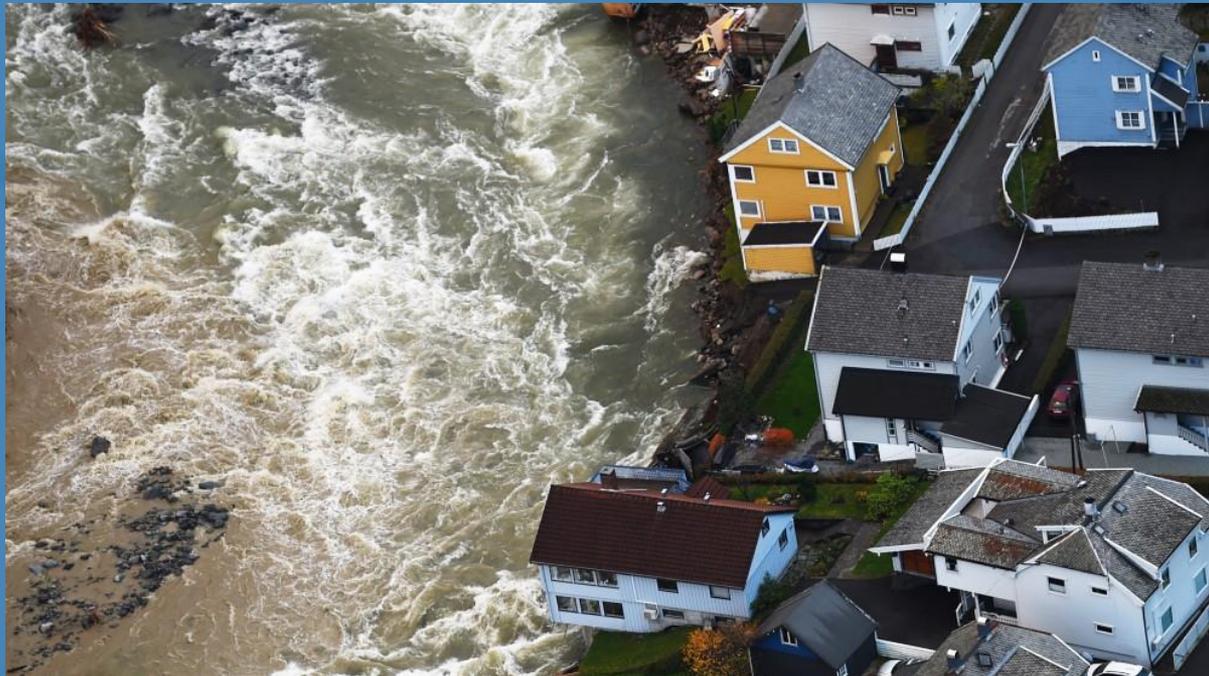


Planning for climate change vulnerability?

Presentation at the 4th Nordic Conference on Climate Change Adaptation
“From Research to Actions and Transformation”
Bergen 29-31 august 2016



