Urban Planning and the Risk of Disasters: A Content Analysis of Planning Documents from Major Urban Areas in Japan and Canada

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Purpose of Study

• Consider the impact of different circumstances on issues raised in plans
• Difference in the experience of urban hazards
• Differences in institutional and political culture
• Look at the impact this has on the importance given to risks and urban resilience
• Also look at how it influences the definition of resilience and the proposal of responses
Definitions of Resilience

• Conventional definitions: 1) return to system equilibrium after a disturbance; 2) achievement of different possible stable states after a disturbance

• Here in a more policy oriented perspective resilience seen as: risk prevention or reduction and mediation when threat cannot be avoided

• Risks can be seen as associated with three interconnected categories based on a time scale, from the more immediate to the more distant
Canadian Plans
The Canadian Survey of Plans

- Focus is on the three largest Canadian metropolitan regions (census metropolitan areas): Toronto (5.5 million population, 6.8 with adjacent CMAs); Montréal (3.8 million) and Vancouver (2.3 million, 2.5 with adjacent CMA)

- Review central city and/or metropolitan region land use and transportation plans
Canadian Survey of Plans

Toronto:

Montréal:

Vancouver:
Findings from the Canadian Plans

• All the plans propose a departure from the low-density, functionally-specialized, dispersed and automobile-oriented from of urbanization. They instead call for recentralization, more overall density, multifunctional developments and reduced reliance on the automobile, as part of a smart growth and sustainable development vision.

• Very little direct reference to hazards and urban resilience as such. The only exception is in the Vancouver plans where there is reference to floods, landslides and interface fires, as well as to consequences of global warming such as a rise in sea level and severe weather phenomena. There is also mention of earthquakes.
Findings from the Canadian Plans

- Resilience is addressed via sustainable development (and smart growth). There are some similarities and overlapping between resilience and sustainable development. Sustainable development is about prevention of adverse effects in the future whereas resilience is about prevention, attenuation or mitigation of hazards, which can be a consequence of unsustainable development. A difference between the two is that sustainable development is about long term trends whereas resilience is about time specific events.
<table>
<thead>
<tr>
<th>Sustainable Development and Smart Growth Strategies in Plans</th>
<th>Resilience Dimension</th>
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<tbody>
<tr>
<td>Recentralization: downtown development, creation of nodes and community centres; in all cases multifunctional development</td>
<td>Redundancy; reduced reliance on complex supply systems; reduced reliance on infrastructures (reduced need for transportation); less greenhouse gases emission; conditions for economic development</td>
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<tr>
<td>Corridors: density and public transit oriented, complete streets</td>
<td>Redundancy; reduced reliance on complex supply systems; reduced reliance on infrastructures (reduced need for transportation); less greenhouse gases emission</td>
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<tr>
<td>Complete communities (neighbourhoods); reinforcing existing communities; bring in multi-functionality</td>
<td>Redundancy; reduced reliance on complex supply systems; reduced reliance on infrastructures (reduce need for transportation); less greenhouse gases emission; favour local social networks and enhance local response capacity, foster self-reliance</td>
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<td>Public transit expansion, encourage walking and cycling as alternatives to car use; transit and walking conducive distribution of density and activities</td>
<td>Redundancy; reduced reliance on complex supply systems; reduced reliance on infrastructures (reduced need for transportation); less greenhouse gases emission</td>
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<tr>
<td>Preservation of natural and agricultural land</td>
<td>Reduced reliance on complex supply systems; reduced reliance on infrastructures (100 mile diet); maintain natural ecology, less need for infrastructure</td>
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Observations from the Canadian Plans

• The focus is on sustainable development and smart growth. Although there are differences in the purpose of these approaches, there are similarities in their outcomes.

• There is no overarching resilience strategy in the surveyed plans; aspects of a proposed approach can be compatible with resilience objectives while others can be in contradiction with these objectives.

• Resilience aspects of the plans reflect the conflict-ridden nature of resilience decision-making: the outcome of compromises between different objectives.
Japanese Plans
The Japanese Survey of Plans

• Focus is on the three large Japanese metropolitan municipalities that have been devastated by large earthquake disasters in the past: Metropolitan Tokyo (13 million population, last earthquake disasters in 1923 as well as 2011); Kobe (1.5 million, 1997) and Sendai (1.0 million, 2011)

• Review master plans of urban development
The Japanese Survey of Plans

• Metropolitan Tokyo

• Kobe
  – City of Kobe (2011) *Kobe 2015 Vision*

• Sendai
  – City of Sendai (2011) *Sendai Master Plan*
Tokyo

MLIT focuses on **stability of business operations**.

