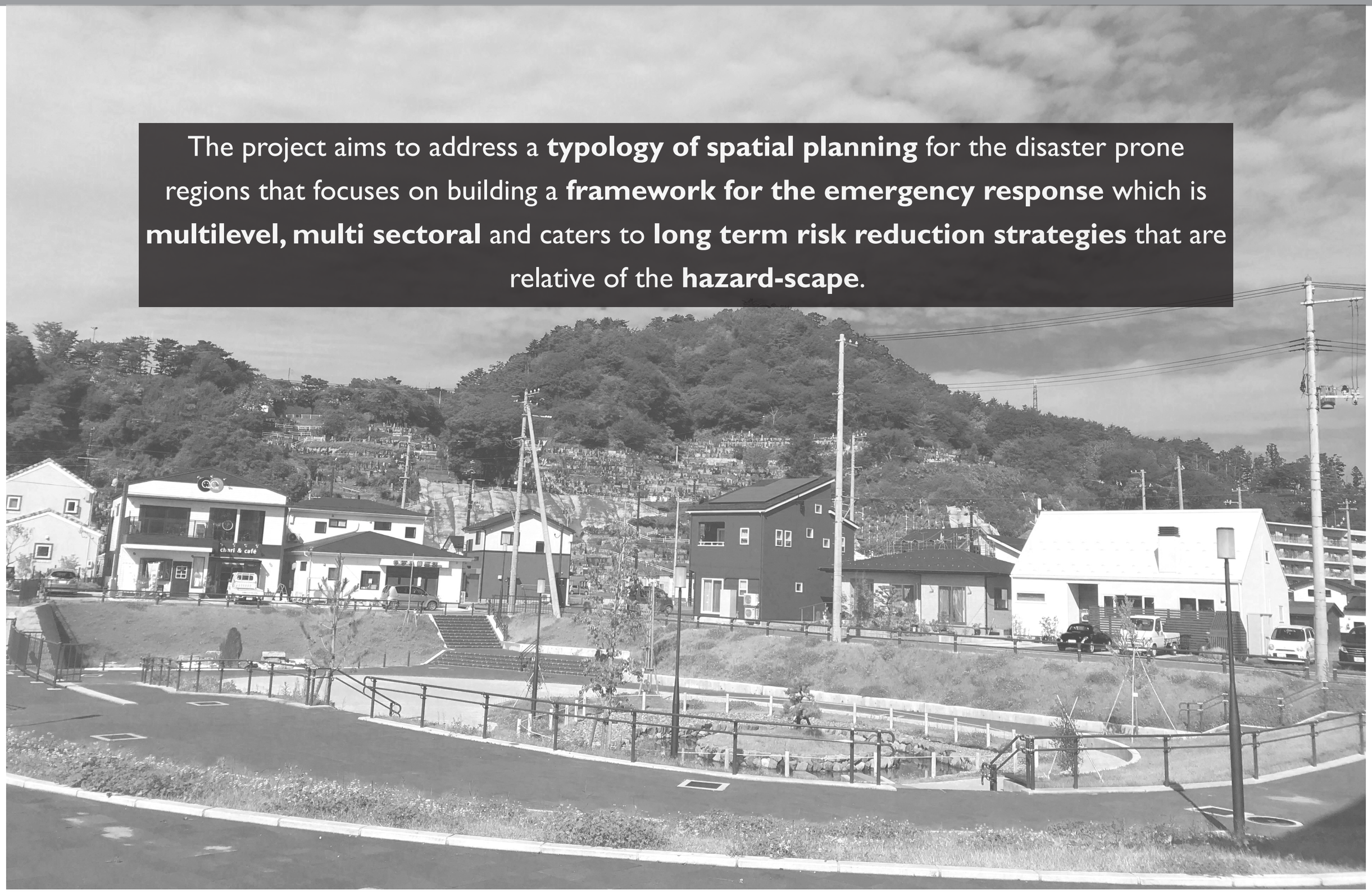
Source: - sustainability, mdpi

Problem Field




Research and Observation
Descriptive
Prescriptive
Descriptive

The project aims to address a **typology of spatial planning** for the disaster prone regions that focuses on building a **framework for the emergency response** which is **multilevel, multi sectoral** and caters to **long term risk reduction strategies** that are relative of the **hazard-scape**.



Research Question

Aim

Tools

How to MOBILIZE inhabitants and land-use through SPATIAL DESIGN AND PLANNING to achieve COMMUNITY RESILIENCE in a HAZARD-SCAPE ?

Acquire

Context

Sub-research Questions

Community resilience

1. How is it possible to reduce disaster impact while creating awareness and preparedness and consequently contribute to improvement of community resilience in the hazard-scape?

2. What role does context play in the domain of community resilience? How significant is it ?

3. How can the study of community resilience contribute to disaster risk reduction governance elsewhere?

Performance domain

Governance

1. How is the approach to mobilization of land-use made enough in a disaster vulnerable region?

2. In what ways can the study of governance measures for urban renewal improve resilience in the reconstruction of the disaster-scape?

3. Can resilience of critical capital and critical infrastructures be undertaken by community-based disaster risk reduction systems and to what extent?

Operational domain

Planning and design

1. How can spatial design and planning strategies generate preparedness within the community in a disaster-scape ?

2. In what ways spatial strategies influencing mobilization of critical capital and infrastructures protect, mitigate and cause recovery in the event of disaster?

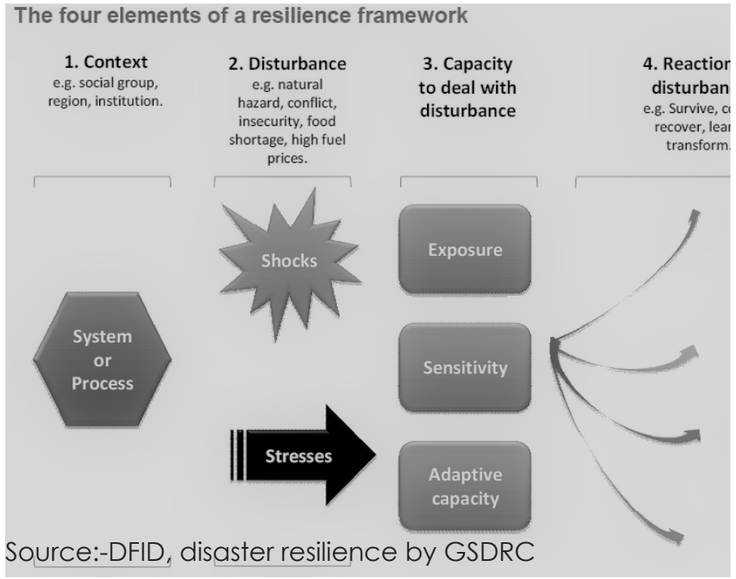
3. How does long-term crisis management of resources affect the reconstruction process?

4. How can design and planning after the disaster event support the governance of spatial decision making?

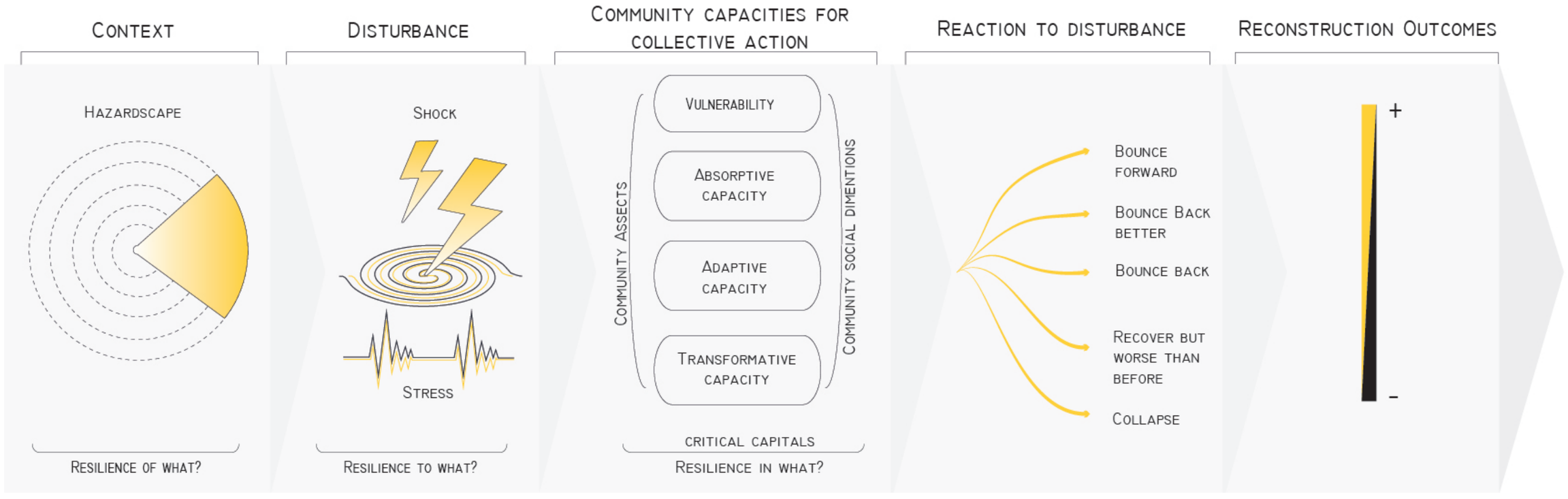
5.How is emergency spatial planning different from the contemporary spatial planning? And in what ways it influences the reconstruction process?

Spatio-Temporal domain

Theoretical framework



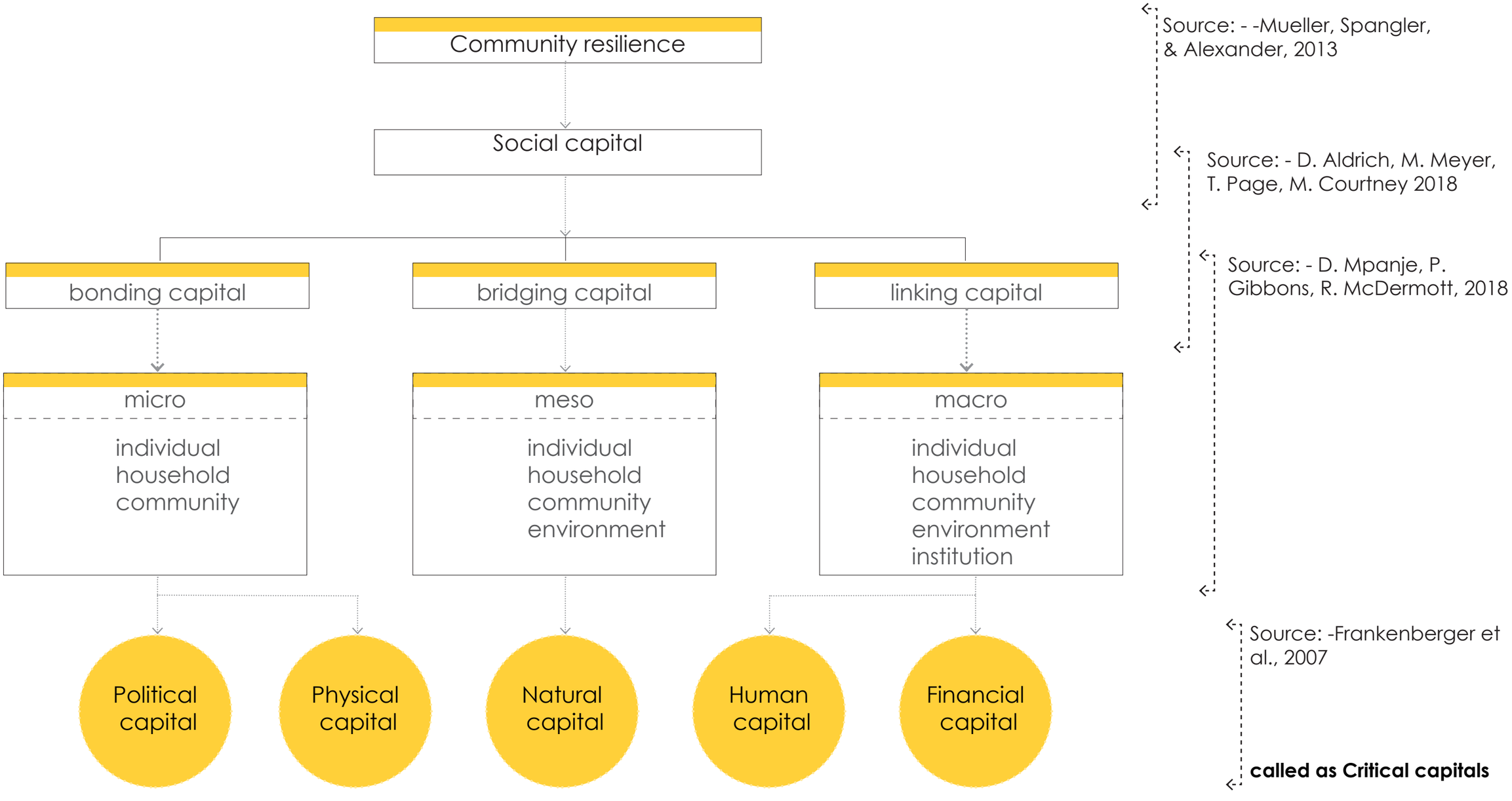
Source:-DFID, disaster resilience by GSDRC



Source: - Adapted from Frankenberger et al. (2012), DFID (2011a), TANGO (2008), and CARE (2002) and authors illustration

Theoretical research

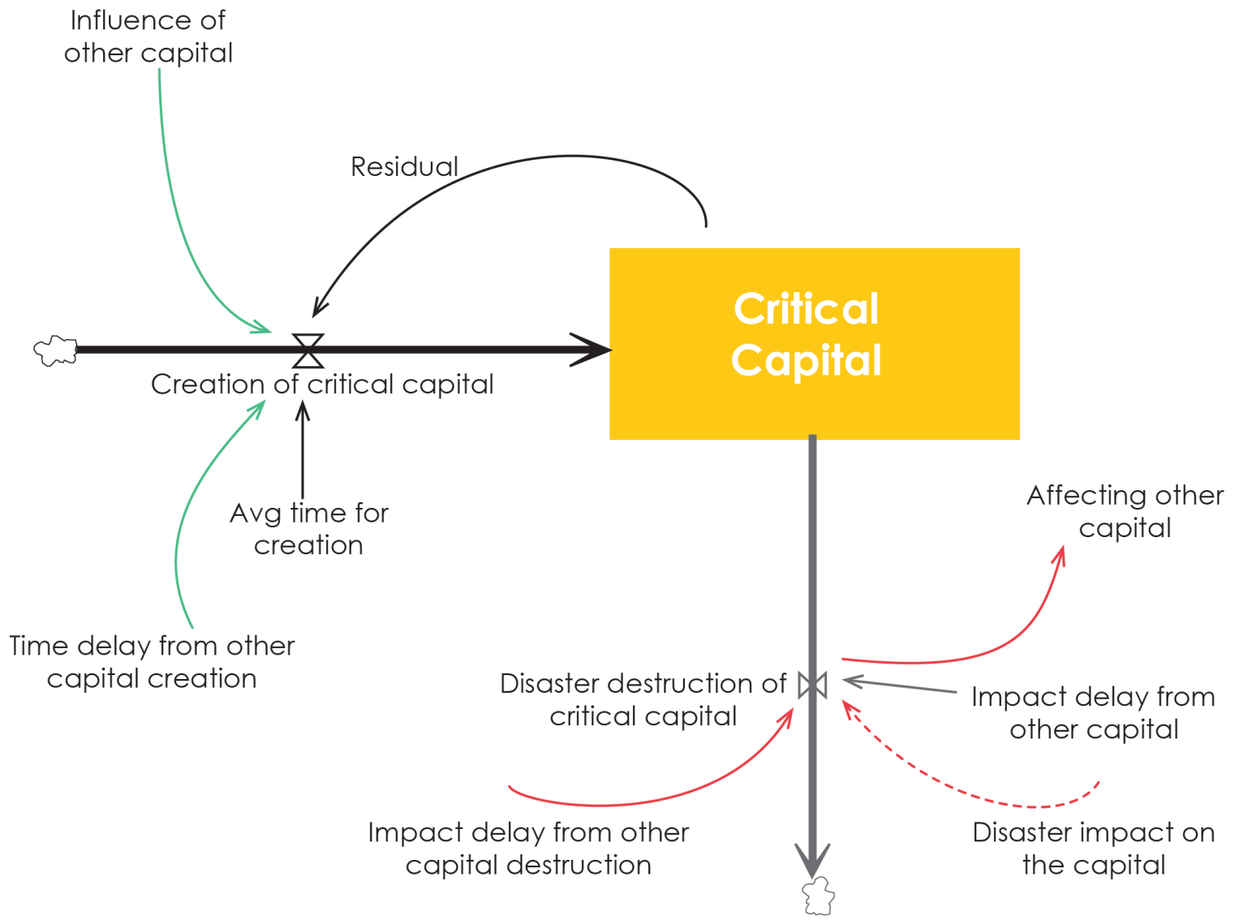
Community collective capacities



Theoretical research

Concept critical Capital model to assess capital dependencies

- Manifestation of how preparedness phase works
- Considers resilience is the ability to recover capital effectively and efficiently
- Based on critical capitals, it shows how one form of capital influences other form of capital in creation and destruction phase
- Provides spatio- temporal understanding by exploring the recovery measures.



Source: - capital model for disaster resilience by (Sakurai, Gonzalez, Watson, & Kokuryo, 2016)

Capital being influenced in creation stage

Capital being influenced / destroyed in the destruction stage

Theoretical research

TOP

Global
Geophysical changes
Future projections based on SLR
Urbanisation trends

National/ territorial- Japan
Risk levels
Social, political, economic vulnerabilities
Risk Governance, Policy and framework

Prefectural/ State Scale- Iwate
Critical infrastructure dependencies
Reconstruction plans and strategies
Implementation strategies

City/ Municipal Scale- Otsuchi
Local context
Organizational Structure
Demographics

Micro Scale/ Vulnerable high risk areas- Downtown
Housing, economy, lifestyle, future

Global

National/ territorial- Japan

Prefectural/ State Scale- Iwate
Social networks

City/ Municipal Scale- Otsuchi
Local context, Land management
Organizational Structure, business and economies
Demographics , environment, cultures, society,

Micro Scale/ Vulnerable high risk areas- Downtown
Housing, economy, lifestyle, future, social relations

BOTTOM

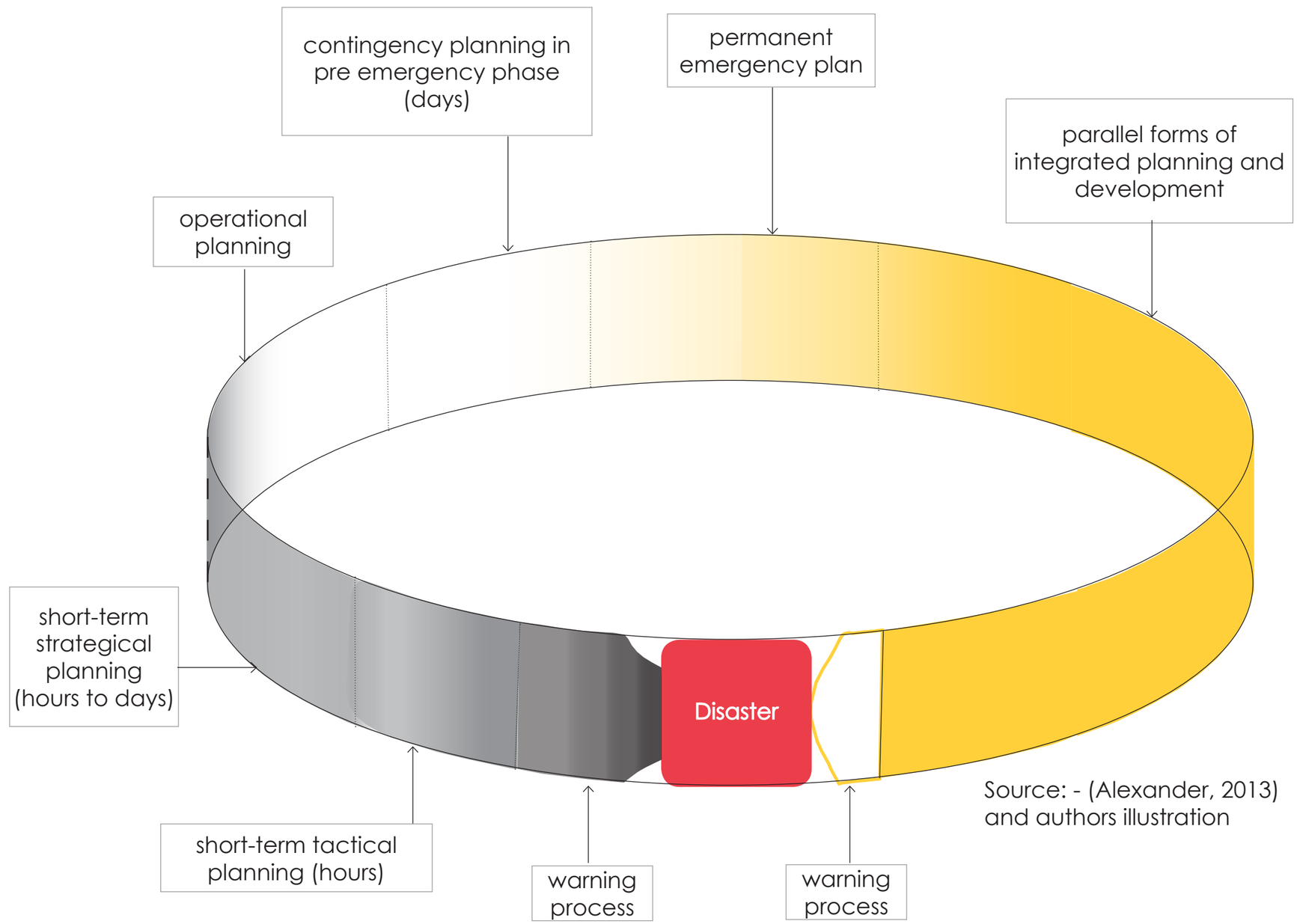
Theoretical research

• Changing hazardscape need changing planning structure.

• Conceptualizing emergency planning (short-term) with contemporary planning forms (lomg term).