By
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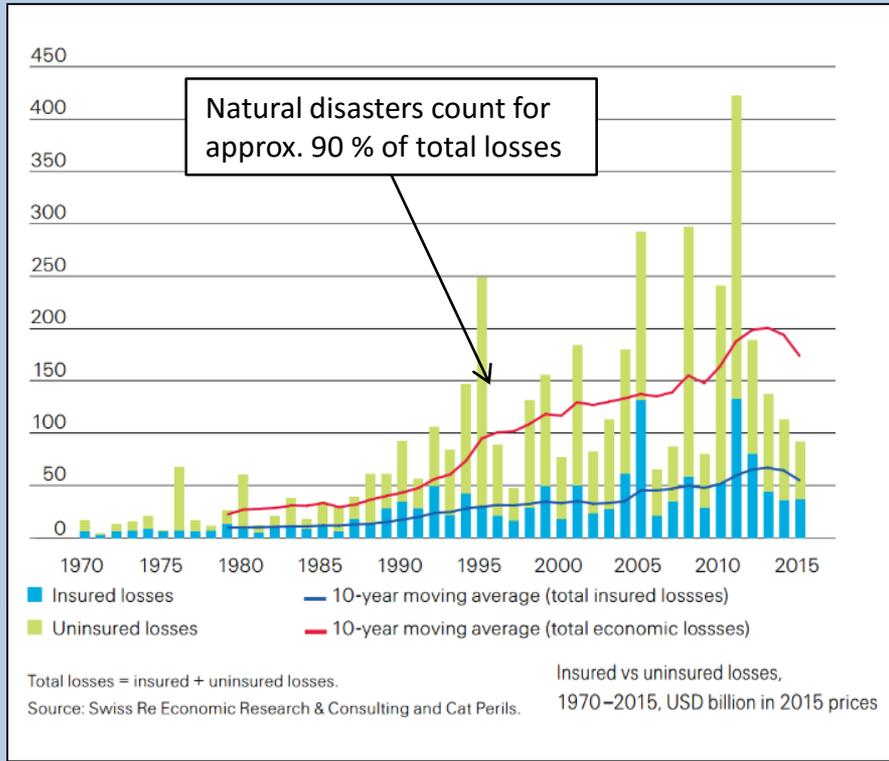
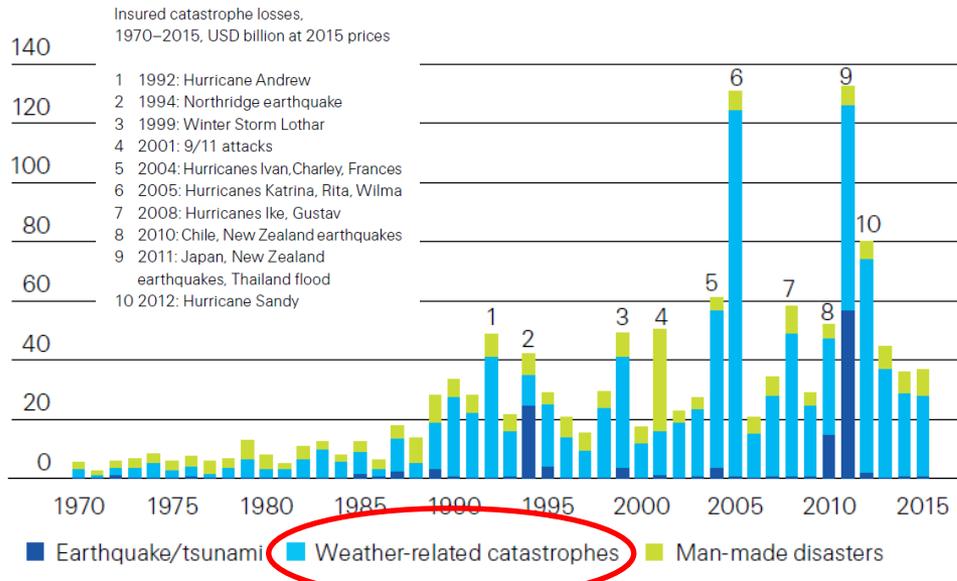
Outline

- Context
 - The need for “new lenses”?
- Theory
 - Trying to construct “new lenses”
- Empirics
 - Cases on climate change adaptation and weather related natural hazard events
- Conclusion
 - Testing the “new lenses” in drawing conclusions

Current state of knowledge

- Adapting society to challenges posed by weather related natural hazard events has always been a central issue of spatial planning (Burby and Dalton, 1994; Burby, 1998)
- The extent of such planning being effective in mitigating disaster events is however often questioned (Burby, 2005)
- The history of spatial planning as a policy means for adaptation to climate change is relatively short (Davoudi, Crawford, Mehmood, 2009; Wilson and Piper, 2010)
- Research on constrains experienced by local authorities in this respect has revealed rather simplistic factors (Measham et al, 2011):
 - limited resources
 - lack of relevant competence
 - lack of information

