

# Deltares

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## **Sand and Sustainability** **Local challenges at a global scale**

Helena van der Vegt

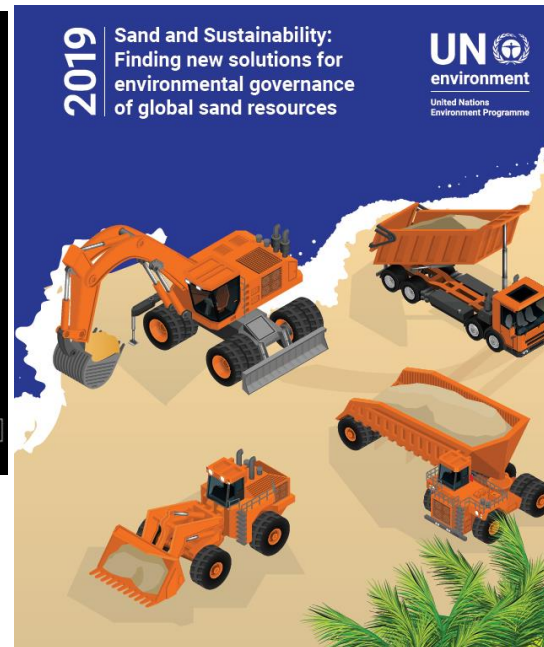
08-6-2022

# UN Environment Programme, Sand and Sustainability

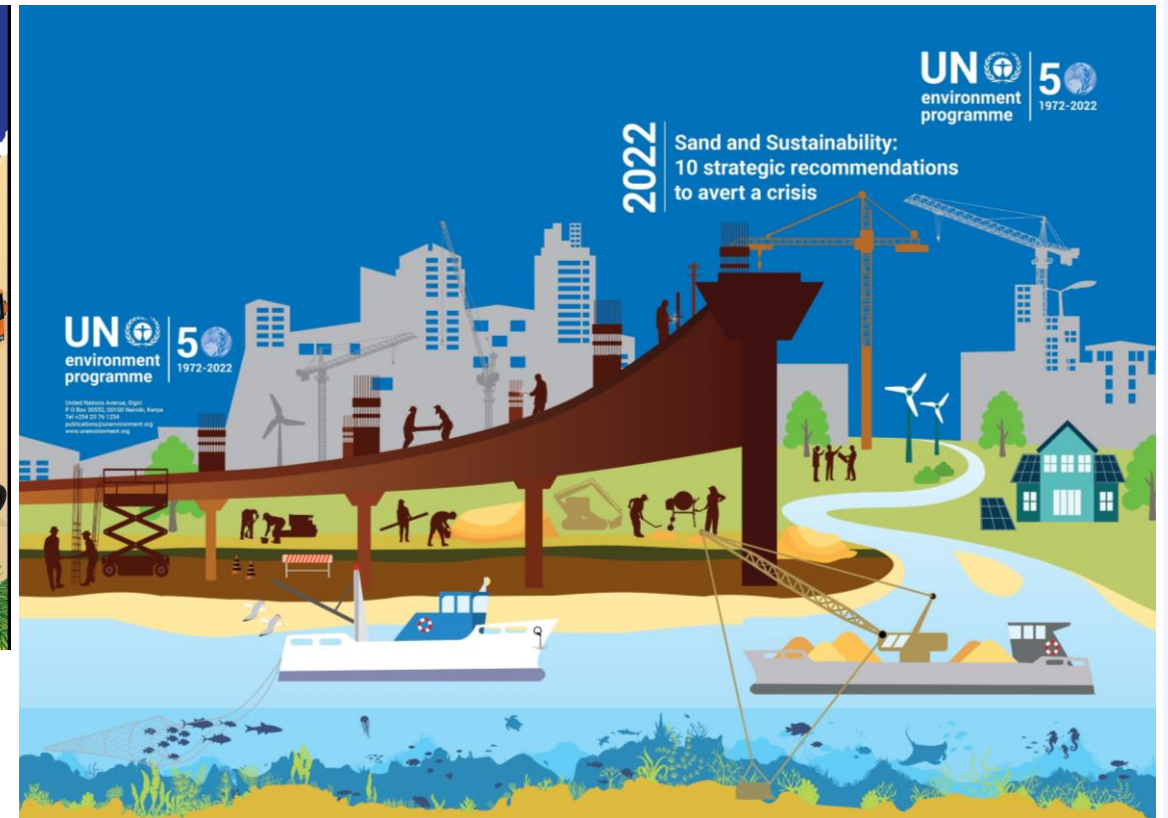
2014



2019



2022



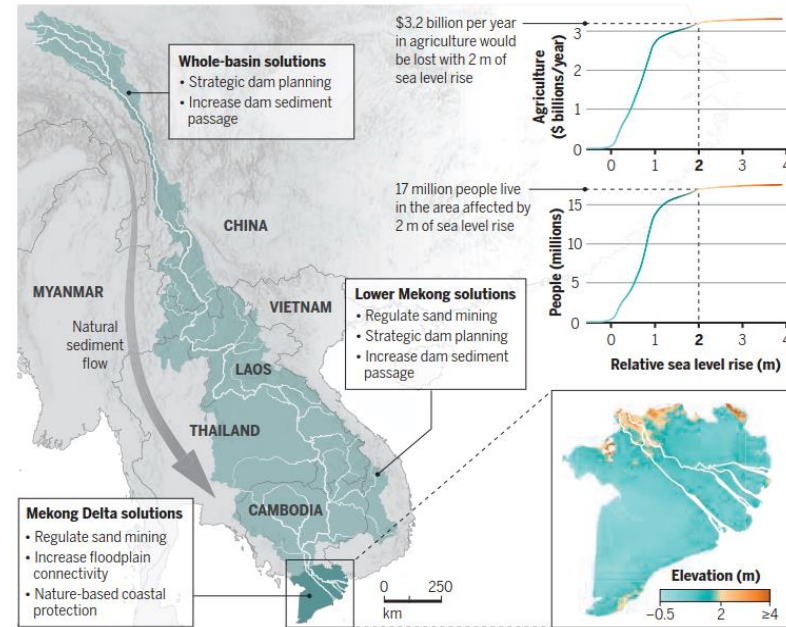


# SAND CRISIS!?

## Science

### The drowning Mekong Delta

The existence of the Mekong Delta is threatened by anthropic drivers. Continuing unsustainable use of water and sediment will result in the delta surface dropping by up to 2 m relative to sea level by 2100, drowning most livelihoods and ecosystems in the delta. Measures to avoid this fate are known but need to be implemented urgently across scales, sectors, and borders (see supplementary methods for data sources).



### Save the Mekong Delta from drowning

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SCIENCE • 5 May 2022 • Vol 376, Issue 6593 • pp. 583–585 • DOI:10.1126/science.abc5176

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## We are running out of sand and global demand could soar 45% by 2060

Demand for sand, a key building material, could skyrocket in the next 40 years, led by development in Africa and Asia – but not if we reuse concrete and design more lightweight buildings



ENVIRONMENT 24 March 2022

By Adam Vaughan

# NewScientist



An excavator working in a sand quarry  
Anton Deev/Alamy

nature  
sustainability

BRIEF COMMUNICATION

<https://doi.org/10.1038/s41893-022-00857-0>

Check for updates

### Increasing material efficiencies of buildings to address the global sand crisis

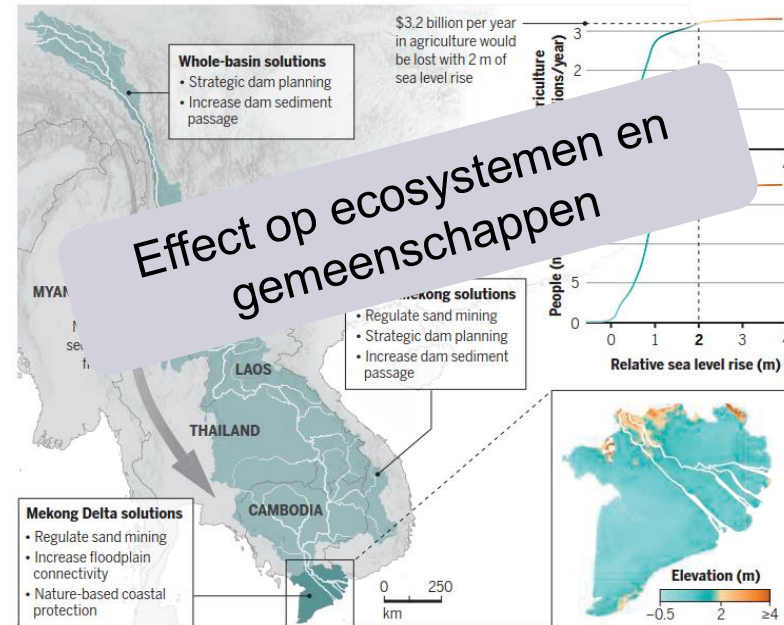
Xiaoyang Zhong<sup>1,2\*</sup>, Sebastiaan Deetman<sup>1,2</sup>, Arnold Tukker<sup>1,3</sup> and Paul Behrens<sup>1,4</sup>

