Sewage services resilience to climate change uncertainties

How to use the resilience concept to analyse the changing capacities of the sewage public service?

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Presentation

1. Introduction
   1. Scientific context
   2. Case studies

2. Research process
   1. Intellectual stages and types of personal involvement
   2. The painful construction of a research problem
   3. Model of analysis

3. Conclusion
   1. Perspectives
   2. Research activities plan
Objectives of the research project:

- Connecting sewage knowledge with the climate change issue
- Involving hydrology, climatology and social sciences in the same project
- Share scientific results with local communities.
Case studies
Seine Saint Denis and Val de Marne

In Parisian suburban areas, what is the ability of the stakeholders in charge of storm water flood management to cope with climate change?

<table>
<thead>
<tr>
<th></th>
<th>Surface</th>
<th>Population Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seine Saint Denis</td>
<td>236 Km²</td>
<td>6731 hab/Km²</td>
</tr>
<tr>
<td>Val de Marne</td>
<td>245 Km²</td>
<td>5348 hab/Km²</td>
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Risk: storm water flooding
Occurrence can increase with climate change

Station RER Val de Marne (07/07/01)
Thesis theoretical framework in social sciences

1. First Question

2. Exploration (readings and interviews)

3. Research problem (« real » questions)

4. Analysis model (hypothesis and data)

5. Results (public policies stories, ways of improving institutional and organisational resilience)

Empirical investigation on case studies
Methodology

1. First Question
2. Exploration (readings and interviews)
3. Research problem (« real » questions)
4. Analysis model (hypothesis, indicators, database)
5. Results

Theoretical framework

Individual framework

Disorientation stage

« The tube » stage

Writer stage
First question: In Parisian suburban areas, what is the ability of the stakeholders in charge of storm water flood management to cope with climate change?

Adaptation capabilities: Does the resilience is a relevant concept to analyse adaptation to climate change?


Climate Change: Does climate change is occuring? What are the perceptions of climate change?…

**From the first question to the research problem**

**Disorientation crisis**

**Exploration phase**

**Readings**

Empirical survey (observation in public meetings and into the services + interviews with technicians, victims, firemen, weather forecast employees)

Lectures, official reports…
Stop the crisis: The « gruyere metaphor »

Thesis is like a huge cheese with lot of holes

Explore one hole of the cheese

Choose and draw the boarders of one cheese hole

Choices have to be done:
• Which perspective with risk management concepts?
• Which actors of social and technical system?
• Which central problem?
The resilience is used to describe the behaviour and response capacity of communities, economy and institutions to change and to face to uncertainty (Davers and Hammer, 1998)

Uncertainty: lack of certainty => a social and political fact because uncertainties generate controversies between stakeholders (Callon et al., 2001)

Sewage services: stakeholders of the sewage social and technical system (= individuals and physical assets of sewage services) technicians, politicians, citizens… and maybe others depending on the context)

How sewage services cope with uncertainties?
How the controversies are created and how do they affect sewage services?
Building model of analysis and enter into the tube

Urbanization increase since 1970’s. In 1977, a calculation method is developed to design sewage systems. This method is used by the sewage services in order to protect for a ten years event return period.

- There are uncertainties in calculation + the calculation does not take into account territorial specificities + the calculation method has not evolved since 1977
- The electives representatives and some technicians distort the definition « A rainfall which occurs each 10 years »

Controversy: Victims of floods do not understand why they are regularly flooded

- The sewage system design method is questioned
- Sometimes victims go to court
- Associations of victims develop expertise and sometimes create crisis management plan
- Sewage services suggest technical solution (detention tank, non structural measures...)
- Electives representatives does not find the liability for storm water flood management

Risk with the tube: stay into!
Conclusion

- The resilience perspective is useful to analyse the social treatment of uncertainties in sewage services
- The disorientation crisis is long and uncomfortable
- The model of analysis is a departure and must be tested toward empirical survey

Perspectives

- Test and develop the model of analysis
- Interviews with electives representatives
- Survey to test the citizens perceptions of flood management
- Study of political and technical discourse
- Analyse of the treatment of uncertainties into sewage services
- Analyse the history of sewage services in the Greater Paris
- Compare case studies with a foreign case study (England)
- Write the thesis
Thank you
Resilience

- **Physics**: « the ability of a material to resist and to recover after a shock »

- **Ecology**: « the amount of disturbances an ecosystem can take without changing structures » Holling, 1973

- **Sociology**: « the measure of a part of system’s capacity to absorb shock and recover from hazardous events » Timmerman, 1983

- **United Nations**: « the degree to which the social system is capable of organizing itself and the ability to increase its capacity for learning and adaptation, including the capacity to recover from a disaster », UN ISDR, 2001

- **Urban planning studies**: « Identify, evaluate, design and urban resilience contribute to sustainable societies » Muller, 2006
Resilience

- A new paradigm?
- A concept?
- An indicator?

- A goal: uncertainties (like climate change) must be taken into account
- A perspective of research with which the uncertainties (like climate change) are considered as « normal » situation.
- Assessing the resilience consists in analysing the dynamics of a system