Beneficial use of dredged sediments

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Beneficial use

- Interest in beneficial uses is increasing;
- Quantity of dredged material is increasing;
- Population growing near waterways
    - Increase in the cost of disposing sites;
- Environmental regulations.

Makoko, Nigeria

Beneficial use – what does it mean?

- "**Beneficial use**: All productive and positive uses of dredged material, which covers broad use categories ranging from fish and wildlife habitat development, to human recreation, to industrial/commercial uses."

  (US Army Corps of Engineers, 1986)

Beneficial use – what does it mean?

- "**Beneficial use** - the relocation has to contribute to a functional and sustainable fulfilment interpretation of the morphological and ecological functions of the sediment."

  Rijkswaterstaat North Sea

Sand engine – Den Haag, NL

Beneficial use – support with science

- Comprehensive investigation of
  - physical, biochemical and engineering characteristics
  - expected behaviour
    - Environmental Impact Assessment
- Practical, cost effective, and environmentally advantageous.

Beneficial use – not only science

- Legislation;
- Large number of interests of stakeholders.
- Long-term planning:
  - Watershed planning;
  - Regional strategies.

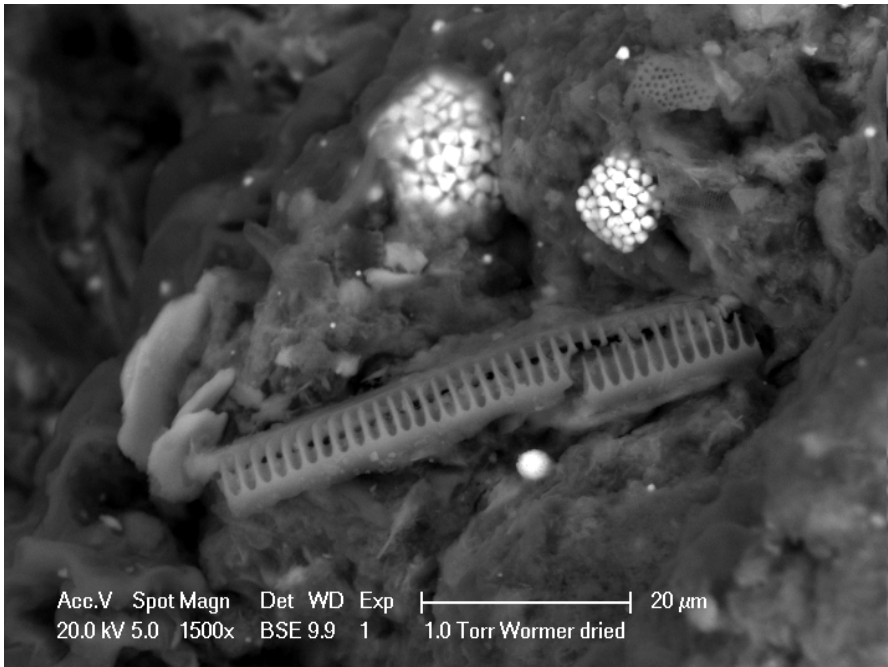
Dredged sediments – beneficial use

- Marine sediments
  - Blended cement
  - Bricks
  - Road construction
- Fresh water & Mineral sediments
  - Flood bank construction
  - Pit restoration
- Fresh water & organic sediments
  - Soil development

Dredged sediments

- New strategies to cope with
  - Land subsidence
  - Dredged sediments management

- Flood-induced inundations can be beneficial
  - Organic matter
  - Nutrients
  - Offset subsidence



