Kick off Meeting and First General Workshop for Supporting Parties

Workshop Report

Details
Sustainable Port Development in Ghana within an African Context
Project: NWO UDW Project W 07.69.206
Date: 20 September 2016
Venue: ‘Frans van Hasseltzaal’ in the Aula of Delft University of Technology
Hosted by: Prof. Tiedo Vellinga Project Manager

Heleen Vreugdenhil, Jill Slinger, Heleen Keijer, Baukje Kothuis, Alexandra Alink, Poonam Taneja, Tiedo Vellinga
Content

1. Introduction ........................................................................................................................................... 2
   Table 1: Workshop Agenda......................................................................................................................... 2
   Structure of the report................................................................................................................................. 3

3. Group Sessions & Common Ground on Sustainable Ports ................................................................. 13
   Group Notes Ghana ................................................................................................................................... 13
   Group 1 Netherlands ................................................................................................................................. 14
   Flipchart of Group 1 Netherlands ............................................................................................................... 15
   Group 2 Netherlands ................................................................................................................................... 15
   Flipchart of Group 2 Netherlands ............................................................................................................... 16
   Group 3 Netherlands ................................................................................................................................... 16
   Flipchart of Group 3 Netherlands ............................................................................................................... 17

4. Serious Game ........................................................................................................................................... 19
   Specific Reflection on the Game.................................................................................................................. 20

5. Results of the Mini Enquetes .................................................................................................................. 21
   1. Most important characteristics of a sustainable port: ................................................................. 21
   2. Activities that do not belong in a sustainable port: Activities that cause ........................................ 21
   3. Most important ecosystem services to take into account when developing a sustainable port................................................................. 22
   4. Key actions to enable the development of a sustainable port: ....................................................... 22
   5. Which stakeholders are critical to develop a sustainable port (max 5)? ........................................... 22
   6. Which knowledge is currently lacking to achieve sustainable port development ? ....................... 23
   7. Important lessons the researchers should take into account in the study of sustainable port development in Tema and/or Ghana ................................................................. 23

6. Reflection on the day ............................................................................................................................... 25
   General reflections on the game (in addition to Annex 3) ................................................................. 25
   Reflection on sustainable port development ......................................................................................... 25

Annexes .......................................................................................................................................................... 27
   Annex 1: Attendance list.......................................................................................................................... 27
   Annex 2: Mini enquete 1.......................................................................................................................... 30
   Annex 4: Mini enquete 2.......................................................................................................................... 31
   Annex 5: Photo Selection......................................................................................................................... 32
1  Introduction

In the first phase of the NWO UDW Project W 07.69.206 on ‘Sustainable Port Development in Ghana within an African Context’, the research team has identified research questions and an initial approach. The purpose of the Kick off Meeting and First General Workshop for Supporting Parties is to acquire valuable feedback on the envisaged approach from the participants (listed in Annex 1). The workshop agenda (Table 1) incorporated an introductory presentation, question and answer session, mini-surveys, group sessions and common ground discussions, the playing of a serious game on ports, and a structured reflection, so as to obtain the necessary information. The feedback obtained will be used to fine-tune the project for optimal impact.

Workshop Goals

- To exchange ideas and specify what is (or is not) a sustainable port in Tema or the ideal world. This entails developing a shared understanding of “Sustainable Port Development”.
- To reflect on sustainable port development and on the game.

Table 1: Workshop Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:00 – 10:15</td>
<td>Welcome</td>
</tr>
<tr>
<td>10:15 – 10:45</td>
<td>Introducing the Project</td>
</tr>
<tr>
<td>10:45 – 11:00</td>
<td>Mini-enquete 1</td>
</tr>
<tr>
<td>11:00 – 11:15</td>
<td>Intro Group Sessions</td>
</tr>
<tr>
<td>11:15 – 11:45</td>
<td>Tea / Coffee</td>
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<tr>
<td>11:45 – 12:30</td>
<td>Group Sessions</td>
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<tr>
<td>12:30 – 13:00</td>
<td>Common Grounds</td>
</tr>
<tr>
<td>13:00 – 14:00</td>
<td>Lunch</td>
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<tr>
<td>14:00 – 16:00</td>
<td>Serious Game</td>
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<tr>
<td>16:00 – 16:45</td>
<td>Reflection</td>
</tr>
<tr>
<td>16:45 – 17:00</td>
<td>Mini-Enquete 2</td>
</tr>
<tr>
<td>17:00 –</td>
<td>Closing Reception</td>
</tr>
</tbody>
</table>
Structure of the report

