

SUSTAINABLE PORT

DEVELOPMENT IN WIO REGION

BY

JOHN OTIENO ODHIAMBO

ASSISTANT LECTURER

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

GHG EXPERT

Maritime Technology Co-operation Centre- Africa (MTCC-Africa)

CONTENT

**Large Scale
Developments
in WIO region**

Port and the Environment

Port-City
Relations

Effects on
Environment

Objectives of the Proposed study

Port Development

Traditional Port
Development

Ports of the

Future

Scenario Modelling

**Policy
Recommendations**

Large Scale Developments in the WIO Region

Large Scale developments along WIO coastlines ranging

from

- ❖ Ports
- ❖ Railways
- ❖ Roads
- ❖ Oil & Gas explorations
- ❖ Mining activities

a) Kenya.

1. Port of Mombasa

- ✓ 3 berths completed in Sep. 2016-550,000 TEUS
- ✓ KSH35B phase II for Additional 450,000TEUs (230,320 and 350m
To handle Pannamax and Post Panamax Vessels

2. Lapsett Project- 32 berth port and other infrastructures (ongoing)

The countries of the WIO are expected to enter into a period of rapid economic growth, enabled by their;

- ❑ Current low economic baseline
- ❑ Rapid demographic growth
- ❑ Access to new energy sources.

b). Tanzania

1. In July 2017 Dar es Salaam Maritime Gateway Project (DSMGP) was unveiled aiming to overhaul Port of Dar es Salaam's infrastructure by 2023.
2. TradeMark East Africa is providing the TPA with technical support in the rehabilitation of access roads to help reduce traffic congestion.
3. Plans to build a dry port in the country's western Kigoma region.

4. Phase I of 205-km rail between Dar es Salaam and Morogoro, is scheduled for completion by October 2019

c). Mauritius

1. Expanded **Port Louis** by dredging up to 16.5m
2. **Mauritius** Container Terminal constructed and Inland Container terminal is proposed.

d). Madagascar's Toamasina Port Development Project (April 2017-April 2027).

e). Nacala Port in **Mozambique** is undergoing Rehabilitation and Expansion

f. Uganda is expected to ship its oil soon-maybe through Mombasa

Port –City Relations

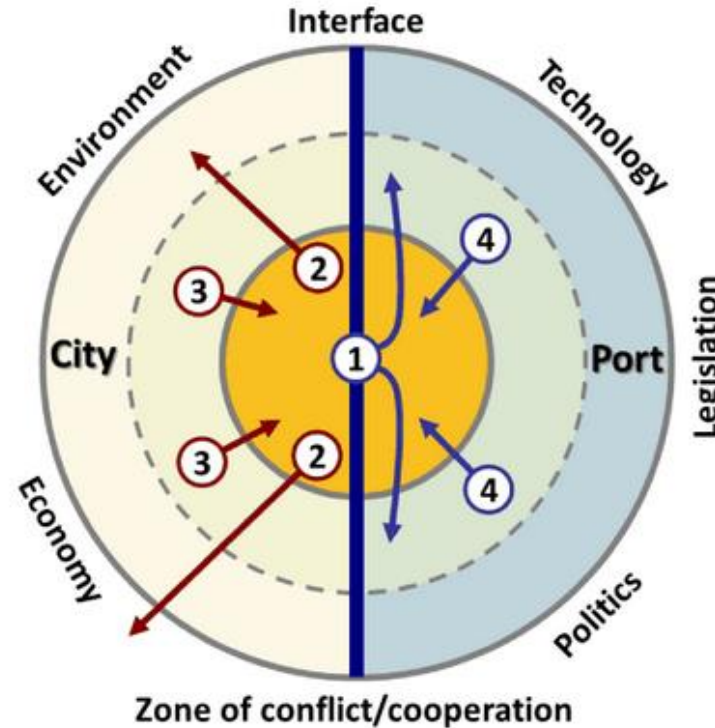
Ports act transfer hubs for trade and are intermodal systems

where road, rail, pipelines and other transport modes meet for purposes of trade enhancement