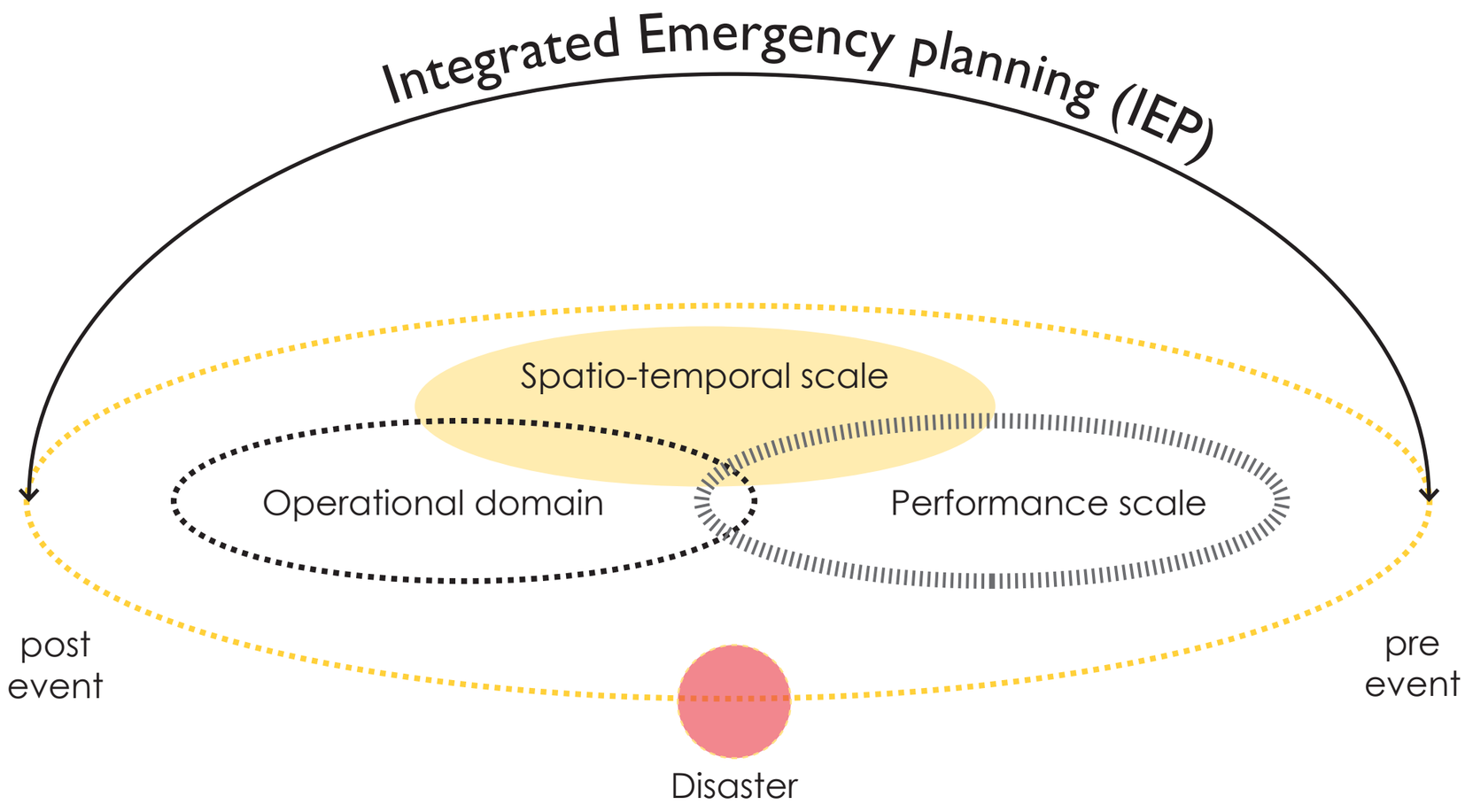
• Preparedness is continuous, so should be planning

• Developing typology of planning **'Integrated Emergency Planning'** for the hazardscape

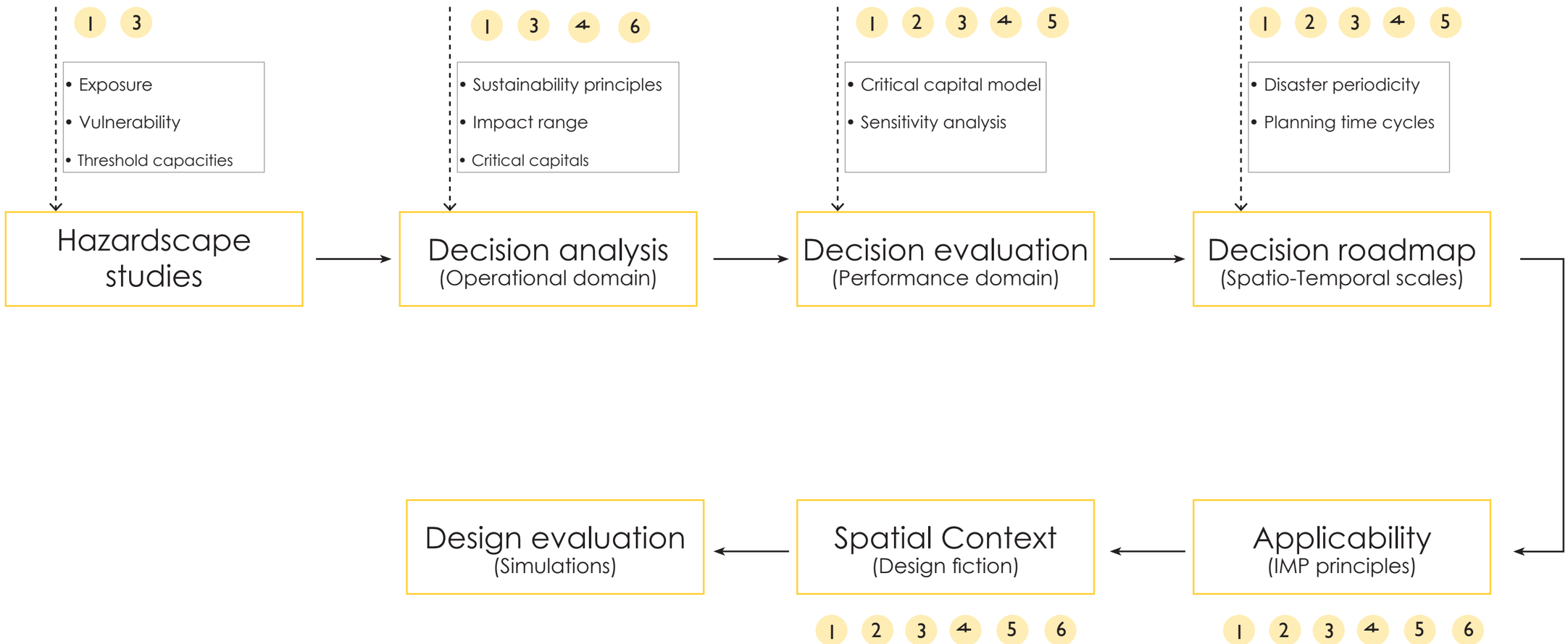


Source: - (Alexander, 2013) and authors illustration

Conceptual Framework



Analytical Framework



1	2	3	4	5	6
Literature reviews	Mapping and documentation	Empirical studies and field studies	Policy and plan-ning documents	Ethnographic review studies	System dynamics simulation studies

Research and Observation → Descriptive → Prescriptive → Descriptive

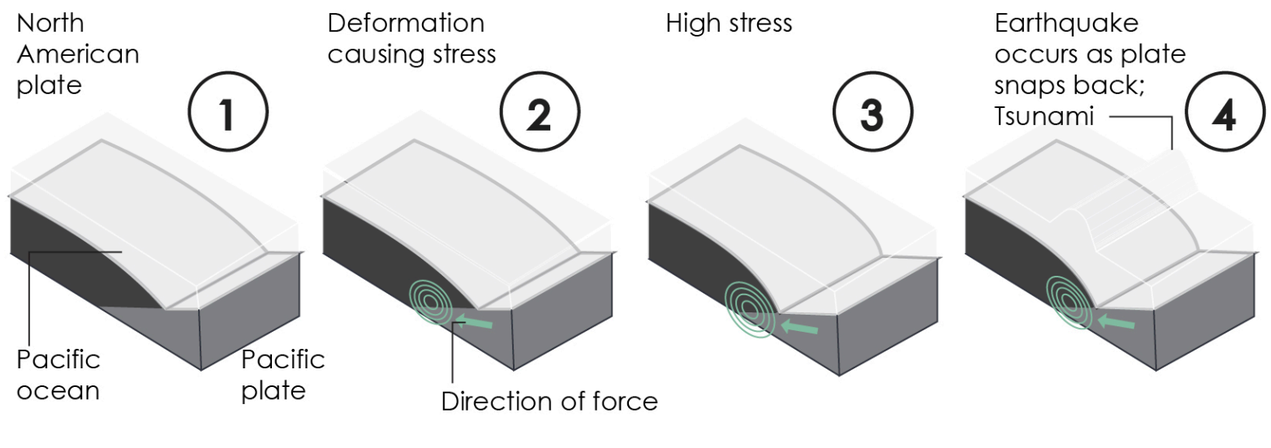
Otsuchi hazardscape

- Earthquake **registered**
- Shaking felt

- Earthquake **NOT registered**
- Shaking felt

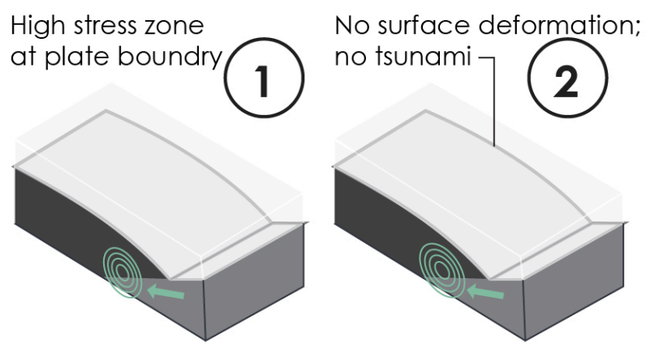
- Earthquake **registered**
- Shaking felt

Earthquake Deformation

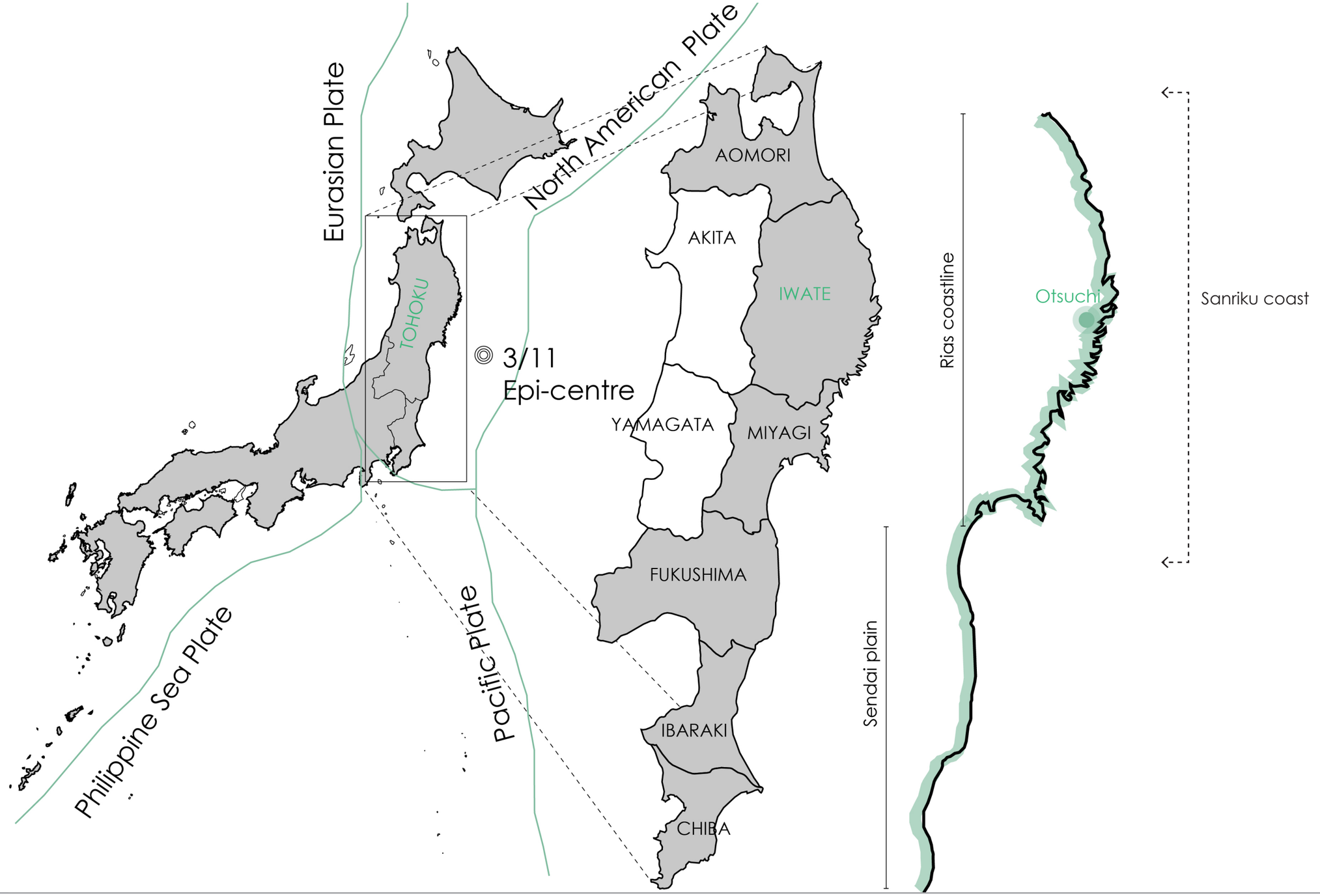


Tsunami occurs

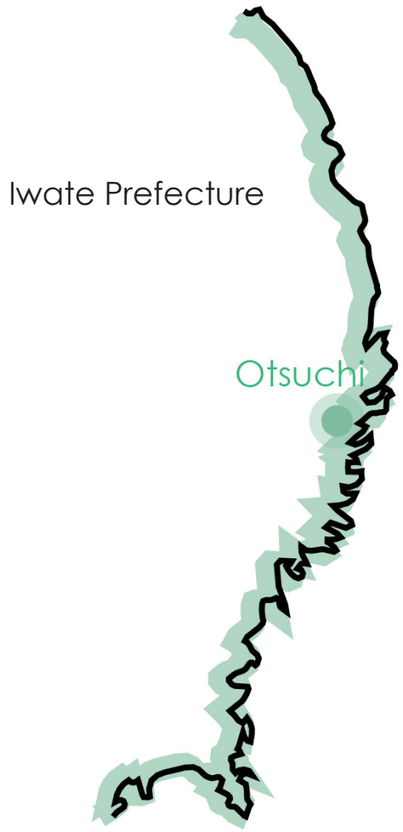
No Tsunami

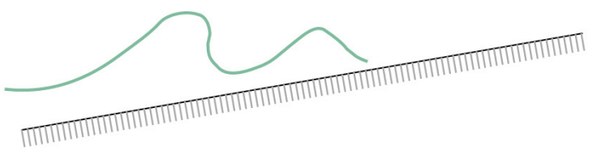


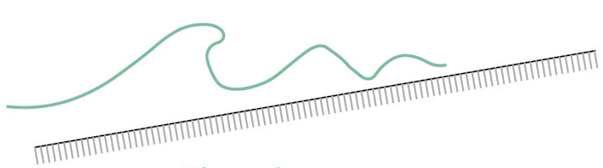
Otsuchi hazardscape

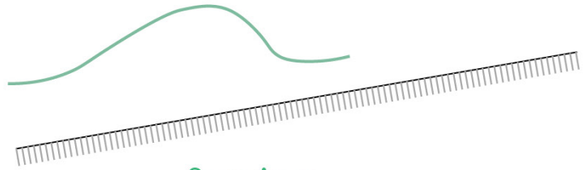


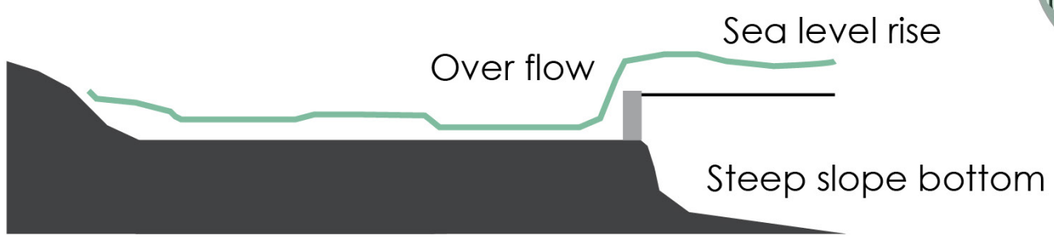
Otsuchi hazardscape

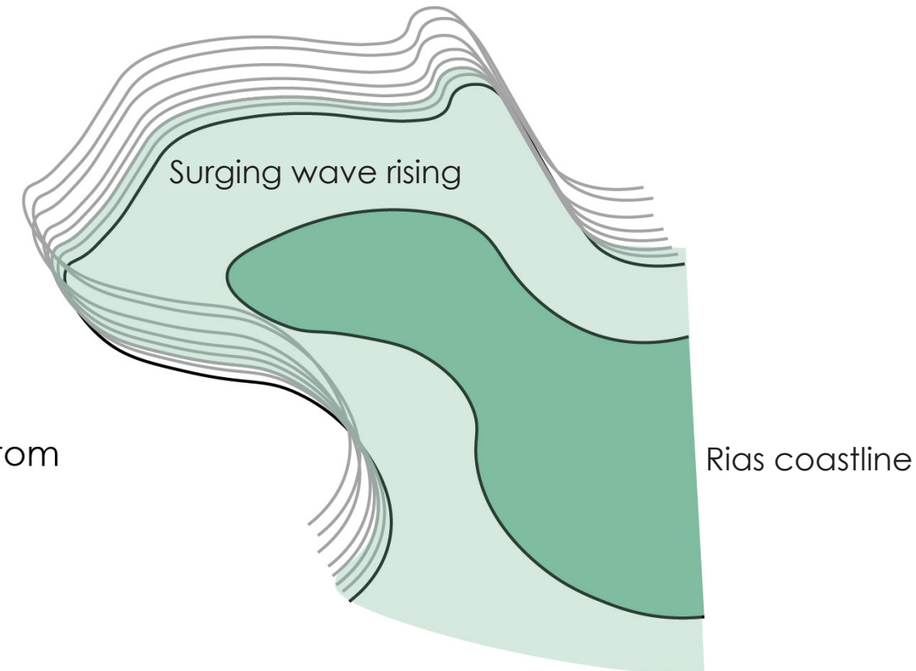






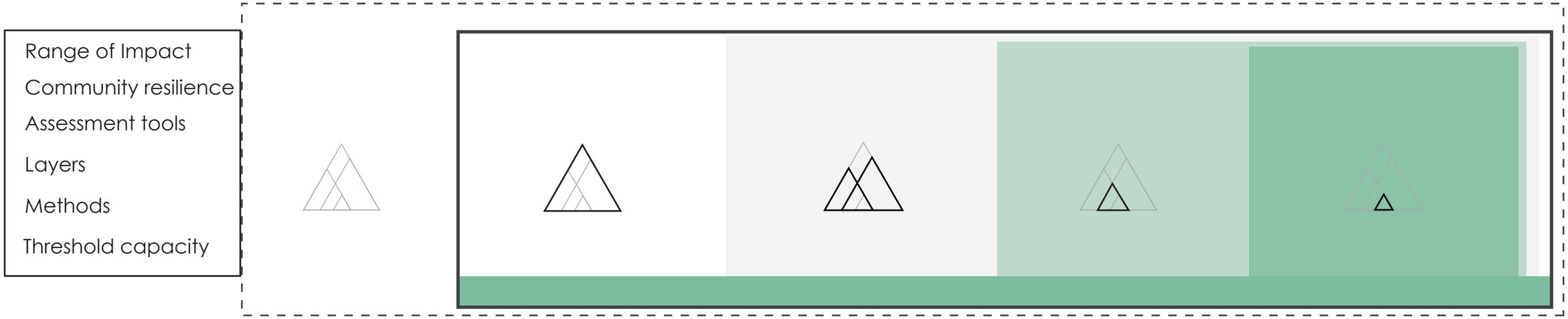






Multidisciplinary Advice- Jochem Roubos (Multidisciplinary group)

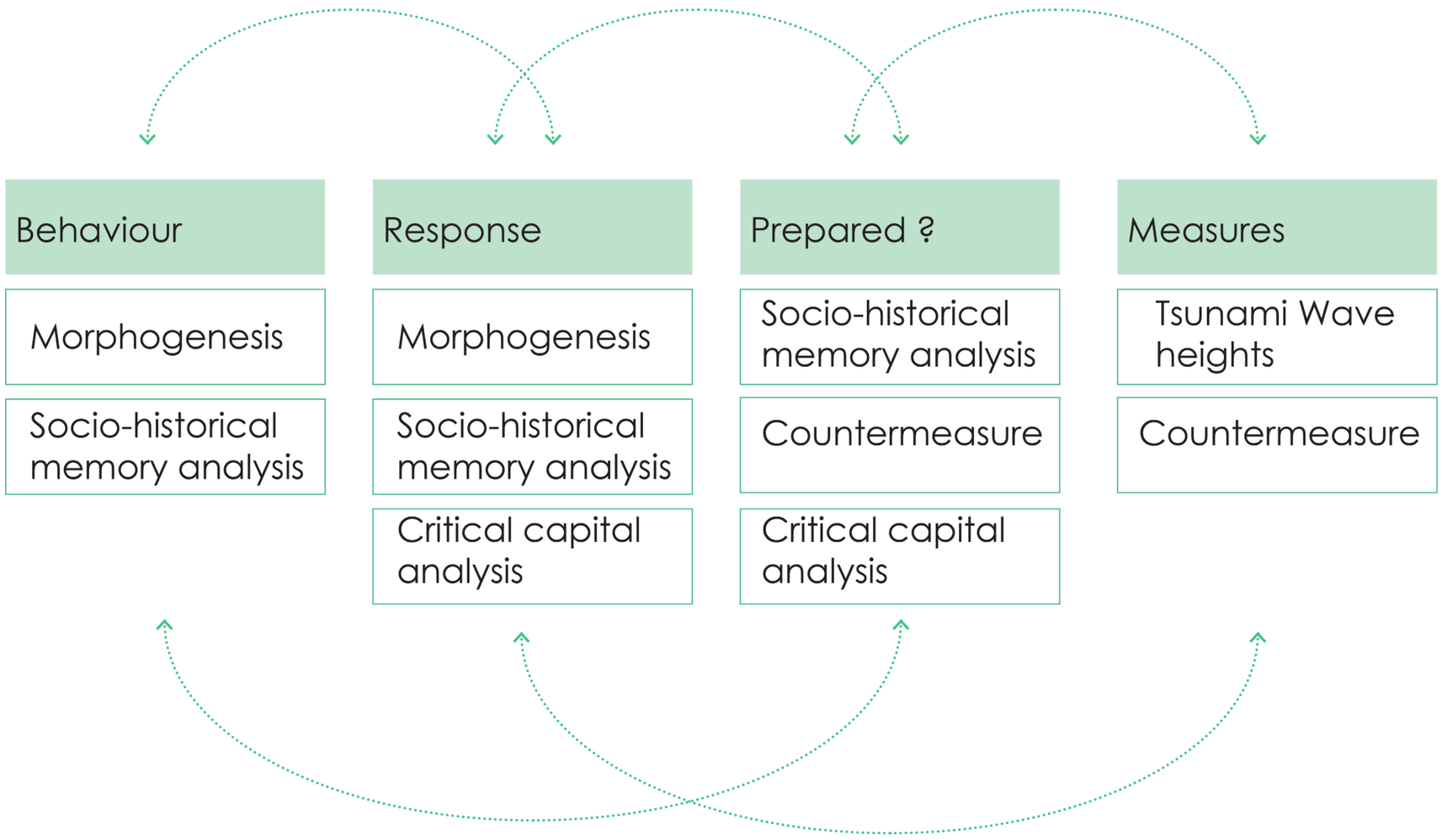
Operational domain action planning



Operational domain action planning

Levels		GLobal	National	Prefectural	City/ MunicipalityI	ndividual/ Organization
Range of Impact		Catastrophes	Disasters	Major incidentsI	ncidents	
Community resilience		Accepted generic model of Community resilience (CR) Models specific to nature of each stress and shock	Conceptual framework of CR for all hazard-scapes	CR indicators and assessment tools Interlikages of CR models for specific hazard-scape Revising and evaluating CR framework per hazard	CR collective action(CRCA) networks for critical capitals	Action plan for critical capitals
Assessment tools		Technical Evaluation systems Hazard warning systems International funding organizations International businedd organizations	Models specific to context of stress/ shock Monitoring changes in CR for hazardscapes Monitoring prediction & warning	Hazard specific CR measurement tools Re-evaluating emergency, recovery and reconstruction planning Strategic, tactical and operational planning for critical capitals Organizations monitoring collective actions of human capital at municipal level	Organizational Interlikages of CR models for critical capitals Organizational, functional network plans for critical capitals Monitoring and revising CRCA network indicators for critical capital	contribution to assessment of action plan
Layers	Human capital				Socio-economic conditions Access and quality of services Access to Health, Knowledge & skill, employment	Relation with the place and community
	Financial capital		Financial funding for CRCA services	Organizations monitoring financial capital investment for CRCA for pre and post disaster	Community based savings, credit institutions Income levels, investment in education and health	Health, Knowledge & skill, ability to labor Liquid resources(savings, credit, remittance, pensions, etc)
	Natural capital		Monitoring Environmental reserves and business based on ecosystem services	Organization monitoring environmental reserves Organizations monitoring investment in maintainence of ecosystem services	Maintainence of environmental reserves	Contribution to functional support for ecosystem services
	Physical capital		Operational and technical assistance for critical infrastructures	Critical infrastructures (water, food, transportation, communication, healthcare, energy, shelter, markets)	Monitoring critical infrastructure for maintainencs of CRCA (community based mechanisms)	Collective action for maintainence of public goods
	Political capital	International policies disaster risk reduction	Interaction between national and prefectural government	Interaction between prefectural and local government	Local government influence, voter participation, involvement of minorities Interaction between local government and traditional authorities	Organisational networks (market based unions, women's association, social networks) Contribution to community collaboration action plans
Methods				Community Resilience indicators simulation study conclusions Integration of parallel planning for disaster recovery Morphogenesis of reconstruction strategies for impact range	Community Resilience indicators mapping CRCA stakeholder analysis CRCA network analysis and mapping	Identifying CRCA contributors- fieldstudy and empirical data
Threshold capacity		Response to impact- intermunicipal, prefectural and national with international assisstance	Response to impact- intermunicipal, prefectural and national	Response to impact- intermunicipal and prefectural	Response to impact- coordinated municipal	Response to impact- local

