ACTIVATE RESILIENCE OF THE MIYAGI COAST

GRADUATION PRESENTATION | NASIEM VAFA | 4112636
SENDAI

35 MUNICIPALITIES

2,347,600 INH.

7200 KM²
TOHOKU

66900 km²

THE NETHERLANDS

41500 km²
$183,000,000,000
IN ECONOMIC DAMAGES

15,860
LIVES LOST

128,530
DESTROYED HOUSES

EXISTING PROBLEMS

AGING POPULATION
34% WILL BE 65 AND ABOVE IN 2040

SINGULAR ECONOMY
TOP 10 RICE AND FISH PRODUCTION IN JAPAN
EXISTING PROBLEMS

AGING POPULATION
34% WILL BE 65 AND ABOVE IN 2040

SINGULAR ECONOMY
TOP 10 RICE AND FISH PRODUCTION IN JAPAN

FUTURE DEMANDS

ENERGY DEPENDENCY
80% OF THE OIL USED IN IMPORTED

CLIMATE CHANGE
STRONGER TYPHOONS, FLOODS AND RISING SEA LEVELS
FIELDTRIP YURIAGE
GOVERNMENT

Affected Municipalities
GOVERNMENT

Guidelines + Physical reconstruction

AFFECTED MUNICIPALITIES
GOVERNMENT

REGIONAL DESIGN

AFFECTED MUNICIPALITIES
Can the introduction of a regional design in Japan lead to development that can increase the resilience of delta regions?
DUTCH LEARNING

Source: Siebold Memorial Museum
DUTCH PLANNING

- Indicative framework
- Conceptual approach
- Open for interpretation
- Facilitating negotiation

Randstad

- Distribution post war housing
- Singular compact cities
- Urbanized vs. Rural land
- Red and Green regulation

RANDSTAD

- International competitiveness
- Complex transition
- Strategic approach
- Plan performance as goal
RANDSTAD

- National and International positioning
- Cooperating and engaging
- Elements of a Metropolis
- Economic ‘powerhouse’
REGIONAL PLANNING

Making use of spatial representations

ORGANIZATIONAL DIMENSION
Territories and effects of political and economic choices
Goal:
- Regional development
- Positioning and interaction between actors
- Effects of policy measures

ANALITICAL DIMENSION
Regional issues based on a empirical foundation
Goal:
- Base of knowlegde
- Collection of regional themes between actors
- Allocating regional resources

NOMRATIVE DIMENSION
Imagination of spatial development
Goal:
- Interpretation of development
- Grasping the spatial layout
- Highlighting regional fields of action

REGIONAL PLANNING

Making use of spatial representations

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Understanding the setting as a framework

Providing new perspectives in the region

Explore in spatial and functional organisation

Source: Verena Baltz, Regional design Conceptual framework.
TRANSFER TO PROJECT

- Diversity in city size
- Diversity in business
- Main ports
- Horticulture
ADAPTATION TO PROJECT

DRIVERS

Top Down

Governmental demands

Local wishes

Bottom Up

Analytical dimension

Energy Transition
Shrinking Population
Tsunami Resilience
Economic Revival
Recaptivating Tourism
Cultural Identity

Organisational dimension

Economic branches
Landuse
Driver performance

Profiling cities

Interaction map

Normative dimension

CONCLUSION

DESIGN

STRATEGY

APPROACH

CONTEXT

PROBLEM STATEMENT
ECONOMIC REVIVAL

LEGEND

Economic Revival
- Context for analysis
- Reconstructed live projects
- Primary economy, Agriculture
- Fishing ports
- Harbour
- Primary economy, Fishing
- Secondary economy, Retail
- tertiary economy, Service
- Tertiary economy, Government
- Tertiary economy, Energy
- Knowledge cluster
- Tramline
- National highway
- Inhabited area
- Irrigated
- Flooded area - Primary
- Flooded area - Irrigated
- River mouth
PROFILES

- Economic branches
- Landuse
- Driver performance

Profiling cities

Interaction map
BRANCHES

• Distribution of main sector and sub sector.

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<thead>
<tr>
<th>Economic sector</th>
<th>Gross production (¥)</th>
<th>Population</th>
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<tbody>
<tr>
<td>ISHINOMAKI</td>
<td>636.105</td>
<td>148.238</td>
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<tr>
<td>HIGASHI-MATSUSHIMA</td>
<td>224.003</td>
<td>40.199</td>
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<td>MATSUSHIMA</td>
<td>57.127</td>
<td>14.817</td>
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<td>RIFU</td>
<td>43.810</td>
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<td>SHIOGAMA</td>
<td>187.265</td>
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<td>TAGAJO</td>
<td>176.807</td>
<td>62.177</td>
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<td>SHICHIHAGAHAMA</td>
<td>41.957</td>
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<td>SENDAI</td>
<td>5.057.680</td>
<td>1.053.304</td>
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<td>NATORI</td>
<td>281.326</td>
<td>77.023</td>
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<tr>
<td>IWANUMA</td>
<td>209.488</td>
<td>44.242</td>
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</table>
LANDUSE

- Location and land distribution

Legend:
- Rice paddies
- Farm land
- Residential land
- National forest
- Private forest
- Surface water
- River
- Waterway

- Ishinomaki: 554 km²
- Higashi matushima: 191 km²
- Matushima: 53 km²
- Rifu: 44 km²

- Shiogama: 17 km²
- Tagajo: 19 km²
- Shiogahama: 13 km²
- Sendai: 796 km²

- Natori: 98 km²
- Iwara: 60 km²
- Miyagi Prefecture: 7,285 km²
PERFORMANCE

- Investments of implemented policies.