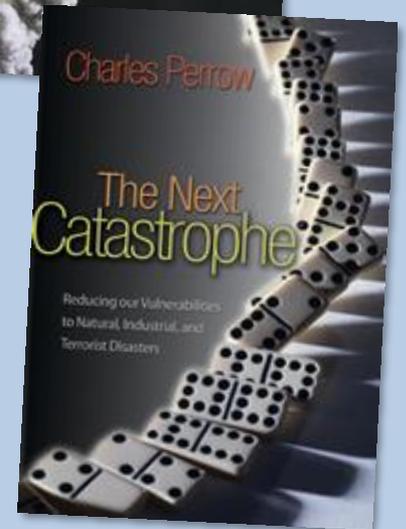
..and the economic losses from weather related natural hazard events continue to increase!



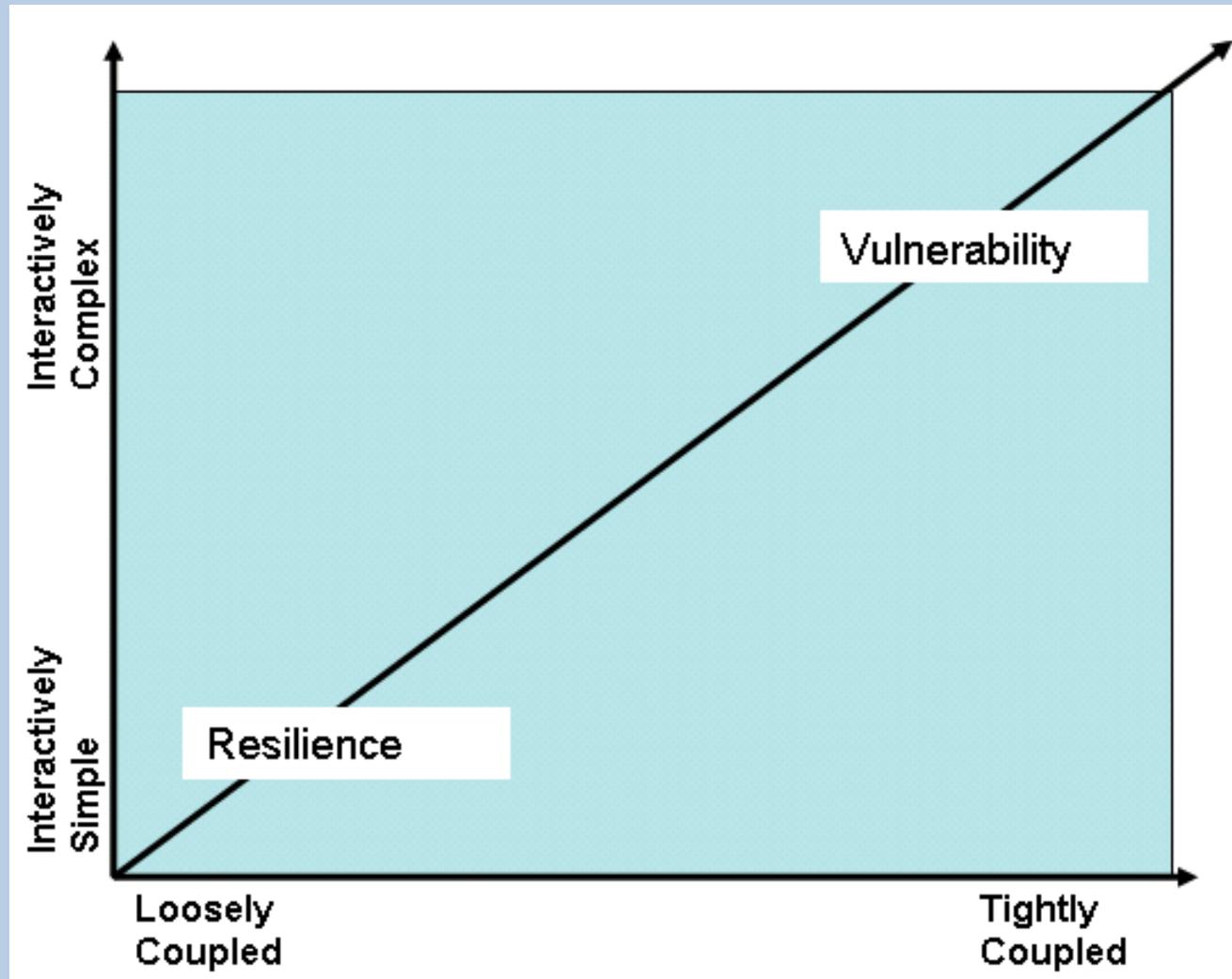
- Thus, is there a need for “new lenses” to study current natural hazard events & adaptation practices in order to get a deeper and better understanding of the drivers of climate change risks – and thus how to reduce such risks?

