The Living Lab for Mud Two Years Later

Update on the Ongoing Pilots that Integrate Sediment Management and Building with Nature

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EcoShape

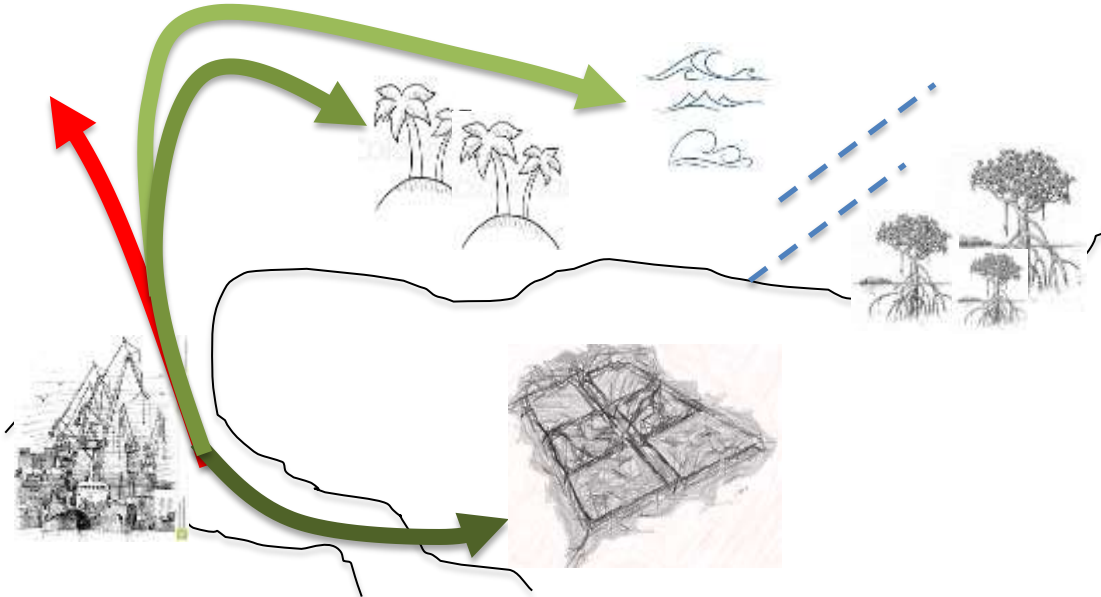
11th International SedNet Conference, 3 – 5 April, 2019 Dubrovnik