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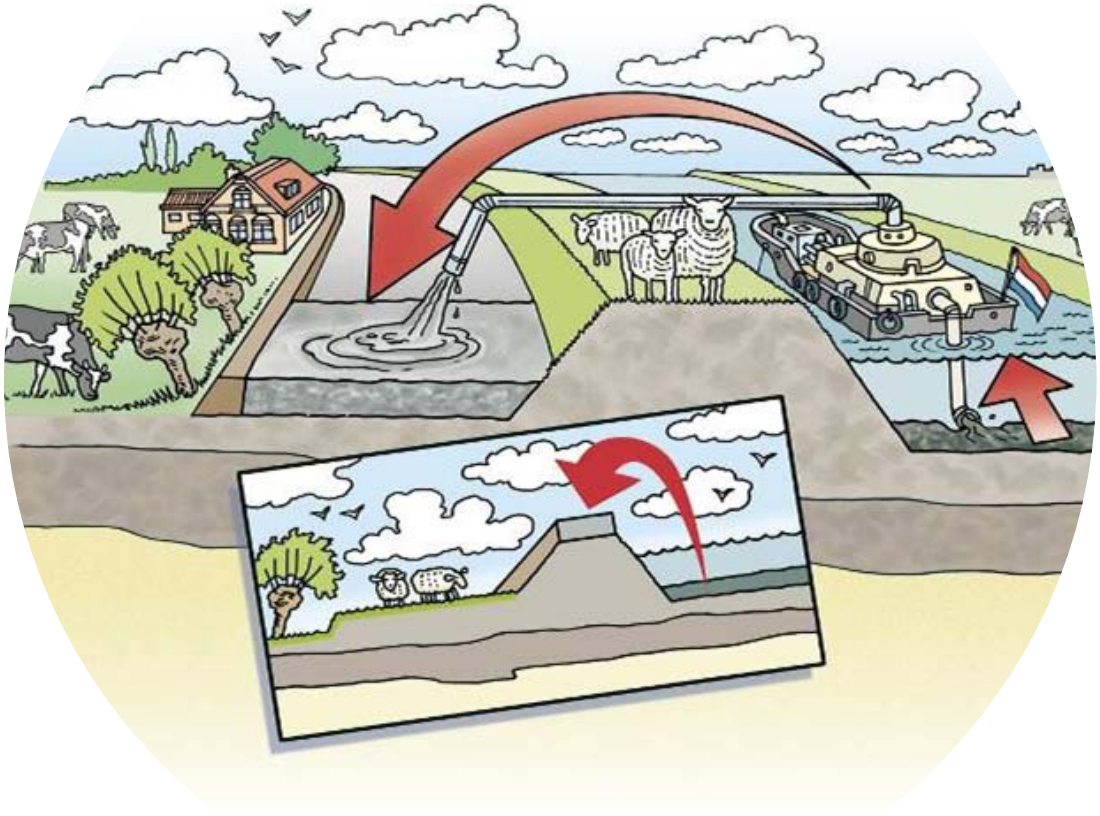
Lift up of Lowlands – STW project 11344

Use of dredged sediments for subsidence mitigation in delta areas



Beneficial use – Lift up of Lowlands

- Spread thin layers of dredged sediments on the land adjacent to the waterways;
- Laboratorial scale experiments of ripening of dredged sediments;
  - T=20°C
  - RH=95%
  - Closed atmosphere.

Beneficial use – Lift up of Lowlands

- Characterization of dredged sediments and biochemically ripened sediments:
  - Particle size distribution;
  - Organic matter content;
  - Type of organic matter;
  - Total C, N, P, S;
  - Aggregate stability;
  - Undrained shear strength.

Beneficial use – Lift up of Lowlands

- Mesoscale experiments:
  - A: Upland;
  - B: Underwater.

