

# Dredged material as a resource: *Options and constraints*

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PIANC EnviCom WG 14

PIANC report no 104-2009

Connecting the World through Dredging

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ACP:Ascanio Arosemena Complex,  
Balboa, Panama



- Introduction
- Definition of Use of Dredged Material
- Options and Constraints for Use
- Examples of Engineering Uses
- Examples of Environmental Enhancement
- Case studies
- Conclusions and Recommendations



# Introduction



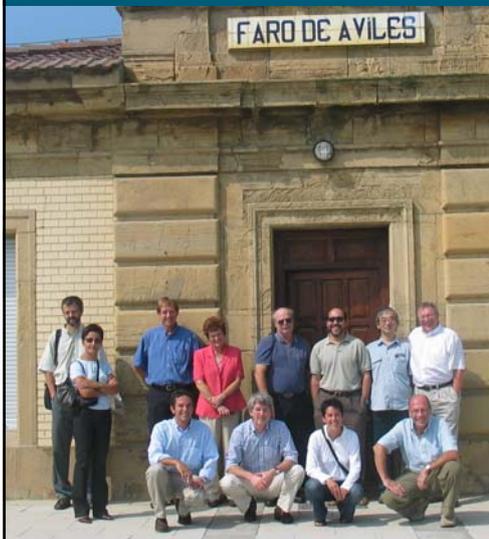
- Dredging is essential for development and maintenance -> large volumes of dredged material
- Much dredged material suitable for use is currently disposed
- Dredged material is a material naturally present in our waterways, mainly uncontaminated
- Contamination does not rule out use, but reduces possibilities depending on legislation and site-specific conditions. Treatment to remove or stabilise contaminants does increase costs.



- Report by PIANC in 1992 on Beneficial use
- Many new developments made that Envicom formulated new TOR in 2004
- Start PIANC EnviCom WG 14 in 2004
- Report no 104-2009 published in January 2009
- Our report captures experience gained since then, provides guidance and makes recommendations based on lessons learned in case studies



## PIANC WG 14



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- Siegfried D'haene, DEC, Belgium
- Pol Hakstege, Rijkswaterstaat, NL
- Lena Paipai, Halcrow Group Ltd, UAE
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- Najat Chaouq, DRAPOR, Morocco
- Jack Word, NewFields NW, USA
- Alejandro Varas, Port of Aviles, Spain
- Liesbet van den Abeele, Min. of the Flemish Community, Belgium
- Hugo De Vlieger, Baggerwerken De Cloedt, Belgium



## Definition

- **Widest range of options**
  - **(Beneficial) use= any use rather than mere disposal**
  - **Including sustainable relocation**
- = the discharge of dredged material into aquatic systems to derive environmental benefit by maintaining or supplementing sediment balance**



# Options for use

## Engineering Uses:

- Construction materials
- Isolation
- Flood and coastal protection
- Land improvement
- Placement on banks of waterways

## Environmental Enhancement:

- Habitat creation and enhancement
- Aquaculture
- Agriculture
- Recreation
- Water quality improvement
- Sustainable relocation
- Filling of deep borrow pits



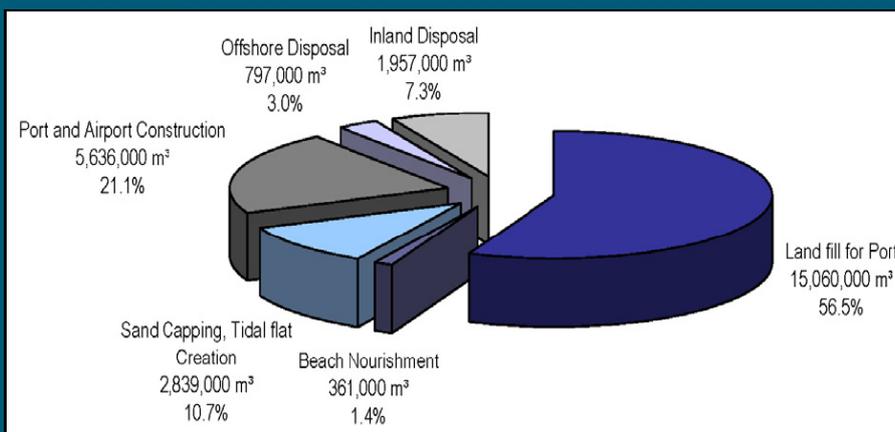
## Examples of Engineering uses of dredged material