Legend

- Tsunami resilience
- Shrinking population
- Energy transition
- Cultural identity
- Recapturing tourism
- Economic revival
PROFILES

- Competition clusters
- Land pressure north of Sendai
- Disparity in policy execution
INTERACTION

- Natural enclosure
- Industrial sites
- Bottle neck infrastructure
- 20th century expansions
NETWORKS

- Overlap
- Pinpoint
- Expanding
GREEN AND BLUE

- East-West
- Strengthening ecosystem
- Natural and Cultural
- New modes of transport
- Increasing density around PT nodes.
- Polycentric development
- Optimizing local sources
- Introducing a new economy
- High and low resources
1- Green & Blue
2- Transport Reconsidered
3- Energy Dispersion
LOCATION 1 - ECO JETTY
FUNCTIONS

• Connecting
• Cultural
• Erosion
• Mitigating and trapping
LOCATION 2- TRANSIT ORIENTED DEVELOPMENT
TOD

- Improving walking infrastructure
- Improving cycling infrastructure
- Optimal coverage and service of public transportation
- Minimal car oriented road design
- Better functional mix of living, leisure, recreation, retail and soft industries.
- Reduction of occupied urban space.

Legend

Source: Robert Mohring, Transport system design considering trends of urbanization and aging society, 2018
INTERDISCIPLINARY

1. Increase walkability (TS) Road Design
2. Increase bikeability (TS) Road Design
3. Increase connectivity (TS + LU) Network Design
4. Increase PT (TS) Network Design
5. Support Transport Shift (TS + LU) Public Places
6. Densify (LU) Urban Design
7. Increase Mix (LU) Urban Design
8. Build compact settlements (LU) Urban Design

Design of Built Environment

Source: Robert Mohring, Transport system design considering trends of urbanization and aging society, 2018
TOD

Road Design

1- Current

2- Potential

Source: Robert Mohring, Transport system design considering trends of urbanization and aging society, 2018
TOD

Urban design

Allocate

Multifunctional
NETWORK DESIGN
ENERGY TRANSITION

- Using local and regional elements
- New energy as a structuring measure for the city
- Safety and stability
- Possibilities for buffer capacity
RENEWABLES

- Solar: Photovoltaic & Solar collectors
- Biomass: Incineration & Fermentation (Gas)
- Geothermal
CASCADING SYSTEM

- Efficient use of exergy
SAFETY

NORMAL SITUATION

TSUNAMI THREAT

TYPHOON/ LANDSLIDE THREAT

[Map showing different risk scenarios and zones]
BUFFER

• Transition zone in the harbour
• Short term solution
Previous situation
7,191 x 10^6 Megajoules a year

New situation
Solar:
- Residential: 397,082,500 kWh
- The industrial zone: 181,678,620 kWh
- Solar parks: 194,668,160 kWh

Biomass:
- Northern plant: 37,500,000 kWh
- Southern plant: 126,111,111 kWh

Geothermal: 155,000,000 kWh

Total: 3,393 x 10^6 MJ

47% renewable energy replacing fossil fuel use.
CONCLUSION

Regional research approach  Indicative strategy  Impact on scale
• Dependent on actions of the government.

• Costly investment with no clear time frame on return of investments.

• Complicated system of land readjustment
CONCLUSION

Factor of difficulty to meet needs

PRE DISASTER

CHALLENGES

AVAILABLE RESOURCES

POST DISASTER

CHALLENGES

AVAILABLE RESOURCES

Factor of difficulty to meet needs
CONCLUSION

PRE DISASTER

POST DISASTER
<table>
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<th>Statistic</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Economic Damages</td>
<td>$183,000,000,000</td>
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<tr>
<td>Lives Lost</td>
<td>15,860</td>
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<tr>
<td>Households Without Power</td>
<td>4,400,000</td>
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<tr>
<td>Households Without Water</td>
<td>1,500,000</td>
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Source: Daily Mail (2011)
THE NEXT BIG ONE

$18,300,000
IN ECONOMIC DAMAGES

0
LIVES LOST

40,000
HOUSEHOLDS WITHOUT POWER

15,000
HOUSEHOLDS WITHOUT WATER

Source: Daily Mail (2016)
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