GRID 25 YEARS
ARENDAL
A Centre Collaborating with UNEP

Environmental knowledge for change

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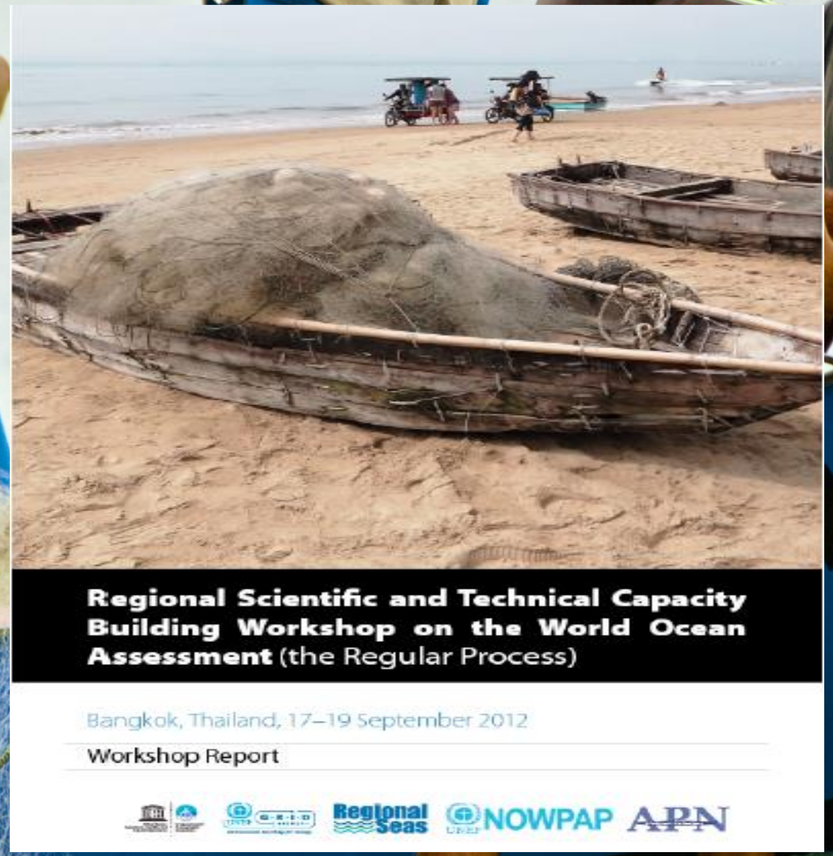
Economics for Transition

Sierra Leone, 5-7 Feb 2014

Bangkok, Thailand – COBSEA and NOWPAP Countries



Expert Elicitation (EE): Features

- Expert elicitation rapid assessment where expert judgment = the ‘data’
- Spatial focus (10% of area)
- Benchmarks – condition today relative to a specified reference
- Confidence in score is explicitly stated (High Medium Low)
- Scoring allows quantitative synthesis, overview of data, quantitative outcomes, repeatable and contestable process
- Integrated assessment, consistent with United Nations World Ocean Assessment DPSIR framework: our focus is Pressure, State and Impact
- Includes socioeconomic evaluation and risk analysis
- Designed for communication to decision-makers

Socioeconomics

Sector-based assessment

Three steps:

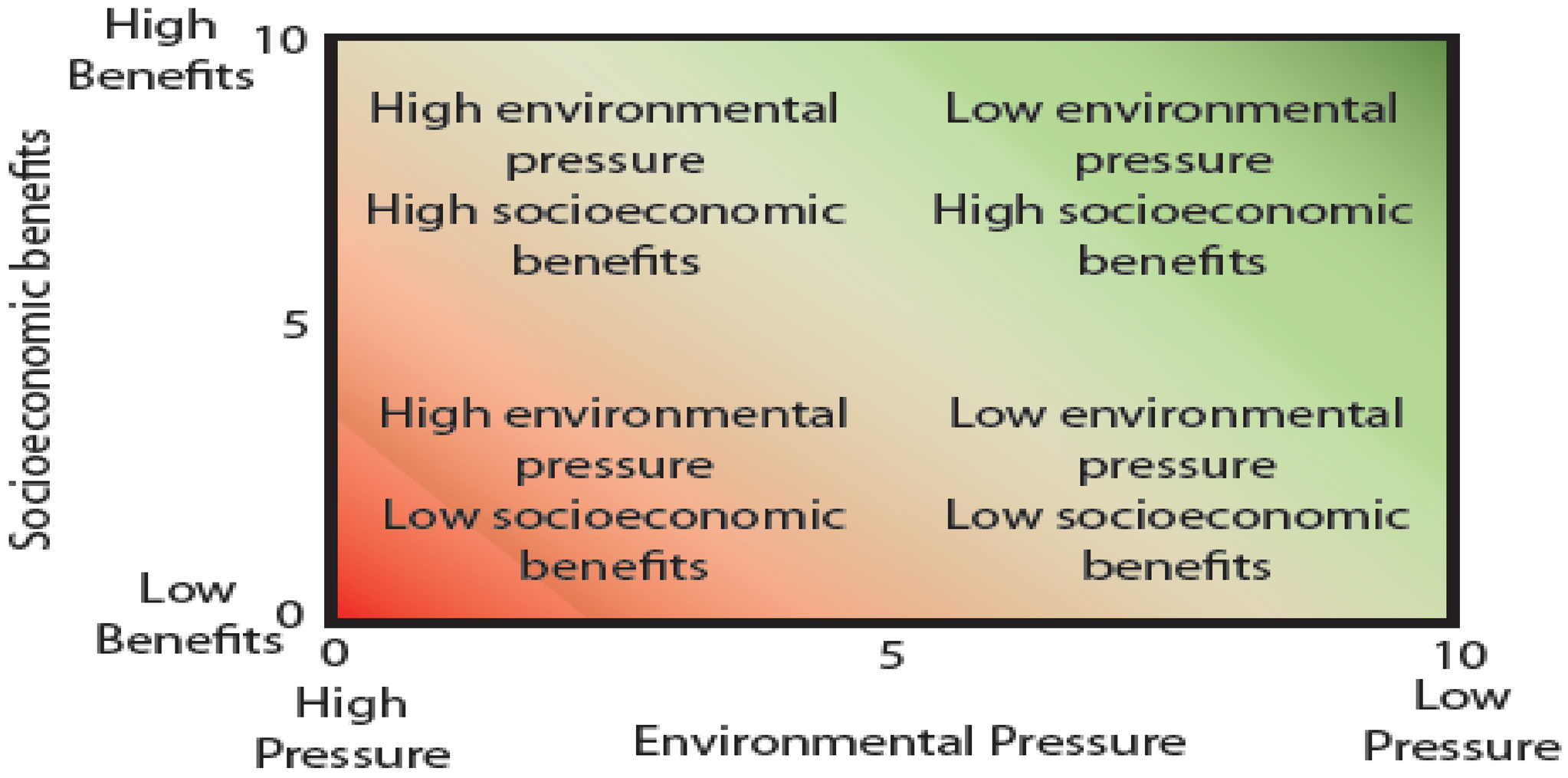
1. Score the condition of the environment that coincides with the spatial footprint (i.e. the space where the industry operates) of the industry (eg. relative to baseline): worst 10%, best 10% and most places.
2. Assess the totality of all socioeconomic benefits that society receives from the industry: worst 10%, best 10% and most places
3. Plot the environmental and socioeconomic scores for the industry on a graph to classify its overall rating

