Resilient and Robust Climate Adaptation Strategies in Cities

- Findings from a survey of Danish Municipalities

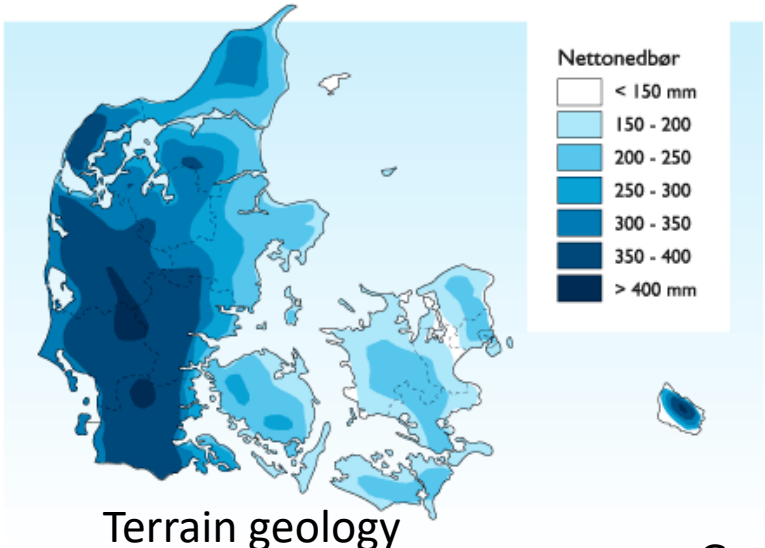
Jarl Krausing
International Director
jk@concito.dk
www.concito.dk

Baltic Development Forum
Tools for Urban Climate Adaptation Training Days
November 30, 2017

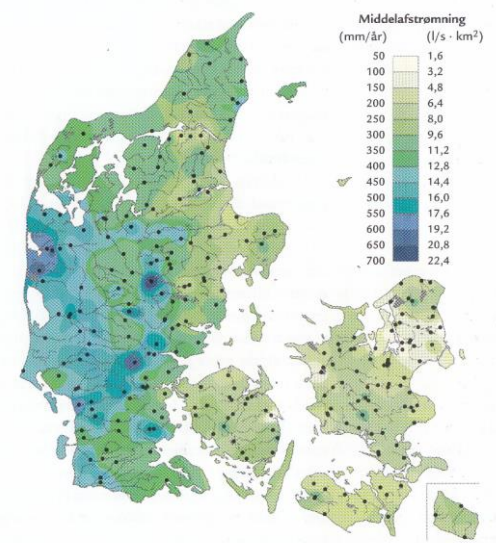
- **The risk**
- **The response**
- **The challenges**