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Toenemende bezorgdheid over aanbod

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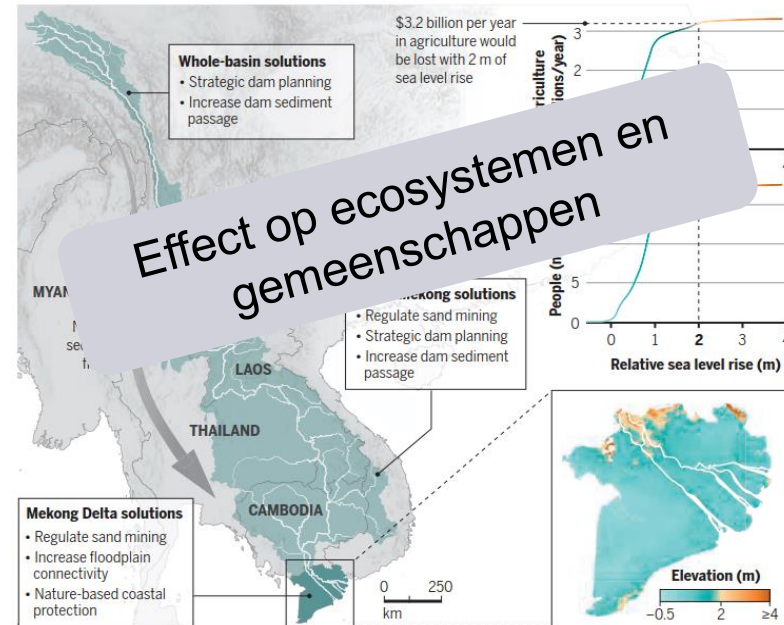


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Ecosystem services

Economische groei en ontwikkeling

Habitat -> biodiversiteit

Ongelijkheid verminderen

Waterveiligheid

Werkgelegenheid

Toegang tot voedsel, schoon water

Veerkrachtige infrastructuur

## We are running out of sand and global demand could soar 45% by 2060

Demand for sand, a key building material, could skyrocket in the next 40 years, led by development in Africa and Asia – but not if we reuse concrete and design more lightweight buildings

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# Existing goals and agreements



## EU Green Deal and Taxonomy

- Climate change adaptation and mitigation
- Circularity and reuse
- No pollution
- Biodiversity
- Water and marine quality



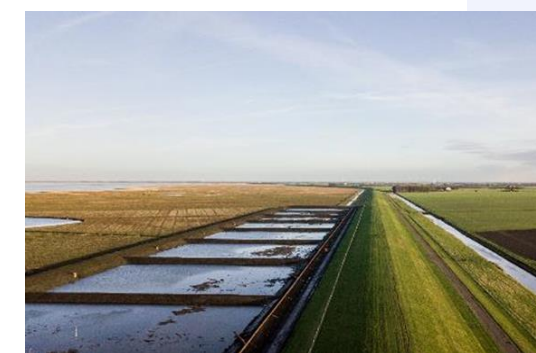
Road to CAS 2021, October 22nd: [https://youtu.be/QHQB\\_dBLb3c](https://youtu.be/QHQB_dBLb3c).



Min 1'55". Cora van Nieuwehuizen, Minister of Infrastructure and Water: "BwN is obviously the best way to counter the effect of climate change. Nature is by far our most important ally"

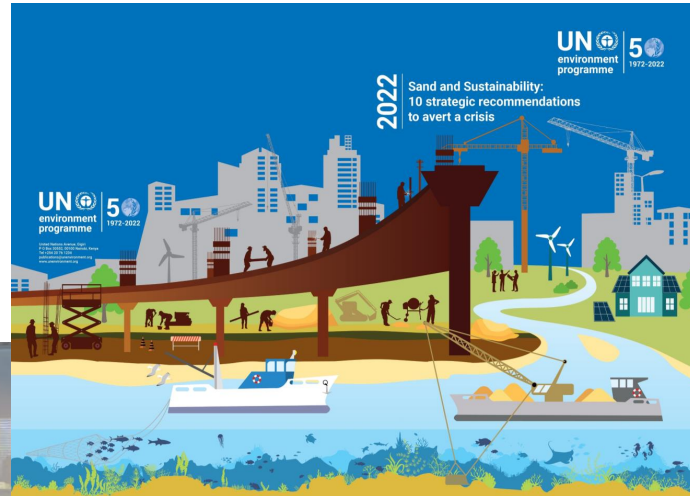


Min 11'15". Peter Glas, Commission Delta Commission: "This book is the way forward...one of the motto's of the Delta Program is "Soft where we can, solid if necessary".





# UN Environmental Programme 2022: Sand and Sustainability 10 Strategic recommendations to avert a crisis



Photos by Paul Capelli

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# UNEP: Sand and Sustainability

## 10 Strategic recommendations to avert a crisis



“Het is niet mogelijk om 50 miljard ton zand aan het milieu te onttrekken zonder dat dit gevolgen heeft voor het natuur en de samenleving.” Pascal Peduzzi, UNEP

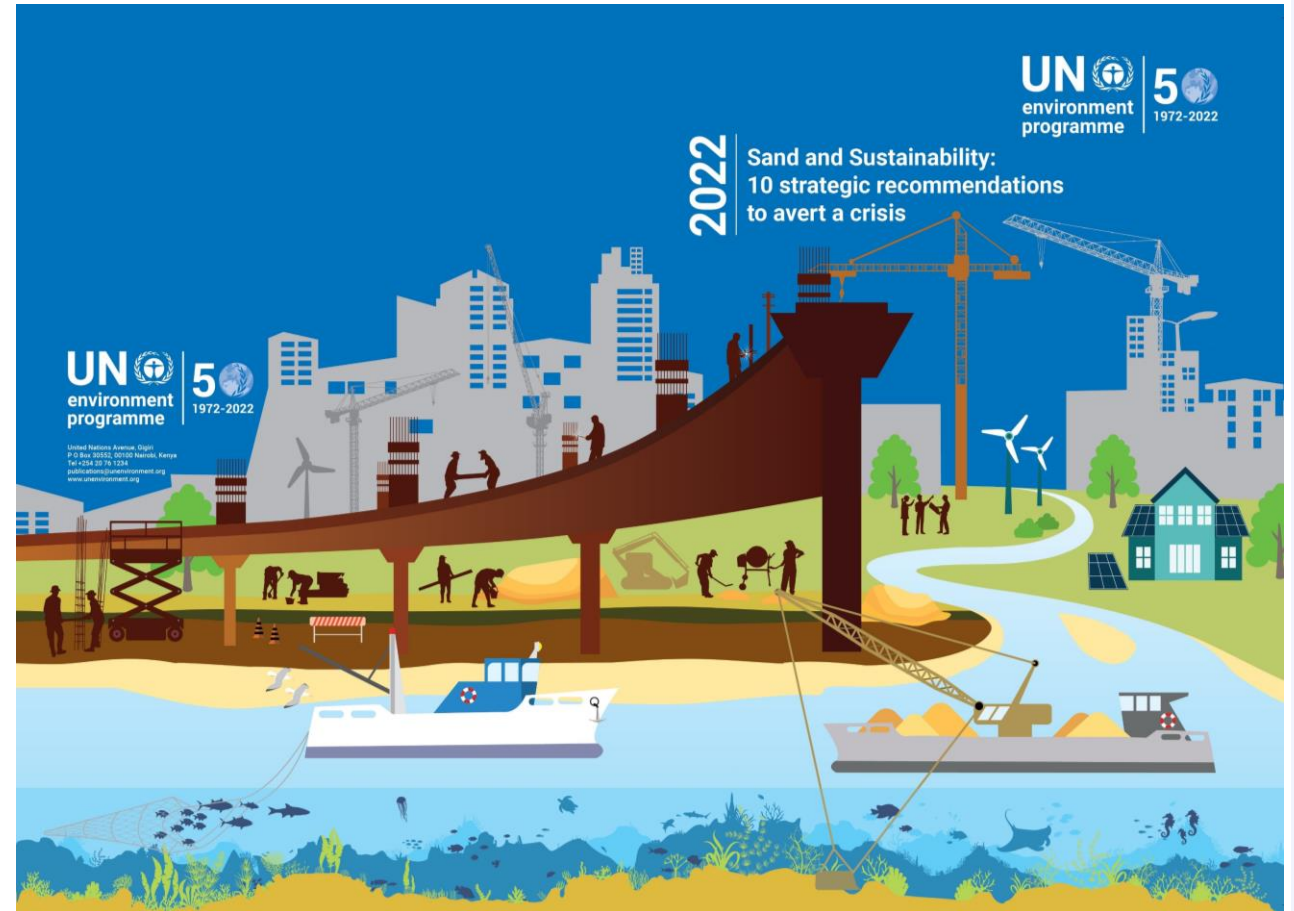


# UNEP: Sand and Sustainability

## 10 Strategic recommendations to avert a crisis

### To make sand resource management just, sustainable, and responsible

- 1 Recognize sand as a strategic resource
- 2 Include place-based perspectives for just sand transitions
- 3 Enable a paradigm shift to a regenerative & circular future
- 4 Integrate policy & legal frameworks
- 5 Create a mineral ownership and access framework
- 6 Map, monitor and report sand resources
- 7 Establish best practices, national standards, & a coherent international framework
- 8 Promote resource efficiency & work towards circularity
- 9 Source responsibly
- 10 Restore ecosystems degraded by sand mining activities & compensate remaining losses





