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Zandmotor - How Dutch innovation can benefit the UK

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Flooding and erosion in the UK

We have a problem!

- Too much flooding and erosion happening, and not enough funding to keep pace with climate change

Paradigm shifts are needed

- Partnership funding, Community adaptation
- Technical solutions?







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Bring in the Dutch?

✗

Not: big Dutch solutions; the context is too different

✓

Inspiration from ‘**Delta approach**’: everyone working together to solve a national problem

✓

Translate & apply **innovations** developed with NL government funding

✓

UK leads the world in flood response in maximising Return on Investment:
→ Export products!





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Geography



Image: Rijkswaterstaat



Environment Agency
Percentage of land at significant likelihood of flooding

Legend: Percentage of land at significant likelihood of flooding

- 0% - 10%
- 10% - 20%
- 20% - 30%
- 30% - 40%
- 40% - 50%
- 50% - 60%
- 60% - 70%
- 70% - 80%
- 80% - 90%
- 90% - 100%

Legend: Urban boundary, Other boundary

- More rain
- More hills
- More diverse

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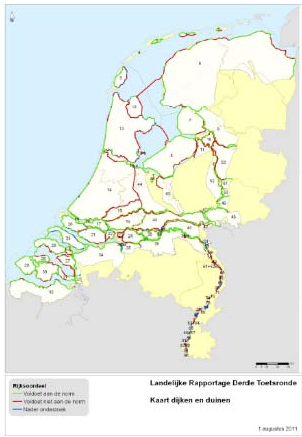


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Governance

Legal status vs Permissive powers



Flood and Coastal Erosion Risk Management Outcome Measures				
Quarter 3 2013/14				
	Actual & Target	2013/14 Target	2013/14 Actual	Comments
1	0.2:1	0:1	0:1	There is no evidence of any measures being implemented. The measures being implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
2	98,803	128,800	156,700	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
2b	44,337	62,400	79,100	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
2c	5,698	10,290	23,800	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
3	5,286	8,800	9,300	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
3b	1,256	1,800	2,100	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
3c	63	250	400	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
4a	4,968	6,500	6,900	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
4b	25	200	350	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
4c	67	200	200	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
5	61.4%	TBC	TBC	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.
6	99.8%	95%	95%	Measures implemented are not in line with the requirements of the Flood and Coastal Erosion Risk Management Act 2012.

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Flood risk

- NL:
 - 11 million people (~2/3rd)
 - Economic risk ~ € 600 million per year

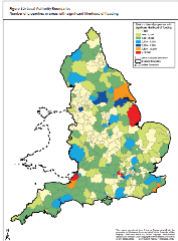
Probability x Consequence



Veiligheid Nederland in Kaart, 2014

- England:
 - 11 million people (~1/5th)
 - Economic risk ~ £ 1 billion per year

Probability x Consequence

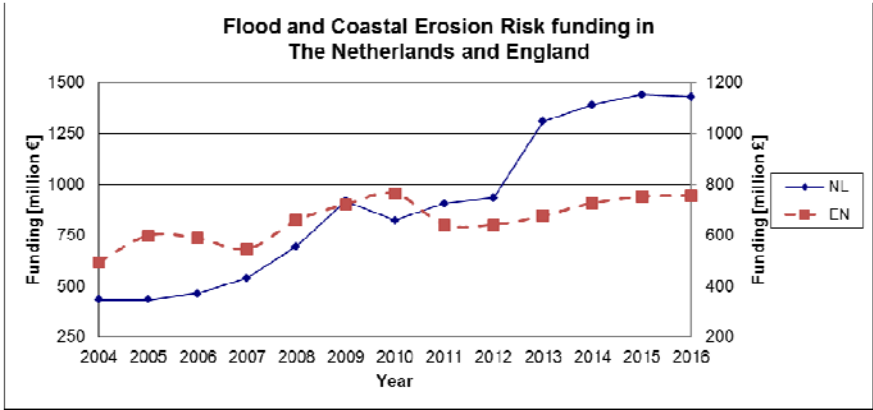


National Flood Risk Assessment, 2008

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Budget



NL: Benefits > Costs
England: Benefits > ~5 x Costs

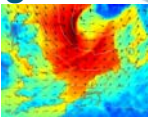
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Public perception and community engagement

NL:

- Well aware of the risk, despite no recent history
- Expect to be protected / Trust engineers to do a good job
- Community is a stakeholder in how to provide defence



UK:

- Well aware of the risk, due to events in recent years
- Appreciate staff on the ground but no trust in the system
- Community can (and needs to) be contributing partner or even initiator of solutions

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Policy

Delta Approach

- Sense of urgency, all together now
- Similar ambition in UK's post-Winter flood reviews?



Integration with spatial planning

- Flood schemes topped up with local investment in spatial quality
- Partnership funding could have a similar role?

Interpreting EU Directives

- Coastal squeeze: feed intertidal areas to keep pace with sea level rise
- WFD Designation of artificial water bodies

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Innovation policy

- Water Management is 1 of 9 'Top Sectors' in NL:
 - Driven by national urgency + export potential
 - Focus, funding & facilities
 - Similar to UK BIS' Eight Great Technologies
- Explicit policy to experiment with sandy solutions for the coast
 - Essential for NL to find new solutions
 - Acceptance that innovative solutions may not always provide maximum value for money – need to take a risk!
 - Note: can't take risks with flood protection!

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So how can the Dutch help?