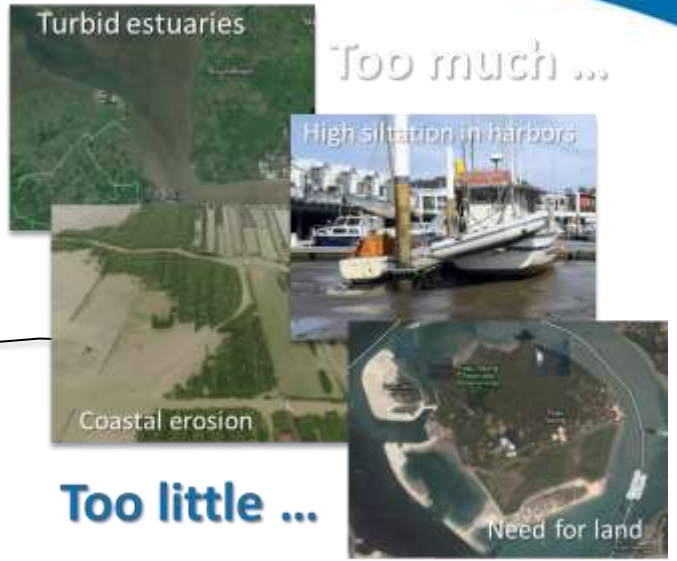
building with nature

…where we left it two years ago…

EcoShape

Integrated, with Nature Sediments Mgmt. for sustainable development





building with nature

The Living Lab for MUD: pilots via BwN

EcoShape

Sedimentation – transport – consolidation – strength – ecology – socio-economics

Marker Wadden, NL

Mud Motor, NL

Demak - Indonesia

Kleirijperij, NL

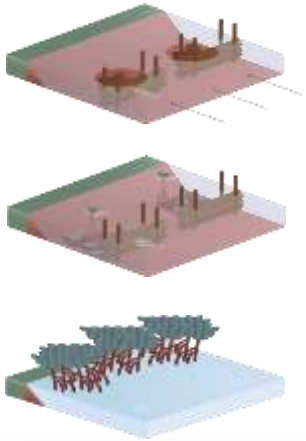
building with nature

The Living Lab for Mud: five *live* applications

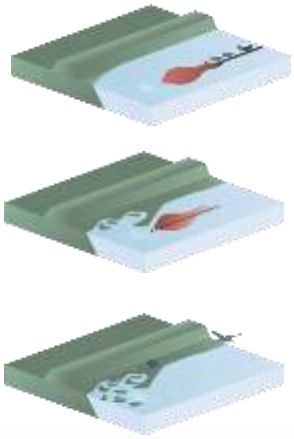
Flyer: https://www.ecoshape.org/uploads/sites/2/2017/10/Ecoshape_mud_aanpassingen-6_ENG-web.pdf

EcoShape

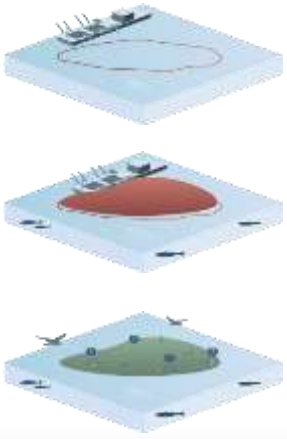
1. Vegetation recovery



2. Mud Motor

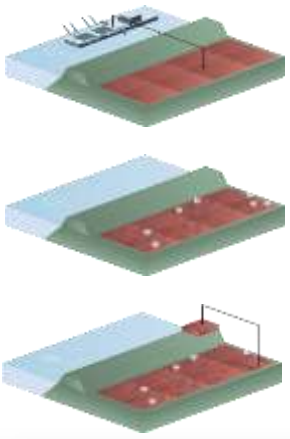


3. Construction natural islands



4. Salt marsh development

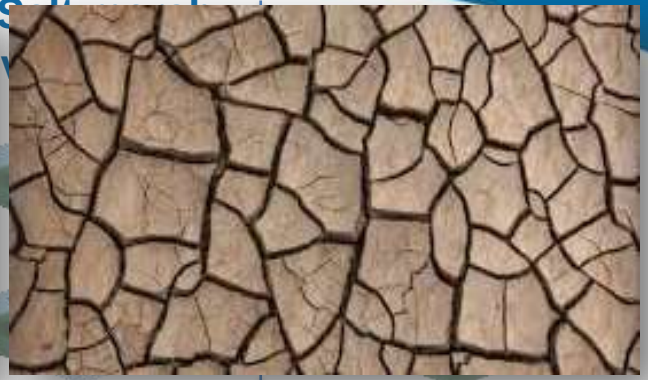
5. Clay ripener



The Living Lab for Mud: five *live* applications

https://www.ecoshape.org/uploads/sites/2/2017/10/Ecoshape_mud_aanpassingen-6_ENG-web.pdf

EcoShape



+ Interaction with Ecology and Governance (socio-economics)


1. Vegetation Recovery: Demak Indonesia
Coastal resilience, climate change, local economy


2. Mudmotor: Koehol, NL
Saltmarsh development, coastal resilience


3. Natural Islands: Marker Wadden, NL
Nature restoration, water quality


4. Salt Marsh Development: Marconi Delfzijl, NL
Saltmarsh and water front development and restoration


1. Vegetation Recovery: Demak Indonesia
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2. Mudmotor: Koehol, NL
Publication Mud Motor, Ecological Engineering: https://www.sciencedirect.com/science/article/pii/S0925857418304361
Saltmarsh development, coastal resilience


3. Natural Islands: Marker Wadden, NL
Nature restoration, water quality


4. Salt Marsh Development: Marconi Delfzijl, NL
Saltmarsh and water front development and restoration

5. Clay ripening: Kleirijperij, Delfzijl, NL

Water quality, coastal resilience, raw material

Project Partners

- Provincie Groningen (“State” Gvmt)
- Rijkswaterstaat (Ministry of Infrustructure and Water)
- Hunze en Aa’s (Waterboard)
- Het Groninger Landschap (Nature Organization)
- Groningen Seaports
- EcoShape

From Pilot to Scale Up and Policy?