The report is structured as follows. The presentation by Prof Tiedo Vellinga and Prof. Jill Slinger is incorporated in Section 2. Then the group sessions and common ground discussion are reported in Section 3. Next the playing of the serious game and specific reflections on this are reported in Section 4. This is followed by the report of the results of the mini surveys, the first of which occurred at the start of the workshop and the second of which occurred at the end of the day. Finally, the Reflection session at the end of the day is reported in Section 6.
2 Presentation of the Project and Workplan by Tiedo Vellinga

INTEGRATED AND SUSTAINABLE PORT DEVELOPMENT IN GHANA WITHIN AN AFRICAN CONTEXT

Presentation NOW UDW project W 07.69.206 to the kick off meeting and workshop with supporting parties September 20, 2016

Tiedo Vellinga & Jill Slinger
Professor Ports & Waterways, Delft University of Technology
Strategic Advisor Environmental Management Port of Rotterdam Authority

Heleen Keijer
Professor, Delft University of Technology

Baukje Kothuis
Professor, Rhodes University, South Africa

Key features and innovations Maasvlakte 2

• Working/building with respect for nature
• Stakeholder inclusive & co-creation of values
• Integrated adaptive design
• New knowledge
• Green growth
Sustainable Port Development in Ghana within an African Context

Heleen Vreugdenhil, Jill Slinger, Heleen Keijer, Baukje Kothuis, Alexandra Alink, Poonam Taneja, Tiedo Vellinga
Definition sustainability of ports

- **The sustainable port**

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

- **The sustainable port planning process**

  "A sustainable port planning is a continuous learning process which is designed to create a balance in economic, environmental and social aspects for the surrounding local region. This can be achieved by including the location choice in the overall port design process, while through early transparent stakeholder involvement and the consideration of long-term uncertainties, flexible and future-proof development and operation can be achieved."

Ref.: PIANC - IAPH EnviCom WG150
"Sustainable Ports, A Guide for Port Authorities"

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**Integrated and Sustainable Ports in Ghana in an African context**

- **Research MVO: Urbanising Deltas of the World**

**Project features**

- Balance between morphological, economic, ecological and social processes
- Interdisciplinary co-creation with African stakeholders
- Bottom-up approach from practical cases into tools and a generic framework
Sustainable Port Development in Ghana within an African Context

Workshop in Accra-Tema Ghana, July 2015

Heleen Vreugdenhil, Jill Slinger, Heleen Keijer, Baukje Kothuis, Alexandra Alink, Poonam Taneja, Tiedo Vellinga
Integrated and Sustainable Ports in Ghana in an African context

Project partners
- TU Delft
- University of Ghana
- UNESCO-IHE Delft
- WUR / Imares
- VU - Amsterdam
- Deltares
- WWF
- NABC (Netherlands African Business Council)*

Budget 700,000 euro (4 postdocs 0.5), and researcher from Ghana, 3 years.
Proposal approved start project May 2010.

* Boskalis, Van Oord, INM, Damen Shipyards, Port of Amsterdam, Deep B.V, STC, FMC, CWT Sites

Project outcomes

- Framework
  - Best practice guidelines for implementing integrated and sustainable port development in Africa
  - Scientific papers

- Tools
  - Quick design tools using remote sensing data and integrating ecological data
  - Tried and tested methods for stakeholder-inclusive port planning, which can include the Ports of the Future serious game

- Green Ports Africa Network
  - A community of researchers, private sector practitioners and port-related stakeholders

Heleen Vreugdenhil, Jill Slinger, Heleen Keijer, Baukje Kothuis, Alexandra Alink, Poonam Taneja, Tiedo Vellinga
Research Planning and Management

- Building the research team
- Detailed work plan
- Research integration
  - 1st Research Integration Meeting 13 May 2016
  - 2nd Research Integration Meeting 26 August 2016
- Planning
  - Regular RIM’s (last Friday of each month)
  - Post-doc skyes on the next Monday to follow up on agreements
  - Stakeholder workshop in Ghana in early February
Research Plan