blue ventures

discovery through research

Socioeconomic benefits grading

Very Good (8-10) High benefits	The industry is mainly or wholly owned by national interests and is a major national employer both through direct employment as well as through supporting industries. The state receives significant taxes, royalties and/or license fees and a significant portion of profits remain in the country. The industry exploits a sustainably managed renewable resource and contributes to one or more of: education and training programs, human health and medical benefits and national infrastructure.
Good (6-7) Significant benefits	The industry is an important national employer both through direct and indirect employment and the state receives taxes, royalties and/or license fees. The industry may contribute to education and training programs, human health or medical benefits.
Poor (3-5) Some benefits	The industry is a minor employer both through direct and indirect employment and the state receives some taxes, royalties and/or license fees. The industry is partly or mainly foreign-owned.
Very Poor (0-2) Few or no benefits	The industry is mainly or wholly foreign-owned and is not a nationally important employer, with most/all employment based overseas. The industry exploits a non-renewable resource (or an unsustainably managed renewable resource) and the state receives very little from taxes royalties or license fees from this industry.


High Benefits
10
Socioeconomic benefits
5
Low Benefits
0
High environmental pressure
High socioeconomic benefits
Low environmental pressure
High socioeconomic benefits
High environmental pressure
Low socioeconomic benefits
Low environmental pressure
Low socioeconomic benefits
0
5
10
High Pressure
Environmental Pressure
Low Pressure

Example from Sierra Leone 2014

(3) Ports

Component	Summary	Assessment grade				Trend	Confidence	
		Very poor	Poor	Good	Very good		In grade	In trend
Environmental Impacts: land development, dredging, pollution				—		—		
Social & Economic aspects - communities, employment taxes, communications and access to goods	Costs and benefits to society				↗	↗		

Risk Assessment

This section summarises the main risks to the marine environment and ranks their potential for impact in a known (5-year and 50 year) timeframes, presented in the form of a simplified risk assessment matrix.

Risks are assessed taking into account current management arrangements that apply in the relevant jurisdictions but NOT possible future changes that might occur.

Risk Assessment: a Two Step Process

1. Assess the likelihood that a risk will occur: a) in the next 5 years; and b) in the next 50 years.

2. Judge the consequences of an event occurring in terms of its overall impact on the marine environment.

The addition of these scores gives the risk

Likelihood

This is the probability of the impact occurring over a 5-year or 50-year timescale, taking into account the effectiveness of present and recently implemented (not planned) management arrangements and activities.

Almost certain (score = 0)	Expected to occur often within 5 (50) years
Likely (score = 1-2)	Expected to occur at least once within 5 (50) years
Possible (score = 3-4)	Occurrence is not certain within 5 (50) years
Unlikely/Rare (score = 5)	Not expected to occur within a 5 (50) year period

Consequence/Impact

This is the extent and severity of the expected impact taking into account the effectiveness of present and recently implemented (not planned) management arrangements and activities.

