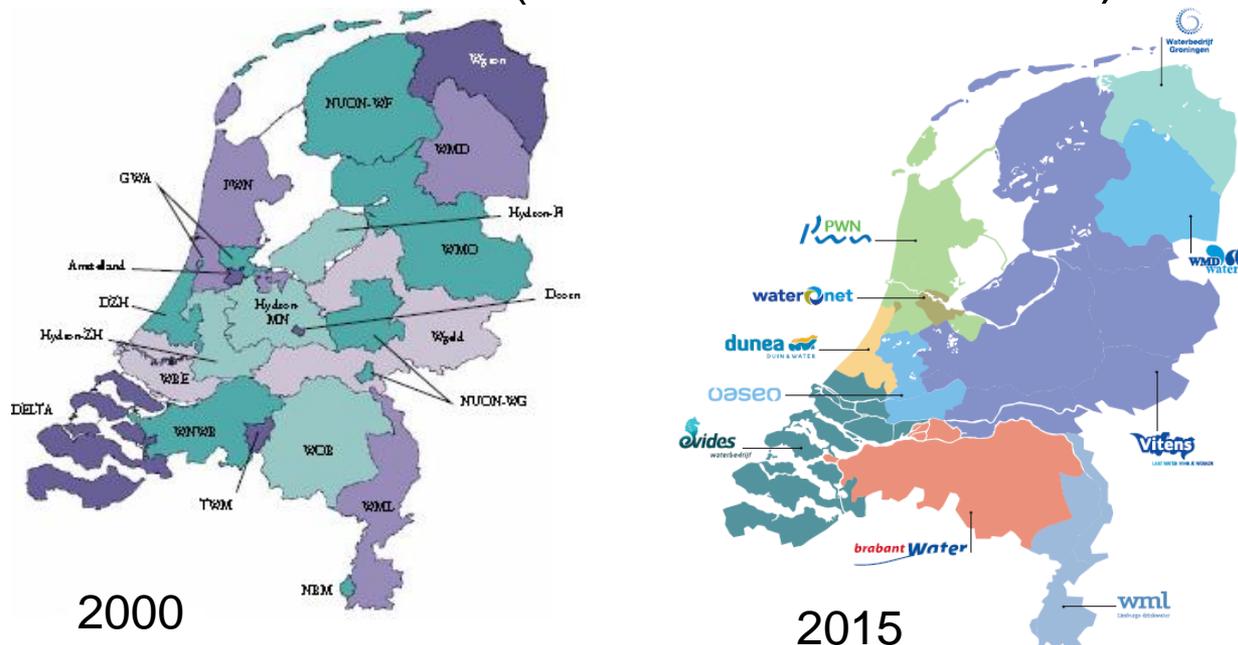


Performance, Riks and Costs: An Emerging Approach to Resilience in a Dutch Water Utility