- Maintaining administrative functions of government and business when disasters occur, based on stable energy provision
- Securing system redundancy for organizational operations, energy provision and help system (government plus community and individual help)
- Providing correct information from the government to the entire public to avoid panic
- **Sustainability is recognized as waste management and continuous economic growth in different contexts.**
Tokyo

TMG focuses on **engineering solutions** to maintain stability against **earthquake, fire, and flood**.

- Making major roads, adjunct buildings, and major public facilities (schools, hospitals, train stations) earthquake/fire-proof and adding more parks inside of the city, so that the collapsed buildings and/or fire will not block evacuation/rescue flows, and public space can serve for damage control/rescue headquarters.

- Flood prevention by improving capacity of rivers as water discharge pipes, as well as constructing underground water discharge routes (provide photo if available).

- Updating and redeveloping old, dense and wooden houses.

- Setting legal and administrative structures for post-disaster reconstruction, as well as clarifying land ownership prior to the expected large earthquake disaster.

- **Sustainability is not found as a word throughout the document.**
Kobe

City of Kobe focuses on improving **adaptive capacity** against disasters, focusing on **initial damage mitigation**.

- Establishing “Risk Management Centre” and building its facility on the deemed-to-be stable land by 2015, with 100 patterns of command and resource allocation to address any situation.

- Classifying 1997 experience as information for the public reference.

- Producing “Local Leaders for Disaster Prevention” (9,500 as of 2010, planned to be 13,000 by 2015). Adding to this, 420,000 people have finished first-aid training as of 2010 (planned to be 570,000 by 2015).

- Conventional engineering approach is still apparent, such as updating public facilities against earthquake, fire and flood, as well as promoting updating and redevelopment of old, dense and wooden houses.

- “Sustainability” covers broader aspects, in terms of improving ecosystem, promoting alternative transportation modes, and reducing CO2 emission and waste.
Sendai seems to follow MLIT’s intentions and Kobe’s actions.

- Primarily focusing on conventional engineering solution against earthquake, tsunami, fire and flood (Sendai added tsunami.)
- Re-establishment of community help system and promotion of self-help (following MLIT’s intention)
- Producing “Local Leaders for Disaster Prevention” and providing first-aid training are recognized in their agenda (same as Kobe).
- “Sustainability” is environment-focused, in terms of reducing CO2 emission and waste, promoting more resource-efficient way of life and reducing pollution.
Findings from the Japanese Plans

- All the plans address engineering solutions facing expected disasters, especially those related to earthquake (building collapse, fire and/or tsunami) and heavy rain (flood).
- Resilience seems to be understood as capacity for post-disasters, which maintains usual urban functions and provides necessary damage mitigation immediately. Therefore, they desperately seek to make urban facilities as durable as scientifically possible.
- Sustainability is understood as a synonym of “environmentally friendly”. Or, it means “CO2 reduction” or “waste reduction”. Thus, urban form would not be altered in the face of disasters for more sustainable manner.
Observations from the Japanese Plans

- Complexity is not yet recognized.
- Sustainability is therefore not recognized in the context of social-ecological complex system interaction.
- There is no overarching resilience strategy in the surveyed plans, which is common with Canadian cases.
- Scientific and engineering solutions promoted by business management are significant.
Observations from the Japanese Plans

• Experiences influence approaches.
  – Concentration on engineering solution is based on Tokyo’s experience in 1923, when such approach was effective as the city was under industrialization from feudal city.
  – Kobe has non-engineering and proactive measures based on their first-hand experience in 1997: the area that had close relationship among residence showed tendency to prevent loss of lives as well as smooth reconstruction afterwards.
  – Unfortunately, 2011 experience showed that disaster sometimes surprises engineers. Sendai and all other cities should reflect this experience.

• Additionally, Japanese plans make the point that too much density degrades safety against disasters, which presents an interesting contrast with Canadian plans.
Conclusion
Comparison of Canadian and Japanese Plans

• In Canada, long-term perspective within the framework of sustainable development; however, lack of specificity and focus on hazards and resilience

• In Japan, need to react immediately to urban hazards; responses are engineering-driven, short-term and focused on specific problems
Comparison of Canadian and Japanese Plans

• Advantages and shortcoming of the two approaches:
  – The Canadian approach provides the potential to connect different issues relating to hazard prevention; the problem is that it remains unspecific and far from the implementation stage
  – The Japanese approach yields readily implementable policies, but they are short-term and do not pay attention to the broader and connected context