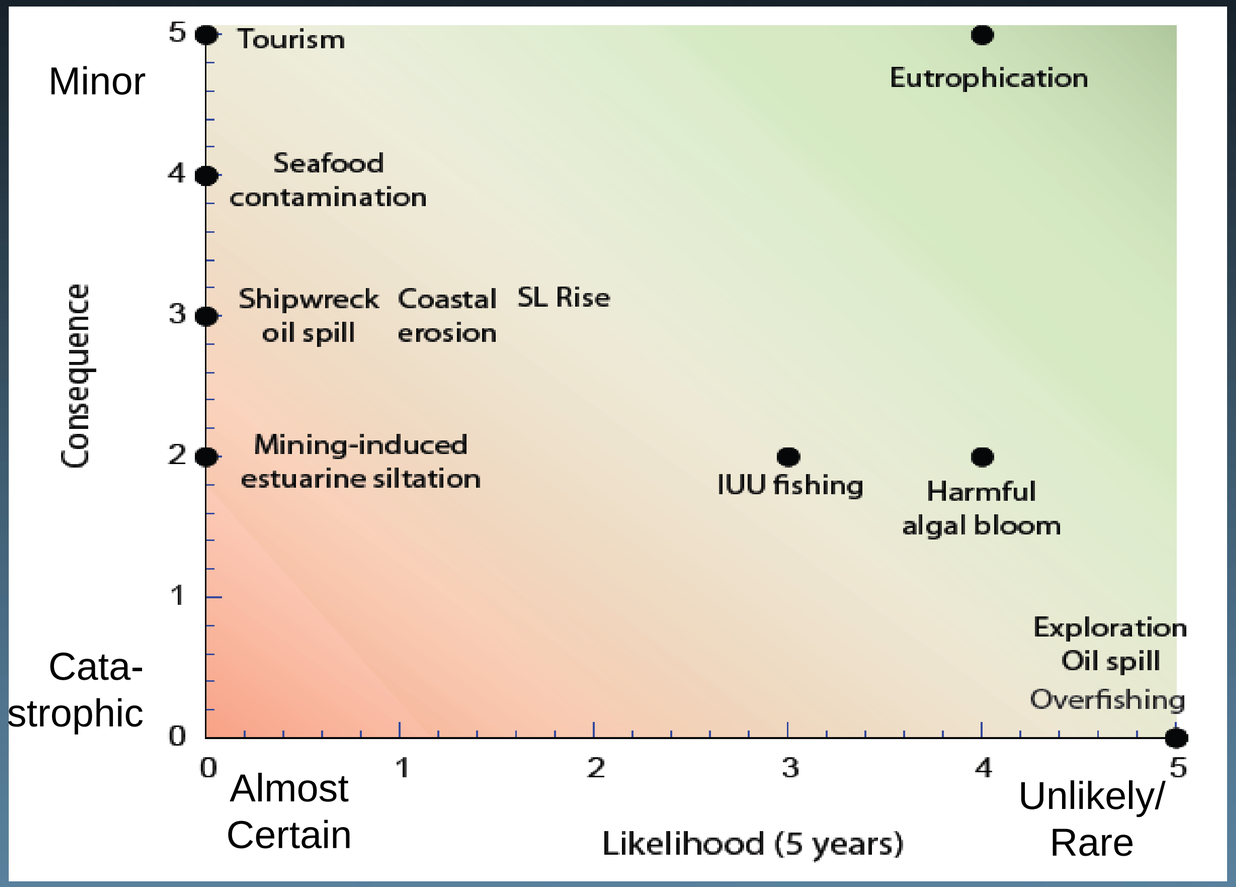
Catastrophic (Score = 0)	Impact will seriously affect the ecosystem in the region, disrupting major ecosystem structure or function, and have recovery periods of more than 20 years (potentially irreversible)
Major (Score = 1-2)	Impact will seriously affect the ecosystem in the region, disrupting major ecosystem structure or function, and have recovery periods of less than 20 years
Moderate (Score = 3-4)	Impact will affect the ecosystem in the region, disrupting some aspects of ecosystem structure or function, and have recovery periods of less than 5 years
Minor (Score = 5)	Impact will be very limited and affect only minor components the ecosystem in the region