African Context

Environment

Harbour design

- Prototype port design
- Final design port design

Research Integration

- 13 May 2016
  - Work plan as basis
  - Clarified cross-linkages, & identified integrative elements within & across the sub-projects:
    1. Storybook
    2. Coastal Morphology e.g. Coastal Erosion and Port Layouts
    3. Use existence of hard structures
    4. Ecosystem, as the provider of Ecosystem Services
    5. Ecosystem Services
    6. Governance and Institutions
    7. Game-structuring methods
    8. Ministerial connection

- 26 August 2016
  - Information needs between tasks
  - Sustainability as port governance process and the status/condition of a port
  - Integrative products – Storybook & 1st scientific article
The presentation was followed by a Question and Answer session, with the Ghanaian participants entering via skype connections. There was general agreement on the work plan as an approach to the complexity of issues involved in research on sustainable ports in Ghana in an African context. The decision to focus on change and to identify a T₀ (existing port) situation, T₁ (proposed extension – standard design) and T₁⁺ (incremental value addition – green port) situation was regarded positively. Participants considered that the choice to focus initially on these alternatives offered the most chance of successfully influencing port development towards sustainability as we are not standing on the side criticizing, but actively suggesting incremental changes that will add ecological value. A number of questions of clarification were also discussed and both the Dutch and Ghanaian participants had ample opportunity to exchange views and answer questions.
3  Group Sessions & Common Ground on Sustainable Ports

The morning session that followed the presentation and question/answer session, focused on forming a picture or specifying what a sustainable port meant for each of the participants. Attendees were divided into small groups, 3 in the Netherlands and 1 in Ghana. Each group was provided with a flip chart, pens and post-its, and a scribe was assigned. Each group was requested to draw and label the attributes of a sustainable port taking Tema as your point of departure, and bringing in your knowledge of Tema or of other harbours. What attributes, activities and operations fit there, and what definitely doesn’t belong? What management, governance process or organisational arrangements are needed for sustainability? So, groups were asked to think about what a sustainable port looks like and what processes need to be in place, or need to be avoided.

Each group elected a representative to provide plenary feedback of their deliberations after ¾ hour. A general discussion and question and answer session followed each of the group presentations. Following the Ghana presentation and discussion, the remaining three groups presented their designs and deliberations accompanied by a lively discussion in which mutual exchange of ideas on what sustainability means for ports occurred.

Group Notes Ghana
The Group from Ghana presented first, coming up with an innovative idea that involved extending the hinterland connection since issues of congestion are important considerations. Also issues of coastal erosion were discussed. They also responded to questions of clarification by explaining more about how the situation stands with the port of Tema at present.
Group Session Ghana

The pictures drawn by each group in the Netherlands are presented below with the factors identified as most important to take into consideration captured in **bold** below.

**Group 1 Netherlands**

Members: Claire Bryant, Daphne Willems, Heleen Vreugdenhil, Jurgen Beerens, Jill Slinger, Obakeng Molelu

- No Harm to local /vulnerable Groups
- Environmental and social impact assessment studies and enforce implementation
- Understand how the ecosystem works related to social +share this understanding with the stakeholders
- Railway-hinterland connection(investigate, possibilities)
- **Efficient customs & gate procedures**
- Equality of gender & diversity (cultural)
- **Manage investigation of the interface with the lagoon (Ramsar site)**
- **Manage Traffic issues (no congestion)**
- Prepare Cut and Fill balance (soil)
- Enlarging the scope by creating added value (fisheries, recreation, etc)
- Getting the current Port operations Involved (APMT, Bollore etc.)
- **Getting the Chinese contractor involved**
- **Clarifying the role of the local community**
- Create an energy neutral port (Low energy consumption & energy generation)
- Maximizing job creation for the local community (construction & operational phases)
- Investigate labour laws on imposed local content & contractual Clause in construction contract(s)
- Involve government (national/local)
- **Investigate to enlarge the scope to create extra value on other themes**
Flipchart of Group 1 Netherlands

**Group 2 Netherlands**
Members: Wiebe de Boer, Heleen Keijer, Poonam Taneja, Bas Kokman, Sander Wubbolts, Cor Schipper, Baukje Kothuis