Technical and economic feasibility


Kleirijperij Valgenweg
D1 – Biologisch blanco
D2 – Standaard laagdikte
D3 – Biologisch vak
D4 – Standaard laagdikte (in één keer gevuld)
D5 – Hoge laagdikte
D6 – Standaard laagdikte
D7 – Lage laagdikte (in één keer gevuld)
D8 – Standaard laagdikte
D9 – Standaard laagdikte
D10 – Lage laagdikte (in één keer gevuld)
D11 – Standaard laagdikte
D12 –Zoet water vak (in één keer gevuld)
D13 – Biologisch vak
D14 – Standaard laagdikte
D15 – Lage laagdikte (in één keer gevuld)
Fiemel
Dallingeweer
Kleirijperij Kwelderlocatie
K1 – Lage laagdikte (in één keer gevuld)
K2 – Standaard laagdikte (in één keer gevuld)
K3 – Biologisch blanco
K4 – Standaard laagdikte
K5 – Biologisch vak
K6 – Standaard laagdikte
K7 – Standaard laagdikte
K8 – Lage laagdikte
K9 – Biologisch vak
K10 – Standaard laagdikte (in één keer gevuld)
Overtocht
Kopaf
Wagenborgen
N362
Nieuwolda-Oost
Nieuwolda
Hondshalstermaar
Westeind
Google


April 5th 2018

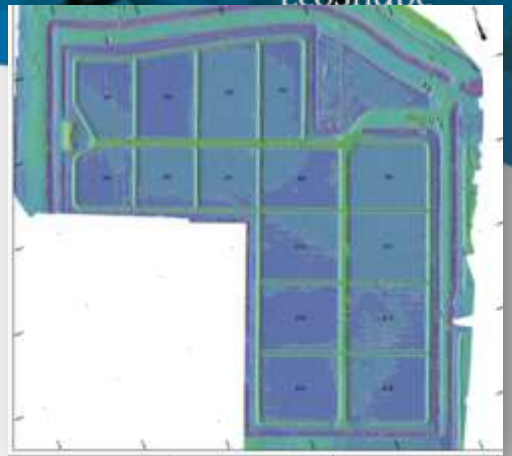

April 2018

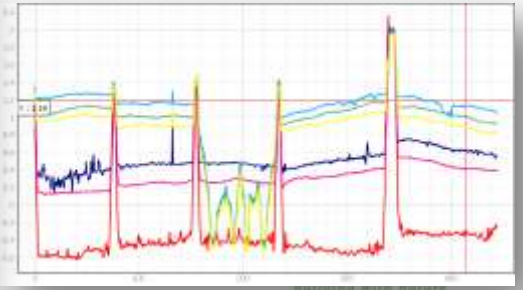
September 2018

September 2018

Kleirijperij Breebart: (partial) filling completed on 31th March

Delfzijl field investigation, October 2018





Main Technical Results at early 2019

Parameter	Oct 2018 (m)	Oct 2018 (M)	Initial Ave	Goal
TDS [ton]	55,000	55,000	55,000	53,000
Density [kg/L]	1.21	1.34	1.19	>1.2
Organic content [%]	10.7	12.9	13.5	5.0
Salt Content [g/L]	14.3	21.4	18	<4.0
Ripening factor n [-]	nd	Nd	2.9	0,5-0,75
Class (env.)	nd	Nd	Klasse A/AW en Wonen	Klasse A + (Wonen)