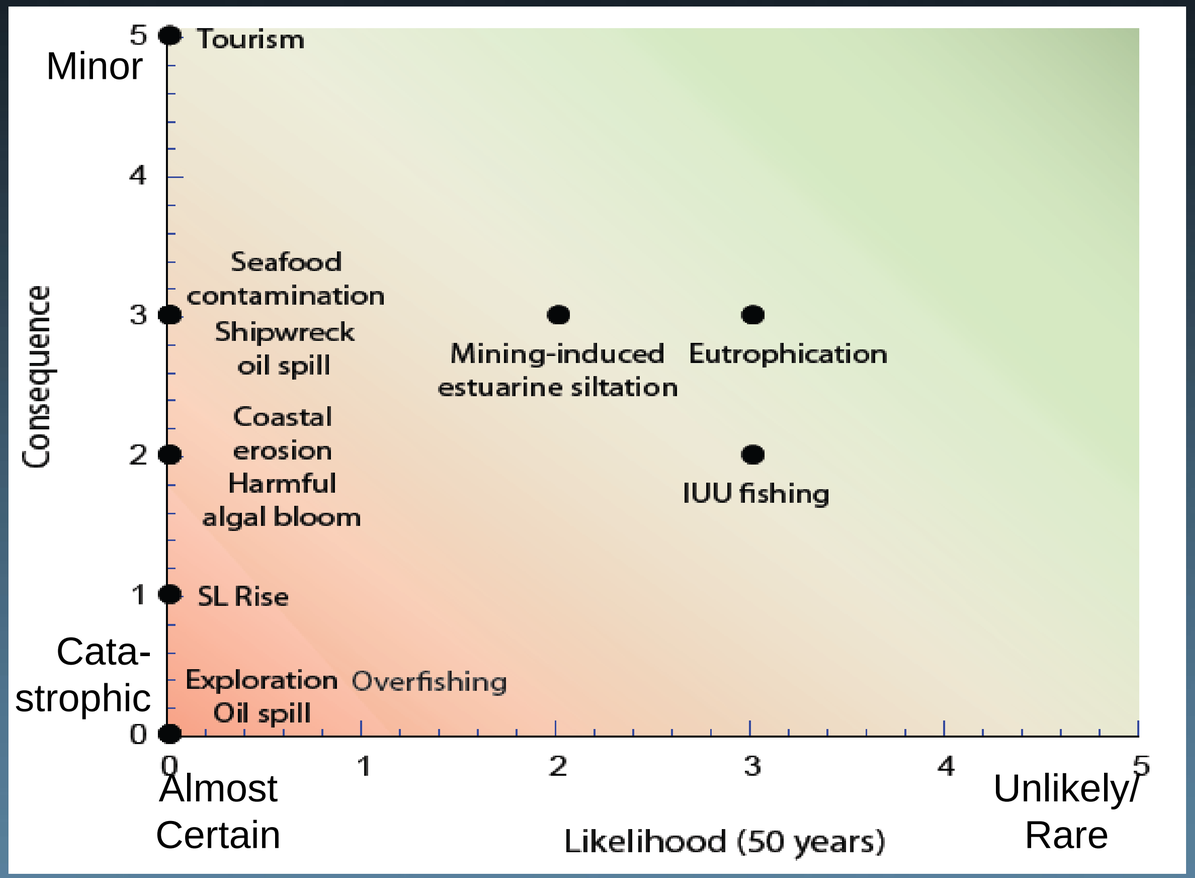
Example from Sierra Leone 2014

Group	Risk factor	Risk in 5 years				Risk in 50 years			
		High	Signi-ficant	Mod-erate	Low	High	Signi-ficant	Mod-erate	Low
Fishing	Illegal fishing continues unchecked		X				X		
Oil and Gas	Oil exploration will result in blowout or major oil spill		X			X			
Shipping	Shipwrecks will cause a major oil spill	X				X			
Coastal erosion	Coastal erosion will continue	X				X			
Climate change	Global sea level will raise and cause inundation	X				X			
Pollution	Pollution will cause contamination of seafood		X			X			
Tourism	Tourism causes environmental damage		X				X		
Mining	Catchment disturbance will cause siltation of estuaries	X					X		
Harmful algea blom	Harmful algea blooms will occur			X		X			

Example from Sierra Leone 2014

5yr – 50 year risk comparison





EE for DSM knowledge gaps

Photo courtesy of
University of Bremen

Knowledge gaps grading statements

Score	Grading statements for estimating the completeness of information available for predicting impacts.
Very Good (8-9)	The scientific information exists on this topic from a representative number of study locations, and there are peer-reviewed published papers available.
Good (6-7)	There is some information available from some study locations on this topic and there are a number of industry reports available.
Poor (3-5)	There is some information available from a few study sites on this topic available only as un-reviewed data and grey literature.
Very Poor (1-2)	There is little or no data available about this topic.

