Arnold de Bruijn

23 September 2025
Lima, Peru

Dredging for Sustainable Infrastructure

6th Hemispheric Conference on Sustainable Port Management and Environmental Protection

PRESENTATION OUTLINE

- Introduction IADC
- Historical perspective of the industry
- Dredging for Sustainable Infrastructure
- Guidance principles & Enabling factors
- Challenges
- Key Takeaways

ABOUT IADC


Baggerbedrijf De Boer
Dutch Dredging


Boskalis


DEME


GROUP
DC


HYUNDAI
ENGINEERING & CONSTRUCTION


DJN
Jan De Nul
GROUP


NMDC
GROUP

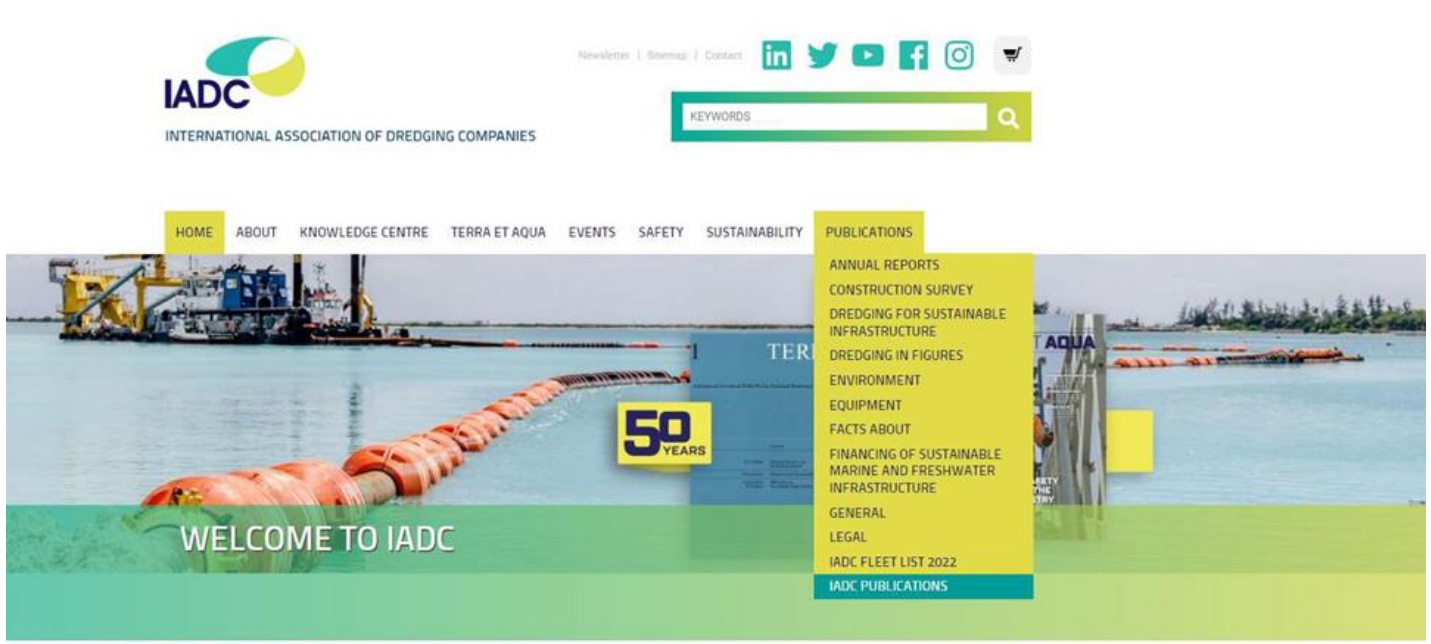

RN


PENTA-OCEAN
CONSTRUCTION CO.,LTD.
五洋建設


TOA CORPORATION


Van Oord
Marine ingenuity

ABOUT IADC



HOME

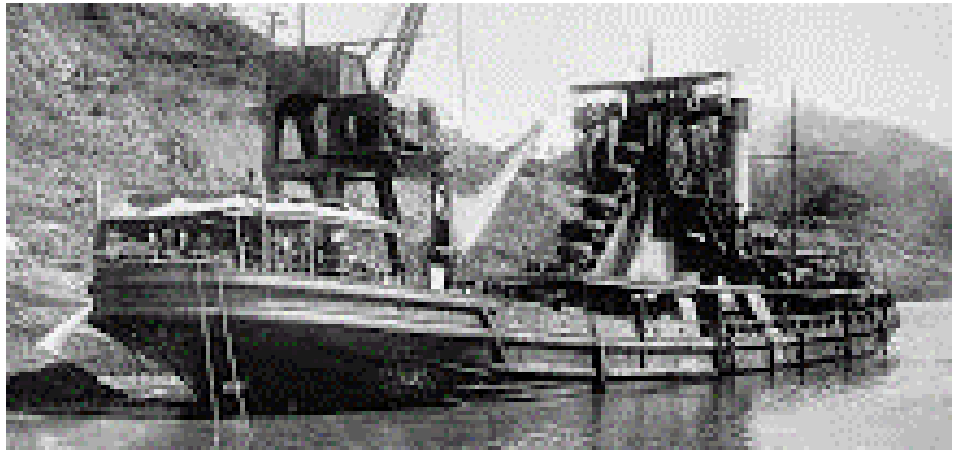
The International Association of Dredging Companies (IADC) is the global umbrella organisation for contractors in the private dredging industry: an industry that makes the world a safer, better and more sustainable place to live. IADC is driven to help that industry move forward with a variety of activities and publications, all of which can be found on this website.

