TOWARDS SUSTAINABLE DEVELOPMENT IN SEA PORT

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1. Introduction

- **92% World Trade is Transported by Sea.**
- **Elements of Maritime Industry are,** Ports , Ships , Cargo.
- **From 1970 to 2015 sea born trade exceeded from 2.6 to more than 10 Billion tons/year.**
- **Number of ports 8293 in 222 country.**
- **Waiting time for berthing alongside has been increased.**
- **Staying Period in some ports for some types of vessels has been increased.**
- **As a result of Port Operation,** many Environmental Issues has been Raised and Posits New Challenges to the Development of Ports.
- **Ports Should Plan and Manage their Operation and Expansion in a Sustainable Method to Decrease the environmental Impacts.**

2- What is the sustainable development?

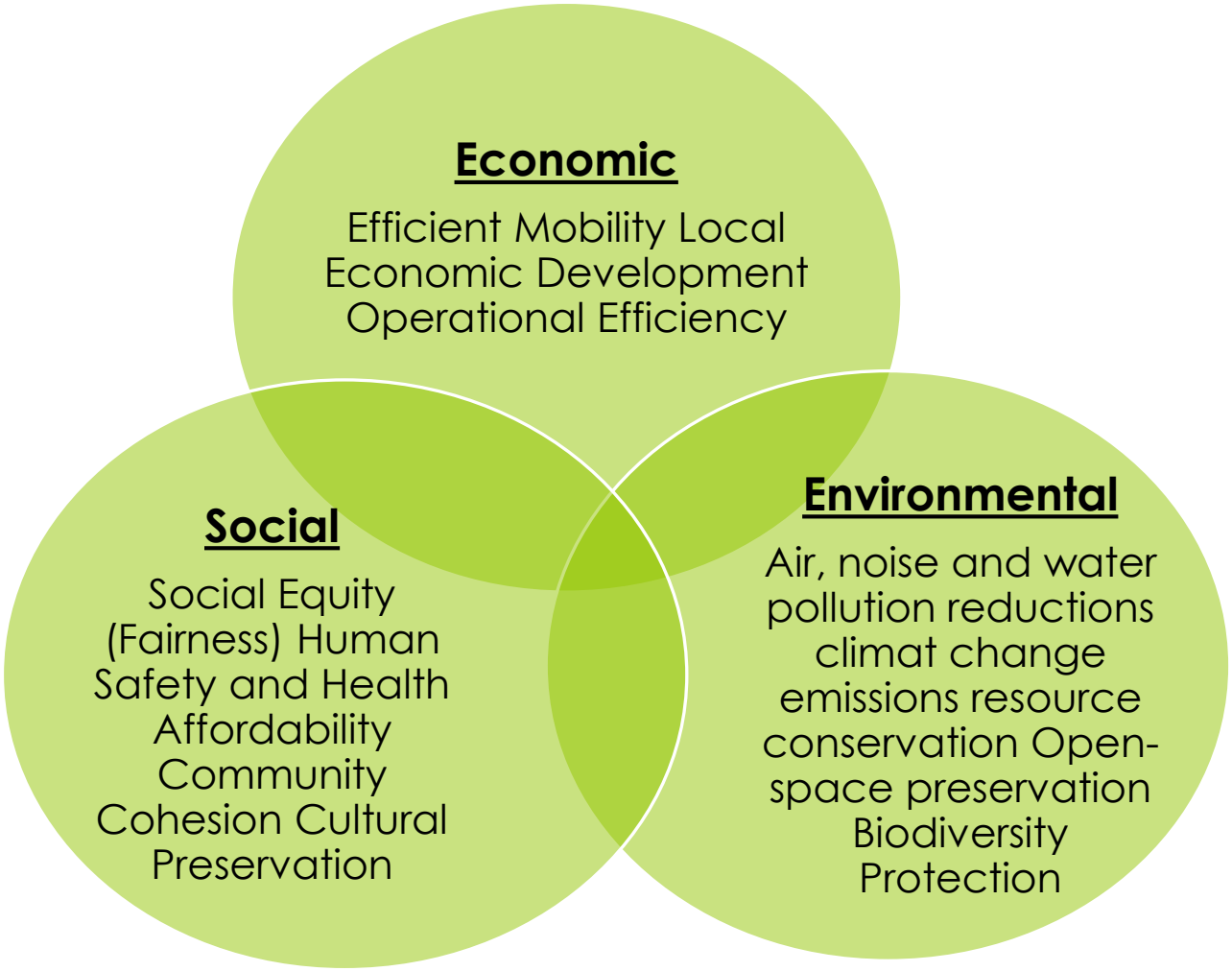
- **World commission environment and development (WCED) defines sustainable development as,** economic and social growth that "meets the needs of the present without affecting the needs of future generations (WCED, 1981).