CONCITO

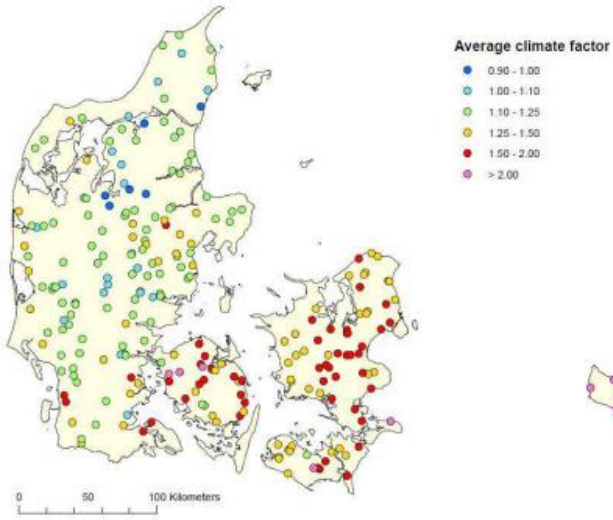
Net precipitation



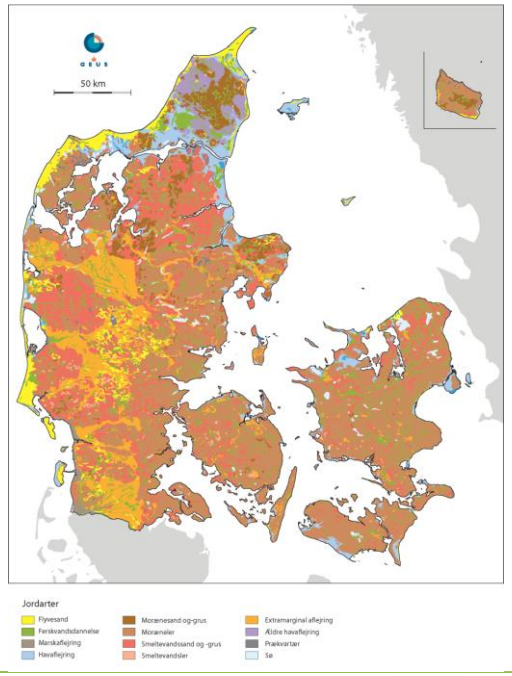
Run-off



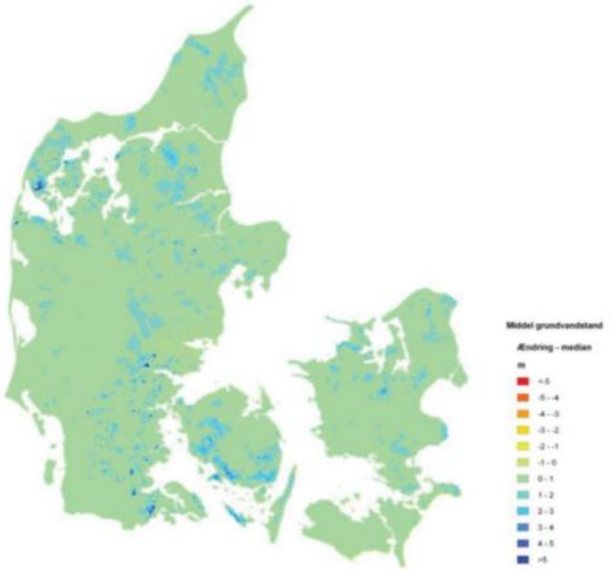
Run-off scenario



Terrain geology



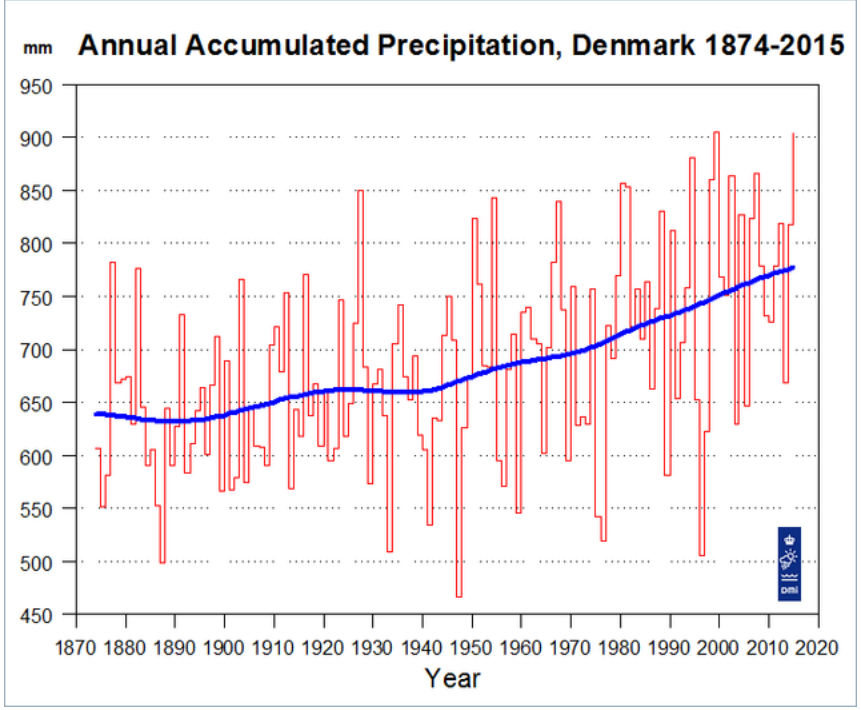
Ground water Scenario