Investments in ports ;

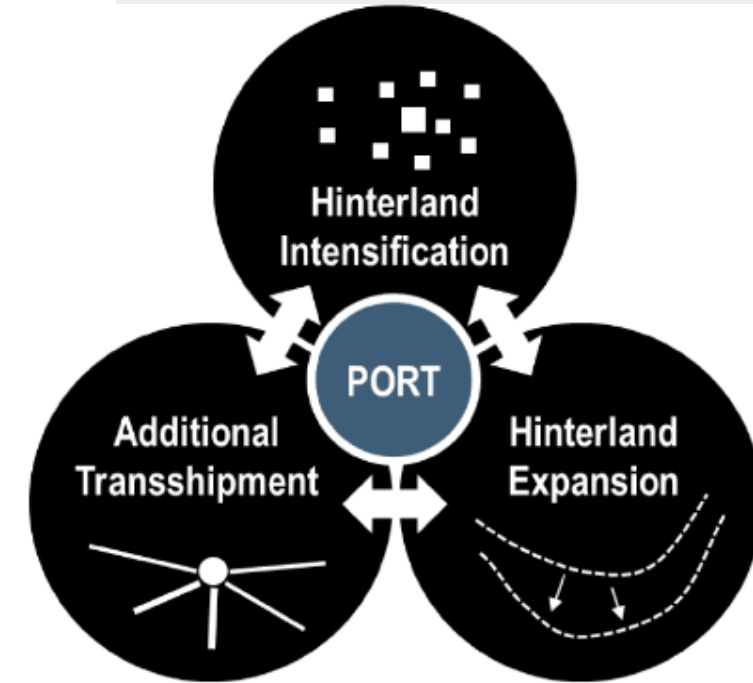
Drivers

1. Increase in vessel sizes.
2. Cargo base expansion among other factors



- ① Port migration
- ② Industrial migration
- ③ Land use competition
- ④ Water use competition
- Environmental filter
- Traditional port/city zone

Port Cargo Base Expansion



Challenges Facing Ports of Today

- a) Increase in Cargo volumes
- b) Challenge in cargo types
- c) Changes in Vessel Fleets
- d) Inland connections constrains
- e) Changing physical conditions
- f) Increased environmental impacts

Can be avoided by proper planning during port development and expansion as well as incorporating strategies to reverse environmental effects of existing port

OBJECTIVES

1. Overview on Ports and developed along the WIO Ocean region.
2. Audit on specific environmental effects of major ports of the WIO region
3. Conduct scenario analysis and develop scenarios for port development and expansion along the WIO region
4. Produce a Toolkit on development of green ports and highlight a mechanism for enforcement to provide support to governments for decision making in port development and expansion.

Ports and the Environment (1)

There is unavoidable intersection with critical coastal and marine resources with huge potential to compromise the integrity of these resources because the resources are critical for the socio-economic development of the region since the economies are largely natural resource based e.g. tourism, fishing, farming, mining etc.

Degradation of natural coastal landscapes

Significant visual intrusion
Replacement of natural shapes and forms with hard lines and edges
Disruption of natural coastal patterns and processes

Loss of public access and amenity

Restriction or exclusion of public access to parts of the coastal environment

- Loss of amenity through increased noise, light and traffic

Changes to coastal processes

Disruption of wave energy, currents and tidal flows
Alteration of sediment transport regimes causing coastal erosion or sediment accumulation

- Habitat change

Degradation of marine heritage

Damage to the integrity of archaeological sites and other sites of historical significance

Degradation of water and sediment quality

Discharge of sediment or pollutant-laden water
Increased levels of rubbish, oil and antifoul paints entering the water, through increased use of an area