Andres Cabrera Flamini, Klaas Schwartz and Rian Kloosterman

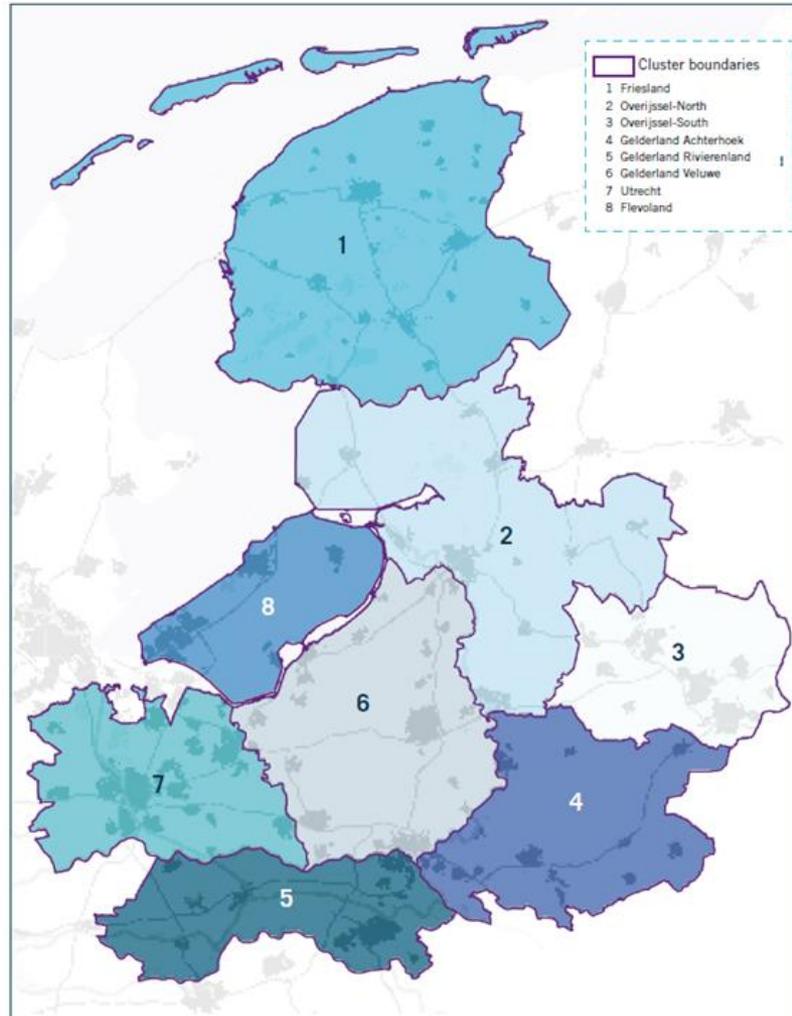
Vitens

- Established in 2002 following the merger of 4 water utilities with additional mergers in 2007.
- Main water source: Groundwater
- 2.5 million connections (5.6 million consumers)



2007-2015 – period of ‘institutional turbulence’

Clusters



Service area divided into 8 clusters, which should be able to be self-sufficient

Challenges/Trends identified by Vitens

- Water supply trends:
 - Uncertainties of water demand and declining per capita consumption
- Physical and spatial trends:
 - Spatial competition (incl. 'sub-soil' competition)
 - Decline in groundwater quality
 - Increasing social value attributed to nature
 - Impacts of climate change
- Social trends:
 - Digitisation
 - New technologies
 - Self-sustaining citizen
 - Growing interest in sustainability and circular economy

Resilience as an Emerging Approach

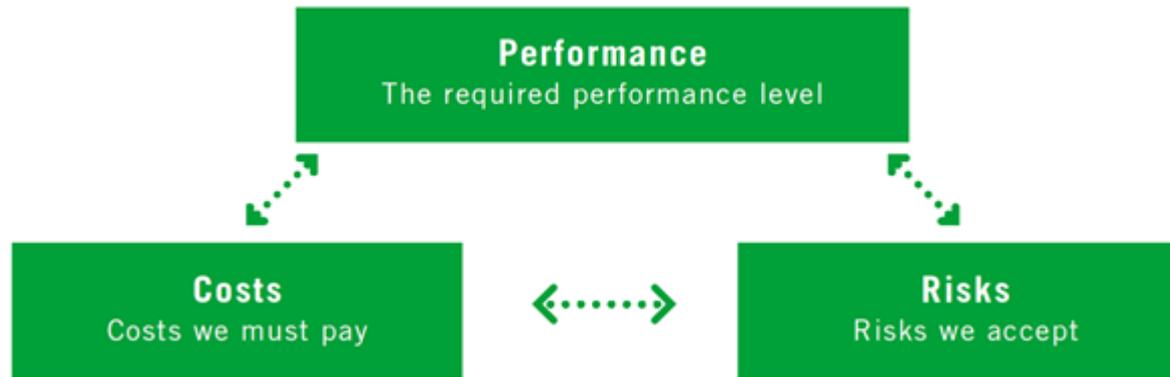
Inspired by Folke's work on resilience, Vitens adopted a long-term strategy that stresses resilience.

Folke (2016)	Vitens
Persistence	Robustness
Adaptability	Flexibility
Transformability	n.a.