- **Logistics**
  - Hinterland Connections
  - Connections to Accra / Satellite Ports

- **Energy Supply**
  - Volta dam
  - Conventional Energy Sources
  - Sustainable Energy (Wind, Tide, Currents, Solar etc)

- **Urban Planning**
  - Sanitation
  - Drinking Water
  - Fisheries
  - Coastal Safety

- **Environment**
  - Sakumono lagoon
  - Volta river/ Ramsar site
  - Sediment Management

- **Local Support / Embedding**
  - Eco Tourism
  - Eduction / Training
  - Employment
  - Involvement in Process
Group 3 Netherlands
Members: Arno Kangeri, Daan Rijks, Tiedo Vellinga, Alexandra Alink, Koos Toebes

- Something like a natural harbour, or offshore port would be ideal
- Using sands from the beaches means no sand left to go along beaches (erosion)
- Is a harbour actually necessary? Yes, port capacity is too small.
  - Tema wants to out-do Takoradi + compete with neighbouring countries
- Needs a connection in-land
- Needs dedicated lanes on roads
  - Existing plan is to add one lane on each side
- Ghana wants to expand railroad
  - Railroad just for cargo
  - Bypass/overpass roads instead?
- Dedicated smaller dispersed harbour – to lessen pressure as concentration on single harbour (Rotterdam does same)
- Contents of cargo should decide where it needs to be exported from
  - Agri, Container, Oil etc.
  - Would need to be build 2-3 new sites
- How to finance multiple new (smaller) sites?
- Create Economic Zone instead of harbour
- Agreement in group on releasing pressure from single harbour
- You don’t need break-water by definition
- Create industry, not housing
- Don’t put oil too close to buildings
- Replace/More Hinterland to create space
  - Re-locate people into new housing
- Include lagoon as component of harbour (e.g. for agriculture)
  - Lagoon is salting up
- Water treated sewage can be fresh water for the lagoon
- Can connect lagoon to sea
- Lagoon is important stop for birds migrating north
  - Possible location for inland port
- Sewage treatment is not quite a concern yet
- Create land where you can put offices etc.
- When you have new land you can make underground rail system
  - Also add new ring-road
  - Add tunnel so that lagoon still has access to sea
- Make new fishing harbour + make it more spacious
- Oil needs its own area
  - Nigeria can be re-directed
- Reducing pressure overall is more sustainable
- Power-plant should be more towards oil area

Flipchart of Group 3 Netherlands

This completes the feedback on what sustainability means for ports, deriving from the group sessions in Ghana and the Netherlands.

Some more general reflections that were made include:
- Sometimes you have to ask local governments first, then national. The situation is sensitive. And we are not that important.
- Focus more on the system, what problems are caused by ports? Also socio-economic system understanding. People in the group may know more about the system.
- In the end what we bring is a holistic design
- Cost-benefit for the government > why would they do this. Different thinking for the government. It is needs, but also the costs benefits to become sustainable.
- Cost and return on investment is what people like
- Show that the benefit cost figures are there to make it work. Platform that we can use for future plans – implement anywhere.
- Designs made here are purely intended for internal use only
4 Serious Game

The Port of the Future Game was introduced by Cor Schipper. It is an interactive, role-playing game in which players decide per role on measures to take in developing a port. Each round involves a negotiation within and between the different roles. The envisaged learning relates to potential sustainability of measures and the importance of negotiating agreements on measures.

Participants were group was divided in three groups and allocated the roles of WWF, Government and Investors, and Citizens. Three rounds were played spanning a time horizon of about 25 years. The outcomes are reported in terms of people, planet and profit indicators. The purpose is to induce learning on the efficacy of measures and negotiation stances. This culminated in a plenary discussion with the focus on Tema. Each round and the key points of the discussion are reported here. A more extensive report is found in Annex 2.

**Round 1**

**WWF:** very concerned. Proposes inland expansion and mangroves. Good for the planet.

**Government and investors:** let’s discuss. Propose inland expansion of port. and to grow mangroves to create spot for tourism and for fisheries.