Disrupting the relationship of people with the marine environment

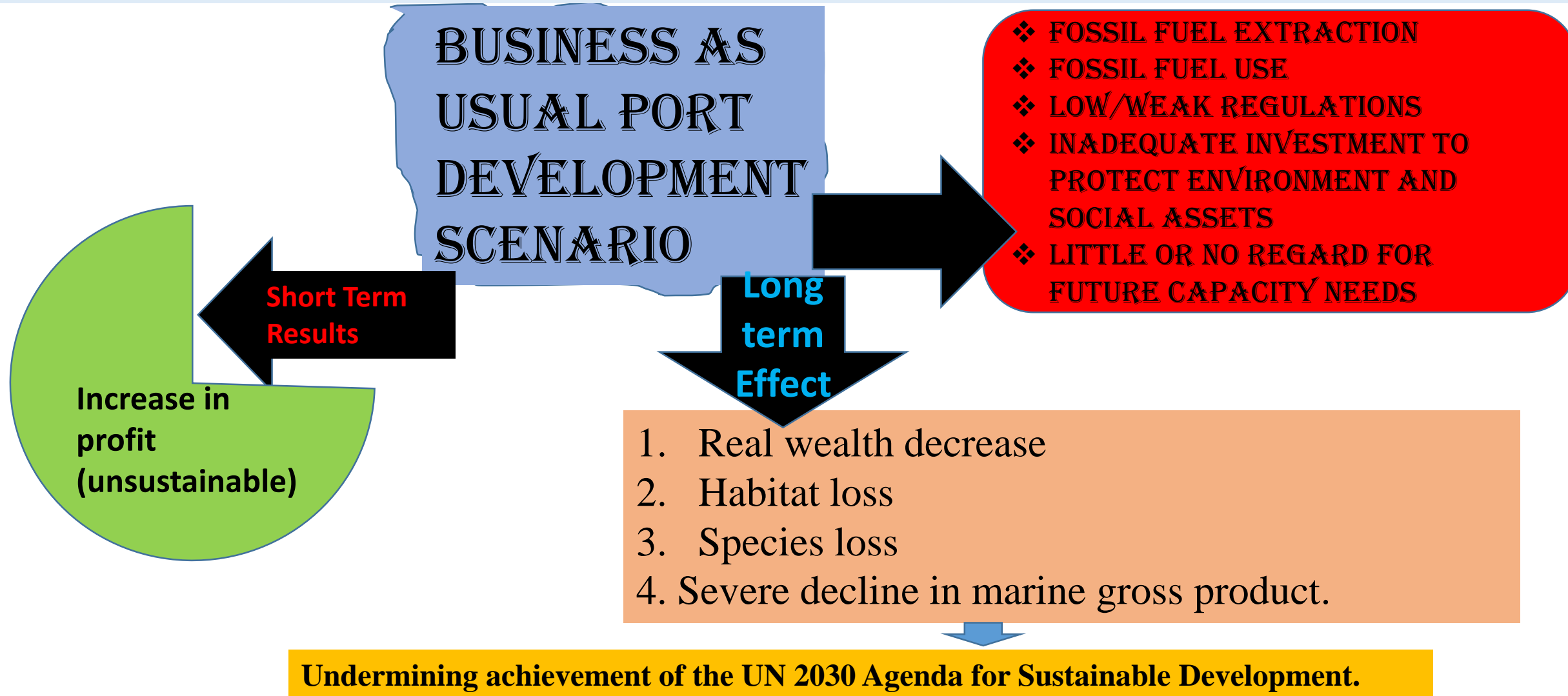
- Contamination of water and sediment
- Loss of intertidal areas
- Loss of access to, or destruction of, culturally important sites

Ports and the Environment (2)