- **The SD Involves the Integration of economic, environmental and social elements.**

3- What is the sustainable transportation.

- Sustainable transportation is one that allows the **basic access needs** of the communities to be met safely and in a manner consistent with human and ecosystem health, and with equity to the generations.

- It Limits the negative environmental issues, emission and waste within the planets ability to absorb them, **minimizes consumption of Non-renewable resources**, **limits** consumption of **renewable resources** to the sustainable yield level, **reuses and recycles** its components, and **minimize** the use of land and the **production of Noise.**



Towards Sustainable Development in Sea Port

4- How can transportation become more sustainable?

- **With respect to society, transportation systems should:**
  a) Allow and support development at a human scale, and provide for a reasonable choice of transport modes, types of housing and community, and living styles.
  b) produce less noise acceptable by communities.
  c) Be safe for people and their property.
  d) Meet basic human needs for health, comfort, and convenience in ways that do not stress the social issues.

- **With respect to the economy, transportation systems should:**
  a) Provide cost-effective service and capacity.

- **With respect to the environment, transportation systems should:**

a) Make use of land without or less impact on the integrity of ecosystems

b) Use energy sources that are essentially not renewable or inexhaustible.

c) Produce no more emissions and waste than can be accommodated by the planets restorative ability.

d) Use other resources that are renewable or inexhaustible, achieved in part through the reuse of items and the recycling of materials used in vehicles and infrastructure.

5. Sustainable development port and shipping.

a) **Development of port** infrastructure and superstructure**,** facilities contribute positively to the growth of Maritime Transport.

b) Provide direct and indirect employment to the region.

HOWEVER,

Port development, port operation – port activities – port Expansion .

Have **adverse consequences on the environment** responsible for a number of Negative external effects, also to the surrounding areas.

- **Shipping operations interact with environment in many ways *either* accidently or Intentionally (talley,2006), such interactions affecting negatively to the economic and the environment .**

  - The environment is always **suffering from oil and chemical spills** from ships either from their operational activities or catastrophic accidents which cause health hazards.

  - **A challenges** for shipping companies is how to carry out shipping **operation profitably** with **reducing their negative Impacts an the environment.**

  - **Bunkering operation** may engender oil spill risks with **potentially catastrophic impacts** an beaches, food chain, sediments and fishing communities.

- Shipping generates a range of atmospheric emission such as No2 , Carbon dioxide CO_2 , Sulfur dioxide SO_S.

- Bengtsson et – al. (2012) evaluated the environmental assessment of two alternative path ways to bio-fuels, the diesel route and the gas route in the shipping industry.

  The study found that the gas route has better overall environmental performance than the-diesel route indicating the use of bio-fuels as one possible measure to decrease the global warming impact from shipping.

6. Sustainable challenges facing ports

- Growing and concentrated **traffic volumes** in ports.
- A changing marketplace as a result of increased alliances between shipping lines.
- Changing in **energy prices** as well as the **new energy specifications** required by international organizations.
- Globalization of business and society; and barriers to internal markets
- National budget constraints limiting the possibilities of public funding for transport infrastructure.

- **Environmental challenges**
  - The transportation industry's share of all the global energy consumed increased from 45 per cent in 1973 to 62 per cent in 2010 (hui-huang, 2015).
  - Ports face a complicated regulatory requirement as well as societal exercitations (Lam and Notteboom 2014)
  - Shipping emission in ports are substantial, accounting for 18 million tons of **CO_2 , 0.4 million tons of Nox, 0.2 million of Sox in 2011.**

- It is estimated that most shipping emission in ports will grow **fourfold until 2050.**

- Asia and Africa are expected to see the **sharpest increases in emissions, due to strong port traffic growth and limited mitigation measures** (Merk, 2014).

- The importance of corporate sustainability reporting and encouraged companies, especially large or publicly listed companies, to consider **integrating sustainable information into their reporting cycles** (Rio 20)

7. Impact of Sustainable Development.

7.1 (Economic Dimension)

- Success in addressing **environmental management** play an important role in improving a **firm's image** (Hansmann and Claudia, 2001).

- Sharfman and Fernando (2008) indicated that improved **environmental risk management** **reduces** the probability of **environmental crises** which can affects negatively the firm expected cash flows

- Yang et al. (2013) indicated that **external green collaboration** has **positive** impact on green performance and **firm competiveness**.

- Rao and Holt (2005) and Zhu and Sarkis (2004) also found that **environmental programs** that included both collaboration and assessment of business partners have a **positive** impact on **economic performance**.

- **Integration** of **environmental responsibility** in firms economic strategies can **reduce cost** from **resources reduction**

7. Impact of Sustainable Development Cont.

7.2 Environmental Dimension

- Better environmental performance would be brought through Implementing **environmental programs and green marketing** and **firm competiveness** (Gimenez et al., 2012; zhu and sarkis, 2004) (Yang et al., 2013).