**Citizen:** Concerned: Invest in sanitation – human health + flexible storm surge barrier

**Debate:** choose for:
Sanitation and inland expansion urban

Discussion how to apply to Africa
Sanitation Benefits much more than in our countries
Expansion: government and investors did not reach anything. Goals very close to WWF.

**Round 2 (10 yrs later):**

Growth + pollution > we need solutions

**Citizens:** Pollution measures, mangroves. Mangroves need to be restored, no fish left.

**WWF:** Focus on sustainability Pollution measures + waste water treatment.

**Government/ Investors:** Inland transport. and attract investors.

Measures chosen: Mangroves + Waste water treatments

Society is doing well (10), environment (10), economy (9)

**Round 3: more climate change / floods (15 yrs later)**

New team captains (not for government)

**Citizens:** problem with cc and sanitation > restore aquifer, secure drinking water for the people + solar energy.

**WWF:** adapt to climate change (not to mitigate) > artificial salt marshes (offer benefit for people), invest in retention water to ensure drinking water supply.
Gov: **heighten the harbour facilities** to comply with SLR and facilitate larger ships. Also important for health of community.

Measures: **artificial salt marshes, retention basin**
Result: social 14, earth 14, economy 10, money 31

**Specific Reflection on the Game**

Specific reflections on the game and how it played out in this case are included here. More general reflections were covered during the Reflection session at the end of the day and are found under the Section Reflection.

- Government: in the end it doesn’t matter, because all the other groups are your stakeholders. But, the investors have their own interests.
- There is an underlying assumption of consensus. But, I got more fixed in my role. More open discussion is needed in the beginning.
- You get more self-centered instead of open. You would expect the other way around. We didn’t even talk about what others wanted or how they would be affected.
- New social world at the negotiation table, there the atmosphere got warmer. The grassroots become stronger, trying to influence the negotiations more strongly. Also, captains need to have a means to disseminate to their grassroots. Can they give the feeling of the negotiation table to us?
- After 20 years negotiators changed. New people were brought in and brought new energy with them.
- The environmental NGO (WWF) didn’t change very much.
- As citizen maybe there were less clear objectives as there are many different voices.
- There were missed solutions (reinsurance, dike/ coastal protection plan, schools, bring up new measures/ joker). The measures cards confined the solution space.
- Africa: be aware of corruption. All choices will probably be affected by corruption.
- Land acquisition as an issue.
- The interesting aspect of the game turned out to be the interactions, more than the sustainable port. Now the Port development is managed by a combination of measures. Maybe this could be more flexible or be expanded.
- Some natural disaster (something unexpected) could happen. This would provide feedback on the efficacy of measures (eg saltmarsh, when there is a storm, what happens?)
- Where are the power levels? Could we give double power to government?
- Use it as an icebreaker, not for teaching about ports.
- Cards are limiting in the discussion> too ‘solution oriented’; need more debate on the problems and system understanding.
5 Results of the Mini Enquetes

The participants completed two mini surveys, one at the beginning of the day and one at the end of the day. The mini surveys were designed to collect the diversity of perspectives on sustainable ports present amongst the invited participants and the research team. The first mini survey comprised six questions focused on the concept of sustainable ports (e.g. characteristics, activities, ecosystem services, key actions, critical stakeholders). The second mini survey focused on enriching the picture of what a sustainable port would look like, particularly in Tema, and what this means for the research team.

The questions in mini survey 2 were the same as in mini survey 1 (see annexures 3 and 4 for full details), except that the focus of this survey was explicitly on the application in Tema. One question on lessons to be taken into account during the study of sustainable port development in Tema, Ghana was added. The results of the survey are now reported per question.

1. Most important characteristics of a sustainable port:
   - Accounts for people, planet, and profit needs
     - Socially Responsible
     - Ecologically sound
     - Economically sound
   - Future oriented
     - Flexible, adaptive
     - Long term planning
   - Integrated, stakeholder inclusive, design
     - Participative planning process: involve all stakeholders affected by port activities now and in the future
     - Ecosystem based design and operation
     - Include monitoring

2. Activities that do not belong in a sustainable port: Activities that cause
   - Pollution:
     - Air (polluting transport, gas/coal electricity plants)
     - Solid and liquid waste (incl waste water, ballast, contaminated sediment)
   - Social issues
     - Corruption
     - Human rights abuses (work conditions, forced removal of people)
     - Non inclusive activities
   - Damage to physical system (coast, essential ecological processes)
     - Location/expansion don’t take physical system into account
     - Design based on static system
   - Lack of ambition with respect to sustainability
3. Most important ecosystem services to take into account when developing a sustainable port