- **Direct loss of coastal habitat**
- **Disruption of sensitive and/or ecologically productive ecosystems and transition zones**
- **Damage to habitats of birds and intertidal fish and animals.**
- **Reduction in natural flushing, potentially leading to eutrophication**
- **Shading of areas of water resulting in the longer term loss of marine plants**
- **Removal of all marine life from parts of the seabed**
- **Permanent loss of slow growing, sensitive species which are unable to recover**
- **Release of sediment into seawater which reduces light penetration, disrupts juvenile species and filter feeders, and smothers benthic communities over a wide area**
- **Release of organic-rich sediments into seawater which can exacerbate algal blooms**
- **Release of metals, chemicals, organochlorines and PCBs into the marine environment**

Traditional Port Development

Port development will continue to impact on the marine ecosystems unless port capacity and efficiency can be shown to benefit more from sustainable port development than from traditional approaches



Let us Reflect on this quote;

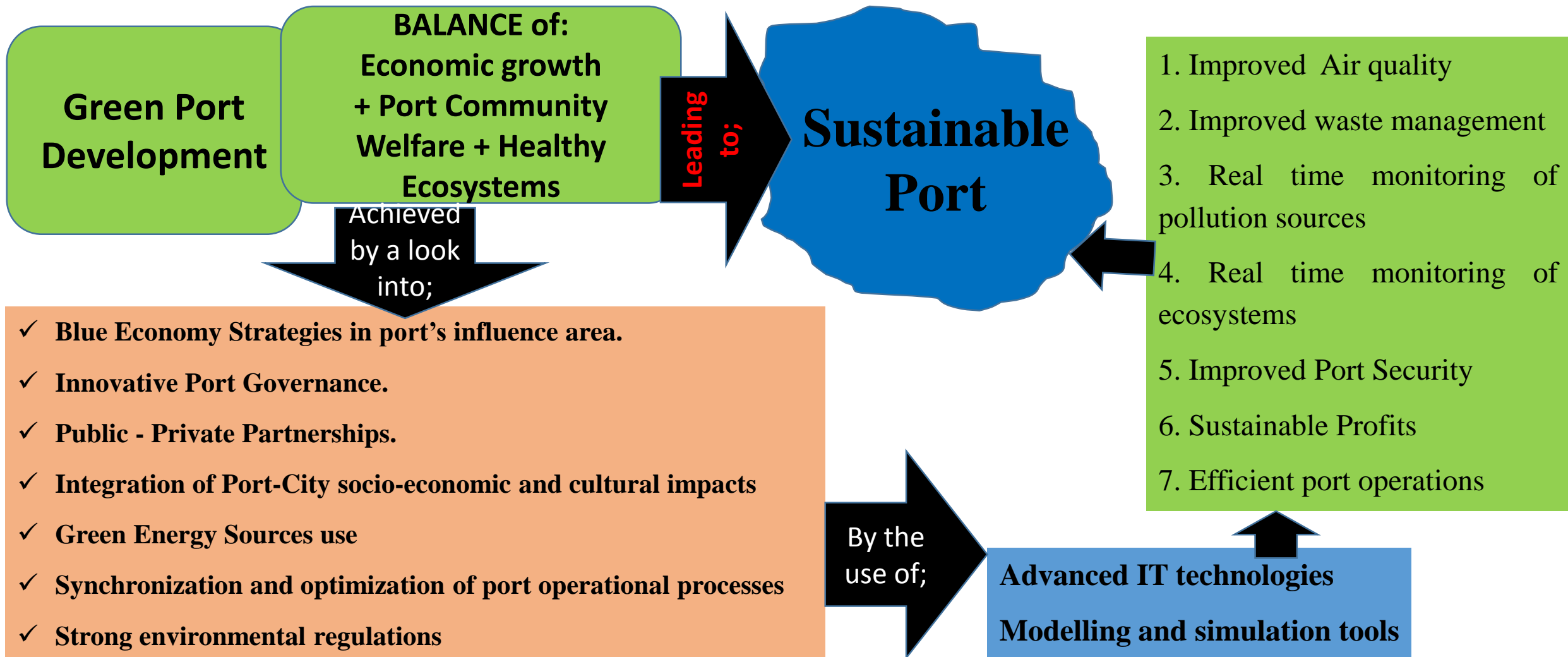
*This planet does not belong to the adults of today and should not be managed on the basis of short-term considerations of economic gain or political power. If the signatures of our children were needed to ratify decisions that affect their future, many of the destructive actions perpetrated today would certainly cease. **Whatever we do, the ocean will survive in one way or another. What is more problematic is whether we shall preserve it in a state that ensures humanity's survival and well-being.***