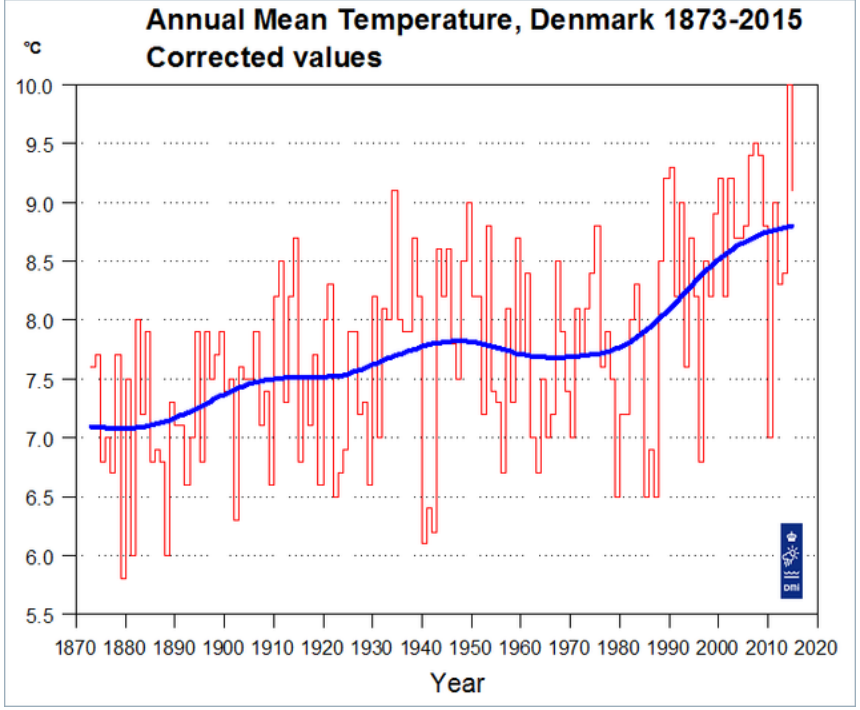


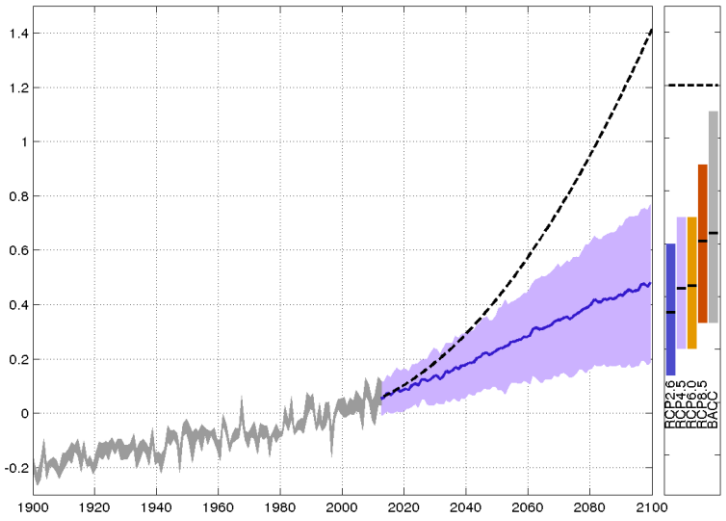
- **Low lying and sediment based terrain geology**
- **Two different hydrological systems in East and West Denmark**
- **All water types and their interplay is changing**