<table>
<thead>
<tr>
<th>Service</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping</td>
<td>12</td>
</tr>
<tr>
<td>Coastal protection/liveability</td>
<td>19</td>
</tr>
<tr>
<td>Tourism/Recreation</td>
<td>6</td>
</tr>
<tr>
<td>Energy Supply</td>
<td>6</td>
</tr>
<tr>
<td>Air Quality</td>
<td>8</td>
</tr>
<tr>
<td>Food Production</td>
<td>2</td>
</tr>
<tr>
<td>Drinking water supply</td>
<td>3</td>
</tr>
<tr>
<td>Fisheries</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
</tbody>
</table>

Supporting services: abiotic and biotic dynamics and habitats, inclusion of nature in design: protection, water quality, etc.

4. Key actions to enable the development of a sustainable port:

- **Stakeholder inclusive process**
  - Users (national and international)
  - Community (make part of system)
  - Deep reflection on needs and opportunities (‘bezint eer ge begint’)
  - Prioritize ecosystems and their services

- **Integration of**
  - Design and Operation/Maintenance
  - Sectors and their related ministries
  - Ecological, economic, governance and engineering components

- **Vision development (long term)**

- **Gain System understanding**
  - Physical (incl ecosystems, quantifying ESS, impacts on coasts)
  - Social (incl governance/management)

- **Work with nature**

- **Reduce congestion**

- **New laws, set environmental standards**

- **Make investments**

- **Make port flexible**

5. Which stakeholders are critical to develop a sustainable port (max 5)?

- **Government:**
  - Local (city council, water treatment)
  - National (ministries of transport, trade, environment, tourism)
  - Port Authority
  - Regulating institute (eg EPA)

- **Business**
  - Shipping companies/Maritime organisation
  - Terminal operators/stevedores
  - Storage, freight
  - Contractors
  - Fisheries
• **Community**
  - Representatives of people living in the port area
  - Labour unions
  - Recreational groups

• **Environmental groups**

• **Research institutes/ Universities**

• **Financers**

6. **Which knowledge is currently lacking to achieve sustainable port development?**

• **Translation in monetary terms of:**
  - ESS
  - Stakeholder values

• **Design and Facilitation of the process** (co-creation, co-operation, communication)

• **Integrated port design: knowledge and skills**

• **Local knowledge**
  - Port location within coastal system/ cause-effect relations
  - How ecosystem enhances port operations and vice versa
  - Clear design goals
  - Insight in implementation barriers

• **Effects of changing governance relations**

• **Knowledge of lobby systems**

• **Lack of:**
  - Awareness
  - Good examples
  - Capacity with governments

7. **Important lessons the researchers should take into account in the study of sustainable port development in Tema and/or Ghana**

• **Process**
  - Keep things practical
  - Go there and see
  - Connect to local stakeholders
  - Humility: there is no one correct approach
  - Be flexible in both design and actor relations. Be prepared for some disappointment, and open to adjusting your ideas.
  - Identify tools and methods for stakeholder engagement

• **Understanding the system (governance and physical)**
  - Be open to needs and wants of local stakeholders as these might be different from what you think initially
  - Understand local politics
Discover where the power is
How does the environment respond to changes in sediment transport?

- **Design:**
  - Don’t just adapt the existing design, think freely
  - Economic arguments are most convincing in decision making – make use of this
  - Survival in the short term outweighs sustainability over the long term
  - Branch into inland waterway transport to effectively reduce congestion
  - Design inclusive governance structures
  - How to integrate systems and to implement are challenges

- **Communication:**
  - Be transparent
  - Publish together with local and Dutch stakeholders
  - Create awareness, let local stakeholders do things
  - Define the problem in consultation with stakeholders

The surveys yield insights regarding the meaning of sustainable ports to the participants. Specific issue-based concerns and more integrated or holistic issues could be distinguished. Overall, a more complete picture of a sustainable harbor was obtained and particular issues of concern to Tema were highlighted. These included the issues of congestion and sector-based, non-integrative governance structures.
6 Reflection on the day

Two reflective components were addressed in a plenary session at the end of the workshop. These included a reflection on the game (its utility, what works, doesn’t work, use in the Ports in Africa project?) and a reflection on sustainable port development. The comments of participants are included under these headings below.