Beneficial use – Lift up of Lowlands

Beneficial use – Lift up of Lowlands

- Field-scale experiment:

Beneficial use – Lift up of Lowlands

- Field-scale experiment:

Dredged sediments – beneficial use

- Contaminated sediments
  - High organic and nutrients
    - Soil development
      - Induced priming effect by addition of other sources of organic matter
      - Activated carbon
      - …
  - Low organic and nutrients
    - Construction
      - Immobilization of contaminants

Activated Carbon immobilization concepts

Lift up of lowlands

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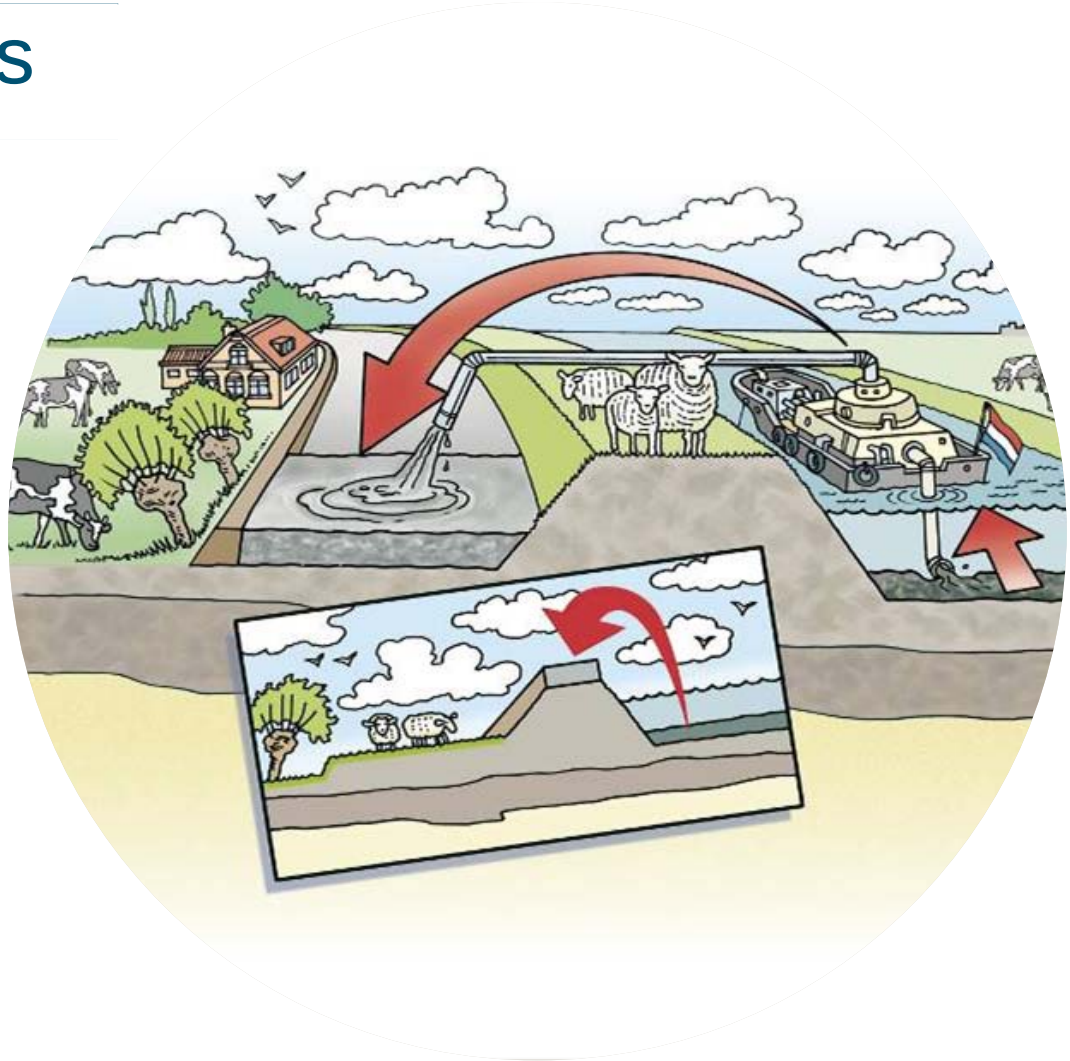

Comments

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Suggestions