More information on:
www.iadc-dredging.com

HISTORICAL PERSPECTIVE

FROM MANUAL LABOUR

TO MECHANICAL EQUIPMENT



USING AUTOMATION AND SUSTAINABLE TECHNOLOGIES

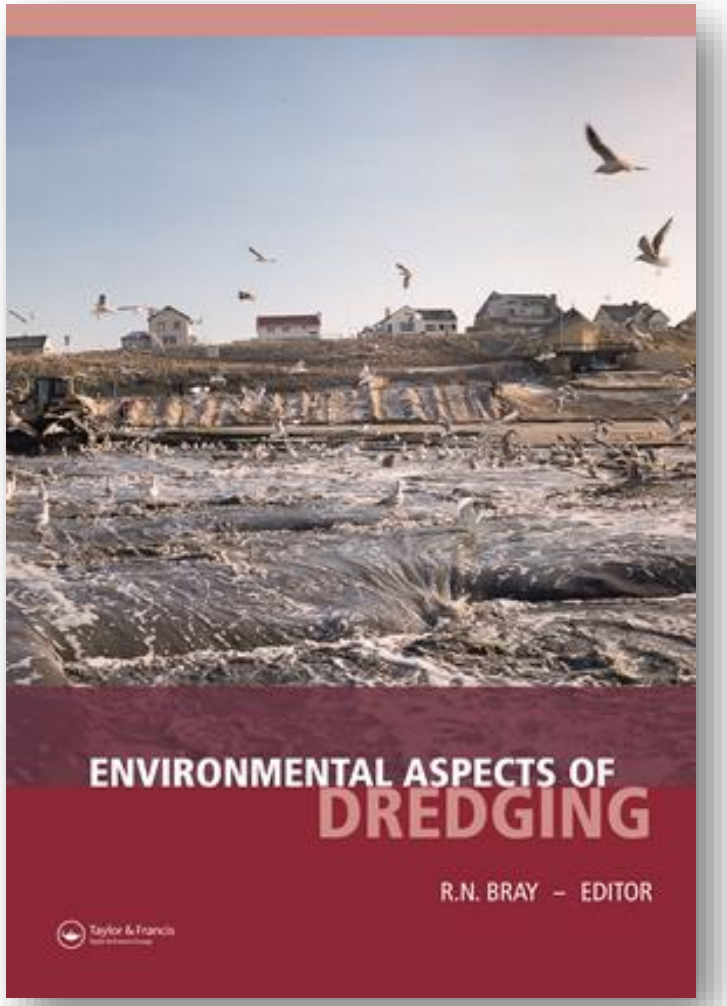
HISTORICAL PERSPECTIVE

FROM TRADITIONAL SOLUTIONS

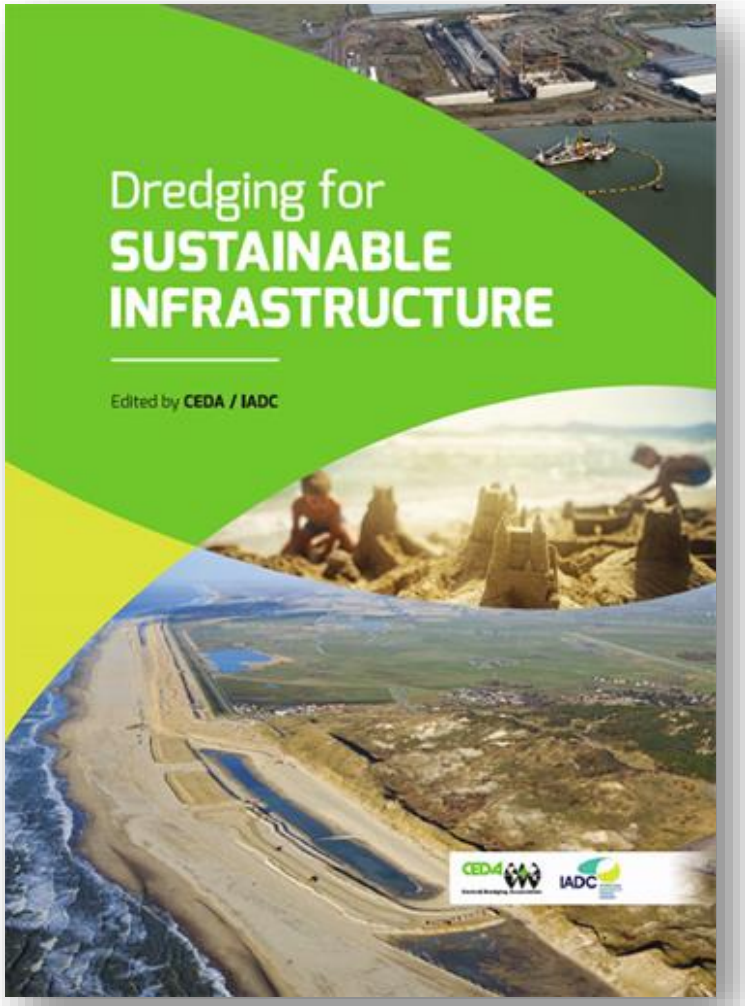
TO NATURE-BASED SOLUTIONS AND ECOSYSTEM SERVICES