Charles Perrow: Theories on risks and vulnerabilities

- High-risk enterprises
 - Nuclear power, Petrochemical plants, Aircrafts
- High-risk technologies
 1. Part (the smallest components)
 2. Unit (a functionally collected unit of parts)
 3. Subsystem (an array of units)
 4. System
- High-risk society
 - Accidents are inevitable due to *interactive complexity* of the system
 - When the system is *tightly coupled*, failures more easily get out of control



The resilience - vulnerability matrix



Climate change vulnerability

Perrow.....

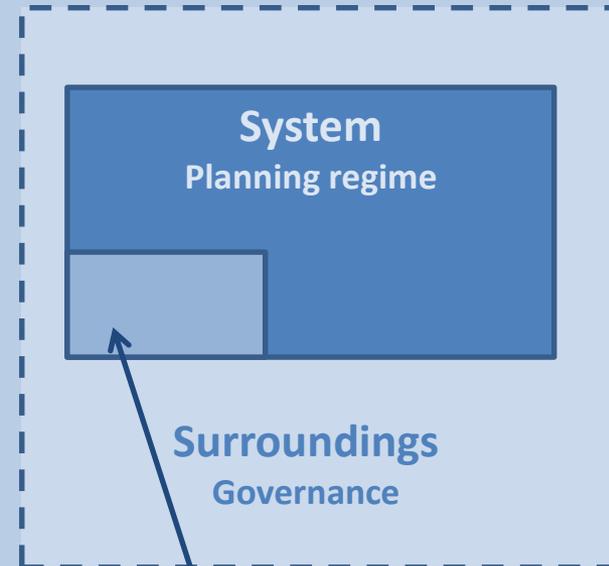
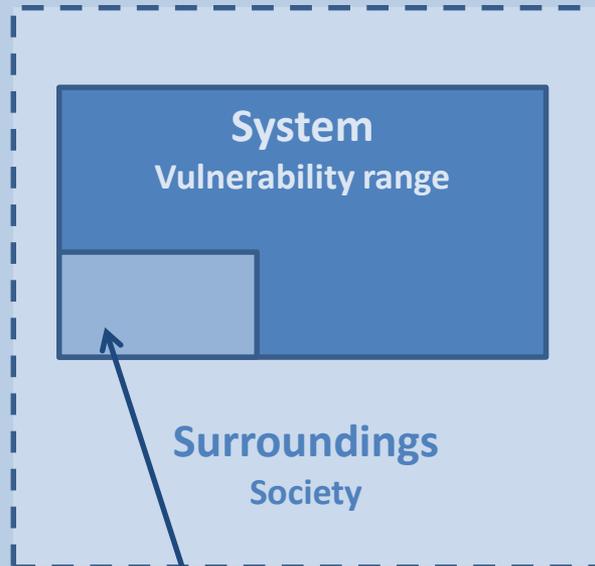
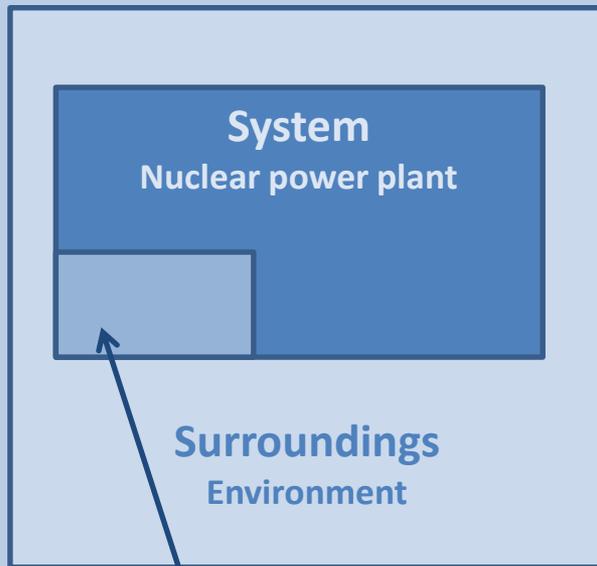