Main Technical Results at early 2019

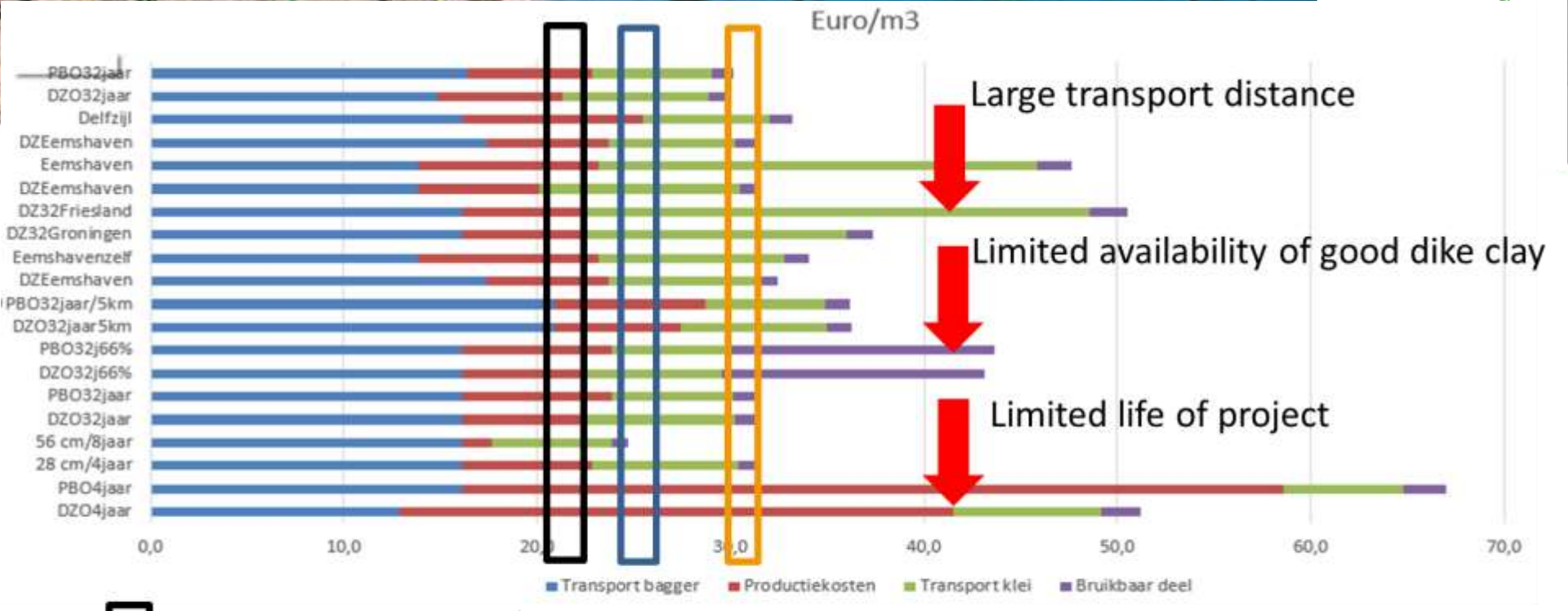
Parameter	Oct 2018 (m)	Oct 2018 (M)	Initial Ave	Goal
TD				
De				
Or				
Sa				
Ri				
Cl				

Conclusions:

1. Watercontent decreased significantly, with ripening underway
2. Very limited decrease in organic content
3. No decrease in salt content

Results skewed by a very dry summer (for Dutch standards)

Business Model – Kleirijperij



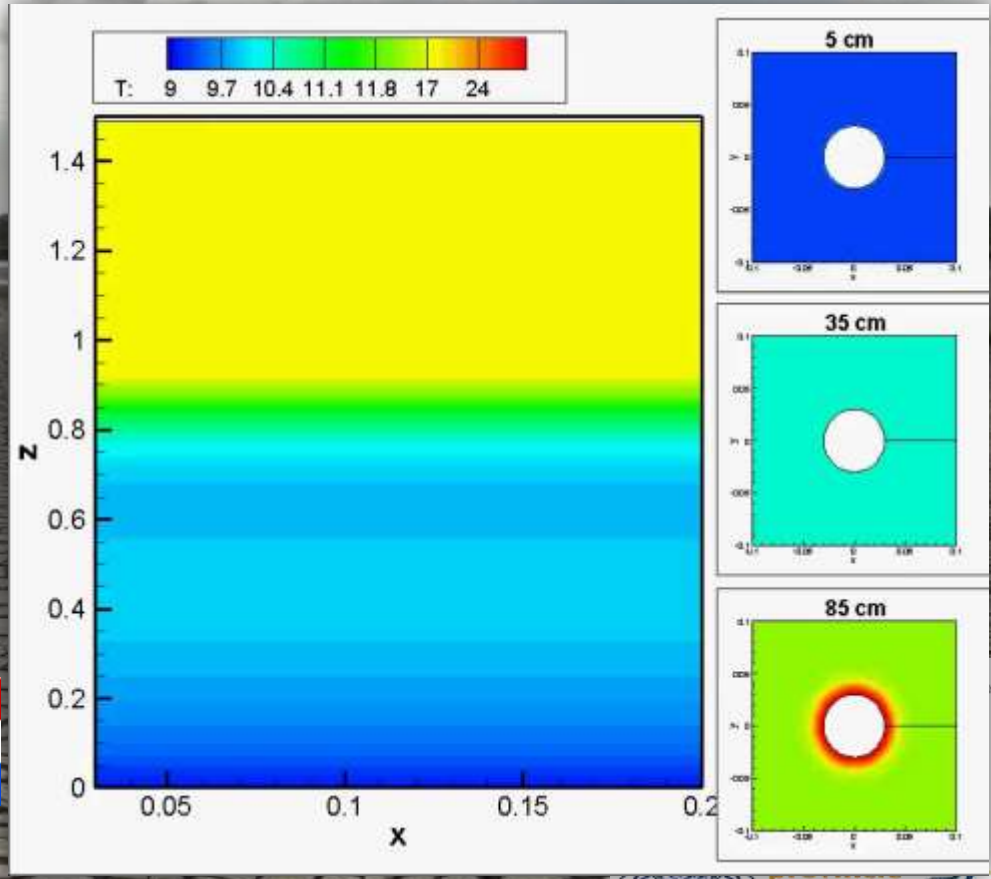
Dubbele dijk: 13 tot 22 Euro/m3 (incl.BTW) voor cat 2 en cat 1 klei, of duurder?