HISTORICAL PERSPECTIVE

FROM RE-ACTIVE



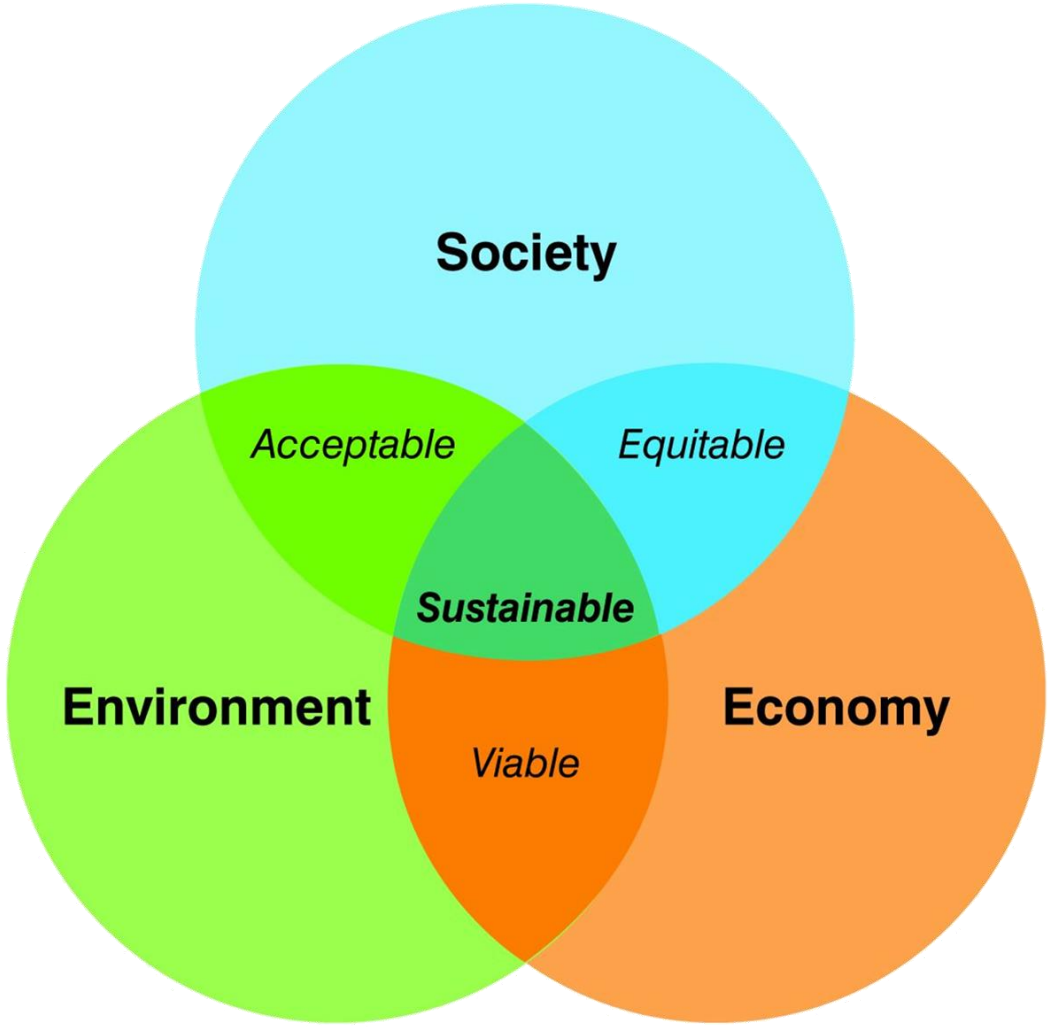
TO PRO-ACTIVE



DREDGING FOR SUSTAINABLE INFRASTRUCTURE

GUIDING PRINCIPLES

- Comprehensive consideration and analysis of the **social, environmental and economic costs and benefits** of a project is used to guide the development of sustainable infrastructure.
- Commitments to **process improvement and innovation** are used to conserve resources, maximise efficiency, increase productivity, and extend the useful lifespan of assets and infrastructure.
- Early **stakeholder engagement and partnering** are used to enhance project value.