## Examples of environmental uses of dredged material

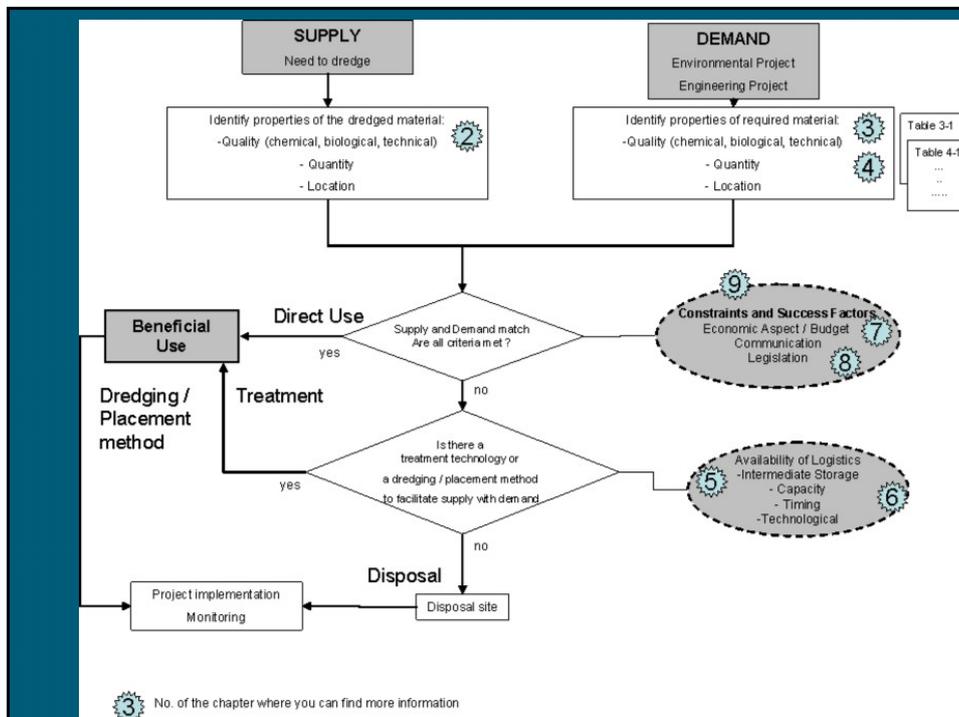


## Japan: 90% Use of Dredged Material (2003)

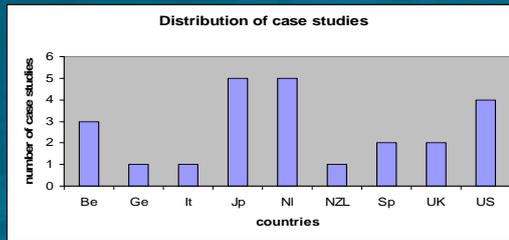
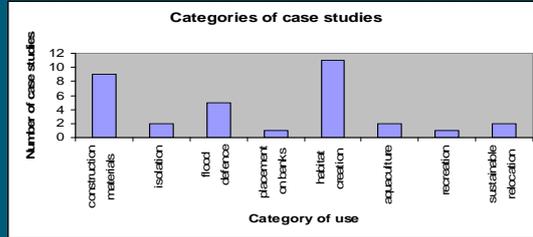


# Constraints

- In general higher costs of treatment & use compared with disposal
- Difficulty of finding suitable locations to use dredged materials
- Lack of markets for products as secondary raw materials
- Complex legislation e.g. limitations for use due to standards for the products, dredged material sometimes classified as waste
- Negative public perception and low awareness to consider treatment & use and/or acceptance of products



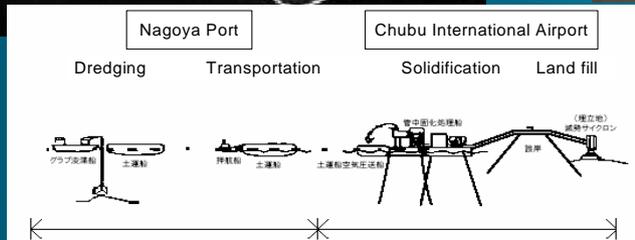
# Case studies



Engineering uses 17  
 Environmental uses 16  
 Number of case studies 24 (some deal with several categories)