Decision evaluation of performance domain

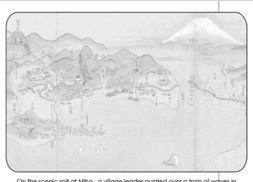


Decision evaluation of performance domain

Keicho Sanriku Earthquake Tsunami
8.1M, 21 meters wave height

Shumpu Castle where diary entry of tsunami was done. Detail from 1687 map, East Asian Library, University of California, Berkeley, as mentioned and adapted in "The orphan tsunami of 1700"

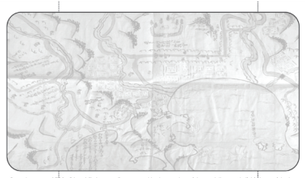
The orphan tsunami, Japan
9M Earthquake at Cascadia, North America
4 meters wave height



On the scenic spit at Miho, a village leader puzzled over a train of waves in january 1700, as mentioned and adapted in "The orphan tsunami of 1700"

Chilean Tsunami
8.5M earthquake at chilean coast,
5-6 meters wave height

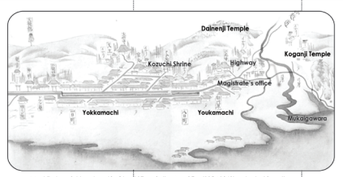
Kansei Earthquake Tsunami
8-8.4M, 4-6 meters wave height



On a tax map 1730, Otsuchi's houses line a road between bayside paddies and district magistrates office . To the southwest, smoke rises from the kiln, as mentioned and adapted from in "The orphan tsunami of 1700"

Hachinohe Earthquake Tsunami
7.5-8M, 4-6 meters wave height

Meiji Great Sanriku Tsunami,
8.5M, 38.2 meters wave height

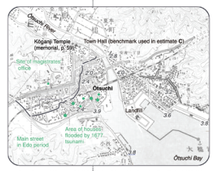


Machikata neighbourhood in Otsuchi Townin the Ansei Era (1854-1860), adopted from the reconstruction plan of Otsuchi town.

Showa Great Sanriku Tsunami,
8.1M, 28.7 meters wave height

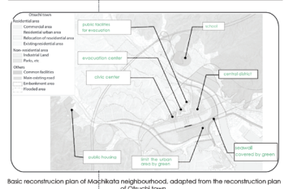
Topographic maps of Machikata neighbourhood in 1913, adopted from the reconstruction plan of Otsuchi town.

Chilean Tsunami,
8.6M earthquake at chilean coast,
5-6 meters wave height



a. Omote and Komachi (1961); b: Otsuchi-cho Kyoiku I'inkai (1961) Base map from Kokudo Chiri'in (geographical survey institute), Otsuchi 1:25,000 quadrangle, 1996, contour interval 10 m, adopted from in "The orphan tsunami of 1700"

The Great Eastern Japan Earthquake Tsunami
9M, 38 meters wave height



Basic reconstruction plan of Machikata neighbourhood, adopted from the reconstruction plan of Otsuchi town.

Tsunami Wave heights

50
40
30
20
10
0M

Ansei-Tokai Earthquake, East coast
Ansei-Nankai Earthquake, West coast

Kanto Earthquake

Japan Sea Earthquake Tsunami

Hokkaido Nansei-Oki Earthquake Tsunami

Socio-historical memory

weakest | moderate | moderate | moderate | moderate | strong | strong | weakest

89 years | 51 years | 42 years | 63 years | 40 years | 37 years | 27 years | 51 years

1600s 1611 1700 1751 1793 1800s 1854-55 -56 1896 1900s 1923 1933 1960 1983 1993 2000s 2011 2019 2100s

Age of samurai | Age of samurai | Modernization | Post war | Post disaster

Edo Period (1603 - 1868) | Edo Period (1603 - 1868) | Meiji Period (1868 - 1912) | Taisho Period (1912 - 1926) | Early Showa Period (1926 - 1945) | Late Showa Period (1945 - 1989) | Heisei Period (1989 - 2019)

Critical capital analysis

Political capital

Closed door policy | Open door policy and westernisation | Militarisation WWI WWII | Democracy & open door policy

Environmental capital

Active trade with Southeast Asia | Strong economy and industrialisation | recession and banking crisis | Strong economy and industrialisation | Bubble burst and economic stagnation

Economic capital

Economic developemnt (per million)

Environmental destruction

Human capital

Agrarian society | Rural to urban migration | Evacuation and dispersion of population | urbanising society | Social innovation and urbanised (aging)society

Population developemnt (per million)

Social capital

Rapid urbanisation, multi-polar urbanization and mass transit systems

Sustainaible growth and high quality of living standards, social transformation

Physical capital

Green field development | Slowdown and maturity

Countermeasure

Historical evacuation measures

Historical evacuation measures

Tsunami science started

* Official undertaking of Tsunami countermersures
* Relocation of dwelling houses to high ground and tsunami forecasting

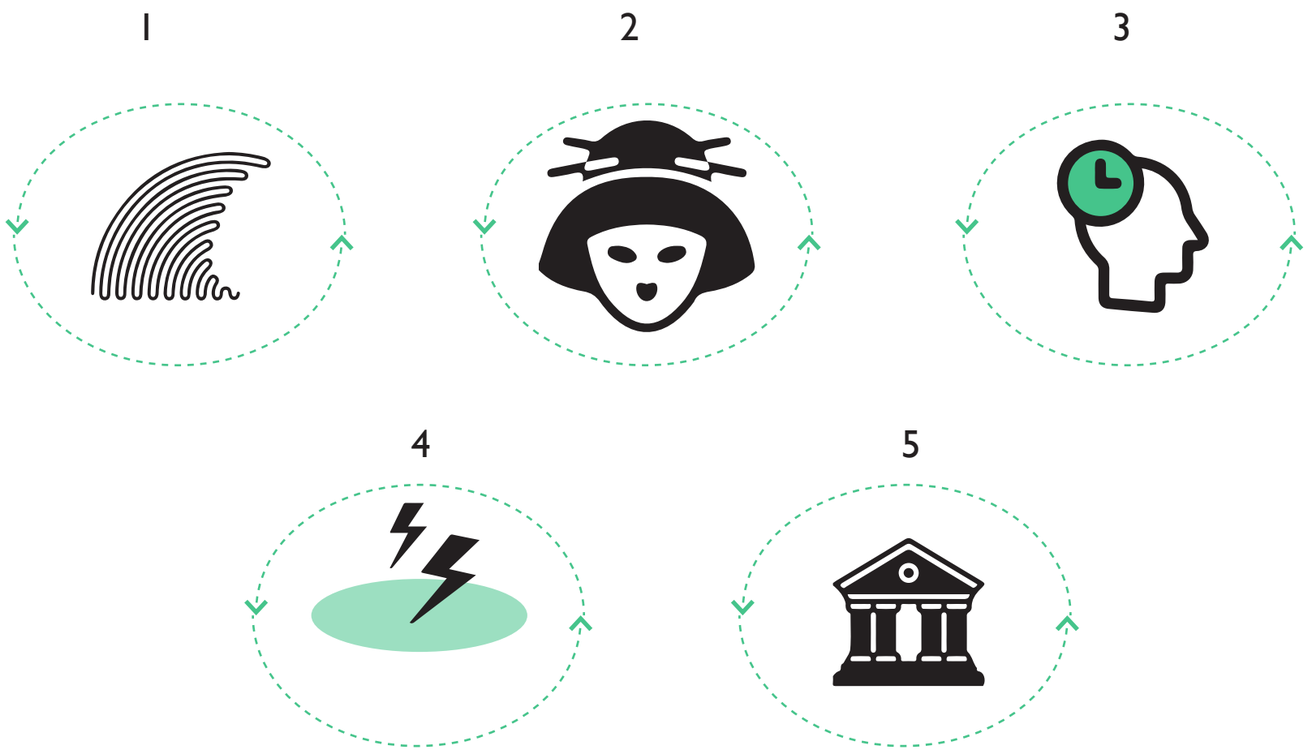
* Tsunami engineering by elaborating coastal structures for tsunami defense.
* Practical comprehensive tsunami disaster prevention 3 measures, defense structures, tsunami-resistant town development and evacuation based on warning
* Tsunami breakwaters, coastal dikes, tsunami resistant forests, memorial ceremonies
* Tsunami and earthquake resistant building standards

* Combiantion of non-structural and structural measures
* Amendment in tsunami countermeasures act
* Changes in zoning laws

Decision evaluation of performance domain

Analysis results

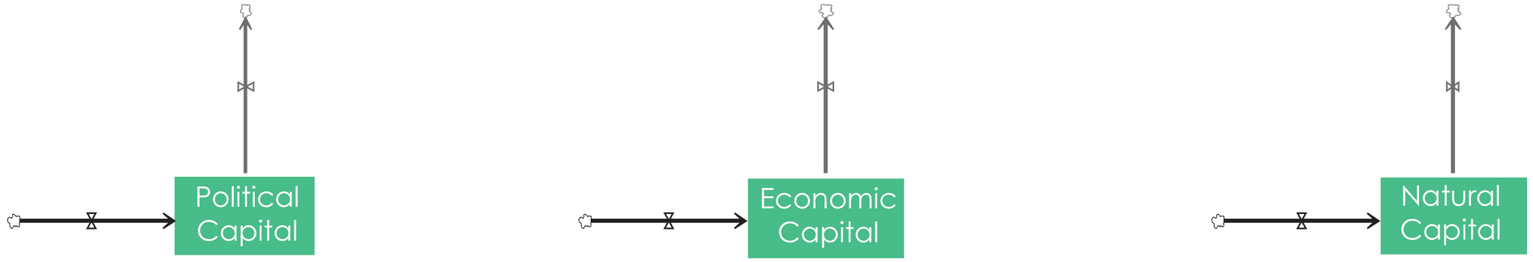
1. Japan has been a tsunami hazardscape since ancient times
2. Japanese people have inherent resilient capacities
3. Social memory of previous disasters increases resilience
4. A turnkey tsunami event changes the dynamics of the resilient capacities and countermeasures
5. The political capital is the key for system change



Decision evaluation

Reconstruction decisions evaluated based on system dynamics

- economic- financial, industrial, market, local economy
- physical- infrastructure, communication, buildings, transport
- social- individual or organization empowered by social connections
- political- mayor, municipality officials, decision makers
- human- skills, knowledge and abilities that individuals use to generate income or other useful outputs
- natural- environment, biodiversity, ecosystems



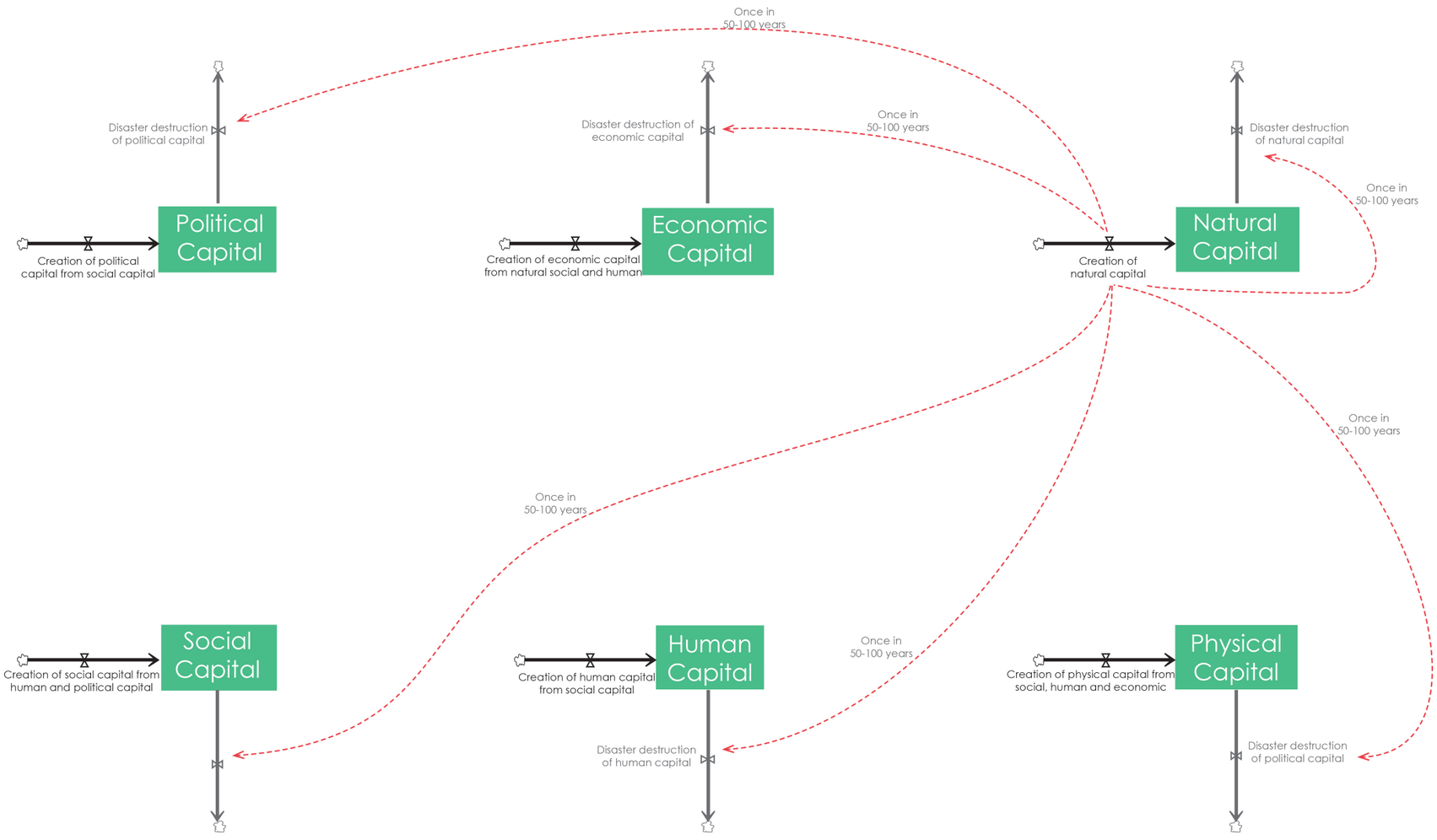
Capital being influenced in creation stage

Capital being influenced /destroyed in the destruction stage

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- Tsunami occurred, a natural phenomenon of the natural capital



Capital being influenced in creation stage

Capital being influenced /destroyed in the destruction stage

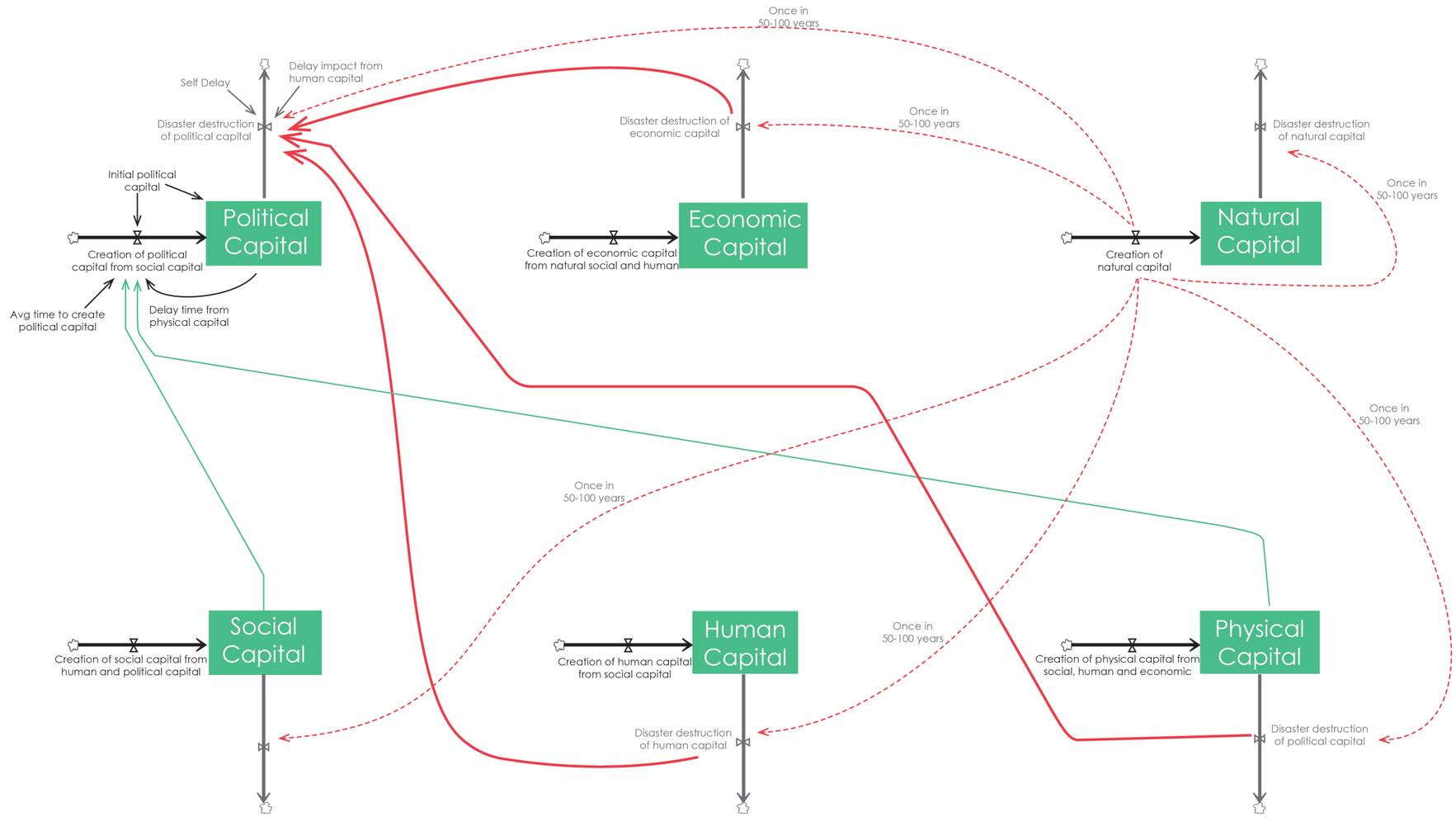
March | April | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec

RESEARCH AND OBSERVATION | DESCRIPTIVE | **PRESCRIPTIVE** | DESCRIPTIVE

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- Town mayor died in tsunami and deputy nearing his term end
- Many governmental official lost their lives
- Town concentrated on election of new mayor



