Designing for stakeholder values in port development in Africa


The Netherlands and Ghana

AFRICA WORKS!
FUTURE AFRICAN CITIES

S.P. AFRICA
SUSTAINABLE PORTS IN AFRICA
Approach

• Place-based
• Stakeholder-inclusive
• Ecosystem-based
• Design-oriented
• Bottom-up
• Aiming to meet societal, economic & management challenges

Transdisciplinary, game structuring approach

Applied in:
Texas, USA
South Africa, the Netherlands
Context

4 Feb
• Research team travel to Ghana

5 Feb
• Field trip along the coast to Tema

6 Feb
Mini-symposium with researchers

7 Feb
• Data acquisition and interviews

8 Feb
• Data acquisition, interviews

9 Feb
• Multi-stakeholder Workshop

10 Feb
• Academic follow-up meeting

DIMI Ghana
Observation, Knowledge integration
Developing system understanding
Stakeholder-inclusive, value-based design
Feedback, Integration
6-Step Workshop

1. Getting acquainted
2. Developing the system story; local stakeholders on past, present and future of Tema and its port
3. Developing the system story; researchers on Sustainable Ports in Africa, Tema and its port
4. Identifying key stakeholders
5. Developing visions
6. Voting on visions from the point of view of key stakeholders

Who are we?
What do we care?
Who cares?
Visioning
Valuing

Slinger et al. (2014), Cunningham et al. (2014)
#1 Getting acquainted: map exercise
#2 – Developing the system story: local stakeholders on past, present, future Tema
#2 – Developing the system story: local stakeholders on past, present, future Tema
#3 Developing the system story: researchers on Tema and its Port

Interaction
people, planet and profit

Socio-economic system

Eco-system (dis)services

Natural/coastal system

Ecological system

Port

Environmental dynamics
#3 Developing the system story: Researchers on Tema and its Port

- Tema Coastal System
  - Kwasi Appeaning-Addo, Wiebe de Boer
- Coastal Ecosystem Response to Change
  - Edem Mahu, Arno Kangeri
- Values Associated with Ecosystem Services
  - Mark Koetse, Barnabas Amisigo
#4: Who cares?

Identifying key stakeholders

1. Civil society organizations
2. Private Sector
3. International
4. Education and Research
5. Ministry of Transport & Agencies
6. Local and Traditional
7. Ministries
8. Environmental Regulators
9. Politicians
#5 – Developing future visions

1a. Cool Africa

- Economic interests and ecology are in balance although there is limited land, growing population
- Improved transportation including an inland port
- Estuaries are designated as a critical habitat e.g. sakumono, Chemu lagoons
- GPHA incorporates the lagoon systems into their development, in an ecologically sensitive way
- Meridian Rock will also act as a artefact of tourist interest
- Tema wastewater treatment sewage system is broken now, but then it will be working
- Tema administration needs to be fixed
- Port development — 10 million euros
- Offshore docks will be linked by rail systems to the mainland and hinterland
- 5°C water from deep sea will be used to cool facilities and improve export potential
1b. Cannabalism

- Chemu and Sakumono lagoons have almost vanished
- No humans are living in Tema or near the port
- Containers abound
- There is cannabilism, as food is short and only port development counts
2a. State of the Art

- Gateway terminal with low waiting time for goods by maritime transport
- Terminals outside the port
- Little travel time for port employees
- Direct link to the national road network, good roads, dedicated lane for port traffic
- Good rail network
- Cranes that can work on both road and rail, rather than one or the other
- Cross modal transport system
- LK to Volta via canal
- Fully automated cranes and gates, CCTV cameras and systems to regulate access where you want to go
- Port has own tram system
- All waste well managed
- Residential areas close to the port with affordable housing (for port workers)
- Hovercraft to attract tourists, local people as tourists
- Port not only for cargo, also for passengers and local people
- Experienced as a State of the Art port

2b. Madness

- Polluted environment
- Bad drainage and visible sewerage
- Congested traffic
- State interference
- Duplication of functions
- Slum development
- Human traffic into the port
- More security offices at the port – there are too many now.
- Depicted on the upper part of the picture above
3a. Love Ghana

- People need to identify with the port
- Tourism:
  - World time tower (Meridian line) with museum, tourism office, cultural (etc.)
  - Cruise terminal for cruises from Tema to the equator
- Tram system in the port
- Dredge Sakumono lagoon – eco-tourism development
- Total automation of the port
- IT & data center
  - Resource Hub
  - Research (ecology)
- Zero waste and clean energy
- Infrastructure:
  - Railway Tema-Takoradi, also for transport of goods
  - Tunnel way, also towards Ada
  - Affordable housing
  - Inland ports linked to Tema
- Nature-culture linkages
  - Tema was formally Toma – the calabash god
  - Replant the calabash to bring economic value to the surrounding people
  - Mangroves
  - Livelihood
  - Port with nature – leave space for ecological developments
- Governance:
  - Involve locals
  - They can assist in monitoring and evaluation
- Depicted below
3b. Hate Ghana

- Business as usual
- Loss of revenues/economic opportunities
- Development agenda driven from elsewhere; (Strong)Investor influence
- Only containers in the port, no room for anything else
- Congestion of port
- Slums- more poverty
- Increased pollution: river, marine, terrestrial
- Loss of biodiversity
- Loss of Sakumono lagoon in the next 10 years
- Flooding and coastal erosion
- Depicted below
4a. Floating Port
- Offshore port connecting to Volta Lake and Akasumbo, so that ships don’t have to come to shore
- Underwater road network + railway
- View of sea from underwater road tunnel, aquatourism as ecotourism
- Link to Volta river
- Sufficient inflow to Sakumono lagoon and restoration
- Chemu lagoon restored
- Enough fish and vegetation in the lagoons
- Well planned settlement
- Well planned roads
- Green energy – windmill, productivity high, off the national grid
- Beach nourishment to create beach at Tema with eco-tourism
- Relocatable offshore floating system

4b. Congested port
- Congested port, no free flow of cargo
- No railway/no road improvements
- Siltation of Sakumono lagoon – it is lost
- Increased slums and settlement in Chemu
- Waste (plastic) along the shore
- Refuse associated with disease
- Increase in traffic and even more congestion associated with the port
#6 – Voting on the visions
Analysis and interpretation of workshop results

- $T_{-1}$: Historic development
- $T_0$: Existing port (status quo)
- $T_1$: Expansion (standard design)
- $T_1^+$: Incremental added value (green port)
- $T_1^{++}$: Out of the box (green port ++)

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SUSTAINABLE PORTS IN AFRICA
Analysis and interpretation of workshop results

• Wide range of envisioned futures
  – with complex inter-sectoral relations
  – reveal understanding of local impacts, global benefits

• 6-step transdisciplinary, game structuring approach was effective in Ghana
  – participants stayed all day and into the evening
  – demonstrated stakeholder-inclusive approach of project
  – provides a basis for further exploration of stakeholder values, and the integrated design framework
Sustainable Ports Framework

Set-up overarching co-design process

- Value-based
- Stakeholder-inclusive
- Ecosystem-based
- Future-proof

Systemic elements of the approach contextualize

Port design hierarchy
(de Boer et al. 2018)

1. Alternatives to port development
2. Port site
3. Port layout
4. Structures & Materials

Integrated engineering design

Compendium of methods

Methods & selection criteria
Theory of Change

Phase 1: Ripple effects of new practices in port development in Ghana

Phase 2: Replicated practices in Ghana and beyond

Phase 3: Institutionalized practices in African port development
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