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**To make sand resource management just, sustainable, and responsible**

1	Recognize sand as a strategic resource	Overzicht en kaders
2	Include place-based perspectives for just sand transitions	
3	Enable a paradigm shift to a regenerative & circular future	
4	Integrate policy & legal frameworks	Beleid en regelgeving
5	Create a mineral ownership and access framework	
6	Map, monitor and report sand resources	Uitvoering en implementatie
7	Establish best practices, national standards, & a coherent international framework	
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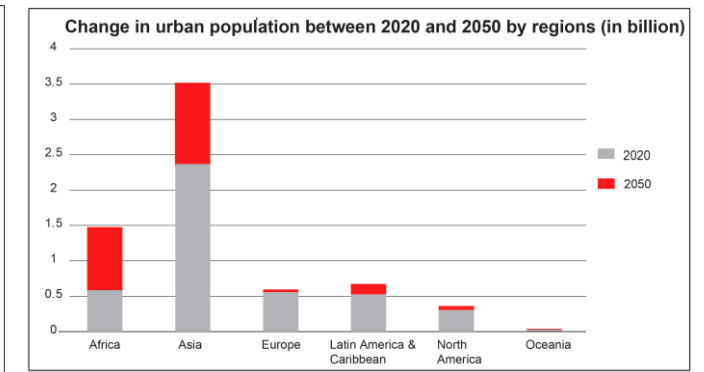
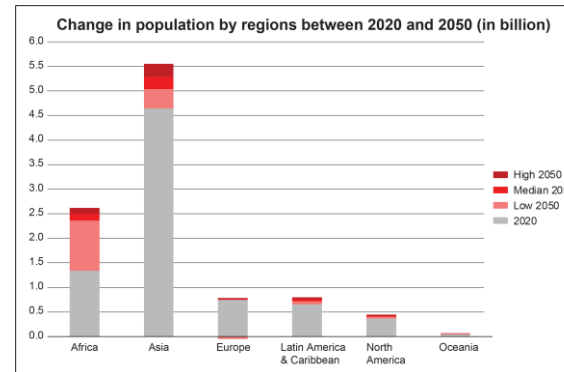
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Planning. Anticiperen  
Rechtvaardigheid.  
Innovatie.



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Verantwoorde zand-  
waardeketen bevorderen



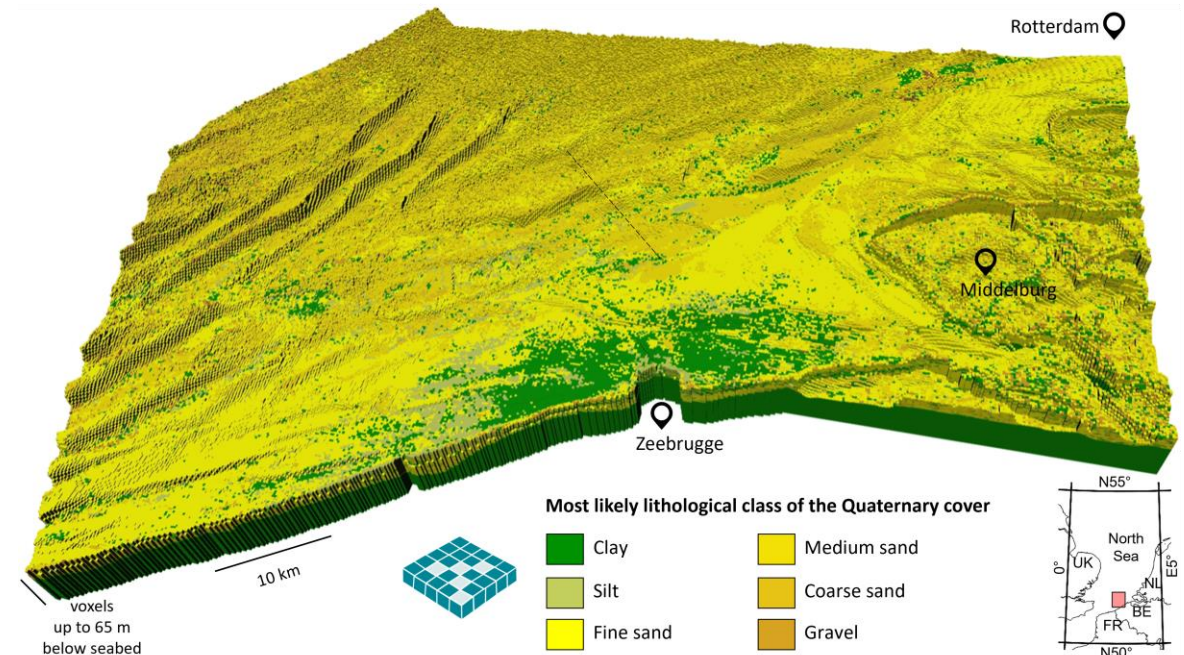
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Globally, most countries do not have a clear estimate of their sand reserves