Capital being influenced in creation stage

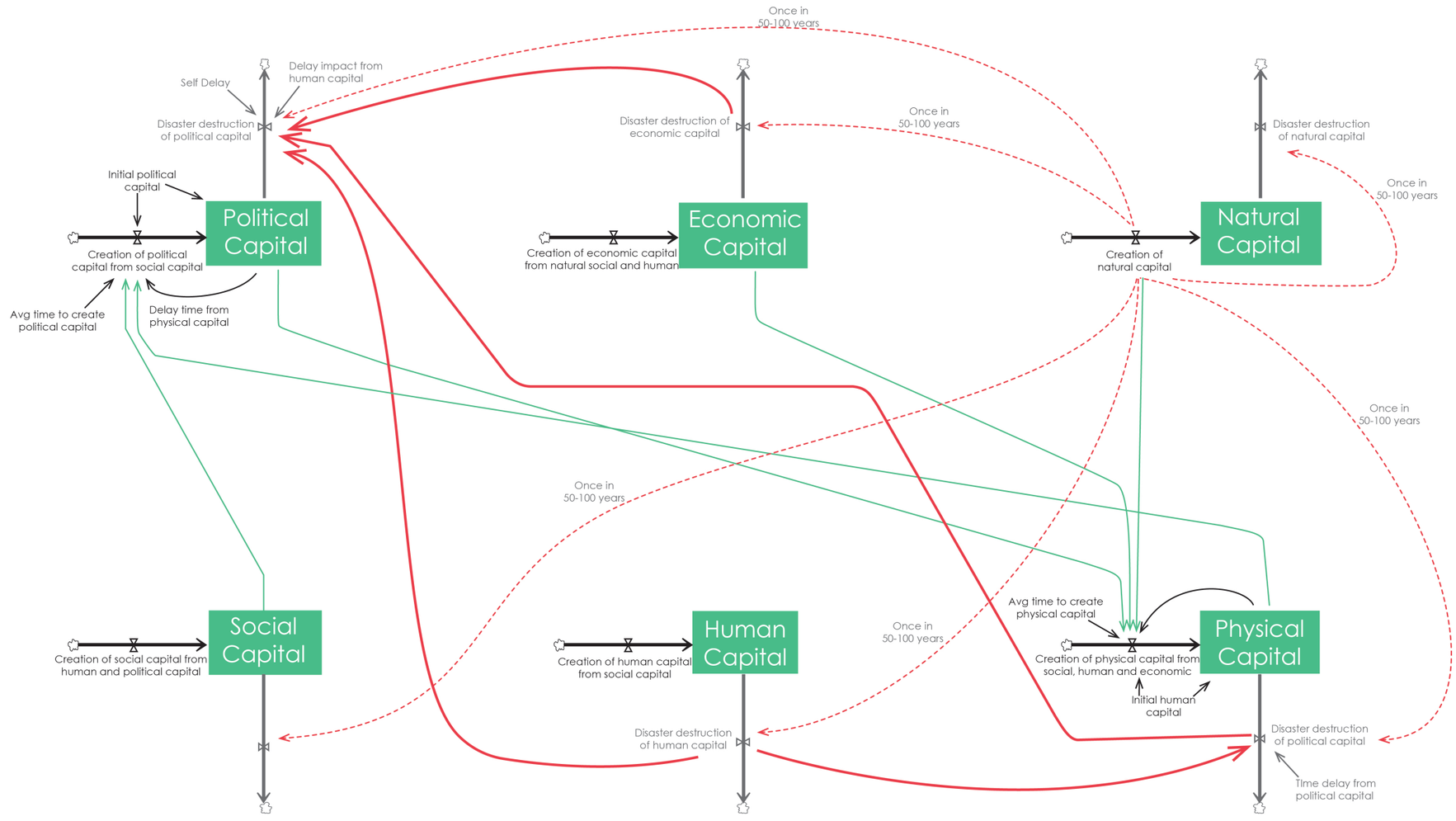
Capital being influenced /destroyed in the destruction stage

March — April — May — Jun — Jul — Aug — Sept — Oct — Nov — Dec

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- For elections efforts put on restoring ICT
- Damaged ICT due to wrongly located
- Delay due to demographic information lost



Capital being influenced in creation stage

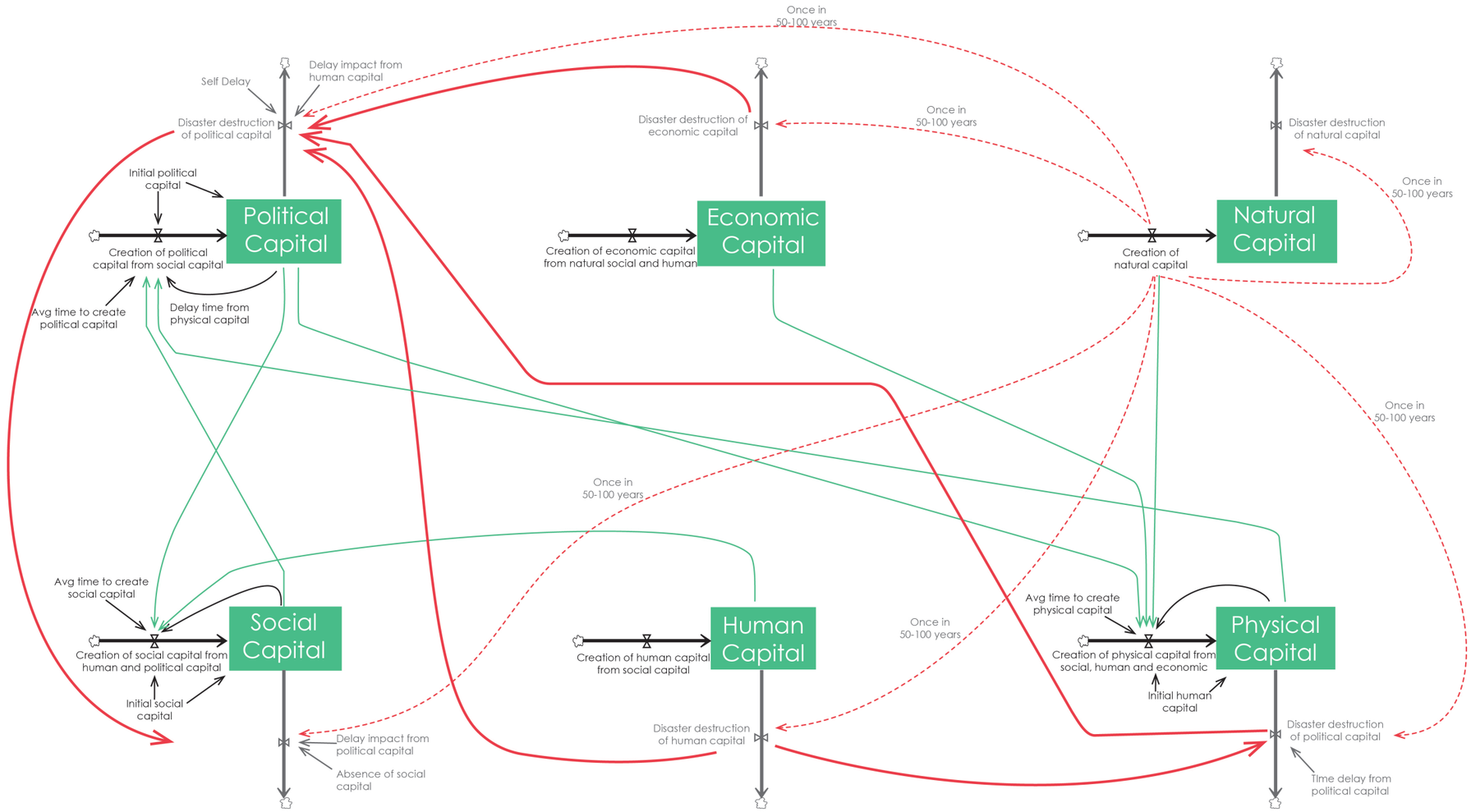
Capital being influenced /destroyed in the destruction stage

March | April | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- Transport external input from prefecture government (social capital)
- Emergency services provided



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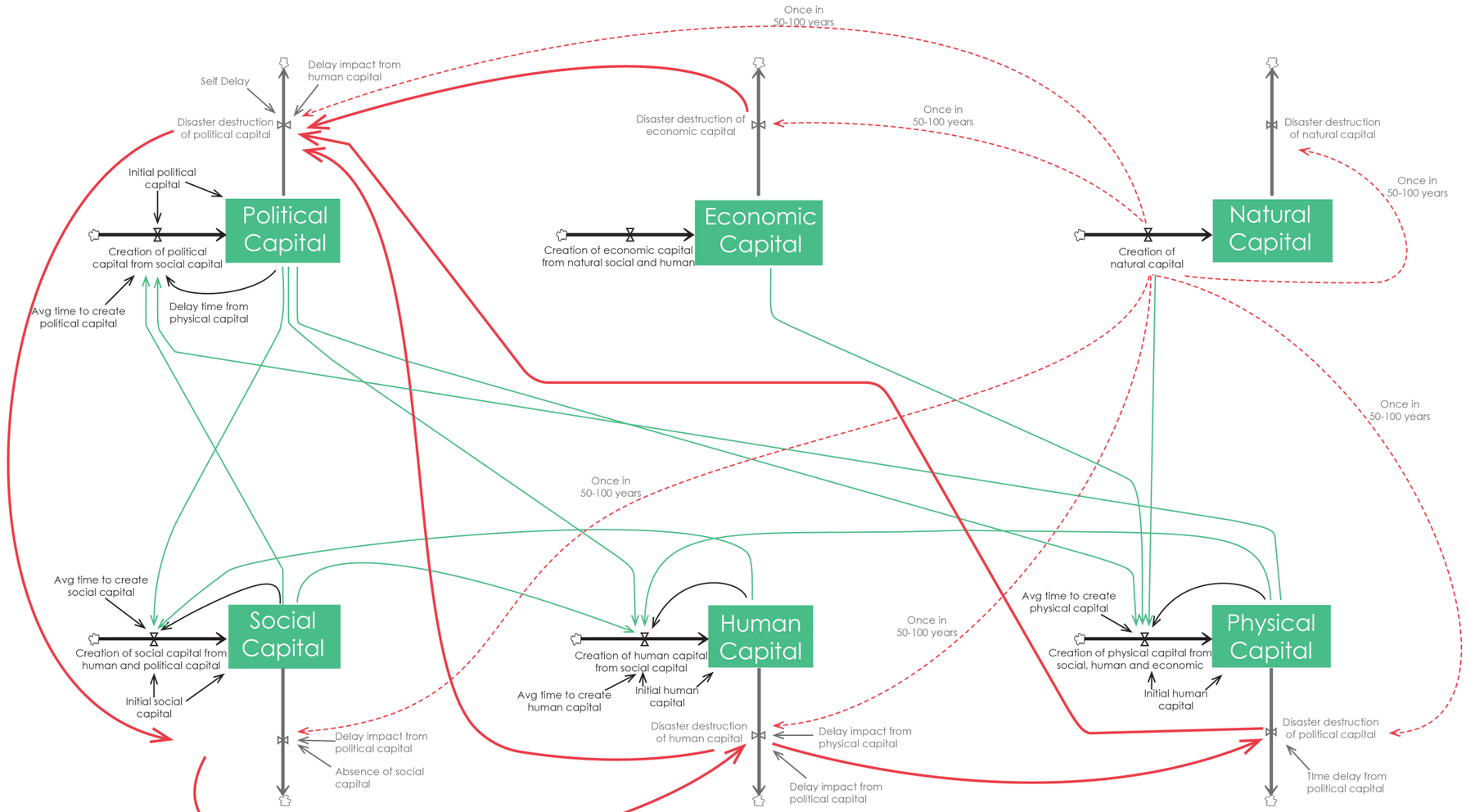
March | April | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec

RESEARCH AND OBSERVATION | DESCRIPTIVE | PRESCRIPTIVE | DESCRIPTIVE

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- Healthcare volunteers catered to evacuees (human capital) and took electoral information



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Capital being influenced /destroyed in the destruction stage

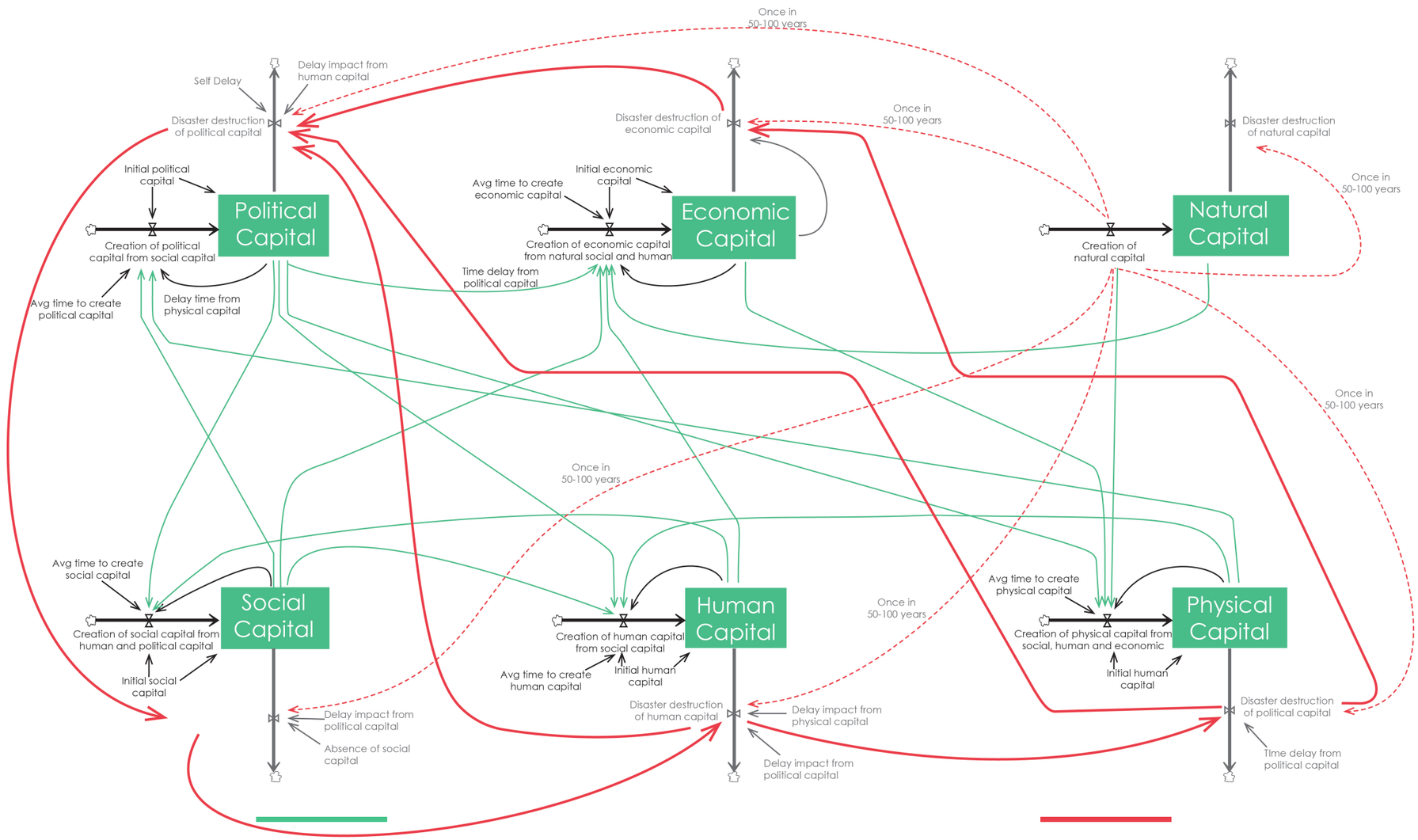
March | April | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec

RESEARCH AND OBSERVATION | DESCRIPTIVE | **PRESCRIPTIVE** | DESCRIPTIVE

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- Communication restored
- New mayor took charge
- Funding and aid was used for recovery



Capital being influenced in creation stage

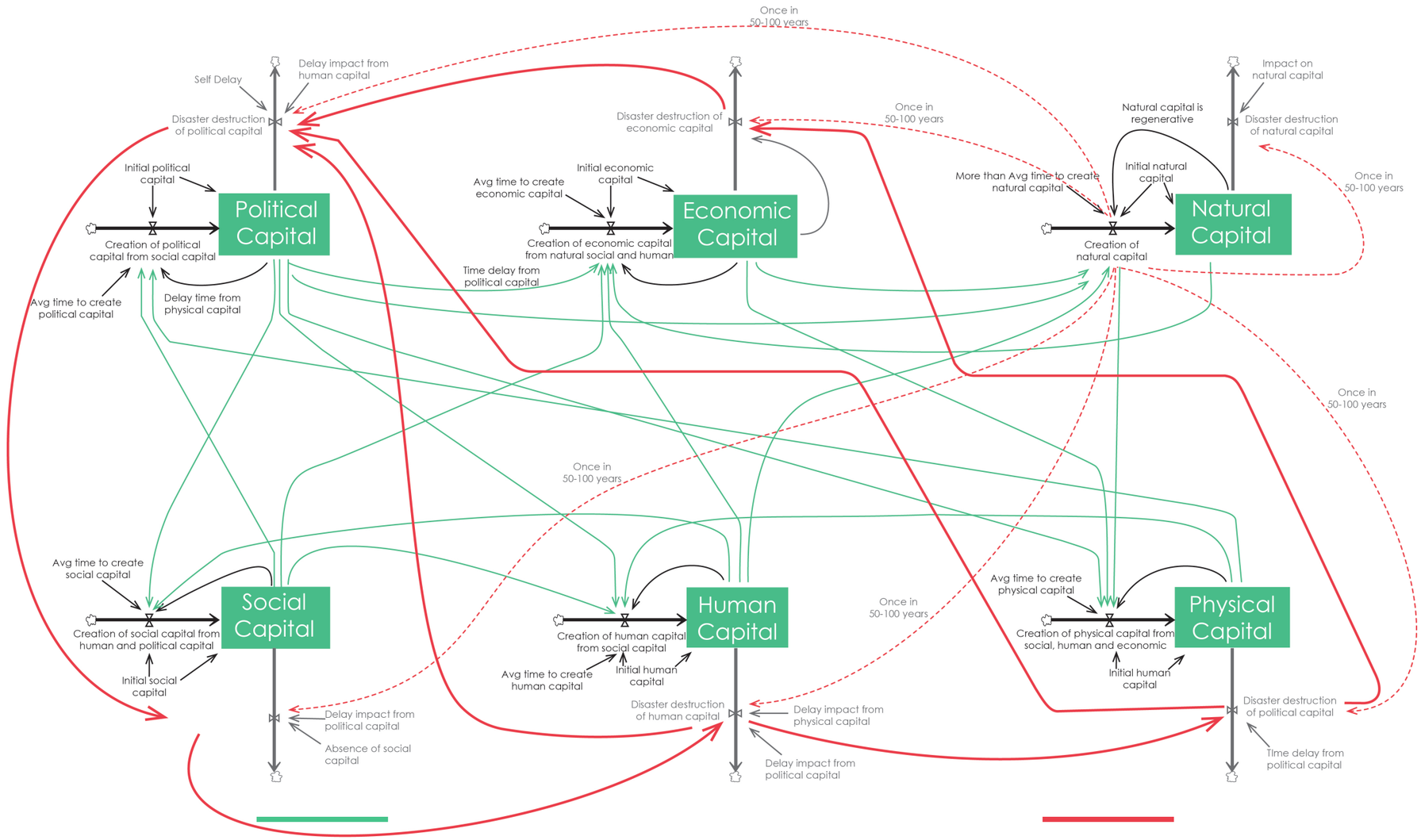
Capital being influenced /destroyed in the destruction stage

March April May Jun Jul Aug Sept Oct Nov Dec

Decision evaluation

Reconstruction decisions of 2011 tsunami evaluated based on system dynamics

- New mayor through collaboration and participating with other leaders started relief and reconstruction work
- Human efforts to restore the
- 1st recovery plan made in Dec 2011
- Actual reconstruction started in 2014



Capital being influenced in creation stage

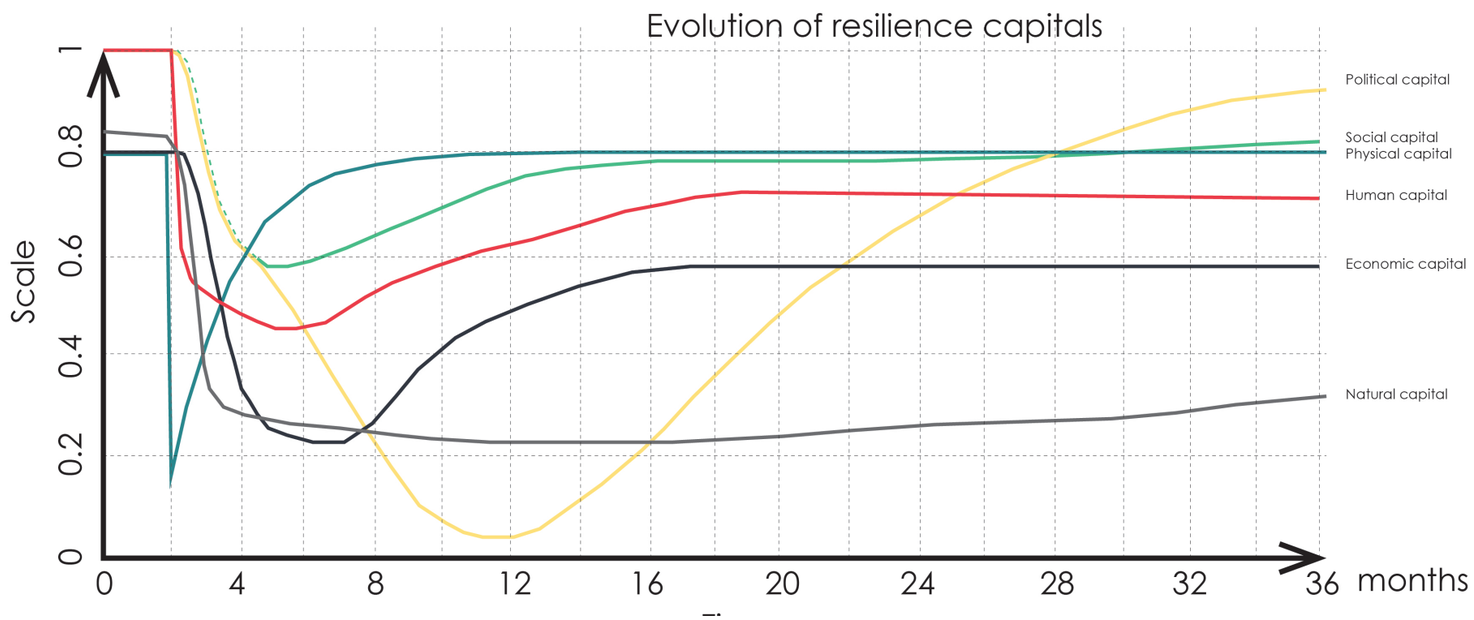
Capital being influenced /destroyed in the destruction stage