Deposit	Question	Score
Sea floor Massive Sulphides (SMS)		
1	Knowledge on ecology and biodiversity of benthic communities associated with SMS	
2	Knowledge on the biogeography of benthic communities associated with SMS	
3	Knowledge on the rates of ecologic succession of benthic communities associated with the SMS	
4	Knowledge of the degree of endemism related to SMS environments	
5	Knowledge of the connectivity between habitats	
6	Knowledge of the ecosystem services provided by benthic communities associated with SMS deposits	
7	Knowledge of currents and likely dispersal pathways and extent of disturbed sediment	
8	Knowledge of chemical reactivity of disturbed sediment	
9	Knowledge on the spatial footprint of the mining activity in relationship to the size of the mine	

Manganese Nodules		
1	Knowledge on ecology and biodiversity of benthic communities associated with manganese nodules	
2	Knowledge on the biogeography of benthic communities associated with manganese nodules	
3	Knowledge on the rates of ecologic succession of benthic communities associated with the manganese nodules	
4	Knowledge of the degree of endemism related to nodule environments	
5	Knowledge of the connectivity between habitats	
6	Knowledge of the ecosystem services provided by benthic communities associated with the abyssal environments where manganese nodules occur	
7	Knowledge of abyssal currents and likely dispersal pathways of disturbed sediment	
8	Knowledge of chemical reactivity of disturbed sediment	
9	Knowledge on the spatial footprint of the mining activity in relationship to the size of the mined area	

Cobalt rich crusts		
1	Knowledge on ecology and biodiversity of benthic communities associated with cobalt rich crusts	
2	Knowledge on the biogeography of benthic communities associated with cobalt rich crusts	
3	Knowledge on the rates of ecologic succession of benthic communities associated with the cobalt rich crusts	
4	Knowledge of the degree of endemism related to crusts environments	
5	Knowledge of the connectivity between habitats	
6	Knowledge of the ecosystem services provided by benthic communities associated with the environments where crusts occur	
7	Knowledge of abyssal currents and likely dispersal pathways of disturbed sediment	
8	Knowledge of chemical reactivity of disturbed sediment	
9	Knowledge on the spatial footprint of the mining activity in relationship to the size of the mined area	

Other Applications of Expert Elicitation Approaches

A TEEB4OC: Building upon the untapped opportunities of a Green Economy in a Blue World…