## Chubu Airport (Japan) construction with DM (9 Mm3) with cement (pneumatic flow mixing)



Port project

Airport project



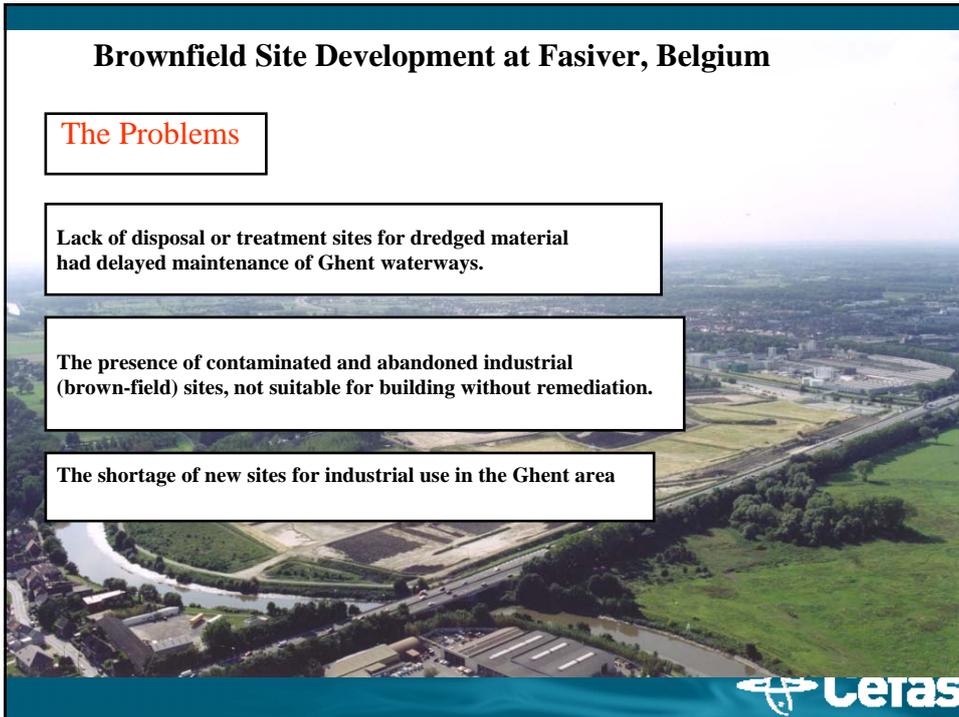
## Brownfield Site Development at Fasiver, Belgium

### The Problems

Lack of disposal or treatment sites for dredged material had delayed maintenance of Ghent waterways.

The presence of contaminated and abandoned industrial (brown-field) sites, not suitable for building without remediation.

The shortage of new sites for industrial use in the Ghent area



### Fasiver, the solutions

•Contaminated site turned into a treatment site for dredged material.

•Dewatered and treated dredged material used to raise the level of the site to make it ready for building.

•Soil and groundwater contamination cleaned up.

•Site available for industrial regeneration.

