Frameworks for Harbor Sustainability in Africa

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Sustainable Ports in Africa

MARE conference
06-07-2017
Existing Harbour and Environs

Source: Deltaires May 2015
Sustainable Harbour Expansion Concept

Source: Deltas May 2015
What is sustainable?

Idyllic recreation spot?

Natural?

Limited usage?
What is sustainable?

Idyllic recreation spot?

Natural?

Limited usage?
What is sustainable?

the sustainable port

• "A sustainable port is a port which has achieved and is maintaining a balance in economic, environmental and social extent for the surrounding local region. A sustainable port uses the Earth’s resources for its own benefit without affecting its capacities for future generations.”

Zhen Zhen Zheng
What is sustainable?

**Economic**: Function as a port
- Allow for future change
- Limit long term costs
- Smart use of ecosystem services

**Environmental**: Room for (semi)natural environment

**Social**: Room for recreation
- Create jobs
- Improve quality of life
Economic: Function as a port

Environmental: Allow room for (semi)natural environment

What is sustainable?

Maasvlakte II: Port of Rotterdam
Approach

Goals

• Tools to facilitate integrated and sustainable port development.

• Development of Framework & Guidelines

• **Quick design tools:** remote sensing data & ecological data

• **Green Ports Network:**
  Community of researchers, private sector and port related stakeholders.
Approach

Pan-African Ports, Harbours, Shipping Networks

Ghanaian (Port) Development

Environment

- Ecosystem
- Society / Stakeholders

Harbour design

- Prototype port design
- Refining & testing
- Final Ghana port design

P1, P2, P3, P4
Understanding the System

Case Study: Tema, Ghana
Understanding the System

Interaction
people, planet and profit

Socio-economic system

Eco-system (dis)services

Natural/coastal system

Ecological system

Environmental dynamics
Understanding the System
Quantifying Change
Understanding the System

Mapping Change

Oral Accounts

Old Images
Understanding the System

Mapping Change
Understanding the System
Valuing Change
Planning the Future
Bottom up

Designing Futures
Planning the Future
Planning the Future

Exploration port lay-outs

e.g.

Port behind a breakwater
Natural port
Offshore berth

Open port

Port behind an island

e.t.c.
Planning the Future
Design for Multifunctionality

**e.g.**

**Safety**
Secondary submerged breakwaters grow with sea level/cheaply upgraded

**Water Quality/Pollution**
Quay walls to facilitate growth of bio-filtration

**Fishery**
Porous breakwaters promoting fish nursery function of harbour

**Tourism**
Attention for Back port area and natural areas
- Potential for attracting tourists and Cruise vessels.

* etc. *
Scaling Up

Practicing change and changing practices.

Vreugdenhil (2010)

• Pilot projects
  – Routinization
  – Replication
  – Institutionalization
  – Diffusion
Ripple effects of new practices in port development in Ghana

Replicated practices in Ghana and beyond

Institutionalized practices in African port development

Phase 1

Phase 2

Phase 3
Scaling Up
Enhancing diffusion

1. Include diffusion activities in the project planning
   - Devote resources to **diffusion from the outset**

2. Adopt a balanced, supported knowledge programme
   - **Diverse** types of **knowledge**, critical **actor support**

3. Explicate **context** dependency, representativeness
   - Too representative, not manageable nor practical
   - Too limited in scope, not transferrable

4. **Spread knowledge and validate**
   - Scientific, professional publications
   - **Multiple pilots** to reduce context dependency

5. Identify, **connect** to current, future application areas, users, institutions

6. Exercise an open, **adaptive governance** style with constructive **social learning**

7. Facilitate a **gradual transfer of ownership**
Project Partners

- Technical University Delft (NL)
- University of Ghana-Legon
- UNESCO-IHE
- Wageningen University Marine Research (NL)
- Free University (VU) Amsterdam
- Deltares
- WWF
- NABC (Netherlands African Business Council)*

*Royal Boskalis (Dredging & Marine Experts), Van Oord Dredging, Dame Shipyards, Port of Amsterdam, Port of Rotterdam, Deep BV, STC, FMO, CWT Sitos