Gunter Pauli

UNEP Regional Seas

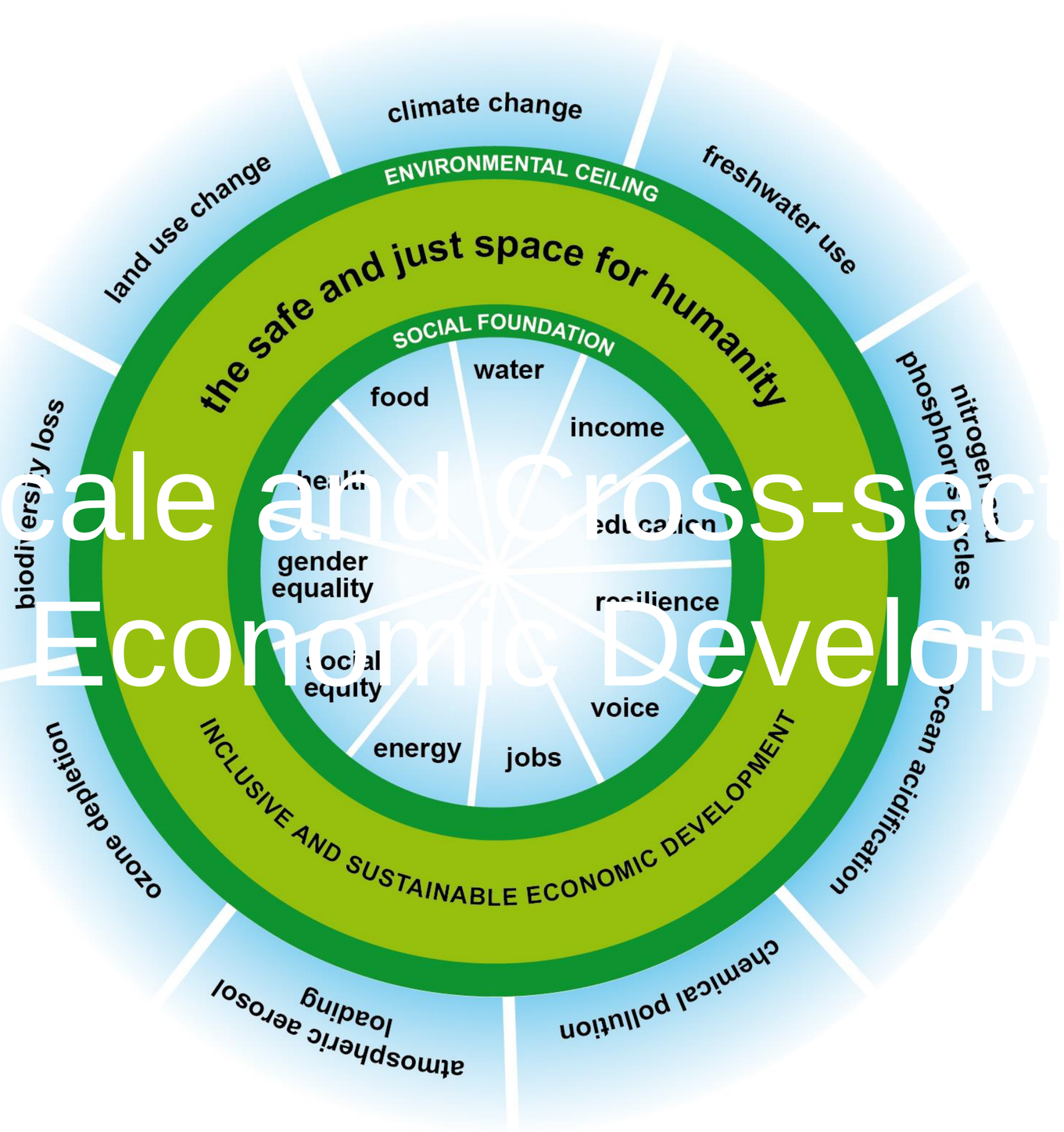
GRID 25 YEARS ARENDAL — A Centre Collaborating with UNEP