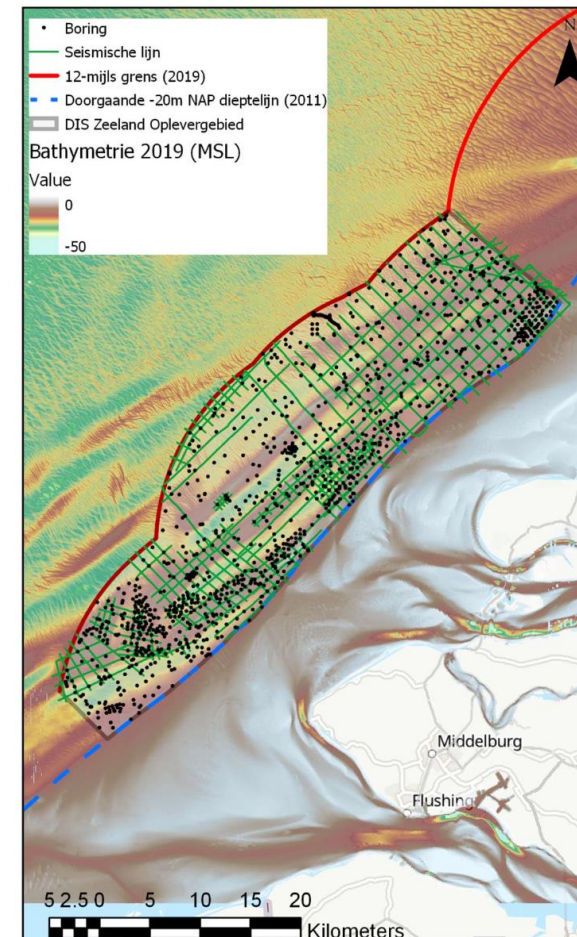
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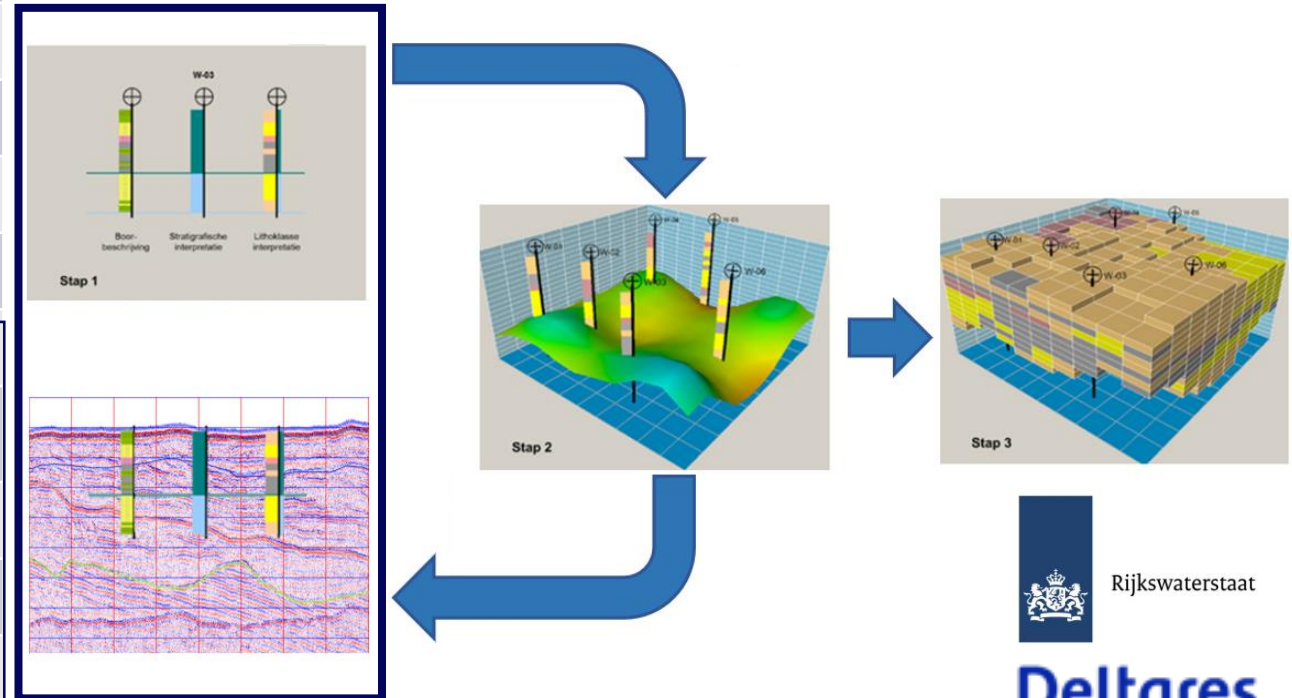
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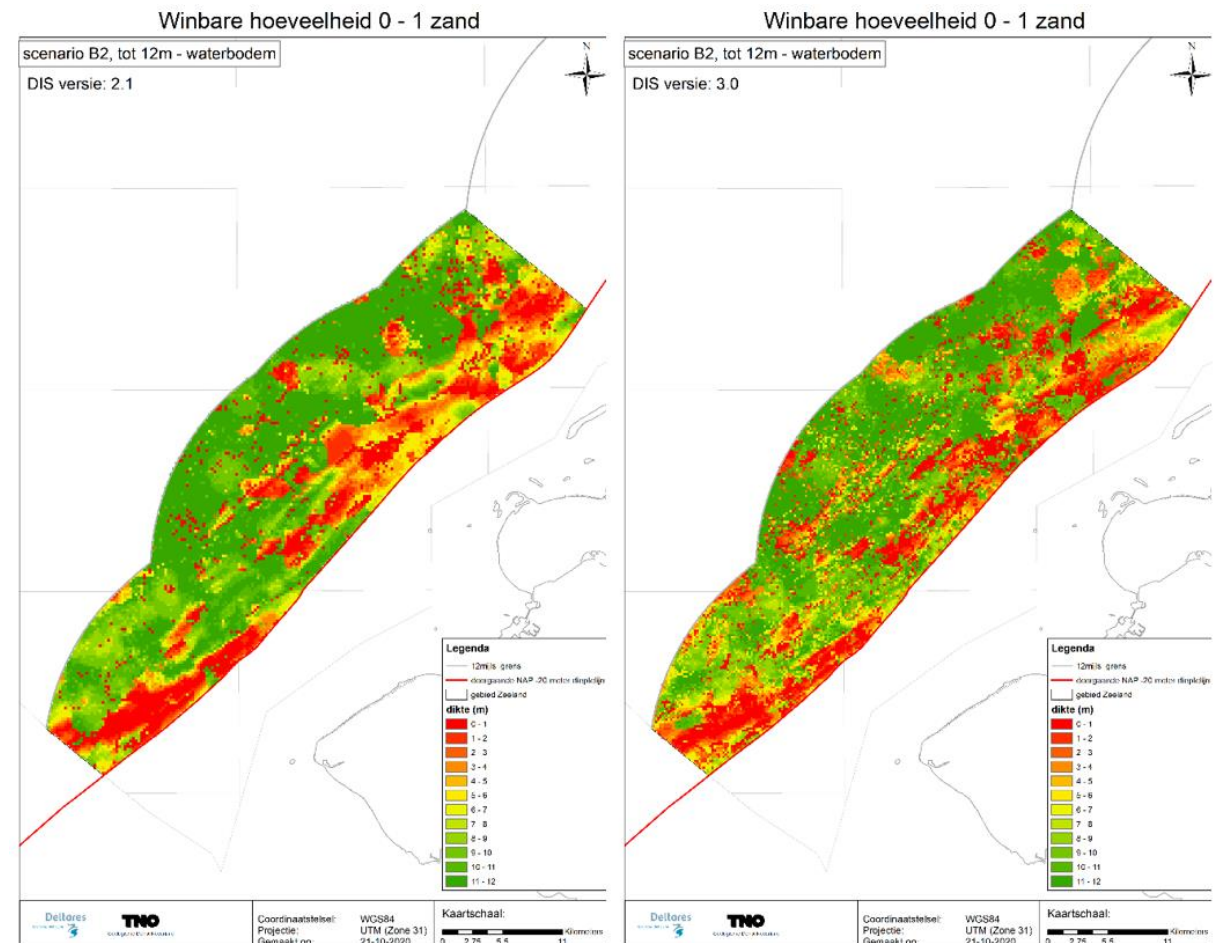
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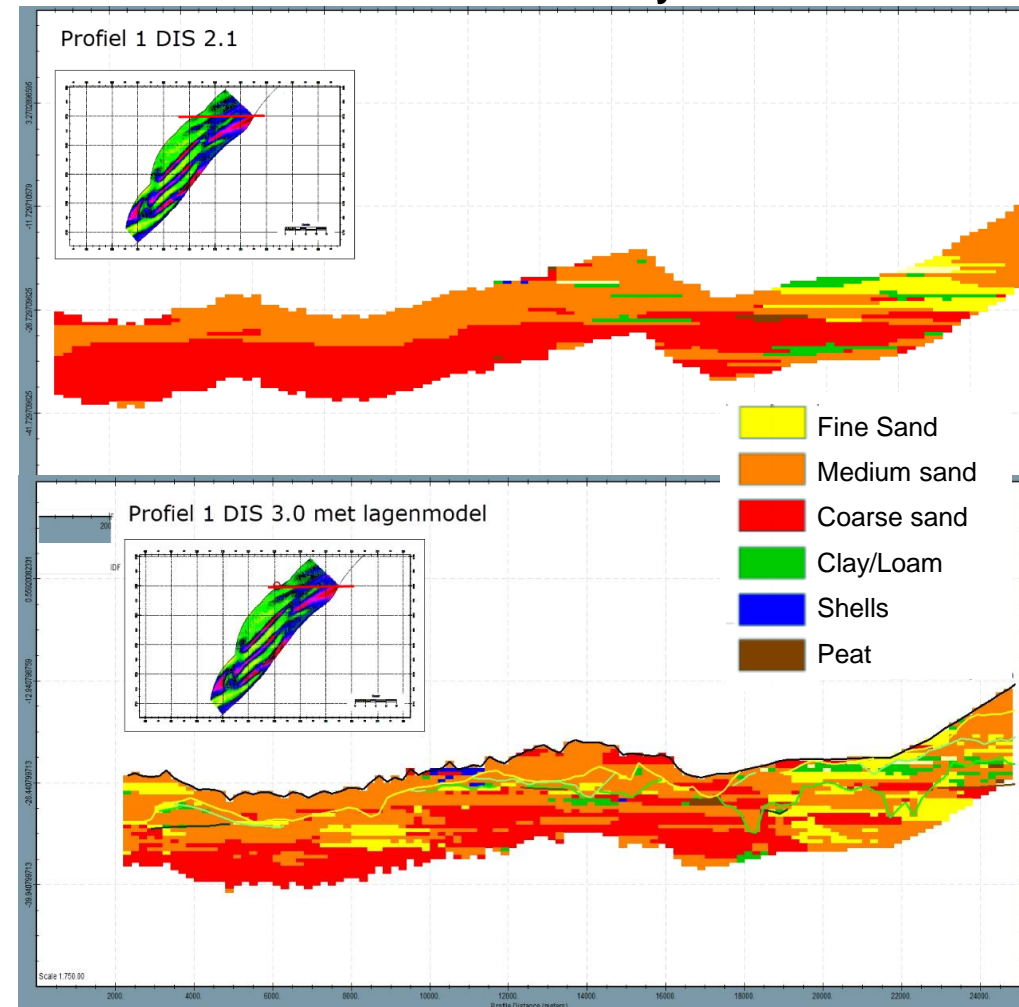
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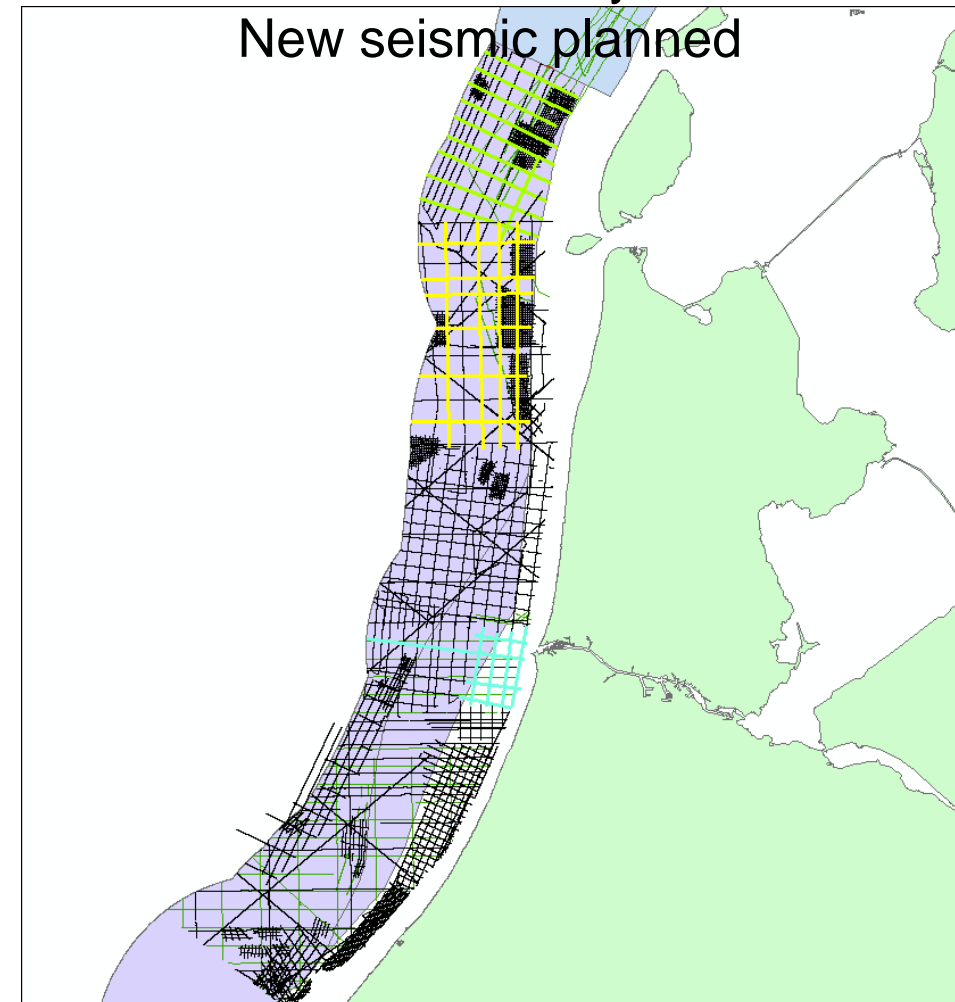
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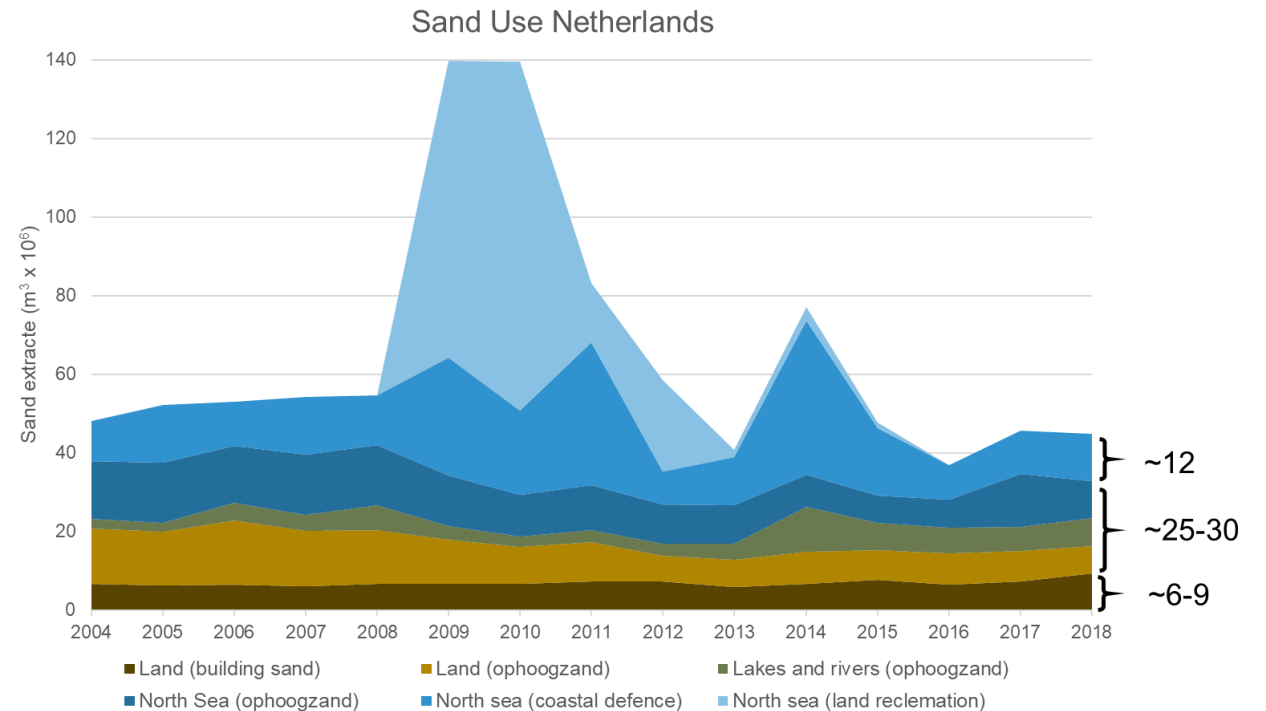
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### Sand use from land and marine sources