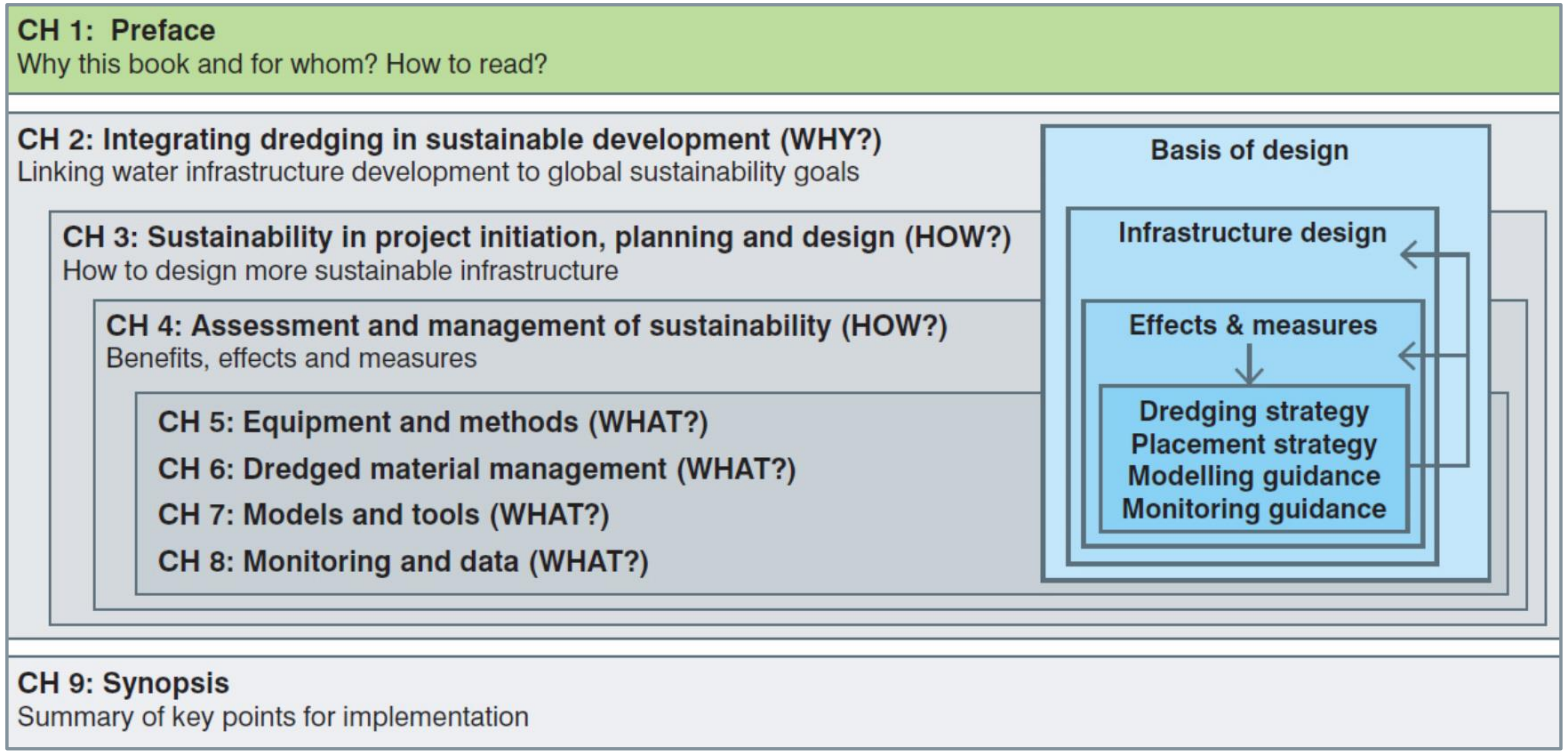


The three pillars of sustainability

DREDGING FOR SUSTAINABLE INFRASTRUCTURE

STRUCTURE OF THE BOOK

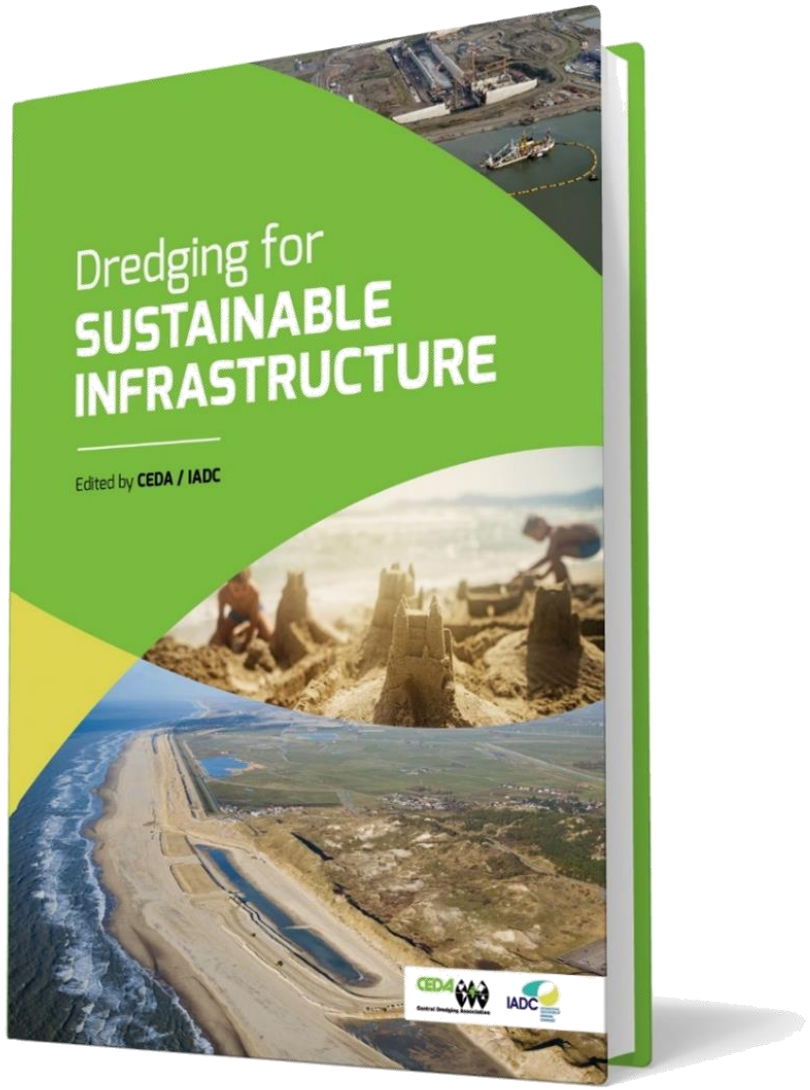
- **Holistic and conceptual approach**.
  (Chapters 2, 3 and 4)
- Specific and more detailed content on **dredging and material management**.
  (Chapters 5 and 6)
- Specific and more detailed content on **modelling and monitoring**.
  (Chapters 7 and 8)