Duke NICHOLAS INSTITUTE FOR ENVIRONMENTAL POLICY SOLUTIONS

The Economics of Ecosystems & Biodiversity

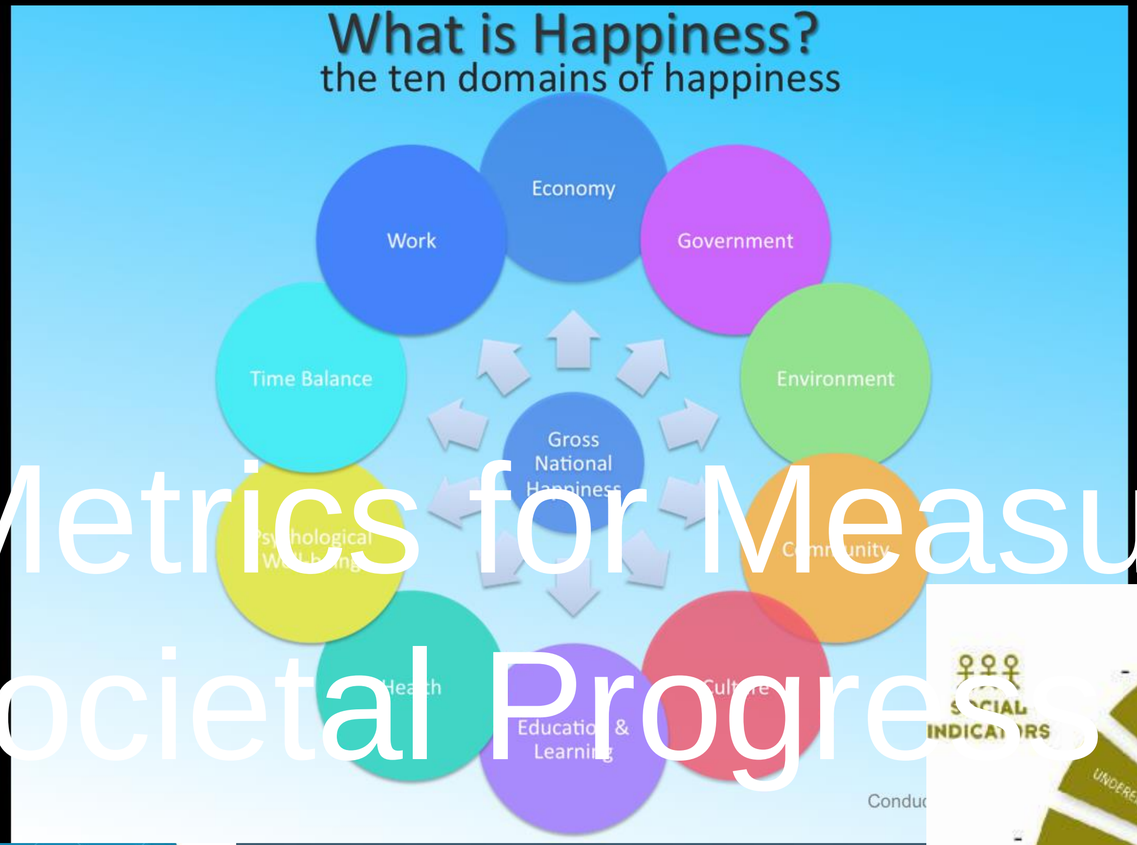
TEEB for Oceans and Coasts

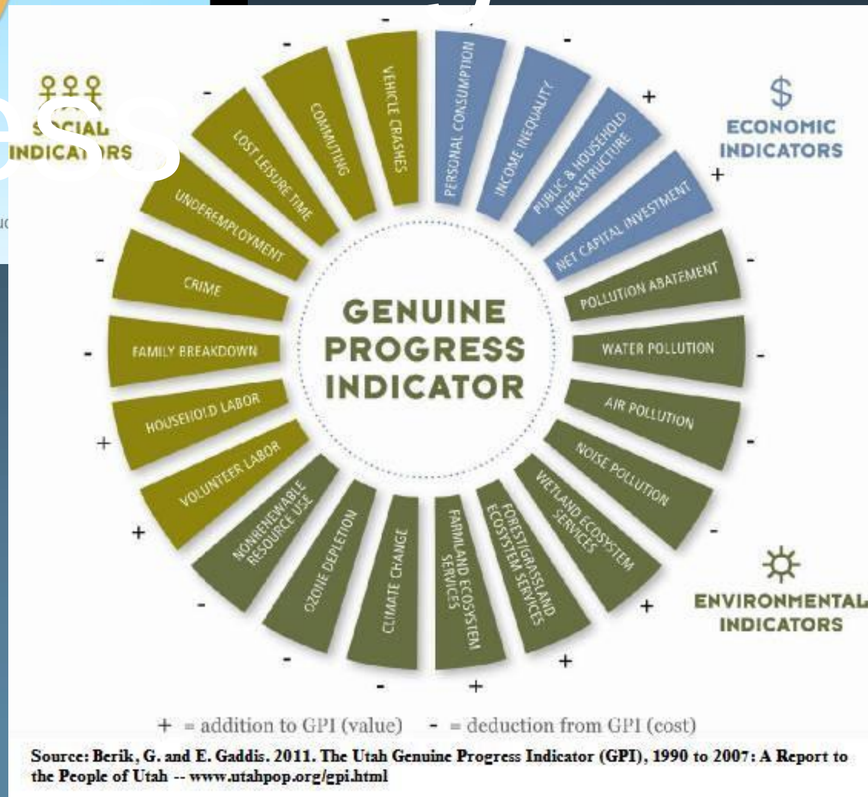
Multi-scale and Cross-sectoral Holistic Economic Development



By Kate Raworth, Economist

New Metrics for Measuring Societal Progress





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