Federico Mayor, Director-General of UNESCO, 1998

Sustainability in port development and management is therefore unavoidable concept that needs to be address urgently

Sustainable Port Development

Aims to create scenarios for “Ports of the Future” which are green, sustainable and has minimal or no impact to the environment



Sustainable Port Development (2)

Measures to Reduce Spatial and Environmental Barriers to Port Development

Improved Air Quality

- Replacing fossil fuel use by electric transportation at the ports and use of renewable energies.
- Equipping new and possibly also existing vehicles/machinery with oxidation catalysts and particulate traps, which may reduce emissions of CO, HC and PM by up to 90%.
- Calm driving (EcoDriving).
- Improve port logistics, reducing fuel consumption and pollutant emissions per goods unit handled
- Introduce and increase the supply and use of shore-side electricity (**regional approach**)
- Use of fuels with lower sulphur content (**by regulations** or voluntarily).
- Use of sulphur scrubbers (**by regulation**s or voluntarily).
- Use of NOX reduction systems (**by regulations** or voluntarily).
- Use of particulate traps (**by regulations** or voluntarily).

Improved Water and Soil Quality

- Environmental friendly antifouling agents.
- Adequate reception facilities
- Structurally sound oil transmission and containment equipment.

Reduce Noise

Flood protection-by Eco-engineering solutions

Benefits

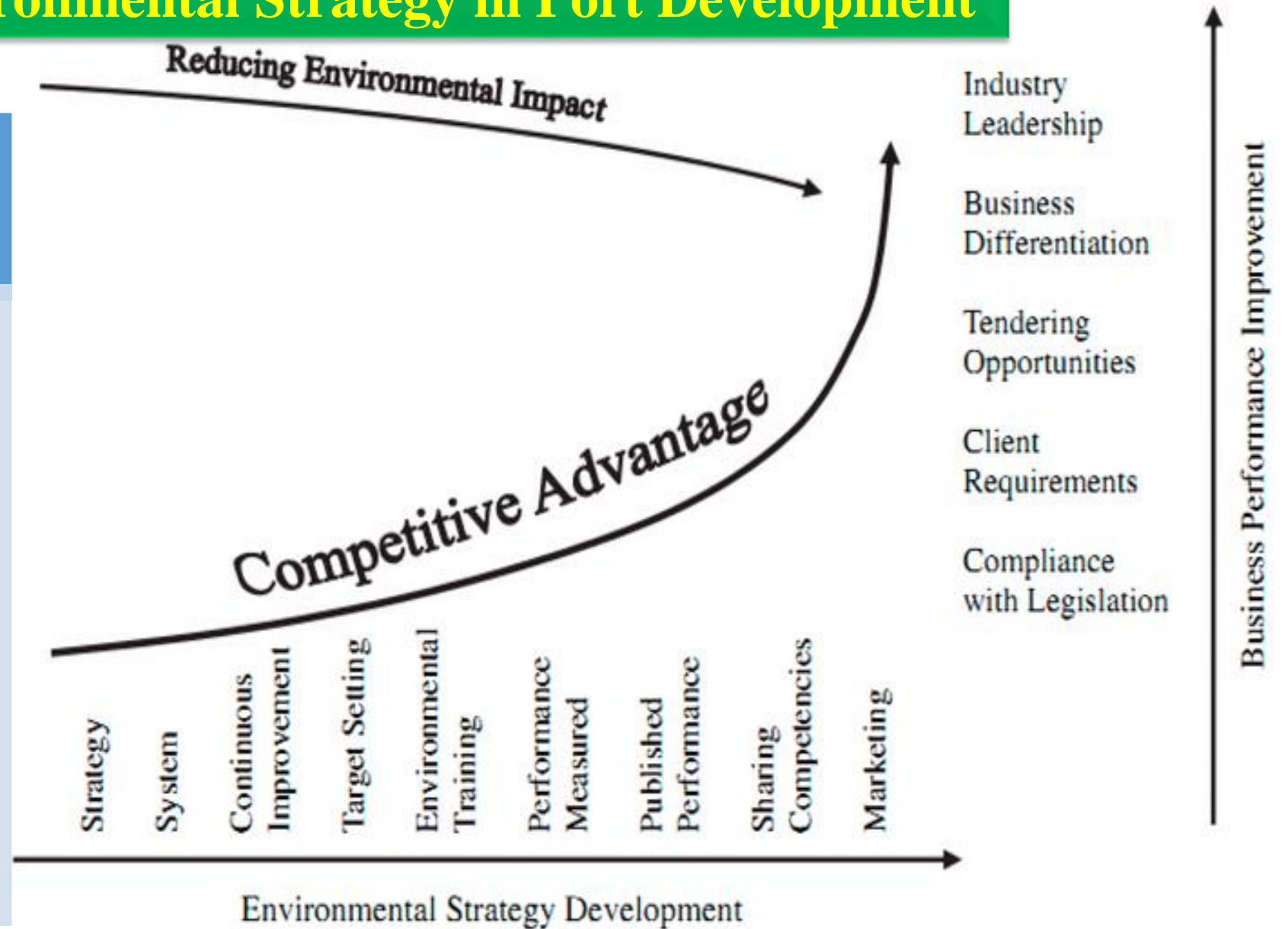
- Reduced inland transport costs
- Reduced operational expenses.
- Healthy Port environment