Applied to the climate change context

High-risk technology

High-risk community

High-risk planning



Subsystem
Secondary cooling system

Subsystem
Peril range (directly
endangered or affected area)

Subsystem
Local land-use plan
(covering the risk-area)

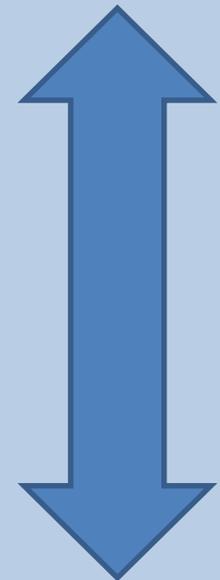
Tight and loose coupling tendencies

Tight coupling	Loose coupling	Comments in light of climate related natural hazards events
Delays in processing not possible	Processing delays possible	Time factor is often crucial, especially when a large population is endangered
Little slack possible in supplies, equipment, personnel	Slack in resources possible	Loose couplings give more room for improvisation in times of crises
Buffers and redundancies are designed-in, deliberate	Buffers and redundancies fortuitously available	Natural hazards zonings are often pushed to their limits, leaving small buffers, especially in densely developed areas
Substitutions of supplies, equipment, personnel limited and designed-in	Substitutions fortuitously available	Loose couplings give more room for improvisation in times of crises

Four levels of climate change adaptation strategies

1. Aiming at part
 - E.g. increasing capacity of culverts
2. Aiming at unit
 - E.g. improving maintenance of a specific road
3. Aiming at subsystem
 - E.g. shifting freight transportation from road to sea
4. Aiming at system
 - E.g. reducing the total traffic volume

Effect oriented



Cause oriented

The empirics: Studies of climate change and weather related natural hazard events

- **The AREALKLIM-project (2012-2015)**
 - A three-year project analyzing 10 former and 4 ongoing land-use planning processes in which WRNHEs have taken place or been identified in the region of Western Norway
 - <http://prosjekt.vestforsk.no/arealklim/>
- **Testing the use of natural hazard damage data from insurance companies in local planning (2013-2015)**
 - A development project commissioned by Finance Norway involving tests in 9 municipalities
 - <http://www.vestforsk.no/prosjekt/pilotprosjekt-om-testing-av-skadedata-fraa-forsikringsbransjen-for-vurdering-av-klimasaarbarheit>
- **Comparing costs of preventing and repairing natural hazard events (2014-15)**
 - A project comparing repair costs versus costs of reinforcement and proactive measures for 13 cases of WRNHEs affecting different categories of physical infrastructure in Norway
 - <http://www.vestforsk.no/prosjekt/naturskader-kostnader-ved-forebygging-vs.-gjenoppbygging-av-kommunalt-eid-infrastruktur>
- **The October flooding project (2015-2016)**
 - A one-year project analyzing the “October flood event” of 2014 in 4 communities located in Hordaland and Sogn og Fjordane in order to assess to what extent the observed damage could have been avoided if planning had been done in a better way
 - <http://www.vestforsk.no/prosjekt/analyse-av-oktoberflaumen-paa-vestlandet-2014>

Conclusions:

Do Parrow's theories apply to that of climate change adaptation and weather-related natural hazard events (WRNHEs)?