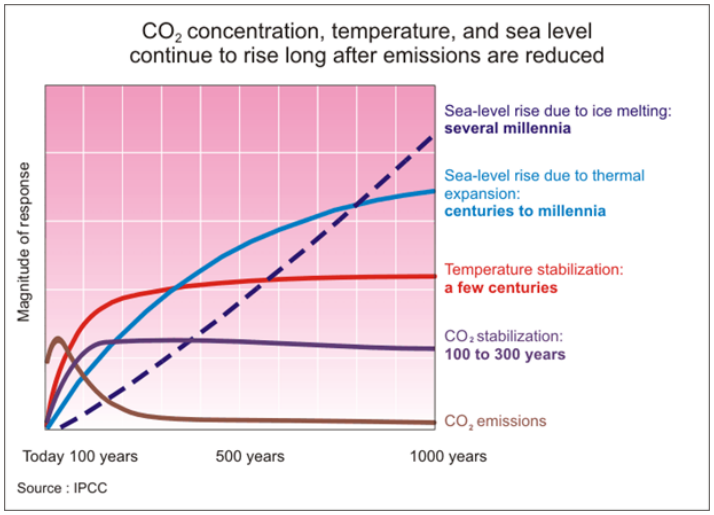
Source: DMI, GEUS

CONCITO



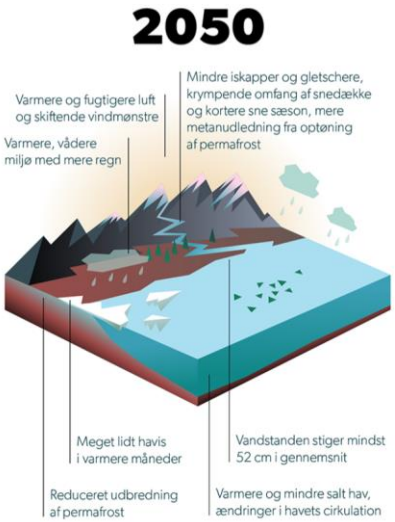






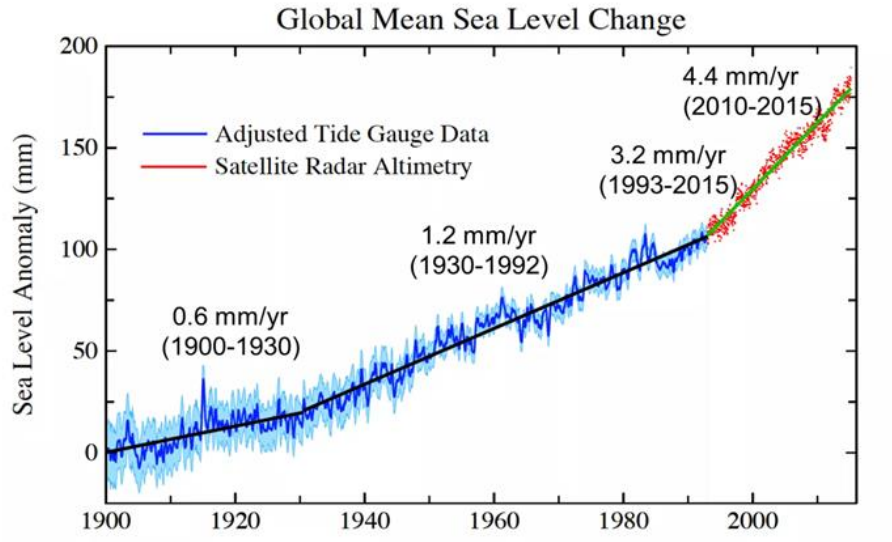
Source: DMI, 2014, IPCC 2014

CONCITO



2016 Coastal Analysis:

- Natural erosion will increase by 70% in 2065
- Coast line reduction between 64 and 35 meter (averages) by 2065



SWIPE 2017 report (Arctic Council)

- Global SLR at least 52 cm by 2100
- Arctic melt will contribute 19-25 cm by 2100, corresponding to 1/3 of global SLR

Source: SWIPE 2017, Kystdirektoratet 2016, Hawai Climate Change Adaptation Portal, 2017

CONCITO

Danish cities are vulnerable to SLR and storm surges

By	Antal Indbyggere		Antal byer
Hedensted kommune			
Juelsminde	3.940	3.940	1
Holstebro Kommune			
Vemb	1.337	4.508	2
Vinderup	3.171		
Lolland Kommune			
Rødbyhavn	1.636	19.311	5
Rødby	2.111		
Holeby	1.445		
Nakskov	12.688		
Søllested	1.431		
Norddjurs Kommune			
Grenaa	14.765	18.060	3
Ørsted	1.458		
Allingåbro	1.837		
Nordfyns kommune			
Bogense	3.751	8.834	2
Otterup	5.083		
Randers kommune			
Assentoft	3.427	70.697	4
Randers	62.342		
Stevnstrup	2.059		
Langå	2.869		
I alt		125.350	17

Lolland Kommune ved 4 meter stormflodshøjde.

Randers kommune ved 4 meters stormflodshøjde.

- 1 million Danes lives within 1 km from the coast line
- 1/2 Danish population live within 5 km from the coast line
- 157 coastal cities vulnerable by 2100 (1 meter SLR on top of *recorded* storm surge events).
- Copenhagen now looking at *historical* events a thousand year back to assess risks.