High investment costs hence there is need for a proper look at the financial viability.

Focus on Environmental Strategy in Port Development

Environmental Technologies

- New Equipment and Technology Introduction
- New and Renewable Energy sources
- Optimizing the routing of vehicles
- Sustainable building construction



Sustainable Practices in Port Operation

Regulatory Compliance	Societal Pressures (Resulting direct Economic Benefit)	Port Development and Planning	Operational Issues	Competitive Advantage (Gain)
<ul style="list-style-type: none"> -International Maritime and Environmental Legislation -National and Local Environmental Legislation (provincial, county, state) 	<ul style="list-style-type: none"> -Corporate and social responsibility -Environmental protection and quality Improvement -Economic Incentives -Environmental Management (pollution prevention) 	<ul style="list-style-type: none"> -Coastal Zone planning -Components of port sustainable development 	<ul style="list-style-type: none"> -Operational Performance -Health and safety Issues -Process standardization 	<ul style="list-style-type: none"> -Competition between regional ports -Create/promote/gain green logistics

Scenario Modelling

1. Financial and economic analysis (Cost and pricing).
2. Operational Analysis and Capacity Assessment.
3. Environmental Assessment and impact analysis.
4. Social cost benefit and value for money analysis

Formulation and
Assessment of
development
scenarios

Models

- Flexible to incorporate change
 - Make best use of existing port assets
 - Allow for phased development to match demand
 - Include port zoning to cover for both land and water areas-often by trade type
 - Allow for future proofing of critical parameters
1. Berth depth
 2. Land areas
 3. Port Zooning
 4. Land Connections etc.

Policy Recommendations

Nairobi Convention to adopt an initiative of identifying a sustainable regional (WIO) development strategy for ports and harbors by;

1. Conducting scenario analysis for port development and expansion in the WIO region
2. Producing a toolkit for green port development for the WIO region

The green port toolkit will aim at providing guidelines for port development with limited impacts on existing ecosystems and maximizing social welfare.

The region will greatly benefit due to reduced ecological and environmental impact that are seen today in the traditional ports

THANK YOU

Q & A