DREDGING FOR SUSTAINABLE INFRASTRUCTURE

4 KEY ENABLERS

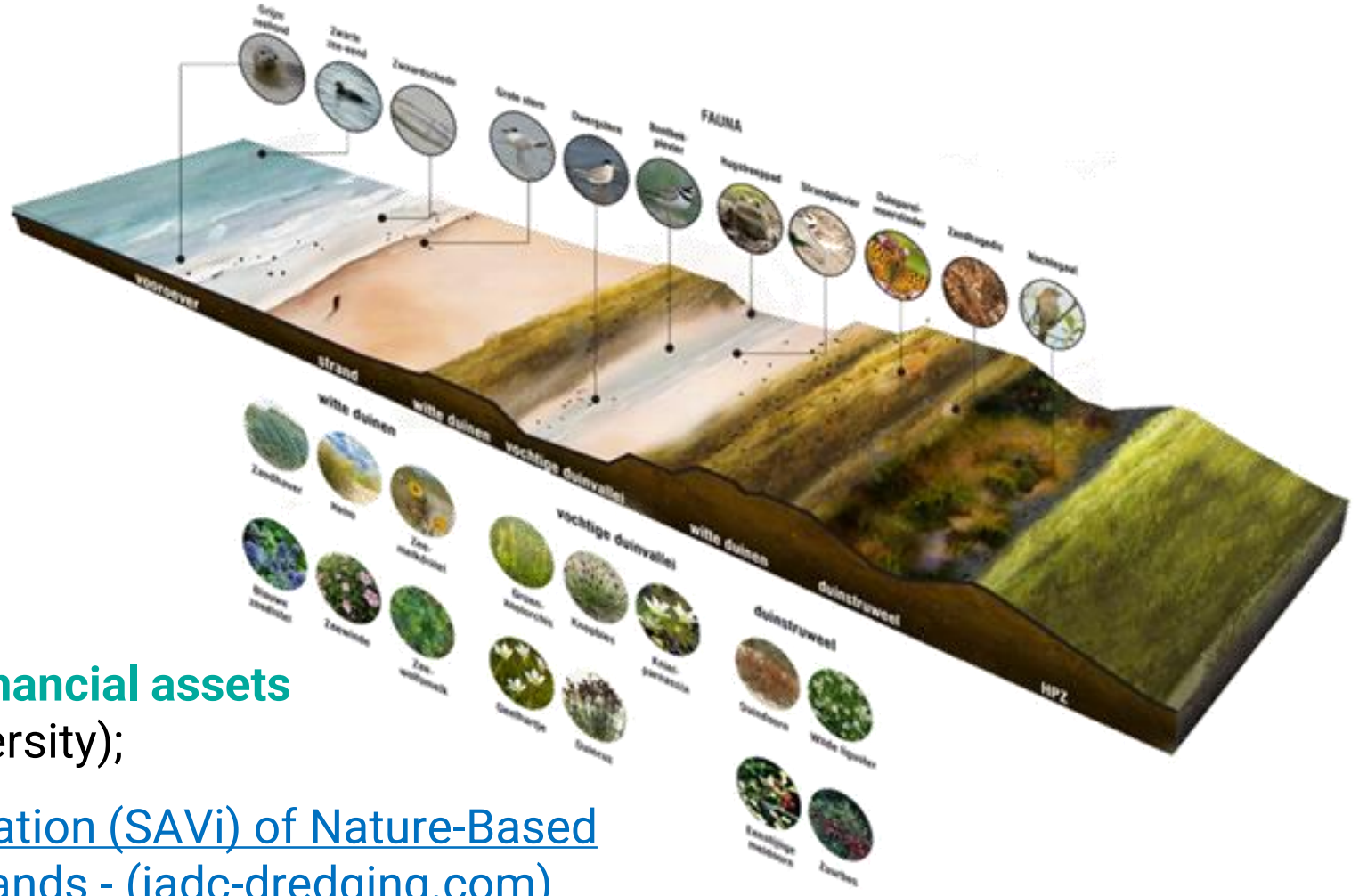
1. Design-related **options** for environmental gain or mitigation
2. **Valuation methods** for environmental pain and gain
3. Key **environmental stressors** for assessment of the sustainability of a dredging project
4. **Adaptive management** to handle uncertainty within projects



KEY ENABLER 1: design-related options

- Selection of **location and footprint** of the project, including **seasonal timing**;
  - Reduce / relocate project;
  - Re-use material;
  - Re-schedule operations.