March | April | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec

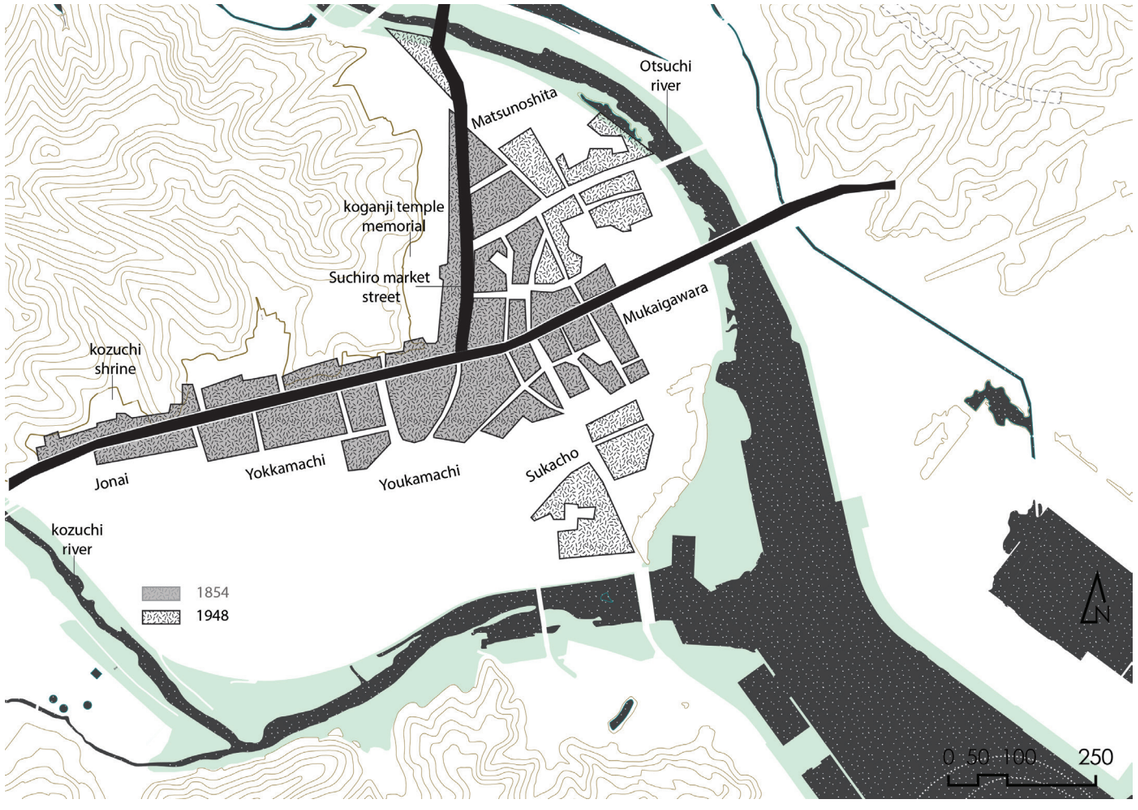
RESEARCH AND OBSERVATION | DESCRIPTIVE | PRESCRIPTIVE | DESCRIPTIVE

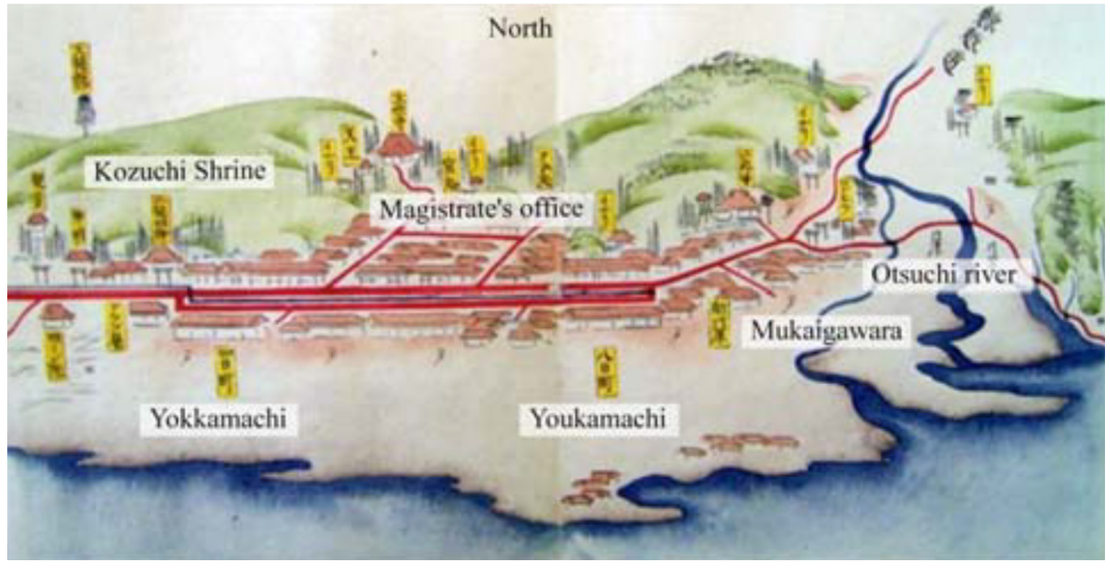
Analysis results

1. Decision delay causes, displacement, psychological trauma, reduced resilience, uncertainty and mistrust in the government
2. Decision making should be decentralised
3. Emergency decision making should be exercised
4. Alternatives to be planned for emergency
5. Social connections should be enhanced
6. Critical services should be located in non-hazard area
7. Business contingency plans should be well researched
8. Tsunami awareness should be enhanced
9. Hazards maps and coastal regulations need to be incorporated