- Robustness – infrastructure can address challenges without adaptation
- Flexibility – infrastructure is flexible to react to unexpected changes



Resilience approach: Performance, Risks and Costs



- Resilience understood as how quickly the desired level of performance of the system can be recovered: engineering resilience
- Shift from *fail-safe* to *safe-to-fail* (Ahren 2011)
- Underlying objective of the shift to resilience appears to be investment efficiency (in the context of infrastructure investments in the coming years/decade)

Resilience Approach: Engaging Stakeholders

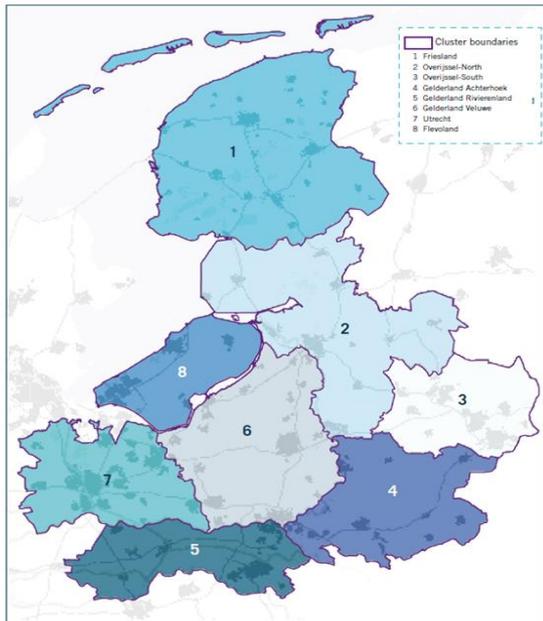
- Dependency on groundwater requires Vitens to engage with stakeholders
 - Spatial competition

“Our [spatial] claim is too big. If we don’t change our way of working, society will not accept us, and tell us to go to other resources (surface and sea water); we can do this but groundwater water has a lot of advantages [...]. We need to keep groundwater as our primary resource, but now we have to approach it differently due to the [spatial] claim.”
 - The Role of Provinces

Provinces are responsible for groundwater permits. *“We came up with a plan to put a pipe from Zwolle to the northern polder, which is in another province...to provide [them] water, and the Province (Overijssel) said: No, this is my water, it is for the expansion of the city of Zwolle and we can’t supply it to someone else. We (Vitens) have the cluster borders, they are both in the same cluster. So what may be resilient to us is not resilient to our stakeholders.”*

Resilience: Scalar level

- At a cluster level emphasis appears to be on robustness
- At lower, sub-cluster levels more room for flexibility exists



Fail-safe at cluster level combined with safe-to-fail at the local-level

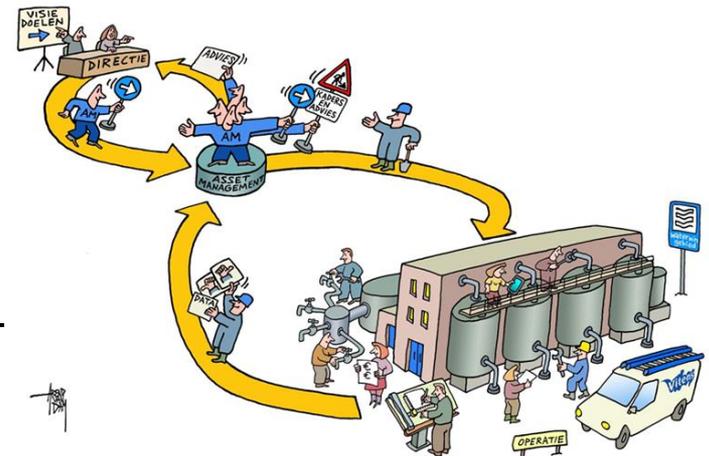
Not all local levels are equal...

Changing (Everyday) Practices

- Utility staff educated to include large safety factors
 - ‘Negative robustness’ – robustness of the system far greater than necessary
 - *“We are doing the same thing already for 30 years”*

Approach

- Asset Management placed between the utility and the Board of Directors
- Long-Term Vision (LTV) Ambassadors – promote the vision of resilience in the organization
- Supervisors to include discussions on flexibility in meetings with staff (2 per year)



Conclusion

- Pragmatic approach to resilience (selection of 2 out of 3 dimensions)
- Emphasis on engineering resilience, i.e. as-fast-as-possible return to normal system functioning.
 - Investment efficiency (avoid ‘negative robustness’)

Context specificity of how resilience is pursued

- Timing of resilience approach following ‘institutional turbulence’ of mergers
- Approach to resilience is strongly linked to water source
 - Groundwater dependency leads to a focus on stakeholder engagement as a key focal point of achieving resilience
- Priority given to robustness and flexibility is scale-bound
 - Robustness at cluster level, flexible at some of the local levels
- Although Vitens does not include transformability in its approach to resilience, the organizational and staff changes suggest elements of transformability are present