\*Op basis van data uit: "Monitoring bouwgrondstoffen 2017-2018" by H2H advise voor Cascade, Vereniging van zand- en grindproducenten



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### The International Council for the Exploration of the Sea (ICES)

Organisatie voor mariene wetenschap, die voorziet in de maatschappelijke behoefte aan onpartijdig onderzoek naar de staat en het duurzaam gebruik van onze zeeën en oceanen.

#### Member Countries



ICES is an intergovernmental organization with 20 Member Countries.

- Belgium
- Canada
- Denmark
- Estonia
- Finland
- France
- Germany
- Iceland
- Ireland
- Latvia
- Lithuania
- The Netherlands
- Norway
- Poland
- Portugal
- Russian Federation
- Spain
- Sweden
- United Kingdom
- United States of America



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Example: Kleirijperij en Breede Groene Dijk



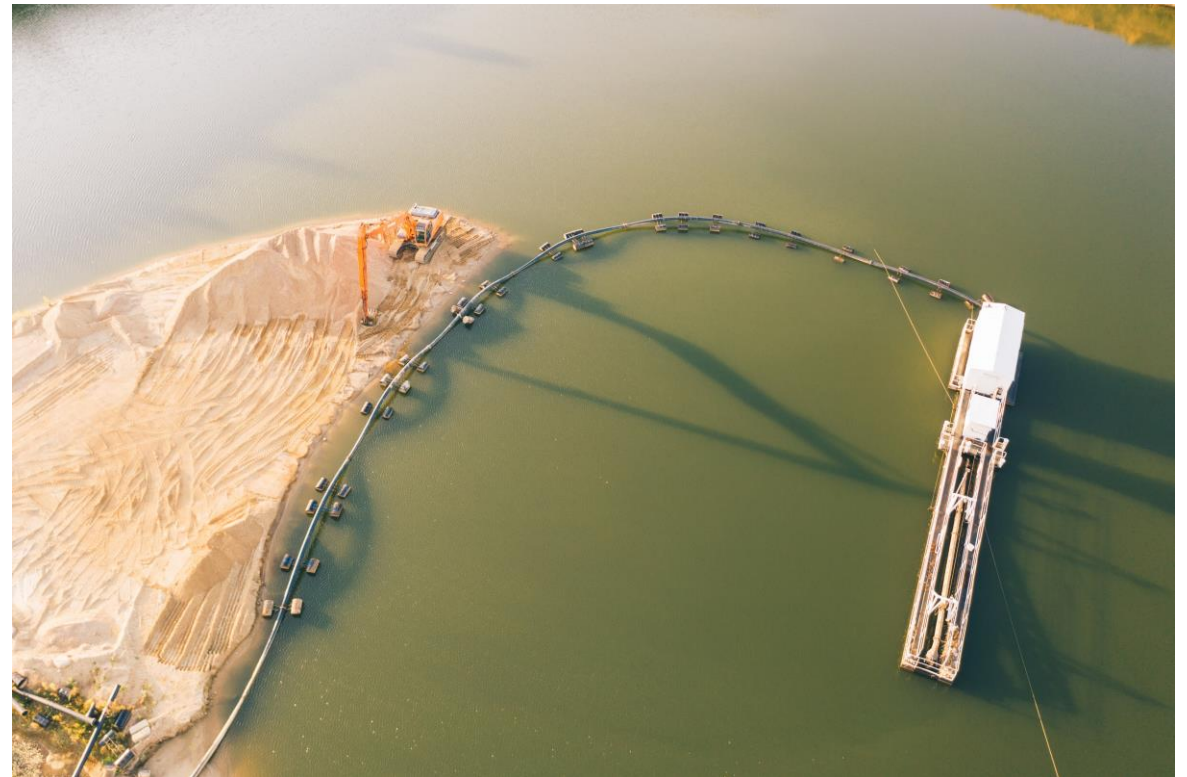
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Supply chain responsibility. Know where your sand comes from. Standards.