Exposure to climate change WRNHEs

- Loose coupled and low-complex rural *communities* exposed to WRNHEs can be *less* prone to severe negative effects than urban settlements
 - No fatalities in any of the rural municipalities affected by the October flood in spite of 17 residential homes being hit, some of which was “washed away” in minutes
- Tight coupled and high-complex *systems* exposed to WRNHEs are *more* prone to experiencing severe negative effects, even if located in loose coupled and low-complex rural communities
 - The case of **Voss Cultural Centre**: In the 2009 building permit the municipal flood zone building restrictions were pushed to its maximum (cote 50.62 m, exceeded with 68 cm by the October flood)
 - Reliance on scientifically based probability calculations, while available historical flood records back to 1604 were neglected

Adapting to climate change WRNHEs

- Adaptation efforts are in most cases limited to level 1 (“part”) and 2 (“unit”), thus not addressing the societal drivers of exposure to climate change (level 3 “sub-system” and 4 “system”)
 - A study of responses after 13 WRNHs revealed that the most common response was to wait until damage occurs and then take the cost of repair, reversing infrastructure to its original state with no reflection on additional risks relating to climate change
- The planning system is in itself a tight coupled and high-complex social technology that calls for a scientific approach defined by detailed and standardized “one-size-fits-all” national regulations
 - This might imply a ‘predict-then-act’ modus operandi that can lead to no-action in anticipation of accurate and scientific data to be presented, with purely developed procedures of including local and tacit knowledge

Societal drivers of continued increase in vulnerability of WRNHEs

- The increasing extent of creating a '*silo-sectorised*' society
 - Cross-sector cooperation was good with respect to reactive efforts (disaster response), but very poor with respect to proactive efforts (like land-use planning) in almost all of the cases we have studied
- The increased extent of substituting national public regulation regimes with *global market solutions*
 - The private finance sector in Norway as in most other countries are increasingly integrated in a global competitive market economy, and thus the private insurance industry are reluctant in allowing public authorities access to their damage data for the sake of improving the knowledge basis for proactive climate change adaptation efforts

Future climate change vulnerabilities in the light of Perrows' theories

- **Economic globalisation** connecting local communities even stronger to the global society
- **Sectorisation** in order to make sectors more effective obstruct the ability to conduct cross-sector 'deep' adaptation efforts
- **Merging institutions** (municipalities, hospitals, etc) into larger units creates tighter couplings in society
- The combination of **national centralisation** from rural to urban areas and **densification** of urban settlements as well as **waterfront development**
- **Fits with Perrows' theory of society becoming more 'tightly coupled' and 'more complex' – and thus becoming more vulnerable to severe effects of 'normal accidents'**

Final conclusion

- Applying the theories of Parrow seems to work!
- Potential for further adaption of this theory to the context of climate change

BUT - perhaps it is simple: Politics is the main driver of a continuous increase in climate change vulnerability?

DN Dagens Næringsliv Oslo Børs: 16:39
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“The challenge that lies ahead of us is to continue to stimulate the oil and gas industry in Norway which then will give us more time to transform the other parts of our society” (the Prime Minister, from the Conservative party)



Oslo, 24.08.16. Erna Solberg - Statsminister. Intervju på SMK. Foto: Elin Høyland

Politikk og samfunn Olje

Nå lover hun oljeindustrien nye utbyggingsområder

Statsminister Erna Solberg mener Lofoten og Vesterålen bør åpnes for øke aktiviteten og hindre fraflytting. 24.08.2016



«I would like to stress that the 'Green shift' is not our initiative, this is not something we aim for» (Minister of Finance, from the Right Wing Progressive Party / Fremskrittspartiet)

Dette er Sivs tøffe krav i forhandlingene med Trine

Siv Jensen kommer ikke til å ofre interessene til bilister og næringsliv, og krever et netto skatte- og avgiftslette. Men Jensen avslører samtidig at hun jobber med konkrete tiltak som kan løse konflikten om det grønne skiftet.

DAGBLADET.NO | BY PEDER OTTOSEN 25.08.2016

Thank you for your attention!

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