CONCITO

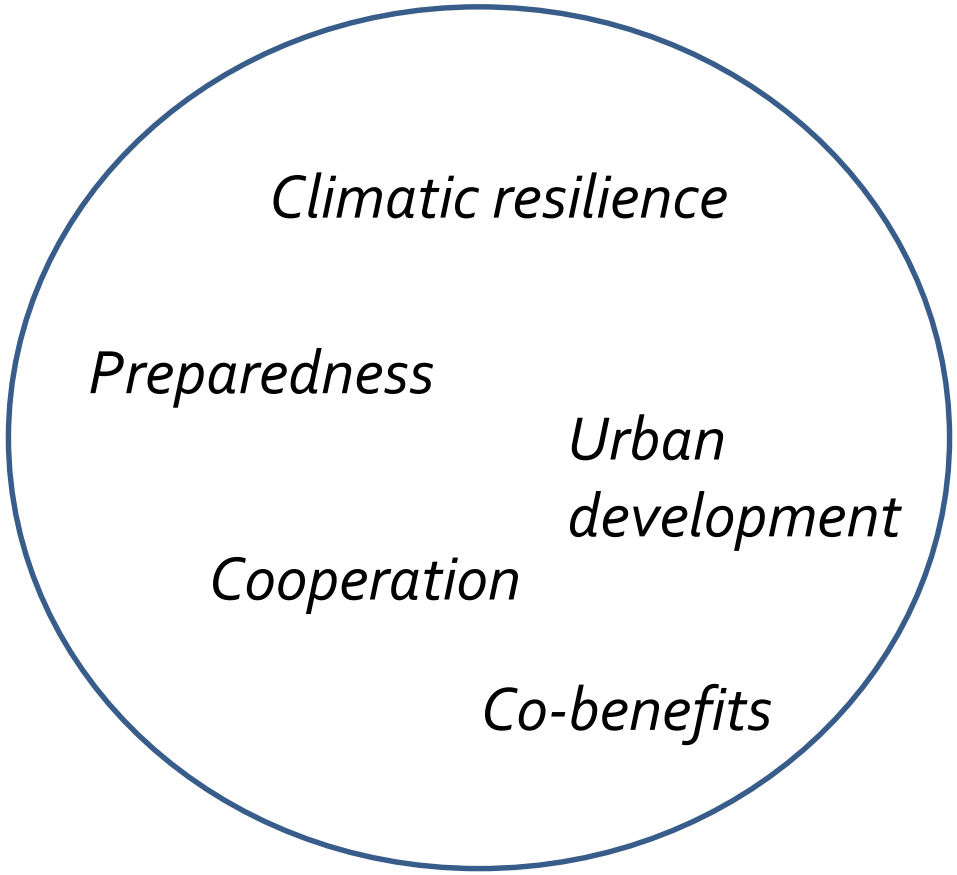
Heightened climate risks due to ”coupled” events – but how much?

Requirement by Danish municipalities

- Agreement between the Government and 98 Danish municipalities in 2012
- Develop adaptation plans that:
  - Assesses vulnerability (focus on precipitation and storm surges)
  - Prioritize efforts
  - By end of 2014
- The government provides different mapping and planning tools for use by the municipalities
- Between 2012 and 2016 municipalities could co-finance certain interventions with the utilities. This is no longer possible.

CONCITO

Analysis – What is contained in the new Municipality Climate Action Plans?