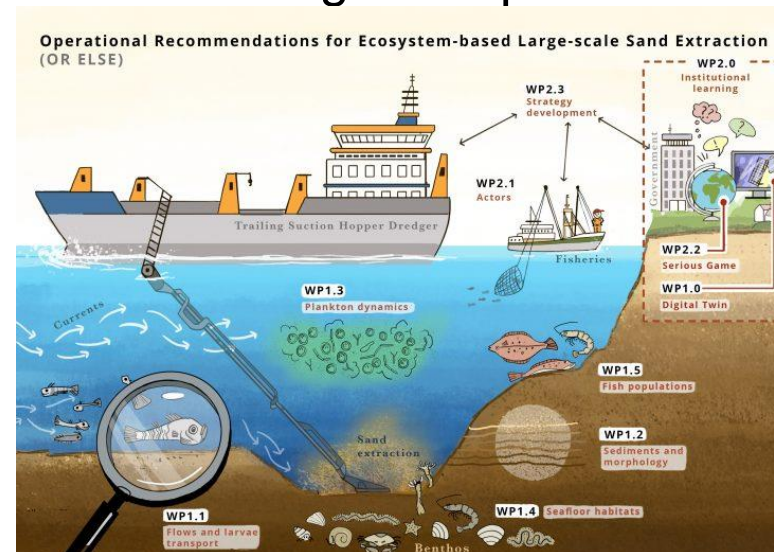
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Need more research to identify and mitigate ecological impacts of sand extraction



\*Consortium: Stichting Wageningen Research, Technische Universiteit Delft, NIOZ - Koninklijk Nederlands Instituut voor Onderzoek der Zee, Wageningen University & Research, Universiteit Twente, Universiteit Twente, Stichting De Noordzee, Hogeschool Van Hall Larenstein, Deltares, Breda University of Applied Sciences, Rijkswaterstaat Zee en Delta, Boskalis, Van Oord, Producentenorganisatie (PO) Texel, PO Wieringen, Nederlandse Vissersbond, Geological Survey Netherlands, Ministerie van Landbouw Natuur en Voedselkwaliteit, Digishape, North Sea Advisory Council, International Council for the Exploration of the Sea -Working Group on the Effects of Extraction of Marine Sediments on the Marine Ecosystem (ICES- WGEXT), KIMO Nederland en België.

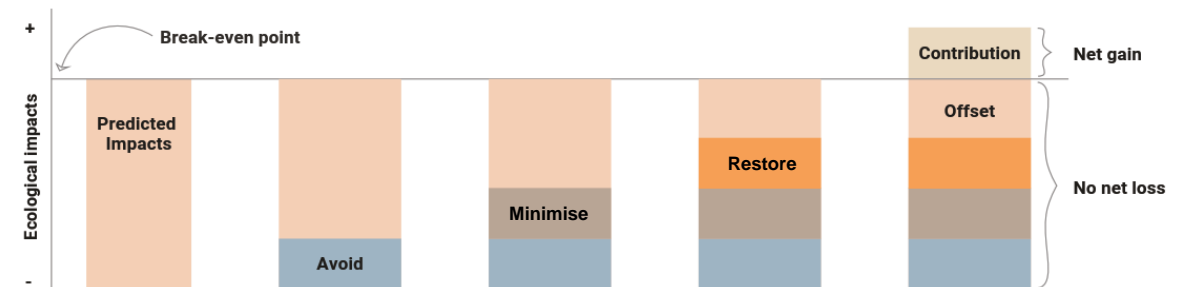
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### To make sand resource management just, sustainable, and responsible

1	Recognize sand as a strategic resource
2	Include place-based perspectives for just sand transitions
3	Enable a paradigm shift to a regenerative & circular future
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5	Create a mineral ownership and access framework
6	Map, monitor and report sand resources
7	Establish best practices, national standards, & a coherent international framework
8	Promote resource efficiency & work towards circularity
9	Source responsibly
10	<b>Restore ecosystems degraded by sand mining activities &amp; compensate remaining losses</b>

### “Mitigation Hierarchy”



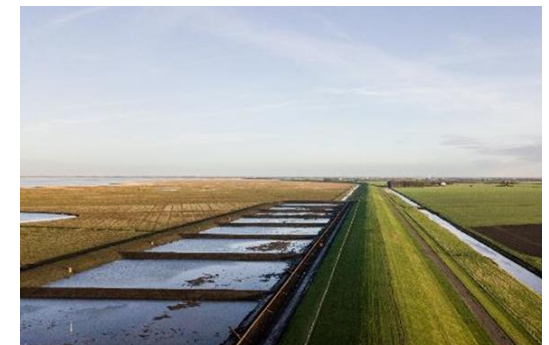
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So a large part of the recommendations require  
***Beneficial use of sediments***



Het gebruik van natuurlijke of gebaggerde sedimenten in toepassingen die gunstig zijn voor en in harmonie zijn met de menselijke en natuurlijke ontwikkeling.