•Achieved through a Public Private Partnership

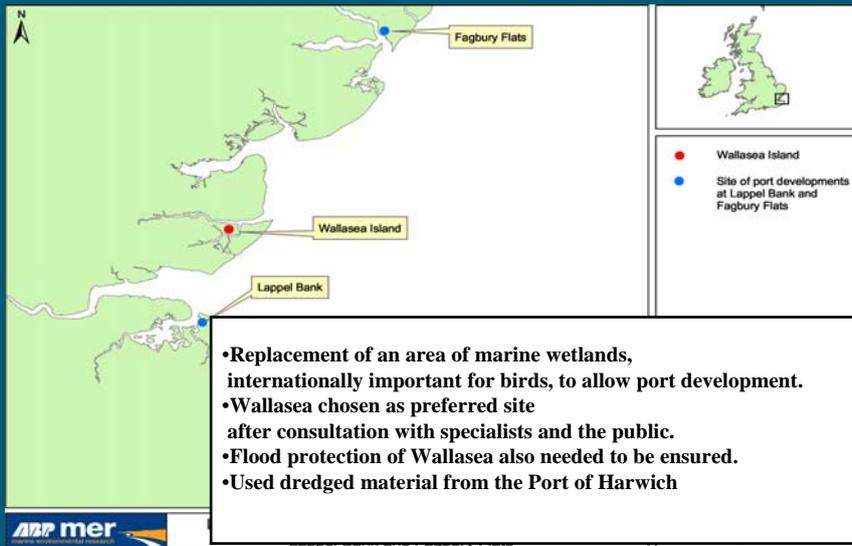


## Riverdelta IJssel (NL) use of dredged material for nature development



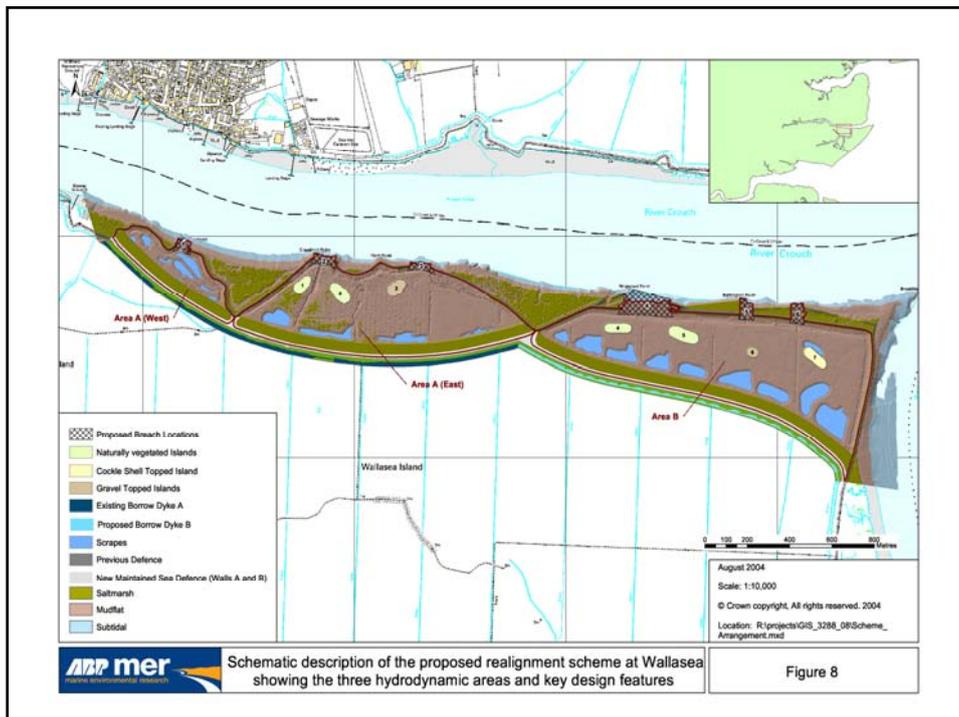
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## Wetland Creation, Wallasea, UK



 ABP mer

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## Excavation of breaches Wallasea



## Wallasea UK Creation of salt marsh + flood protection



## Recommendations (1)

- Match supply and demand. Planning, timing, availability and transport issues are key. Site-specific factors are important. Cooperation of parties needed (sometimes PPP suitable).
- Economics. Saving on costs for primary resources. Consider total of costs and benefits to society. Look for economies of scale.
- Legislation. Do not classify dredged material as a waste by default. Adapt legislation to enable use of dredged material.
- Promote better understanding of benefits and risks of using dredged material.



## Recommendations (2)

- Source control to reduce emissions. This will improve the quality and increase the quantity of dredged material suitable for direct use
- Promote sustainable relocation. Relocation in the aquatic system should be the first option to consider. Maintaining sediment balance is essential for environment: e.g. reduce erosion of wetlands.
- Carry out pilot projects to test large scale treatment and uses in order to gather expertise for use in other projects and to demonstrate effectiveness .
- Communicate, communicate, communicate.  
Gain trust and support from stakeholders by information about actual benefits and risks for society
  - To overcome (NIMBY) attitude
  - To overcome the view that disposal is the only option
  - To consider dredged material as a valuable resource



## Horticulture on a mound of dredged material (NL)



Thank you for your attention!

Dredged material can be a resource  
Use it!