General reflections on the game (in addition to Annex 3)

- The game is useful for team building. It would be nice to do it together with people in Ghana. But, how to do this in February?
- Playing the game with Kwasi could help to gain Ghanese input. The game is very general. The research team would need to add elements typical of Africa. For instance, land acquisition, different governance structures, possible corruption were identified as issues to be considered.
- It is potentially possible to develop pre-master plan based on knowledge out of the game. Alternatively, the game can be used to initiate knowledge exchange.
- Use the game as an icebreaker, not for about teaching about ports
- New social world in negotiation table, there it got warmer. De grassroots become stronger, trying to influence more strongly. Also: captains need to have means to disseminate to their constituency/interest group. Can they give the feeling of the negotiation table to us?
- The game is ‘solution oriented’, asking players to come up with a combination of measures; there needs to be more debate on the problem and understanding the system.
- Some natural disaster or something unexpected could happen. This would provide the players with feedback on the efficacy of the measures they have chosen (eg saltmarsh, when there is a storm, what happens?)

Reflection on sustainable port development

- Other techniques are available for undertaking governance research: e.g. game structuring as applied in Texas.
- The do’s and don’ts of working in Ghana need to be checked. It is important to do no harm.
- Sometimes one has to consult local governments first, and only then national governments. This can be sensitive, and we may not be very important.
- Focus more on the system and what problems are caused by ports? Also focus on developing the socio-economic system understanding. People in the group of stakeholders may know more about the system than the researchers do.
- The designs sketched during the workshop should stay in the room – they are not to be shared more widely, as they have not been checked for feasibility or even screened in a preliminary fashion for desirability.
- Recommendations: continue to get companies involved. There are now only 5 representatives present. Perhaps a shorter workshop would help or asking specific questions on topics where we can help.
In the end what we bring is a holistic design.

The cost-benefit for a government needs to be taken into account. Why would they do sustainable port development? It represents a different way of thinking for the government. The needs of society are important, but the costs or business case for sustainability need to be clarified.

Clear information on costs and returns on investment is what the people involved in port development like.

Demonstrate that the business case and financial figures are there to make a sustainable port work. This would provide a platform that we can use for future plans, and that we could implement elsewhere.

The Workshop closed with Prof Tiedo Vellinga thanking all participants for their attendance and contributions.
### Annexes

#### Annex 1: Attendance list

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<thead>
<tr>
<th>NAME</th>
<th>Institution</th>
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<tbody>
<tr>
<td>1 Alexandra Alink</td>
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<td>4 Tiedo Vellinga</td>
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<td>7 Kwasi</td>
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<td>8 Fleur</td>
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<td>10 Daan Rijks</td>
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<td>13 Daphne Willems</td>
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<td>14 Sander Wubbolts</td>
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<td>15 Arno Kangiri</td>
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<td>16 Cornelis van Dorsser</td>
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<td>17 Bas Kokman</td>
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<td>18 Jurgen Beerens</td>
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<td>20 Wiebe de Boer</td>
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<td>21 Dirk de Bruijn</td>
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<td>22 Koos Toebes</td>
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<td>23 Claire Bryant</td>
<td>APM Terminals</td>
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Round 1

**WWF**: very concerned. Low impact port. We think it is feasible to start with inland expansion and mangroves. Good for the planet.

**Government and investors**: let’s discuss. We want inland expansion of port. We see economic growth, we want to keep up with the growth. Happy with sustainable growth. Connection to hinterland, compensation damage to environment. Mitigate harm to nature. Current port is already doing harm, we expand in sustainable way. Compensate for the port being there. Measure: we want to grow mangroves to create spot for tourism and for fisheries.

**Citizen**: Concerned long term jobs, energy security, social security, physical security. Invest in sanitation – human health + flexible storm surge barrier (cheap).

**Debate**: we have to invest in infrastructure to keep up eco growth. Is not in your plan. The port is too small. Bigger ships cannot come in.