# Contact

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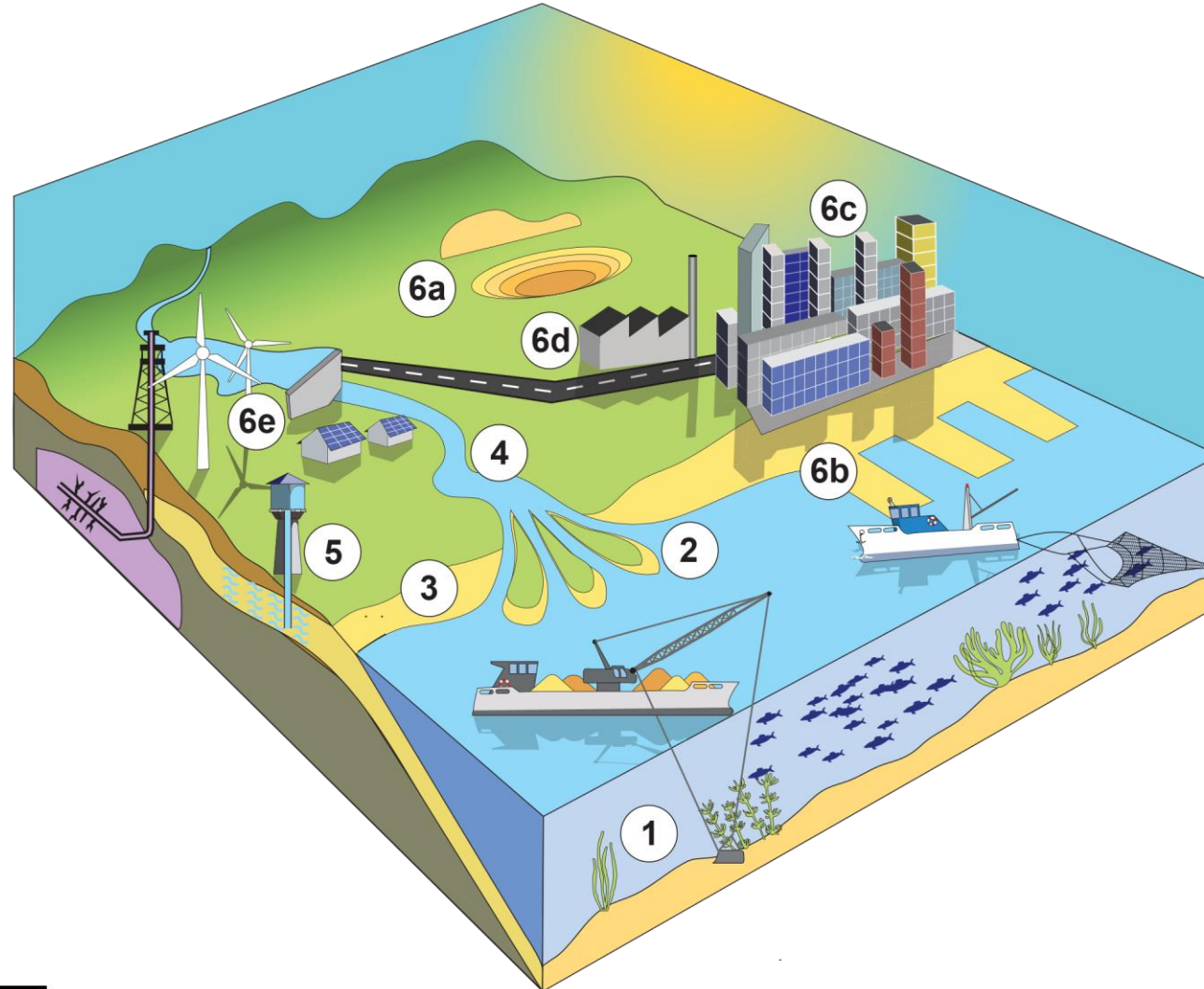
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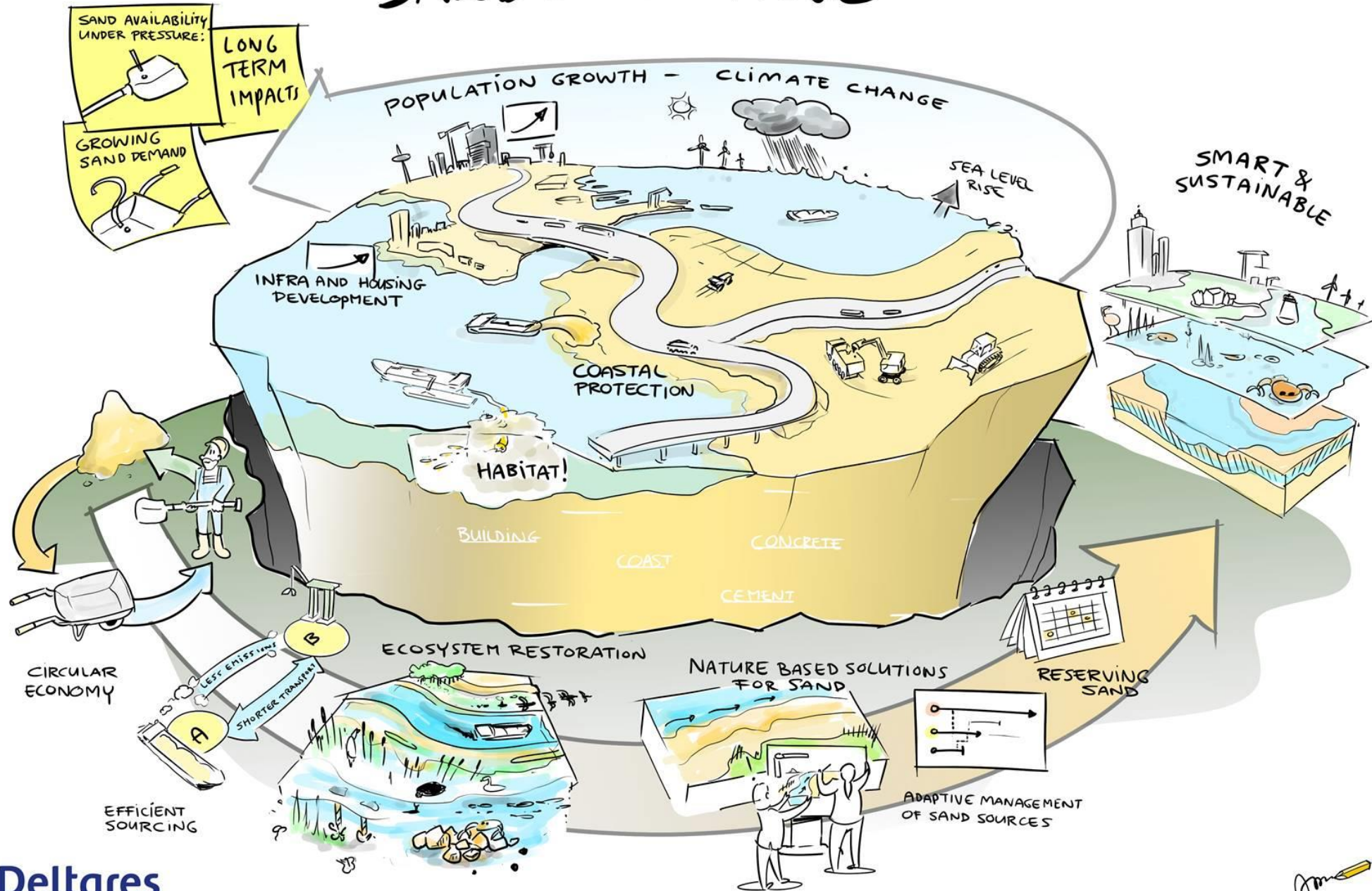
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# What is sand's strategic importance?