- **Landscaping** within the project;
  - Re-shape ultimate product for better ecosystem.
- **Enhancing nature** development within or near the project.
  - Add natural values, support nature

KEY ENABLER 2: valuation methods



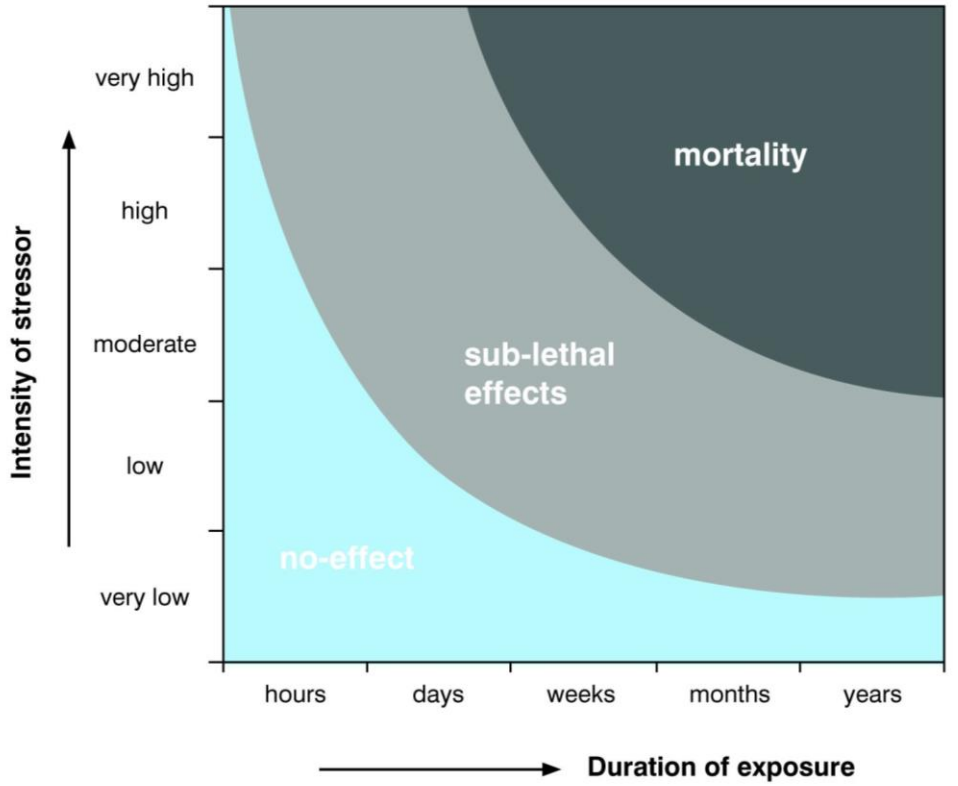
- Consider **life-cycle costs**, not just project costs;
- Consider **Socio-economic Cost Benefit Analysis** (SCBA)
- Assign **financial values to non-financial assets** (eco-system services, biodiversity);
- Example: Sustainable Asset Valuation (SAVi) of Nature-Based Coastal Protection in the Netherlands - (iadc-dredging.com)