We think it is important to think about people first. If not happy citizen, port cannot grow neither.

Compromise? Eco growth, community. Which is the cheapest?

M1: sanitation to keep people quiet - - in exchange for mangroves. WWF? Choice is up to you for the other measures.

M2= inland expansion urban

**Cor**: how to apply to Africa
Sanitation Benefits much more than in our countries
Expansion: government and investors did not reach anything. Goals very close to WWF.

Round 2 (10 yrs later):

Growth + pollution > we need solutions

Citizens are annoyed. Pollution, too little jobs. Pollution measures, mangroves. Mangroves need to be restored, no fish left.

**WWF**: not excited about coal. Focus on sustainability Pollution measures + waste water treatment.

**Investors**: not just leave the coal there > gives wealth and employment. Only for investors, not for citizens (citizen). Inland transport. We want to attract investors.

We cannot pay for inland connection. The people have to trust that the government does it in a susatainable way. We need to attract money for that and enough money to spend on sustainable issue. But: very high pressure

More investors, more pollution > we as citizens don’t want that.

Although conditions are good, conflict becomes larger (reason = news paper), environmental issues not part of discussion – it is about money.
Africa: governments do want they want. First resource = natural resource (also why Europeans came there, cannot expect people not to do it)
Real world: environment and social not part of the discussion

M1= mangroves
M2= waste water treatments

Society is doing well (10), environment (10), economy (9)

**Round 3: more climate change / floods (15 yrs later)**
New team captains (not for government)

*Citizens*: problem with cc and sanitation > restore aquifer, secure drinking water for the people + solar energy.
*WWF*: agree: adapt to climate change (not to mitigate) > artificial salt marshes (offer benefit for people), invest in retention water to ensure drinking water supply.
*Gov*: heighten the harbour facilities to comply with SLR and facilitate larger ships. Also important for health of community. Only thing we want.

All tackled newspaper? Not investors, they didn’t address salt water intrusion. Discussion about the extent they protect. Gov says, we protect you against toxics. We proposed many robust measures, but they didn’t get through. We make sure we are not responsible – we do more than is required from us
Harbour is motor of economy, can be flooded – if we loose it, we loose our income.
If no drinking water no people to work.
How should we deal with uncertainty> redoing base design or adapt every 10 years (higher quays)?

*WWF* and *Citizens* work together / *Gov* aangewezen op verantwoordelijkheden.
Measures: artificial salt marshes, retention basin
Result: social 14, earht 14, economy 10, money 31
Annex 2: Mini enquete 1

N=22

Topic: Characterising Sustainable Ports

Name:
Organisation:

1. What are in your view the most important characteristics of a sustainable port (max 3)?

2. Which activities do not belong in a sustainable port (max 3)?

3. Which ecosystem services are, in your view, the most important to take into account when developing a sustainable port? (max 3)?

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4. Which key actions need to be taken to enable the development of a sustainable port (min 2)?

5. Which stakeholders are critical to develop a sustainable port (max 5)?

6. Which knowledge is currently lacking to achieve sustainable port development? (max 3)
Annex 4: Mini enquête 2

N=17

Topic: Perspective on Sustainable Port development in Ghana

Name:
Organisation:

1. What are in your view the most important characteristics of a sustainable port of Tema (max 3)?

2. Which activities do not belong in a sustainable port of Tema (max 3)?

3. Which ecosystem services are, in your view, the most important to take into account when developing Tema port sustainably? (max 3)?

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4. Which key actions need to be taken to enable the development of the port of Tema in a sustainable way (min 2)?

5. Which stakeholders are critical to developing the port of Tema in a sustainable way (max 5)?

6. Which knowledge is currently lacking to achieve sustainable port development in Tema? (max 3)

7. What is an important lesson that we (the researchers) should take into account in the study of sustainable port development in Tema and/or Ghana?
Annex 5: Photo Selection

Photo 1: Introduction to the Project and Workplan
Integrated and Sustainable Port Development in Ghana within an African Context

Photo 2: Question and Answer session with local participants (GNBCC, University of Ghana, CWT commodities)

Photo 3: GNBCC & University of Ghana
Integrated and Sustainable Port Development in Ghana within an African Context

Photo 4: Playing the serious game in the Netherlands