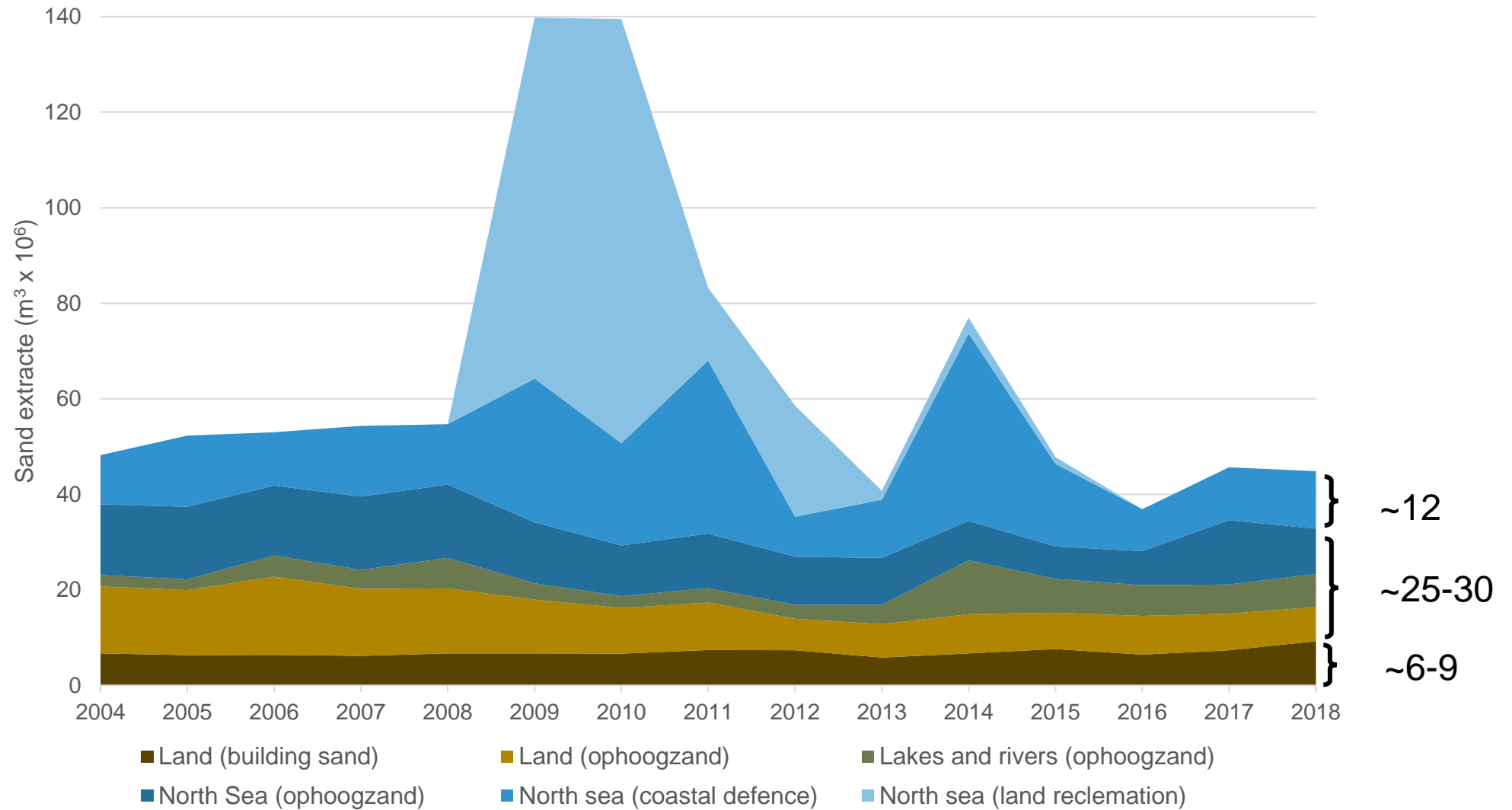


# SAND ON THE MOVE

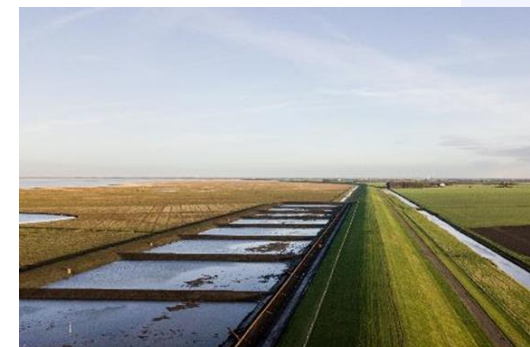
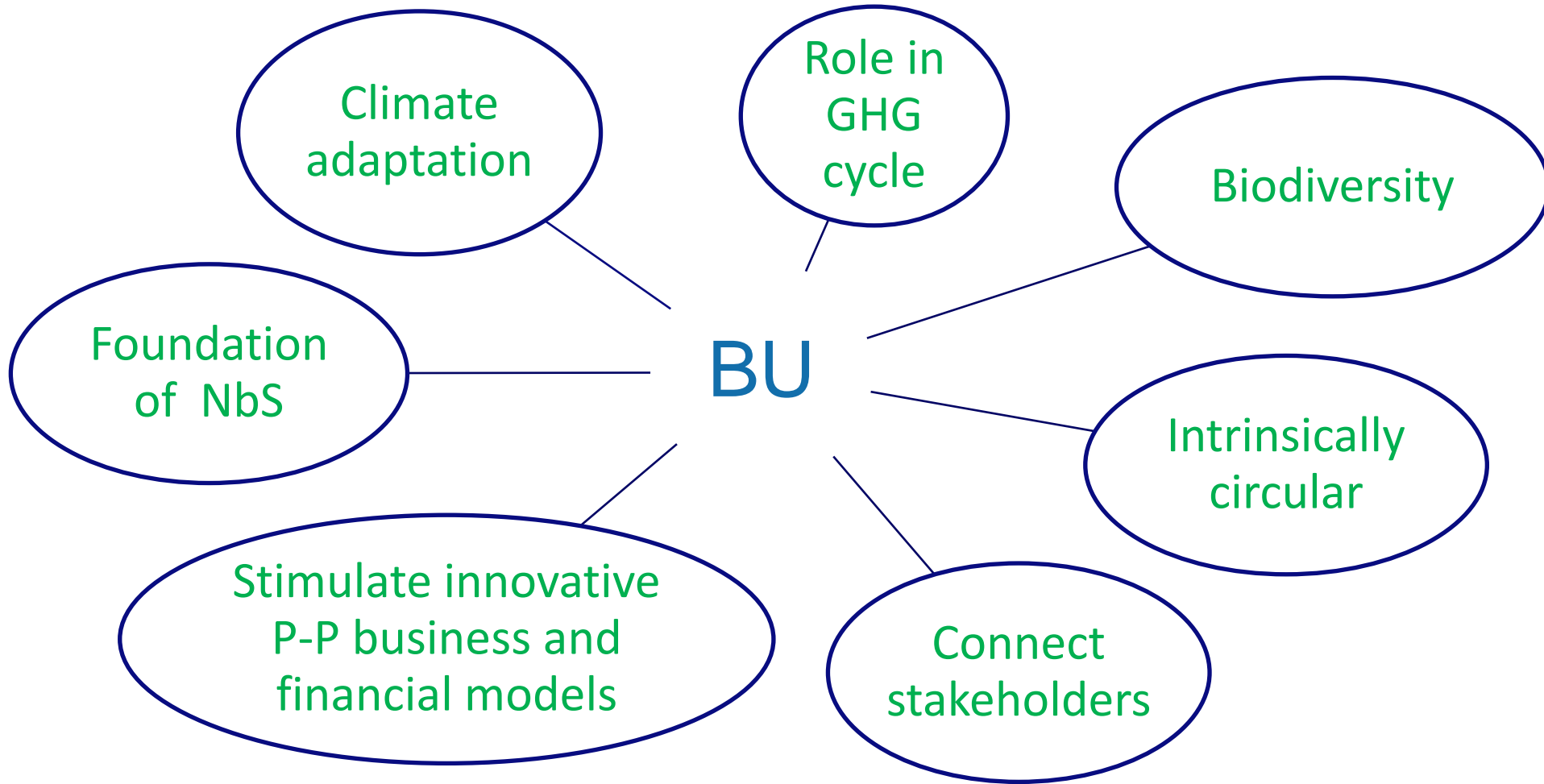




## Sand Use Netherlands



# Beneficial use of sediments



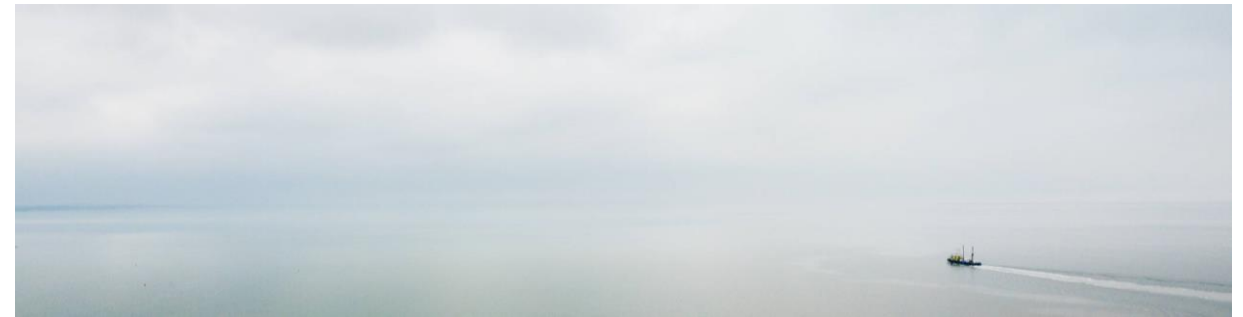
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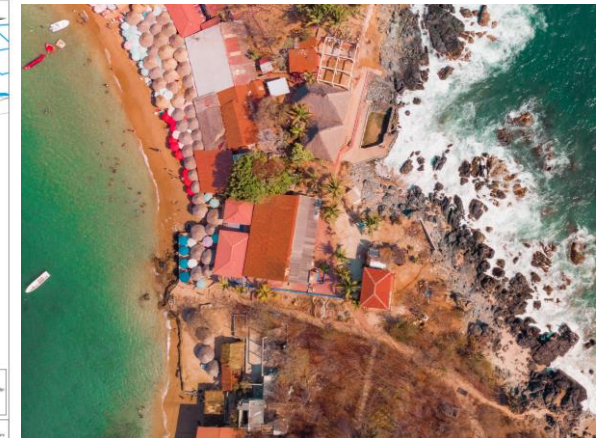
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Sand may be present, but can we also extract it?



VS.



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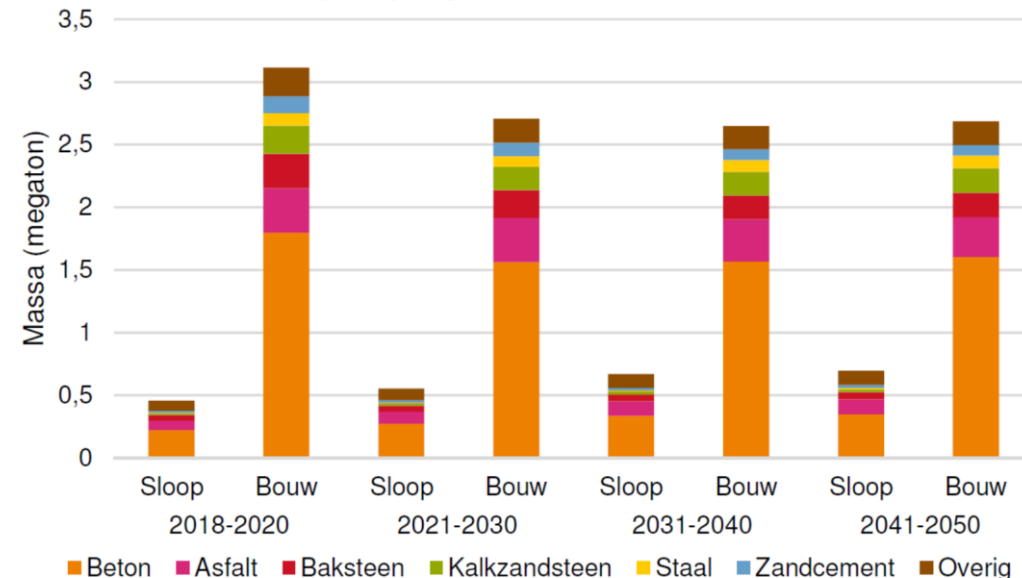
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Cascade: “Het EIB (Economisch Instituut voor de Bouw) heeft uitgerekend dat hergebruik van materiaal uit sloop voor maximaal 20% voorziet in de vraag naar grondstoffen voor de (nieuw)bouw. Dit betekent dat ten minste 80% van de vraag ingevuld moet worden met primaire (bouw)grondstoffen. ”

Materiaalstroom vrijkomend bij sloop en benodigd in nieuwbouw (woning- en utiliteitsbouw, infrastructuur en riool), jaarlijks gemiddelde\*, midden scenario



\*De materiaalvolumen zijn op basis van tijdvakken van 10 jaar in kaart gebracht. Het jaarlijkse gemiddelde geeft hierdoor beperkt inzicht in de geprognosticeerde hoeveelheid in een bepaald jaar. Dit kan hoger of lager liggen.





**High turbidity in Eems-Dollard**



**Supply of fine (salty) sediments**



**Beneficial use in dike**



**Sediments ripening into clay**



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Example: Kleirijperij en Breede Groene Dijk



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