- Implementing and practicing ISO 14001 series and EMS such as PERS would **enhance environmental performance** (saengsupavanih et al., 2009; yang et al., 2013).

- Continuously collaboration is very essential for port authorities with shipping companies to minimize environmental damage they produce.

  Reducing CO_2 emissions is an essential issue for the container shipping industry in achieving environmental and economic sustainability (Bauhaus et al., 2009; Qi and song, 2012).

- Ports differentiate port dues for ships with low sulfur content emission or with voluntary vessel speed limit (puing et al., 2014) lai et al.

- such as using clean-burning low sulfur fuels, environmental-friendly materials and equipment, and adopting environmental friendly design shipbuilding have positive impact on green performances and firm competitiveness (Yang et al., 2013).

- Green practice in the shipping industry such as using **clean-burning low sulfur fuels**, **environmental-friendly materials** and **equipment**, and adopting environmental friendly design shipbuilding have positive impact on **green performances** and **firm competitiveness** (Yang et al., 2013).
- Employee welfare, **education and training** (internal social programs) play an important part in **environmental management** (Wu and Goh, 2010) as they have been positively related to the reduction of **potentially damaging environmental practices** and lead **to improvements on environmental performance.**

8. Proposed criteria to be included in port sustainable development frame work

8.1 Port internal management criteria

1- Internal environmental management

1.1) Clear environmental **policy statement**

1.2) Establishment or upgrade of the **"Green policies"** annually

1.3) **Environmental Management system**, such as ISO 14001 series PERS.

1.4) **Environmental risk management** practices

1.5) Activities to reduce environmental damages

1.6) **Environmental education and training support**

1.7) Clear **environmental performance indicators**

1.8) Regular exercise of port state control for ship inspection

1.9) **Budget** on green performance, including **promotion campaign**.

2- Optimized operation planning

2.1) Continuously **implementing berth planning improvement strategy**

2.2) Continuously implementing **quay crane scheduling improvement strategy**

2.3) Continuously implementing loading/unloading sequence improvement **strategy**

2.4) Continuously implementing **space planning improvement strategy**

2.5) Continuously **reducing truck queuing time at the ports gates**

2.6) **Integrated various port operations activities**

2.7) Collaboration with **business partners in information sharing**, improving data accuracy, and integrated scheduling

3- Cost savings

3.1) Use of **cleaner technology port equipment**, such as hybrid/alternative (e.g bio-energy, electric powered) quay cranes, **RTGs**, etc.

3.2) Use of **automated port equipment**

3.3) Collaboration with **business partners** in sharing the **cost of environmental-friendly equipment.**

4- Internal social programs

4.1) Constantly giving **support** for corporate social activities

4.2) Constantly improving **employs working conditions** and safety

4.3) Constantly improving **employee welfare**

4.4) Constantly giving support for **employees training and education**

8.2 Port external management criteria

1. External environmental management

1.1) Having **common environmental goals** collectively with **business partners**

1.2) Developing a **mutual understanding of environmental risk** and responsibilities with **business partners**

1.3) Working together with **business partners** to address **environmental risks and establish a green supply chain.**

1.4) **Requiring and guiding business partners** to comply with EMSs ISO 140001 environmental management standards or **PERS**.

1.5) Including **environmental criteria** in sleeting **business partners**

1.6) Conducting **environmental audits for partners**

2. Environmental collaboration with shipping companies

2.1) Providing incentives to shipping companies which use clean-burning low su8lfur fuels for their ships main and auxiliary engines while at port.

2.2) Providing incentives to shipping companies which use environmental-friendly materials and equipment's (e.g non-toxic paint, electric deck machine, ballast water system).

2.3) Providing incentives to shipping companies which adopt environmental-friendly design of shipbuilding (e.g. improved engine, waste heat recovery systems, double skin and internal oil tank).

2.4) Providing incentives to shipping companies whose ships reduce speed while at port.

3. External social program

3.1) Providing expansion plan project information to the public

3.2) Giving support to community social activities

3.3) Providing scholarships to students

3.4) Providing internships to students for work experience

3.5) Giving support to community economical activities

3.6) Giving support to community projects in general

Conclusion and further research

- Sustainable development is the key for continues success in sea ports.
- Environmental issues are playing very essential role in the running of the seaport economically and profitability
- Optimizing sea ports operation planning through a clear strategy playing an essential role in sustainable development.
- Collaboration with business partners in all stages carried out in the sea port reflect positively in its sustainable development.
- Collaboration with shipping companies and offering them incentives share positively in sea ports sustainable development.
- Clear sustainable development frame work for sea ports will assist them to continue and success without any harm to the economy, social and environment.

THANK YOU