KEY ENABLER 3: environmental stressors

- Implementation of **project and construction process** introduces **physical impact** to environment → physical impact causes **stresses** on species → stresses lead to **impact on ecology**.

- Physical impacts: **suspended sediment concentrations** (SSC), sound, **gaseous emissions** (CO_2, NO_2, SO_x, NO_x, greenhouse), contaminants, solid matter

- Impact of stresses for species to be determined with **Species Response Curves (SRC)**



CHALLENGES

- Sustainable dredging is perceived expensive (ignoring possible gains)
- Tenders often focussed on CAPEX/OPEX (less non-financial award criteria)
- Financing sustainable infrastructure projects (public-private)

- Valuation of non-financial aspects still under development (lack of standards)
- Some impacts are hard to measure (such as biodiversity)
- Reducing one impact often leads to the increase of another, so responsible dredging is about finding balance;

Responsible Marine Solutions

Dredging for Sustainable Infrastructure

Responsible Marine Solutions
Dredging for Sustainable Infrastructure

About | Principles of sustainable dredging | Dredging and the SDGs | DFSI in action | Publications | Search...

IADC

Building responsible marine solutions through sustainable dredging practices

More and more, the world needs responsible marine solutions through dredging to enable economic growth, societal improvement and environmental responsibility, be that for port development, coastal protection, land reclamation and more.

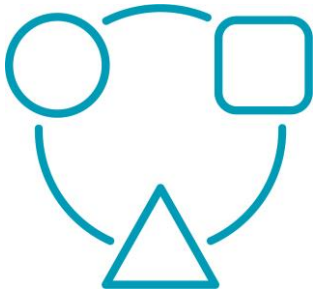
The international dredging industry plays a key role in providing these solutions, but to truly support sustainable development, those solutions need to be undertaken in the right way.

Five Principles of DFSI

ECOSYSTEM SERVICES

NATURE BASED SOLUTIONS

STAKEHOLDER INVOLVEMENT



ADAPTIVE MANAGEMENT

EQUIPMENT, TECHNOLOGY AND INNOVATION

KEY TAKEAWAYS

- The dredging industry is aware of its impacts and uses best practices to minimize them;
- Valuation of non-financial aspects will increase insight in both the negative and positive impacts.
- A truly responsible marine solution considers all three pillars of sustainability (environmental, social and economic) equally important.
- Early stakeholder involvement is crucial for the best result.

Scan QR-code to visit:
www.sustainabledredging.com

IADC

INTERNATIONAL ASSOCIATION OF DREDGING COMPANIES

THANK YOU

Contact me directly or scan this QR-code to connect on LinkedIn

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