Otsuchi in history

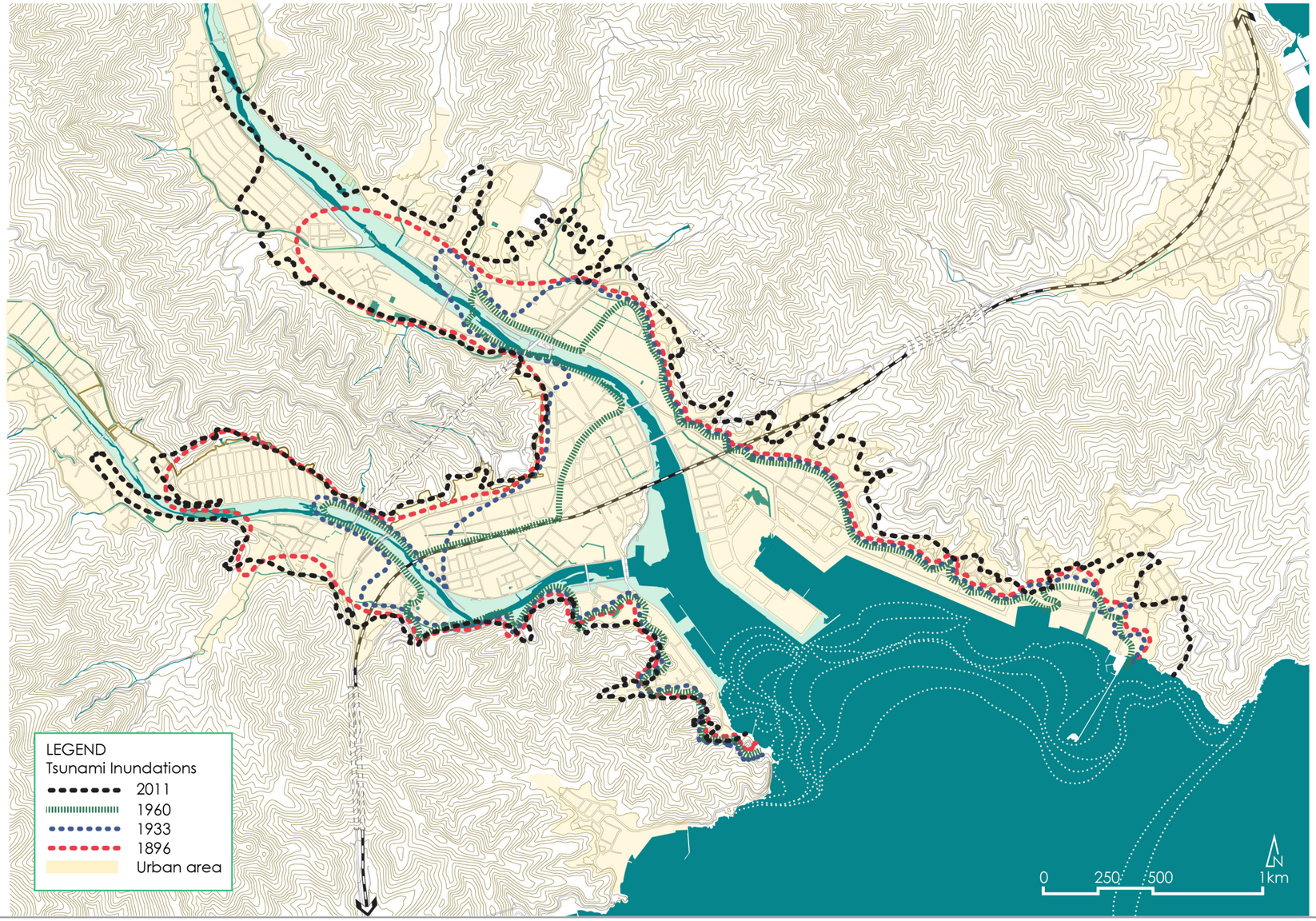




Otsuchi in the Ansei Era 1854-1860

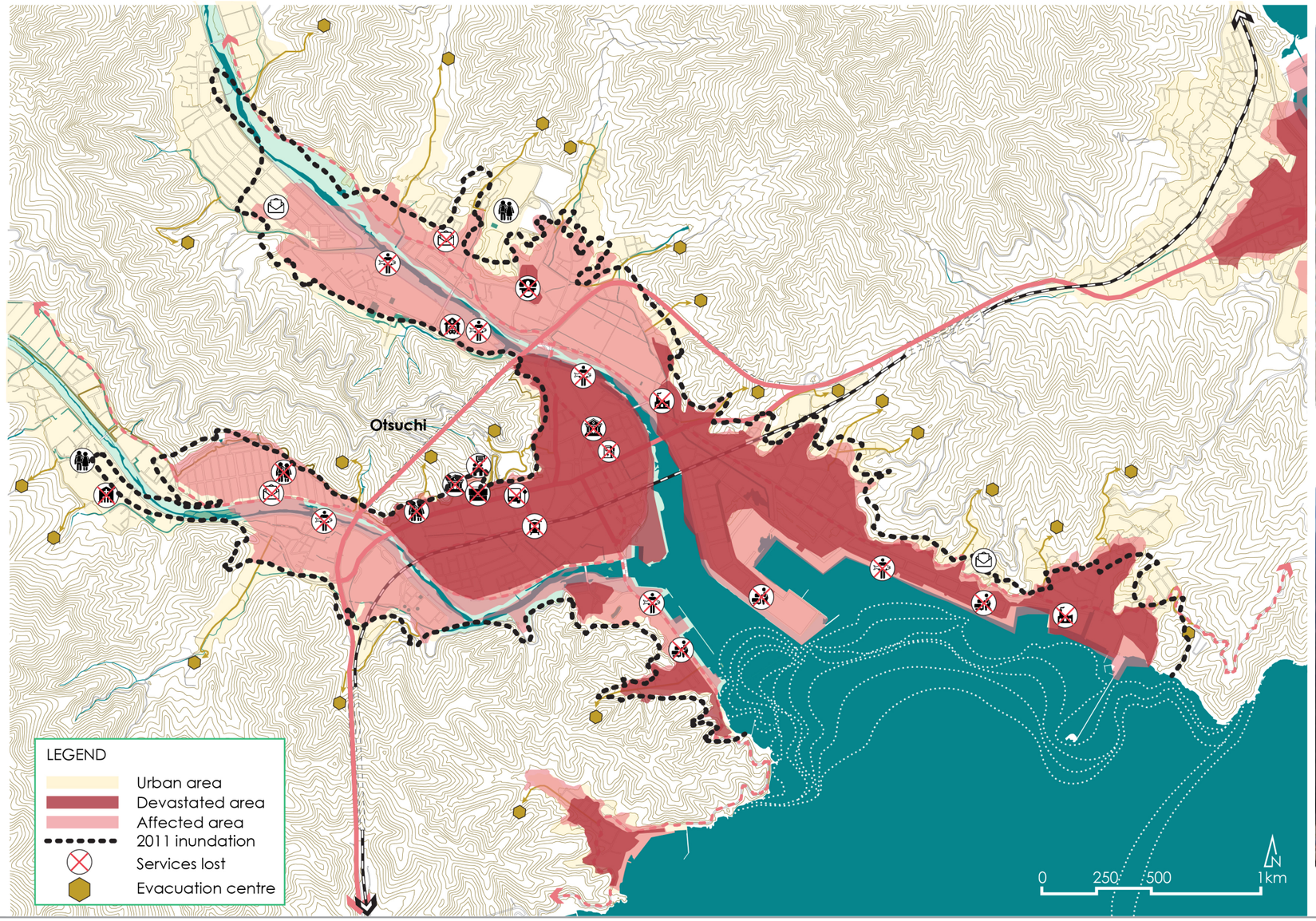
Otsuchi in history

Inundations levels in Otsuchi



Otsuchi in history

Damage due to 2011 Otsuchi



Otsuchi Before 3/11

Otsuchi After 3/11

Spatial analysis

Downtown Otsuchi
Before 3/11

Assessment of
critical capitals

+

Downtown Otsuchi
Reconstructed 3/11

Required additional
critical capital for 9M

Earthquake Tsunami of 9M on 3/11

System dynamics

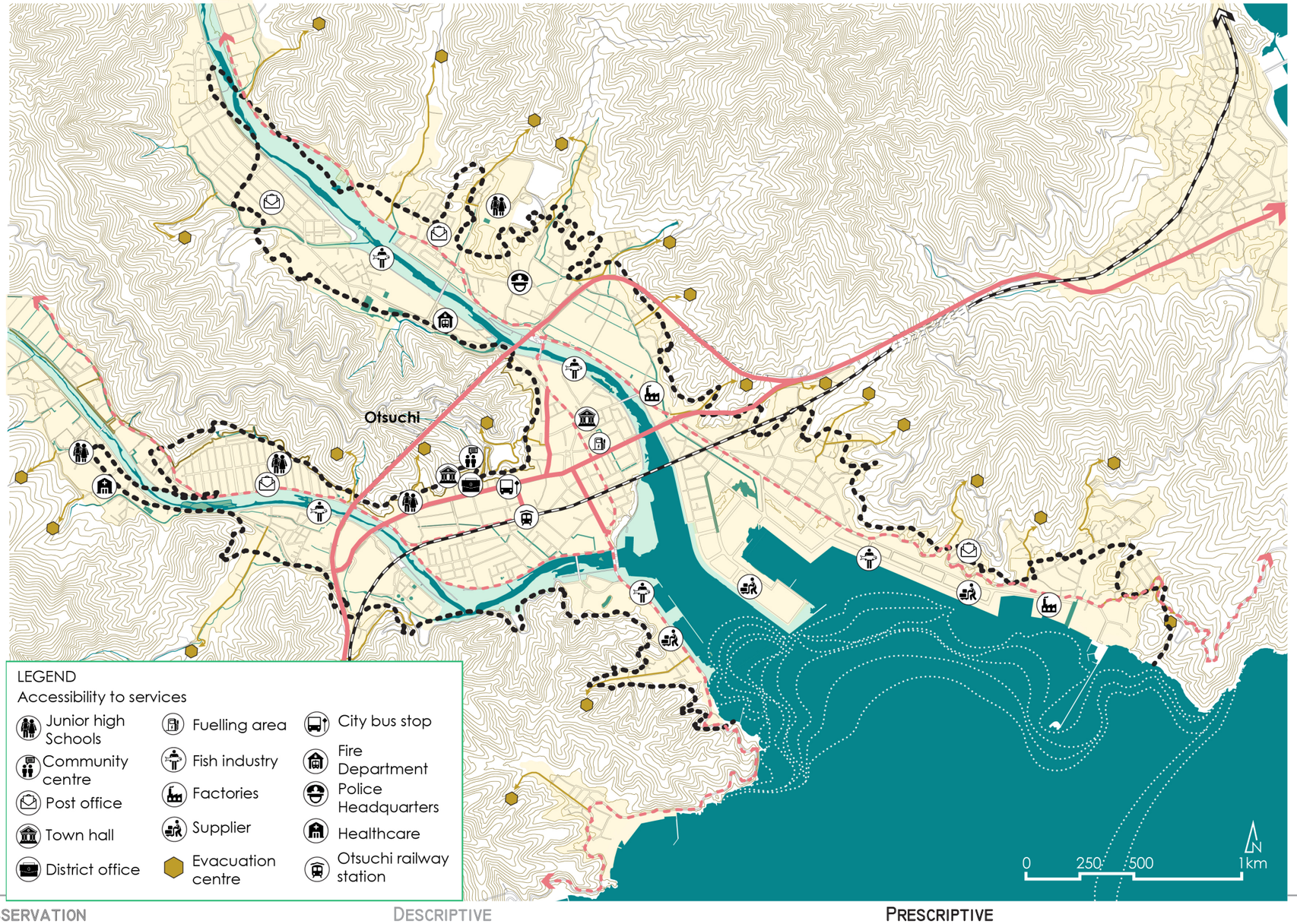
Downtown Otsuchi
Renewed 3/11

Urban design and
strategies

Evaluation of the
design

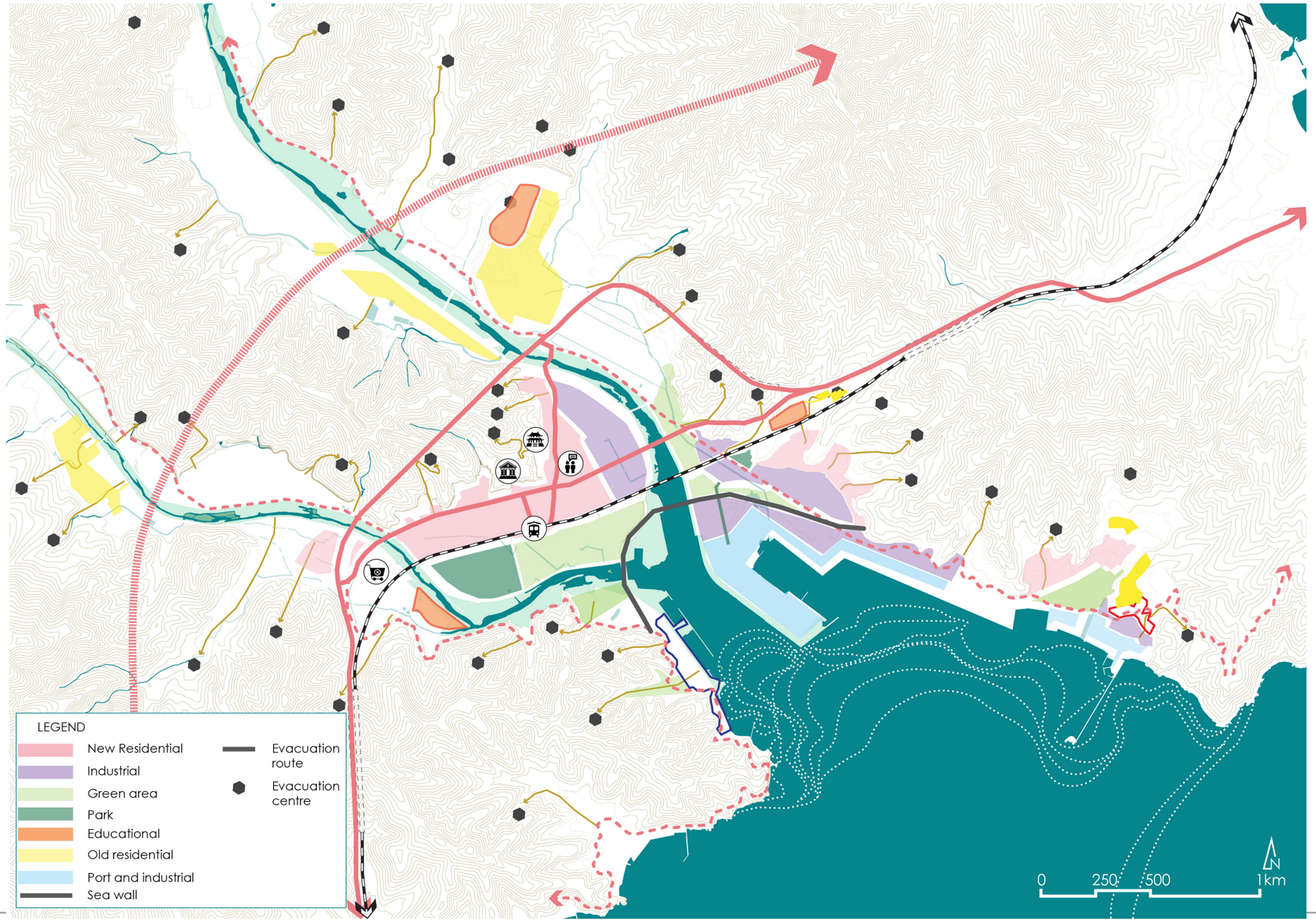
Design fiction

Otsuchi Before 3/11



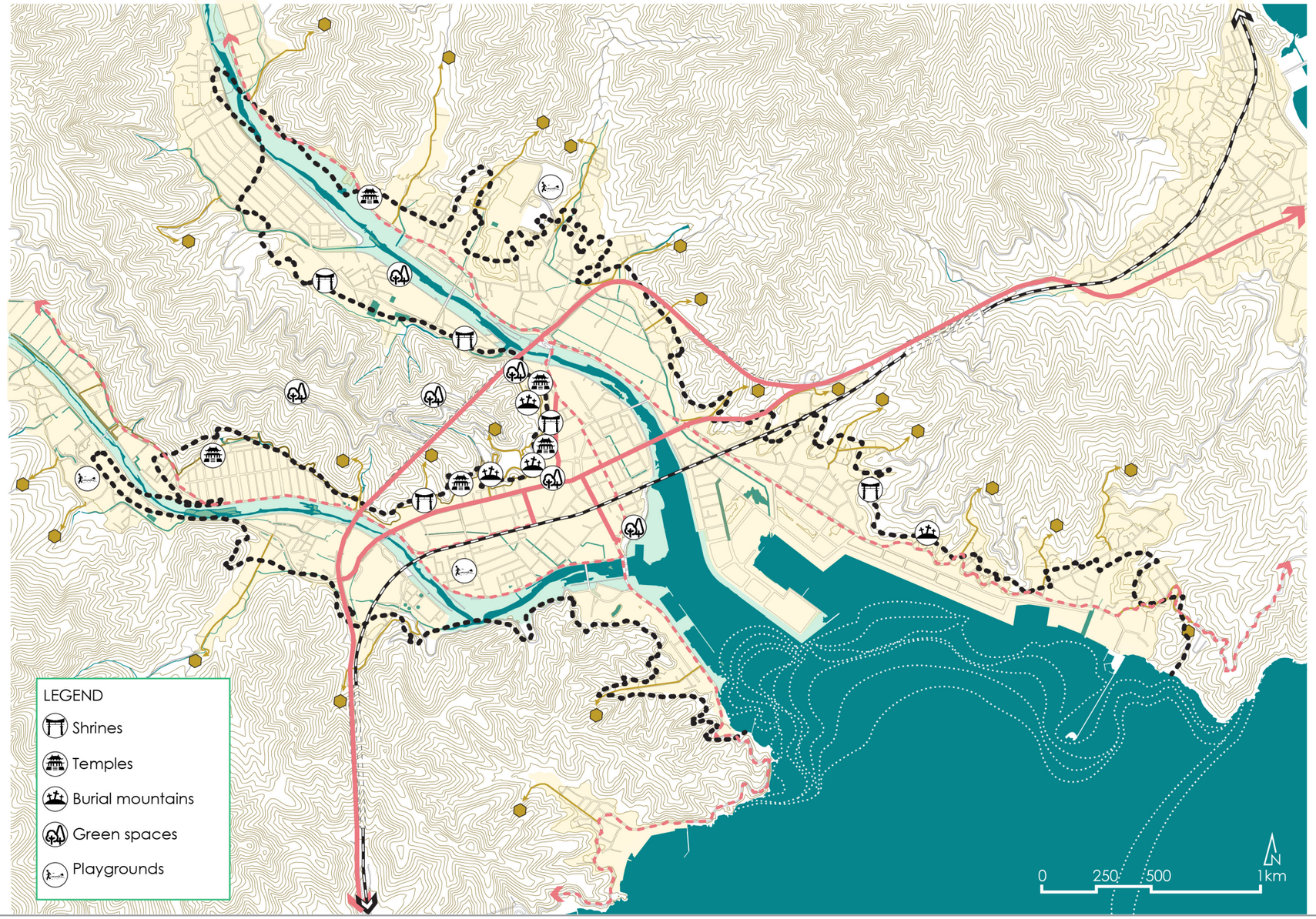
Design fiction

Otsuchi Reconstructed after 3/11



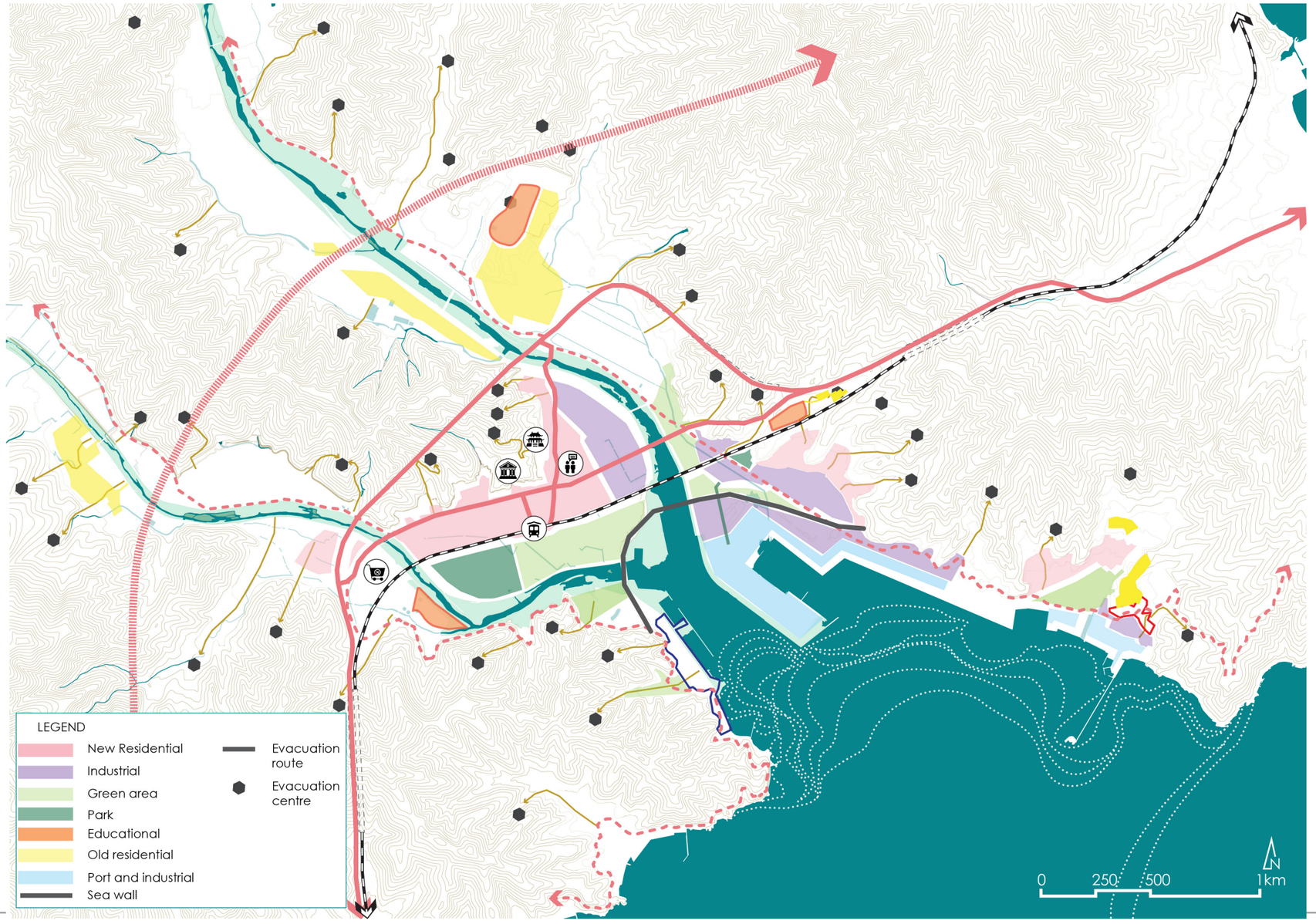
Design fiction

Otsuchi Before 3/11



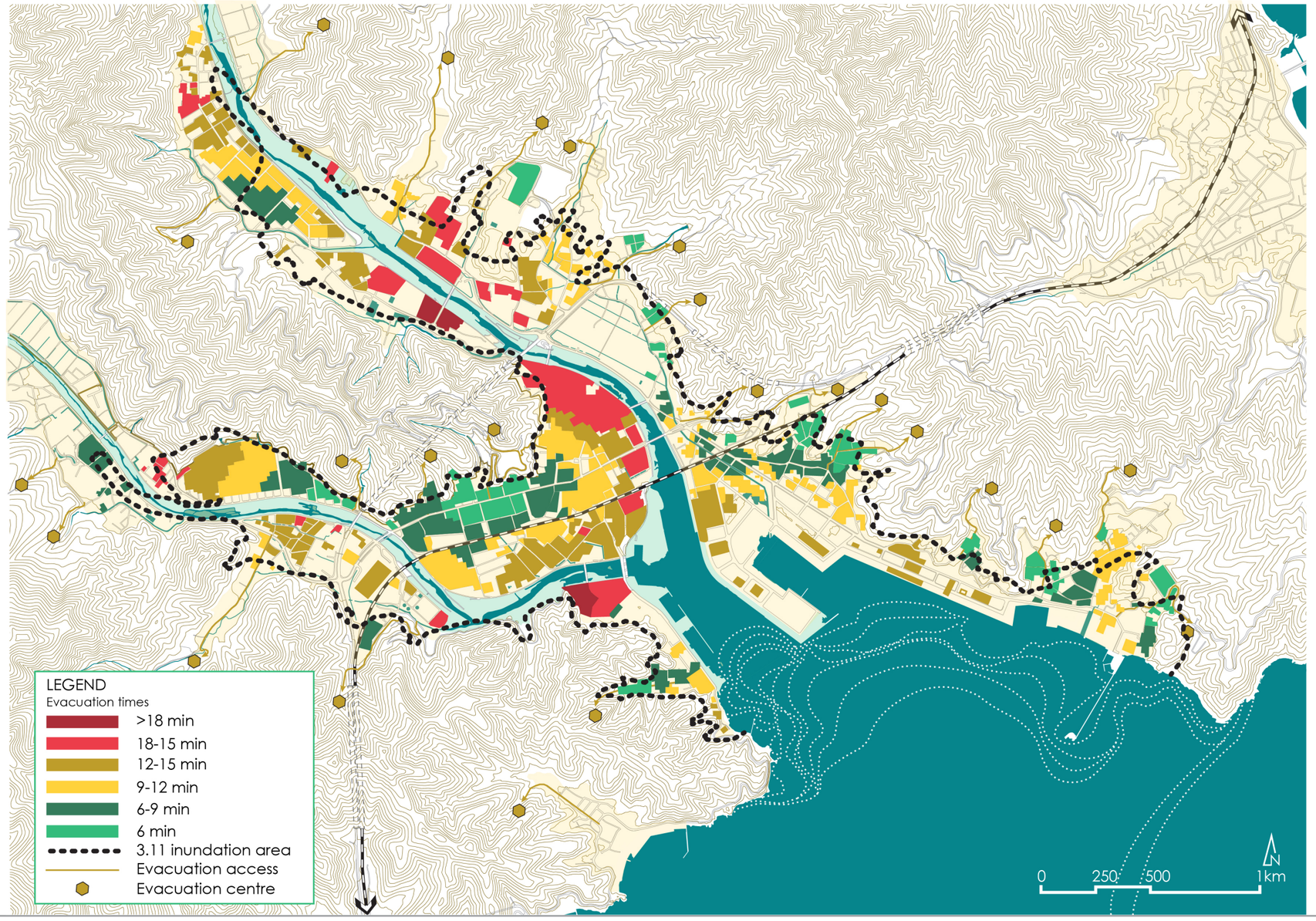
Design fiction

Otsuchi Reconstructed after 3/11



Design fiction

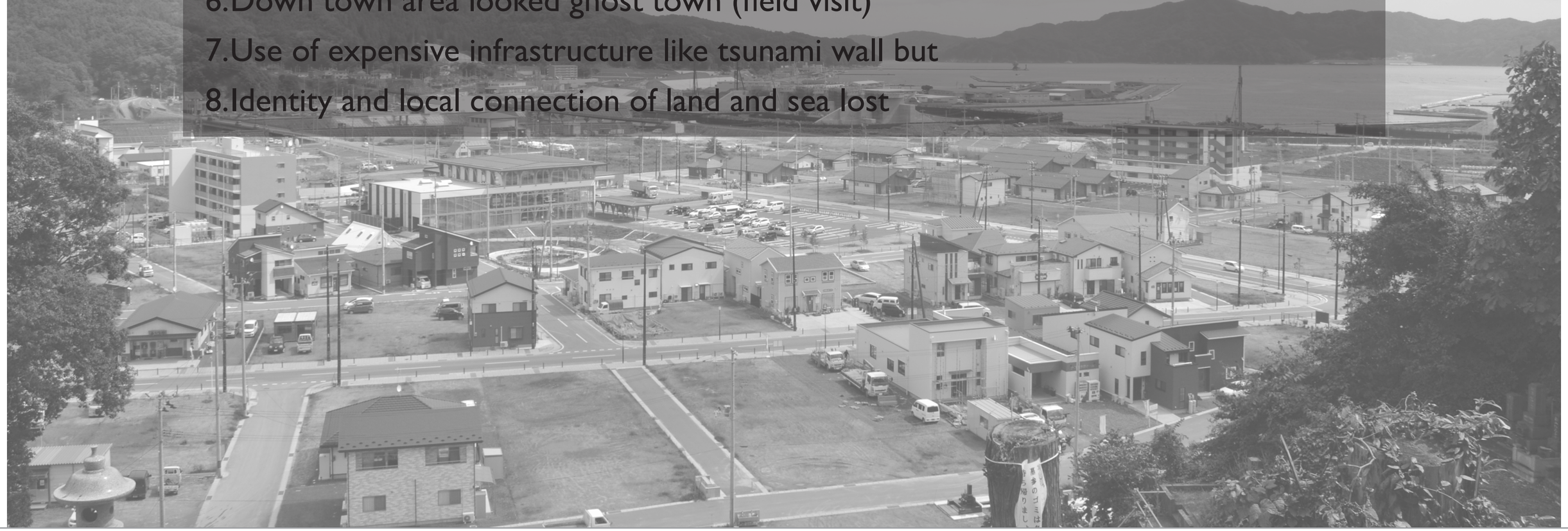
Otsuchi Before 3/11



Source- MAS SimTread Software, Tomonori Sano

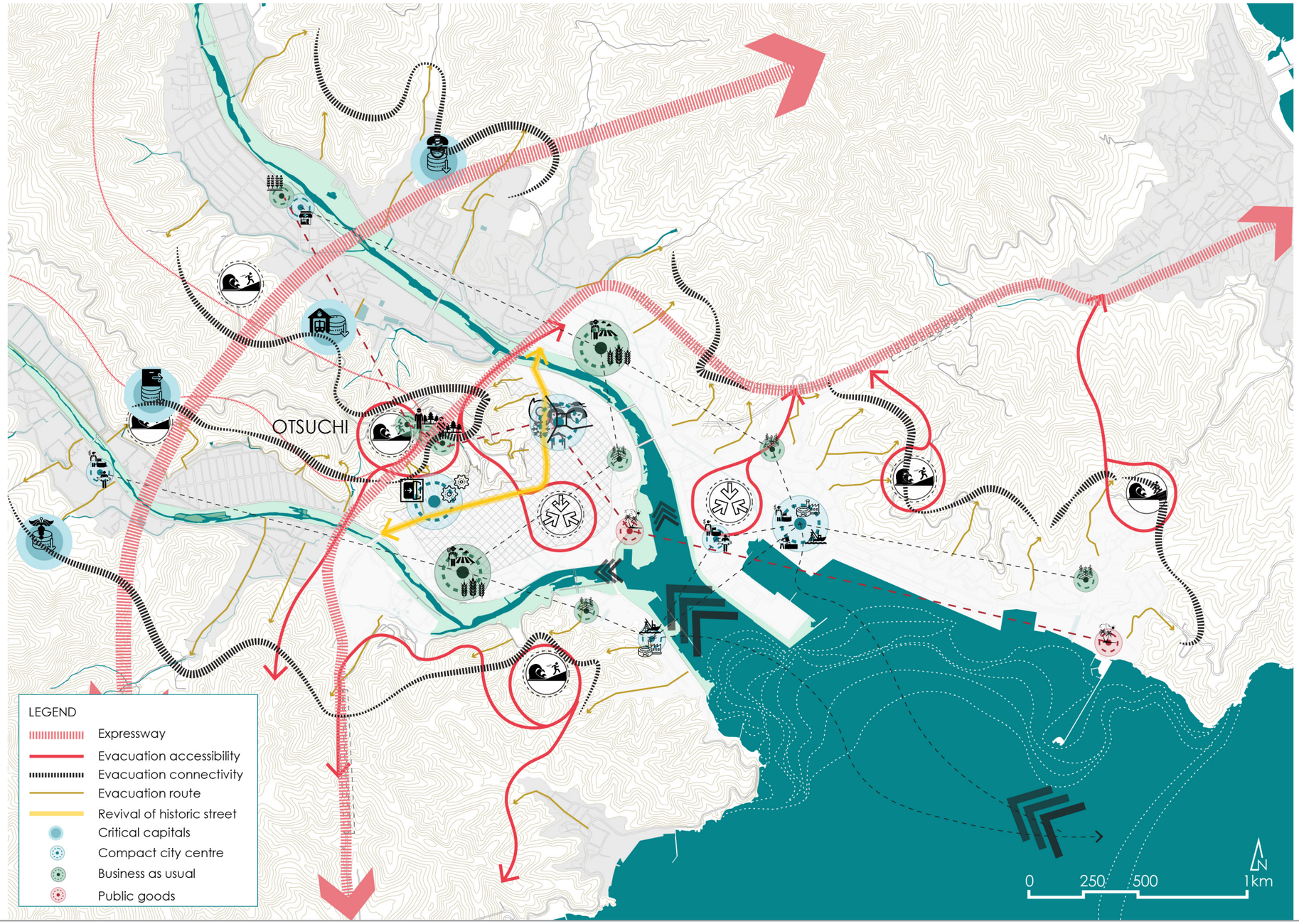
Spatial analysis

1. Clustering (residential and amenities) near the mountain
2. No coastal regulation but hazard zone present as green space
3. Evacuation not enhanced
4. Elements for cascading disasters still present, like use of gas cylinder
5. Landuse and demographics disproportionate
6. Down town area looked ghost town (field visit)
7. Use of expensive infrastructure like tsunami wall but
8. Identity and local connection of land and sea lost



Research and Observation → Descriptive → Prescriptive → Descriptive

Design Vision | "KAIZEN OTSUCHI"



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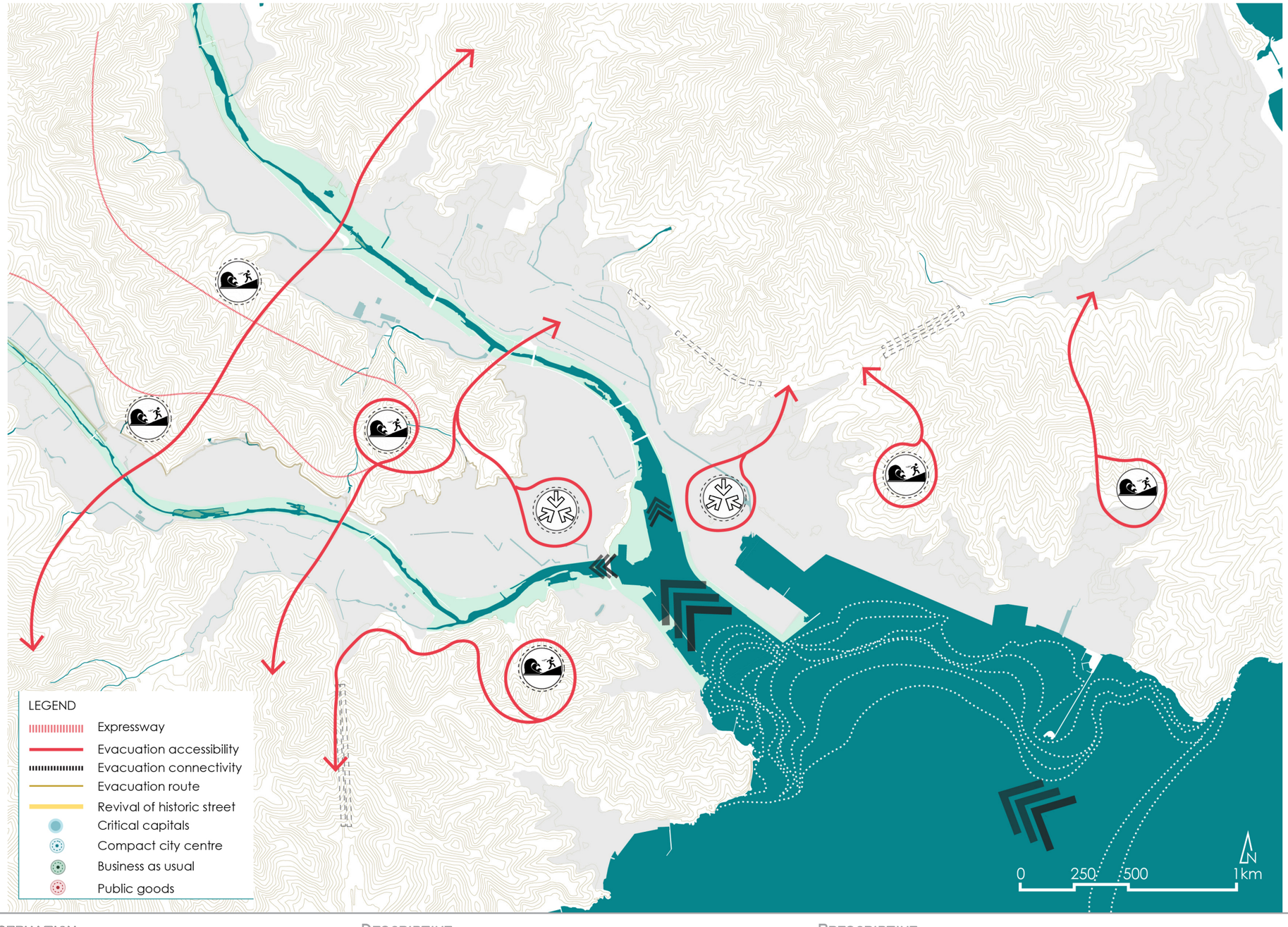
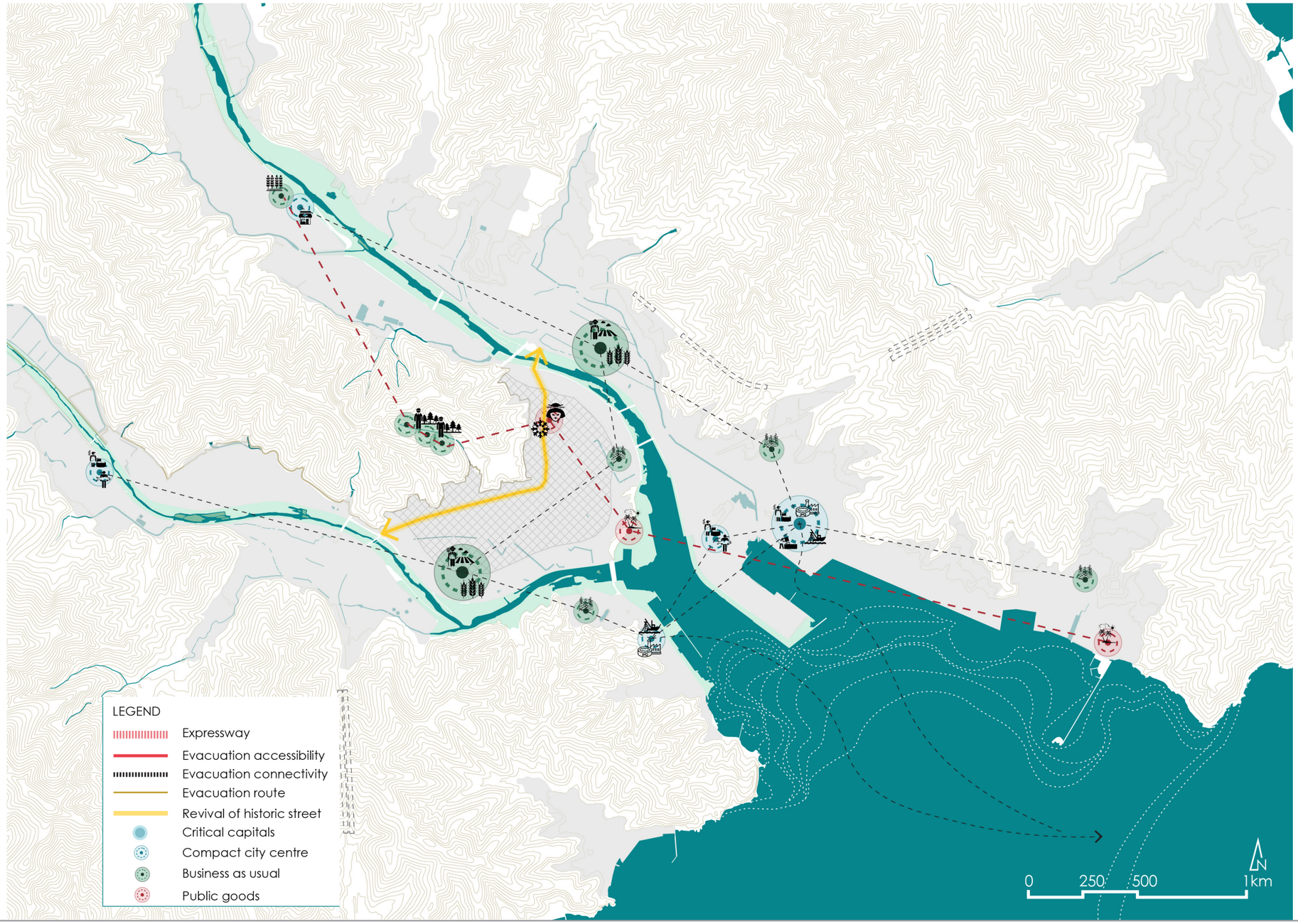
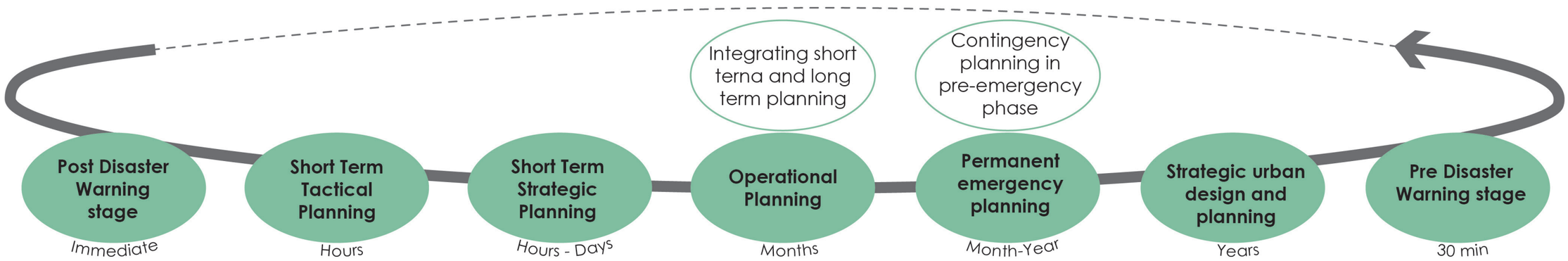