Aftrek huidige kosten voor baggerwerk (ca 1-1,2 Euro/m3 slib=2,5-3 Euro/m3 klei)

Potentiele kosten voor afvoer naar NZ (ca 3 Euro/m3 slib=9 Euro/m3 klei)

Kleirijperij as Living Lab

Fiber Optics for in-situ density



Key enablers

- Alignement and commitment of (public and private) stakeholders to mutual added value
- Demonstrate economical value and opportunity to scale-up / transfer
- Show that it works technically
- High profile and integrated challenge(s)
  - Water quality / ecological
  - Flood risk and climate adaptation
  - Need for local resource and circular economy
- Opportunity for multifaced solution
  - Technical
  - Socio-economic
  - Multi-stakeholders
- (Political) will for iconic project, and potential for export

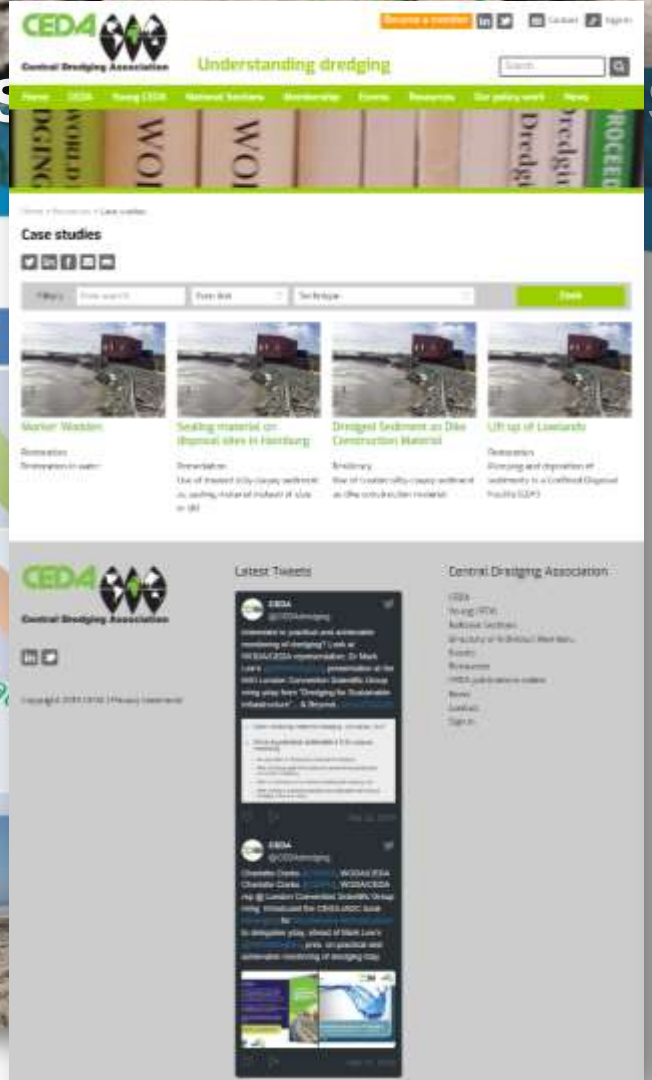
International initiatives and publications


CEDA (Delft)

CEDA Working Group Beneficial Sediment Use

- Collection of BU Case studies
- Focus on last 10 years, sustainability and NBS
- Clean and contaminated sediments
- In press

International initiatives



International initiatives and publications

SedNet WG Sediment and Circular Economy
- Circular pathways of sediments
- Includes financial and policy considerations

PIANC WG 214: Beneficial Use of Sediments
- Building up on current material (CEDA, PIANC, …):
- Transition from technical to governance
- Highlight success factor or triggers, and hold backs
- Startded Q1 – 2019, expected publication after 18 months

AquaConSoil, Antwerp May 20th – 24th
- Working Group
- Session on Beneficial Sediment Use and Circular Economy

Take home messages

1. *Clean and contaminated* sediment is a critical resource for sustainable development and climate adaptation

2. Beneficial Use ←→ Circular Economy

3. Lot of energy and Intl. activities → Need to coordinate

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