- UK flooding problem is just as big & more complex, but there is less funding & drive →
We have a real problem!
- Difficult in the UK to initiate *paradigm shifting innovation* in this field
- Can we benefit from innovations that have been tried & tested (and funded) by the Netherlands?
- Example: Building with Nature
→ Zandmotor

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Building with Nature

Public – Private – Academia:

Design to use natural processes to meet society's needs

- Oyster reefs
- Creating pioneer saltmarsh
- 'Feeding' mudflat development
- Zandmotor



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Zandmotor in the Netherlands

Flood defence (legal standard)

Experiment for long term sustainable coastal management:

- Reduce cost of nourishment
- Reduce disturbance of habitats

£50m

Creating opportunity:

- Tourism and recreation
- New habitats - in licensing areas and on the Zandmotor

£10m

Image Rijkswaterstaat

Zandmotor in the Netherlands

Inspirational...

- Large scale & innovative nature
- Multi-functional & multi-funding solution
- Adaptive
- Transformational



...But could it work in the UK?

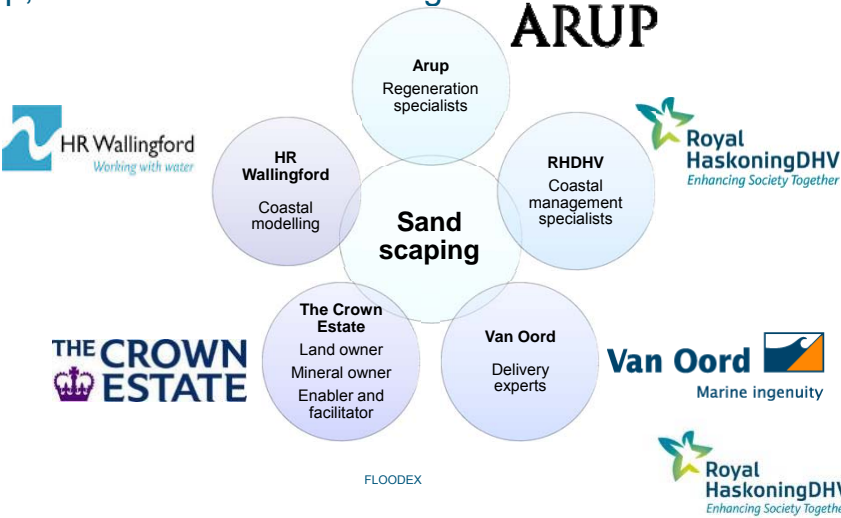
- More complex coastlines
- Different governance & funding

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Application in the UK: Sandscaping

The Crown Estate working with Royal HaskoningDHV, Arup, Van Oord and HR Wallingford





Application in the UK: Sandscaping

What are we doing?

- National: profiling & enabling
- High-potential Sites
- Work with local parties on local cases



So what is Sandscaping?

- Soft coastal management
 - sand or shingle, or even mud
- Design to make use of natural processes
 - can be more natural & more efficient
- Large scale
 - to influence processes & create economic opportunities
- Multi-functional = Multi-fundable
 - reduce risk but also create opportunity
- Flexible with a medium term functional life
 - buying time for adaptation
- Long-shore interaction
 - potential for sequence of benefits



In the right place, and if designed well!

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What will it take?

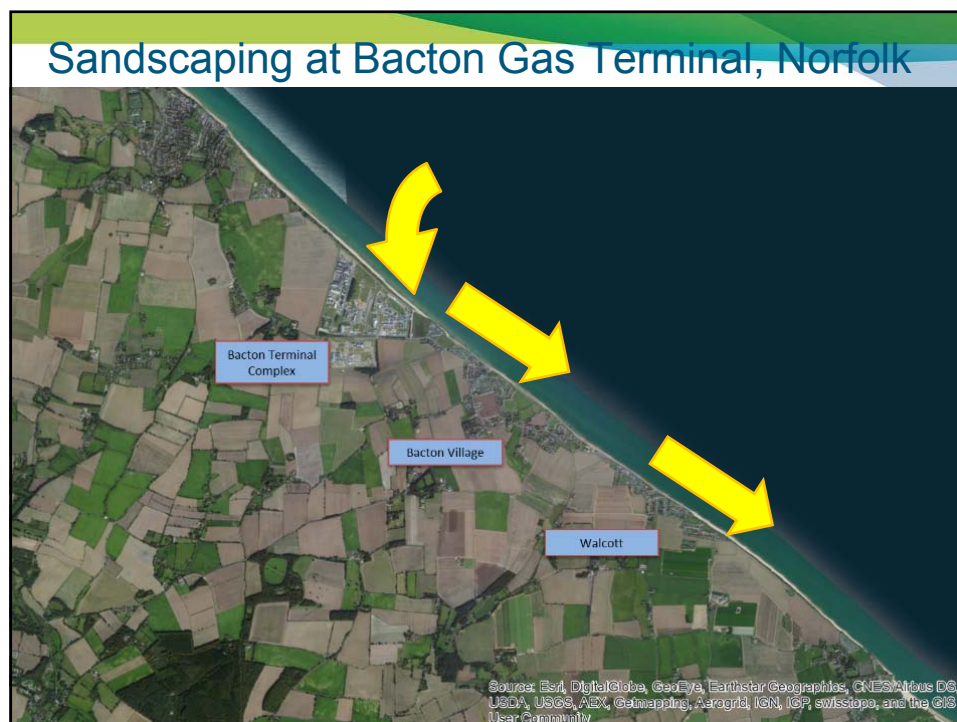
- Local ownership & drive
- Competitive business case
- Acceptable uncertainty
- Win-Win → Partnership of those who benefit & are willing to pay
- Please In My Back Yard

SAND SCAPING
Catalyst for coastal communities



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Conclusions

- Lots of potential for learning, but only if differences in context are addressed; these have deep roots
- UK could benefit from innovations tried & tested in NL
- Zandmotor / Sandscaping could be a good example:
 - Efficiencies
 - Multiple benefits
 - Managed-adaptive
- Various promising locations on the UK coast

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