Design Vision | "KAIZEN OTSUCHI"



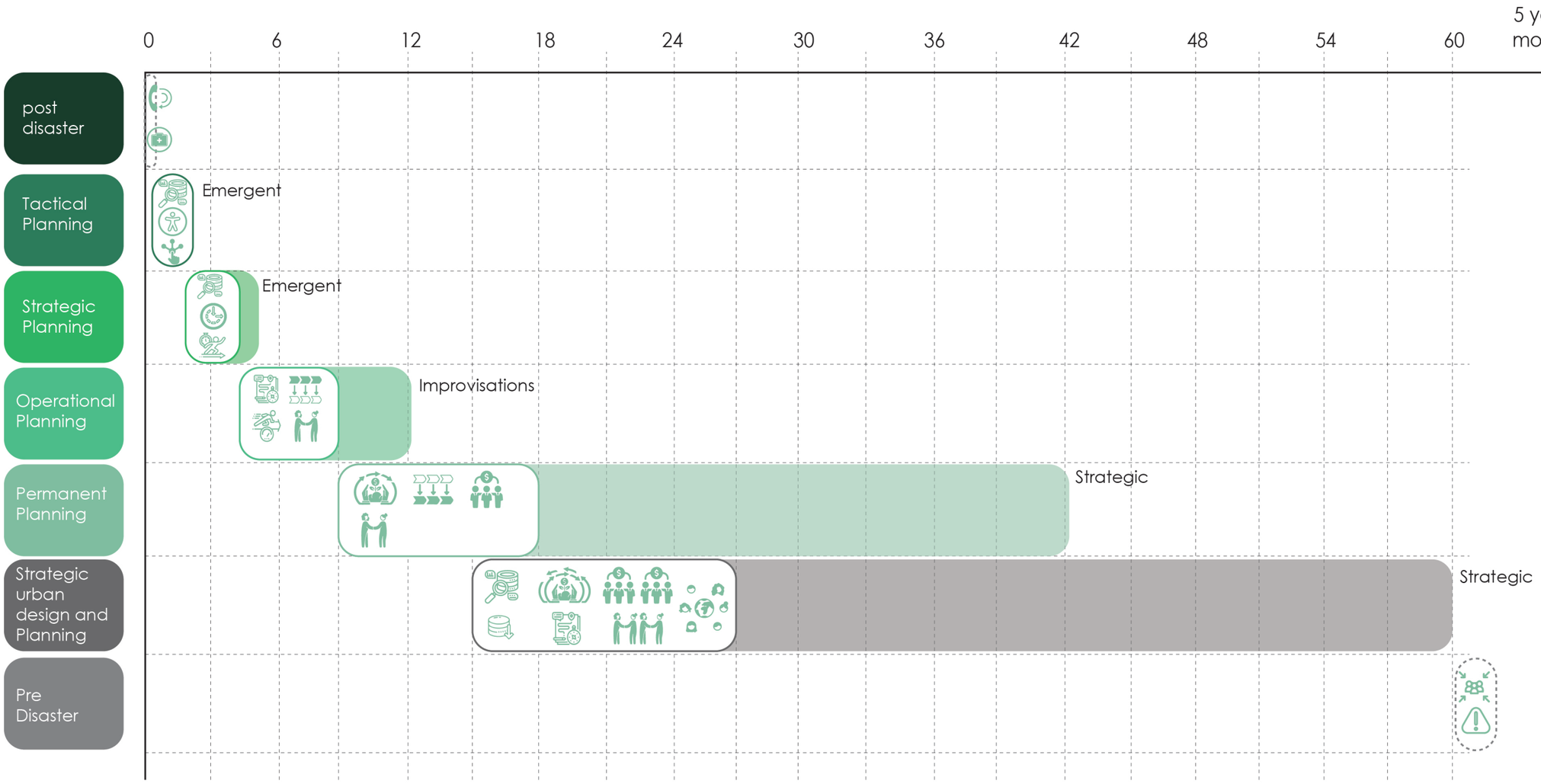
Design Strategy through IEP



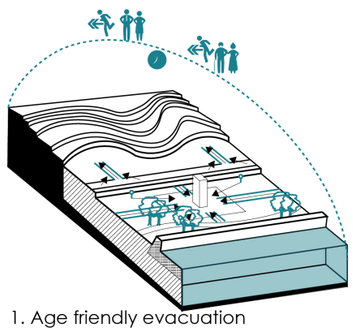
NOTES

1. **Dispersing the power of political capital to manage decisions**
2. **Exercising emergency decision making across operational domains**

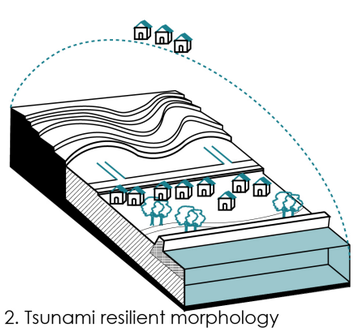
Strategy roadmap



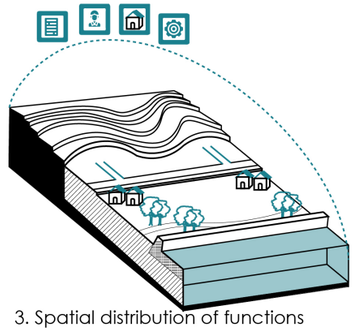
Design strategy principles



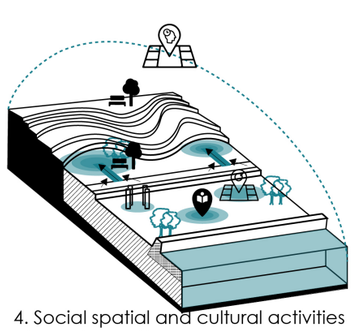
1. Age friendly evacuation



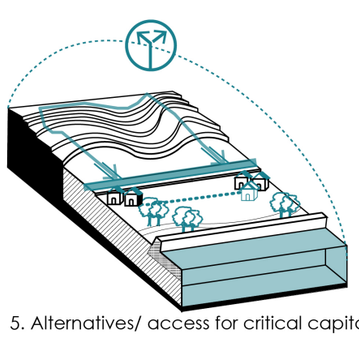
2. Tsunami resilient morphology



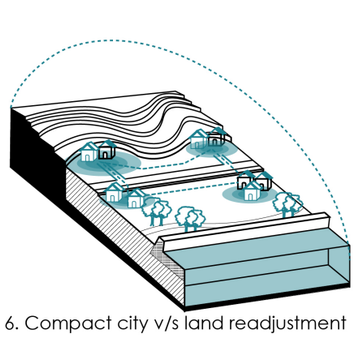
3. Spatial distribution of functions



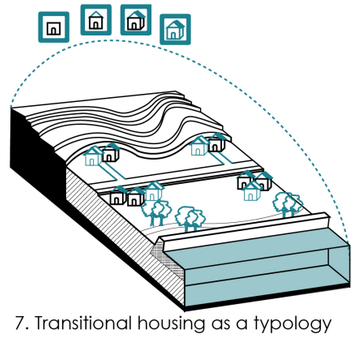
4. Social spatial and cultural activities stimulating resilience



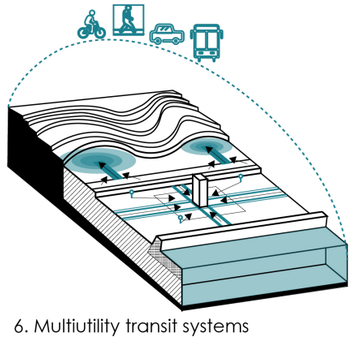
5. Alternatives/ access for critical capitals



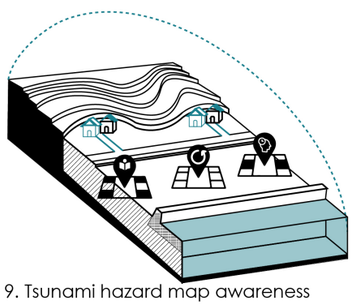
6. Compact city v/s land readjustment



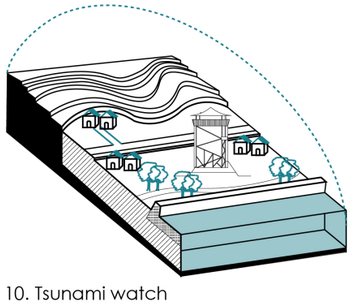
7. Transitional housing as a typology



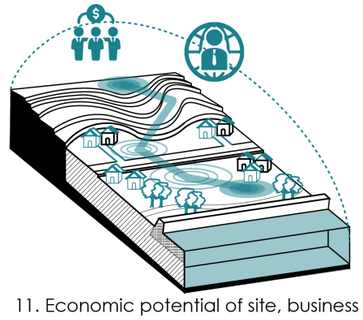
6. Multiutility transit systems



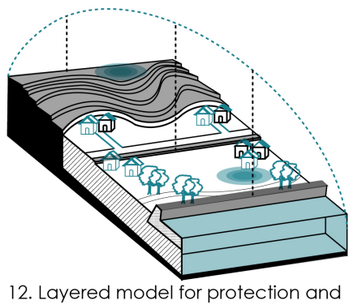
9. Tsunami hazard map awareness



10. Tsunami watch

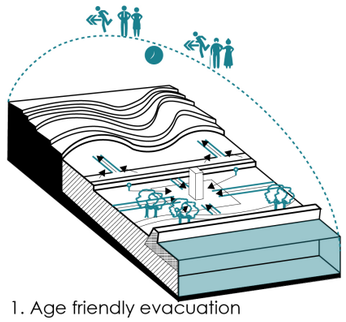


11. Economic potential of site, business as usual

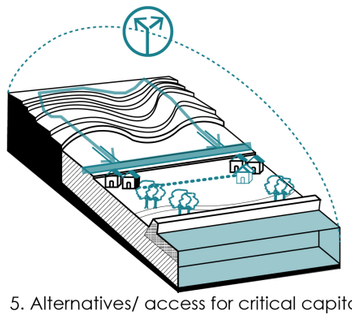


12. Layered model for protection and mitigation

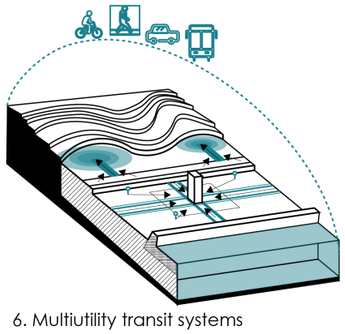
Design strategy | Safety



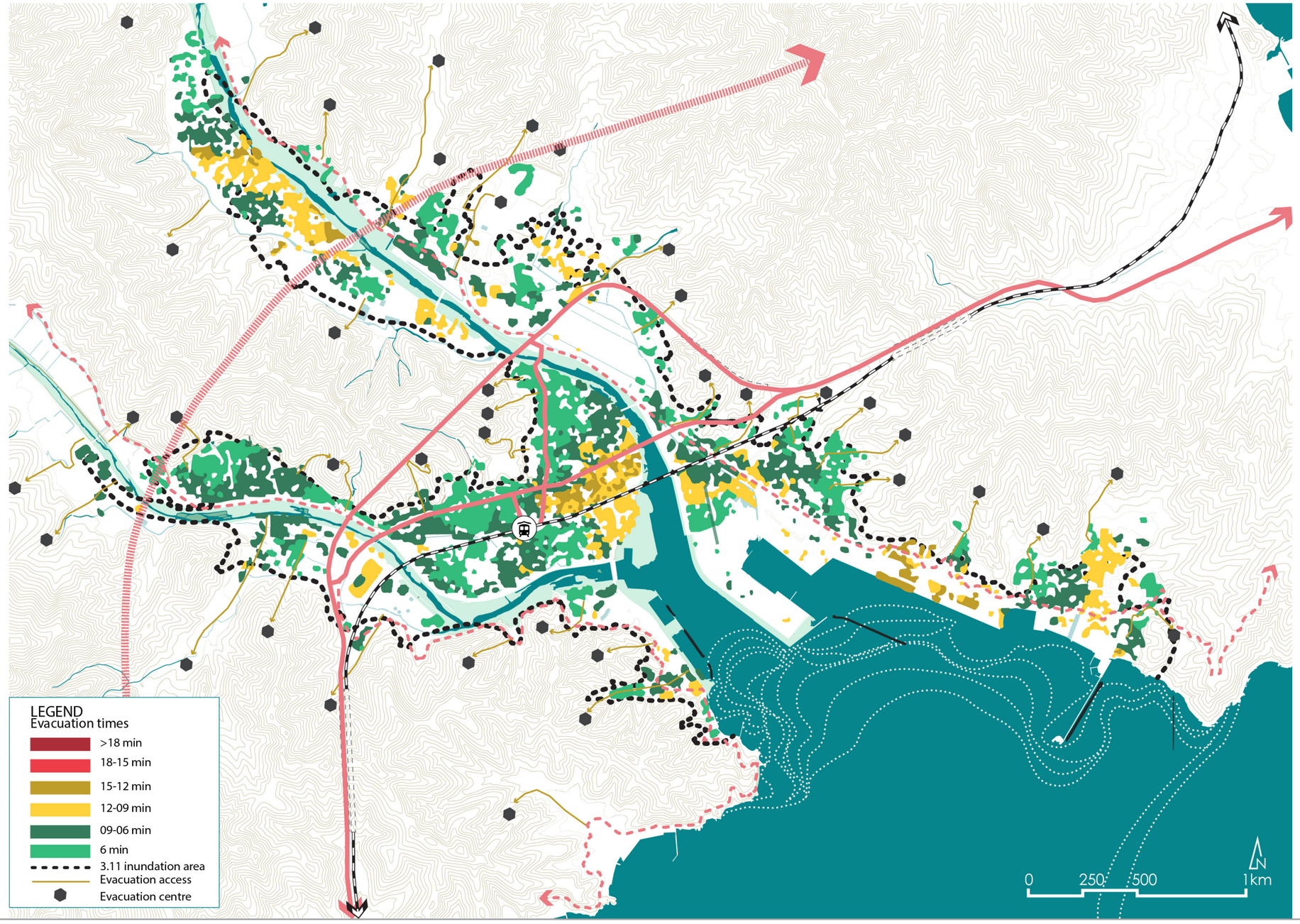
1. Age friendly evacuation



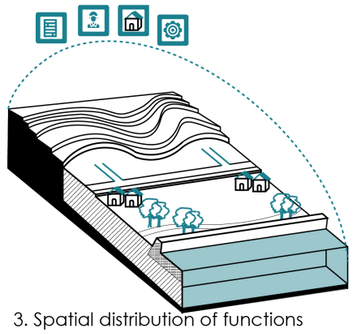
5. Alternatives/ access for critical capitals



6. Multiutility transit systems



Design strategy | Protection



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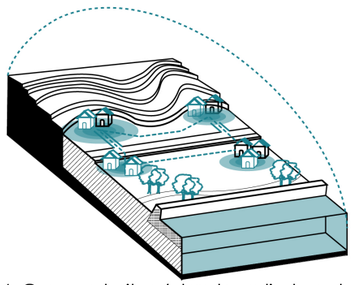

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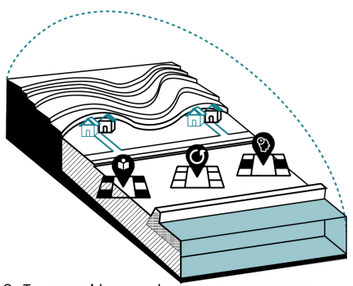
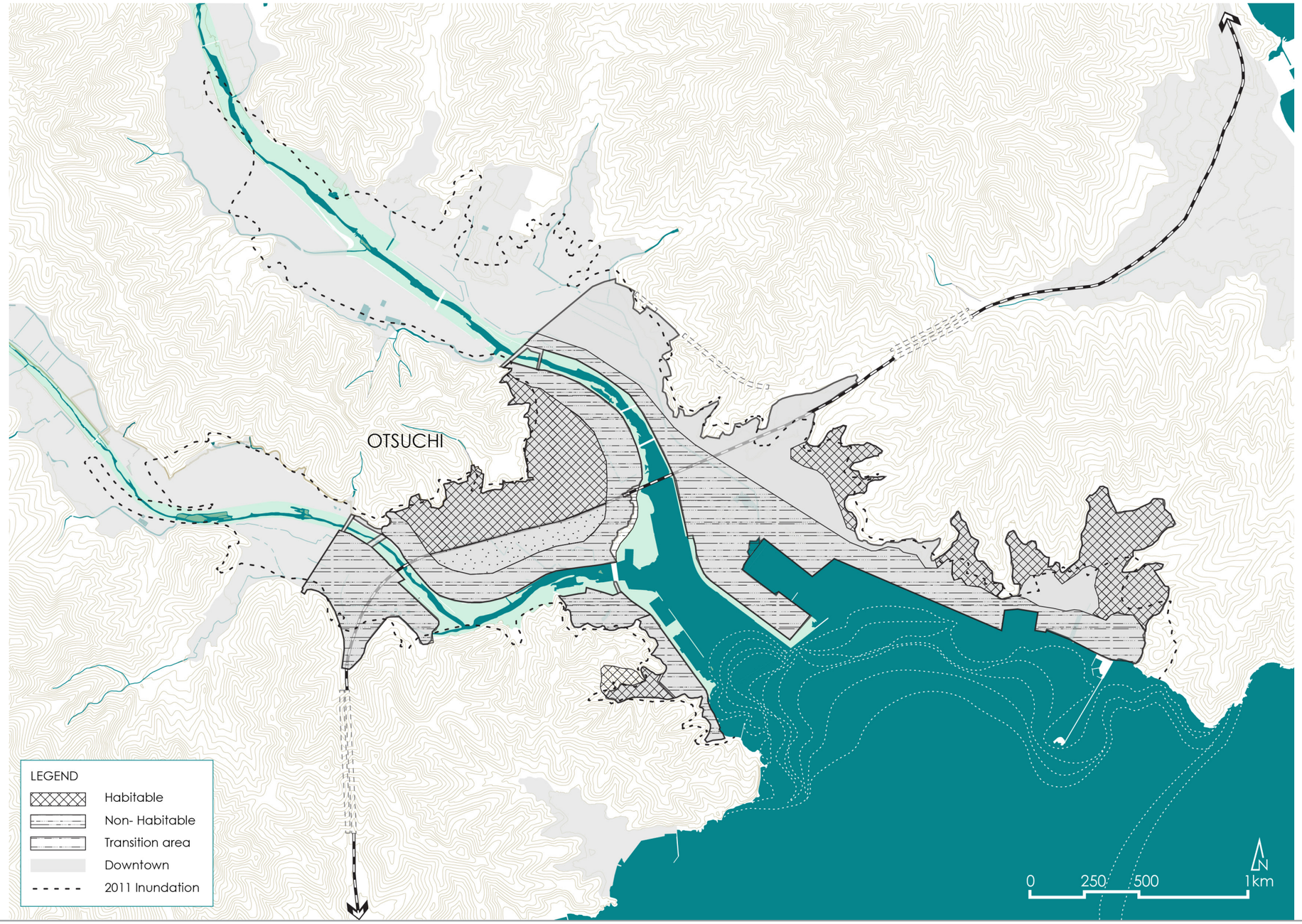
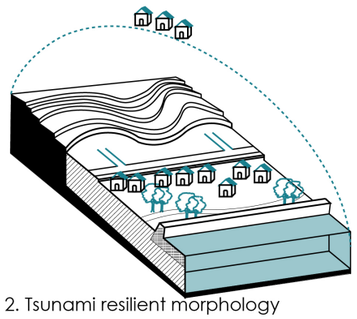