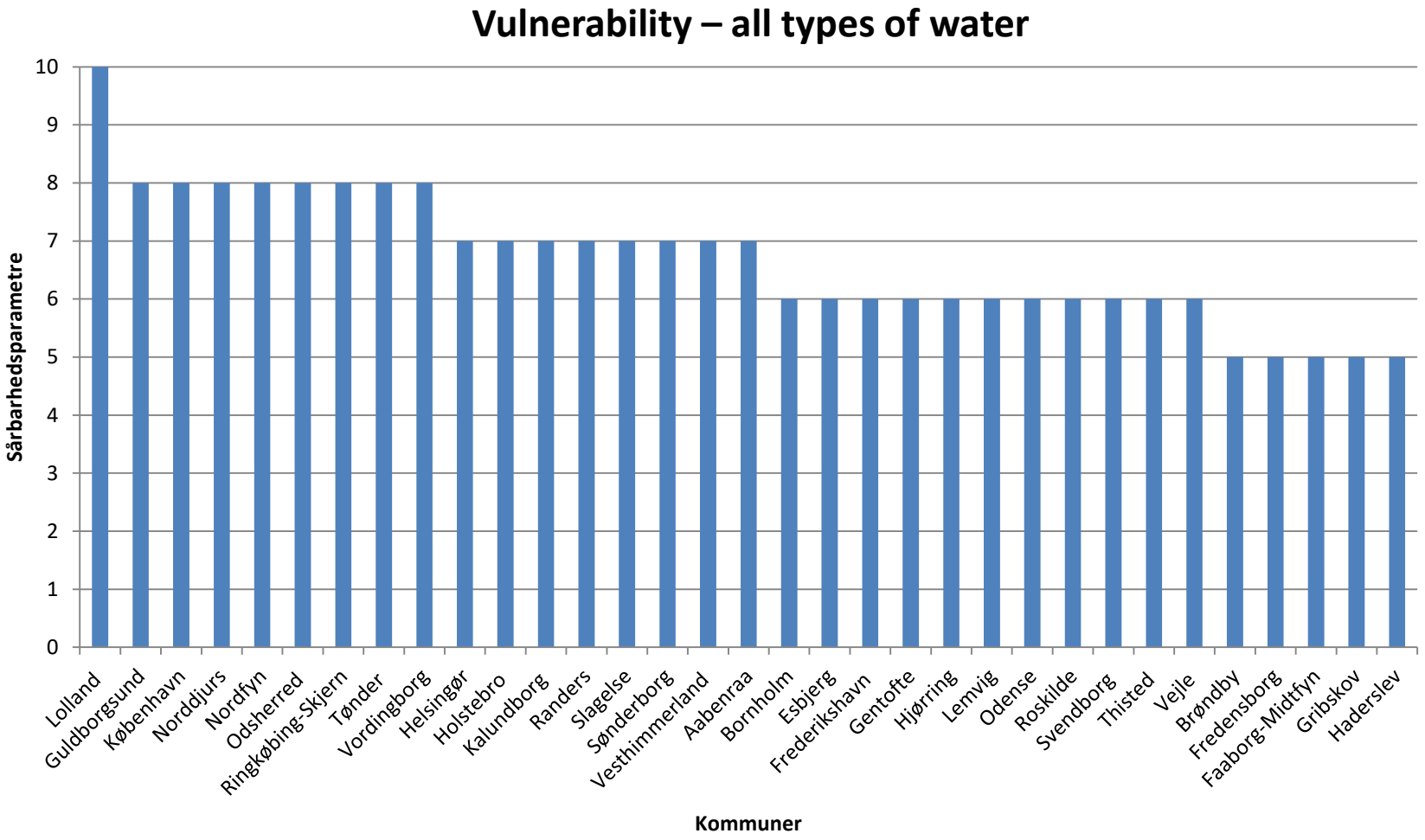


Framework conditions:

- *National*
- *Municipalities*

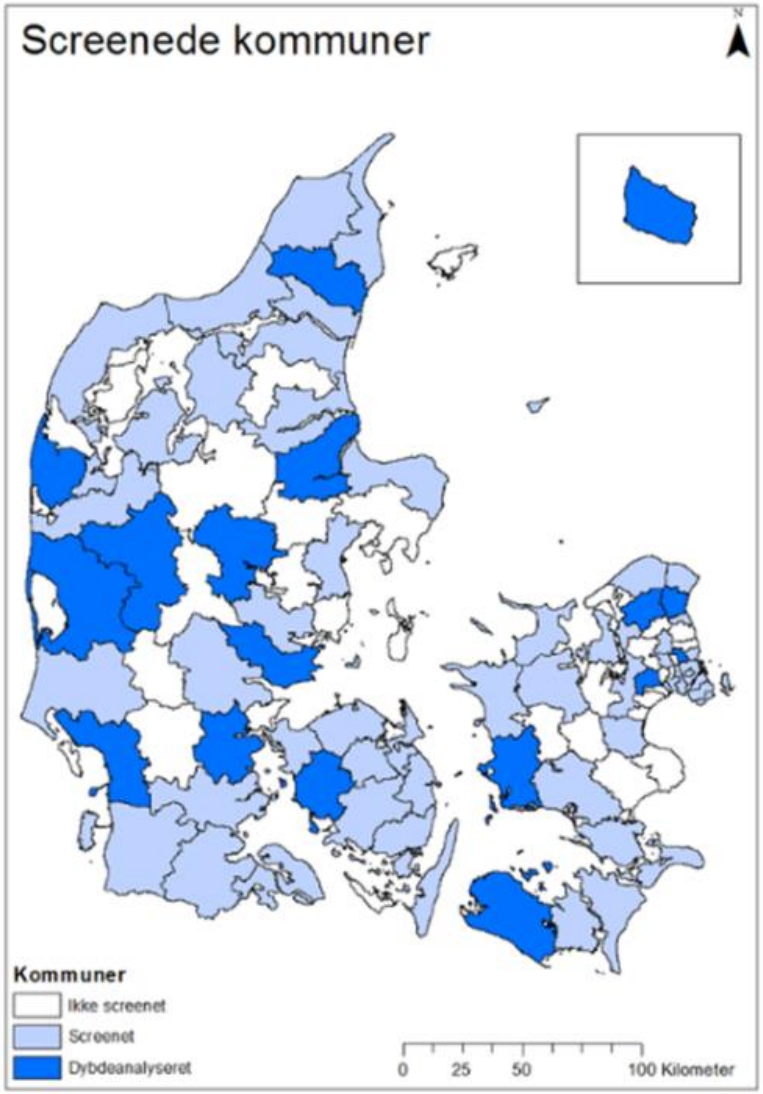
CONCITO

Developing a vulnerability index:



CONCITO

67 municipalities examined



Method:

- 17 municipalities analyzed
- 50 municipalities screened

Selection criteria:

- Selected on basis of exposure, vulnerability, insurance-statistics, regional distribution, hard surface rates, city typology.

Examined instruments:

- Planning documents
- Web pages
- Questionnaires (17)
- Interviews (17)

CONCITO

Observations

- Municipalities have generally embraced adaptation seriously and are off on a good start in mapping their risks and planning their efforts.
- The municipalities have largely followed state recommendations (scenarios, mapping).
- The municipalities have been seriously challenged in a new complex agenda.
- Large uneven practices in the municipalities (scenarios, mapping, urban development, cooperation)
- Overall, insufficient risk management in most municipalities for all relevant water types in the hydraulic system. Groundwater is the least addressed water type.
- Generally a major need for better handling locally of all water elements - mapping, modeling, interaction, and better synergy with synergies and efforts in the open country.
- There is no clear match between vulnerability and efforts (designation, insurance statistics and reference to preparedness and emergency contingencies).

Observations

- Major regional differences in risk management. Municipalities located in Regions (5 Danish regional authorities) that engage in the adaptation agenda perform better.

- Cooperation across municipality borders is difficult, but under way. Regionalization of efforts in joint waterways and coastal areas is imperative. Cross-sector cooperation can be significantly increased with the right incentives

- The overall preparedness is not aligned with increased climate risks, and the state / municipality should coordinate closer in defining local needs.

- Climate adaptation is lacking as a “theme” in municipal plans. Legal lifting necessary, and into the management's finance departments (and, incidentally, other non-technical departments).

- The will is there, but the money is not always there. Simplification of the funding base is necessary. Experienced as a barrier along with lack of financial space in municipality budgets.

Recommendations

- Significantly strengthening integrated and strategic climate research.
- Developing a stronger strategic framework for the overall Danish climate adaptation effort.
- Creating a common climate future for the Danish municipalities, through common, regularly updated, climate scenarios and risk assessments (“climate atlasses”).
- Addressing climate adaptation at shared watershed levels and along shared coastlines.
- Enhancing the government's support for municipal climate adaptation planning and action
- Giving Regional authorities a mandated role in the municipal climate adaptation efforts.
- Uncovering / clarifying the contradictions in legislation and rules related to the administration of especially the Danish coasts, streams and the country side
- Creating clearer and more stable predictable financial framework for municipal action on the reduction of flood risk from all types of water.

Recommendations

- Aligning better state and municipal climate adaptation with preparedness efforts.
- Strengthening the legal status of climate adaptation in municipal planning with a view to prioritize efforts and ensure full integration across the municipal administration.
- Developing clear requirements in connection with urban development in cooperation between state and municipalities in areas exposed to climate change.
- That the municipalities prioritize – joint efforts with other municipalities and Regions
- That the municipalities prioritize a mapping of risks related to all elements of the hydraulic system and their interaction
- Prioritize climate adaptation efforts as a cross-cutting theme in the entire municipal administration
- Involve homeowners more closely in adaptation efforts - in order to clarify real climate risks in the future, and share the cost.

Thank you!

Jarl Krausing
International Director
jk@concito.dk
www.concito.dk

Baltic Development Forum
Tools for Urban Climate Adaptation Training Days
November 30, 2017