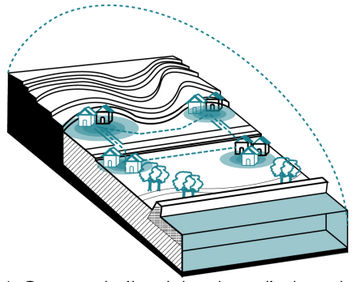
9. Tsunami hazard map awareness



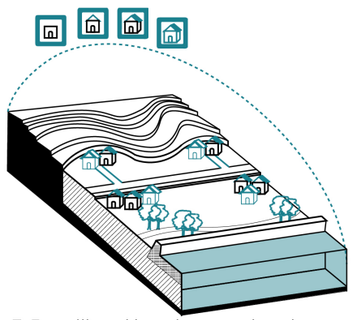
Design strategy | Connectivity



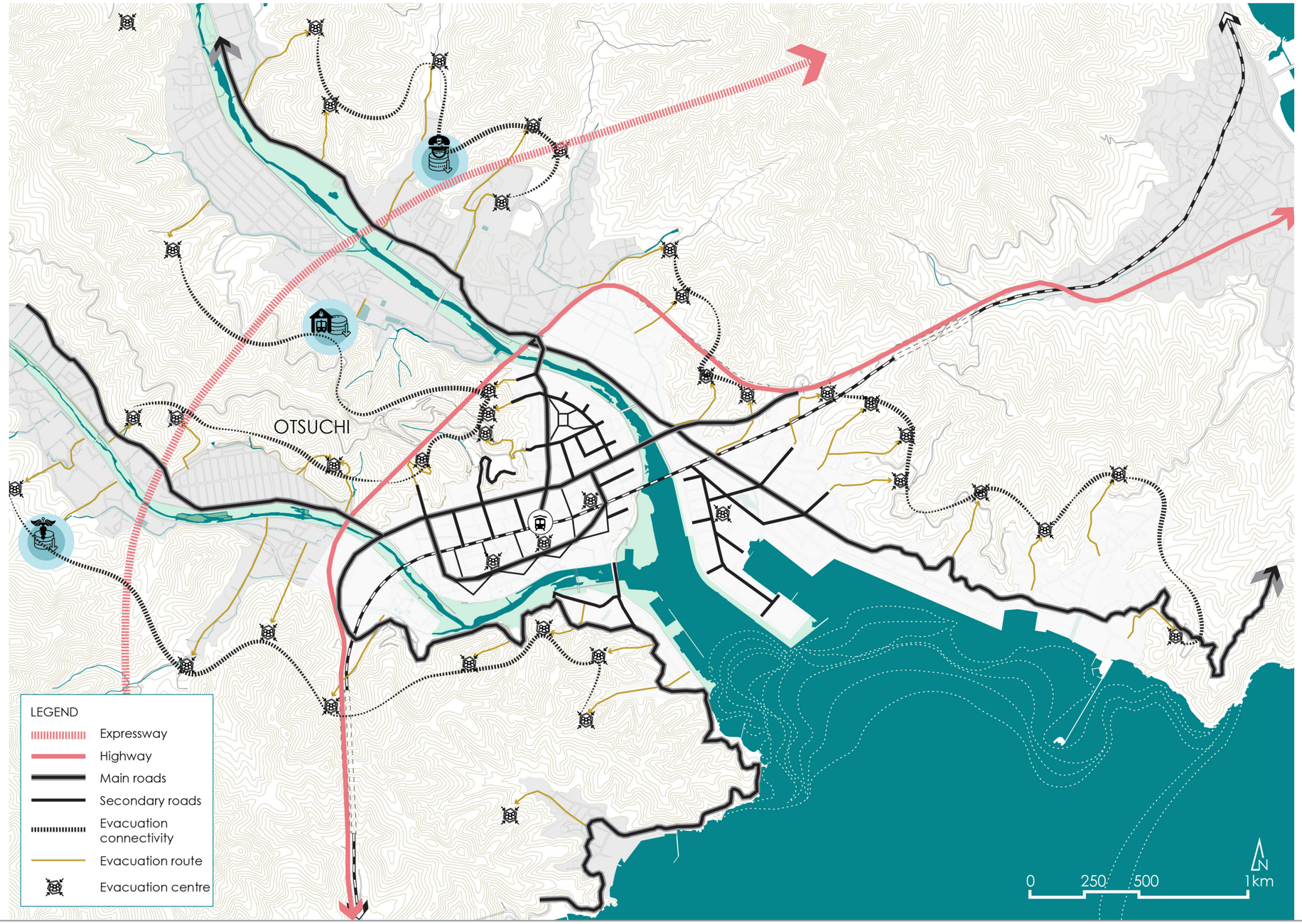
2. Tsunami resilient morphology



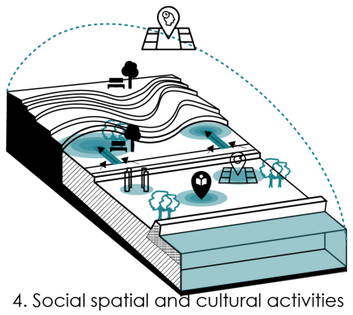
6. Compact city v/s land readjustment



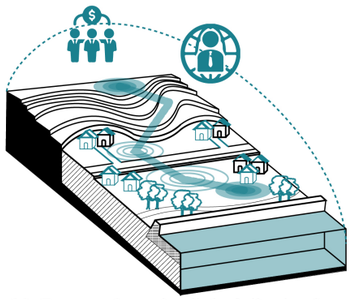
7. Transitional housing as a typology



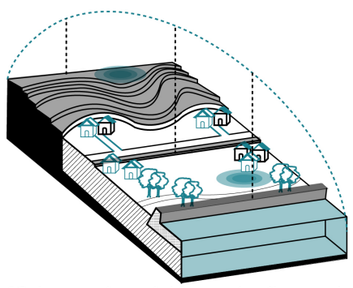
Design strategy | Longetivity



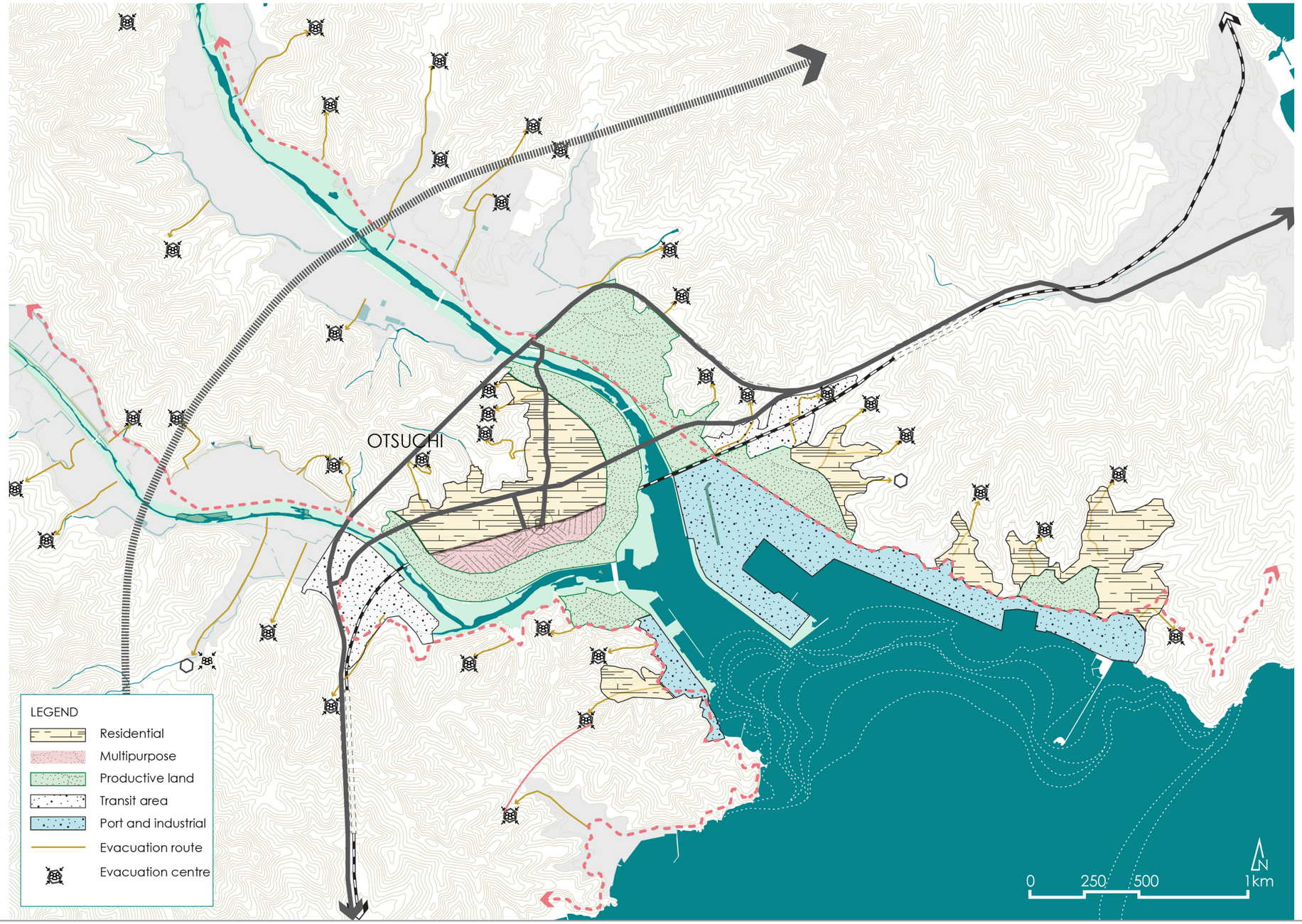
4. Social spatial and cultural activities stimulating resilience



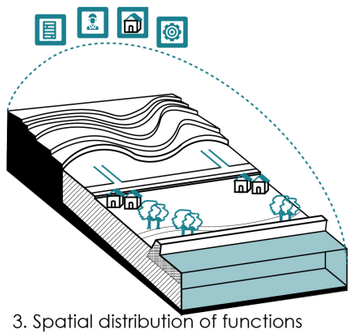
11. Economic potential of site, business as usual



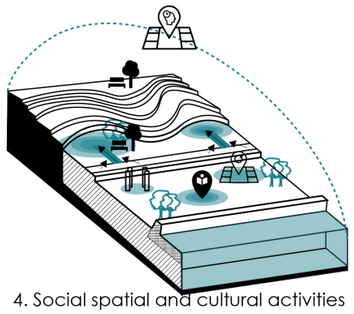
12. Layered model for protection and mitigation



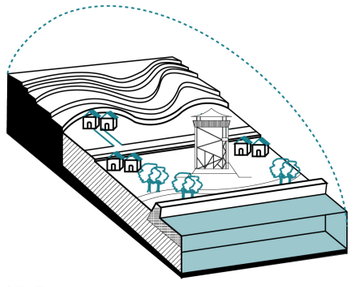
Design strategy | Revival



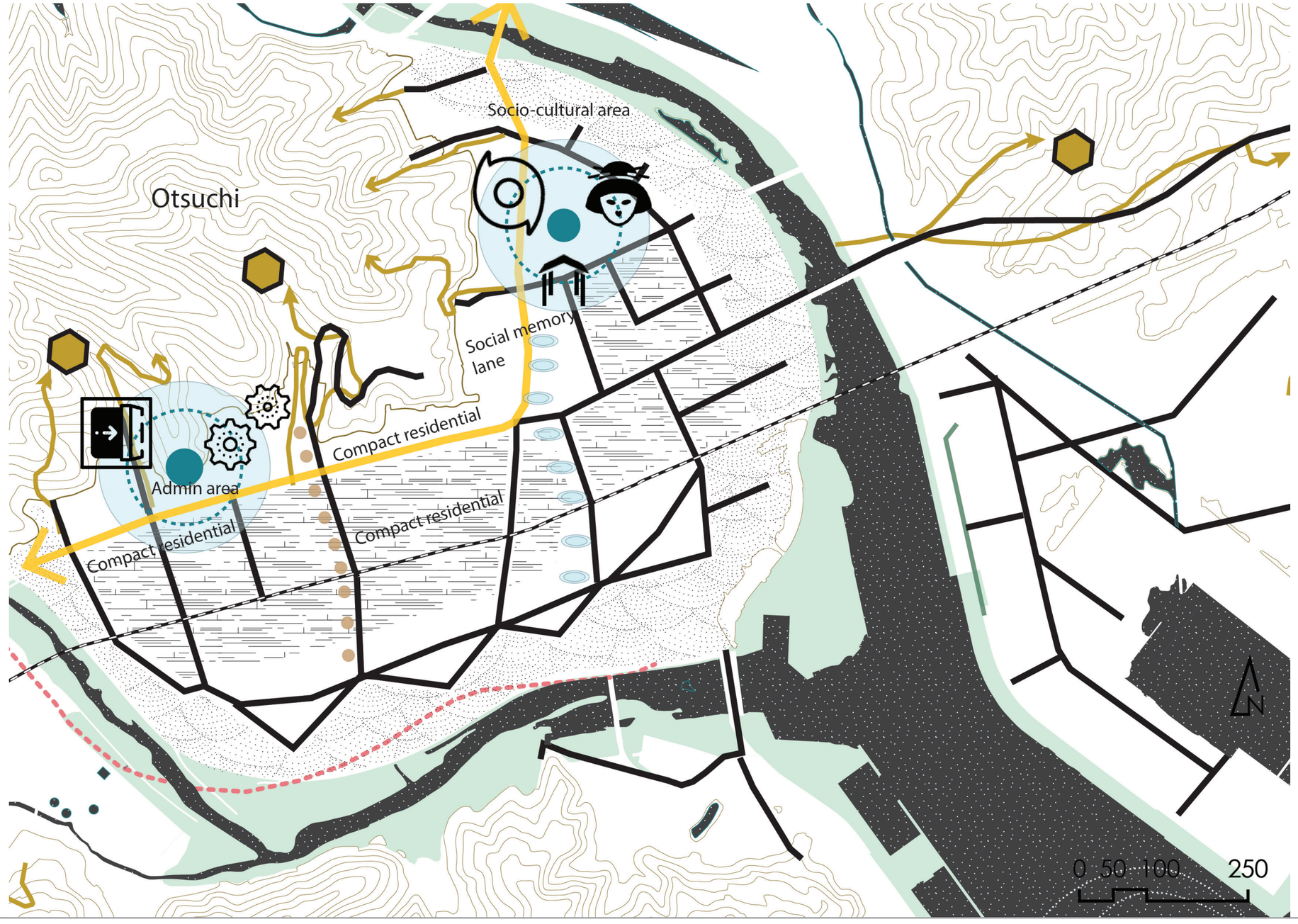
3. Spatial distribution of functions



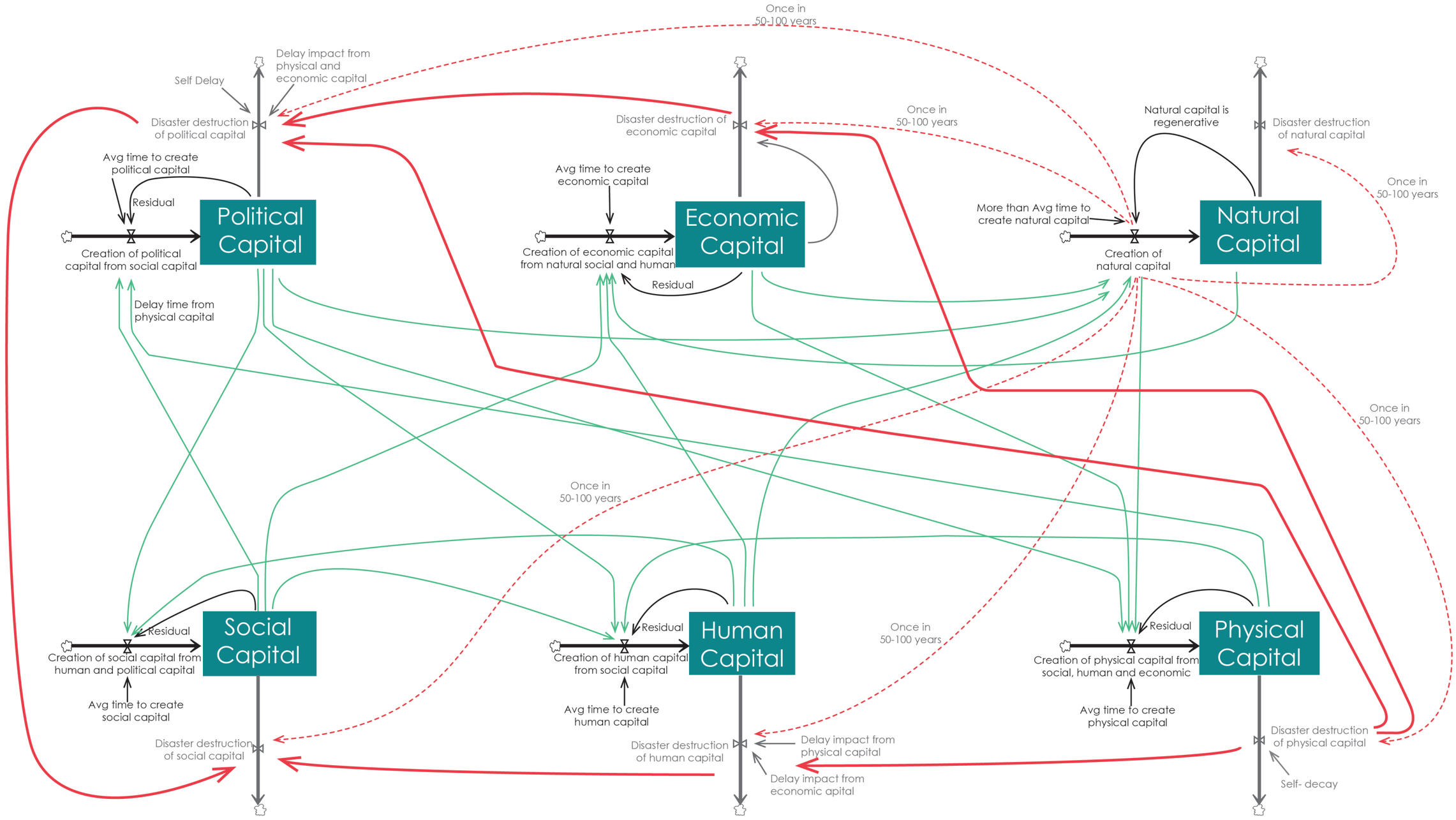
4. Social spatial and cultural activities stimulating resilience



10. Tsunami watch



Design decision analysis



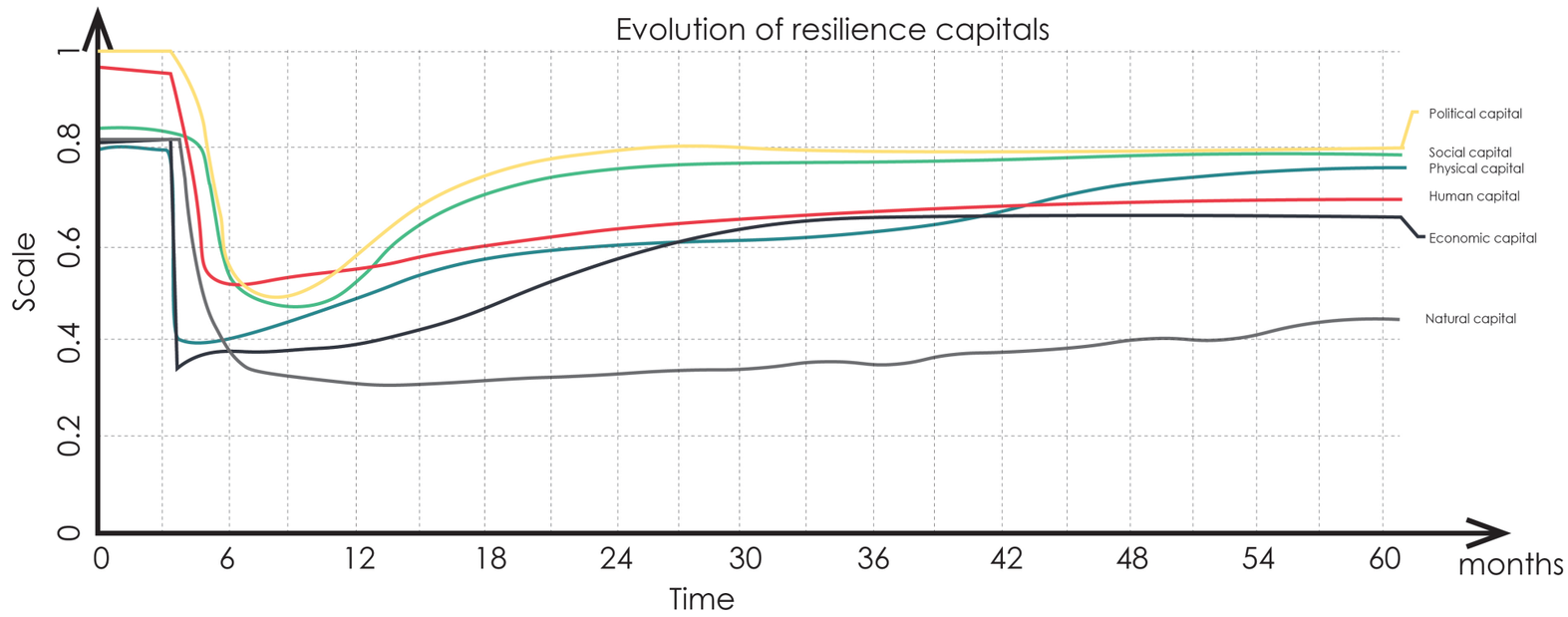
Capital being influenced in creation stage

Capital being influenced /destroyed in the destruction stage

Design evaluation

Principles

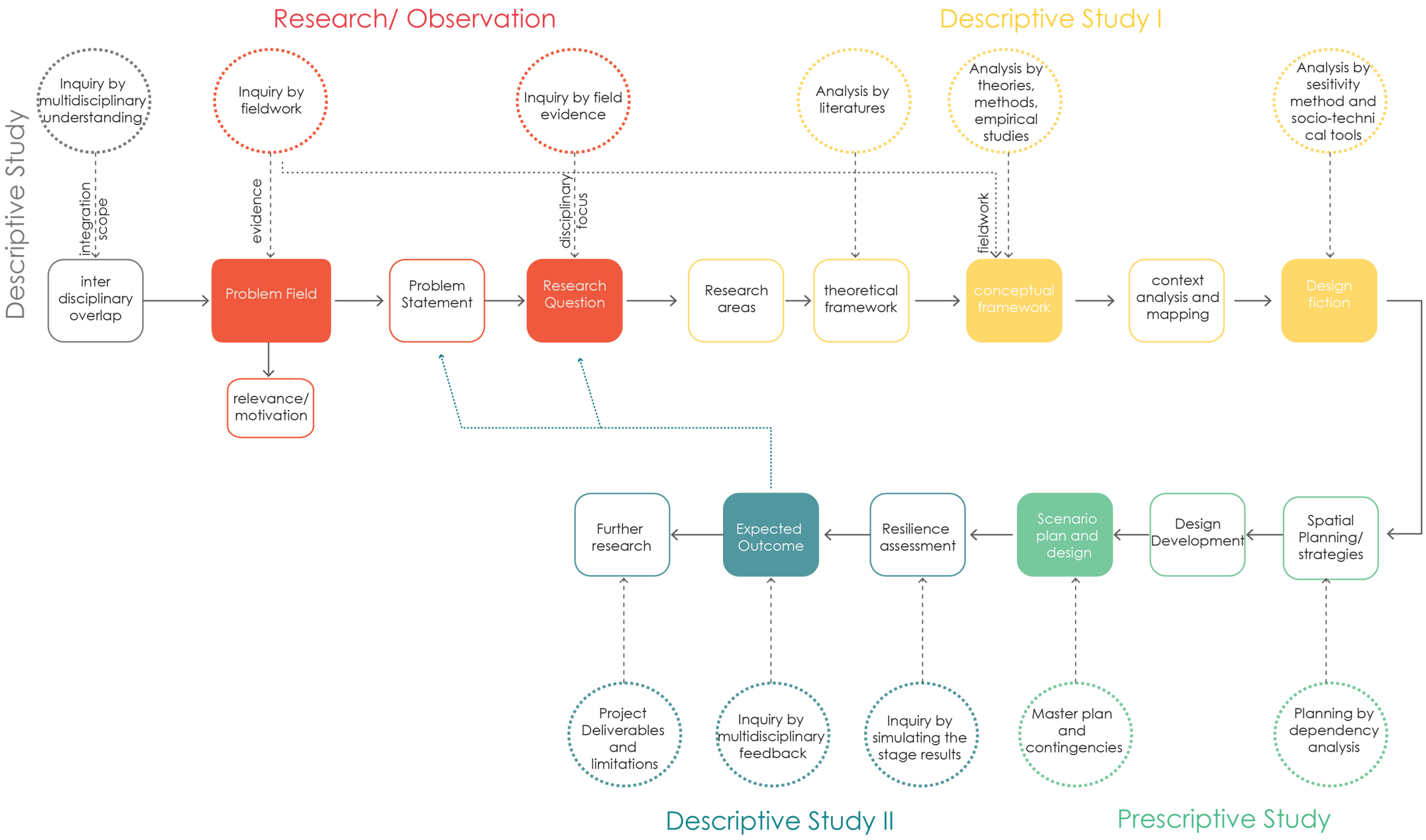
- Though the recovery will be faster and effective
- Even after another tsunami Otsuchi will survive and thrive in the area with the culture, heritage and identity intact



Thankyou

Arigatogozaimashita

ありがとうございました


Research/ Observation
Descriptive Study I
Descriptive Study
Inquiry by multidisciplinary understanding
Inquiry by fieldwork
Inquiry by field evidence
Analysis by literatures
Analysis by theories, methods, empirical studies
Analysis by sesitivity method and socio-technical tools
integration
scope
evidence
disciplinary focus
fieldwork
inter disciplinary overlap
Problem Field
Problem Statement
Research Question
Research areas
theoretical framework
conceptual framework
context analysis and mapping
Design fiction
relevance/ motivation
Further research
Expected Outcome
Resilience assessment
Scenario plan and design
Design Development
Spatial Planning/ strategies
Project Deliverables and limitations
Inquiry by multidisciplinary feedback
Inquiry by simulating the stage results
Master plan and contingencies
Planning by dependency analysis
Descriptive Study II
Prescriptive Study